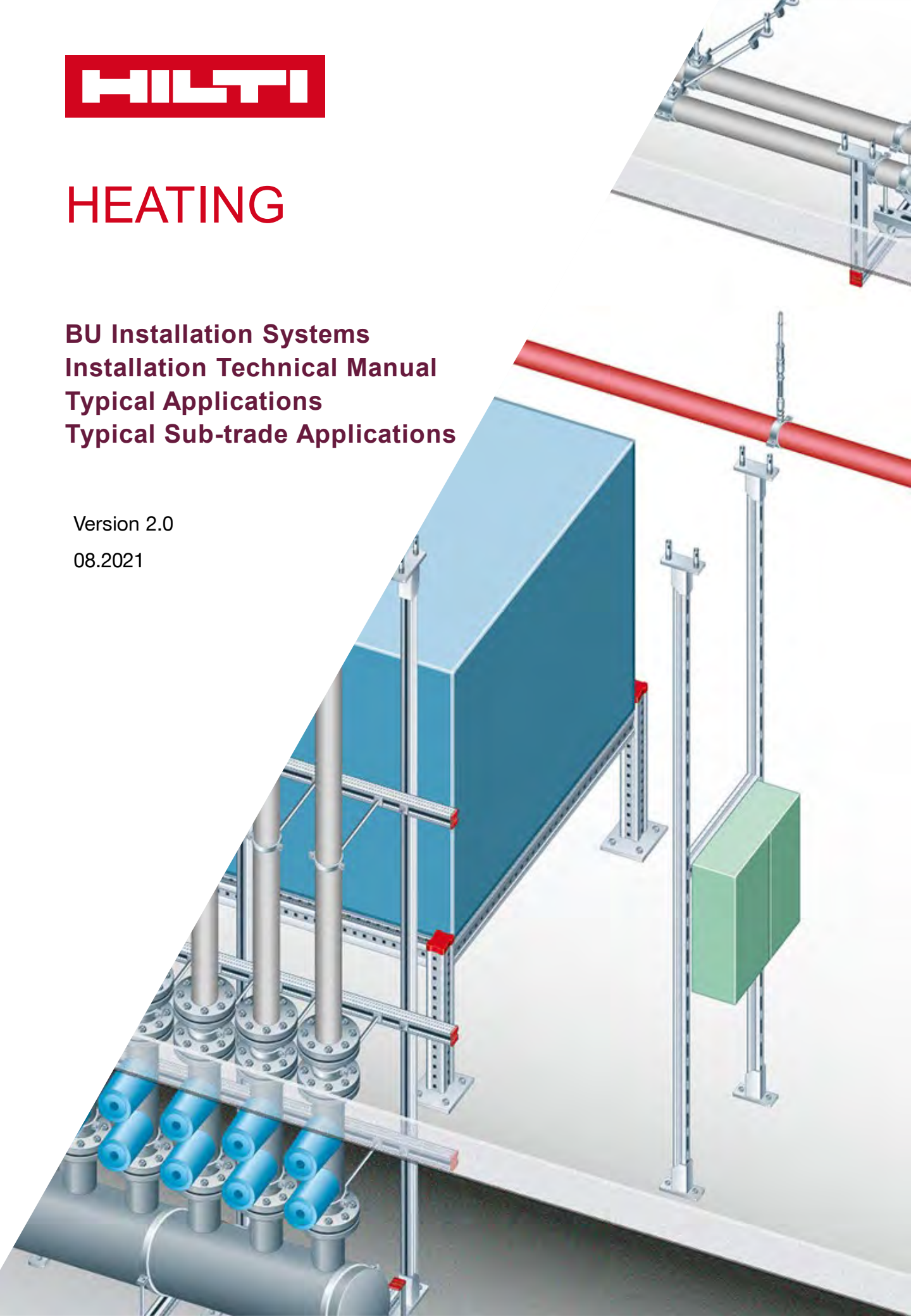
HEATING

BU Installation Systems
Installation Technical Manual
Typical Applications
Typical Sub-trade Applications

Version 2.0

08.2021



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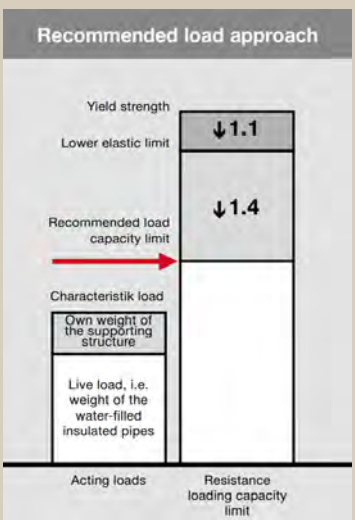
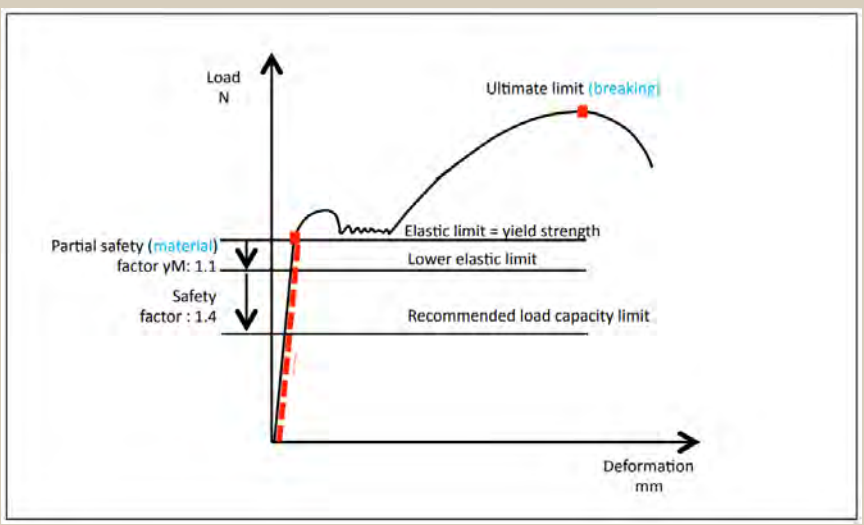
Hilti strives to achieve continuous development and innovation. This manual is thus subject to change without notice. Hilti strongly advises customers to verify the respective product application for the intended use by consulting a structural engineer and making the necessary calculations to ensure compliance with the applicable norms and standards. It is essential that the product is used strictly in accordance with the applicable Hilti instructions for use and within the application limits specified in the Hilti technical data sheets, technical specifications and supporting product literature. Due to the fact that construction materials and environmental conditions vary widely, information given in this manual is solely based on principles and safety factors believed to be correct at the time they were established. The customer is ultimately responsible for checking the present condition of supporting materials and the applicability of the selected product application. Hilti shall not be liable for direct, indirect, incidental or consequential damages, losses or expenses in connection with any information contained in this manual or in connection with, or by reason of, the use of, or inability to use the products for any intended purpose. This limitation of liability does not apply to personal damages culpably caused by Hilti. Implied warranties of merchantability or fitness of the products are herewith expressly excluded.

LOADING CAPACITY LIMIT

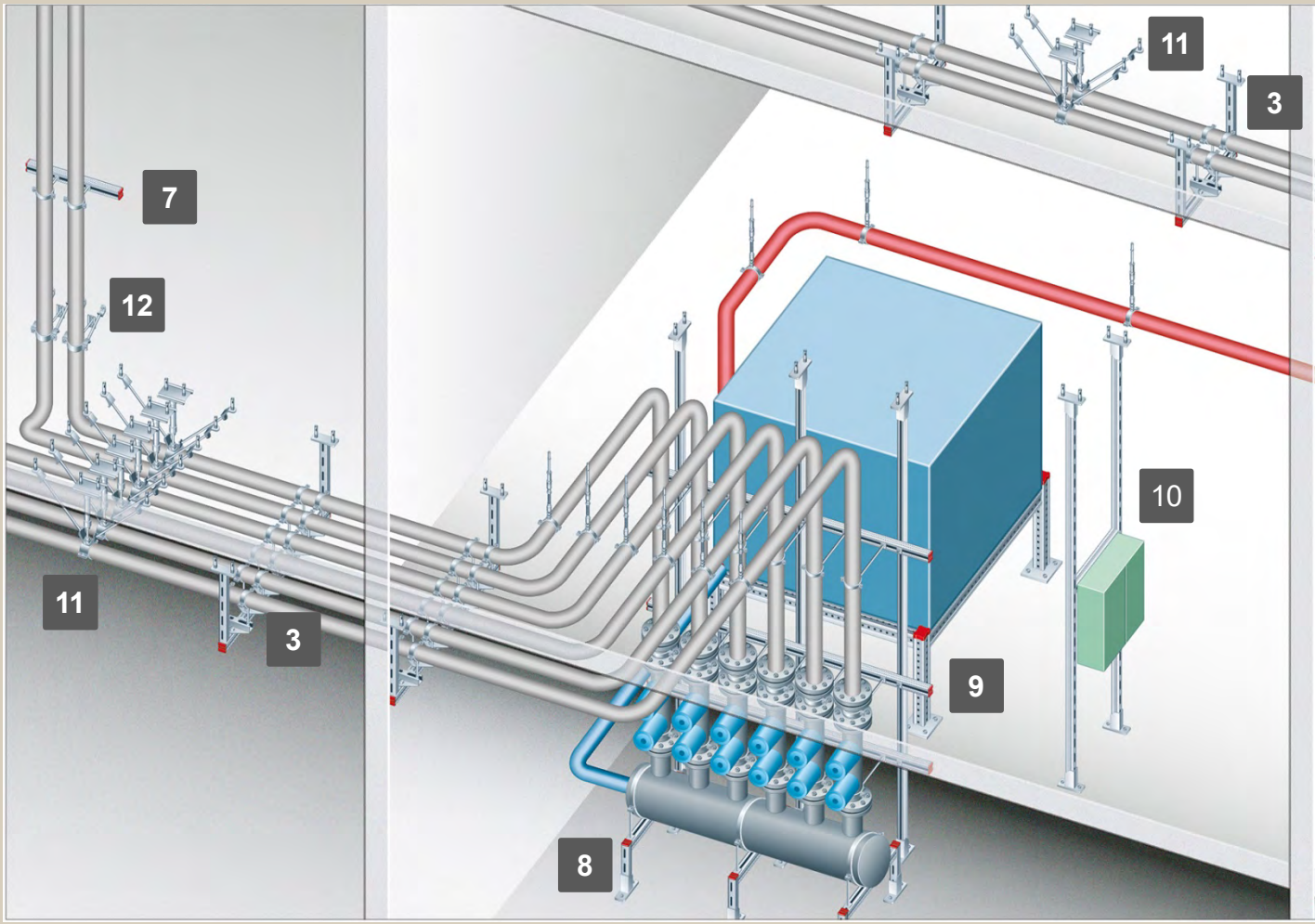
All loading capacity limits in this manual are to be considered as recommended values. Recommended values are calculated from the elastic limit equal to yield strength, with an applied material safety factor of 1.1 and an applied additional safety factor of 1.4.





CONTENT OF THE MANUAL

HEATING APPLICATION OVEVIEW



Heating is the general term applied to the system used to raise and maintain the ambient temperature inside a building at a comfortable level.

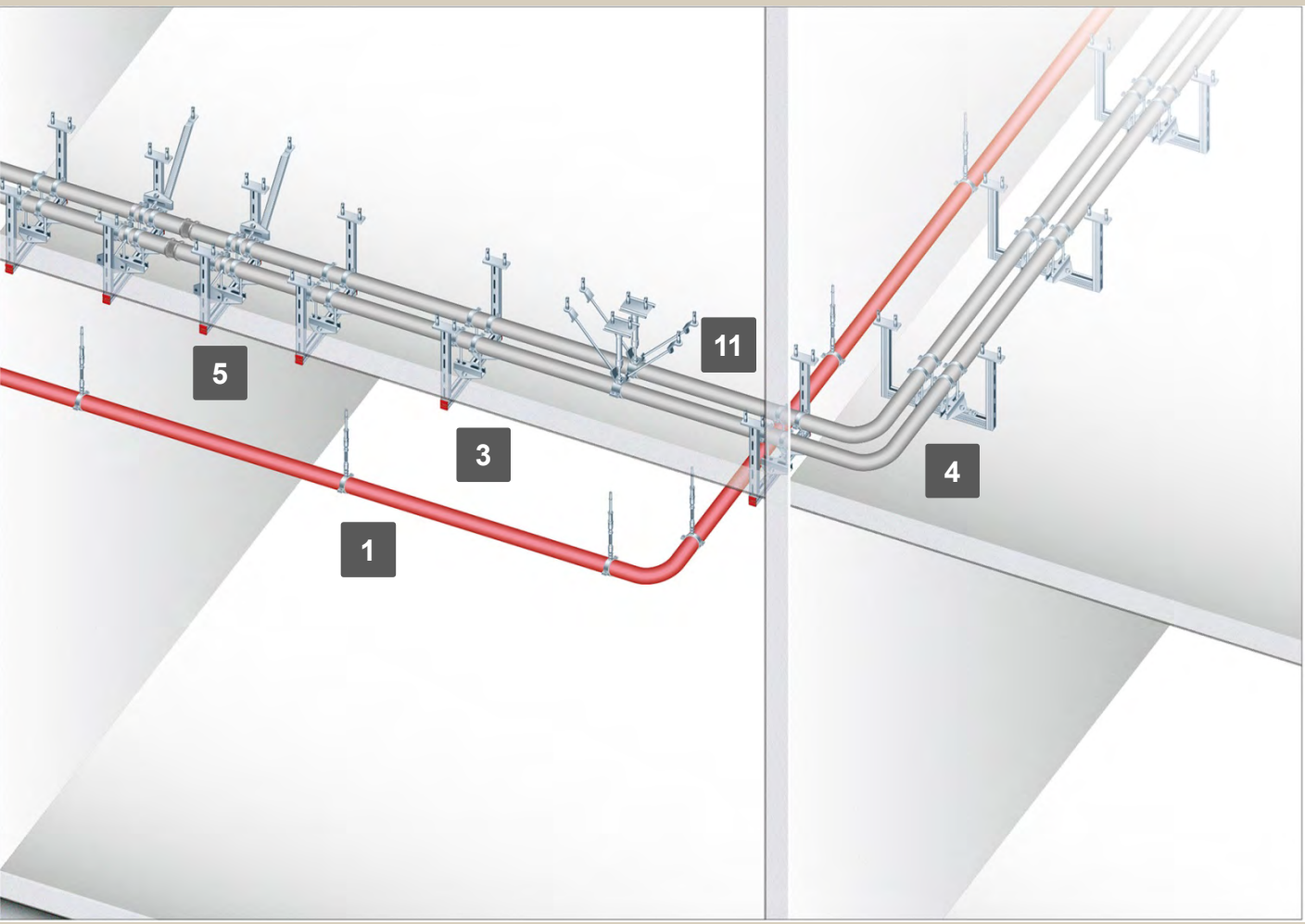
Several different principles are employed. Most widespread in central Europe are systems where heat is produced locally in a unit located in the plant room or associated room in or adjacent to the building. This heating unit (e.g. gas heater) heats the heating media directly, which is then distributed through the piping system to the places of final radiation (e.g. radiators or floor heating).

Other principles employed in large building complexes include the use of centralized district heating (either purpose-built heating plants or those designed to utilize waste energy, e.g. from a power plant or waste incineration plant) with a primary heating media such as steam. This primary heating media is distributed through underground pipes to local plant rooms in the buildings to be heated. The primary heating media then passes through a heat exchanger, thereby raising the temperature of the secondary heating media. The system used to distribute the secondary heating media in the building is exactly the same as in the local system described above.

Several other principles are in use mainly in Northern Europe, where local heating units are combined with air conditioning and ventilation systems. Advanced technologies associated with green building and passive building are also gaining acceptance for use in heating systems, but still on a very limited scale and generally only where very local or just-in-case back-up solutions are required.

The system described in this manual reflects the most widespread solutions found in the commercial building segment in Central Europe. The heating media begins its journey in a local heating unit or boiler in a plant room before passing through a splitter, from which various branches then continue on into pipe corridors and rising shafts for final distribution to the places of final consumption or radiation.

Heating pipes running along corridors are typically installed on common supports together with other services.



1	Single fastening	2	Head rail	3	Trapeze frame
4	Natural compensation zone trapeze	5	Axial guide support frame	6	Bracket
7	Riser guides	8	Plant Room Equipment Support - Splitter frame	9	Plant room framing – 3D frame
10	Plant room equipment / switch box support frame	11	Fixed points	12	Riser fixed points
13	Primary heating media collector bracket	14	Various other applications		

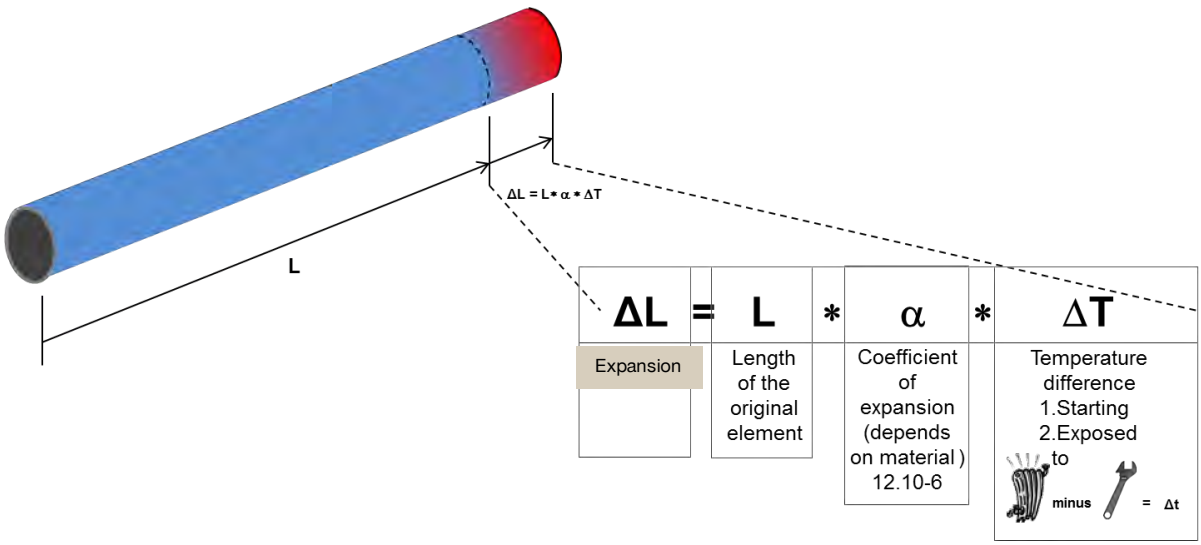
1.0 THERMAL EXPANSION

Technical challenges and how these dictate the product requirements

Heating

The major challenge when fastening heating pipes is thermal expansion of the pipe and its impact on pipe supports and the surroundings.

Thermal expansion leads to extension of the length of the pipe and depends on three basic parameters:



Examples of materials and their coefficients of expansion

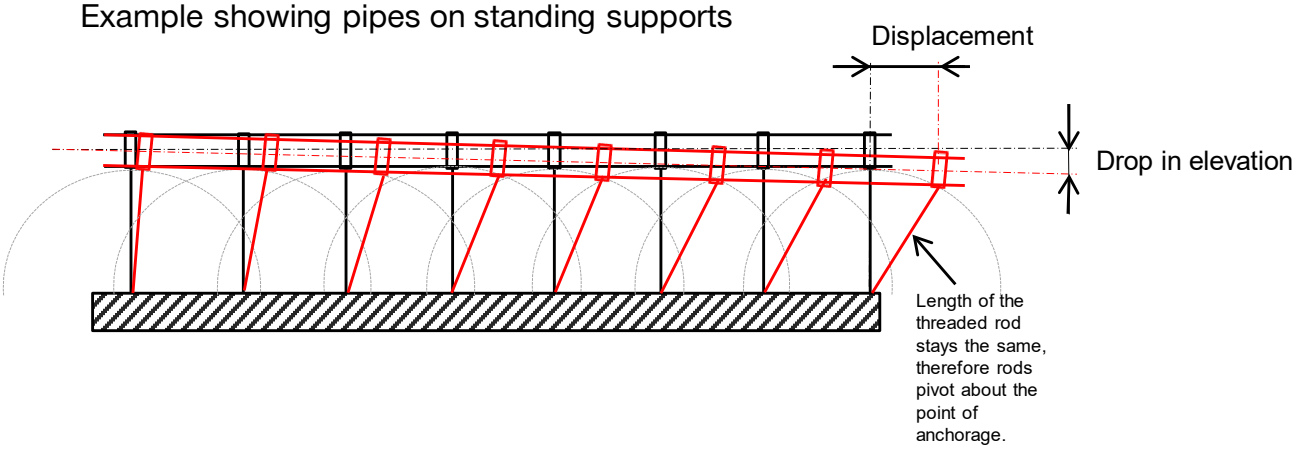
Material	Coefficient of expansion	Example for 10m, ΔT 50°C
Steel St 37-2	0.0000111	5.55 mm
Stainless steel	0.000016	8.00 mm
Cast iron	0.0000105	5.25 mm
Copper SF-Cu	0.0000168	8.40 mm
Polyethylene PE 100	0.00018	90.0 mm

2.0 UNCONTROLED EXPANSION

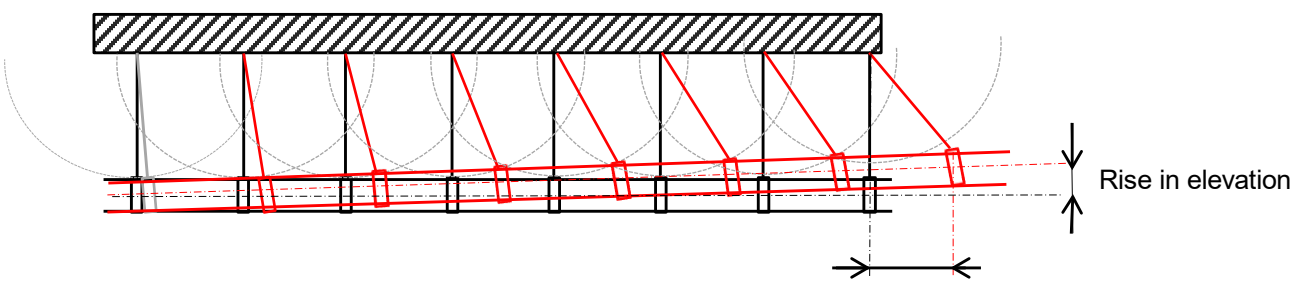
Expansion must be controlled

What can happen in the event of uncontrolled expansion – the impact of expansion on pipe supports

Example showing pipes on standing supports



Example showing suspended pipes



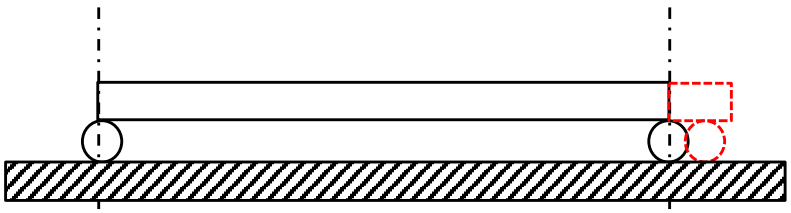
Both cases may lead to irreversible deformation, huge displacements, wrong load re-distribution and ultimately to chain reactions causing pipe collapse.

2.0 UNCONTROLED EXPANSION

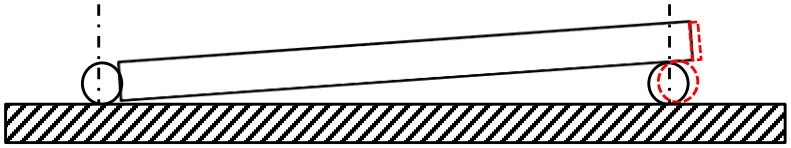
Uncontrolled expansion – impact on supports and surroundings

What can happen in the event of uncontrolled expansion – the impact of expansion on pipe supports

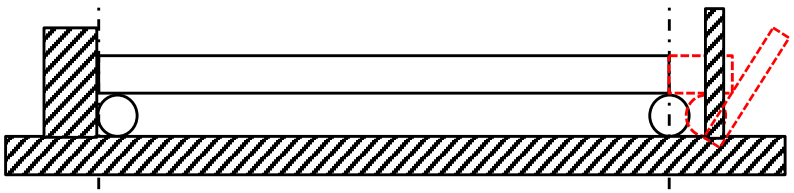
It may, by coincidence, have little effect, i.e. the pipe system is able to take up the movement.



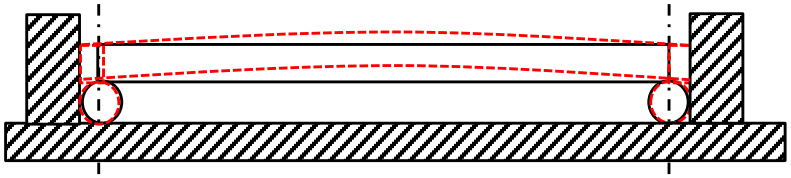
Some of the supports may detach.



An expanding element may exert pressure against the surrounding structure, which is not designed to carry these loads.



The expanding element exerts pressure between two rigid structures, thereby subjecting it to inner stress, possibly leading to breakage.



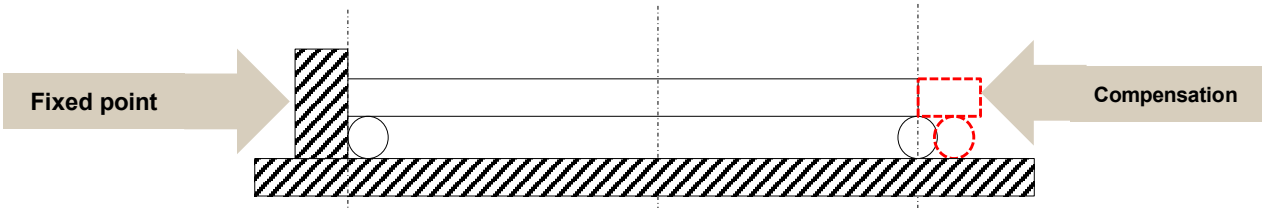
Ignoring the control of thermal expansion can have many more negative effects. The cases above represent the majority of the problems encountered in the installation of pipes.

3.0 CONTROLED EXPANSION

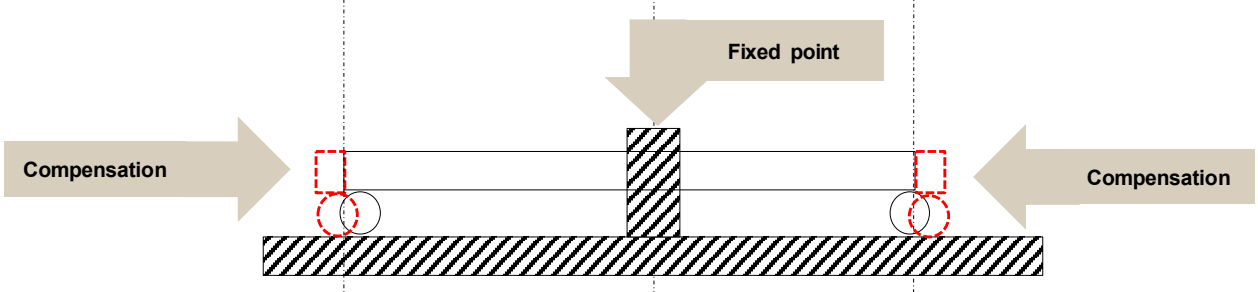
Controlling expansion – methods used to control expansion

Expansion must be controlled. Its impact can then be predicted and calculated.

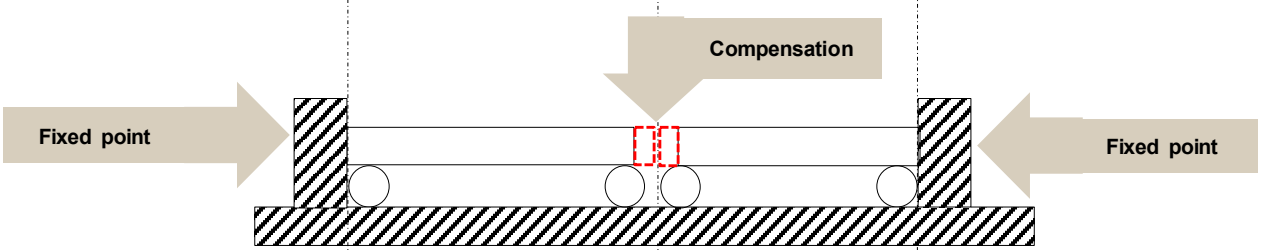
Fixed (anchor) point at one end, compensation for expansion at the other end.



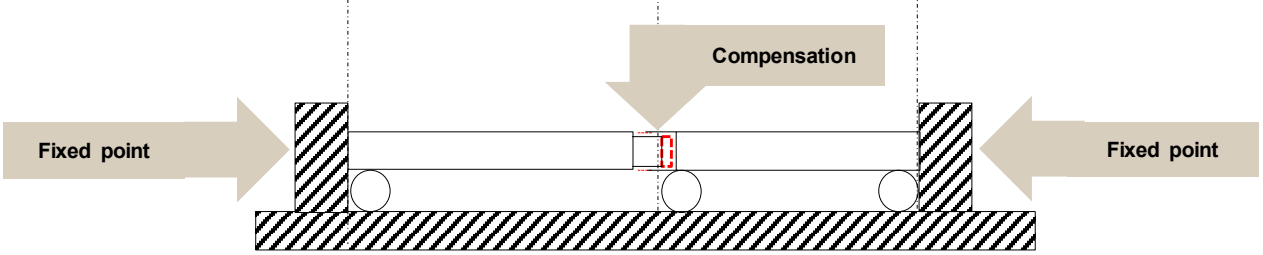
Fixed (anchor) point in the middle, compensation for expansion at both ends.



Fixed (anchor) points at the ends and space designed to provide compensation for expansion somewhere in between.



Fixed (anchor) points at the ends and a mechanism designed to provided compensation for expansion somewhere in between.

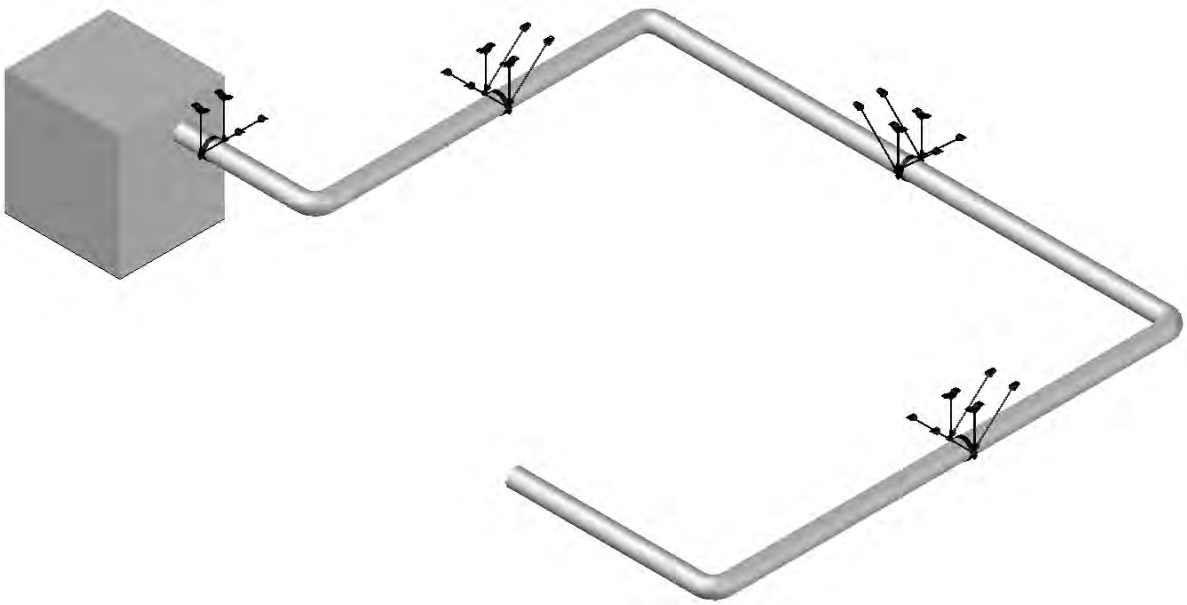


A system for controlling expansion always consists of a set of fixed points and a means of compensation.

4.0 FIXED POINT

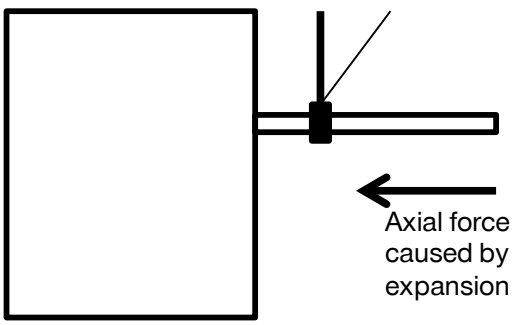
Fixed points – placement

Generally, a good starting point is the following basic rule: For every straight section of pipe with a diameter of 2 ½" (76.1 mm) or more and a length of 10 m or more, expansion must be controlled by a fixed point in the middle of the run.

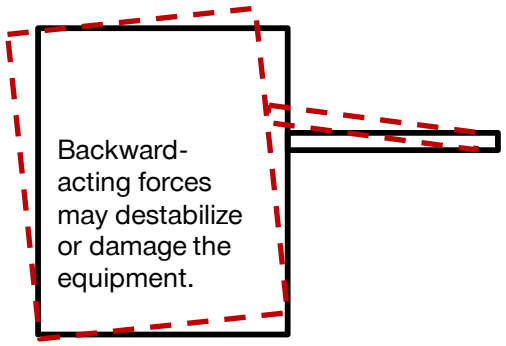


Some plant room equipment may be subject to a risk of destabilization or damage by pipe axial forces. Protection at the start of the run is therefore required in some cases.

Plant room equipment with fixed point protection



Plant room equipment without fixed point protection



5.0 FIXED POINT LOADS

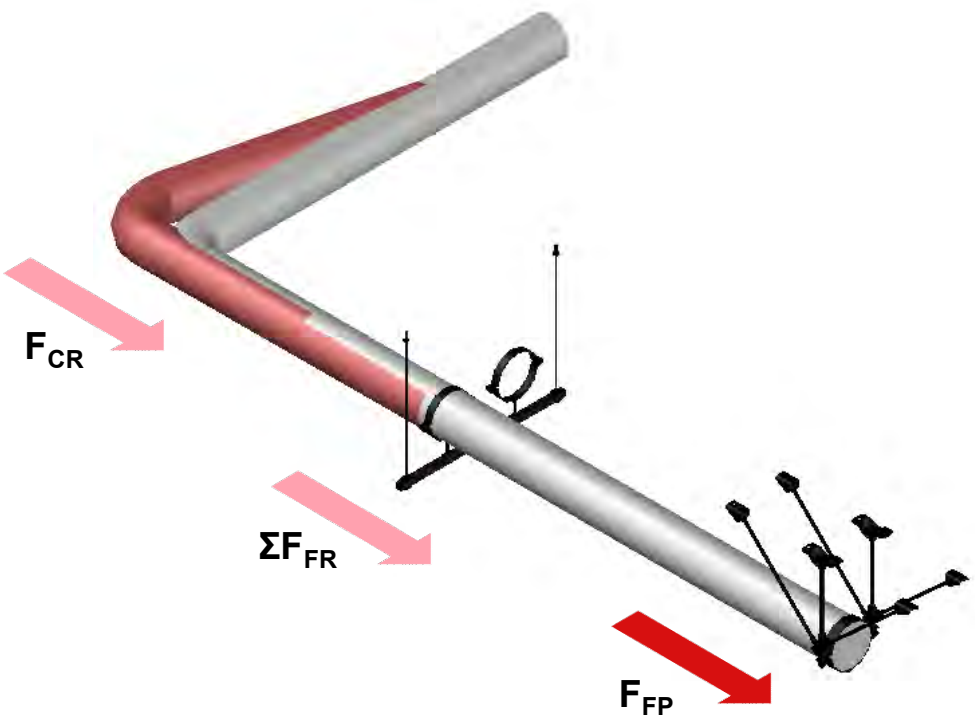
The basic function of a fixed (anchor) point is to anchor the pipe in a place where the building structure is designed to carry loads generated by expansion and to thus ensure zero movement of the pipe. This control of the pipe will generate certain loads due to several factors, depending on the type of compensation used:

Loads generated at a fixed point by **natural compensation**:

$\mathbf{F_{CR}}$ - Resistance of compensation (elbow, u-bend..)

$\mathbf{\Sigma F_{FR}}$ – Friction (resistance) at all pipe supports

Information about detailed calculation can be found in the “Natural compensation" section.



$$\mathbf{F_{CR} + \Sigma F_{FR} = F_{FP}}$$

5.0 FIXED POINT LOADS

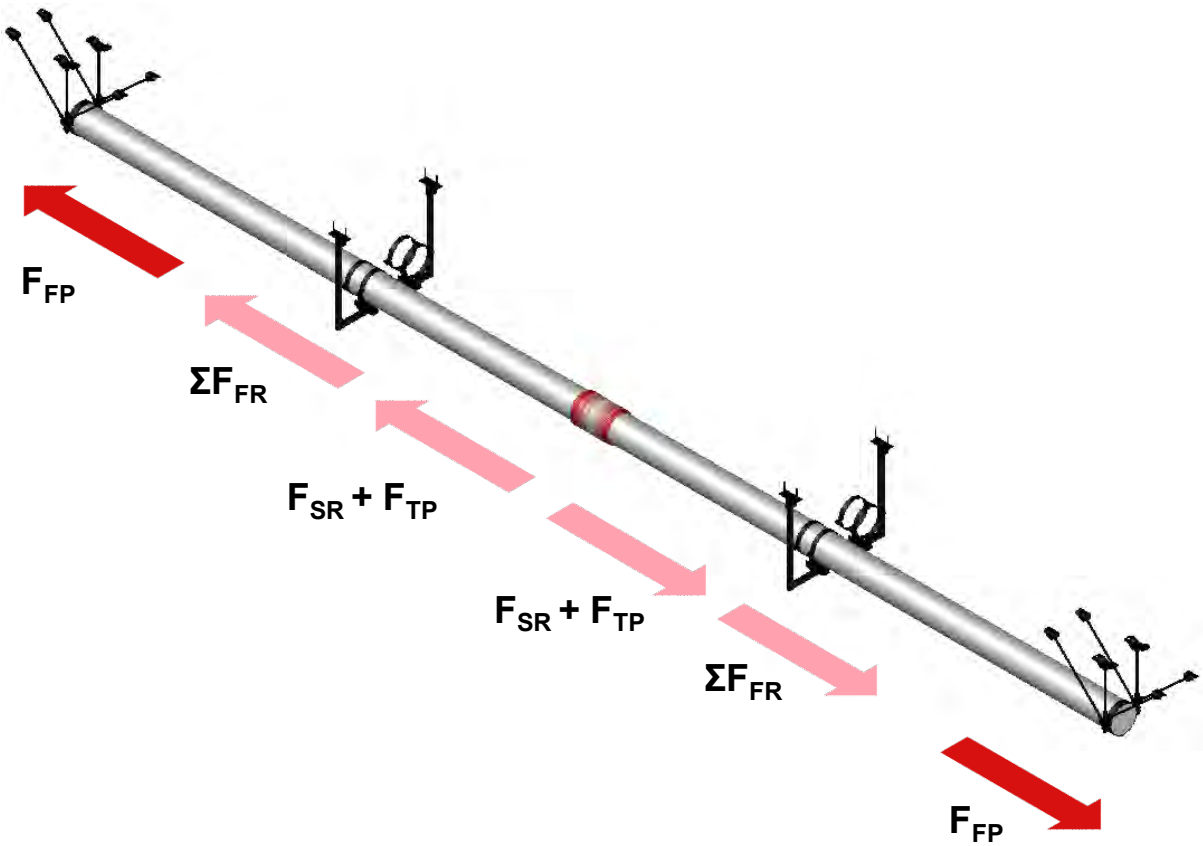
Loads generated at a fixed point by **technical compensation**:

$\mathbf{F_{SR}}$ - Load generated by spring rate of the expansion joint

$\mathbf{F_{TP}}$ - Media pipe pressure

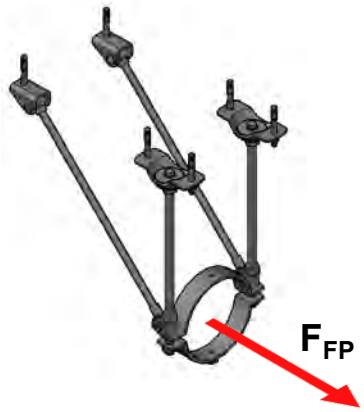
$\mathbf{\Sigma F_{FR}}$ - Friction at all pipe supports

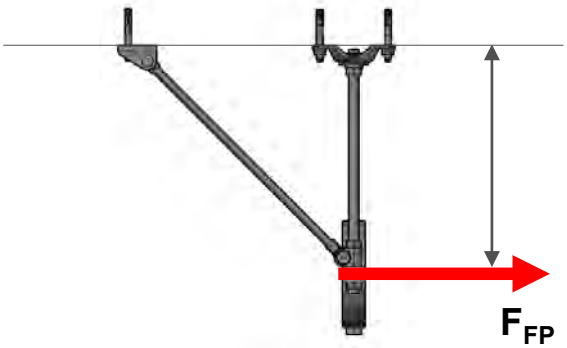
Information about detailed calculation can be found in the "Technical compensation" section.



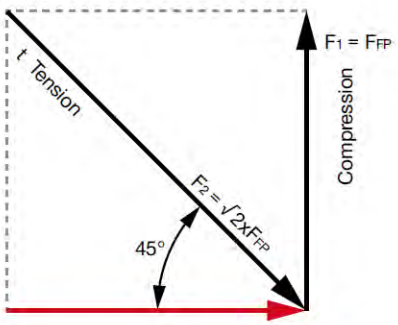
$$\mathbf{F_{SR} + F_{TP} + \Sigma F_{FR} = F_{FP}}$$

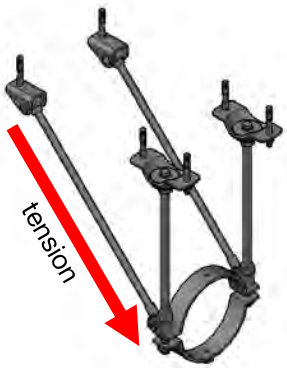
6.0 FIXED POINT LOAD TRANSFER PRINCIPLES



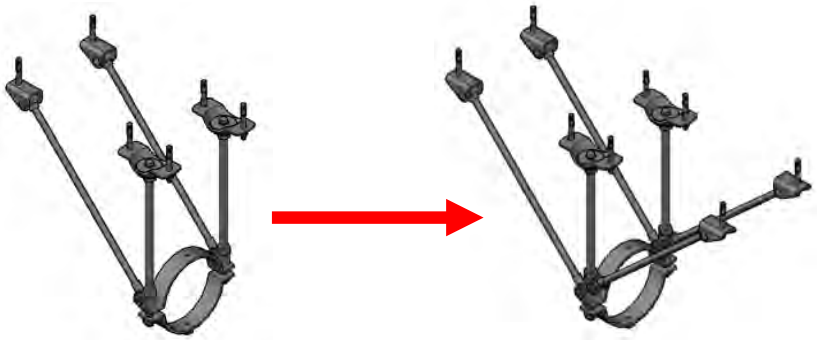


Most of the Hilti fixed point sets work on the stand and brace principle, thereby splitting the load into two parts on a triangular principle.



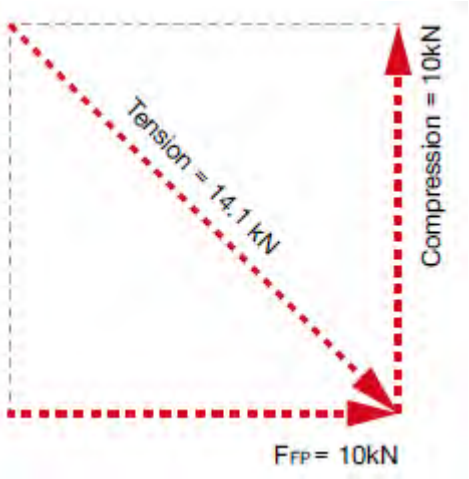


Braces in Hilti fixed point sets are made from M16 threaded rods. The threaded rod must be subjected to tension only. The orientation of the brace must reflect this. The brace must be subjected to tension only.
In cases where you are not sure, or the brace can be even temporarily subjected to opposite loads (when the system is heating up or cooling down), we recommend that braces are fitted on both sides.

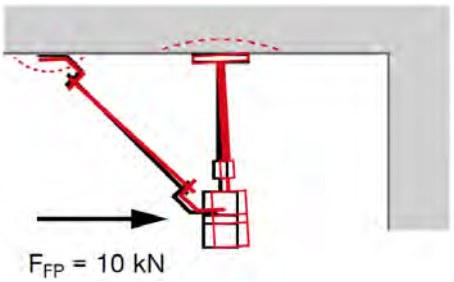


7.0 FIXED POINT AND SUPERSTRUCTURE OF THE BUILDING

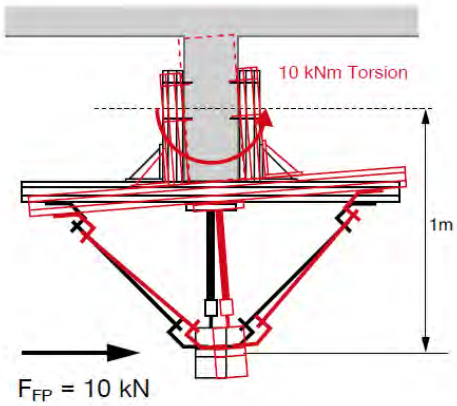
Placement of fixed points should always take the loading capacity of the building structure into account. The structural engineer responsible for the structure must always be consulted about the impact of the fixed point. The cases mentioned below are examples of situations that could present a risk to the stability of the building structure or any other sub-structures.
The cases are explained on the basis of a fixed point load of 10 kN acting on an arm at a distance of 1m from the supporting material.

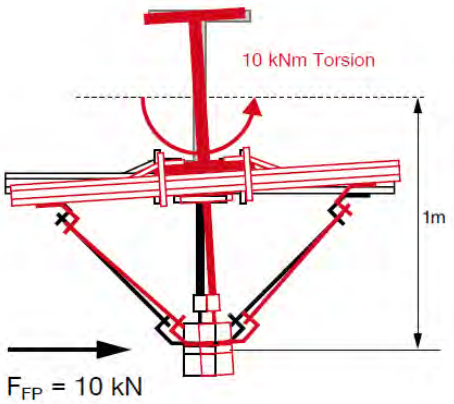


10 kN may exceed the spot loading capacity of a concrete slab and the loads acting in this way may pull out the entire anchor (on the brace of the fixed point).



Load transfer to the girder may subject it to torsion or other mechanisms that could impact its stability.

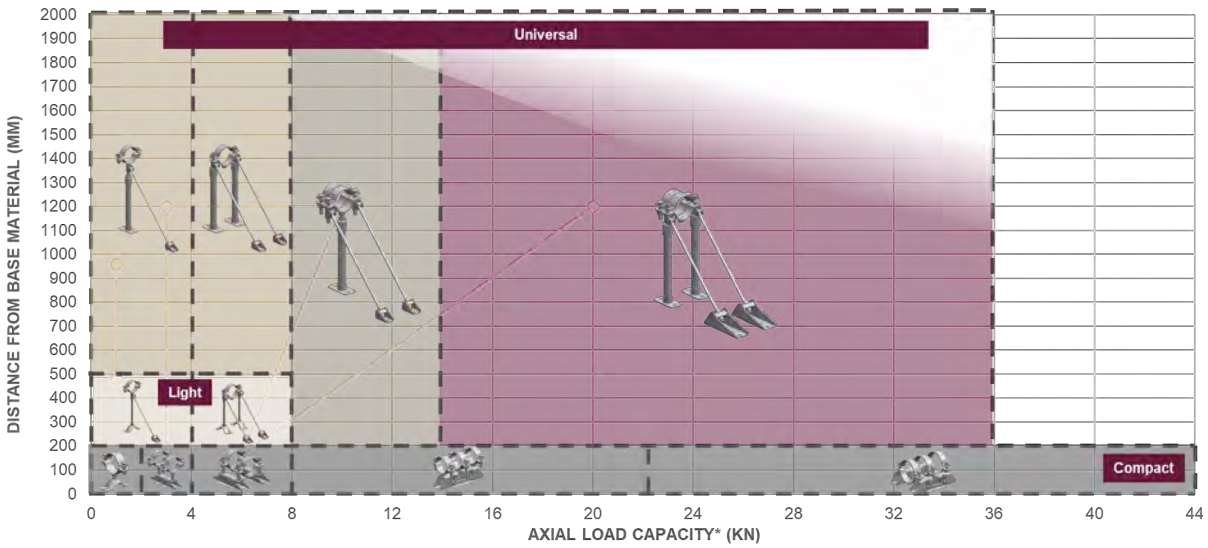




8.0 FIXED POINT PORTFOLIO

Hilti Fixed Point portfolio has to solve three basic technical solutions:

- Very short distances (up to 200mm) and very high loads (up to 44kN) – e.g., in riser shafts
- Medium distances (up to 500mm) and Light loads (up to 8kN) – e.g. for heating pipes in pipe coroidors
- Far distances (up to 2000mm) and Medium loads (up to 36kN) – e.g. for underground collectors and piping in industrial facilities.



These solutions leads to three basic classes of Hilti Fixed Points:

8.0 FIXED POINT PORTFOLIO

These solutions leads to three basic classes of Hilti Fixed Points:

COMPACT FIXED POINTS:

- EASY AND FAST TO INSTALL
- SOUND INSULATED
- AXIAL LOADS UP TO 44 KN

LIGHT FIXED POINTS:

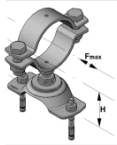
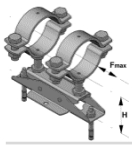
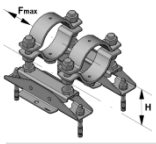
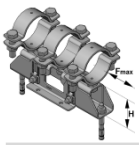
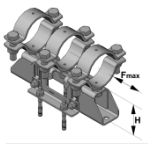
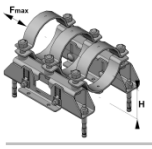
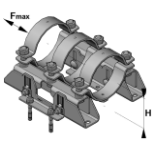
- OPTIMIZED FOR YOUR APPLICATION
- ADJUSTABLE TO AVOID REBAR
- ONLY ONE SIZE OF ANCHOR REQUIRED

UNIVERSAL FIXED POINTS:

- FULL FLEXIBILITY
- UP TO 2 M FROM THE BASE MATERIAL
- LOADS UP TO 36 KN

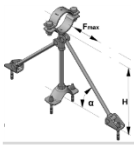
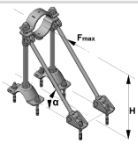
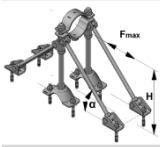
8.0 FIXED POINT PORTFOLIO

Hilti Compact Fixed Points:

Picture	Designation	Item number	Sound insulation	Min. distance (mm)	Max. distance (mm)	Max. rec. load (kN)	Max. Pipe size (mm)
	MFP-CSL	2223016	No	85	115	2.0	115
	MFP-CSL-I	2203017	Yes	85	115	2.0	115
	MFP-CL-I	2223018	Yes	85	115	4.0	170
	MFP-CLD-I	2223014	Yes	95	175	8.0	221
	MFP-CH	2223015	No	115	165	22	326
	MFP -CH(M12)	2223015	No	115	165	12	326
	MFP-CHD	2238264	No	130	180	44	321
	MFP-CHD(M12)	2238264	No	130	180	24	321

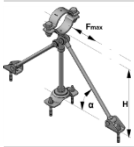
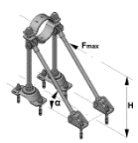
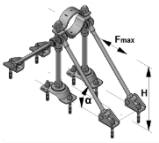
8.0 FIXED POINT PORTFOLIO

Hilti Light Fixed Points Without Sound Insulation:

Picture	Designation	Item number	Sound insulation	Min. distance (mm)	Max. distance (mm)	Max. rec. load (kN)	Max. Pipe size (mm)
	MFP-L	2223121	No	150	500	*4.0	142
	MFP-L2	2223123	No	190	500	*4.0	142
	MFP-LD	2223122	No	190	500	*8.0	326
	MFP-LD2	2223124	No	190	500	*8.0	326

* the designated loading capacity does not have to reflect maximal loading capacity for maximal distance. For most of the fixed points the loading capacity for max. distance is smaller. Every case should be evaluated using proper technical documentation e.g. ITM Fixed Point or software

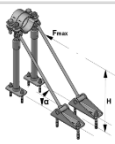
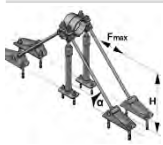
Hilti Light Fixed Points With Sound Insulation:

Picture	Designation	Item number	Sound insulation	Min. distance (mm)	Max. distance (mm)	Max. rec. load (kN)	Max. Pipe size (mm)
	MFP-L-I	2223125	No	150	500	*4.0	142
	MFP-L2-I	2223127	No	190	500	*4.0	142
	MFP-LD-I	2223126	No	190	500	*8.0	326
	MFP-LD2-I	2223128	No	190	500	*8.0	326

* the designated loading capacity does not have to reflect maximal loading capacity for maximal distance. For most of the fixed points the loading capacity for max. distance is smaller. Every case should be evaluated using proper technical documentation e.g. ITM Fixed Point or software

8.0 FIXED POINT PORTFOLIO

Hilti Universal Fixed Points Without Sound Insulation:

Picture	Designation	Item number	Sound insulation	Min. distance (mm)	Max. distance (mm)	Max. rec. load (kN)	Max. Pipe size (mm)
	MFP-UL	2223129	No	185	2000	*4.0	142
	MFP-UL2	2223131	No	225	2000	*4.0	142
	MFP-ULD	2223130	No	185	2000	*8.0	326
	MFP-ULD2	2223132	No	225	2000	*8.0	326
	MFP - UM	2238272	No	175	2000	*14.0	326
	MFP - UM2	2238273	No	175	2000	*14.0	326
	MFP-UHD	2223138	No	200	2000	*36.0	326
	MFP-UHD2	2223140	No	200	2000	*36.0	326

* the designated loading capacity does not have to reflect maximal loading capacity for maximal distance. For most of the fixed points the loading capacity for max. distance is smaller. Every case should be evaluated using proper technical documentation e.g. ITM Fixed Point or software

8.0 FIXED POINT PORTFOLIO

Hilti Universal Fixed Points With Sound Insulation:

Picture	Designation	Item number	Sound insulation	Min. distance (mm)	Max. distance (mm)	Max. rec. load (kN)	Max. Pipe size (mm)
	MFP-UL-I	2223133	Yes	185	2000	*4.0	142
	MFP-UL2-I	2223135	Yes	225	2000	*4.0	142
	MFP-ULD-I	2223134	Yes	185	2000	*8.0	326
	MFP-ULD2-I	2223136	Yes	225	2000	*8.0	326
	MFP-UM-I	2238274	Yes	175	2000	*14.0	326
	MFP-UM2-I	2238275	Yes	175	2000	*14.0	326

* the designated loading capacity does not have to reflect maximal loading capacity for maximal distance. For most of the fixed points the loading capacity for max. distance is smaller. Every case should be evaluated using proper technical documentation e.g. ITM Fixed Point or software

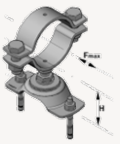
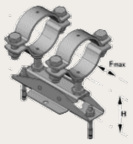
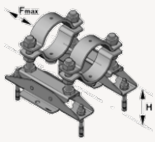
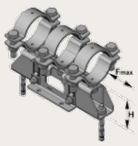
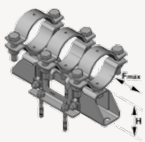
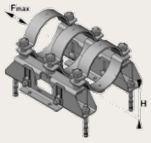
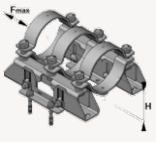
8.0 FIXED POINT PORTFOLIO

Hilti Fixed Points Pipe Clamps Ordering:

Picture	Fixed Point Set	Designation	Item number	Clamping range (mm)
	Every Fixed Point type has specific quantity of the pipe clamps – see following pages	MFP-PC M20 21-22	2227599	21-22
		MFP-PC M20 25-27	2227690	25-27
		MFP-PC M20 28-30	2227691	28-30
		MFP-PC M20 31-33	2227692	31-33
		MFP-PC M20 34-36	2227693	34-36
		MFP-PC M20 39-41	2227694	39-41
		MFP-PC M20 42-45	2227695	42-45
		MFP-PC M20 47-50	2227696	47-50
		MFP-PC M20 53-56	2227697	53-56
		MFP-PC M20 57-61	2227698	57-61
		MFP-PC M20 62-66	2227699	62-66
		MFP-PC M20 68-72	2227700	68-72
		MFP-PC M20 73-78	2227701	73-78
		MFP-PC M20 88-93	2227702	88-93
		MFP-PC M20 100-105	2227703	100-105
		MFP-PC M20 108-115	2227704	108-115
		MFP-PC M20 125-133	2227705	125-133
		MFP-PC M20 134-142	2227706	134-142
		MFP-PC M20 154-162	2227707	154-162
		MFP-PC M20 162-170	2227708	162-170
		MFP-PC M20 192-200	2227709	192-200
		MFP-PC M20 213-221	2227710	213-221
		MFP-PC M20 242-250	2227711	242-250
		MFP-PC M20 267-275	2227712	267-275
		MFP-PC M20 318-326	2227598	318-326

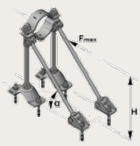
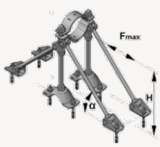
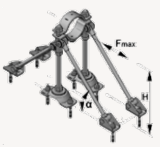
8.0 FIXED POINT PORTFOLIO

Hilti Compact Fixed Points Ordering:

Picture	Fixed Point Set	Designation	Item number	Quantity
	MFP-CSL	MFP-PC fixed point pipe clamp	Various	1
		MFP-CSL set	2223016	1
		HUS3-H 10x90 35/15/5 anchor	2079914	2
	MFP-CSL-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-CSL-I set	2203017	1
		HUS3-H 10x90 35/15/5 anchor	2079914	2
	MFP-CL-I	MFP-PC fixed point pipe clamp	Various	2
		MFP-CL-I set	2223018	1
		HUS3-H 10x60 5/-/- anchor	2079911	2
	MFP-CLD-I	MFP-PC fixed point pipe clamp	Various	2
		MFP-CLD-I set	2223014	1
		HUS3-H 10x60 5/-/- anchor	2079911	4
	MFP-CH	MFP-PC fixed point pipe clamp	Various	3
		MFP-CH set	2223015	1
		HUS3-H 14x130 65/45/15 anchor	2079923	2
	MFP -CH(M12)	MFP-PC fixed point pipe clamp	Various	3
		MFP-CH set	2223015	1
		HUS3-H 10x90 35/15/5 anchor	2079914	4
	MFP-CHD	MFP-PC fixed point pipe clamp	Various	3
		MFP-CHD set	2238264	1
		HUS3-H 14x130 65/45/15 anchor	2079923	4
	MFP-CHD(M12)	MFP-PC fixed point pipe clamp	Various	3
		MFP-CHD set	2238264	1
		HUS3-H 10x60 5/-/- anchor	2079911	8

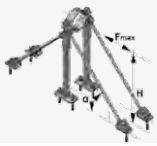
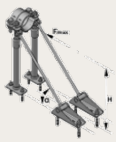
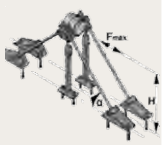
8.0 FIXED POINT PORTFOLIO

Hilti Light Fixed Points Ordering:

Picture	Fixed Point Set	Designation	Item number	Quantity
	MFP-L	MFP-PC fixed point pipe clamp	Various	1
		MFP-L set	2223121	1
		AM20x1000 4.8 threaded rod	216425	1
		AM16x1000 4.8 threaded rod	216422	1
		HUS3-H 10x90 35/15/5 anchor	2079914	3
	MFP-L2	MFP-PC fixed point pipe clamp	Various	1
		MFP-L2 set	2223123	1
		AM20x1000 4.8 threaded rod	216425	1
		AM16x1000 4.8 threaded rod	216422	2
		HUS3-H 10x90 35/15/5 anchor	2079914	4
	MFP-LD	MFP-PC fixed point pipe clamp	Various	1
		MFP-LD fixed point set	2223122	1
		AM20x1000 4.8 threaded rod	216425	2
		AM16x1000 4.8 threaded rod	216422	2
		HUS3-H 10x90 35/15/5 anchor	2079914	6
	MFP-LD2	MFP-PC fixed point pipe clamp	Various	1
		MFP-LD2 fixed point set	2223124	1
		AM20x1000 4.8 threaded rod	216425	2
		AM16x1000 4.8 threaded rod	216422	4
		HUS3-H 10x90 35/15/5 anchor	2079914	8
	MFP-L-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-L-I set	2223125	1
		AM20x1000 4.8 threaded rod	216425	1
		AM16x1000 4.8 threaded rod	216422	1
		HUS3-H 10x90 35/15/5 anchor	2079914	3
	MFP-L2-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-L2-I set	2223127	1
		AM20x1000 4.8 threaded rod	216425	1
		AM16x1000 4.8 threaded rod	216422	2
		HUS3-H 10x90 35/15/5 anchor	2079914	4
	MFP-LD-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-LD-I fixed point set	2223126	1
		AM20x1000 4.8 threaded rod	216425	2
		AM16x1000 4.8 threaded rod	216422	2
		HUS3-H 10x90 35/15/5 anchor	2079914	6
	MFP-LD2-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-LD2-I fixed point set	2223128	1
		AM20x1000 4.8 threaded rod	216425	2
		AM16x1000 4.8 threaded rod	216422	4
		HUS3-H 10x90 35/15/5 anchor	2079914	8

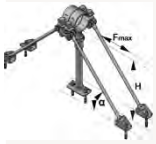
8.0 FIXED POINT PORTFOLIO

Hilti Universal Fixed Points Without Sound Insulation Ordering:

Picture	Fixed Point Set	Designation	Item number	Quantity
	**MFP-UL**	MFP-PC fixed point pipe clamp	Various	1
		MFP-UL set	2223129	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	1
		HUS3-H 10x90 35/15/5 anchor	2079914	3
	**MFP-UL2**	MFP-PC fixed point pipe clamp	Various	1
		MFP-UL2 set	2223131	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x90 35/15/5 anchor	2079914	4
	**MFP-ULD**	MFP-PC fixed point pipe clamp	Various	1
		MFP-ULD set	2223130	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	2
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x90 35/15/5 anchor	2079914	6
	**MFP-ULD2**	MFP-PC fixed point pipe clamp	Various	1
		MFP-ULD2 set	2223132	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	2
		AM16x3000 4.8 threaded rod	216424	4
		HUS3-H 10x90 35/15/5 anchor	2079914	8
	**MFP - UM**	MFP-PC fixed point pipe clamp	Various	2
		MFP-UM set	2238272	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x110 55/35/25	2079916	4
	**MFP - UM2**	MFP-PC fixed point pipe clamp	Various	2
		MFP-UM2 set	2238273	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	4
		HUS3-H 10x110 55/35/25	2079916	6
	**MFP-UHD**	MFP-PC fixed point pipe clamp	Various	2
		MFP-UHD set	2223138	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	2
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x110 55/35/25 anchor	2079916	4
		HUS3-H 14x130 65/45/15 anchor	2079923	4
	**MFP-UHD2**	MFP-PC fixed point pipe clamp	Various	2
		MFP-UHD2 set	2223140	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	2
		AM16x3000 4.8 threaded rod	216424	4
		HUS3-H 10x110 55/35/25 anchor	2079916	4
		HUS3-H 14x130 65/45/15 anchor	2079923	4

8.0 FIXED POINT PORTFOLIO

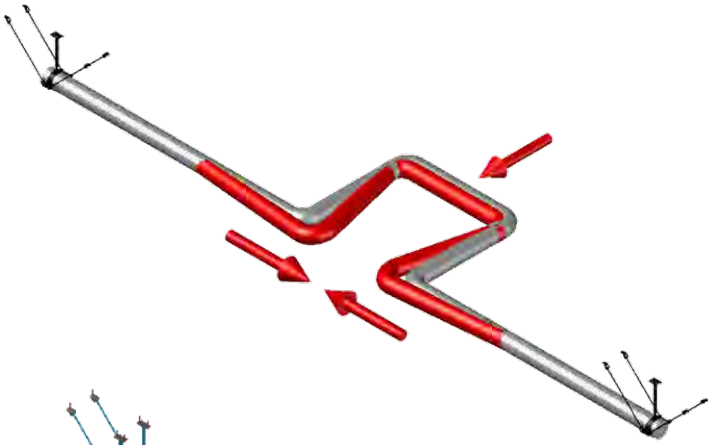
Hilti Universal Fixed Points With Sound Insulation Ordering:

Picture	Fixed Point Set	Designation	Item number	Quantity
	MFP-UL-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-UL-I set	2223133	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	1
		HUS3-H 10x90 35/15/5 anchor	2079914	3
	MFP-UL2-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-UL2-I set	2223135	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x90 35/15/5 anchor	2079914	4
	MFP-ULD-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-ULD-I set	2223134	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	2
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x90 35/15/5 anchor	2079914	6
	MFP-ULD2-I	MFP-PC fixed point pipe clamp	Various	1
		MFP-ULD2-I set	2223136	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	2
		AM16x3000 4.8 threaded rod	216424	4
		HUS3-H 10x90 35/15/5 anchor	2079914	8
	MFP-UM-I	MFP-PC fixed point pipe clamp	Various	2
		MFP-UM - I set	2238274	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	2
		HUS3-H 10x90 35/15/5 anchor	2079914	4
	MFP-UM2-I	MFP-PC fixed point pipe clamp	Various	2
		MFP-UM2 - I set	2238275	1
		GR-G 1 1/4''x 2000 4.6 thr. tube	248532	1
		AM16x3000 4.8 threaded rod	216424	4
		HUS3-H 10x90 35/15/5 anchor	2079914	6

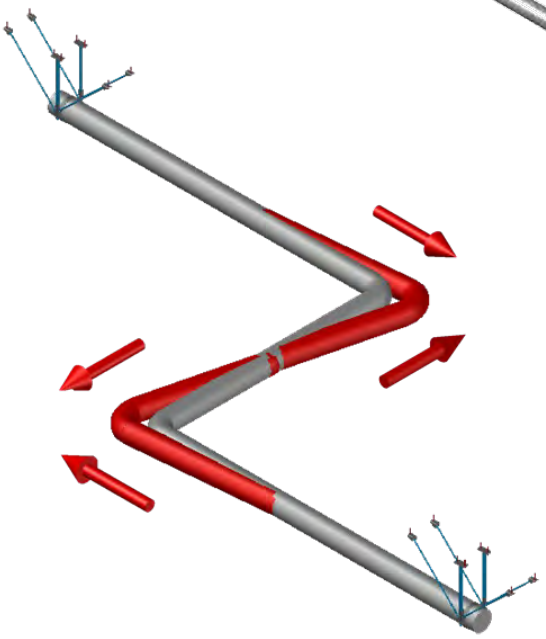
9.0 COMPENSATION

Types of natural compensations:

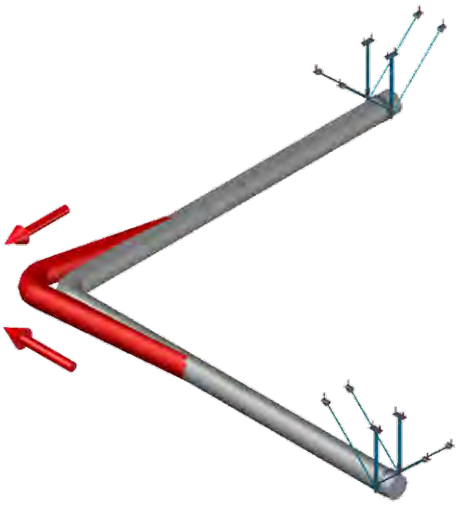
U-bend



Z-bend



L-bend

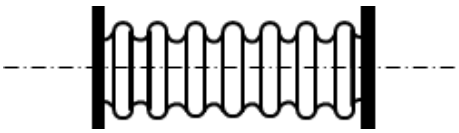


9.0 COMPENSATION

Types of technical compensations:

Important notice The expansion joint supplier must be consulted about placement of fixed points and the accommodation of expansion. His instructions regarding design and installation must be strictly followed.

Axial expansion joints

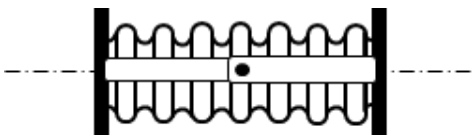


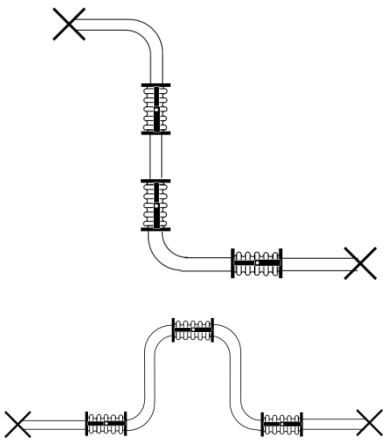
Axial expansion joints and fixed points

Angular expansion joints

Angular expansion joints and fixed points

Two types of angular expansion joints:
1. Planar – one axis of rotation
2. Spatial – gimbal types



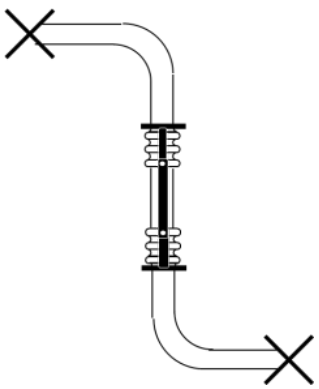


Lateral expansion joints

Lateral expansion joints and fixed points

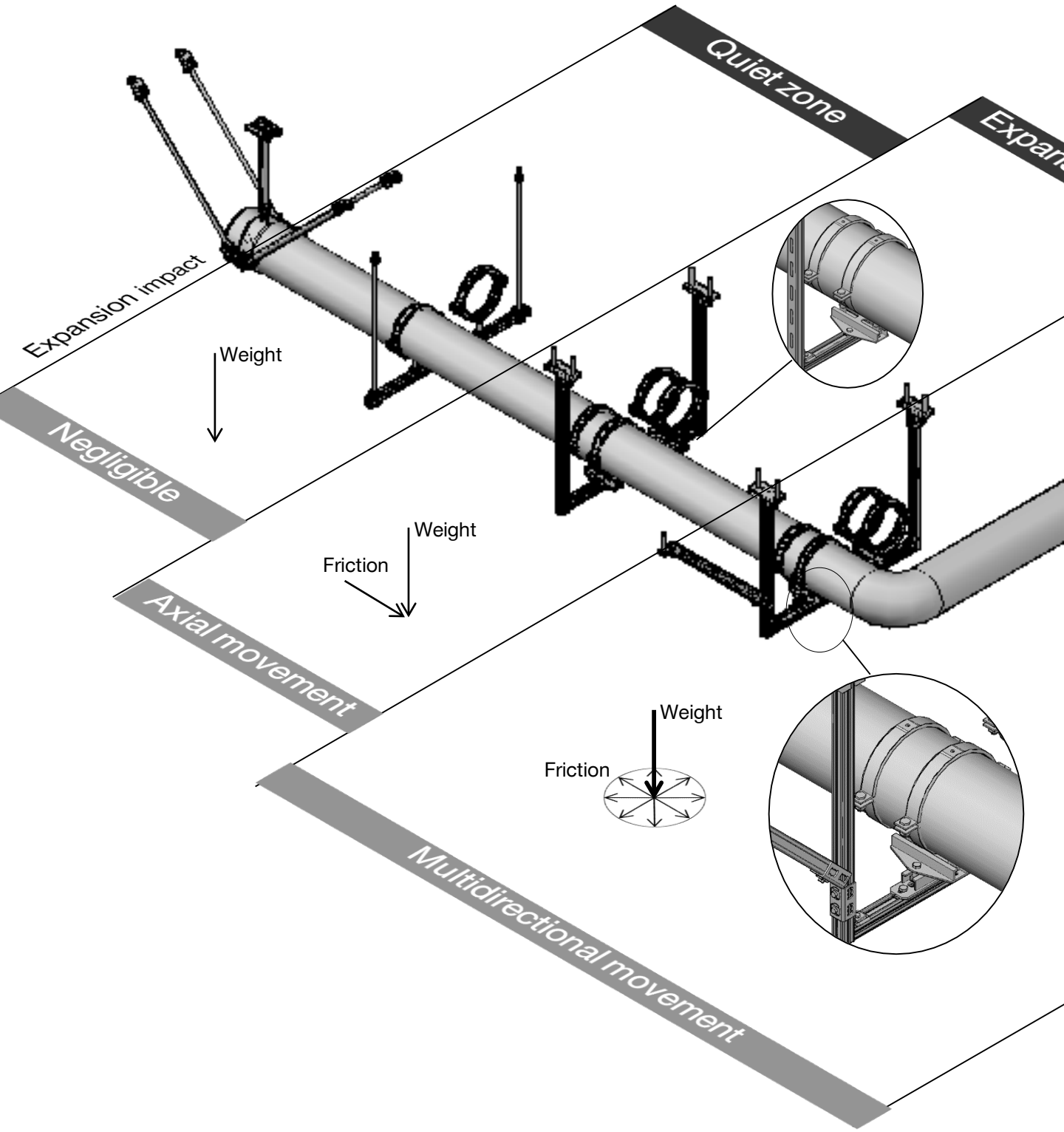
Two types of lateral expansion joints:

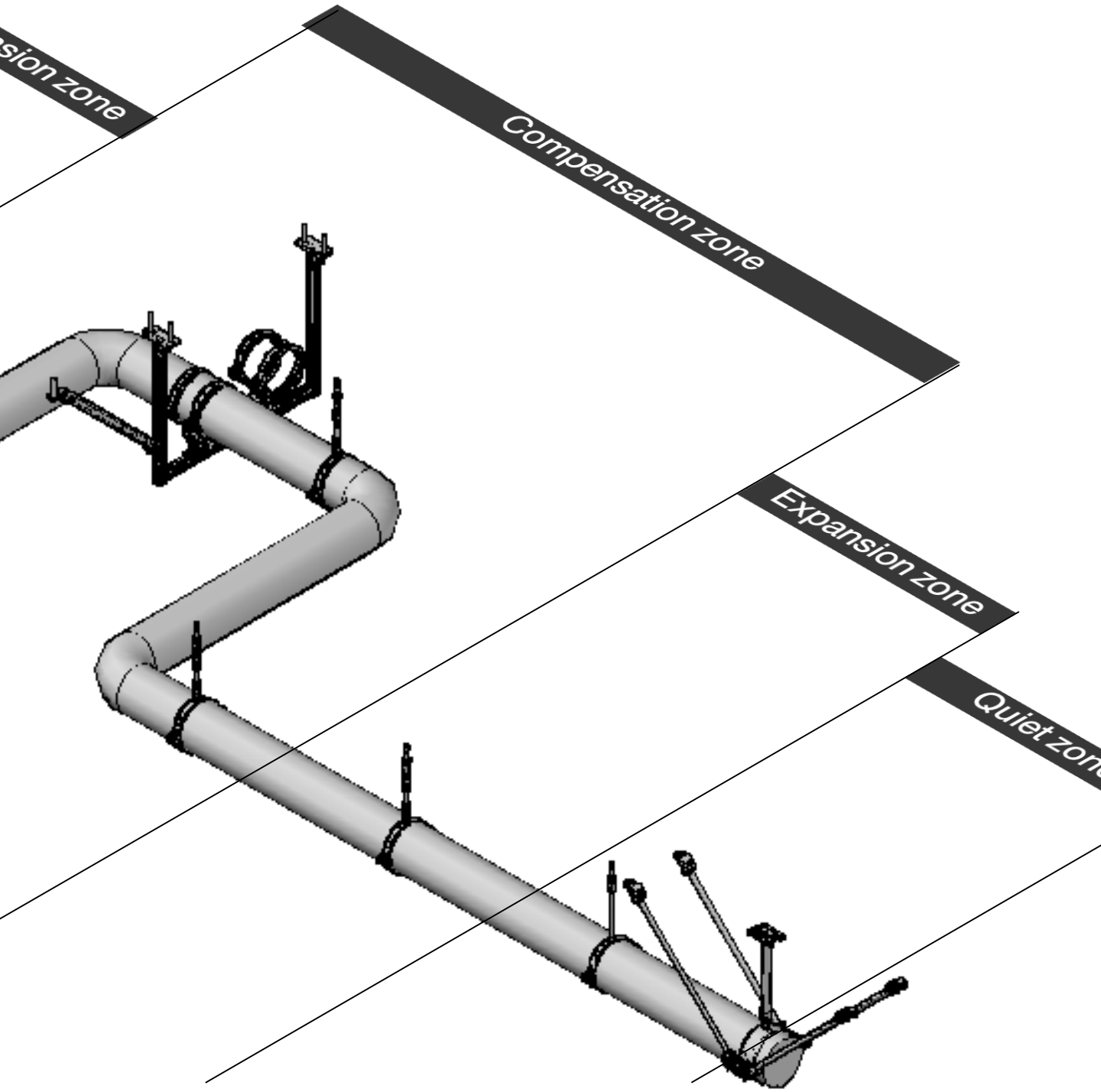
1. Planar – one axis of rotation with own control of pipe pressure
   2. Spatial (circular) – multidirectional with own control of pipe pressure able to absorb multidirectional lateral movement



10.0 NATURAL COMPENSATION

Zones and typical solutions:

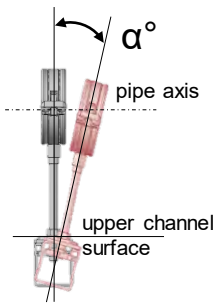



sion zone
Compensation zone
Expansion zone
Quiet zon

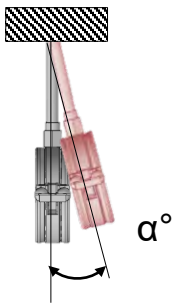
10.0 NATURAL COMPENSATION

Pipe runs can be divided into zones according to the impact of expansion on the pipe supports. The zones are defined differently for pipes on standing supports and for suspended pipes. The main factors are expansion along the pipe axis and distance from the upper surface of the channel (in the case of pipes on standing supports) and expansion along the pipe axis and distance from the underside of the supporting structure (in the case of suspended pipes).

Supported pipes

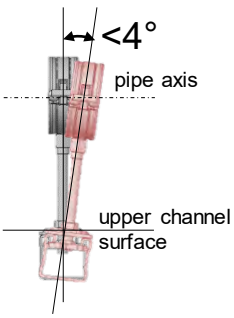


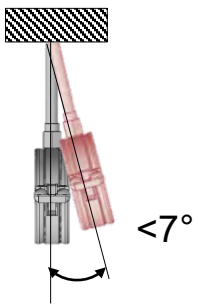
Hanged pipes



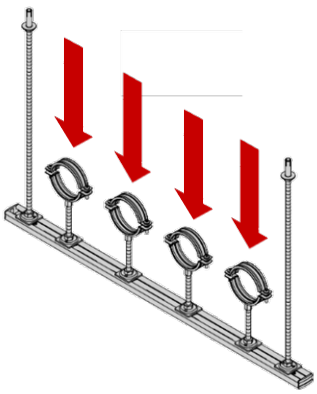
Quiet zone:

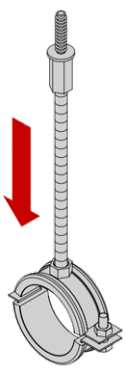
At this pipe zone the impact of expansion is negligible – no special measures are required.





The pipe supports must be designed to take up the vertical load resulting from the weight of the pipe section (only for relevant applications). See section “Typical plumbing applications”.



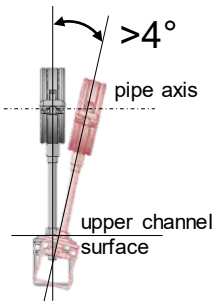


10.0 NATURAL COMPENSATION

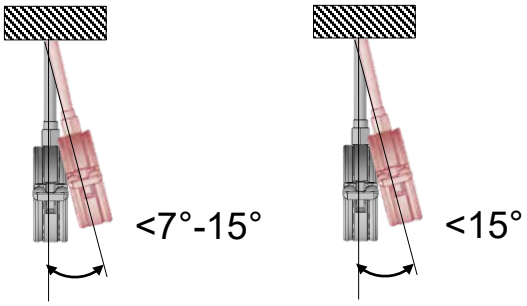
Expansion zone:

This is the zone in which expansion begins to have an impact in axial direction. Traditional methods of pipe installation begin to run out of options and use of special expansion elements becomes necessary. Ignoring expansion would result in torque moment in channels, significant displacement of threaded rods and irreversible deformation of several parts. All of these impacts could lead to a chain reaction and, in extreme cases, to collapse of the pipe support system.

Supported pipes

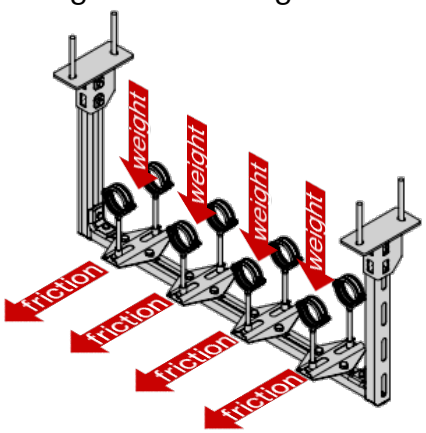


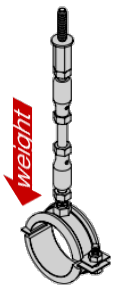
Hanged pipes



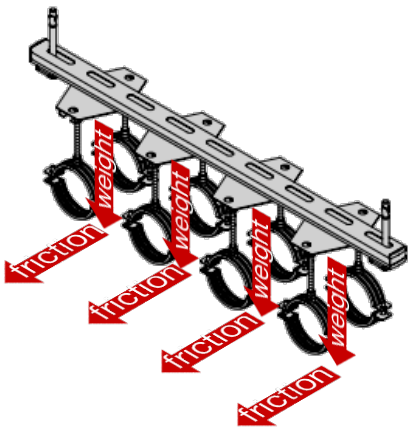
Swing hanger Expansion elements

In the expansion zone it is necessary to make use of expansion elements that properly distribute expansion forces to the supporting structure. The pipe support must be designed according the loading scheme:



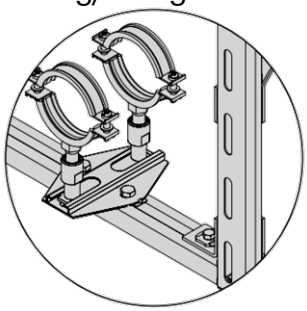


Swing hanger

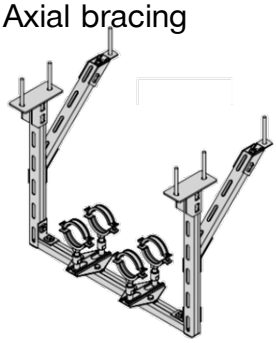


This leads to use of special solutions:

Sliding/rolling elements



Axial bracing

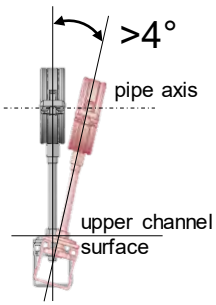


10.0 NATURAL COMPENSATION

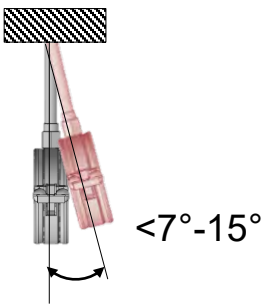
Compensation zone:

In this zone, the expansion impact meets natural compensation achieved by the spring effect (resistance) of the system. Compensation tends to comprise movement in several directions during the heating-up or cooling-down phases. The pipe supports must therefore allow all of these movements and be able to transfer the loads properly to the supporting building structure.

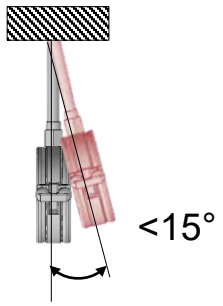
Supported pipes



Hanged pipes

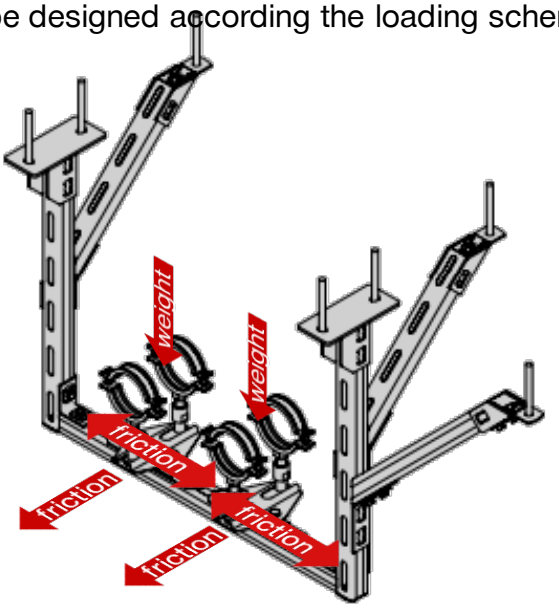


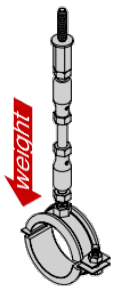
Swing hanger



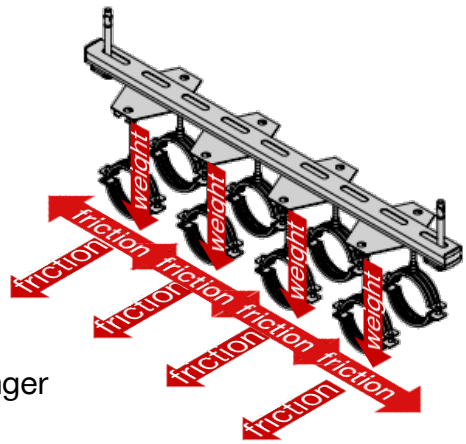
Expansion element

In the compensation zone it is necessary to make use of expansion cross elements that properly distribute expansion forces to the supporting structure. The pipe support must be designed according the loading scheme:



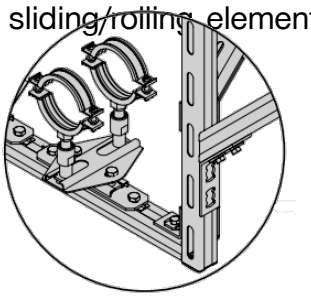


Swing hanger

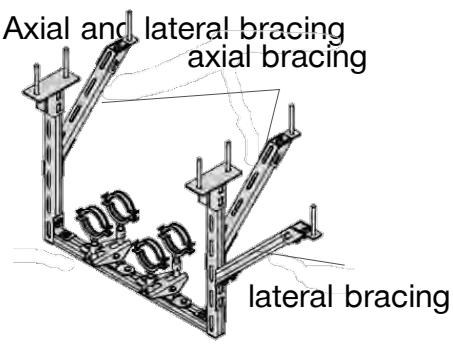


This leads to use of special solutions:

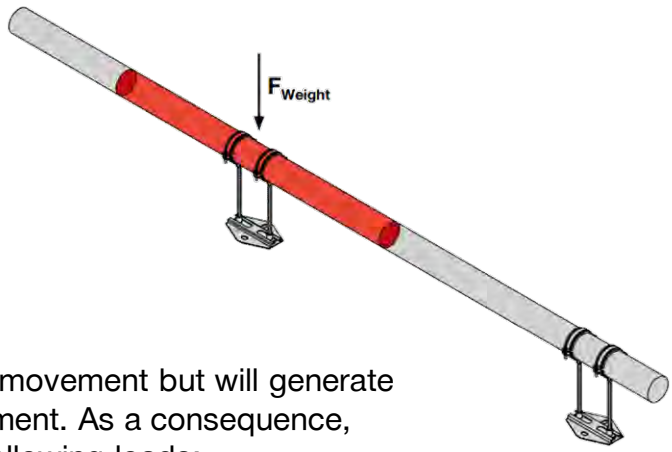
Cross sliding/rolling elements



Axial and lateral bracing



11.0 FRICTION



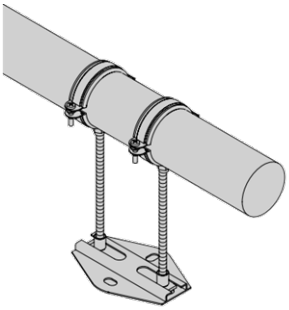
F_{Weight} = weight of 1m pipe x spacing

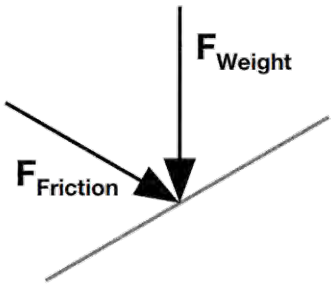
$F_{Friction}$ = F_{Weight} x μ

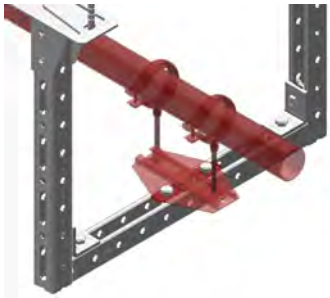
μ = specific friction factor for slider/roller

Every expansion element will allow pipe movement but will generate horizontal force due to friction in the element. As a consequence, the pipe supports are subjected to the following loads:

Two loads where double sliding/rolling elements are used.

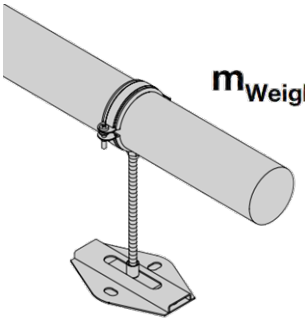


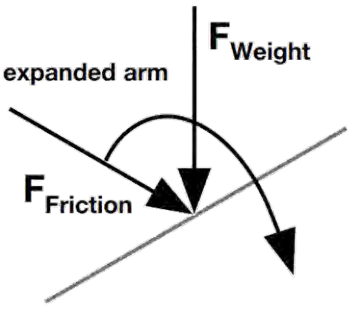




Combination of pipe, two pipe clamps, two threaded rods, double connection head on the slider and the slider creates very rigid torque resistant box

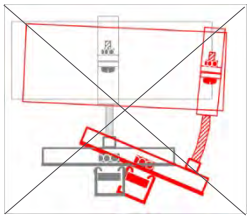
Two loads and one moment (torsional) where single sliding/rolling elements are used.

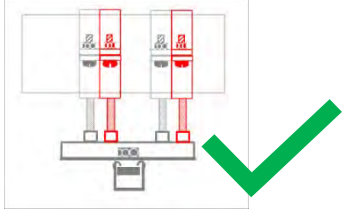




When used single slider the supporting structure is exposed to torsional moment due to eccentricity caused by traveling pipe clamp connection.

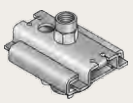
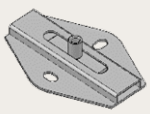
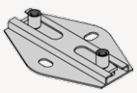
Recommendation: Always use double sliders/rollers on open-section profiles (MQ /MT system)





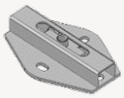
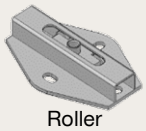
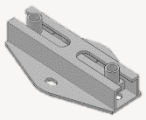
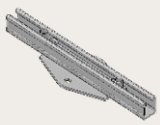
12.0 EXPANSION ELEMENTS

Hilti Galvanised Expansion elements:

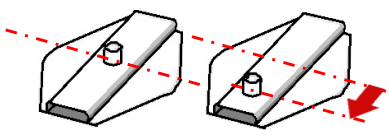
Picture	Designation	Item number	Loading capacity kN	Friction (-)	Travel capacity		Temperature resistance °C
					*Centric (mm)	*Pre-set (mm)	
 Swing Hanger	MPH M8 MPH-I M8 MPH M10 MPH M12 MPSG-M8 MPSG-M10	418 035 418 037 418 036 418 038 338 994 338 995	2.5 2.5 2.5 5.0 0.8 1.5	negligible negligible negligible negligible negligible negligible	max. 15° max. 15° max. 15° max. 15° max. 15° max. 15°		*max. 100° *max. 100° *max. 100° *max. 100° *max. 100° *max. 100°
 Slider	MSG-MQ 0,6 M8/M10	2171848	0.6	0.1	20	40	-40 +130
 Slider	MSG-L 1,2 M8/M10	2172050	1.2	0.1	30	60	-40 +130
 Slider	MSG 1.0 M12/16	248 206	1.0	0.18	40	80	-40 +130
 Slider	MSG 1.75 M8/M10D MSG 1.75 M12/M16D	248 209 248 210	1.75 1.75	0.18 0.18	47 47	94 94	-40 +130 -40 +130
 Slider	MSG-SE 1,75 M10	2172051	1.75	0.13	Limited by the lenght of the channel		-40 +130
 Slider	MSG-D 200 1,5 M12/M16	2171849	1.5	0.1	100	200	-40 +100

12.0 EXPANSION ELEMENTS

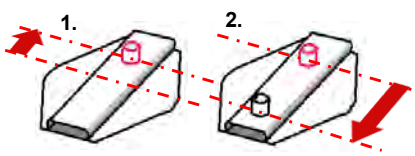
Hilti Galvanised Expansion elements:

Picture	Designation	Item number	Loading capacity kN	Friction (-)	Travel capacity		Temperature resistance °C
					*Centric (mm)	*Pre-set (mm)	
 Roller	MRG 2.0 M10/12	243 550	2.0	0.08	40	80	-40 +300
 Roller	MRG 4.0 M12/16	243 551	4.0	0.08	60	120	-40 +300
 Roller	MRG-D6 M12/16	334 131	8.0	0.08	58	116	-40 +300
 Roller	MRG-D 225 M12/M16	237 394	2.5	0.1	112.5	225	-40 +300

* Workers on the jobsite have tendency to set slider / roller in the centric position. In engineered and inspected cases the maximal travel capacity of the slider / roller from pre-set position could be utilised.



Maximal travel capacity CENTRIC



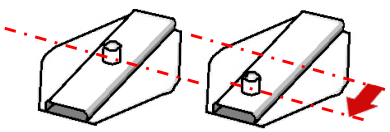
Maximal travel capacity PRE-SET

12.0 EXPANSION ELEMENTS

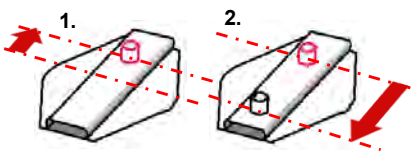
Hilti Galvanised Cross sliding / rolling elements:

Picture	BOM Designation	BOM Item number	Loading capacity kN	Friction (-)	Travel capacity		Temperature resistance °C
					*Centric (mm)	*Pre-set (mm)	
 Cross slider	1x MSG-L 1,2 M8/M10 1x MSG-SE 1,75 M10 2x M10x16 hex-screw	2172050 2172051 2184551	1.2	Axial 0.1 Lateral 0.13	Axial 30 Lateral unlimited	Axial 60 Lateral unlimited	-40 +130
 Cross slider	1x MSG 1.75 M8/M10D 1x MSG-UK D1.75 M8/10 connection screws incl.	248 209 337 115	1.75	Axial 0.18 Lateral 0.18	Axial 47 Lateral 27	Axilal 94 Lateral 54	-40 +130
 Cross roller	1x MRG-D6 M12/16 1x MRG-UK D6 M12/16 connection screws incl.	334 131 336 755	6.0	Axial 0.08 Lateral 0.08	Axial 58 Latera 23	Axial 116 Lateral 46	-40 +300

* Workers on the jobsite have tendency to set slider / roller in the centric position. In engineered and inspected cases the maximal travel capacity of the slider / roller from pre-set position could be utilised.



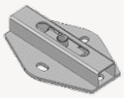
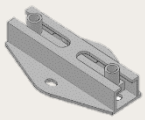
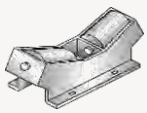
Maximal travel capacity CENTRIC



Maximal travel capacity PRE-SET

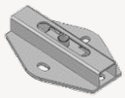
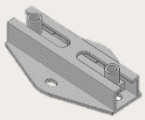
12.0 EXPANSION ELEMENTS

Hilti Hot Dipped Galvanised Expansion elements:

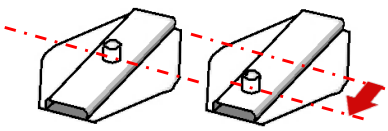
Picture	Designation	Item number	Loading capacity kN	Friction (-)	Travel capacity		Temperature resistance °C
					*Centric (mm)	*Pre-set (mm)	
 Roller	MRG 2.0 M10/12-F	304 213	1.5	0.15	40	80	-40 +300
 Roller	MRG-D6 M12/16-F	302 214	6.0	0.15	58	116	-40 +300
 Roller for pipes 219-406mm	MI–DPR	304880	15.0	0.035	Unlimited – rolling on the surface of the pipe		-40 +300
 Height Adjustable Pipe Shoe	MP-PS 1-1	various	See the MP-PS technical documentation	On HDG 0.13 ZnMg 0.15 Steel 0.18	Limited by the size of the base plate and surface on what the pipe shoe is sliding		-40 +300
 Height Adjustable Pipe Shoe	MP-PS 2-2	various	See the MP-PS technical documentation	On HDG 0.13 ZnMg 0.15 Steel 0.18	Limited by the size of the base plate and surface on what the pipe shoe is sliding		-40 +300
 Height Adjustable Pipe Shoe	MP-PS 4-2	various	See the MP-PS technical documentation	On HDG 0.13 ZnMg 0.15 Steel 0.18	Limited by the size of the base plate and surface on what the pipe shoe is sliding		-40 +300

12.0 EXPANSION ELEMENTS

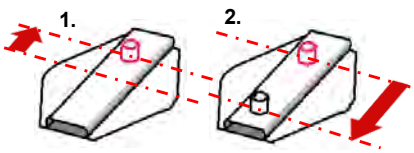
Hilti Stainless Steel Expansion elements:

Picture	Designation	Item number	Loading capacity kN	Friction (-)	Travel capacity		Temperature resistance °C
					*Centric (mm)	*Pre-set (mm)	
 Roller	MRG 2.0 M10/12-R	304 086	1.5	0.15	40	80	-40 +300
 Roller	MRG-D6 M12/16-R	304 087	6.0	0.15	58	116	-40 +300

* Workers on the jobsite have tendency to set slider / roller in the centric position. In engineered and inspected cases the maximal travel capacity of the slider / roller from pre-set position could be utilised.



Maximal travel capacity CENTRIC

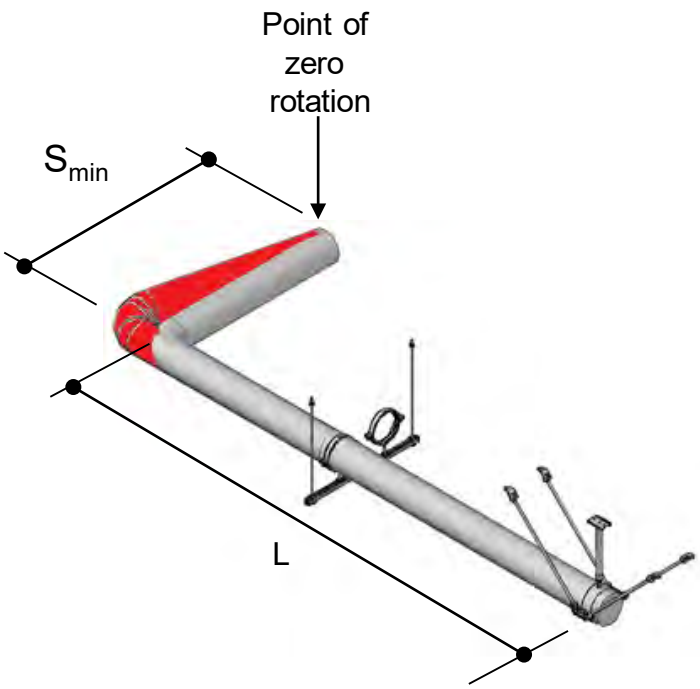


Maximal travel capacity PRE-SET

13.0 NATURAL COMPENSATION ELBOW RESISTANCE

Point of zero rotation

The important point is the so-called point of zero rotation. It is the point where expansion has no further influence after natural compensation.



$$S_{min} = \sqrt{\frac{3E}{2\sigma_{zul}}} * \sqrt{\Delta L * AD}$$

E [N/mm²] = Modulus of elasticity of pipe material (temperature dependent)

σ_{zul} [N/mm2] = Allowable stress on pipe material (temperature dependent and load factor included – yield stress / safety factor)

ΔL [mm] = *L [mm]* * *ΔT [C°]* * α [-]

ΔT [C°] = *Tmax. – Tinst*

α [-] = Coefficient of pipe material expansion

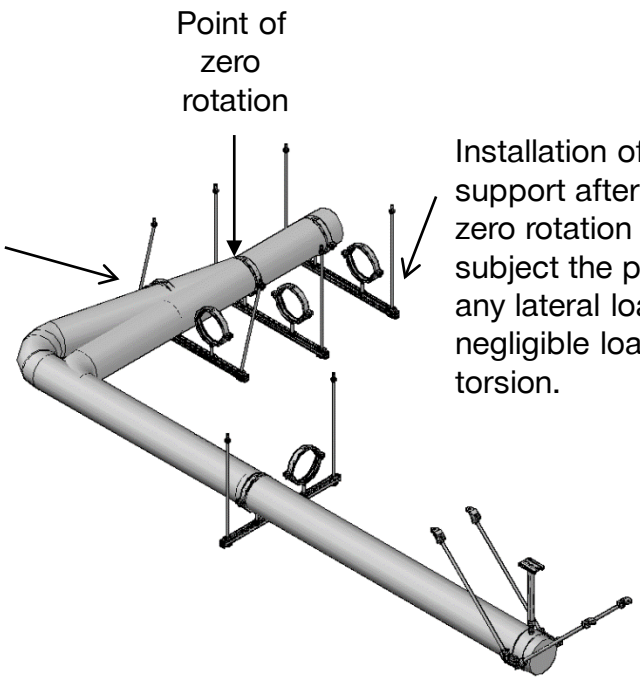
L [mm] = Length between fixed point and bending arm

Tmax. = Max. operational temperature e.g. heating media temperature 70°C

Tinst = Installation temperature (temperature at which the fixed points were tightened) e.g. 20°C

AD [mm] = Outside diameter of pipe material

Installation of a pipe support before the point of zero rotation would subject the pipe support to lateral loads and, at the same time, it would increase the load at the fixed point (the value depends on lateral resistance of the pipe support).



Installation of a pipe support after the point of zero rotation would not subject the pipe support to any lateral load (only a negligible load) or any torsion.

14.0 NATURAL COMPENSATION FIXED POINT LOADS

$$F_{FP} = F_{CR} + F_{FR}$$

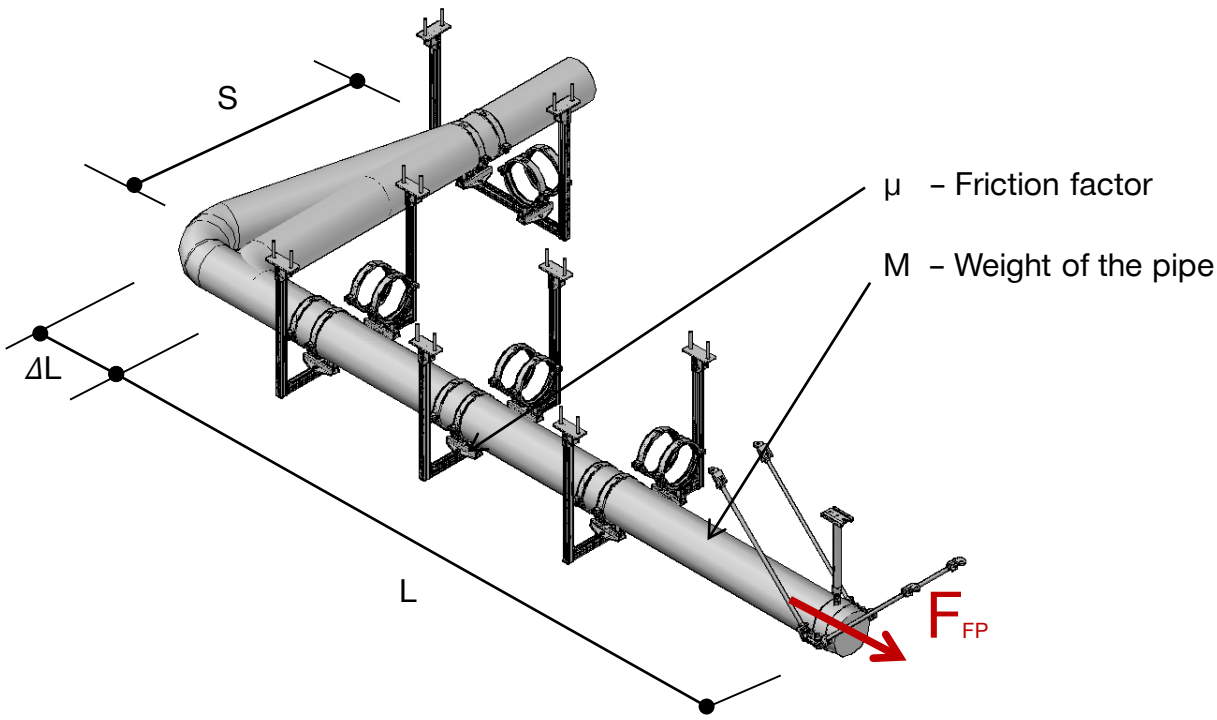
F_{CR} - Resistance of compensation (elbow, U-bend, etc.)
ΣF_{FR} - Friction load in all pipe supports

$$F_{CR}[kN] = (E[N/mm^2] \times I[mm^4] * \frac{3 * \Delta L[mm]}{S^3[mm^3]})/1000$$

E - Modulus of elasticity
I - Moment of inertia of the pipe
ΔL - Expansion of the pipe
S - Bending arm

$$F_{FR}[kN] = (\mu * 9.81[m/s^2] * M[kg/m] * L[m])/1000$$

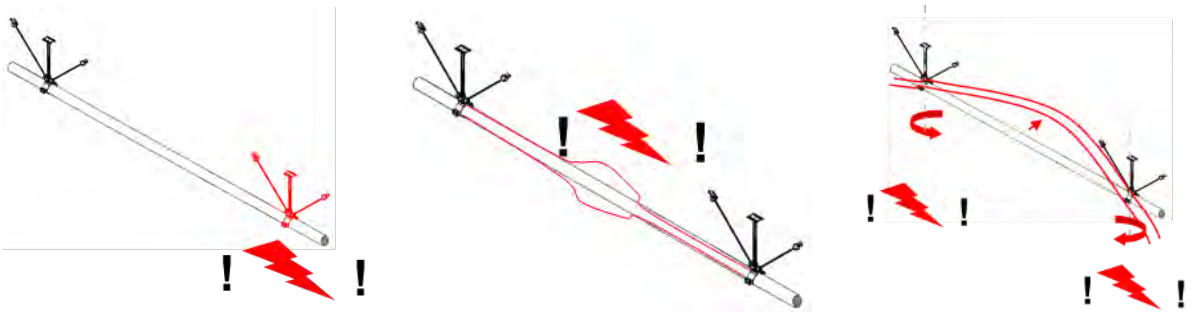
μ - Friction factor (-)
M - Weight of the pipe: 1m, water-filled, incl. insulation (kg/m)
L - Length of the pipe section from fixed point to bending arm (m)



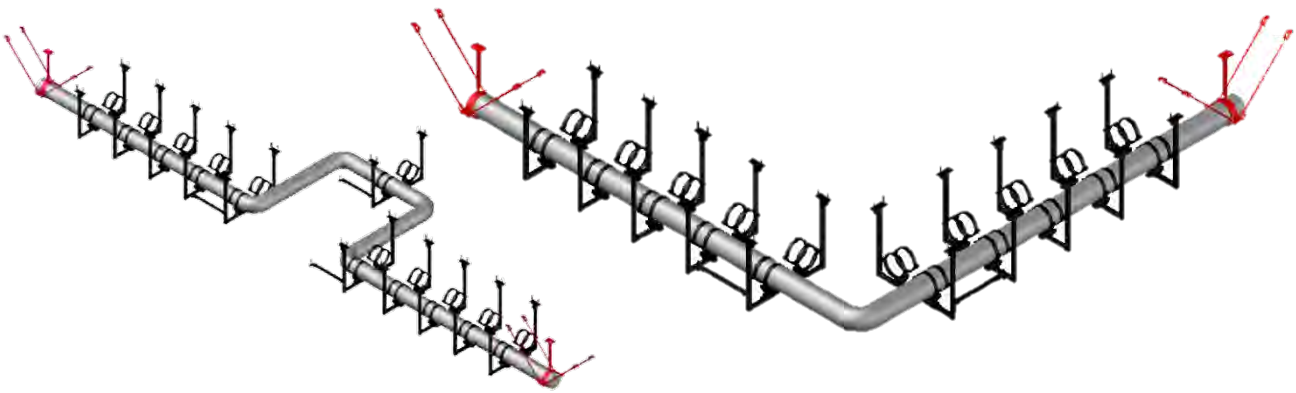
15.0 NATURAL COMPENSATION RULES TO FOLLOW

Rules to follow forsafe design and control of the expansion

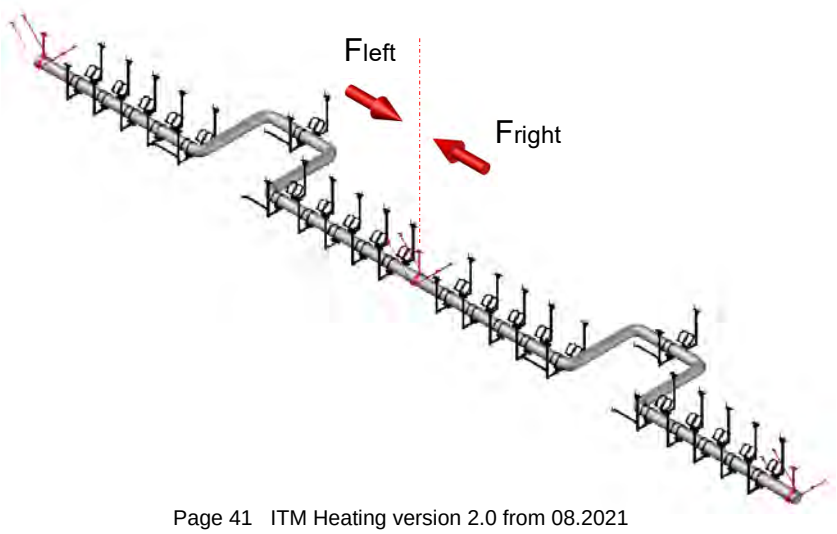
Rule no. 1
Never two fixed points on the same pipe without compensation between.



Rule no. 2
Every compensation must be accompanied by one fixed point on each side.

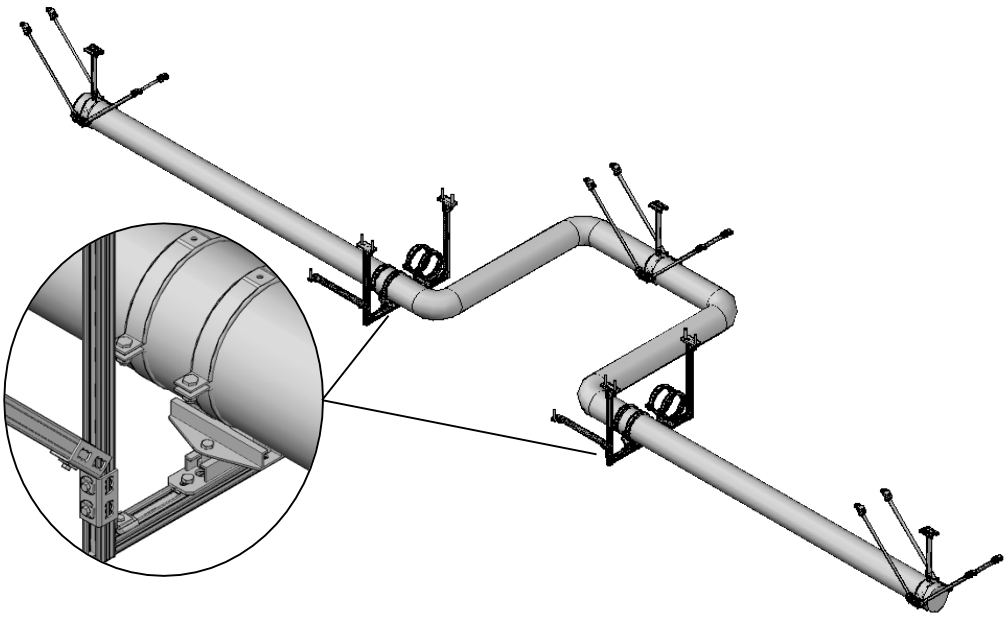


Rule no. 3
The fixed point between two compensations must be designed to take up a single load action – the higher of the two potential loads.

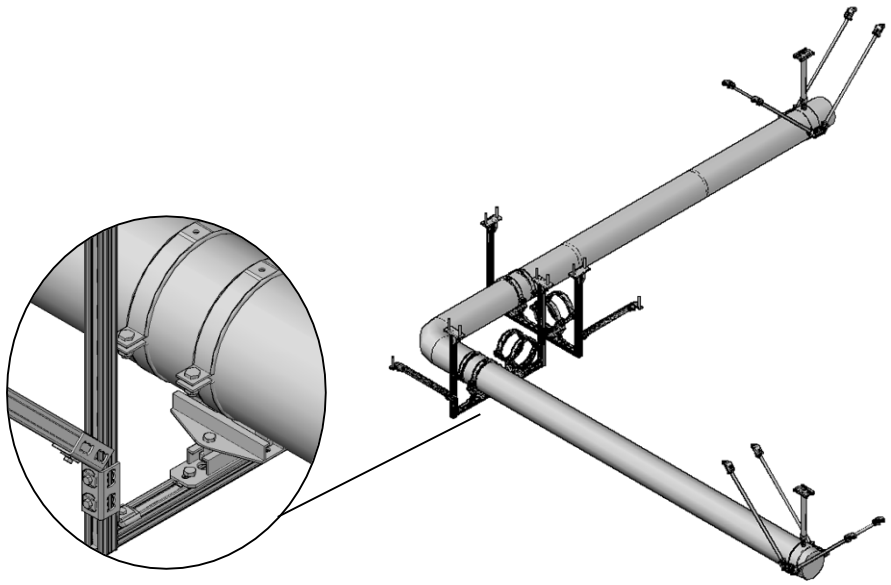


16.0 NATURAL COMPENSATION SPECIAL CASES

Mainly in the industrial segment, the preferred method of achieving even more control of expansion involves placement of a **fixed point at the U-bend arm**.
The only difference here is that the last support and all supports up to the point of zero rotation must have cross sliding/rolling elements to allow lateral compensation.

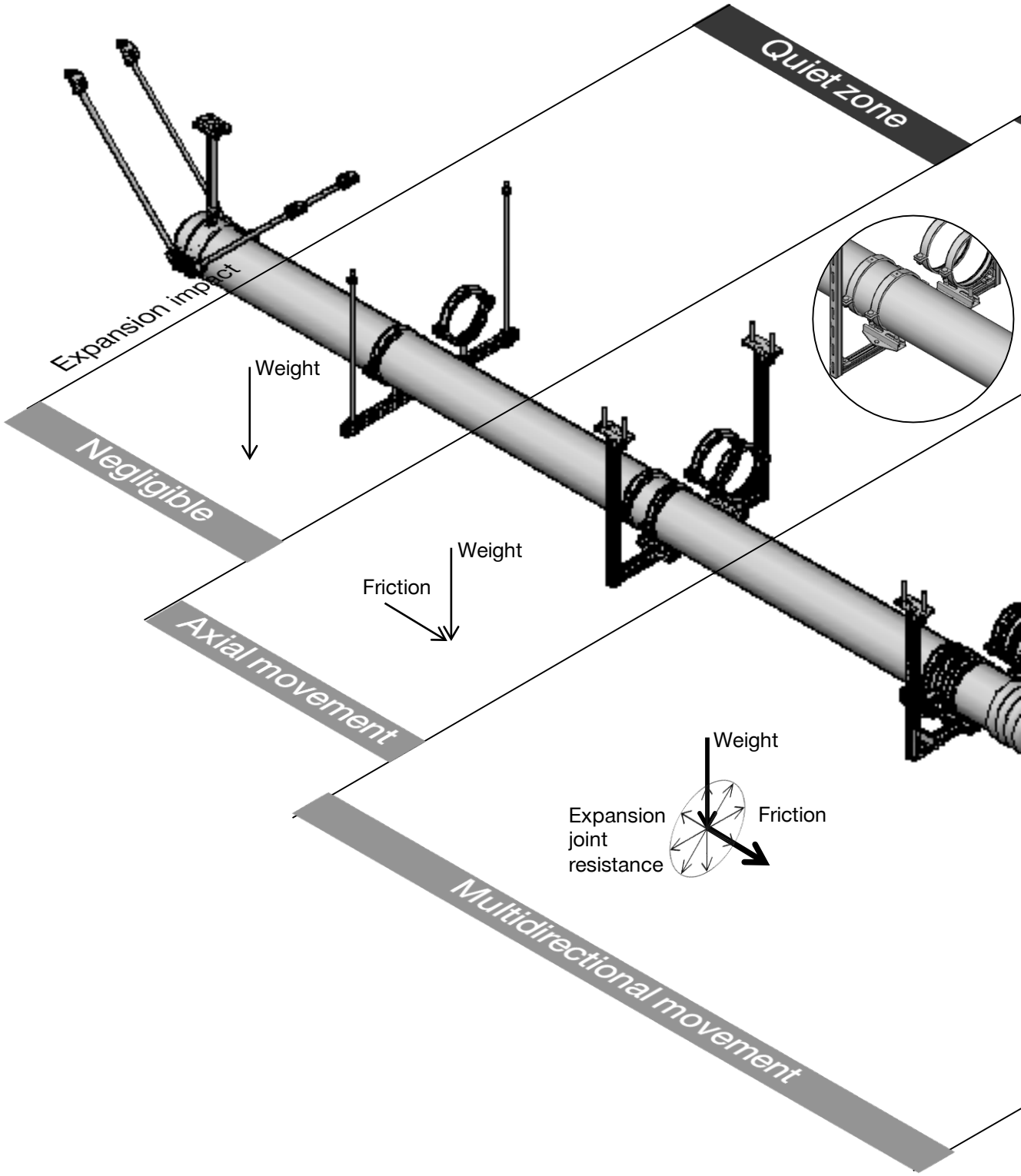


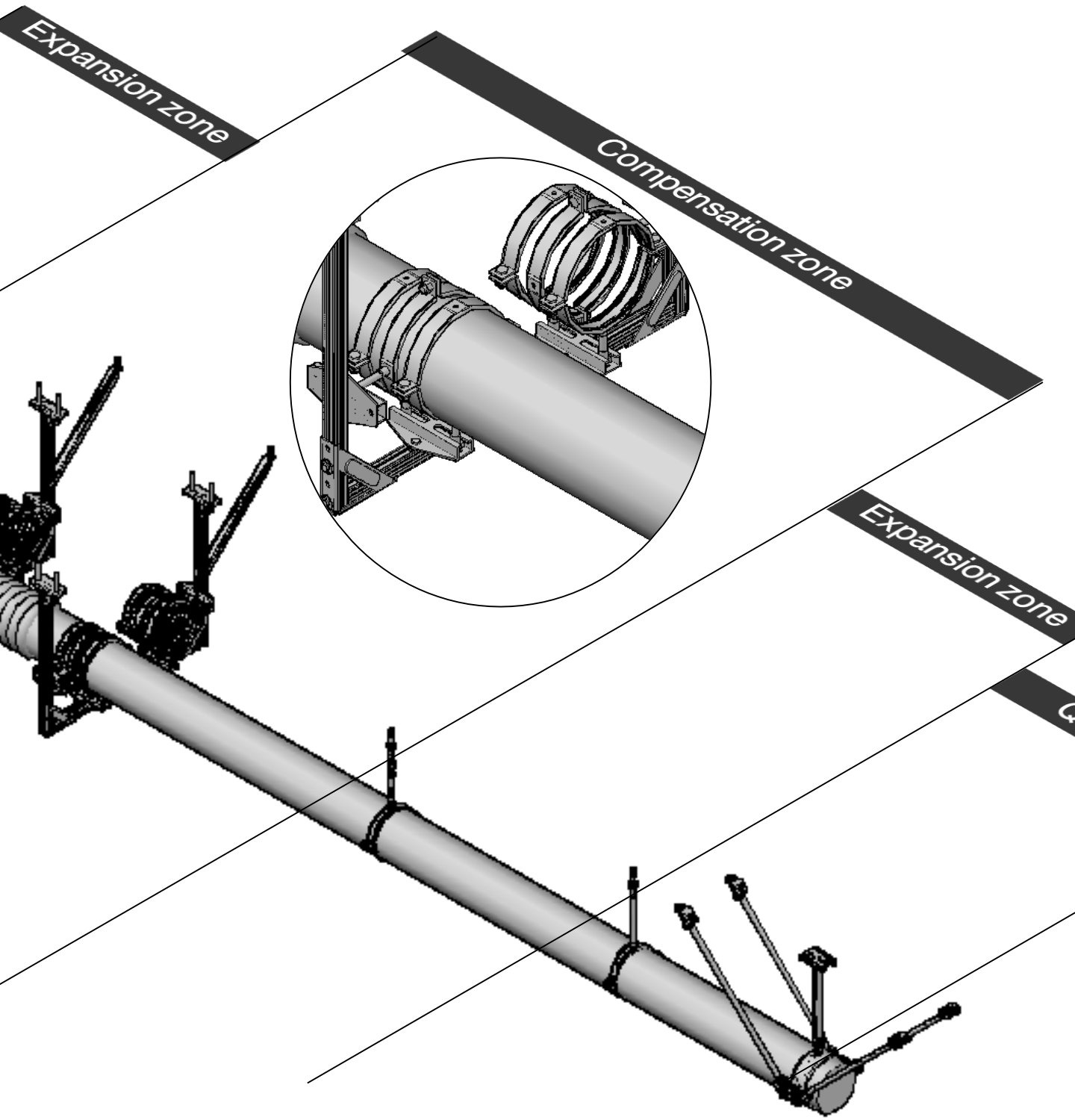
In situations where the pipe support has to be placed very close to the elbow (between the point of zero rotation and the elbow) due to exceeding the max. spacing or loading capacity limits, the pipe supports must allow multidirectional movement and the entire frame structure must be designed to carry these vertical, axial and lateral loads. Cross sliding elements with sufficient traveling capacity must be used.



17.0 TECHNICAL COMPENSATION

Zones and typical solutions:

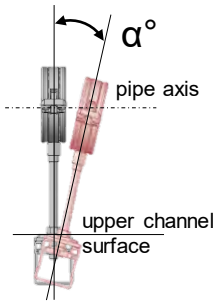



Expansion zone
Compensation zone
Expansion zone

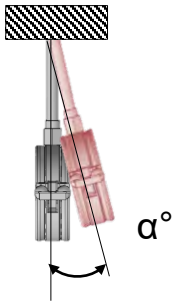
17.0 TECHNICAL COMPENSATION

Pipe runs can be divided into zones according to the impact of expansion on the pipe supports. The zones are defined differently for pipes on standing supports and for suspended pipes. The main factors are expansion along the pipe axis and distance from the upper surface of the channel (in the case of pipes on standing supports) and expansion along the pipe axis and distance from the underside of the supporting structure (in the case of suspended pipes).

Supported pipes

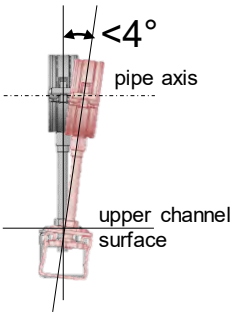


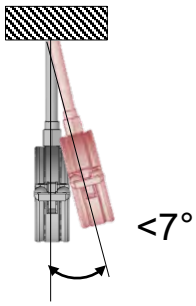
Hanged pipes



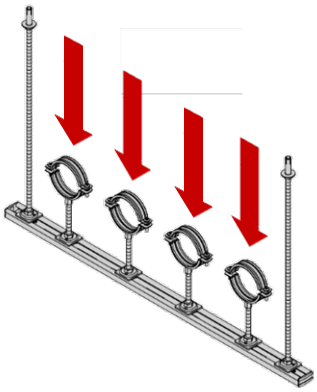
Quiet zone:

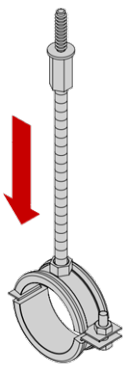
At this pipe zone the impact of expansion is negligible – no special measures are required.





The pipe supports must be designed to take up the vertical load resulting from the weight of the pipe section (only for relevant applications). See section “Typical plumbing applications”.



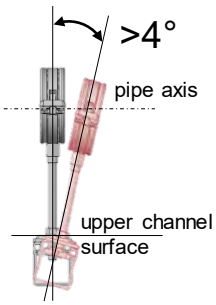


17.0 TECHNICAL COMPENSATION

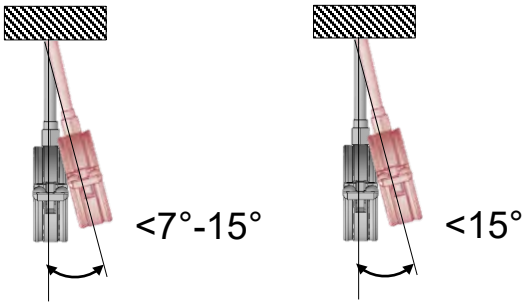
Expansion zone:

This is the zone in which expansion begins to have an impact in axial direction. Traditional methods of pipe installation begin to run out of options and use of special expansion elements becomes necessary. Ignoring expansion would result in torque moment in channels, significant displacement of threaded rods and irreversible deformation of several parts. All of these impacts could lead to a chain reaction and, in extreme cases, to collapse of the pipe support system.

Supported pipes

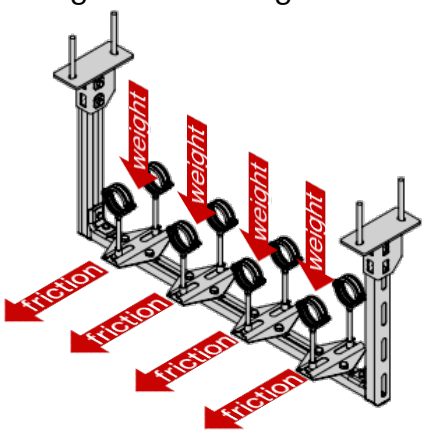


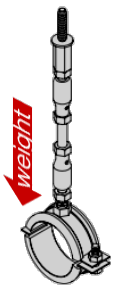
Hanged pipes



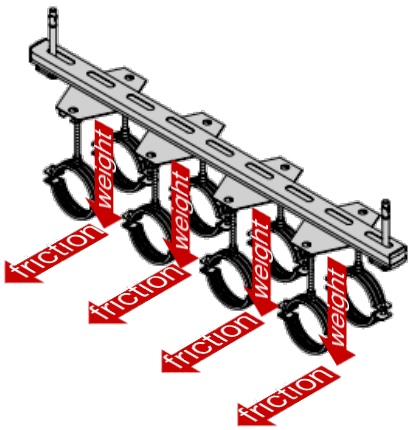
Swing hanger Expansion elements

In the expansion zone it is necessary to make use of expansion elements that properly distribute expansion forces to the supporting structure. The pipe support must be designed according the loading scheme:



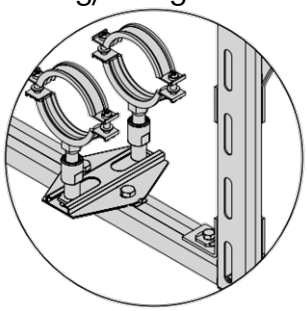


Swing hanger

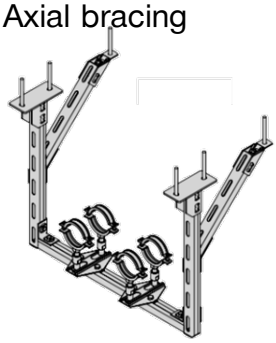


This leads to use of special solutions:

Sliding/rolling elements



Axial bracing

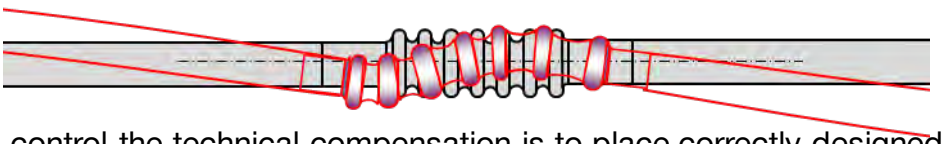


17.0 TECHNICAL COMPENSATION

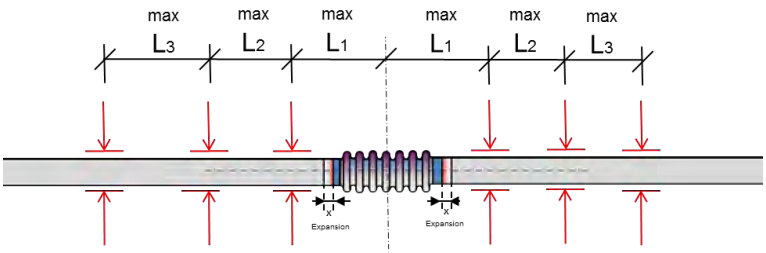
Compensation zone:

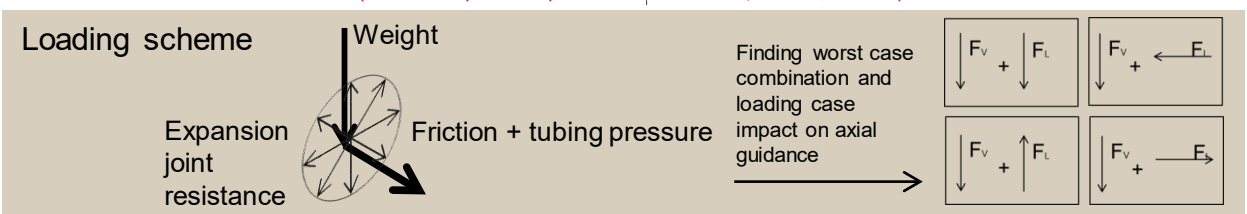
In this zone, the expansion impact meets technical compensation and its resistance. Technical compensation (axial) behaves like a spring under pressure. This leads to unpredictability regarding the direction of the spring-back effect. An uncontrolled spring-back effect would lead to irreversible deformation of the expansion joint and would subject the pipe supports to unpredictable loads in unpredictable directions. The expansion joint must therefore be controlled by fitting suitably engineered axial guides at exactly the required distance from the expansion joint and at both sides of the joint.

Uncontrolled expansion leads to irreversible deformation and in many cases to collapse of the pipe system.

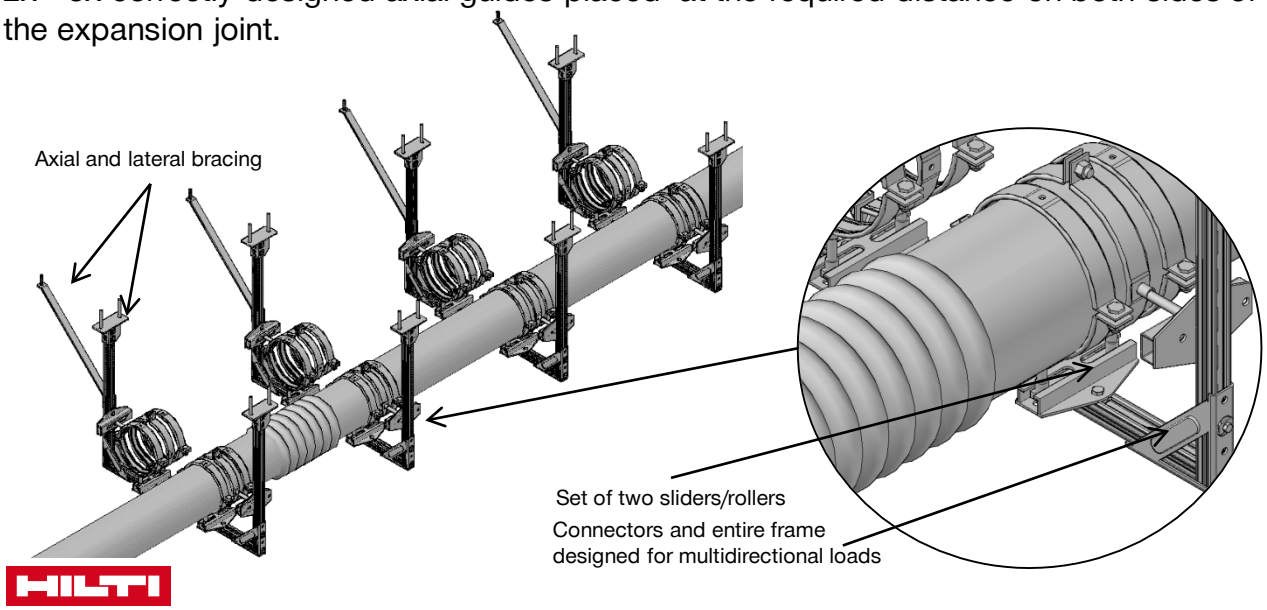


The way to control the technical compensation is to place correctly designed axial guides placed at the required distances.





This leads to use of special solutions:
2x - 3x correctly designed axial guides placed at the required distance on both sides of the expansion joint.



18.0 TECHNICAL COMPENSATION FIXED POINT LOADS

$$F_{FP} = F_{TP} + F_{SR} + F_{FR}$$

F_{TP} - Tubing pressure load
F_{SR} - Spring rate load
F_{FR} - Friction load at all pipe supports

$$F_{TP}[kN] = (P[bar] \times A[mm^2])/10000$$

P - Design value for pressure
A - Effective area of compensator (see manufacturer's data)

$$F_{SR}[kN] = (\Delta L[mm] * C[N/mm])/1000$$

ΔL - Expansion of the pipe
C - Spring rate of the expansion joint (see manufacturer's data)

Note: In case of pre-tightened expansion joints $F_{SR} = 2 * \Delta L * C$

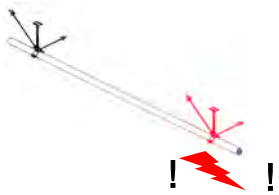
$$F_{FR}[kN] = (\mu[-] * 9.81[m/s^2] * M[kg/m] * L[m])/1000$$

μ - Friction factor
M - Weight of the pipe: 1m, water-filled, incl. insulation
L - Length of the pipe section from fixed point to bending arm

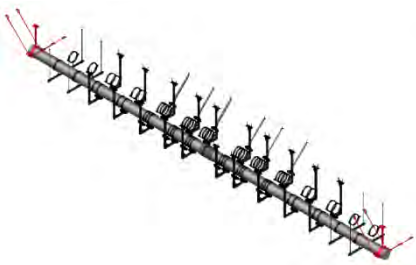
19.0 TECHNICAL COMPENSATION RULES TO FOLLOW

Rules to follow forsafe design and control of the expansion

Rule no. 1
Never two fixed points on the same pipe without compensation between.



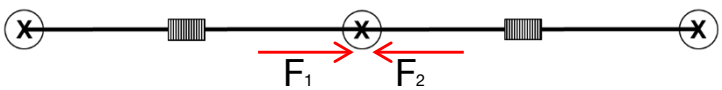
Rule no. 2
Every compensation must be accompanied by two fixed points – one on each side.



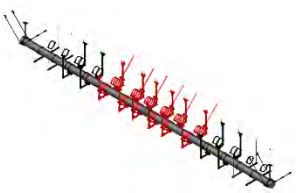
Rule no. 3
Every fixed point must be braced on both sides.

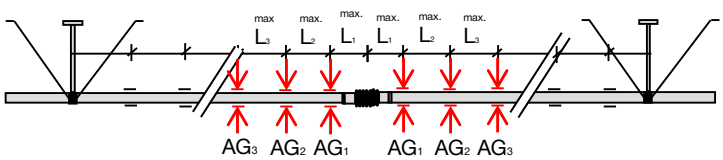
Rule no. 4
The fixed point between two compensations must be designed to take up a single load action – the higher of the two potential loads.

F_{FP}= higher of F_1 or F_2



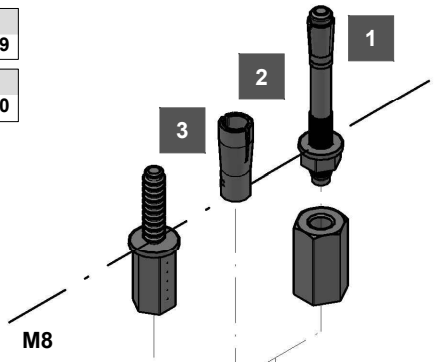
Rule no. 5
Axial expansion must be accommodated by *two or three correctly engineered axial guides on both sides at the proper distance. *The expansion joint vendor's instructions must be strictly observed.



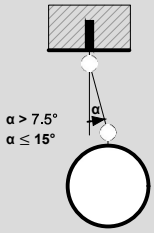


Single Fastening On Concrete - M8 Options

1	M8 Stud Anchor	
	1x HST3 M8x75 -/10 anchor	**2105888**
	HST2 M8x75/10	**2108161**
	1x M8x25 threaded rod coupler	**216703**
2	M8 Drop-in Anchor	
	1x HKD M8x30 anchor	**376959**
3	M8 Screw Anchor	
	1x HUS-I 6x55 M8/M10	**423180**



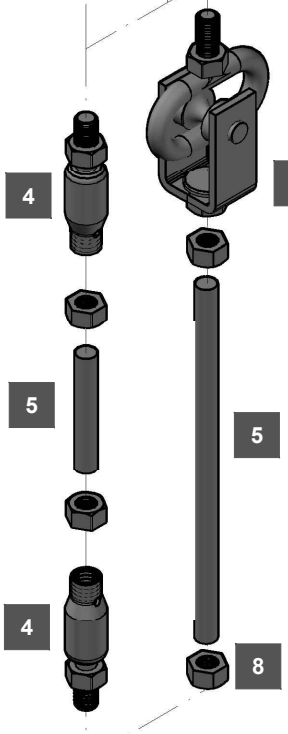
Limitation



4	M8 Swivel Hanger	
	1x MPH M8 swivel hanger	**418035**
	1x M8 nut	**2184504**

Max. travel distance of 25 mm

7	M8 Swivel Hanger	
	1x MPSG M8 swivel hanger	**338994**
	1x M8 nut	**2184504**



5	M8 Threaded Rods	
	AM8x1000 4.8 zinced	**339793**
	AM8x2000 4.8 zinced	**339794**
	AM8x3000 4.8 zinced	**216415**

4	M8 Swivel Hanger	
	1x MPH M8 swivel hanger	**418035**
	1x M8 nut	**2184504**

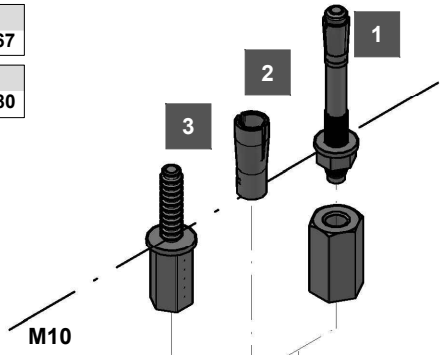
8	M8 Nut	
	1x M8 nut	**2184504**

6	M8 Pipe Clamps	
	MP-PI	**Sizes 11mm - 219mm**
	MP-L-I	**Sizes 9mm - 170mm**
	MP-HI	**Sizes 8mm - 172mm**
	MP-U-I	**Sizes 9mm - 170mm**

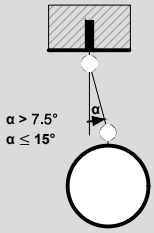
Application description	Application	Product lines	Base material
Heating - Single fastening M8	1	Anchors	Concrete
General comments		Swiveling elements	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On Concrete - M10 Options

1	M10 Stud Anchor	
	1x HST3 M10x100 40/20 anchor	2105713
	HST2 M10x100/20	2107846
	1x M10x30 threaded rod coupler	216704
2	M10 Drop-in Anchor	
	1x HKD M10x40 anchor	376967
3	M10 Screw Anchor	
	1x HUS-I 6x55 M8/M10	423180



Limitation



4	M10 Swivel Hanger	
	1x MPH M10 swivel hanger	418036
	1x M10 nut	2184505

Max. travel distance of 25 mm

7	M10 Swivel Hanger	
	1x MPSG M10 swivel hanger	338995
	1x M10 nut	2184505

5	M10 Threaded Rods	
	AM10x1000 4.8 zinced	339795
	AM10x2000 4.8 zinced	339796
	AM10x3000 4.8 zinced	216418

4	M10 Swivel Hanger	
	1x MPH M10 swivel hanger	418036
	1x M10 nut	2184505

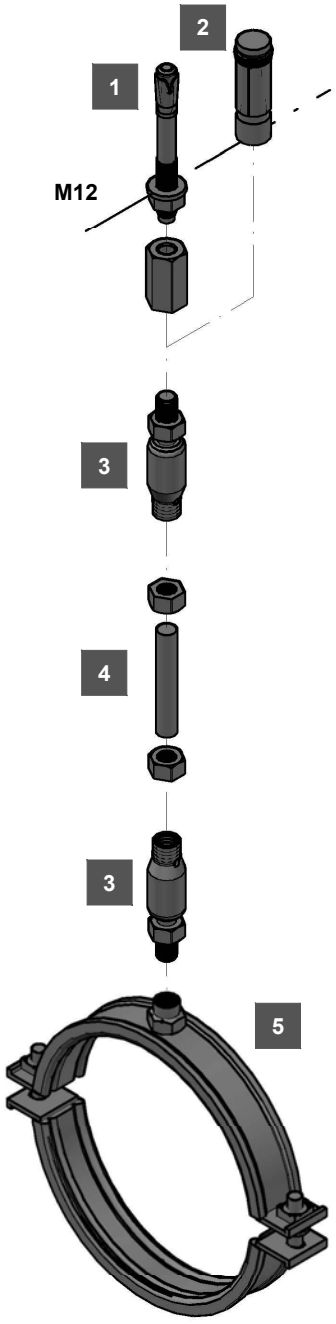
8	M10 Nut	
	1x M10 nut	2184505

6	M10 Pipe Clamps	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm
	MP-MI ... G	Sizes 15mm - 168mm
	MP-MXI M10/M12	Sizes 60mm - 93mm

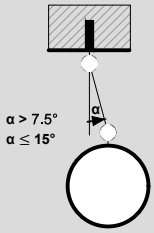
Application description	Application	Product lines	Base material
Heating - Single fastening M10	1	Anchors	Concrete
General comments		Swiveling elements	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On Concrete - M12 Options

1	M12 Stud Anchor	
	1x HST3 M12x115 40/20 anchor	**2105719**
	HST2 M12x115/20	**2107849**
	1x M12x40 threaded rod coupler	**216705**
2	M12 Safety Anchor	
	1x HSC-I M12x60 anchor	**31146**
3	M12 Swivel Hanger	
	1x MPH M12 swivel hanger	**418038**
	1x M12 nut	**2184554**
4	M12 Threaded Rods	
	AM12x1000 4.8 zinced	**339797**
	AM12x2000 4.8 zinced	**216420**
	AM12x3000 4.8 zinced	**216421**
3	M12 Swivel Hanger	
	1x MPH M12 swivel hanger	**418038**
	1x M12 nut	**2184554**
5	M12 Pipe Clamps	
	MP-PI	**Sizes 218mm - 326mm**
	MP-MI ... G	**Sizes 15mm - 168mm**
	MP-MXI M10/M12	**Sizes 60mm - 93mm**



Limitation



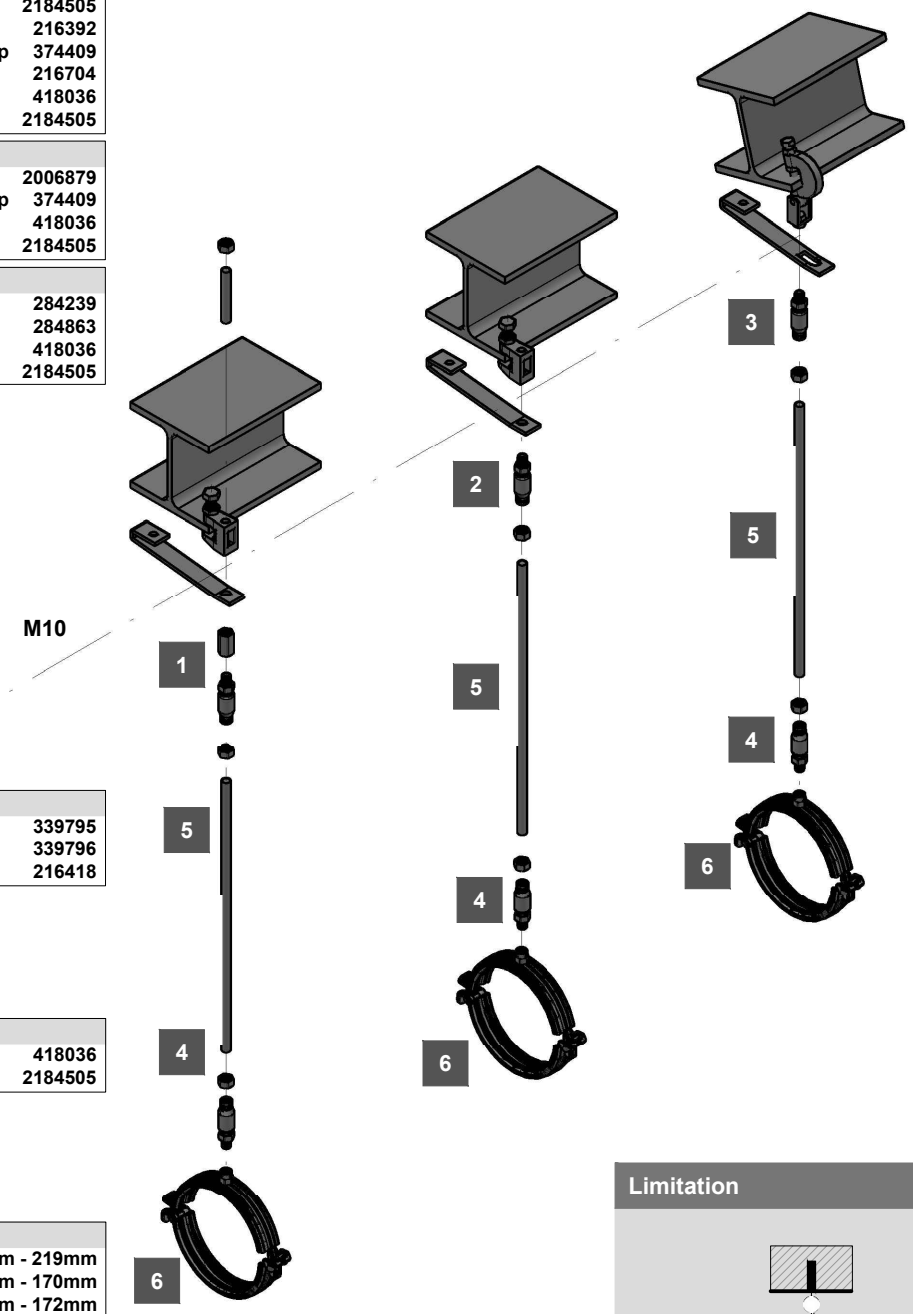
Application description	Application	Product lines	Base material
Heating - Single fastening M12	1	Anchors	Concrete
General comments		Swiveling elements	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On Steel - M10 Options

1	Unthreaded Beam Clamp M10	
	1x MAB 11 beam clamp	375957
	1x M10 nut	2184505
	1x AM10x80 threaded bolt	216392
	1x MAB-S 11/13 securing strap	374409
	1x M10x30 threaded coupler	216704
	1x MPH M10 swivel hanger	418036
	1x M10 nut	2184505

2	Threaded Beam Clamp M10	
	1x MAB-M10 beam clamp	2006879
	1x MAB-S 11/13 securing strap	374409
	1x MPH M10 swivel hanger	418036
	1x M10 nut	2184505

3	Swivel Beam Clamp M10	
	1x MQT-G M10 beam clamp	284239
	1x MQT-S securing strap	284863
	1x MPH M10 swivel hanger	418036
	1x M10 nut	2184505

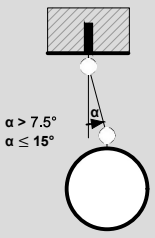


5	M10 Threaded Rods	
	AM10x1000 4.8 zinced	339795
	AM10x2000 4.8 zinced	339796
	AM10x3000 4.8 zinced	216418

4	M10 swivel Hanger	
	1x MPH M10 swivel hanger	418036
	1x M10 nut	2184505

6	M10 Pipe Clamps	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm
	MP-MI ... G	Sizes 15mm - 168mm
	MP-MXI M10/M12	Sizes 60mm - 93mm

Limitation



Application description	Application	Product lines	Base material
Heating - Single fastening M10	1	Beam Clamps	Steel
General comments		Swiveling elements	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On PMS - M10 Options

1 M10 Connection to PMS - Through-Bolted V

1x MF-TSH M10 V-hanger	229907
2x M8 nut	2184504
1x AM8x1000..m threaded rod	339793
1x MPH M10 swivel hanger	418036
1x M10 nut	2184505

2 M10 Alternative Through Bolt

1x M8x120 4.8 screw	2063165
1x M8 nut	2184504

3 M10 Connection to PMS - Through-Bolted V

1x MVA-MS M10 V-hanger	386559
2x M8 nut	2184504
1x AM8x1000..m t-rod	339793
1x MPH M10 swivel hanger	418036
1x M10 nut	2184505

PMS Punch Plies

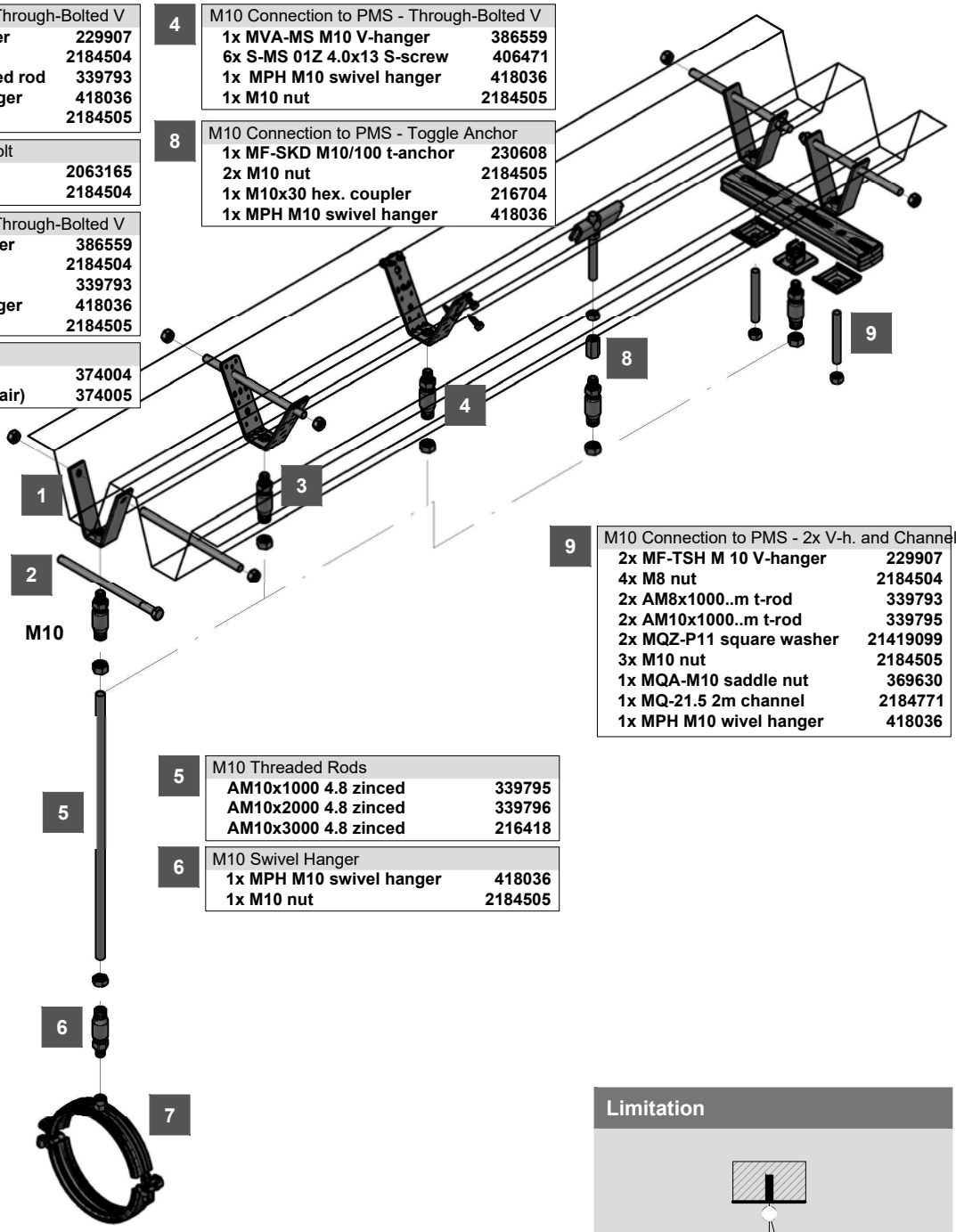
TSH-Z punch plies	374004
M-TSH-I spare spikes (pair)	374005

4 M10 Connection to PMS - Through-Bolted V

1x MVA-MS M10 V-hanger	386559
6x S-MS 01Z 4.0x13 S-screw	406471
1x MPH M10 swivel hanger	418036
1x M10 nut	2184505

8 M10 Connection to PMS - Toggle Anchor

1x MF-SKD M10/100 t-anchor	230608
2x M10 nut	2184505
1x M10x30 hex. coupler	216704
1x MPH M10 swivel hanger	418036



9 M10 Connection to PMS - 2x V-h. and Channel

2x MF-TSH M 10 V-hanger	229907
4x M8 nut	2184504
2x AM8x1000..m t-rod	339793
2x AM10x1000..m t-rod	339795
2x MQZ-P11 square washer	21419099
3x M10 nut	2184505
1x MQA-M10 saddle nut	369630
1x MQ-21.5 2m channel	2184771
1x MPH M10 wivel hanger	418036

5 M10 Threaded Rods

AM10x1000 4.8 zinced	339795
AM10x2000 4.8 zinced	339796
AM10x3000 4.8 zinced	216418

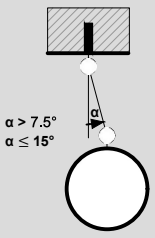
6 M10 Swivel Hanger

1x MPH M10 swivel hanger	418036
1x M10 nut	2184505

7 M10 Pipe Clamps

MP-PI	Sizes 8mm - 8"
MP-HI	Sizes 8mm - 6"
MPN-RC	Sizes 8mm - 6"
MPN-QRC M10	Sizes 8mm - 2"
MP-MI..G	Sizes 3/8" - 6"
MP-MXI M10/M12	Sizes 2" - 3"

Limitation



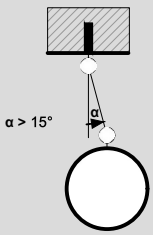
Application description	Application	Product lines	Base material
Heating - Single fastening M10	1	Beam Clamps	PMS
General comments		Swiveling elements	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

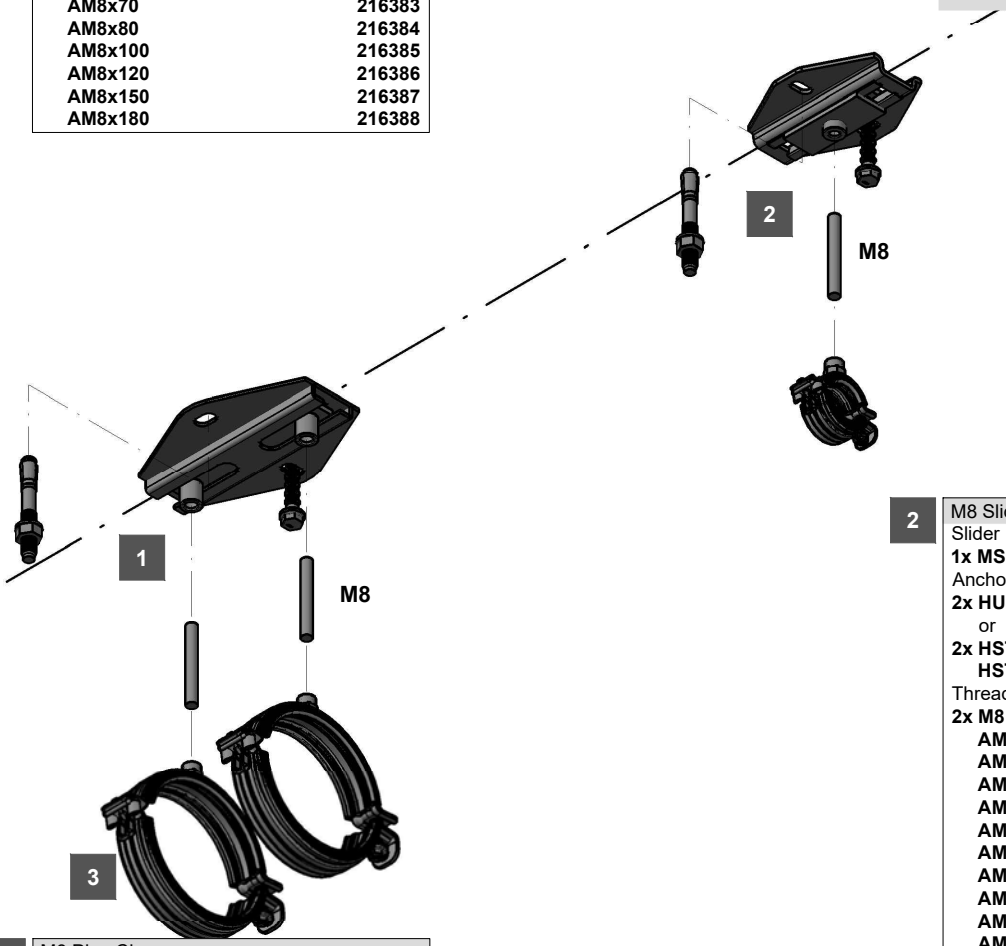
Single Fastening On Concrete - M8 Options

1

M8 Sliding Support	1x
Slider	
1x MSG 1.75 M8/M10 D slider	**248209**
Anchor	
2x HUS3-H 8x55/-/- screw anchor	**2079794**
or	
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 10x90/10 anchor	**2107847**
Threaded bolt	
2x M8 threaded bolt	
AM8x30	**216379**
AM8x40	**216380**
AM8x50	**216381**
AM8x60	**216382**
AM8x70	**216383**
AM8x80	**216384**
AM8x100	**216385**
AM8x120	**216386**
AM8x150	**216387**
AM8x180	**216388**

Limitation





2

M8 Sliding Support	1x
Slider	
1x MSG-L 1,2 M8/M10 D slider	**2172050**
Anchor	
2x HUS3-H 8x55/-/- screw anchor	**2079794**
or	
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 10x90/10 anchor	**2107847**
Threaded bolt	
2x M8 threaded bolt	
AM8x30	**216379**
AM8x40	**216380**
AM8x50	**216381**
AM8x60	**216382**
AM8x70	**216383**
AM8x80	**216384**
AM8x100	**216385**
AM8x120	**216386**
AM8x150	**216387**
AM8x180	**216388**

3

M8 Pipe Clamps	
MP-PI	**Sizes 11mm - 219mm**
MP-L-I	**Sizes 9mm - 170mm**
MP-HI	**Sizes 8mm - 172mm**
MP-U-I	**Sizes 9mm - 170mm**

Application description	Application	Product lines	Base material
Heating - Single fastening M8	1	Anchors	Concrete
General comments		Sliders and Rollers	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On Concrete - M10 Options

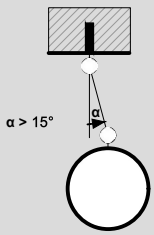
1

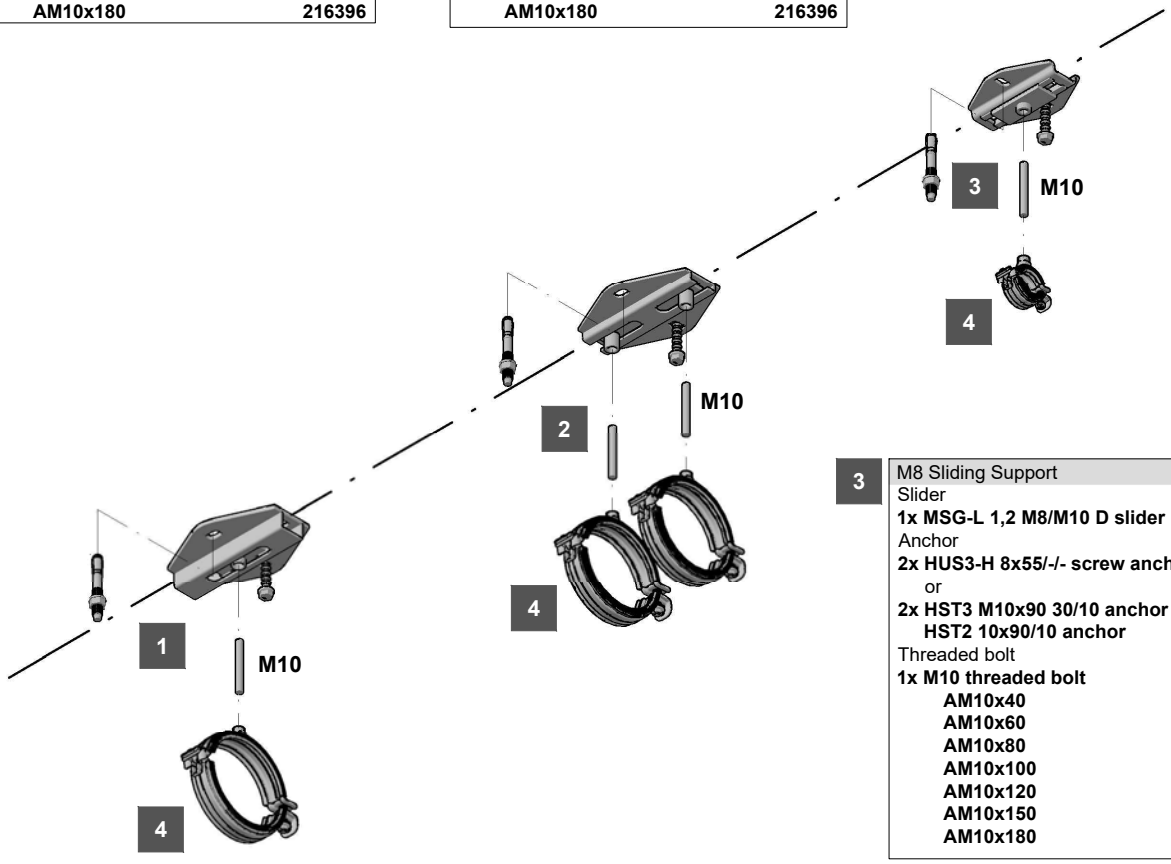
M8 Sliding Support	
Slider	
1x MRG 2.0 M10/M12 D slider	**243550**
Anchor	
2x HUS3-H 8x55/-/- screw anchor	**2079794**
or	
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 10x90/10 anchor	**2107847**
Threaded bolt	
1x M10 threaded bolt	
AM10x40	**216390**
AM10x60	**216391**
AM10x80	**216392**
AM10x100	**216393**
AM10x120	**216394**
AM10x150	**216395**
AM10x180	**216396**

2

M8 Sliding Support	
Slider	
1x MSG 1.75 M8/M10 D slider	**248209**
Anchor	
2x HUS3-H 8x55/-/- screw anchor	**2079794**
or	
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 10x90/10 anchor	**2107847**
Threaded bolt	
2x M10 threaded bolt	
AM10x40	**216390**
AM10x60	**216391**
AM10x80	**216392**
AM10x100	**216393**
AM10x120	**216394**
AM10x150	**216395**
AM10x180	**216396**

Limitation





3

M8 Sliding Support	
Slider	
1x MSG-L 1,2 M8/M10 D slider	**2172050**
Anchor	
2x HUS3-H 8x55/-/- screw anchor	**2079794**
or	
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 10x90/10 anchor	**2107847**
Threaded bolt	
1x M10 threaded bolt	
AM10x40	**216390**
AM10x60	**216391**
AM10x80	**216392**
AM10x100	**216393**
AM10x120	**216394**
AM10x150	**216395**
AM10x180	**216396**

4

M10 Pipe Clamps	
MP-PI	**Sizes 11mm - 219mm**
MP-L-I	**Sizes 9mm - 170mm**
MP-HI	**Sizes 8mm - 172mm**
MP-U-I	**Sizes 9mm - 170mm**
MP-MI ... G	**Sizes 15mm - 168mm**
MP-MXI M10/M12	**Sizes 60mm - 93mm**

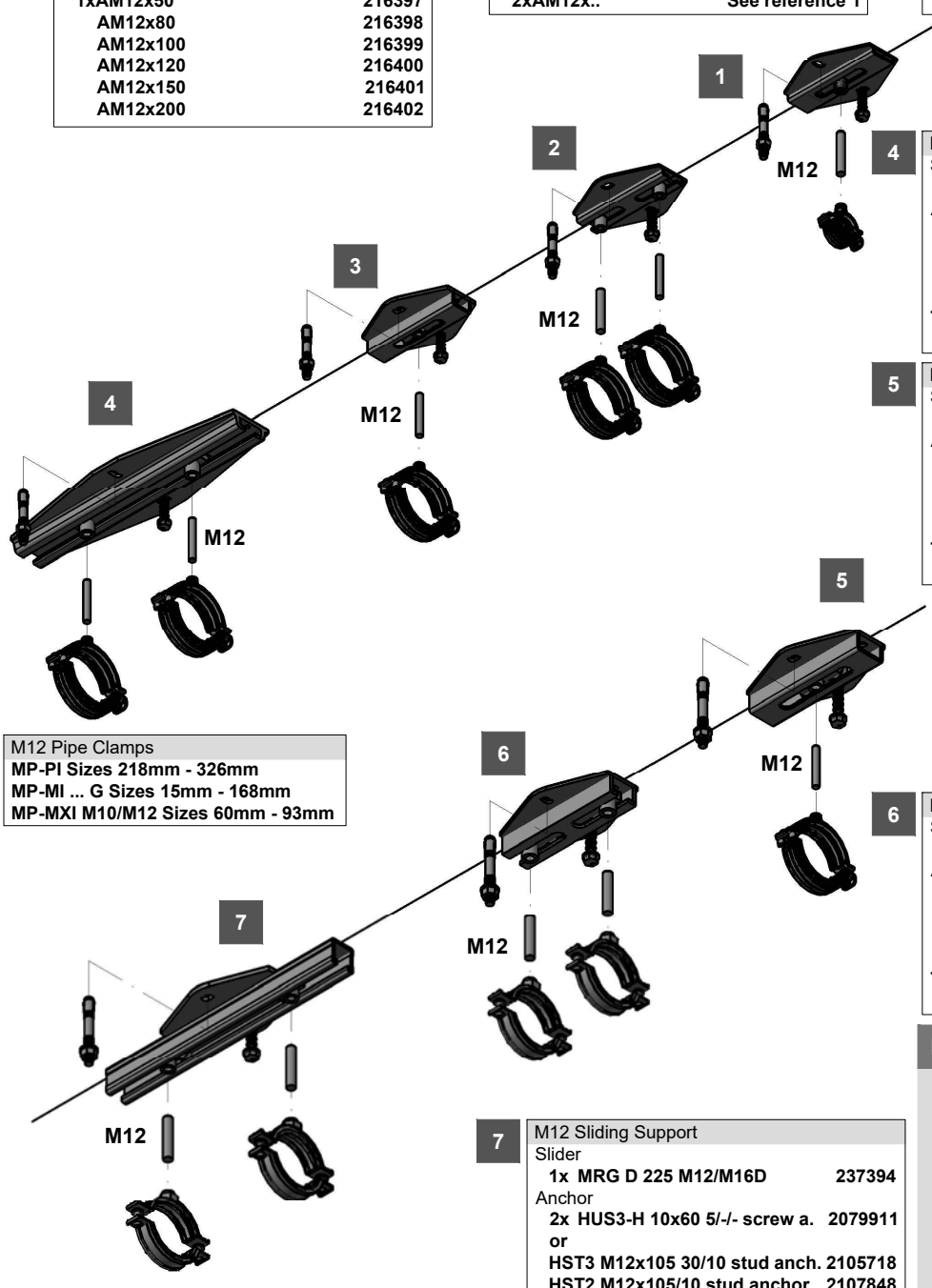
Application description	Application	Product lines	Base material
Heating - Single fastening M10	1	Anchors	Concrete
General comments		Sliders and Rollers	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On Concrete - M12 Options

1 M12 Sliding Support
Slider
1x MSG 1.0 M12/M16 248206
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
1xAM12x50 216397
AM12x80 216398
AM12x100 216399
AM12x120 216400
AM12x150 216401
AM12x200 216402

2 M12 Sliding Support
Slider
1x MSG 1.75 M12/M16D 248210
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
2xAM12x.. See reference 1

3 M12 Sliding Support
Slider
1x MRG 2.0 M12/M16D 243550
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
2xAM12x.. See reference 1



4 M12 Sliding Support
Slider
1x MSG-D 200 1,5 M12/M16D 2171849
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
2xAM12x.. See reference 1

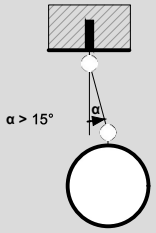
5 M12 Sliding Support
Slider
1x MRG 4.0 M12/M16D 243551
Anchor
2x HUS3-H 10x60 5/-/- screw a. 2079911
or
HST3 M12x105 30/10 stud anch. 2105718
HST2 M12x105/10 stud anchor 2107848
Threaded bolt
2xAM12x.. See reference 1

M12 Pipe Clamps
MP-PI Sizes 218mm - 326mm
MP-MI ... G Sizes 15mm - 168mm
MP-MXI M10/M12 Sizes 60mm - 93mm

6 M12 Sliding Support
Slider
1x MRG D6 M12/M16D 334131
Anchor
2x HUS3-H 10x60 5/-/- screw a. 2079911
or
HST3 M12x105 30/10 stud anch. 2105718
HST2 M12x105/10 stud anchor 2107848
Threaded bolt
2xAM12x.. See reference 1

7 M12 Sliding Support
Slider
1x MRG D 225 M12/M16D 237394
Anchor
2x HUS3-H 10x60 5/-/- screw a. 2079911
or
HST3 M12x105 30/10 stud anch. 2105718
HST2 M12x105/10 stud anchor 2107848
Threaded bolt
2xAM12x.. See reference 1

Limitation



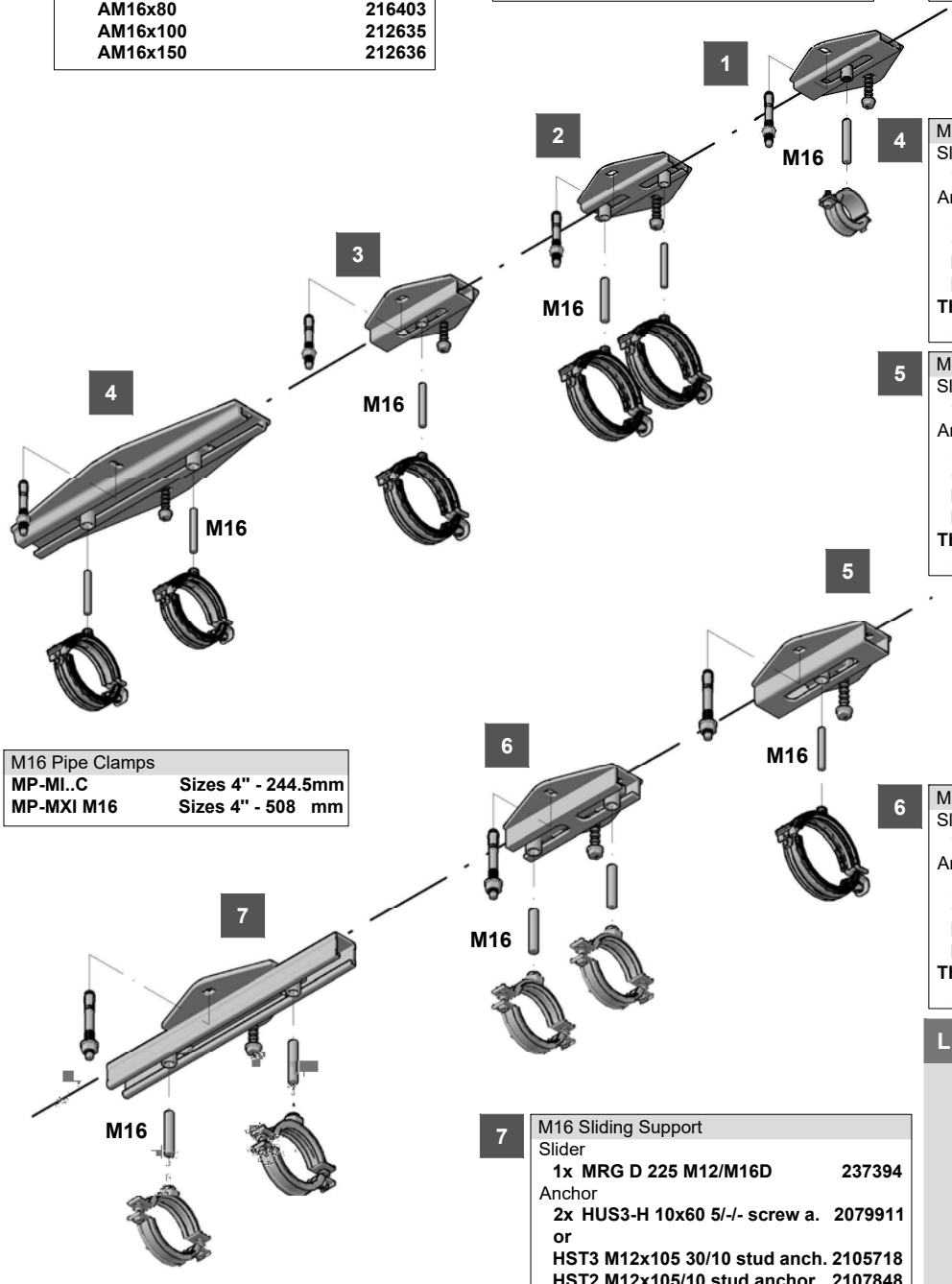
Application description	Application	Product lines	Base material
Heating - Single fastening M12	1	Anchors	Concrete
General comments		Sliders and Rollers	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Single Fastening On Concrete - M16 Options

1 M16 Sliding Support
Slider
1x MSG 1.0 M12/M16 248206
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
1xAM16x60 212634
AM16x80 216403
AM16x100 212635
AM16x150 212636

2 M16 Sliding Support
Slider
1x MSG 1.75 M12/M16D 248210
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
2xAM16x.. See reference 1

3 M16 Sliding Support
Slider
1x MRG 2.0 M12/M16D 243550
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
2xAM16x.. See reference 1



4 M16 Sliding Support
Slider
1x MSG-D 200 1,5 M12/M16D 2171849
Anchor
2x HUS3-H 8x55/-/- screw anch. 2079794
or
HST3 M10x90 30/10 stud anchor 2105712
HST2 M10x90/10 stud anchor 2107847
Threaded bolt
2xAM16x.. See reference 1

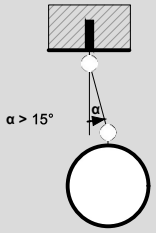
5 M16 Sliding Support
Slider
1x MRG 4.0 M12/M16D 243551
Anchor
2x HUS3-H 10x60 5/-/- screw a. 2079911
or
HST3 M12x105 30/10 stud anch. 2105718
HST2 M12x105/10 stud anchor 2107848
Threaded bolt
2xAM16x.. See reference 1

M16 Pipe Clamps
MP-MI..C Sizes 4" - 244.5mm
MP-MXI M16 Sizes 4" - 508 mm

6 M16 Sliding Support
Slider
1x MRG D6 M12/M16D 334131
Anchor
2x HUS3-H 10x60 5/-/- screw a. 2079911
or
HST3 M12x105 30/10 stud anch. 2105718
HST2 M12x105/10 stud anchor 2107848
Threaded bolt
2xAM16x.. See reference 1

7 M16 Sliding Support
Slider
1x MRG D 225 M12/M16D 237394
Anchor
2x HUS3-H 10x60 5/-/- screw a. 2079911
or
HST3 M12x105 30/10 stud anch. 2105718
HST2 M12x105/10 stud anchor 2107848
Threaded bolt
2xAM16x.. See reference 1

Limitation



Application description	Application	Product lines	Base material
Heating - Single fastening M16	1	Anchors	Concrete
General comments		Sliders and Rollers	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Pipe rings	

Heating - MQ System Headrail on Concrete

1	HUS-3PL 6 Screw Anchor in the slot	
2x	HUS-3PL 6 screw anchor	2195766

2	HUS-3PL 6 Screw Anchor in the anchor hole	
2x	HUS-3PL 6 screw anchor	2195766

3	HUS-3H 10 Screw Anchor in the slot	
2x	HUS3-H 10x60 5/-/- anchor	2079911

4	HUS-3H 8 Screw Anchor in the anchor hole	
2x	HUS3-H 8x55 5/-/- anchor	2079794

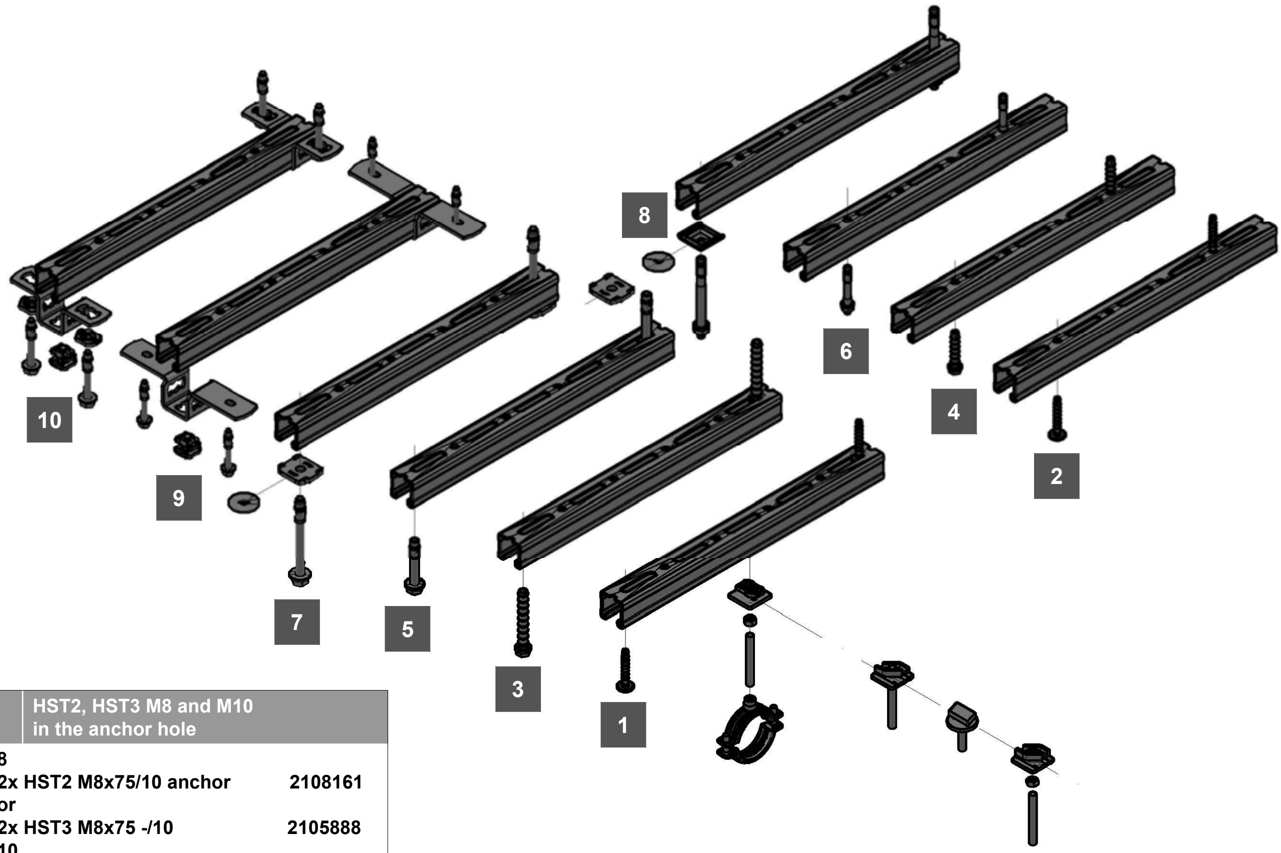
5	HST2, HST3 M10 in the slot
2x HST3 M10x90 30/10 anchor	2105712
or	
2x HST2 M10x90/10 anchor	2107847
Tip:	
Wrench to fit 41 mm channel :	
SI-S 1/2“-17 L	2070404

7	HST2 M12, HST3 M12 through bolted through the slot
Anchor	
2x HST3 M12x145 70/50 anchor	2105851
or	
2x HST2 M12x145/50	2227480
Load distribution washer	
2x MQZ-L13 boss plate	2199456
or	
2x 13,0x40x3 A2K Sim.ISO708 washer	2184518

8	HST2 M10, HST3 M10 through bolted through the slot
Anchor	
2x HST3 M10x130 70/50 anchor	2105715
or	
2x HST2 M10x130/50 anchor	2227089
Washer	
2x MQZ-L11 boss plate	2199455
or	
2x MQZ-P11 boss plate	2141909
or	
2x 10,5x40x3 A2K Sim.ISO708 washer	2184517

9	MQB-G ceiling clamp for 41mm format channel
2x MQB-G41 clamp	369674
2x MQN-C pushbutton	2184368
Screw anchor	
4x HUS3-H 8x55 5/-/- anchor	2079794
Stud anchor	
4x HST3 M10x90 30/10 anchor	2105712
or	
4x HST2 M10x90/10 anchor	2107847

10	MQB clamp for 41mm format channel
For M10 only	
2x MQB-41 clamp	369668
2x MQN-C pushbutton	2184368
4x MQZ-U reduction	369692
Screw anchor	
4x HUS3-H 8x55/-/- anchor	2079794
Stud anchor	
4x HST3 M10x90 30/10 anchor	2105712
or	
4x HST2 M10x90/10 anchor	2107847



Pipe fastening:
please see trapeze application

6	HST2, HST3 M8 and M10 in the anchor hole
M8	
2x HST2 M8x75/10 anchor	2108161
or	
2x HST3 M8x75 -/10	2105888
M10	
2x HST3 M10x90 30/10	2105712
or	
2x HST2 M10x90/10	2107847
Tip:	
Wrench to fit 41 mm channel :	
SI-S 1/2“-17 L	2070404

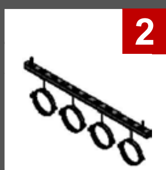
Application description

Heating applications - Headrail

General comments

These pictures do not show any loading capacity limits or exposure or limitation to any load combinations.

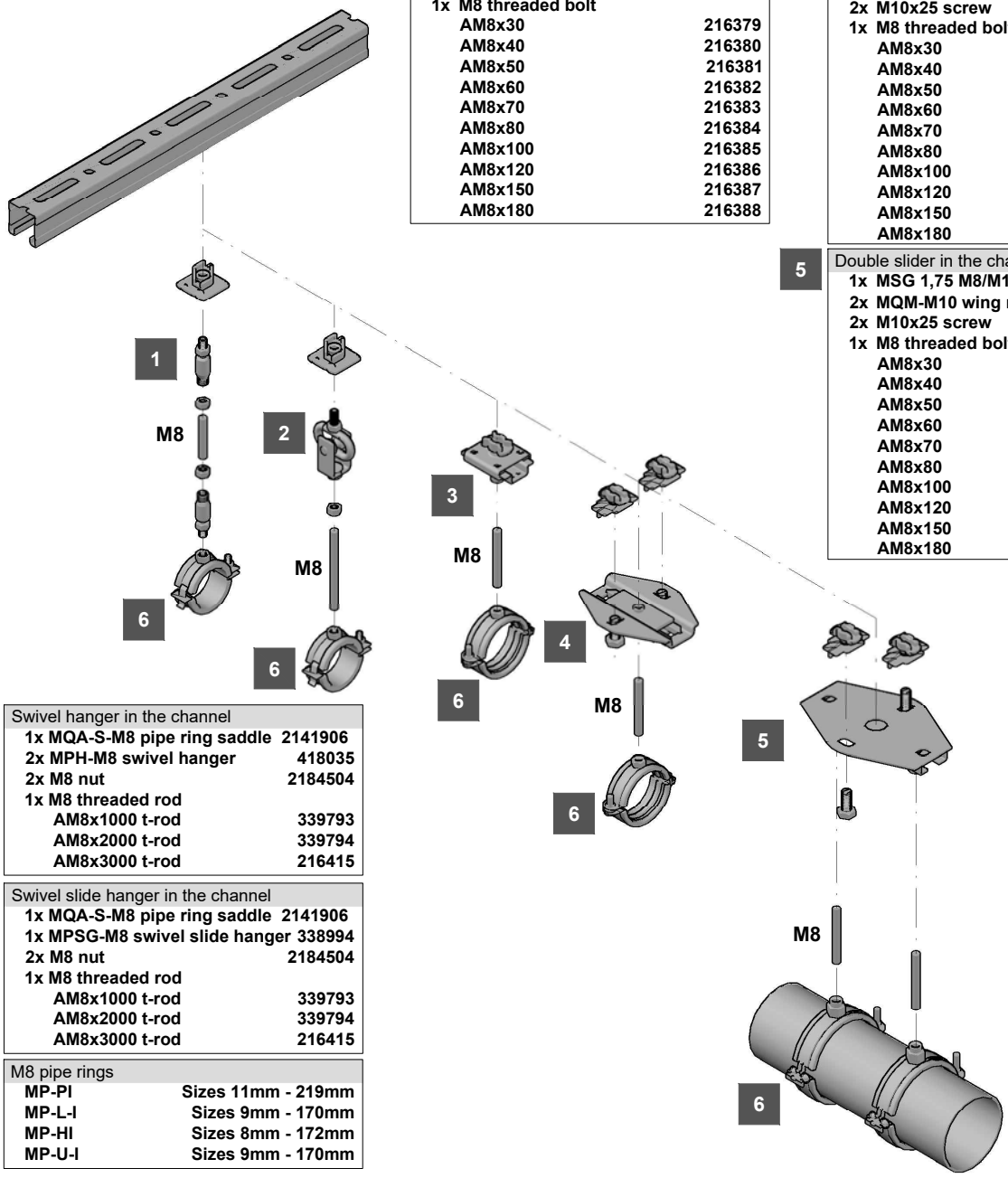
Application



Product lines	Base material
MQ System	Concrete
Anchors	
Accessories	

Head Rail On Concrete - Options For M8 Pipe Connections

M8 solutions



1	Swivel hanger in the channel	
	1x MQA-S-M8 pipe ring saddle	2141906
	2x MPH-M8 swivel hanger	418035
	2x M8 nut	2184504
	1x M8 threaded rod	
	AM8x1000 t-rod	339793
	AM8x2000 t-rod	339794
	AM8x3000 t-rod	216415

2	Swivel slide hanger in the channel	
	1x MQA-S-M8 pipe ring saddle	2141906
	1x MPSG-M8 swivel slide hanger	338994
	2x M8 nut	2184504
	1x M8 threaded rod	
	AM8x1000 t-rod	339793
	AM8x2000 t-rod	339794
	AM8x3000 t-rod	216415

6	M8 pipe rings	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm

3	Single slider in the channel	
	1x MSG-MQ 0,6 M8/M10 slider	2171848
	Slider includes pre-mounted channel nut	
	1x M8 threaded bolt	
	AM8x30	216379
	AM8x40	216380
	AM8x50	216381
	AM8x60	216382
	AM8x70	216383
	AM8x80	216384
	AM8x100	216385
	AM8x120	216386
	AM8x150	216387
	AM8x180	216388

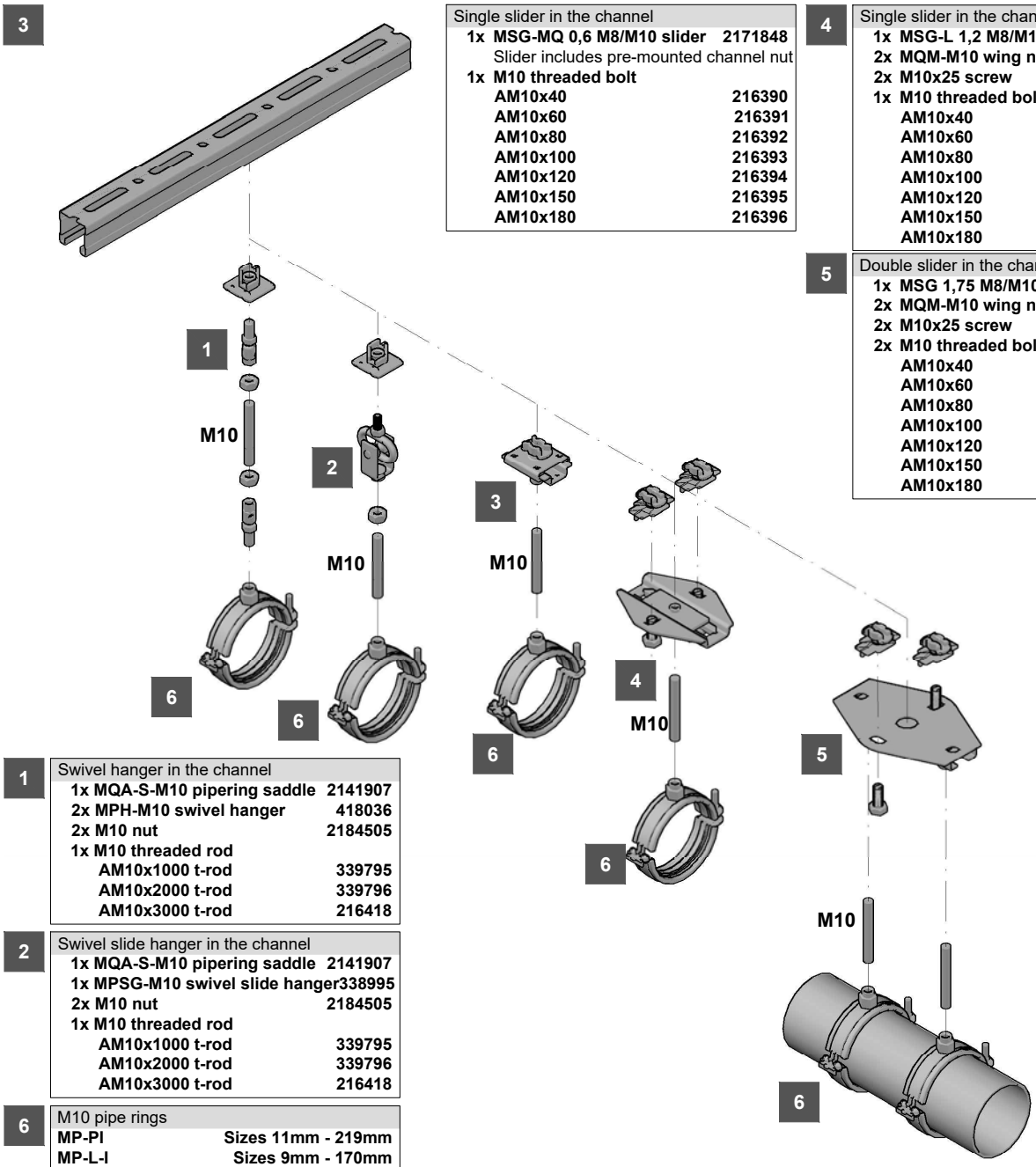
4	Single slider in the channel	
	1x MSG-L 1,2 M8/M10 slider	2172050
	2x MQM-M10 wing nut	369626
	2x M10x25 screw	216454
	1x M8 threaded bolt	
	AM8x30	216379
	AM8x40	216380
	AM8x50	216381
	AM8x60	216382
	AM8x70	216383
	AM8x80	216384
	AM8x100	216385
	AM8x120	216386
	AM8x150	216387
	AM8x180	216388

5	Double slider in the channel	
	1x MSG 1,75 M8/M10 slider	248209
	2x MQM-M10 wing nut	369626
	2x M10x25 screw	216454
	1x M8 threaded bolt	
	AM8x30	216379
	AM8x40	216380
	AM8x50	216381
	AM8x60	216382
	AM8x70	216383
	AM8x80	216384
	AM8x100	216385
	AM8x120	216386
	AM8x150	216387
	AM8x180	216388

Application description	Application	Product lines	Base material
Heating - Head Rail	2	MQ System	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Expansion elements	

Head Rail On Concrete - Options For M10 Pipe Connections

M10 solutions



3	Single slider in the channel	
	1x MSG-MQ 0,6 M8/M10 slider	2171848
	Slider includes pre-mounted channel nut	
	1x M10 threaded bolt	
	AM10x40	216390
	AM10x60	216391
	AM10x80	216392
	AM10x100	216393
	AM10x120	216394
	AM10x150	216395
	AM10x180	216396

4	Single slider in the channel	
	1x MSG-L 1,2 M8/M10 slider	2172050
	2x MQM-M10 wing nut	369626
	2x M10x25 screw	216454
	1x M10 threaded bolt	
	AM10x40	216390
	AM10x60	216391
	AM10x80	216392
	AM10x100	216393
	AM10x120	216394
	AM10x150	216395
	AM10x180	216396

5	Double slider in the channel	
	1x MSG 1,75 M8/M10 slider	248209
	2x MQM-M10 wing nut	369626
	2x M10x25 screw	216454
	2x M10 threaded bolt	
	AM10x40	216390
	AM10x60	216391
	AM10x80	216392
	AM10x100	216393
	AM10x120	216394
	AM10x150	216395
	AM10x180	216396

1	Swivel hanger in the channel	
	1x MQA-S-M10 pipering saddle	2141907
	2x MPH-M10 swivel hanger	418036
	2x M10 nut	2184505
	1x M10 threaded rod	
	AM10x1000 t-rod	339795
	AM10x2000 t-rod	339796
	AM10x3000 t-rod	216418

2	Swivel slide hanger in the channel	
	1x MQA-S-M10 pipering saddle	2141907
	1x MPSG-M10 swivel slide hanger	338995
	2x M10 nut	2184505
	1x M10 threaded rod	
	AM10x1000 t-rod	339795
	AM10x2000 t-rod	339796
	AM10x3000 t-rod	216418

6	M10 pipe rings	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm
	MP-MI ... G	Sizes 15mm - 168mm
	MP-MXI M10/M12	Sizes 60mm - 93mm

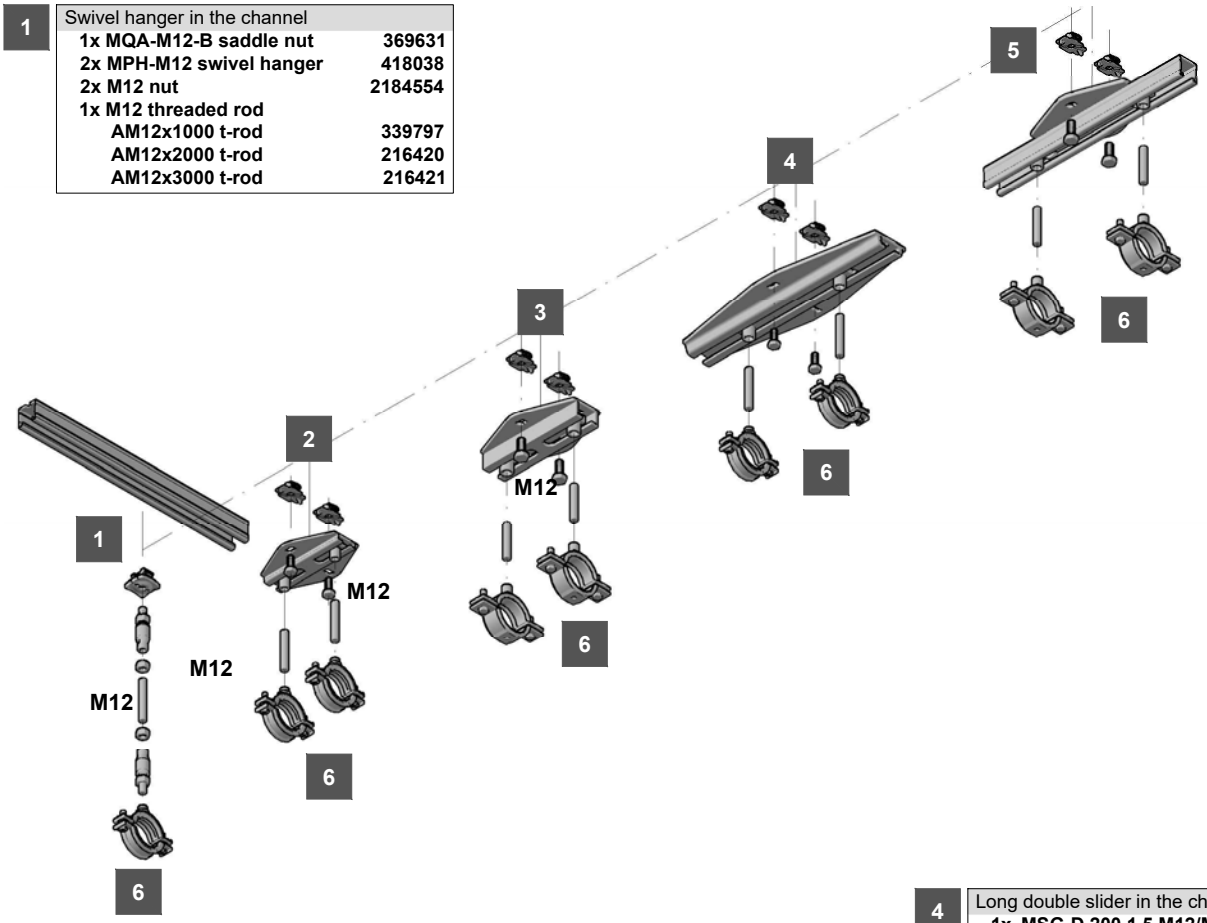
Application description	Application	Product lines	Base material
Heating - Head Rail	2	MQ System	Concrete
		Anchors	
		Expansion elements	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Head Rail On Concrete - Options For M12 Pipe Connections

M12 solutions



1 Swivel hanger in the channel

1x MQA-M12-B saddle nut	369631
2x MPH-M12 swivel hanger	418038
2x M12 nut	2184554
1x M12 threaded rod	
AM12x1000 t-rod	339797
AM12x2000 t-rod	216420
AM12x3000 t-rod	216421

2 Double slider in the channel

1x MSG 1,75 M12/M16 slider	248210
2x MQM-M10 wing nut	369626
2x M10x25 screw	216454
2x M12 threaded bolt	
AM12x50	216397
AM12x80	216398
AM12x100	216399
AM12x120	216400
AM12x150	216401
AM12x200	216402

3 Double roller in the channel

1x MRG-D6 M12/M16 roller	334131
2x MQM-M12 wing nut	369627
2x M12x25 screw	216458
2x M12 threaded bolt	
AM12x..	See reference 2

4 Long double slider in the channel

1x MSG-D 200 1,5 M12/M16 slider	2171849
2x MQM-M10 wing nut	369626
2x M10x25 screw	216454
2x M12 threaded bolt	
AM12x50	216397
AM12x80	216398
AM12x100	216399
AM12x120	216400
AM12x150	216401
AM12x200	216402

5 Long double roller in the channel

1x MRG-D 225 M12/M16 roller	237394
2x MQM-M12 wing nut	369627
2x M12x25 screw	216458
2x M12 threaded bolt	
AM12x..	See reference 4

6 TM12 pipe clamps

MP-PI	Sizes 218mm - 326mm
MP-MI ... G	Sizes 15mm - 168mm
MP-MXI M10/M12	Sizes 60mm - 93mm

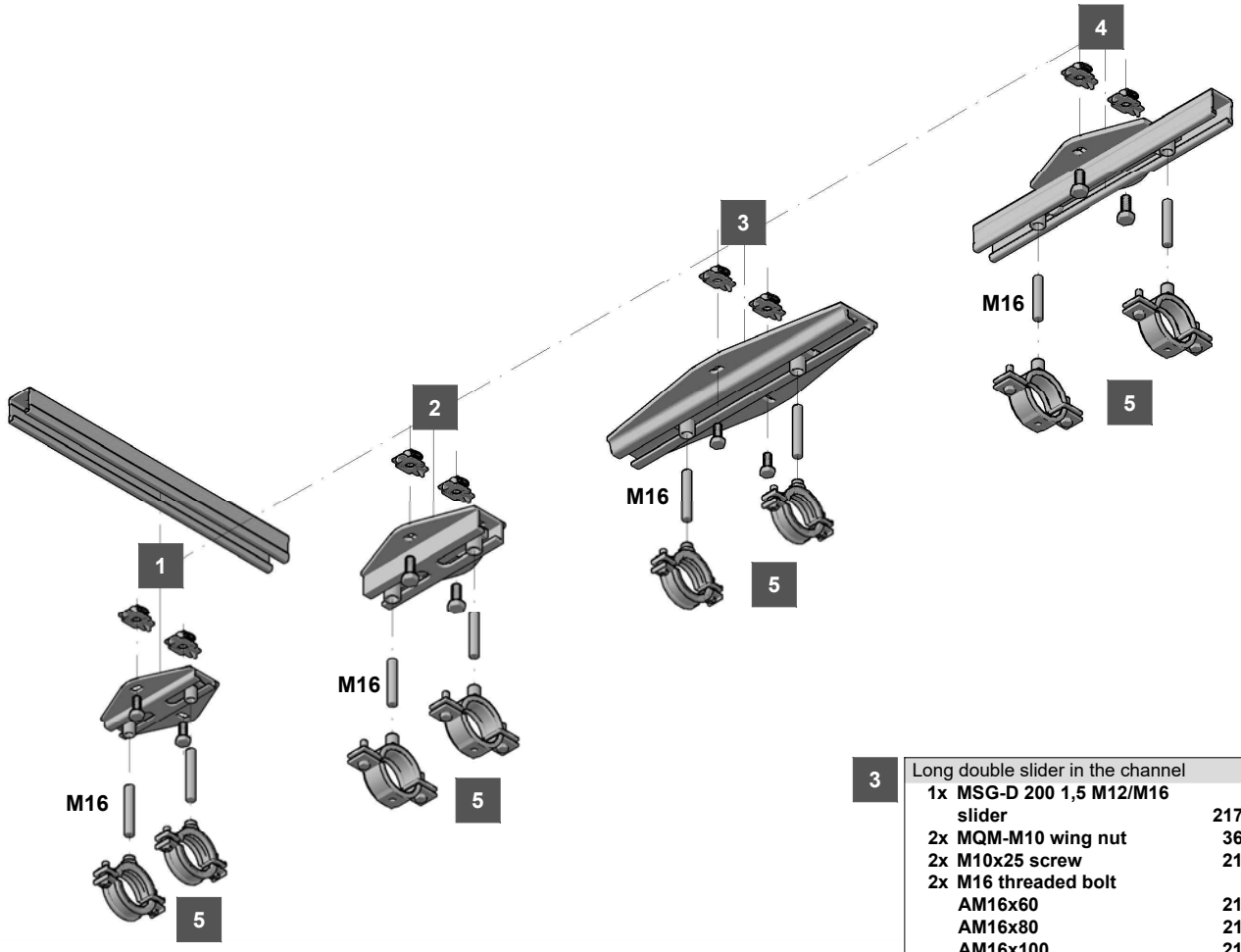
Application description	Application	Product lines	Base material
Heating - Head Rail	2	MQ System	Concrete
		Anchors	
		Expansion elements	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Head Rail On Concrete - Options For M16 Pipe Connections

M16 solutions



1	Double slider in the channel	
	1x MSG 1,75 M12/M16 slider	248210
	2x MQM-M10 wing nut	369626
	2x M10x25 screw	216454
	2x M16 threaded bolt	
	AM16x60	212634
	AM16x80	216403
	AM16x100	216404
	AM16x150	216405

2	Double roller in the channel	
	1x MRG-D6 M12/M16 roller	334131
	2x MQM-M12 wing nut	369627
	2x M12x25 screw	216458
	2x M16 threaded bolt	
	AM16x..	See reference 1

3	Long double slider in the channel	
	1x MSG-D 200 1,5 M12/M16 slider	2171849
	2x MQM-M10 wing nut	369626
	2x M10x25 screw	216454
	2x M16 threaded bolt	
	AM16x60	212634
	AM16x80	216403
	AM16x100	216404
	AM16x150	216405

4	Long double roller in the channel	
	1x MRG-D 225 M12/M16 roller	237394
	2x MQM-M12 wing nut	369627
	2x M12x25 screw	216458
	2x M16 threaded bolt	
	AM16x..	See reference 3

5	M16 pipe clamps	
	MP-U-I M8/10/O16	Sizes 9 - 170mm
	MP-MI..C	Sizes 4" - 244.5mm
	MP-MXI M16	Sizes 4" - 508 mm

M16 Threaded rod	1x
AM16x1000 t-rod	216422
AM16x2000 t-rod	216423
AM16x3000 t-rod	216424

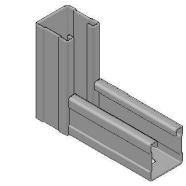
Application description	Application	Product lines	Base material
Heating - Head Rail	2	MQ System	Concrete
		Anchors	
		Expansion elements	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Trapeze On Concrete - Main Frame Options

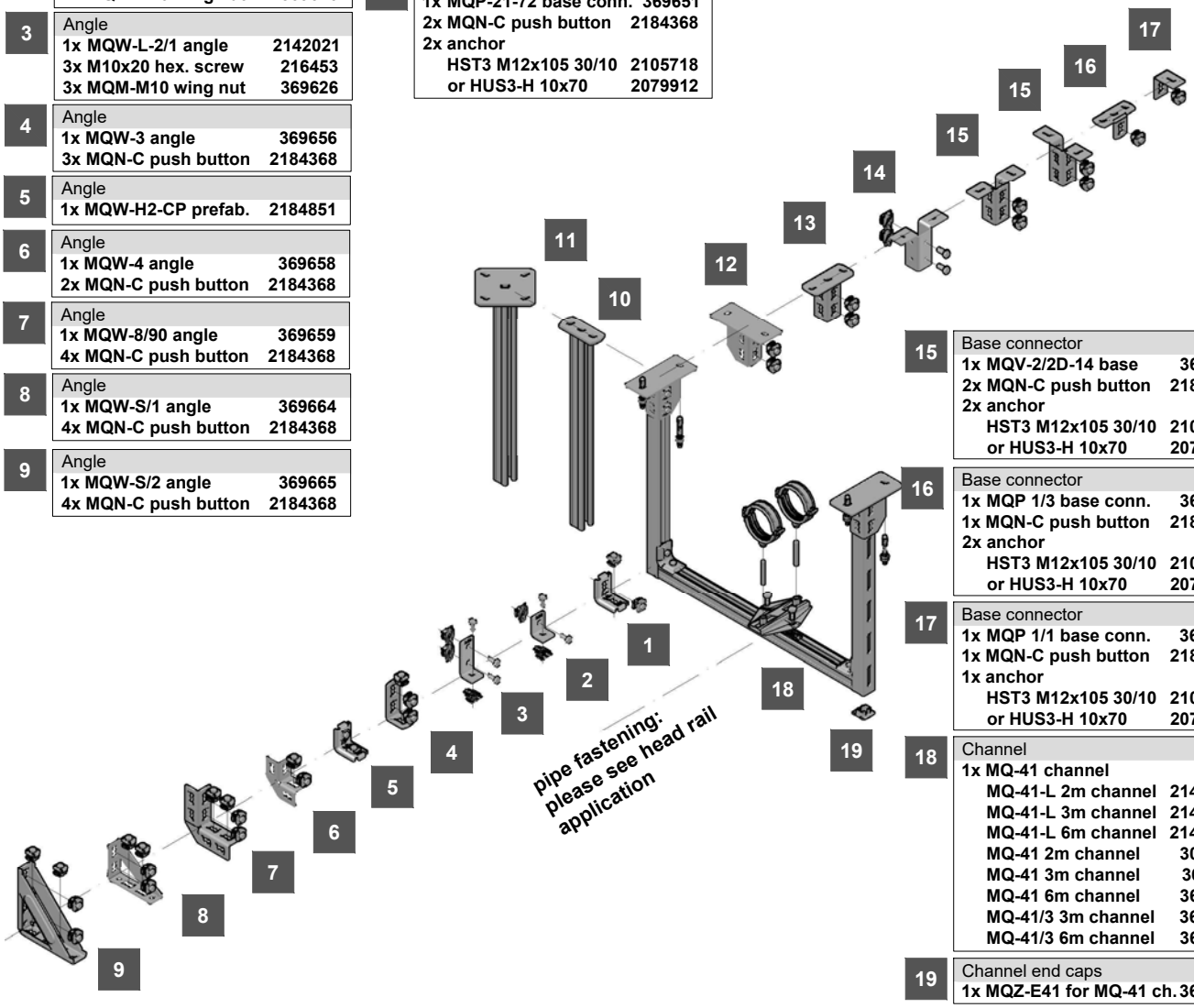
Open section of vertical profiles facing inside of the trapeze



1	Angle	
	1x MQW-H2 angle	2141929
	2x MQN-C push button	2184368
2	Angle	
	1x MQW-L-1/1 angle	2142020
	2x M10x20 hex. screw	216453
	2x MQM-M10 wing nut	369626
3	Angle	
	1x MQW-L-2/1 angle	2142021
	3x M10x20 hex. screw	216453
	3x MQM-M10 wing nut	369626
4	Angle	
	1x MQW-3 angle	369656
	3x MQN-C push button	2184368
5	Angle	
	1x MQW-H2-CP prefab.	2184851
6	Angle	
	1x MQW-4 angle	369658
	2x MQN-C push button	2184368
7	Angle	
	1x MQW-8/90 angle	369659
	4x MQN-C push button	2184368
8	Angle	
	1x MQW-S/1 angle	369664
	4x MQN-C push button	2184368
9	Angle	
	1x MQW-S/2 angle	369665
	4x MQN-C push button	2184368

10	41 format brackets-2 hole base plate	
	MQK-41/300	369609
	MQK-41/450	369610
	MQK-41/600	369611
	MQK-41/1000	369612
	MQK-41/3/300	370595
	MQK-41/3/450	370596
	MQK-41/3/600	370597
	MQK-21 D/300	369617
	MQK-21 D/450	369618
	MQK-21 D/600	369619
11	41 format brackets-4 hole base plate	
	MQK-41/600/4	369613
	MQK-41/1000/4	369614
12	Base material connector	
	1x MQP-21-72 base conn.	369651
	2x MQN-C push button	2184368
	2x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912

13	Base material connector	
	1x MQP-41 base conn.	2141927
	2x MQN-C push button	2184368
	or pre-fab version	
	1x MQP-41-CP	2184852
	2x anchor	
	HST3 M10x90 30/10	2105712
	or HUS3-H 8x55	2079794
14	Base material connector	
	1x MQP-L-6/2 base conn.	2141928
	2x M10x20 hex. screw	216453
	2x MQM-M10 wing nut	369626
	2x anchor	
	HST3 M10x90 30/10	2105712
	or HUS3-H 8x55	2079794

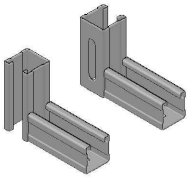


15	Base connector	
	1x MQV-2/2D-14 base	369639
	2x MQN-C push button	2184368
	2x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912
16	Base connector	
	1x MQP 1/3 base conn.	369647
	1x MQN-C push button	2184368
	2x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912
17	Base connector	
	1x MQP 1/1 base conn.	369646
	1x MQN-C push button	2184368
	1x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912
18	Channel	
	1x MQ-41 channel	
	MQ-41-L 2m channel	2141966
	MQ-41-L 3m channel	2141965
	MQ-41-L 6m channel	2141964
	MQ-41 2m channel	304559
	MQ-41 3m channel	369591
	MQ-41 6m channel	369592
	MQ-41/3 3m channel	369596
	MQ-41/3 6m channel	369597
19	Channel end caps	
	1x MQZ-E41 for MQ-41 ch.	369685

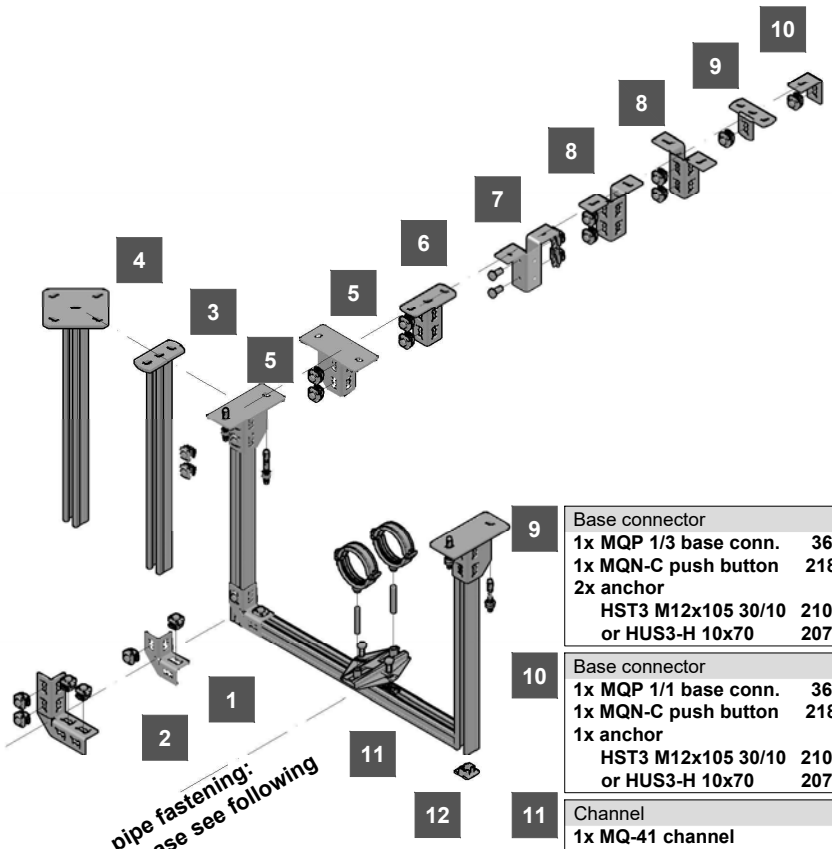
Application description	Application	Product lines	Base material
Plumbing - trapez frame	3	MQ System	Concrete
General comments		Sliders/Rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Anchors	

Trapeze On Concrete - Main Frame Options

Open section of vertical profiles facing pipe axis



1	Angle	
	1x MQW-4 angle	**369658**
	2x MQN-C push button	**2184368**
2	Angle	
	1x MQW-8/90 angle	**369659**
	4x MQN-C push button	**2184368**
3	41 format brackets-2 hole base plate	
	MQK-41/300	**369609**
	MQK-41/450	**369610**
	MQK-41/600	**369611**
	MQK-41/1000	**369612**
	MQK-41/3/300	**370595**
	MQK-41/3/450	**370596**
	MQK-41/3/600	**370597**
	MQK-21 D/300	**369617**
	MQK-21 D/450	**369618**
	MQK-21 D/600	**369619**
4	41 format brackets-4 hole base plate	
	MQK-41/600/4	**369613**
	MQK-41/1000/4	**369614**
5	Base material connector	
	1x MQP-21-72 base conn.	**369651**
	2x MQN-C push button	**2184368**
	2x anchor	
	HST3 M12x105 30/10	**2105718**
	or HUS3-H 10x70	**2079912**
6	Base material connector	
	1x MQP-41 base conn.	**2141927**
	2x MQN-C push button	**2184368**
	2x anchor	
	HST3 M10x90 30/10	**2105712**
	or HUS3-H 8x55	**2079794**
7	Base material connector	
	1x MQP-L-6/2 base conn.	**2141928**
	2x M10x20 hex. screw	**216453**
	2x MQM-M10 wing nut	**369626**
	2x anchor	
	HST3 M10x90 30/10	**2105712**
	or HUS3-H 8x55	**2079794**
8	Base connector	
	1x MQV-2/2D-14 base conn.	**369639**
	2x MQN-C push button	**2184368**
	2x anchor	
	HST3 M12x105 30/10	**2105718**
	or HUS3-H 10x70	**2079912**



9	Base connector	
	1x MQP 1/3 base conn.	**369647**
	1x MQN-C push button	**2184368**
	2x anchor	
	HST3 M12x105 30/10	**2105718**
	or HUS3-H 10x70	**2079912**
10	Base connector	
	1x MQP 1/1 base conn.	**369646**
	1x MQN-C push button	**2184368**
	1x anchor	
	HST3 M12x105 30/10	**2105718**
	or HUS3-H 10x70	**2079912**
11	Channel	
	1x MQ-41 channel	
	MQ-41-L 2m channel	**2141966**
	MQ-41-L 3m channel	**2141965**
	MQ-41-L 6m channel	**2141964**
	MQ-41 2m channel	**304559**
	MQ-41 3m channel	**369591**
	MQ-41 6m channel	**369592**
	MQ-41/3 3m channel	**369596**
	MQ-41/3 6m channel	**369597**
12	Channel end caps	
	1x MQZ-E41 for MQ-41 ch.	**369685**

Application description	Application	Product lines	Base material
Plumbing - trapez frame	3	MQ System	Concrete
General comments		Sliders/Rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Anchors	

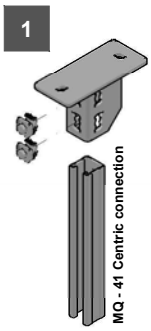
Trapeze On Concrete - Main Frame Options: Vertical Upright

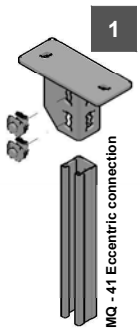
Assembly options

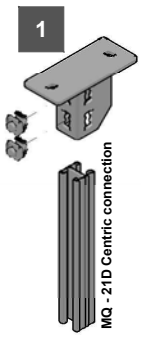
1

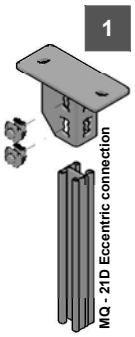
MQP 21-72 Base material Connector
multidirectional connection and associated channels

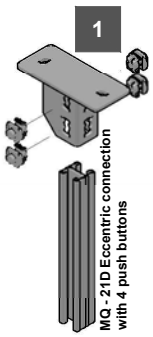
1x MQP-21-72 base conn.	**369651**
2x MQN-C push button	**2184368**
41 mm format channels	
MQ-41-L 2m channel	**2141966**
MQ-41-L 3m channel	**2141965**
MQ-41-L 6m channel	**2141964**
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
MQ-41/3 3m channel	**369596**
MQ-41/3 6m channel	**369597**
MQ-41 U 6m channel	**369595**
MQ-21 D 3m channel	**369601**
MQ-21D 6m channel	**369602**







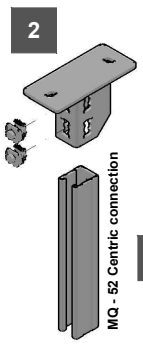


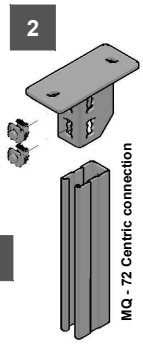


2

MQP 21-72 Base Material Connector
one direction connection and associated channels

1x MQP-21-72 base conn.	**369651**
2x MQN-C push button	**2184368**
52 and 72 mm format channels	
MQ-52 3m channel	**373795**
MQ-52 6m channel	**369598**
MQ-72 3m channel	**373797**
MQ-72 6m channel	**369599**
MQ-72 U 6m channel	**370593**

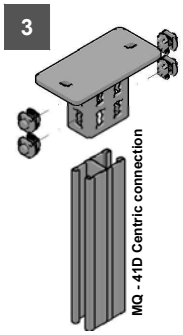




3

MQP 82 Base Material Connector
and associated channels

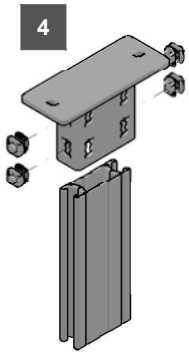
1x MQP-82 base conn.	**369652**
4x MQN-C push button	**2184368**
41D mm format channels	
MQ-41D 3m channel	**369603**
MQ-41D 6m channel	**369604**

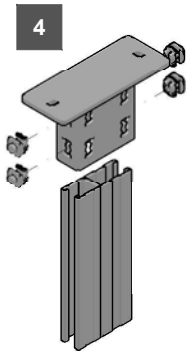


4

MQP 124 Channel base
and associated channels

1x MQP- 124 ch.base	**369653**
4x MQN-C push button	**2184368**
124mm format channels	
MQ-52-72 D 3m	**373799**
MQ-52-72 D 6m	**369605**
MQ-124X D 6m	**369606**





Application description	Application	Product lines	Base material
Plumbing - trapez frame	3	MQ System	Concrete
General comments		Sliders/Rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Anchors	

Trapeze On Concrete - Quiet Zone pipe Fastening M8,M10

Quiet zone solutions M8

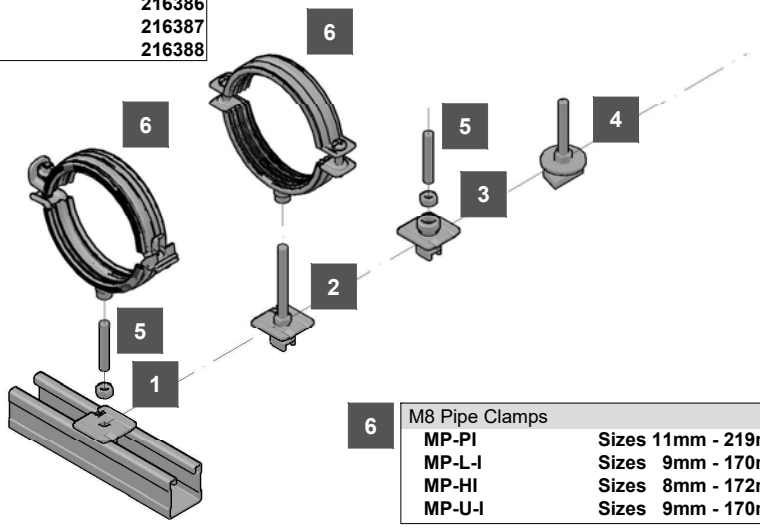
1	M8 Saddle Nut - Light	
	1x MQA-S-M8 saddle n.	20141906
	1x M8 nut	2184504
	1x AM8x..t-bolt	see reference 5
	1x Pipe ring	see reference 6

2	M8 Pre-assembled Pipe C. Saddle	
	1x MQA-ST M8 x 40	2184833
	MQA-ST M8 x 60	2184834
	MQA-ST M8 x 80	2184835
	MQA-ST M8 x 100	2184836
	1x Pipe ring	see reference 6

3	M8 Height Adjustable Pipe C. Saddle	
	1x MQA-H M8 Saddle	2184830
	1x M8 nut	2184504
	1x AM8x..t-bolt	see reference 5
	1x Pipe ring	see reference 6

4	M8 T-head Bolt	
	1x HHK 41 M8x40	312361
	HHK 41 M8x50	312362
	HHK 41 M8x60	312363
	HHK 41 M8x80	312365
	HHK 41 M8x100	312367
	HHK 41 M8x120	312368
	HHK 41 M8x150	312369
	1x Pipe ring	see reference 6

5	M8 Threaded Bolts	
	AM8x30	216379
	AM8x40	216380
	AM8x50	216381
	AM8x60	216382
	AM8x70	216383
	AM8x80	216384
	AM8x100	216385
	AM8x120	216386
	AM8x150	216387
	AM8x180	216388



6	M8 Pipe Clamps	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm

Quiet zone solutions M10

7	M10 Saddle Nut - Light	
	1x MQA-S-M10 saddle n.	20141907
	1x M10 hex. nut	2184505
	1x AM10x..t-bolt	see reference 12
	1x Pipe ring	see reference 13

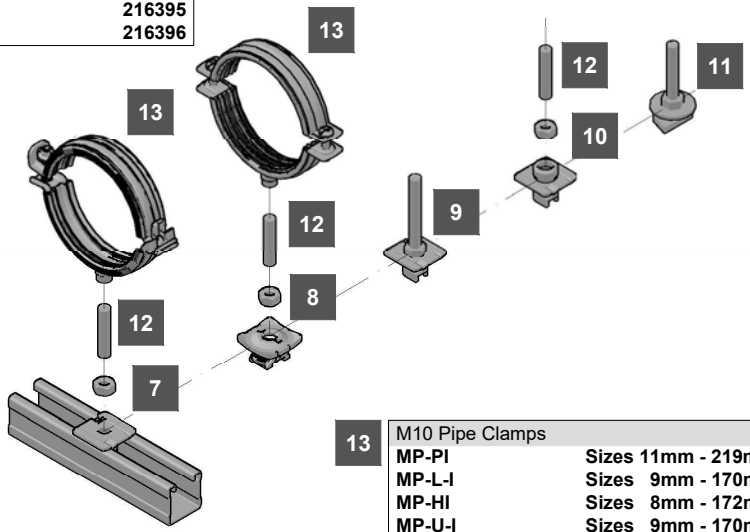
8	M10 Saddle Nut - Heavy Fire Rated	
	1x MQA-M10-B saddle n.	2199452
	1x M10 hex. nut	2184505
	1x AM10x..t-bolt	see reference 12
	1x Pipe ring	see reference 13

9	M10 Pre-assembled Pipe C. Saddle	
	1x MQA-ST M10 x 40	2184837
	MQA-ST M10 x 60	2184838
	MQA-ST M10 x 80	2184839
	MQA-ST M10 x 100	2184840
	1x Pipe ring	see reference 13

10	M10 Height Adjustable Pipe C.Saddle	
	1x MQA-H M10 Saddle	2184831
	1x M10 hex. nut	2184505
	1x AM10x..t-bolt	see reference 12
	1x Pipe ring	see reference 13

11	M10 T-head Bolt	
	1x HHK 41 M10x40	312371
	HHK 41 M10x60	312373
	HHK 41 M10x80	312374
	1x Pipe ring	see reference 13

12	M10 Threaded Bolts	
	AM10x40	216390
	AM10x60	216391
	AM10x80	216392
	AM10x100	216393
	AM10x120	216394
	AM10x150	216395
	AM10x180	216396



13	M10 Pipe Clamps	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm
	MP-MI ... G	Sizes 15mm - 168mm
	MP-MXI M10/M12	Sizes 60mm - 93mm

Application description	Application	Product lines	Base material
Plumbing - trapez frame	3	MQ System	Concrete
		Pipe Rings	

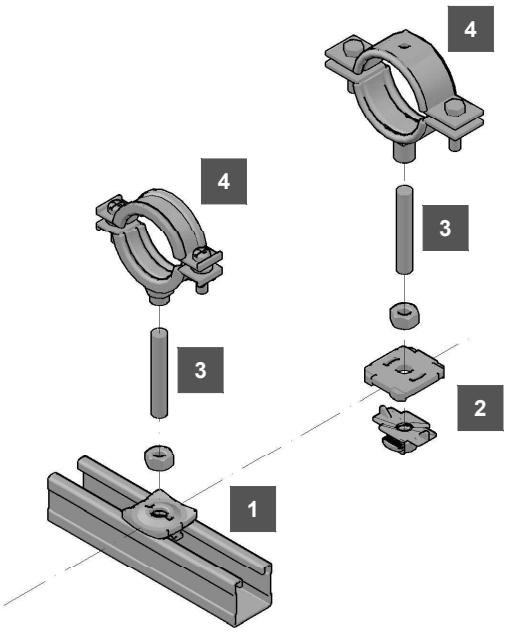
General comments

- Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Trapeze On Concrete - Quiet Zone pipe Fastening M12,M16

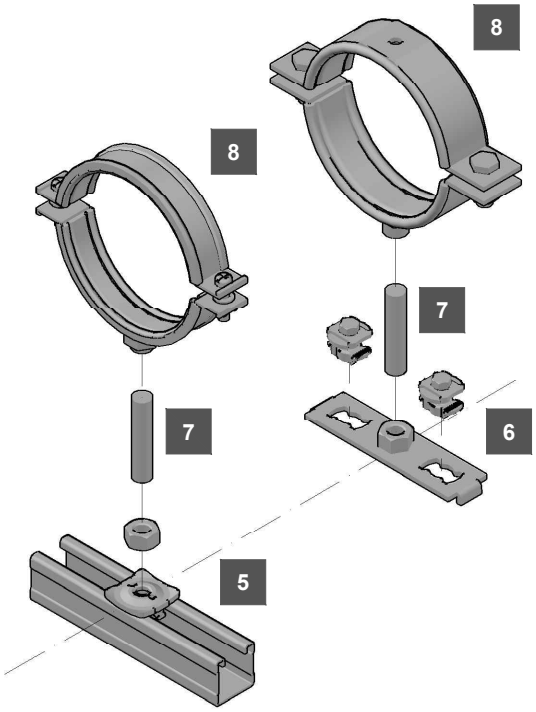
Quiet zone solutions M12

1	M12 Saddle Nut - Heavy	
	1x MQA-M12-B saddle nut	**2199453**
	1x M12 nut	**2184554**
	1x AM12x..t-bolt	**see reference 3**
	1x Pipe Clamp	**see reference 4**
2	M12 Channel Nut and Square Washer	
	1x MQM-M12 wing nut	**369627**
	1x MQZ-L13 square washer	**2199456**
	1x M12 nut	**2184554**
	1x AM12x..t-bolt	**see reference 3**
	1x Pipe Clamp	**see reference 4**
3	M12 Threaded Bolts	
	AM12x50	**216397**
	AM12x80	**216398**
	AM12x100	**216399**
	AM12x120	**216400**
	AM12x150	**216401**
	AM12x200	**216402**
4	M12 Pipe Clamps	
	MP-PI	**Sizes 218mm - 326mm**
	MP-MI ... G	**Sizes 15mm - 168mm**
	MP-MXI M10/M12	**Sizes 60mm - 93mm**



Quiet zone solutions M16

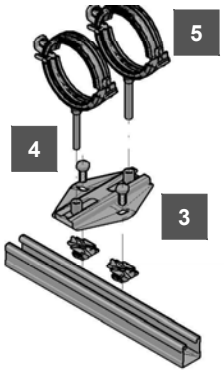
5	M16 Saddle Nut - Heavy	
	1x MQA-M16-B saddle nut	**2199454**
	1x M16 nut	**2184506**
	1x AM16x..t-bolt	**see reference 7**
	1x Pipe Clamp	**see reference 8**
6	M16 Pipe Ring Connection Saddle	
	1x MQG-2-M16 base plate	**369682**
	MQN-C push button	**2184368**
	1x AM16x..t-bolt	**see reference 7**
	1x Pipe Clamp	**see reference 8**
7	M16 Threaded Bolts	
	AM16x60	**212634**
	AM16x80	**216403**
	AM16x100	**212635**
	AM16x150	**212636**
8	M16 Pipe Clamps	
	MP-U-I M8/10/O16	**Sizes 9 - 170 mm**
	MP-MI..C	**Sizes 4" - 244.5mm**
	MP-MXI M16	**Sizes 4" - 508 mm**



Application description	Application	Product lines	Base material
Plumbing - trapez frame	3	MQ System	Concrete
General comments		Pipe Rings	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Trapeze On Concrete
Expansion Zone Pipe Fastening M8,M10

Expansion zone solutions M8



3 **MSG 1,75 Double Slider for M8/M10**

Loading capacity		max. 1.75kN
Expansion capacity:	centered	47mm
	end to end	94mm

BOM for connection to channel

1x	MSG 1,75 M8/M10D slider	248209
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

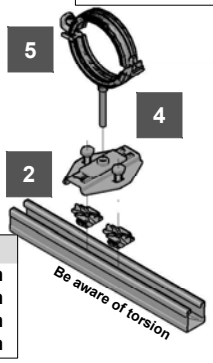
1 **MSG-MQ 0,6 Single Slider for M8/M10**

Loading capacity		max. 0.60kN
Expansion capacity:	centered	20mm
	end to end	40mm

BOM for connection to channel

1x	MSG-MQ 0,6 M8/M10 slider	2171848

Slider includes pre-mounted channel nut



2 **MSG-L 1,2 Single Slider for M8/M10**

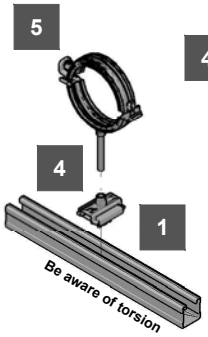
Loading capacity		max. 1.20kN
Expansion capacity:	centered	30mm
	end to end	60mm

BOM for connection to channel

1x	MSG-L 1,2 M8/M10 slider	2172050
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

5 M8 Pipe Clamps

MP-PI	Sizes 11mm - 219mm
MP-L-I	Sizes 9mm - 170mm
MP-HI	Sizes 8mm - 172mm
MP-U-I	Sizes 9mm - 170mm



4 Threaded Bolts M8

AM8x 30	216379
AM8x 40	216380
AM8x 50	216381
AM8x 60	216382
AM8x 70	216383
AM8x 80	216384
AM8x100	216385
AM8x120	216386
AM8x150	216387
AM8x180	216388

Expansion zone solutions M10

12 M10 Pipe Clamps

MP-PI	Sizes 11mm - 219mm
MP-L-I	Sizes 9mm - 170mm
MP-HI	Sizes 8mm - 172mm
MP-U-I	Sizes 9mm - 170mm
MP-MI ... G	Sizes 15mm - 168mm
MP-MXI M10/M12	Sizes 60mm - 93mm

8 **MSG-L 1,2 Single Slider for M8/M10**

Loading capacity		max. 1.20kN
Expansion capacity:	centered	30mm
	end to end	60mm

BOM for connection to channel

1x	MSG-L 1,2 M8/M10 slider	2172050
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

6 **MSG-MQ 0,6 Single Slider for M8/M10**

Loading capacity		max. 0.60kN
Expansion capacity:	centered	20mm
	end to end	40mm

BOM for connection to channel

1x	MSG-MQ 0,6 M8/M10 slider	2171848

Slider includes pre-mounted channel nut

9 **MSG 1,75 Double Slider for M8/M10**

Loading capacity		max. 1.75kN
Expansion capacity:	centered	47mm
	end to end	94mm

BOM for connection to channel

1x	MSG 1,75 M8/M10D slider	248209
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

10 **MRG 2,0 Single Roller for M10/M12**

Loading capacity		max. 2.00kN
Expansion capacity:	centered	40mm
	end to end	80mm

BOM

1x	MRG 2,0 M10/M12 roller	243550
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

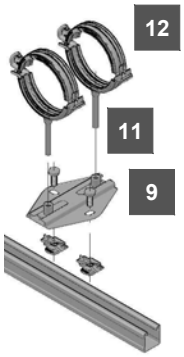
for connection to channel

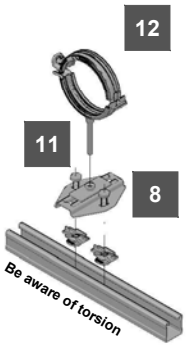
7 **MSG-SE 1,75 Slider for M10 traveling in channel**

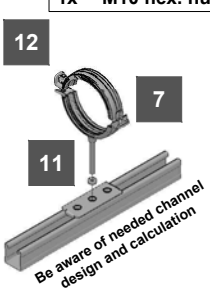
Loading capacity		max. 1.75kN
Expansion capacity:		limited by channel

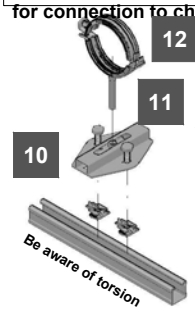
BOM for connection to channel

1x	MSG-SE 1,75 M10 slider	2172051
1x	M10 hex. nut	2184505



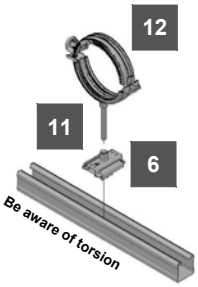






11 Threaded Bolts M10

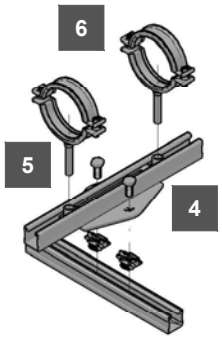
AM10x 40	216390
AM10x 60	216391
AM10x 80	216392
AM10x100	216393
AM10x120	216394
AM10x150	216395
AM10x180	216396

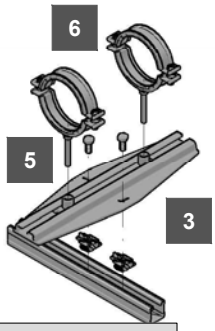


Application description	Application	Product lines	Base material
Sliders - Fixed on channel	3	Sliders / Rollers	Channel
General comments		Acessories	
• Application subject to vertical loads caused by weight of the pipes Application not subjects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits fo every single part of the application		MQ channels	

Trapeze On Concrete
Expansion Zone Pipe Fastening M12,M16

Expansion zone solutions M12





4 **MRG-D 225 Double Roller for M12/M16**

Loading capacity		max. 2.50kN
Expansion capacity:	centered	112.5mm
	end to end	225.0mm

BOM for connection to channel

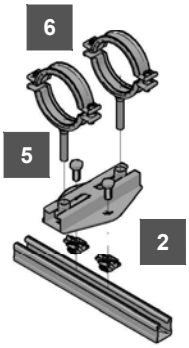
1x	MRG-D 225 M12/M16 roller	237394
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457

1 **MSG 1,75 Double Slider for M12/M16**

Loading capacity		max. 1.75kN
Expansion capacity:	centered	47mm
	end to end	94mm

BOM for connection to channel

1x	MSG 1,75 M12/M16D slider	248210
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

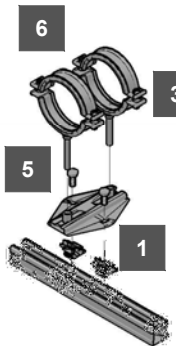


2 **MRG D6 Double Roller for M12/M16**

Loading capacity		max. 8.00kN
Expansion capacity:		
	centered	58mm
	end to end	116mm

BOM for connection to channel

1x	MRG D6 M12/M16 roller	344131
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457



3 **MSG-D 200 Double Slider for M12/M16**

Loading capacity		max. 1.50kN
Expansion capacity:	centered	100mm
	end to end	200mm

BOM for connection to channel

1x	MSG-D 200 1,5 M12/M16	2171849
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

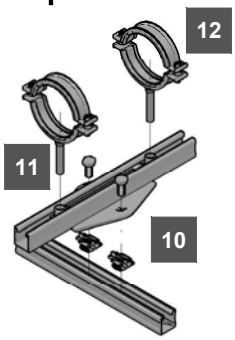
5 Threaded Bolts M12

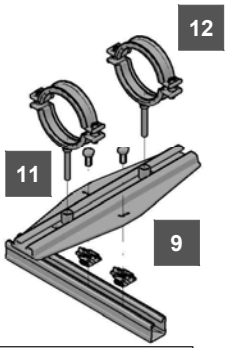
AM12x 50	216397
AM12x 80	216398
AM12x100	216399
AM12x120	216400
AM12x150	216401
AM12x180	216402

6 M12 Pipe Clamps

MP-PI	Sizes 218mm - 326mm
MP-MI ... G	Sizes 15mm - 168mm
MP-MXI M10/M12	Sizes 60mm - 93mm

Expansion zone solutions M16





10 **MRG-D 225 Double Roller for M12/M16**

Loading capacity		max. 2.50kN
Expansion capacity:	centered	112.5mm
	end to end	225.0mm

BOM for connection to channel

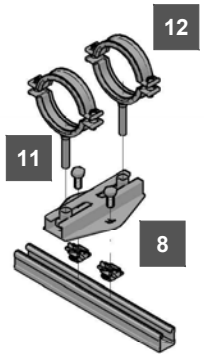
1x	MRG-D 225 M12/M16	237394
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457

7 **MSG 1,75 Double Slider for M12/M16**

Loading capacity		max. 1.75kN
Expansion capacity:	centered	47mm
	end to end	94mm

BOM for connection to channel

1x	MSG 1,75 M12/M16D slider	248210
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

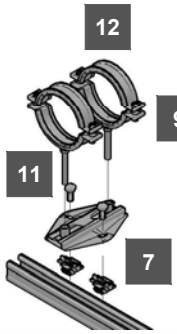


8 **MRG D6 Double Roller for M12/M16**

Loading capacity		max. 8.00kN
Expansion capacity:	centered	58mm
	end to end	116mm

BOM for connection to channel

1x	MRG D6 M12/M16 roller	344131
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457



9 **MSG-D 200 Double Slider for M12/M16**

Loading capacity		max. 1.50kN
Expansion capacity:	centered	100mm
	end to end	200mm

BOM for connection to channel

1x	MSG-D 200 1,5 M12/M16	2171849
2x	MQM-M10 wing nut	369626
2x	M12x22 hex. head screw	216453

11 Threaded Bolts M16

AM16x 60	212634
AM16x 80	216403
AM16x100	212635
AM16x150	212636

12 M16 Pipe Clamps

MP-U-I M8/10/O16	Sizes 9 - 170 mm
with addapter or directly in the slider/roller	
MP-GA M16 (M16)	2244772
MP-MI..C	Sizes 4" - 244.5mm
MP-MXI M16	Sizes 4" - 508 mm

Application description	Application	Product lines	Base material
Sliders - Fixed on channel	3	Sliders / Rollers	Channel
General comments		Acessories	
• Application subject to vertical loads caused by weight of the pipes Application not subjects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits fo every single part of the application		MQ channels	

Galvanized Sliders / Rollers Fixed On Channel

1

MSG-MQ 0,6 Single Slider for M8/M10

Loading capacity		max. 0.60kN
Expansion capacity:	centered	20mm
	end to end	40mm

BOM for connection to channel

1x	MSG-MQ 0,6 M8/M10 slider	2171848
	Slider includes pre-mounted channel nut	

2

MSG-SE 1,75 Slider for M10 traveling in channel

Loading capacity		max. 1.75kN
Expansion capacity:		limited by channel

BOM for connection to channel

1x	MSG-SE 1,75 M10 slider	2172051
	no other accessories necessary	

4

MSG 1,0 Single Slider for M12/M16

Loading capacity		max. 1.00kN
Expansion capacity:	centered	40mm
	end to end	80mm

BOM for connection to channel

1x	MSG 1,0 M12/M16 slider	248206
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

MSG 1,0 Single Slider for 1/2"

Loading capacity		max. 1.00kN
Expansion capacity:	centered	40mm
	end to end	80mm

BOM for connection to channel

1x	MSG 1,0 1/2" slider	248207
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

MSG 1,0 Single Slider for 3/4"

Loading capacity		max. 1.00kN
Expansion capacity:	centered	40mm
	end to end	80mm

BOM for connection to channel

1x	MSG 1,0 1/2" slider	248208
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

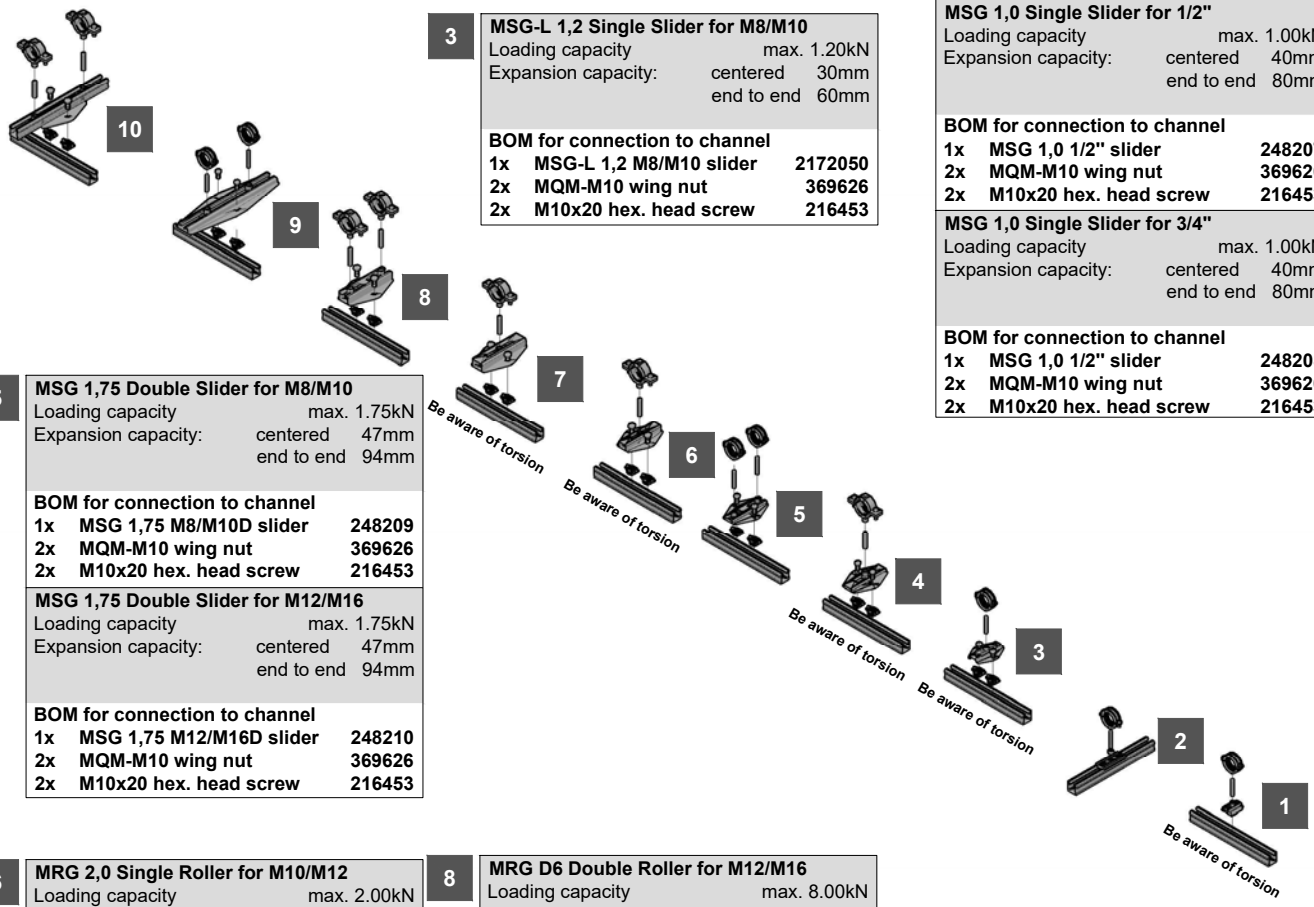
3

MSG-L 1,2 Single Slider for M8/M10

Loading capacity		max. 1.20kN
Expansion capacity:	centered	30mm
	end to end	60mm

BOM for connection to channel

1x	MSG-L 1,2 M8/M10 slider	2172050
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453



5

MSG 1,75 Double Slider for M8/M10

Loading capacity		max. 1.75kN
Expansion capacity:	centered	47mm
	end to end	94mm

BOM for connection to channel

1x	MSG 1,75 M8/M10D slider	248209
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

MSG 1,75 Double Slider for M12/M16

Loading capacity		max. 1.75kN
Expansion capacity:	centered	47mm
	end to end	94mm

BOM for connection to channel

1x	MSG 1,75 M12/M16D slider	248210
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

6

MRG 2,0 Single Roller for M10/M12

Loading capacity		max. 2.00kN
Expansion capacity:	centered	40mm
	end to end	80mm

BOM for connection to channel

1x	MRG 2,0 M10/M12 roller	243550
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

8

MRG D6 Double Roller for M12/M16

Loading capacity		max. 8.00kN
Expansion capacity:	centered	58mm
	end to end	116mm

BOM for connection to channel

1x	MRG D6 M12/M16 roller	344131
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457

7

MRG 4,0 Single Roller for M12/M16

Loading capacity		max. 4.00kN
Expansion capacity:	centered	60mm
	end to end	120mm

BOM for connection to channel

1x	MRG 4,0 M12/M16 roller	243550
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457

9

MSG-D 200 Double Slider for M12/M16

Loading capacity		max. 1.50kN
Expansion capacity:	centered	100mm
	end to end	200mm

BOM for connection to channel

1x	MSG-D 200 1,5 M12/M16	2171849
2x	MQM-M10 wing nut	369626
2x	M10x20 hex. head screw	216453

10

MRG-D 225 Double Roller for M12/M16

Loading capacity		max. 2.50kN
Expansion capacity:	centered	112.5mm
	end to end	225.0mm

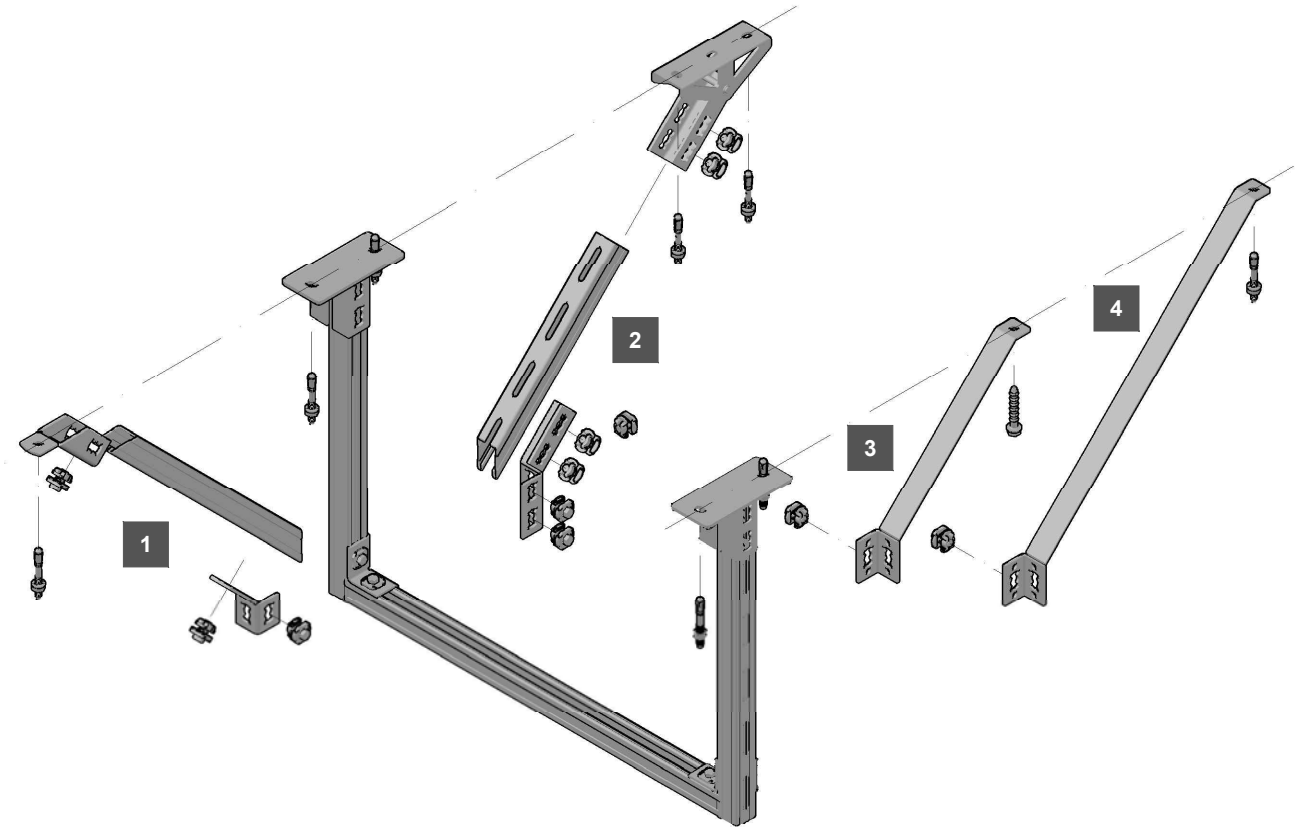
BOM for connection to channel

1x	MRG-D 225 M12/M16	237394
2x	MQM-M12 wing nut	369627
2x	M12x22 hex. head screw	216457

Application description	Application	Product lines	Base material
Sliders - Fixed on channel	3	Sliders / Rollers	Channel
General comments		Acessories	
• Application subject to vertical loads caused by weight of the pipes Application not subjects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits fo every single part of the application		MQ channels	

Trapeze On Concrete - Main Frame Options - Axial Bracing

Using MQ channels or pre-fab. braces



1 Axial Bracing using MQP-45 Connector

Upper brace connection	
1x MQP-45 channel base	**369649**
1x MQN-C push button	**2184368**
1x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
Channel brace - 41 mm format channels	
MQ-41-L 2m channel	**2141966**
MQ-41-L 3m channel	**2141965**
MQ-41-L 6m channel	**2141964**
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
MQ-41/3 3m channel	**369596**
MQ-41/3 6m channel	**369597**
MQ-21D 3m channel	**369601**
MQ-21D 6m channel	**369602**
Bottom brace connection	
1x MQW-3/135 connector	**369663**
2x MQN-C push button	**2184368**

2 Axial Bracing using MQP-45 Connector

Upper brace connection	
1x MQP-G pivot base	**369654**
2x MQN-C push button	**2184368**
2x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
Channel brace - 41 mm format channels	
MQ-41-L 2m channel	**2141966**
MQ-41-L 3m channel	**2141965**
MQ-41-L 6m channel	**2141964**
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
MQ-41/3 3m channel	**369596**
MQ-41/3 6m channel	**369597**
MQ-21D 3m channel	**369601**
MQ-21D 6m channel	**369602**
Bottom brace connection	
1x MQW-8/45 connector	**369660**
4x MQN-C push button	**2184368**

3 Axial Bracing using Short MQK Brace

1x MQK-SK pre-fab. brace	**369622**
1x MQN-C push button	**2184368**
2x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

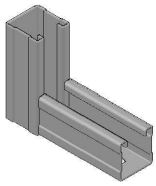
4 Axial Bracing using Short MQK Brace

1x MQK-SL pre-fab. brace	**369621**
1x MQN-C push button	**2184368**
2x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

Application description	Application	Product lines	Base material
Plumbing - trapez frame	3	MQ System	Concrete
General comments		Anchor	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Natural Compensation Zone Trapeze - Options

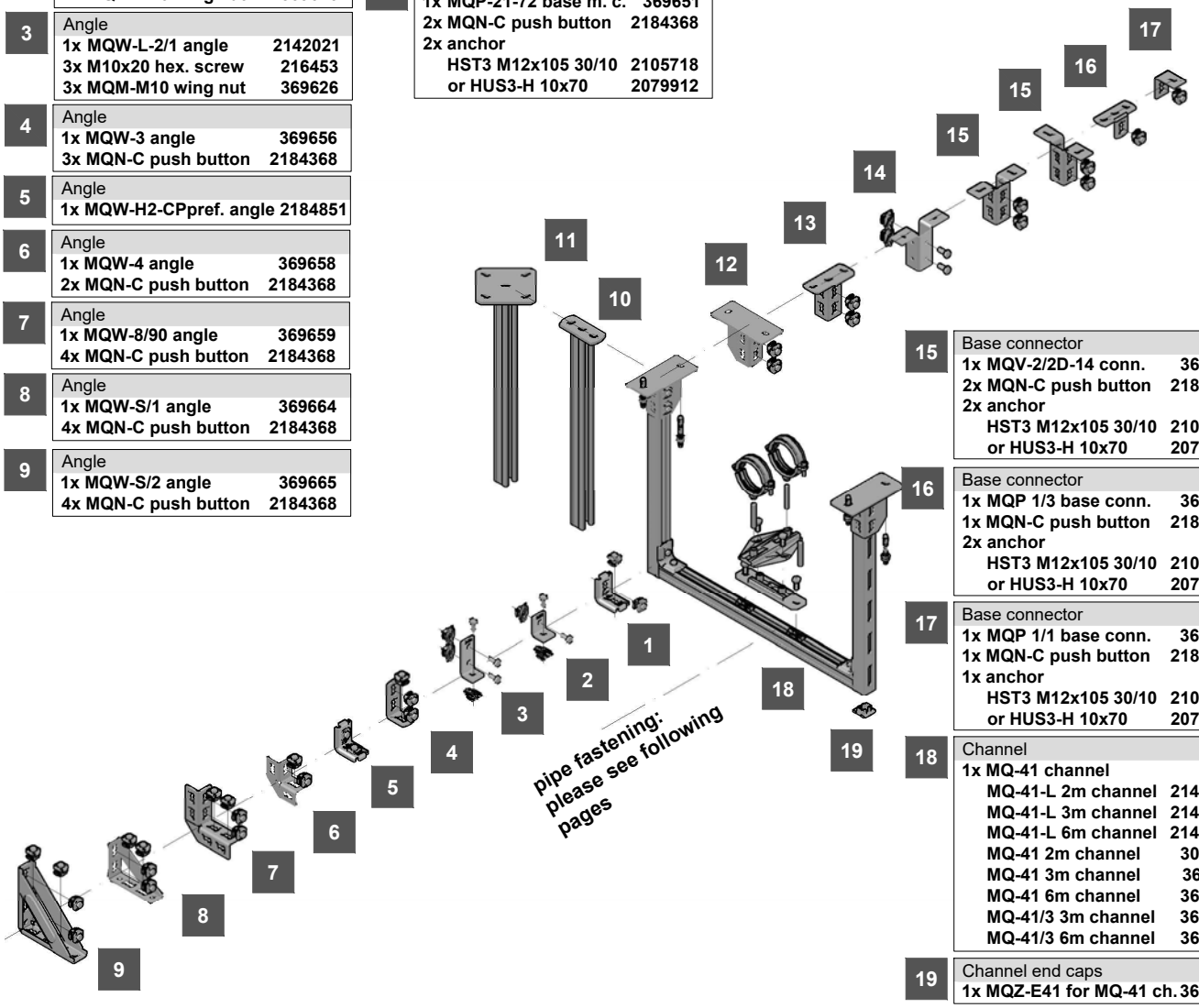
Open section of vertical profiles facing inside of the trapeze



1	Angle	
	1x MQW-H2 angle	2141929
	2x MQN-C push button	2184368
2	Angle	
	1x MQW-L-1/1 angle	2142020
	2x M10x20 hex. screw	216453
	2x MQM-M10 wing nut	369626
3	Angle	
	1x MQW-L-2/1 angle	2142021
	3x M10x20 hex. screw	216453
	3x MQM-M10 wing nut	369626
4	Angle	
	1x MQW-3 angle	369656
	3x MQN-C push button	2184368
5	Angle	
	1x MQW-H2-CPpref. angle	2184851
6	Angle	
	1x MQW-4 angle	369658
	2x MQN-C push button	2184368
7	Angle	
	1x MQW-8/90 angle	369659
	4x MQN-C push button	2184368
8	Angle	
	1x MQW-S/1 angle	369664
	4x MQN-C push button	2184368
9	Angle	
	1x MQW-S/2 angle	369665
	4x MQN-C push button	2184368

10	41 format brackets-2 hole base plate	
	MQK-41/300	369609
	MQK-41/450	369610
	MQK-41/600	369611
	MQK-41/1000	369612
	MQK-41/3/300	370595
	MQK-41/3/450	370596
	MQK-41/3/600	370597
	MQK-21 D/300	369617
	MQK-21 D/450	369618
	MQK-21 D/600	369619
11	41 format brackets-4 hole base plate	
	MQK-41/600/4	369613
	MQK-41/1000/4	369614
12	Base material connector	
	1x MQP-21-72 base m. c.	369651
	2x MQN-C push button	2184368
	2x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912

13	Base material connector	
	1x MQP-41 base conn.	2141927
	2x MQN-C push button	2184368
	or pre-fab version	
	1x MQP-41-CP	2184852
	2x anchor	
	HST3 M10x90 30/10	2105712
	or HUS3-H 8x55	2079794
14	Base material connector	
	1x MQP-L-6/2 base conn.	2141928
	2x M10x20 hex. screw	216453
	2x MQM-M10 wing nut	369626
	2x anchor	
	HST3 M10x90 30/10	2105712
	or HUS3-H 8x55	2079794



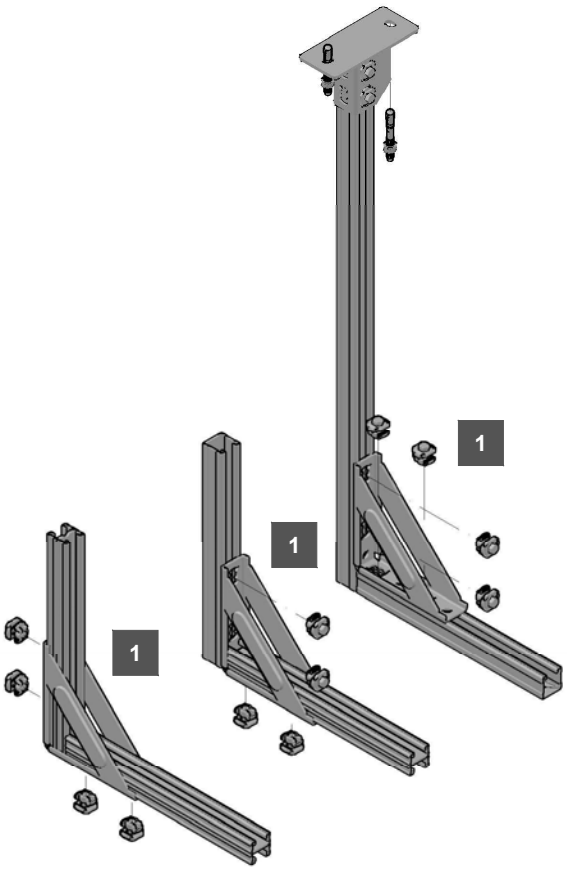
15	Base connector	
	1x MQV-2/2D-14 conn.	369639
	2x MQN-C push button	2184368
	2x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912
16	Base connector	
	1x MQP 1/3 base conn.	369647
	1x MQN-C push button	2184368
	2x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912
17	Base connector	
	1x MQP 1/1 base conn.	369646
	1x MQN-C push button	2184368
	1x anchor	
	HST3 M12x105 30/10	2105718
	or HUS3-H 10x70	2079912
18	Channel	
	1x MQ-41 channel	
	MQ-41-L 2m channel	2141966
	MQ-41-L 3m channel	2141965
	MQ-41-L 6m channel	2141964
	MQ-41 2m channel	304559
	MQ-41 3m channel	369591
	MQ-41 6m channel	369592
	MQ-41/3 3m channel	369596
	MQ-41/3 6m channel	369597
19	Channel end caps	
	1x MQZ-E41 for MQ-41 ch.	369685

Application description	Application	Product lines	Base material
Heating - natural compensation zone trapeze	4	MQ System	Concrete
General comments		Sliders/Rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Anchors	

Natural Compensation Zone Trapeze - Node stiffening Options 1

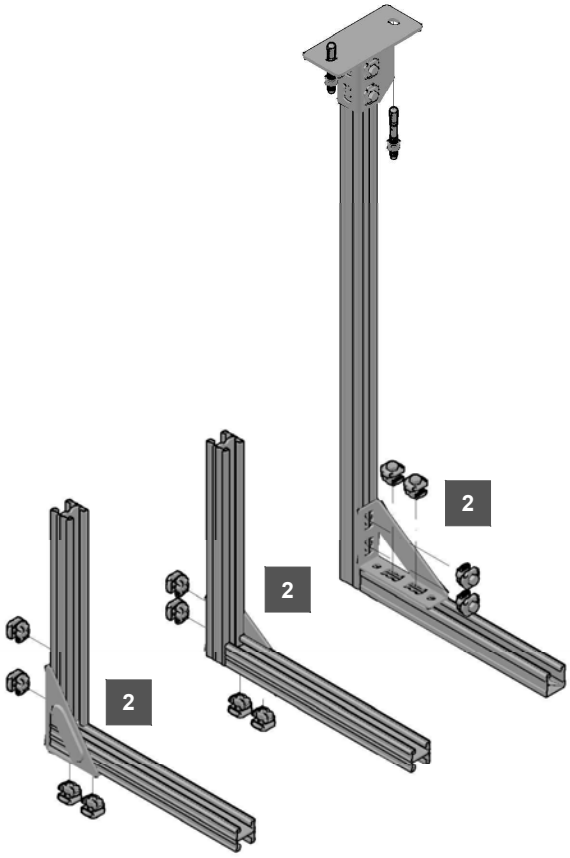
Stiffening by using MQW-S2

1	Connector	
	1x MQW-S2 connector	369665
	4x MQN-C push button	2184368



Stiffening by using MQW-S1

2	Connector	
	1x MQW-S1 connector	369664
	4x MQN-C push button	2184368



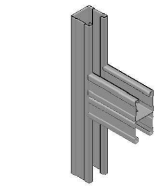
Application description	Application	Product lines	Base material
Heating - natural compensation zone trapeze	4	MQ System	Concrete

General comments

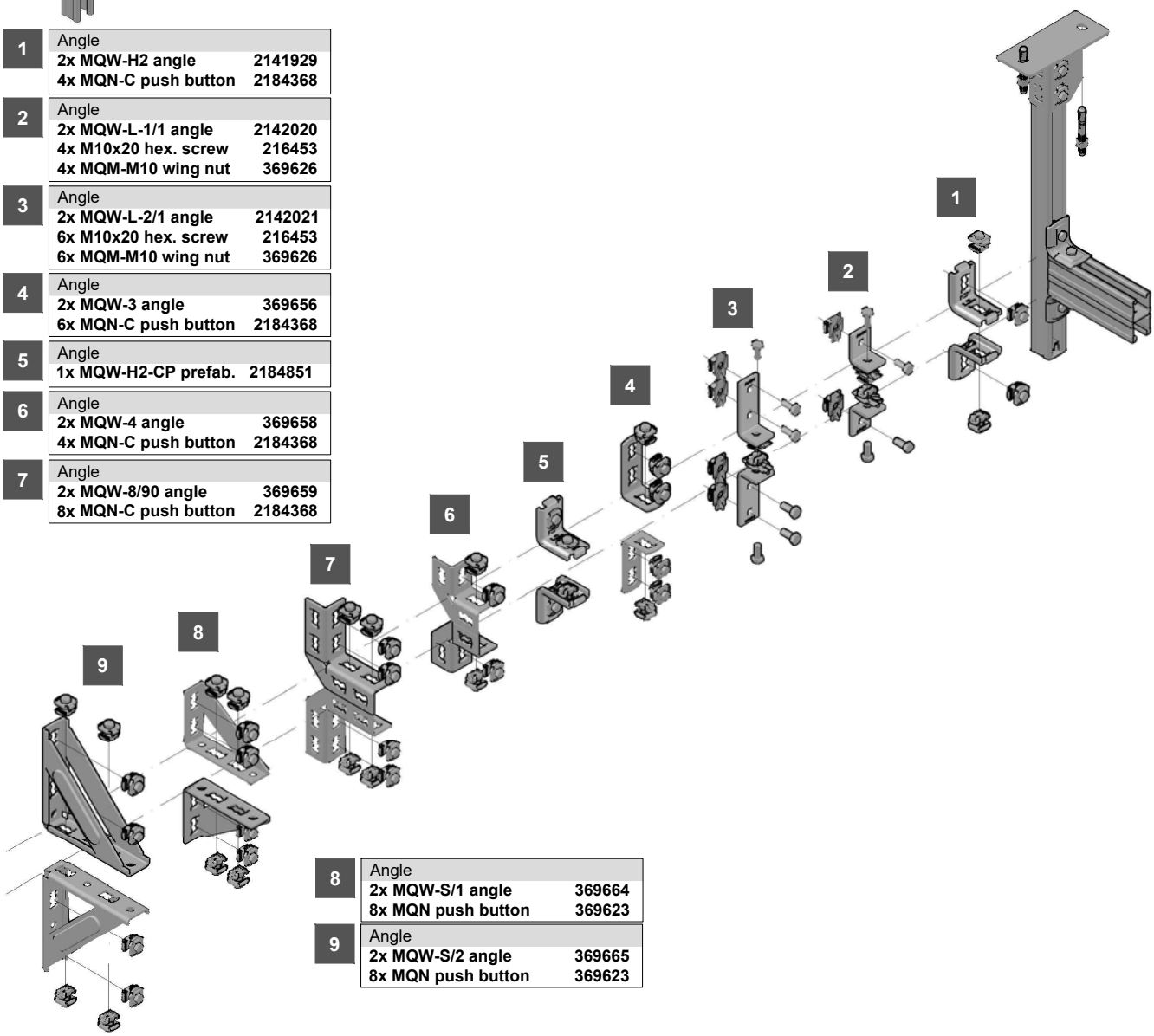
- Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Natural Compensation Zone Trapeze - Node stiffening Options 2

Open section of the vertical channel facing inside of the trapeze and horizontal channel as double channel



1	Angle		
	2x MQW-H2 angle	**2141929**	
	4x MQN-C push button	**2184368**	
2	Angle		
	2x MQW-L-1/1 angle	**2142020**	
	4x M10x20 hex. screw	**216453**	
	4x MQM-M10 wing nut	**369626**	
3	Angle		
	2x MQW-L-2/1 angle	**2142021**	
	6x M10x20 hex. screw	**216453**	
	6x MQM-M10 wing nut	**369626**	
4	Angle		
	2x MQW-3 angle	**369656**	
	6x MQN-C push button	**2184368**	
5	Angle		
	1x MQW-H2-CP prefab.	**2184851**	
6	Angle		
	2x MQW-4 angle	**369658**	
	4x MQN-C push button	**2184368**	
7	Angle		
	2x MQW-8/90 angle	**369659**	
	8x MQN-C push button	**2184368**	



8	Angle		
	2x MQW-S/1 angle	**369664**	
	8x MQN push button	**369623**	
9	Angle		
	2x MQW-S/2 angle	**369665**	
	8x MQN push button	**369623**	

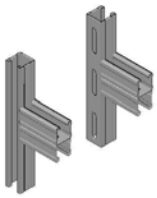
Application description	Application	Product lines	Base material
Heating - natural compensation zone trapeze	5	MQ System	Concrete

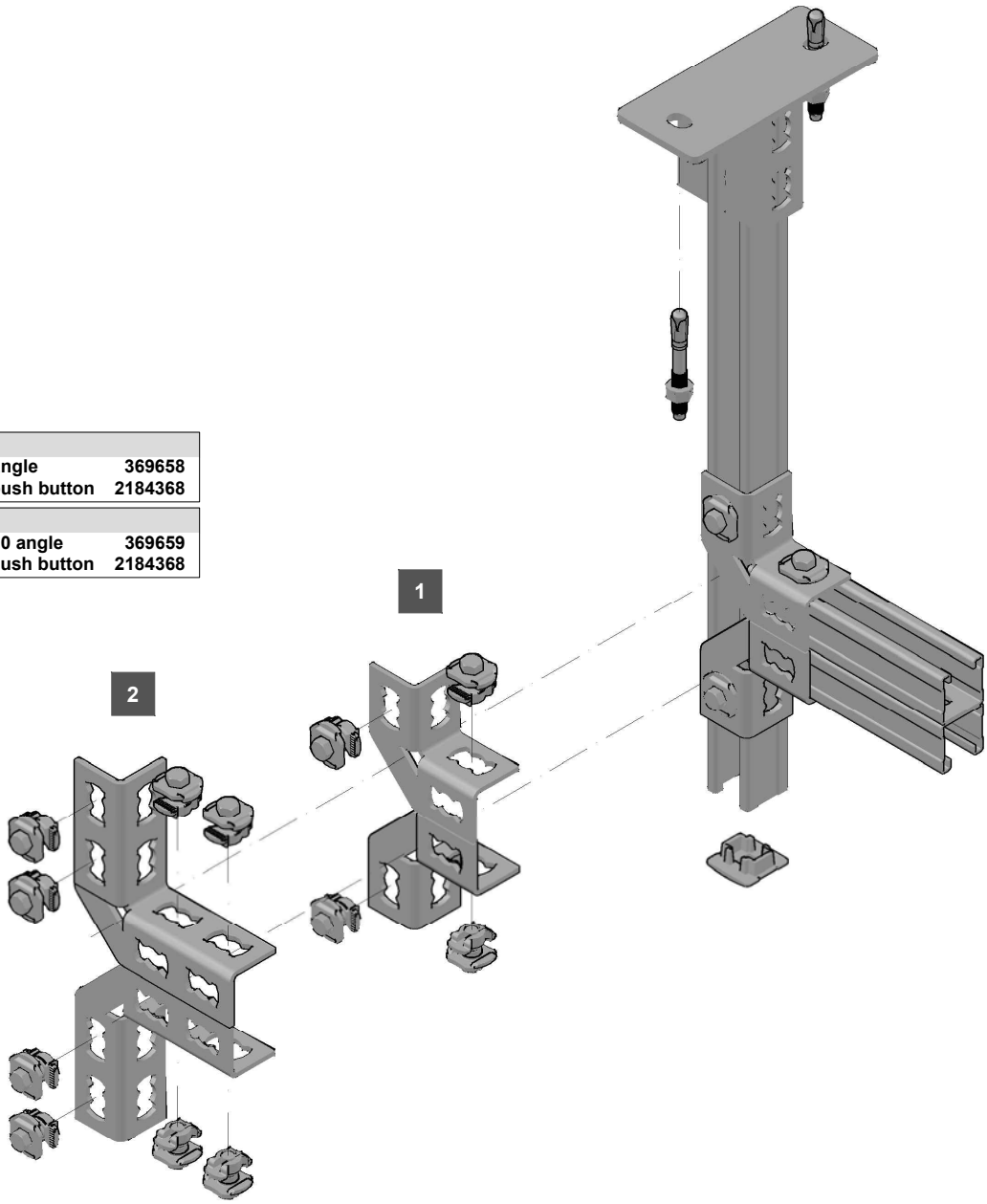
General comments

- Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Natural Compensation Zone Trapeze - Node stiffening Options 3

Open section of the vertical channel facing pipe axis and horizontal channel as double channel





1	Angle	
	2x MQW-4 angle	**369658**
	4x MQN-C push button	**2184368**
2	Angle	
	2x MQW-8/90 angle	**369659**
	8x MQN-C push button	**2184368**

Application description	Application	Product lines	Base material
Heating - natural compensation zone trapeze	4	MQ System	Concrete

General comments

- Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Natural Compensation Zone - Fastening Cross Sliding / Rolling Elements

Fastening cross sliding / rolling elements on channel

1

1.2 kN Cross Slider	
Base slider traveling in channel	
1x MSG-SE 1.75 M10	**2172051**
Connecting screws	
2x M10x20	**216453**
Upper slider	
1x MSG-L 1,2 M8/M10	**2172050**
Pipe ring connection	
1x Threaded bolt	**See reference 4**
1x Pipe ring	**See reference 5**

2

1.75 kN Cross Slider	
Base slider	
1x MSG - UK 1,75D M8/M10 incl. hex.head screws	**337115**
Upper slider	
1x MSG - 1,75D M8/M10	**248209**
Connection to the channel	
2x M10x20 screw	**216453**
2x MQM-M10 wing nut	**369626**
Pipe ring connection	
2x Threaded bolt	**See reference 4**
2x Pipe ring	**See reference 5**

3

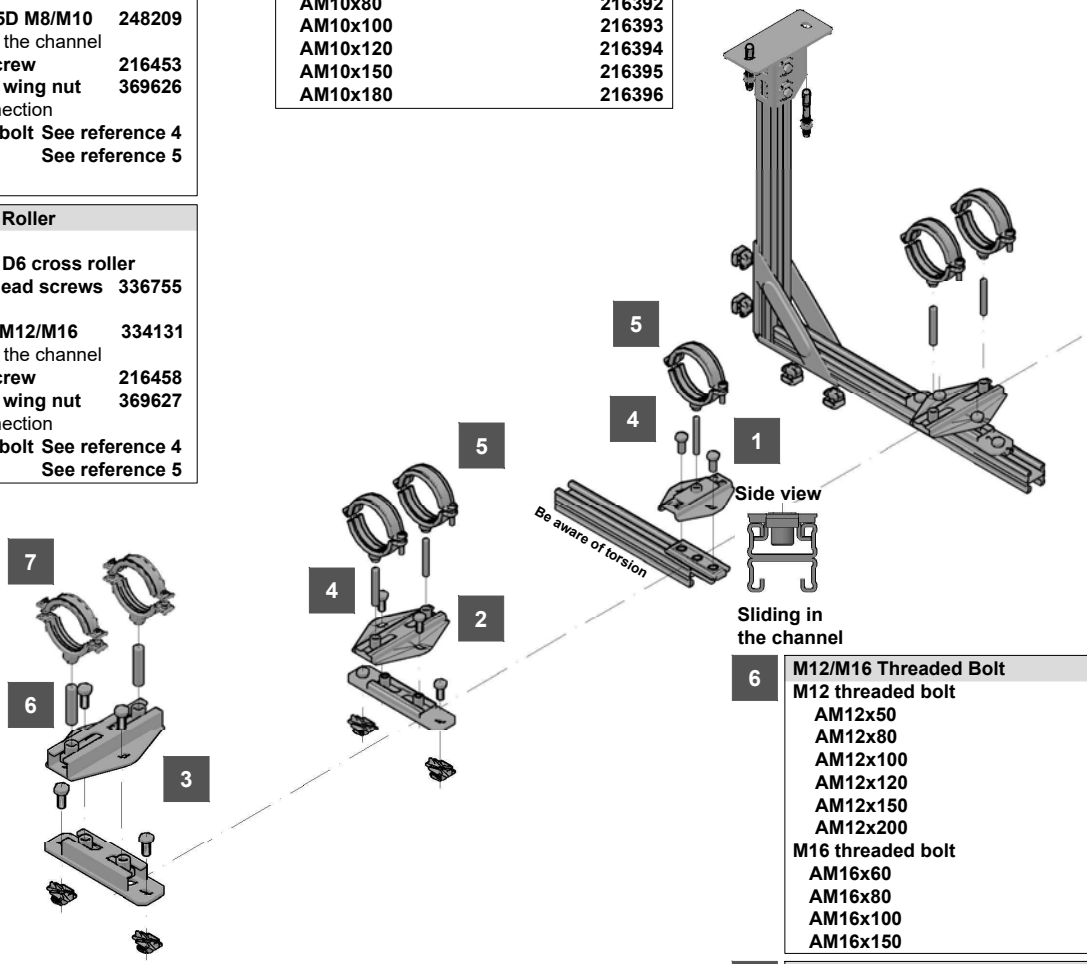
6.0 kN Cross Roller	
Base roller	
1x MRG - UK D6 cross roller incl. hex.head screws	**336755**
Upper roller	
1x MRG - D6 M12/M16	**334131**
Connection to the channel	
2x M12x25 screw	**216458**
2x MQM-M12 wing nut	**369627**
Pipe ring connection	
2x Threaded bolt	**See reference 4**
2x Pipe ring	**See reference 5**

4

M8/M10 Threaded Bolt	
M8 threaded bolt	
AM8x30	**216379**
AM8x40	**216380**
AM8x50	**216381**
AM8x60	**216382**
AM8x70	**216383**
AM8x80	**216384**
AM8x100	**216385**
AM8x120	**216386**
AM8x150	**216387**
AM8x180	**216388**
M10 threaded bolt	
AM10x40	**216390**
AM10x60	**216391**
AM10x80	**216392**
AM10x100	**216393**
AM10x120	**216394**
AM10x150	**216395**
AM10x180	**216396**

5

M8/M10 Pipe Clamps	
M8 pipe rings	
MP-PI	**Sizes 11mm - 219mm**
MP-L-I	**Sizes 9mm - 170mm**
MP-HI	**Sizes 8mm - 172mm**
MP-U-I	**Sizes 9mm - 170mm**
M10 pipe rings	
MP-PI	**Sizes 11mm - 219mm**
MP-L-I	**Sizes 9mm - 170mm**
MP-HI	**Sizes 8mm - 172mm**
MP-U-I	**Sizes 9mm - 170mm**
MP-MI ... G	**Sizes 15mm - 168mm**
MP-MXI M10/M12	**Sizes 60mm - 93mm**



6

M12/M16 Threaded Bolt	
M12 threaded bolt	
AM12x50	**216397**
AM12x80	**216398**
AM12x100	**216399**
AM12x120	**216400**
AM12x150	**216401**
AM12x200	**216402**
M16 threaded bolt	
AM16x60	**212634**
AM16x80	**216403**
AM16x100	**212635**
AM16x150	**212636**

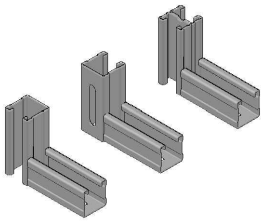
7

M12/M16 Pipe Clamps	
M12 pipe rings	
MP-PI	**Sizes 218mm - 326mm**
MP-MI ... G	**Sizes 15mm - 168mm**
MP-MXI M10/M12	**Sizes 60mm - 93mm**
M16 pipe rings	
MP-U-I M8/10/O16	**Sizes 9 - 170mm**
MP-MI..C	**Sizes 4" - 244.5mm**
MP-MXI M16	**Sizes 4" - 508 mm**

Application description	Application	Product lines	Base material
Plumbing - Natural compensation zone trapeze	4	MQ System	Concrete
General comments		Sliders/Rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Natural Compensation Zone - Axial Bracing Options

Open section of vertical profiles facing pipe axis

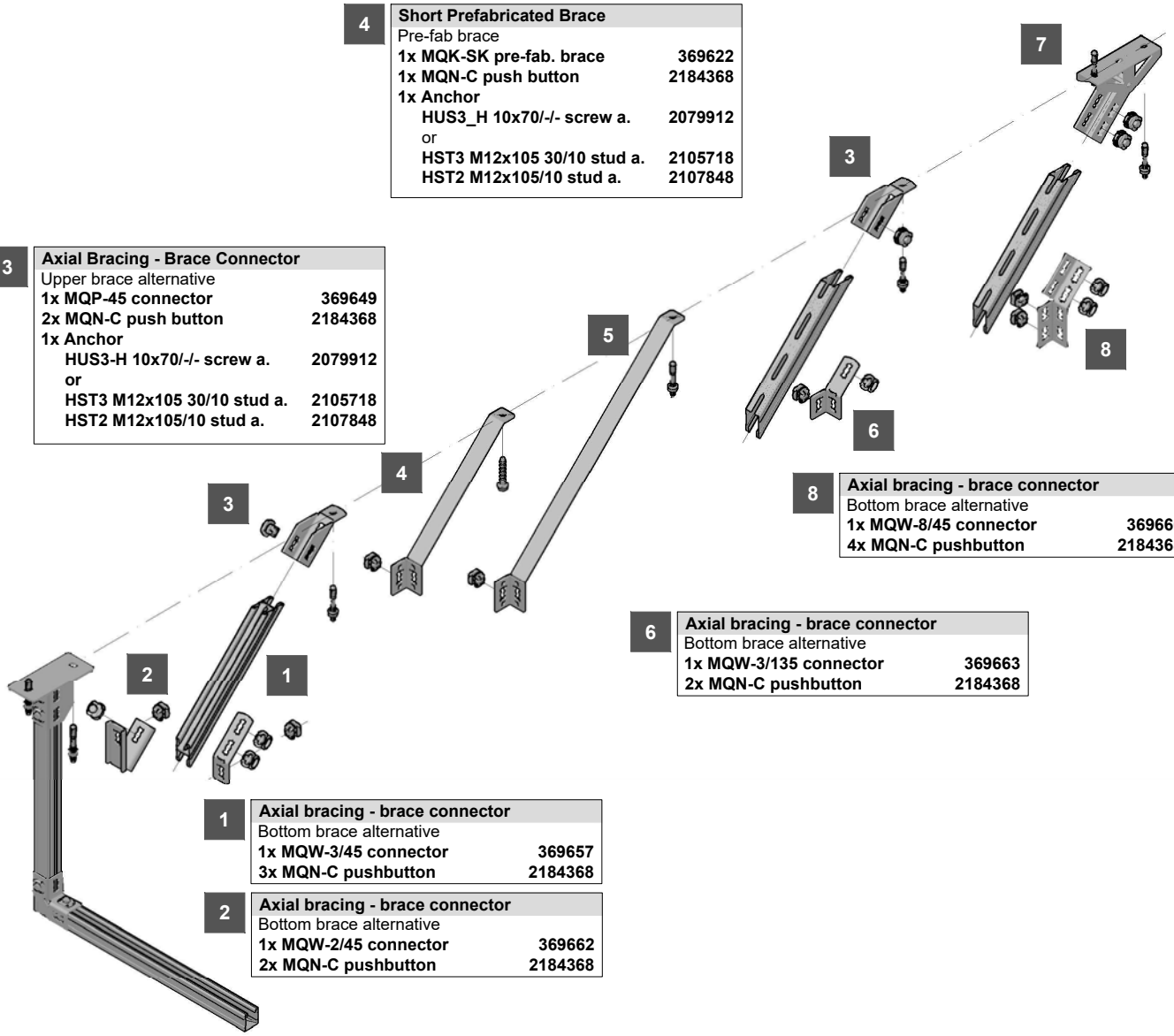


5	Long Prefabricated Brace	
	Pre-fab brace	
	1x MQK-SL pre-fab. brace	**369621**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

4	Short Prefabricated Brace	
	Pre-fab brace	
	1x MQK-SK pre-fab. brace	**369622**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

7	Axial bracing - brace connector	
	Upper brace alternative	
	1x MQP-G pivot connector	**369654**
	2x MQN-C pushbutton	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

3	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-45 connector	**369649**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**



8	Axial bracing - brace connector	
	Bottom brace alternative	
	1x MQW-8/45 connector	**369660**
	4x MQN-C pushbutton	**2184368**

6	Axial bracing - brace connector	
	Bottom brace alternative	
	1x MQW-3/135 connector	**369663**
	2x MQN-C pushbutton	**2184368**

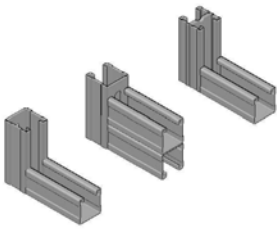
1	Axial bracing - brace connector	
	Bottom brace alternative	
	1x MQW-3/45 connector	**369657**
	3x MQN-C pushbutton	**2184368**

2	Axial bracing - brace connector	
	Bottom brace alternative	
	1x MQW-2/45 connector	**369662**
	2x MQN-C pushbutton	**2184368**

Application description	Application	Product lines	Base material
Heating - Natural compensation zone trapeze	4	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Natural Compensation Zone - Axial Bracing Options

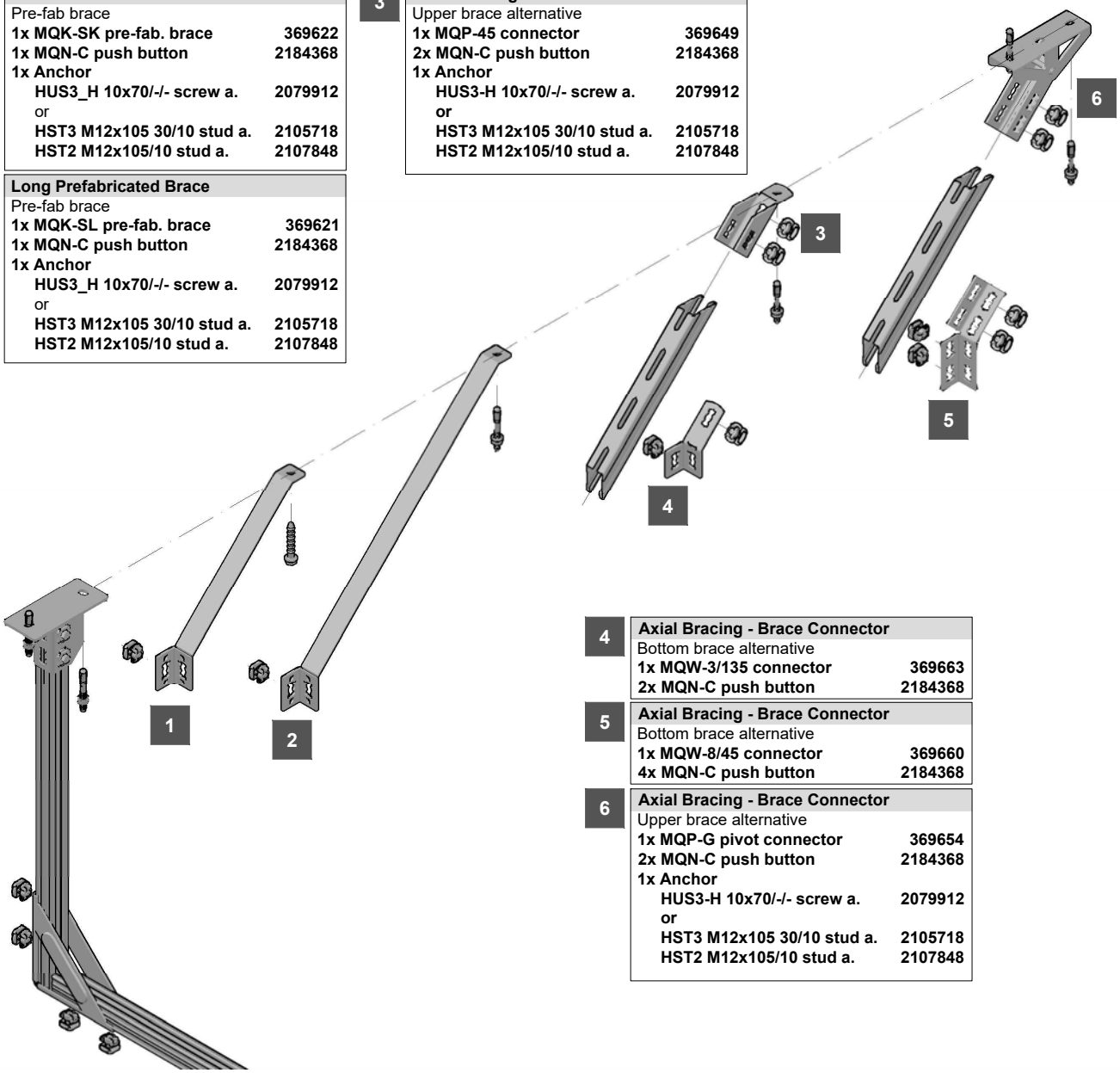
Open section of vertical profiles opened towards inside / outside of the trapeze



1	Short Prefabricated Brace	
	Pre-fab brace	
	1x MQK-SK pre-fab. brace	**369622**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

2	Long Prefabricated Brace	
	Pre-fab brace	
	1x MQK-SL pre-fab. brace	**369621**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

3	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-45 connector	**369649**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**



4	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-3/135 connector	**369663**
	2x MQN-C push button	**2184368**

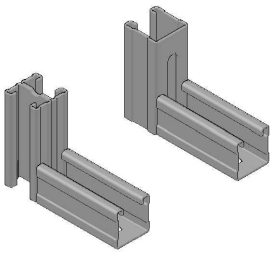
5	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-8/45 connector	**369660**
	4x MQN-C push button	**2184368**

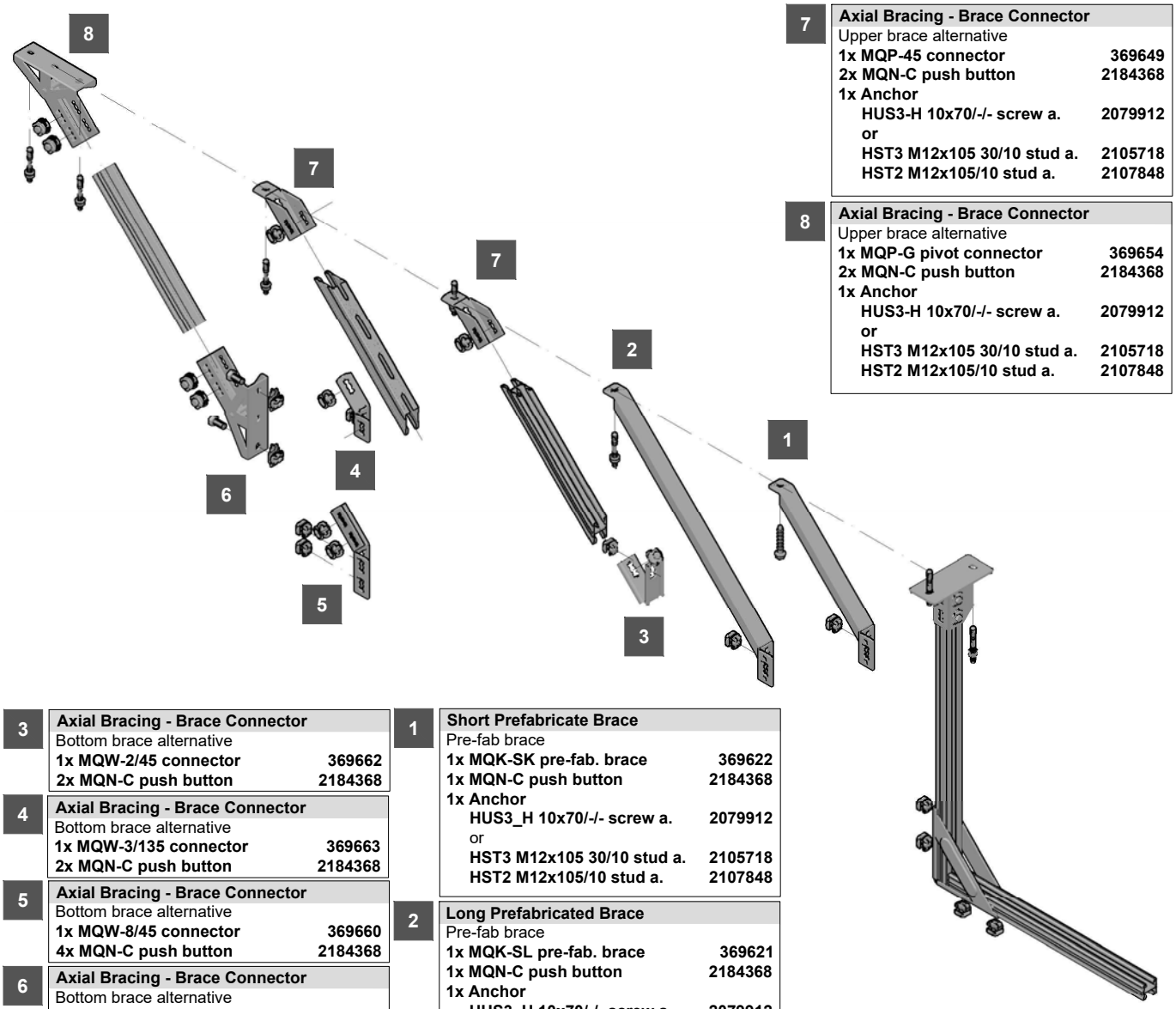
6	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

Application description	Application	Product lines	Base material
Heating - Natural compensation zone trapeze	4	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Natural Compensation Zone Trapeze - Lateral Bracing Options 1

Open section of vertical profiles facing out of trapeze





7	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-45 connector	**369649**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

8	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

3	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-2/45 connector	**369662**
	2x MQN-C push button	**2184368**

4	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-3/135 connector	**369663**
	2x MQN-C push button	**2184368**

5	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-8/45 connector	**369660**
	4x MQN-C push button	**2184368**

6	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	2x M12x22 hex.screw	**216457**
	2x MQM-M12 wing nut	**369623**

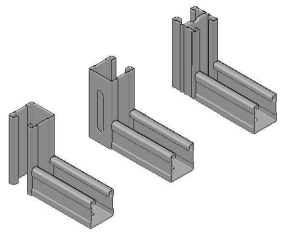
1	Short Prefabricate Brace	
	Pre-fab brace	
	1x MQK-SK pre-fab. brace	**369622**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

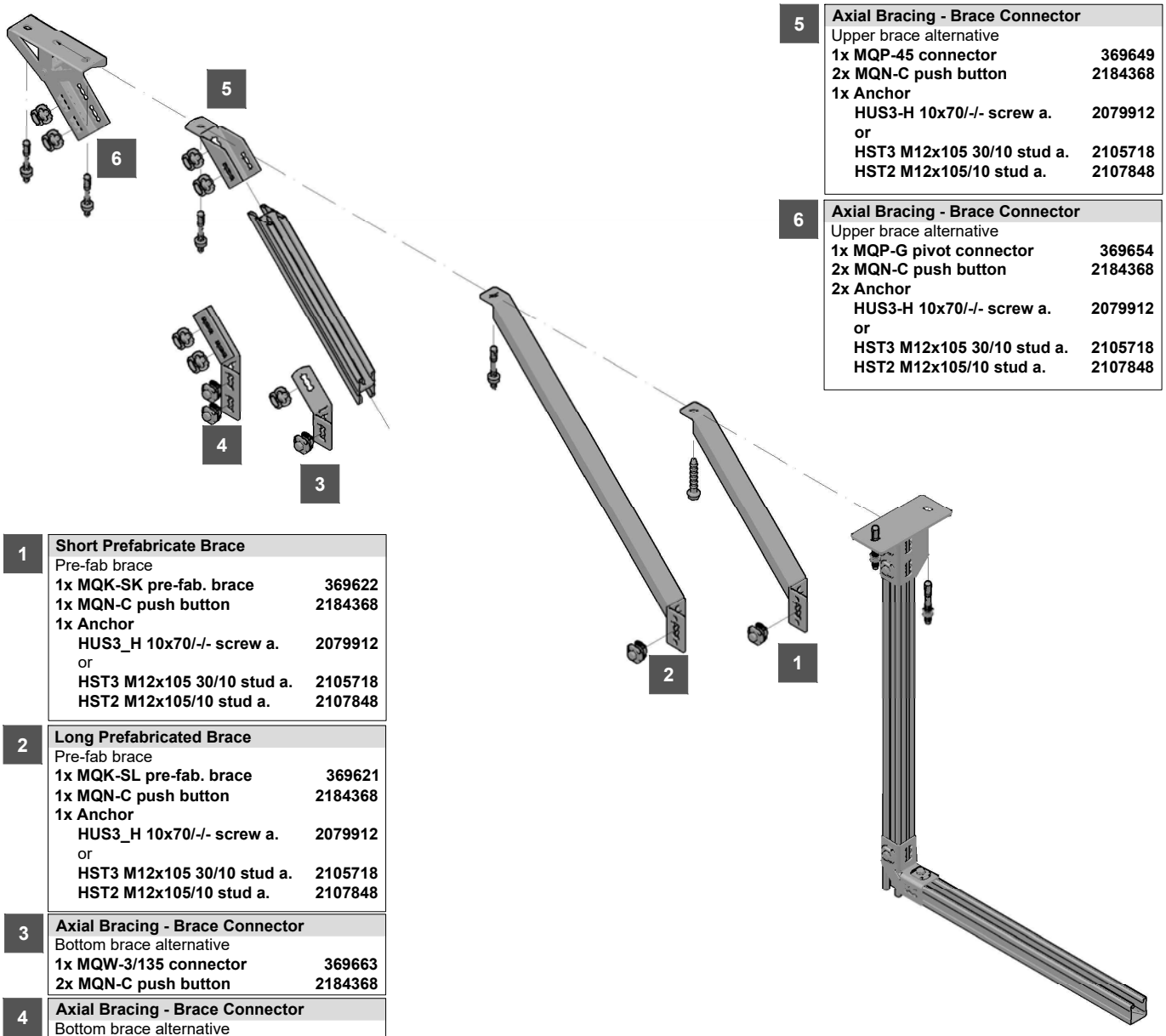
2	Long Prefabricated Brace	
	Pre-fab brace	
	1x MQK-SL pre-fab. brace	**369621**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

Application description	Application	Product lines	Base material
Heating - Natural compensation zone trapeze	4	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Natural Compensation Zone Trapeze - Lateral Bracing Options 2

Open section of vertical profiles facing pipe axis





5	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-45 connector	**369649**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

6	Axial Bracing - Brace Connector	
	Upper brace alternative	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	2x Anchor	
	HUS3-H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

1	Short Prefabricate Brace	
	Pre-fab brace	
	1x MQK-SK pre-fab. brace	**369622**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

2	Long Prefabricated Brace	
	Pre-fab brace	
	1x MQK-SL pre-fab. brace	**369621**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3_H 10x70/-/- screw a.	**2079912**
	or	
	HST3 M12x105 30/10 stud a.	**2105718**
	HST2 M12x105/10 stud a.	**2107848**

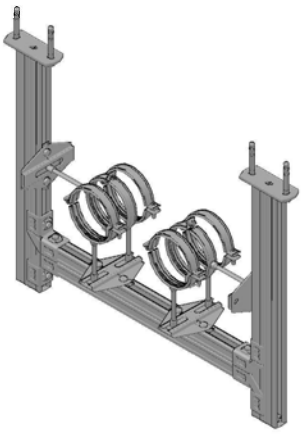
3	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-3/135 connector	**369663**
	2x MQN-C push button	**2184368**

4	Axial Bracing - Brace Connector	
	Bottom brace alternative	
	1x MQW-8/45 connector	**369660**
	4x MQN-C push button	**2184368**

Application description	Application	Product lines	Base material
Heating - Natural compensation zone trapeze	4	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Axial Guides On Concrete - Options 1

For frames requiring no axial or lateral bracing

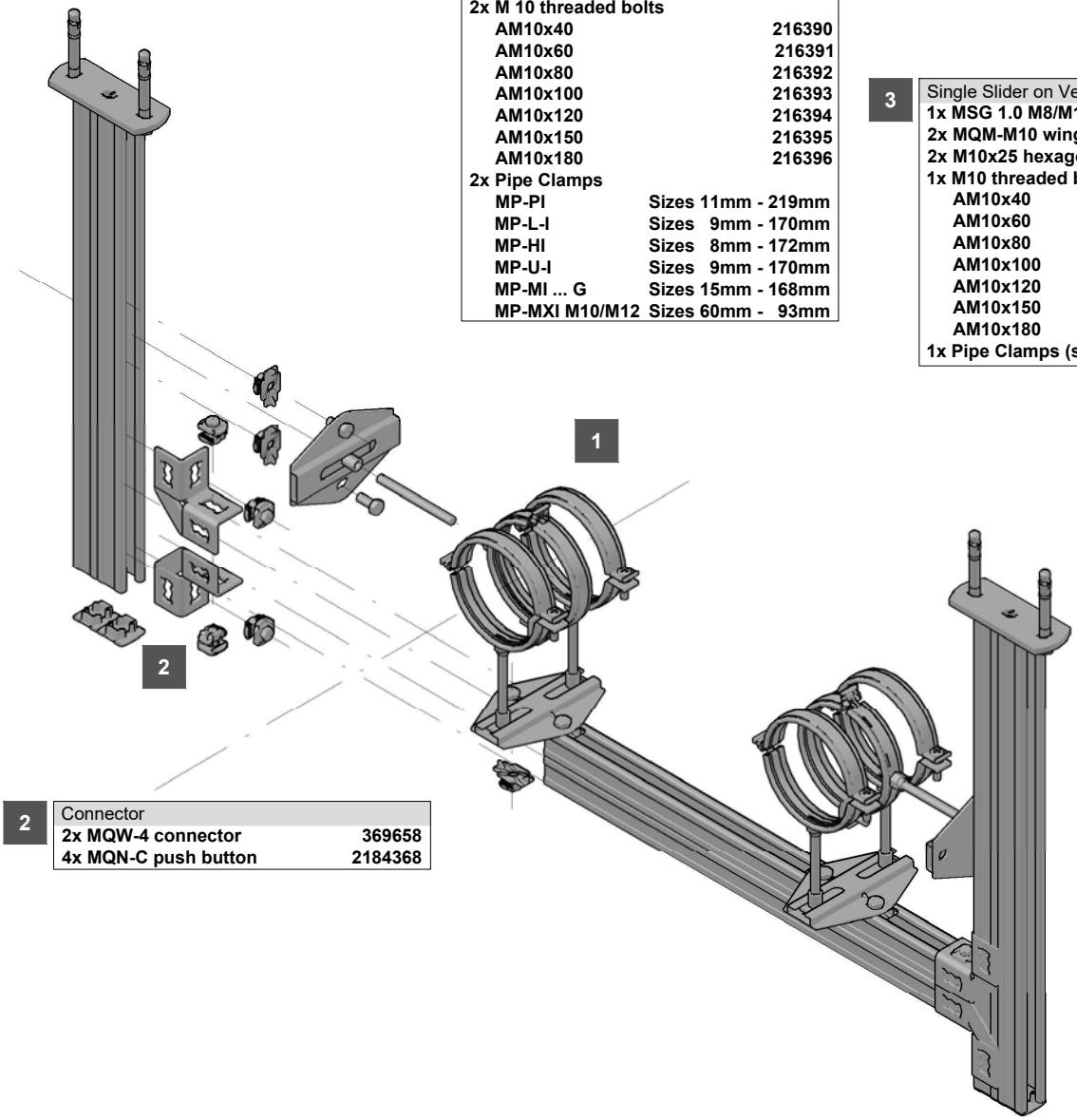


1 Double Slider on Channel

1x MSG 1.75 M8/M10 slider		248209
2x MQM-M10 wing nut		369626
2x M10x25 hexagon screw		216454
2x M 10 threaded bolts		
AM10x40		216390
AM10x60		216391
AM10x80		216392
AM10x100		216393
AM10x120		216394
AM10x150		216395
AM10x180		216396
2x Pipe Clamps		
MP-PI	Sizes 11mm - 219mm	
MP-L-I	Sizes 9mm - 170mm	
MP-HI	Sizes 8mm - 172mm	
MP-U-I	Sizes 9mm - 170mm	
MP-MI ... G	Sizes 15mm - 168mm	
MP-MXI M10/M12	Sizes 60mm - 93mm	

3 Single Slider on Vertical Upright

1x MSG 1.0 M8/M10	248205
2x MQM-M10 wing nut	369626
2x M10x25 hexagon screw	216454
1x M10 threaded bolt	
AM10x40	216390
AM10x60	216391
AM10x80	216392
AM10x100	216393
AM10x120	216394
AM10x150	216395
AM10x180	216396
1x Pipe Clamps (see double slider)	



2 Connector

2x MQW-4 connector	369658
4x MQN-C push button	2184368

Application description	Application	Product lines	Base material
Heating - Axial Guide	5	MQ System	Concrete
General comments		Sliders / rollers	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Axial Guides On Concrete - Options 2

For cases where axial bracing is necessary

1 Lateral Bracing using Long MQK Brace

1x	MQK-SL pre-fab. brace	369621
1x	MQN-C push button	2184368
1x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

2 Lateral Bracing using Short MQK Brace

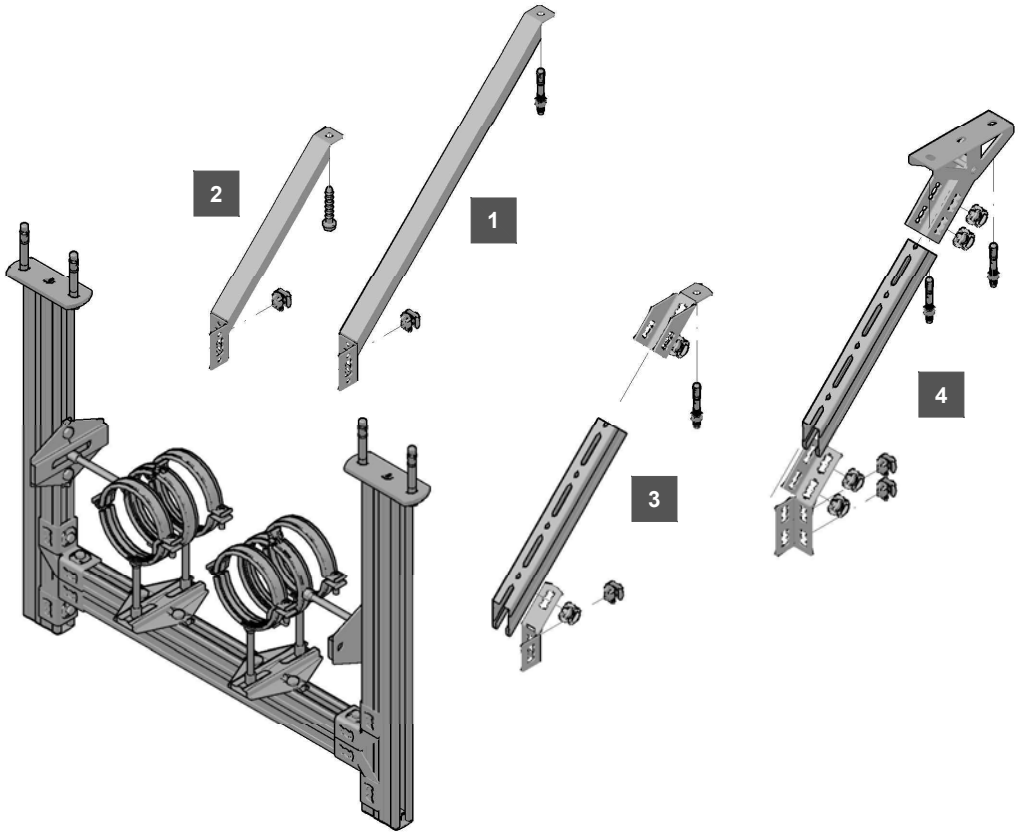
1x	MQK-SK pre-fab. brace	369622
1x	MQN-C push button	2184368
1x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

3 Lateral Bracing using MQP-45 Connector

Upper brace connection		
1x	MQP-45 channel base	369649
2x	MQN-C push button	2184368
1x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848
Channel brace - 41 mm format channels		
	MQ-41-L 2m	2141966
	MQ-41-L 3m	2141965
	MQ-41-L 6m	2141966
	MQ-41 2 m	304559
	MQ-41 3 m	369591
	MQ-41 6 m	369592
	MQ-41 3 m LL	2048100
	MQ-41 6 m LL	2048101
	MQ-41/3 3 m	369596
	MQ-41/3 6 m	369597
	MQ-41 U 6 m	369595
	MQ-21D 3 m	369601
	MQ-21D 6 m	369602
Bottom brace connection		
1x	MQW-3/135 connector	369663
2x	MQN-C push button	2184368

4 Lateral Bracing using MQP-G Connector

Upper brace connection		
1x	MQP-G pivot base	369654
2x	MQN-C push button	2184368
2x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848
Channel brace - 41 mm format channels		
	MQ-41-L 2m	2141966
	MQ-41-L 3m	2141965
	MQ-41-L 6m	2141966
	MQ-41 2 m	304559
	MQ-41 3 m	369591
	MQ-41 6 m	369592
	MQ-41 3 m LL	2048100
	MQ-41 6 m LL	2048101
	MQ-41/3 3 m	369596
	MQ-41/3 6 m	369597
	MQ-41 U 6 m	369595
	MQ-21D 3 m	369601
	MQ-21D 6 m	369602
Bottom brace connection		
1x	MQW-8/45 connector	369660
4x	MQN-C push button	2184368



Application description	Application	Product lines	Base material
Heating - Axial Guide	5	MQ System	Concrete
		Sliders / rollers	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Axial Guides On Concrete - Options 3

For cases where lateral bracing is necessary

1 Lateral bracing using long MQK brace

1x	MQK-SL pre-fab. brace	369621
1x	MQN-C push button	2184368
1x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

2 Lateral bracing using short MQK brace

1x	MQK-SK pre-fab. brace	369622
1x	MQN-C push button	2184368
1x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

3 Lateral bracing using 3D elements

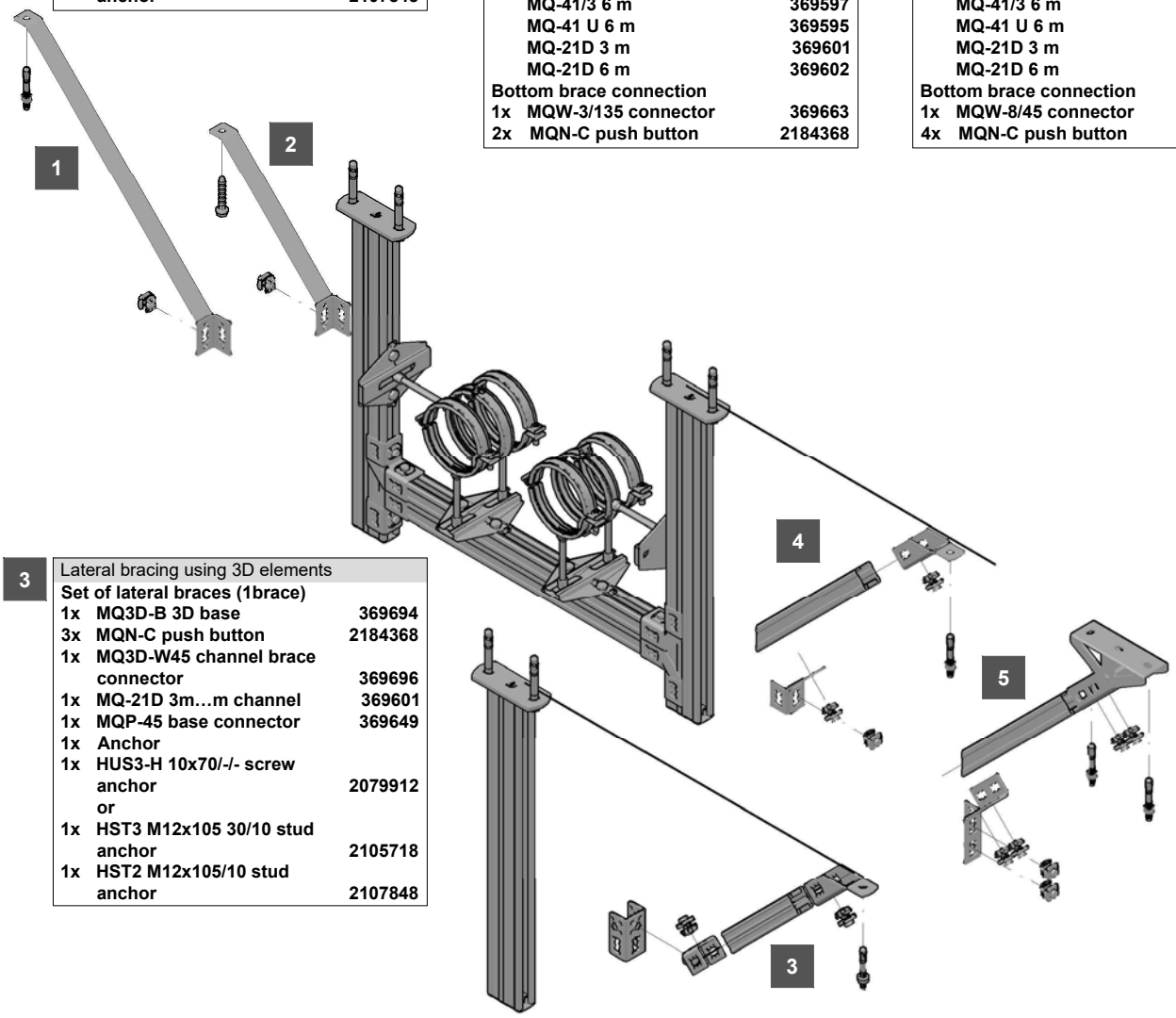
Set of lateral braces (1brace)		
1x	MQ3D-B 3D base	369694
3x	MQN-C push button	2184368
1x	MQ3D-W45 channel brace connector	369696
1x	MQ-21D 3m…m channel	369601
1x	MQP-45 base connector	369649
1x	Anchor	
1x	HUS3-H 10x70/-/- screw anchor	2079912
	or	
1x	HST3 M12x105 30/10 stud anchor	2105718
1x	HST2 M12x105/10 stud anchor	2107848

4 Lateral bracing using MQP-45 connector

Upper brace connection		
1x	MQP-45 channel base	369649
2x	MQN-C push button	2184368
1x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848
Channel brace - 41 mm format channels		
	MQ-41-L 2m	2141966
	MQ-41-L 3m	2141965
	MQ-41-L 6m	2141966
	MQ-41 2 m	304559
	MQ-41 3 m	369591
	MQ-41 6 m	369592
	MQ-41 3 m LL	2048100
	MQ-41 6 m LL	2048101
	MQ-41/3 3 m	369596
	MQ-41/3 6 m	369597
	MQ-41 U 6 m	369595
	MQ-21D 3 m	369601
	MQ-21D 6 m	369602
Bottom brace connection		
1x	MQW-3/135 connector	369663
2x	MQN-C push button	2184368

5 Lateral bracing using MQP-G connector

Upper brace connection		
1x	MQP-G pivot base	369654
2x	MQN-C push button	2184368
2x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848
Channel brace - 41 mm format channels		
	MQ-41-L 2m	2141966
	MQ-41-L 3m	2141965
	MQ-41-L 6m	2141966
	MQ-41 2 m	304559
	MQ-41 3 m	369591
	MQ-41 6 m	369592
	MQ-41 3 m LL	2048100
	MQ-41 6 m LL	2048101
	MQ-41/3 3 m	369596
	MQ-41/3 6 m	369597
	MQ-41 U 6 m	369595
	MQ-21D 3 m	369601
	MQ-21D 6 m	369602
Bottom brace connection		
1x	MQW-8/45 connector	369660
4x	MQN-C push button	2184368



Application description	Application	Product lines	Base material
Heating - Axial Guide	5	MQ System	Concrete
		Sliders / rollers	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

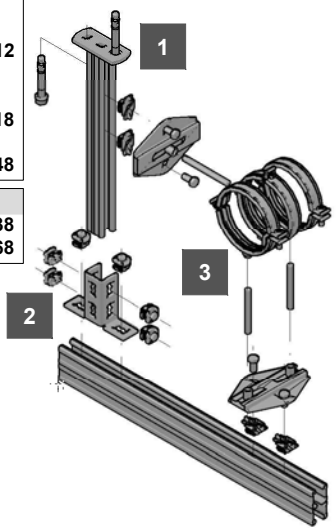
Axial Guides On Concrete - Corridor Wall-to-wall Options

1 Vertical upright anchored to ceiling supporting two axial guides

1x	Cantilever arm	
	MQK-21D/300	369617
	MQK-21D/450	369618
	MQK-21D/600	269619
	MQK-41D/1000	269620
2x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

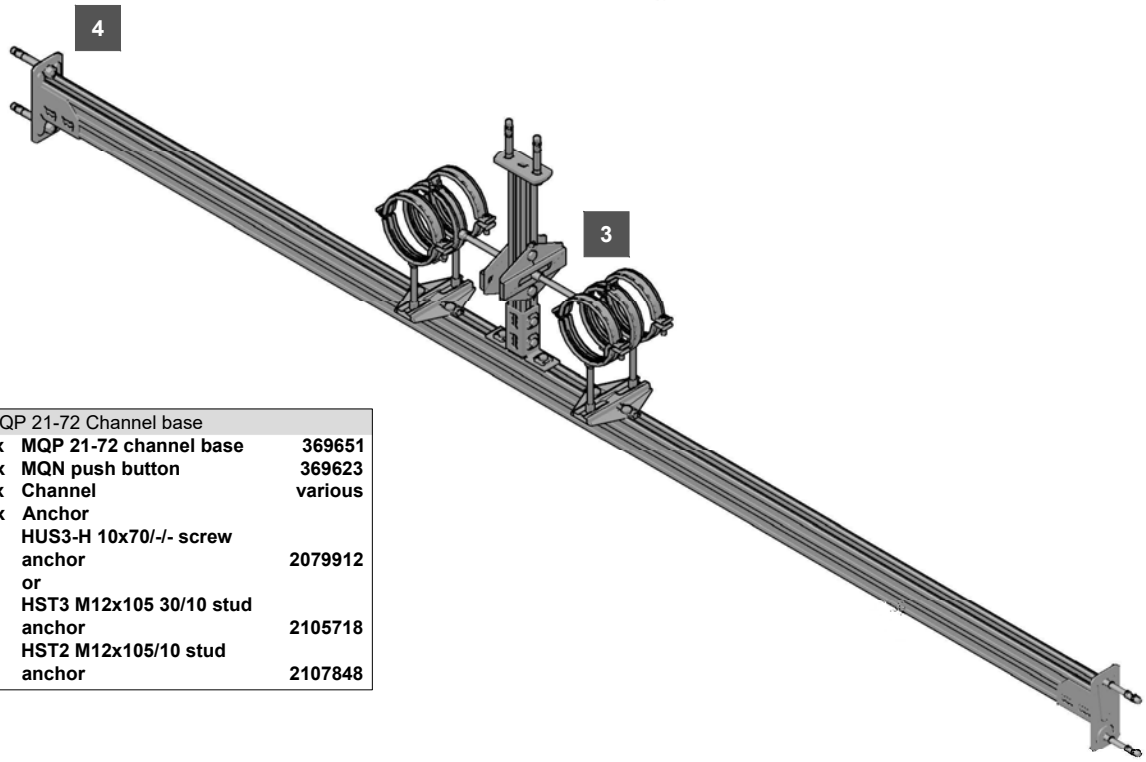
2 Connector

1x	MQV-2/2 D connector	369638
6x	MQN-C push button	2184368



3 Set of axial guides - complete

1x	MSG 1.75 M8/M10 double slider	248209
1x	MSG 1.0 M8/M10 single slider	248205
4x	MQM-M10 wing nut	369626
4x	M10x20 hexagon screw	216453
3x	M10 threaded bolts	
	AM10x40	216390
	AM10x60	216391
	AM10x80	216392
	AM10x100	216393
	AM10x120	216394
	AM10x150	216395
	AM10x180	216396
3x	Pipe rings	
	MP-PI	Sizes 11mm - 219mm
	MP-L-I	Sizes 9mm - 170mm
	MP-HI	Sizes 8mm - 172mm
	MP-U-I	Sizes 9mm - 170mm
	MP-MI ... G	Sizes 15mm - 168mm
	MP-MXI M10/M12	Sizes 60mm - 93mm



4 MQP 21-72 Channel base

1x	MQP 21-72 channel base	369651
2x	MQN push button	369623
1x	Channel	various
2x	Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

Application description	Application	Product lines	Base material
Heating - Axial Guide	5	MQ System	Concrete
		Sliders / rollers	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Cantilever Arm On Concrete - Product Options

Single profile brackets - galvanized portfolio

1

21 mm format brackets	1x
MQK-L-21/200 bracket	**2141924**
MQK-L-21/300 bracket	**2141925**
MQK-L-21/450 bracket	**2141926**
2x Anchors	
HUS3-H 8x55 5/-/-	
screw anchor	**2079794**
or	
HST3 M10x90 30/10	
stud anchor	**2105712**
2x end caps	
MQZ-E21	**370598**

2

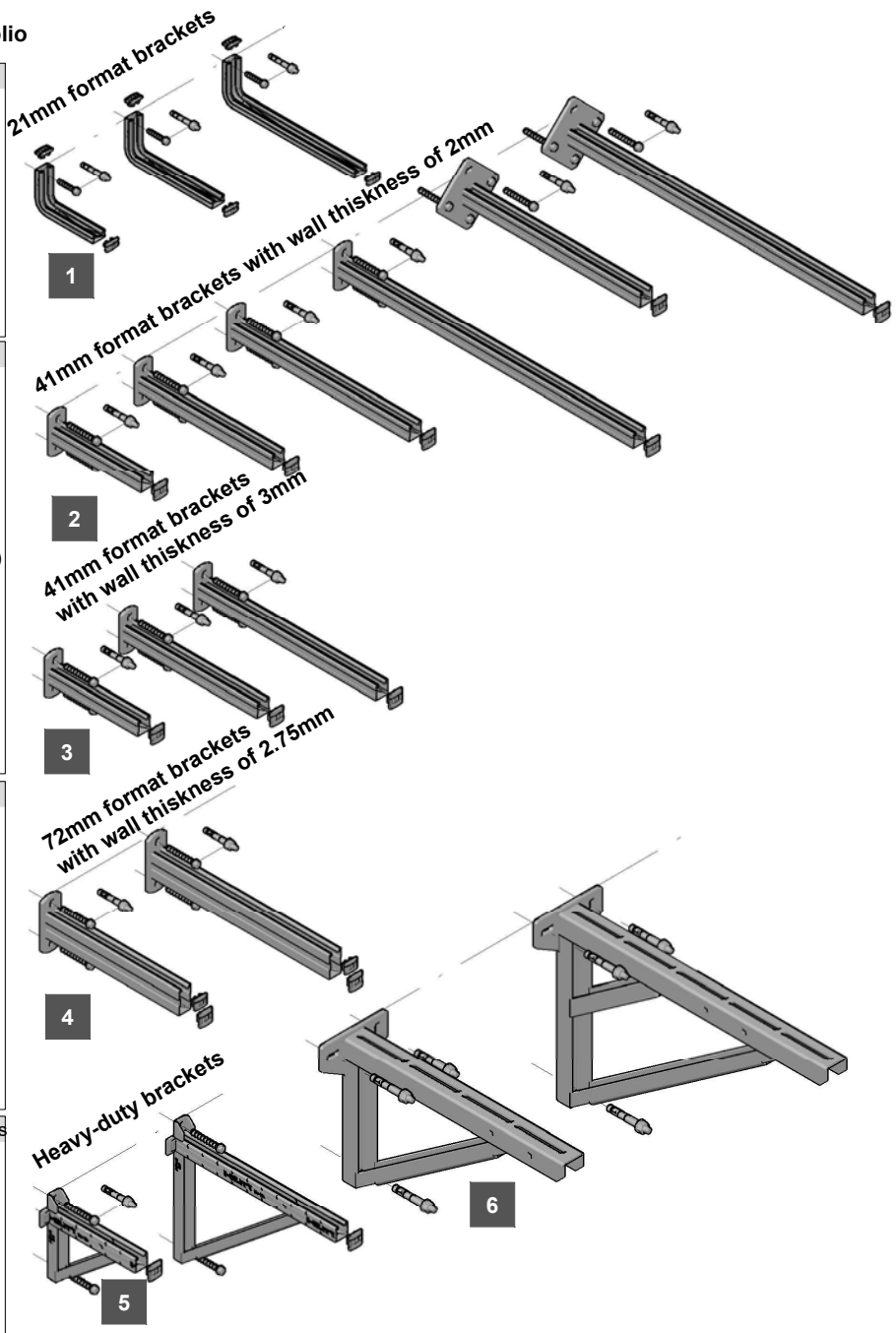
41 mm fromat brackets 2mm wall thickness	
with 2 hole base plate	
MQK-41/300	**369609**
MQK-41/450	**369610**
MQK-41/600	**369611**
MQK-41/1000	**369612**
with 4 hole base plate	
MQK-41/1000/4	**369613**
MQK-41/1000/4	**369614**
2x Anchors (4x anchors for 4 hole b. plate)	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
1x end cap	
MQZ-E41	**369685**

3

41 mm fromat brackets 3mm wall thickness	
MQK-41/3/300	**370595**
MQK-41/3/450	**370596**
MQK-41/3/600	**370597**
2x Anchors	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
1x end cap	
MQZ-E41	**369685**

4

72 mm fromat brackets 2.75mm wall thickness	
MQK-72/450	**369615**
MQK-72/600	**369616**
2x Anchors	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
End caps	
1x MQZ-E31	**369686**
1x MQZ-E41	**369685**



5

Heavy-duty brackets - hot-dip galvanized	
MQK-H/300	**2048096**
MQK-H/550	**2048097**
2x Anchors	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
1x end cap	
MQZ-E41	**369685**

6

Heavy-duty brackets - hot-dip galvanized	
MQK-H/750	**2048098**
MQK-H/900	**2048099**
3x Anchors	
HST3 M16x135 35/15	
stud anchor	**2105858**
HST2 M16x140/25	
stud anchor	**2108160**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
		Anchors	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Cantilever Arm On Concrete - Product Options

Double - B2B profile brackets - galvanized portfolio

1

21D (2x21) mm fromat brackets	
MQK-21D/300	**369617**
MQK-21D/450	**369618**
MQK-21D/600	**369619**
2x Anchors	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
2x End caps	
MQZ-E21	**370598**

2

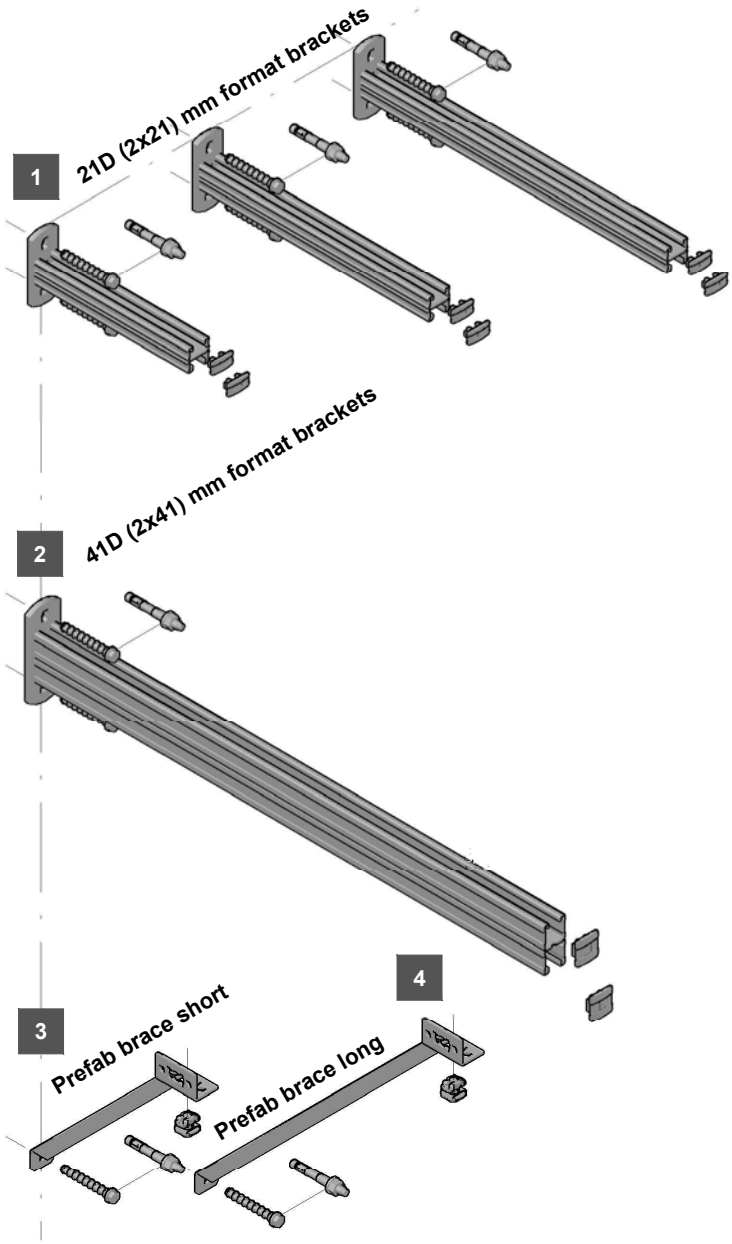
41D (2x41) mm fromat brackets	
MQK-41D/1000	**369620**
2x Anchors	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
2x End caps	
MQZ-E41	**369685**

3

Prefab brace for min arm 450 mm	
MQK-SK	**369622**
1x Anchor	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
This brace is possible to combine with:	
MQK-21D/450	**269618**
MQK-21D/600	**369619**
MQK-41D/1000	**369620**

4

Prefab brace for min arm 600 mm	
MQK-SL	**369621**
1x Anchor	
HUS3-H 10x90 35/15/5	
screw anchor	**2079914**
or	
HST3 M12x105 30/10	
stud anchor	**2105718**
HST2 M12x105/10	
stud anchor	**2107848**
This brace is possible to combine with:	
MQK-21D/600	**369619**
MQK-41D/1000	**369620**



Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Cantilever Arm On Concrete - Vertical Bottom Bracing

1 Prefab brace for min arm 450 mm

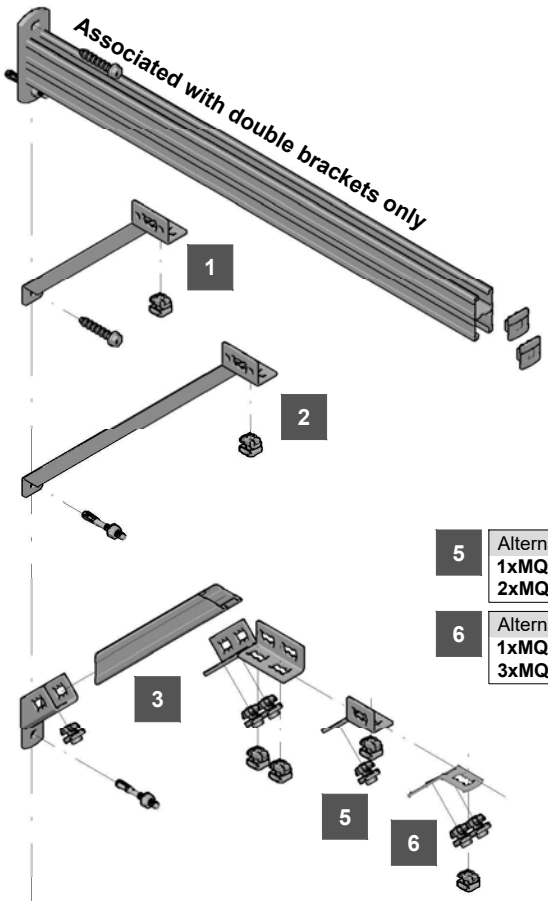
1x Pre-fab brace	
MQK-SK	**369622**
1x Push button	
MQN-C push button	**2184368**
1x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
This brace is possible to combine with:	
MQK-21D/450	**269618**
MQK-21D/600	**369619**
MQK-41D/1000	**369620**

2 Prefab brace for min arm 600 mm

1x Pre-fab brace	
MQK-SL	**369621**
1x Push button	
MQN-C push button	**2184368**
1x Anchor	
1x HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
This brace is possible to combine with:	
MQK-21D/600	**369619**
MQK-41D/1000	**369620**

3 Axial bracing using MQP-45 connector

Upper brace connector	
1x MQW-8/45 connector	**369660**
4x MQN-C push button	**2184368**
Bracket	
MQK-21D/300	**369617**
MQK-21D/450	**369618**
MQK-21D/600	**369619**
MQK-41D/1000	**369620**
Channel brace - 41mm format channel	
1x MQ-41 2m channel	**304559**
Bottom brace connection	
1x MQP-45 channel base	**369649**
2x MQN-C push button	**2184368**
1x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**



5 Alternative upper brace connector

1xMQW-3/135 connector	**369663**
2xMQN-C push button	**2184368**

6 Alternative upper brace connector

1xMQW-3/45 connector	**369663**
3xMQN-C push button	**2184368**

4 Axial bracing using MQP-G pivot connector

Upper brace connector	
1x MQP-G pivot connector	**369654**
2x MQN-C push button	**2184368**
2x M12x22 hex. screw	**216457**
2x MQM-M12 wing nut	**369627**
Bracket	
MQK-21D/300	**369617**
MQK-21D/450	**369618**
MQK-21D/600	**369619**
MQK-41D/1000	**369620**
Channel brace - 41mm format channel	
1x MQ-41 2m channel	**304559**
Bottom brace connection	
1x MQP-G pivot connector	**369654**
2x MQN-C push button	**2184368**
2x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
		Anchors	

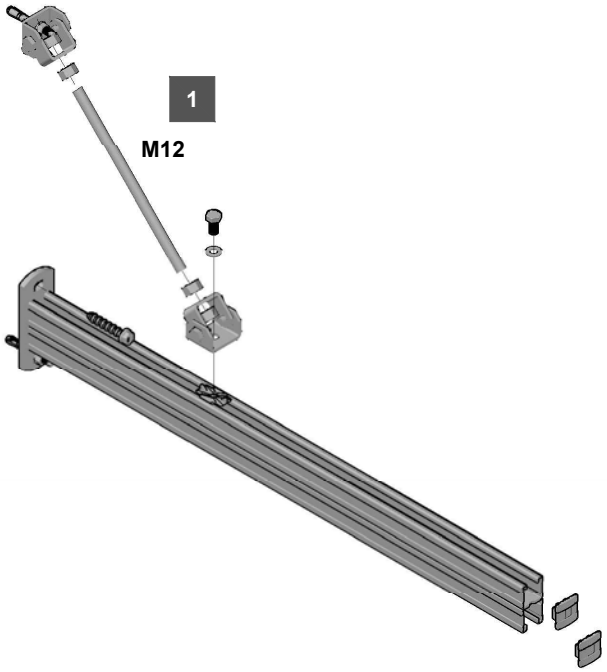
General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Cantilever Arm On Concrete - Vertical Upper Bracing With Threaded Rods

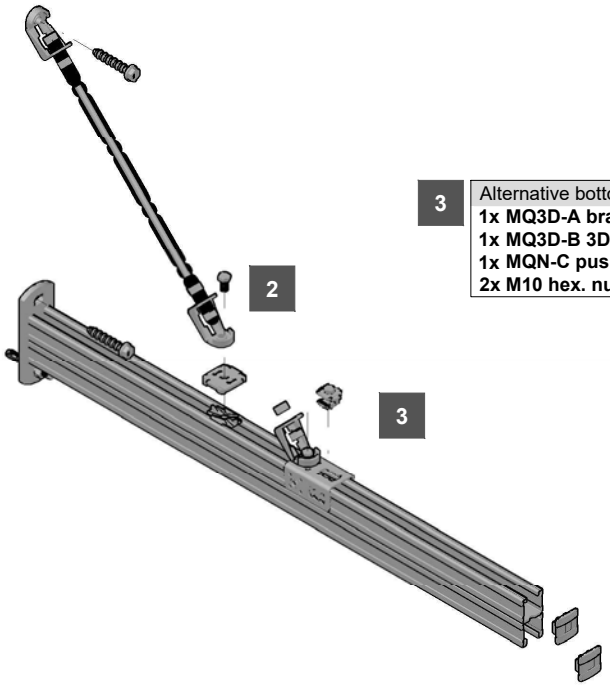
Using MQP-U hinge connectors and M12 threaded rods

1	Vertical upper bracing - MQP-U M12 hinge	
	Upper brace connection	
	1x MQP-U M12 hinge	**284248**
	2x M12 nut	
	1x Anchor	**2184554**
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**
	Brace	
	1x M12 threaded rod	
	AM12x1000 t.rod	**339797**
	AM12x2000 t.rod	**216420**
	AM12x3000 t.rod	**216421**
	bottom brace connection	
	1x MQP-U M12 hinge	**284248**
	1x M12x22 hex. screw	**216457**
	2x M12 nut	**2184554**
	1x MQM-M12 wing nut	**369627**
	1x A12/24 washer	**282852**



Using MQ - 3D elements and M10 threaded rods

2	Vertical upper bracing using MQ-3D elements	
	Upper brace connection	
	1x MQ3D-A brace connector with removed screw	**369697**
	2x M10 nut	**2184505**
	1x Anchor	
	HUS3-H 8x65 15/5/- screw anchor	**2079795**
	or	
	HST3 M10x90 30/10 stud anchor	**2105712**
	HST2 M10x90/10 stud anchor	**2107847**
	Brace	
	1x AM10 threaded rod	
	AM10x1000 t.rod	**339795**
	AM10x2000 t.rod	**339796**
	AM10x3000 t.rod	**216418**
	Bottom brace connection	
	1x MQ3D-A brace connector with removed screw	**369697**
	2x M10 nut	**2184505**
	1x M10x20 hex. screw	**216453**
	1x MQZ-L11 square washer	**2199455**
	1x MQM-M10 wing nut	**369626**



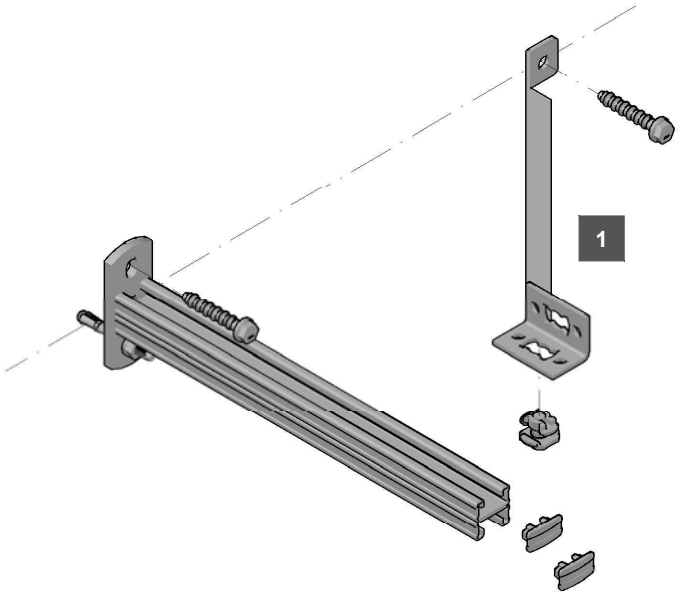
3	Alternative bottom brace connector	
	1x MQ3D-A brace connector	**369697**
	1x MQ3D-B 3D base	**369694**
	1x MQN-C push button	**2184368**
	2x M10 hex. nut	**216466**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Cantilever Arm On Concrete - Side (Axial) Bracing With Pre-fab. Braces

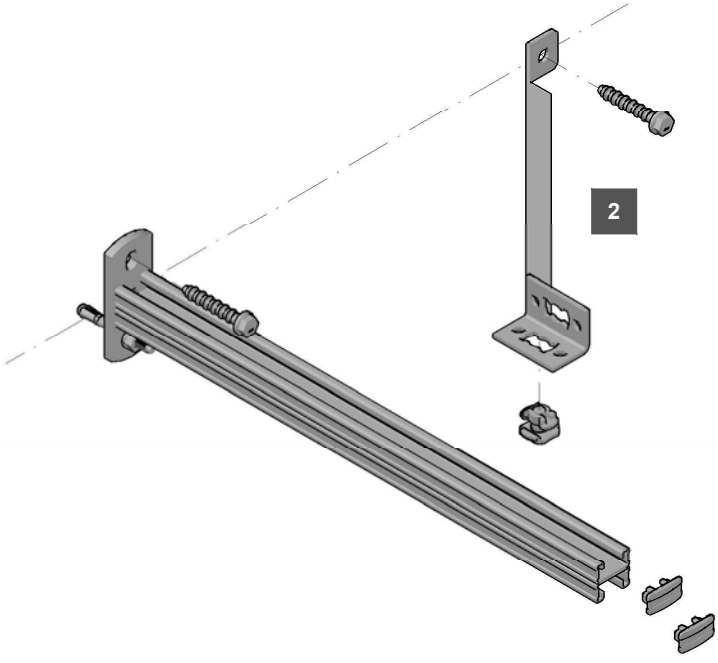
Bracket with short pre-fab brace

1	For double brackets min arm 450 mm	
	1x Brackets	
	MQK-21D/450	**269618**
	MQK-21D/600	**369619**
	MQK-41D/1000	**369620**
	Side brace	
	1x MQK-SK	**369622**
	1x MQN-C push button	**2184368**
	3x Anchors	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**



Bracket with long pre-fab brace

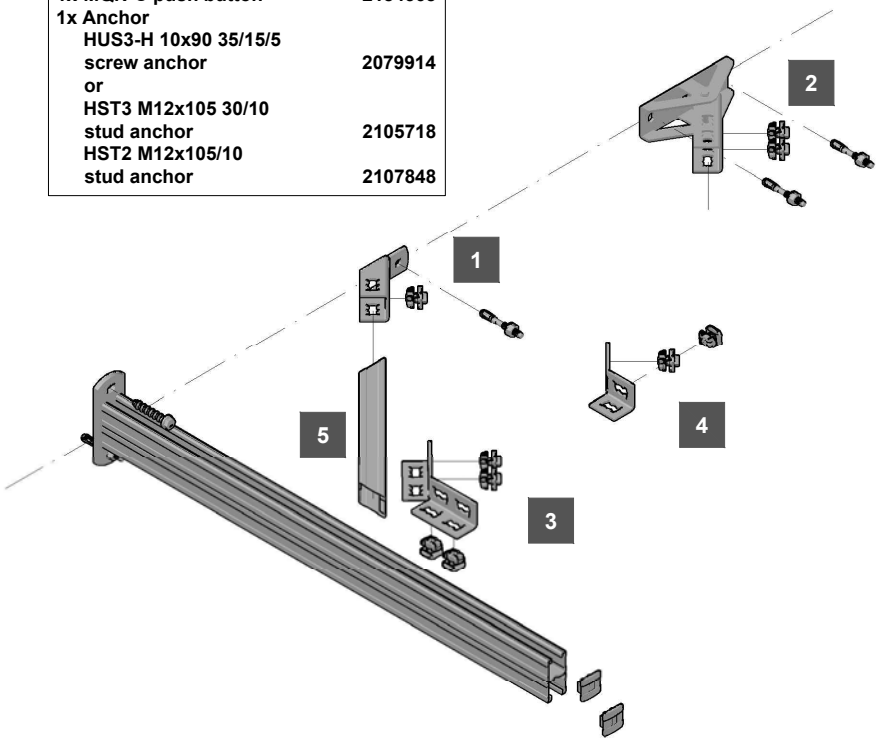
2	For double brackets min arm 600 mm	
	1x Brackets	
	MQK-21D/600	**369619**
	MQK-41D/1000	**369620**
	Side brace	
	1x MQK-SL	**369621**
	1x MQN-C push button	**2184368**
	3x Anchors	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**



Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Cantilever Arm On Concrete - Side (Axial) Bracing Using Channel

1	Base material brace connection MQP-45	
	1x MQP-45 channel base	**369649**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**



2	Base material brace connection MQP-G	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	2x Anchors	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

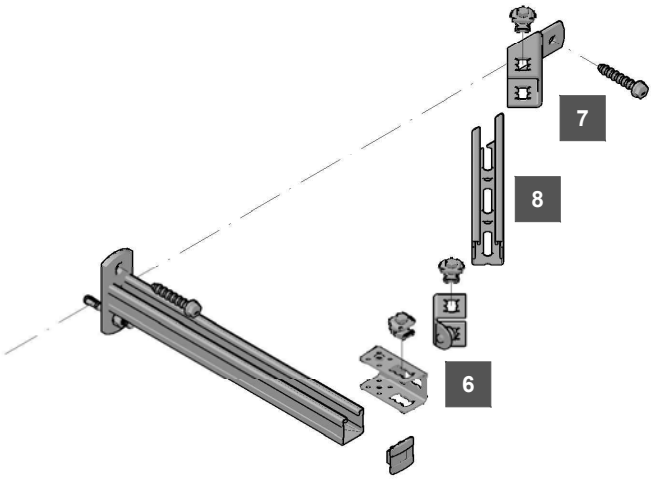
5	Brace made of 41 mm format channel	
	MQ-41-L 2m channel	**2141966**
	MQ-41-L 3m channel	**2141965**
	MQ-41-L 6m channel	**2141964**
	MQ-41 2m channel	**304559**
	MQ-41 3m channel	**369591**
	MQ-41 6m channel	**369592**
	MQ-41/3 3m channel	**369596**
	MQ-41/3 6m channel	**369597**
	MQ-21D 3m channel	**369601**
	MQ-21D 6m channel	**369602**

3	Cantilever arm brace connector	
	1x MQW-8/45 connector	**369660**
	4x MQN-C push button	**2184368**

4	Cantilever arm brace connector	
	1x MQW-3/135 connector	**369663**
	2x MQN-C push button	**2184368**

Bracket 41 mm format with MQ3D elements and braced with channel

6	Cantilever arm brace connection MQP-45	
	1x MQ3D-B 3D base	**369694**
	2x MQN-C push button	**2184368**
	1x MQ3D-W45 channel brace connector	**369696**



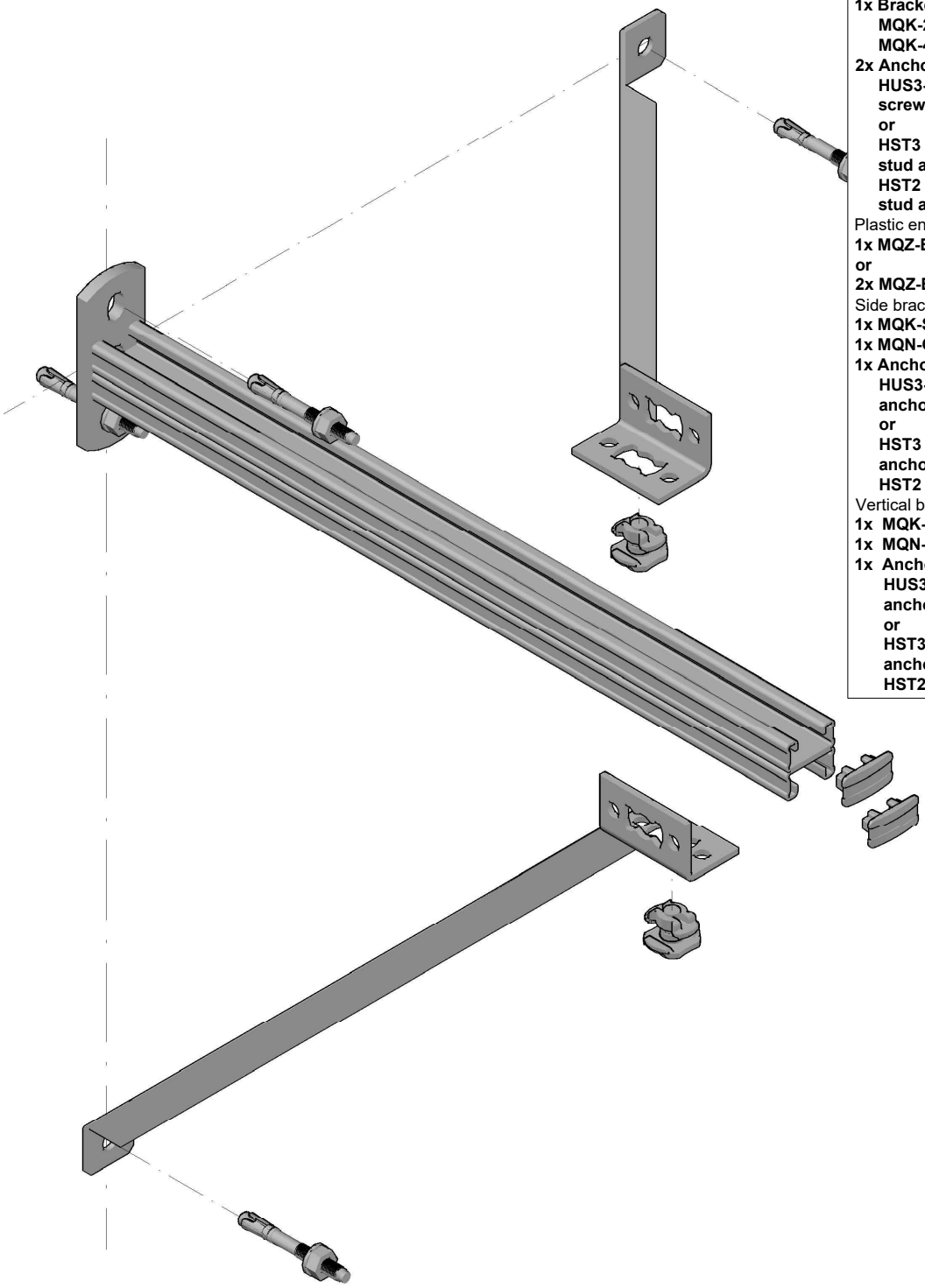
7	Base material brace connection MQP-45	
	1x MQP-45 channel base	**369649**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

8	Brace made of 41 mm format channel	
	MQ-41-L 2m channel	**2141966**
	MQ-41-L 3m channel	**2141965**
	MQ-41-L 6m channel	**2141964**
	MQ-41 2m channel	**304559**
	MQ-41 3m channel	**369591**
	MQ-41 6m channel	**369592**
	MQ-41/3 3m channel	**369596**
	MQ-41/3 6m channel	**369597**
	MQ-21D 3m channel	**369601**
	MQ-21D 6m channel	**369602**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Cantilever Arm On Concrete - Vertical And Side Bracing Using Pre-fab Braces

Cantilever arm with vertical and side (axial) bracing using pre-fab braces
For brackets with min. arm of 600 mm



For double brackets min. arm 600 mm	
Bracket	
1x Bracket	
MQK-21D/600	**369619**
MQK-41D/1000	**369620**
2x Anchors	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
Plastic end cap	
1x MQZ-E41 end cap for MQK-41	**369685**
or	
2x MQZ-E21 end cap for MQ-21D	**370598**
Side brace	
1x MQK-SK pre-fab. brace	**369622**
1x MQN-C push button	**2184368**
1x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
Vertical brace	
1x MQK-SL pre-fab. brace	**369621**
1x MQN-C push button	**21843683**
1x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Cantilever Arm On Concrete - Slider Fastening

Use of slider is associated with axial loads, making side (axial) bracing necessary

1

Double slider in bracket with M8	
1x MSG 1.75 M8/M10 D slider	**248209**
2x MQM-M10 wing nut	**369626**
2x M10x25 hexagon screw	**216454**
2x M8 threaded bolts	
AM 8x30	**216379**
AM 8x40	**216380**
AM 8x50	**216381**
AM 8x60	**216382**
AM 8x70	**216383**
AM 8x80	**216384**
AM 8x100	**216385**
AM 8x120	**216386**
AM 8x150	**216387**
AM 8x180	**216388**

2

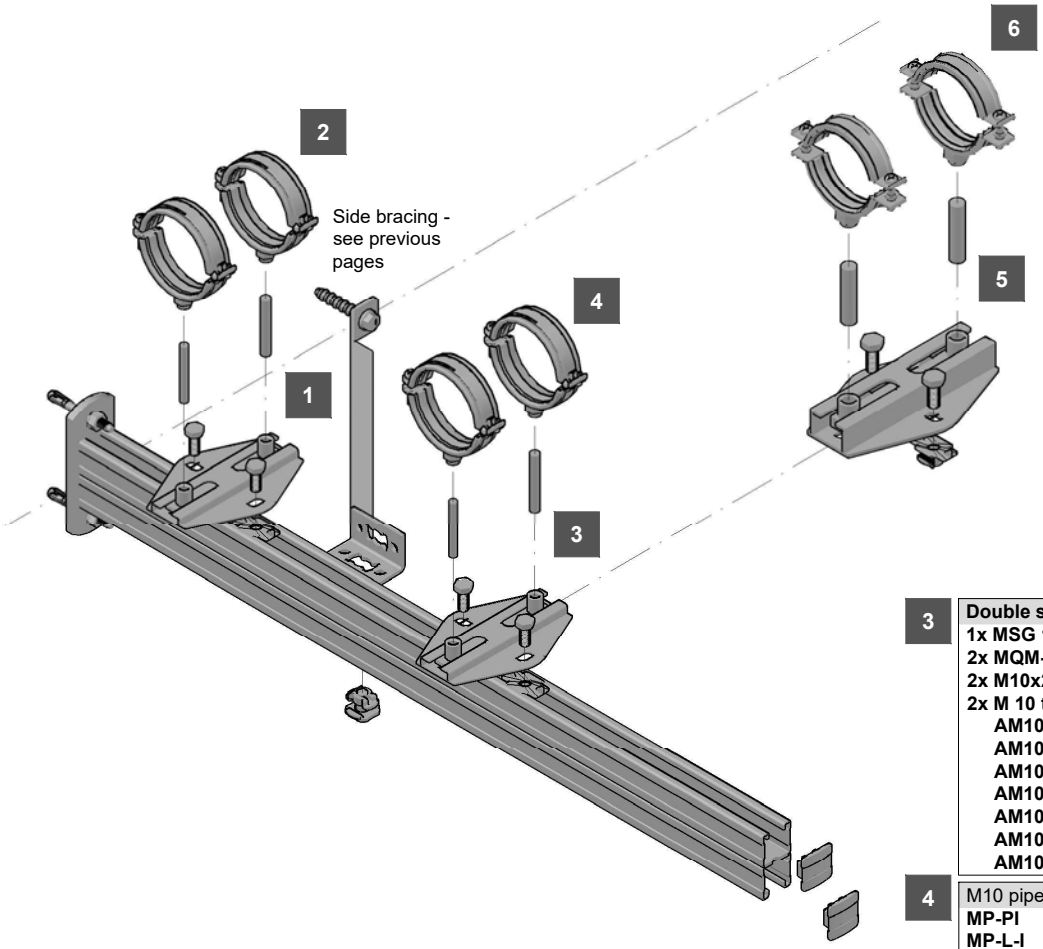
M8 Pipe Clamps	
MP-PI	**Sizes 11mm - 219mm**
MP-L-I	**Sizes 9mm - 170mm**
MP-HI	**Sizes 8mm - 172mm**
MP-U-I	**Sizes 9mm - 170mm**

5

Double roller in bracket with M16	
1x MRG-D6 M12/M16 roller	**334131**
2x MQM-M12 wing nut	**369627**
2x M12x25 hexagon screw	**216458**
2x M 16 threaded bolts	
AM 16x60	**212634**
AM 16x80	**216403**
AM 16x100	**212635**
AM 16x150	**212636**

6

M16 pipe clamps	
MP-U-I M8/10/O16	Sizes 9 - 170mm
MP-MI..C	**Sizes 4" - 244.5mm**
MP-MXI M16	**Sizes 4" - 508 mm**



3

Double slider in bracket with M10	
1x MSG 1.75 M8/M10 D slider	**248209**
2x MQM-M10 wing nut	**369626**
2x M10x25 hexagon screw	**216454**
2x M 10 threaded bolts	
AM10x40	**216390**
AM10x60	**216391**
AM10x80	**216392**
AM10x100	**216393**
AM10x120	**216394**
AM10x150	**216395**
AM10x180	**216396**

4

M10 pipe rings	
MP-PI	**Sizes 11mm - 219mm**
MP-L-I	**Sizes 9mm - 170mm**
MP-HI	**Sizes 8mm - 172mm**
MP-U-I	**Sizes 9mm - 170mm**
MP-MI ... G	**Sizes 15mm - 168mm**
MP-MXI M10/M12	**Sizes 60mm - 93mm**

Application description	Application	Product lines	Base material
Heating - Cantilever arm	4	MQ system	Concrete
General comments		Anchors	
• Application subject to thermal expansionimpact, no seismic, no fatigue impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Cantilever Arm On Concrete - Slider Fastening On MQK-H Brackets

Sliders / rollers on MQK-H300 and MQK-H500

1 Heavy bracket

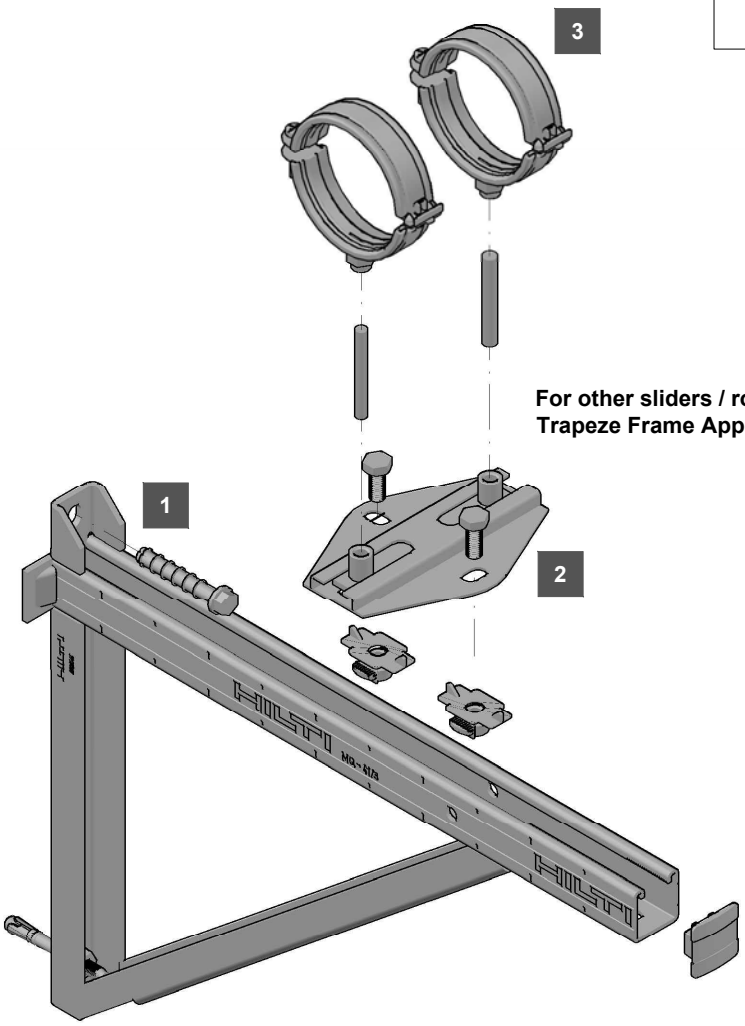
Bracket	
1x MQK-H/300 bracket	2048096
or	
1x MQK-H/550 bracket	2048097
2x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	2079914
or	
HST3 M12x105 30/10 stud anchor	2105718
HST2 M12x105/10 stud anchor	2107848

2 Double slider in channel with M10 connections

1x MSG 1.75 M8/M10 D slider	248209
2x MQM-M10 wing nut	369626
2x M10x25 hexagon screw	216454
2x M 10 threaded bolts	
AM10x40	216390
AM10x60	216391
AM10x80	216392
AM10x100	216393
AM10x120	216394
AM10x150	216395
AM10x180	216396

3 M10 pipe rings

MP-PI	Sizes 11mm - 219mm
MP-L-I	Sizes 9mm - 170mm
MP-HI	Sizes 8mm - 172mm
MP-U-I	Sizes 9mm - 170mm
MP-MI ... G	Sizes 15mm - 168mm
MP-MXI M10/M12	Sizes 60mm - 93mm



For other sliders / rollers see Trapeze Frame Application

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
		Sliders / rollers	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Cantilever Arm On Concrete - Slider Fastening On MQK-H Brackets

Sliders / rollers on MQK-H750 and MQK-H900

1

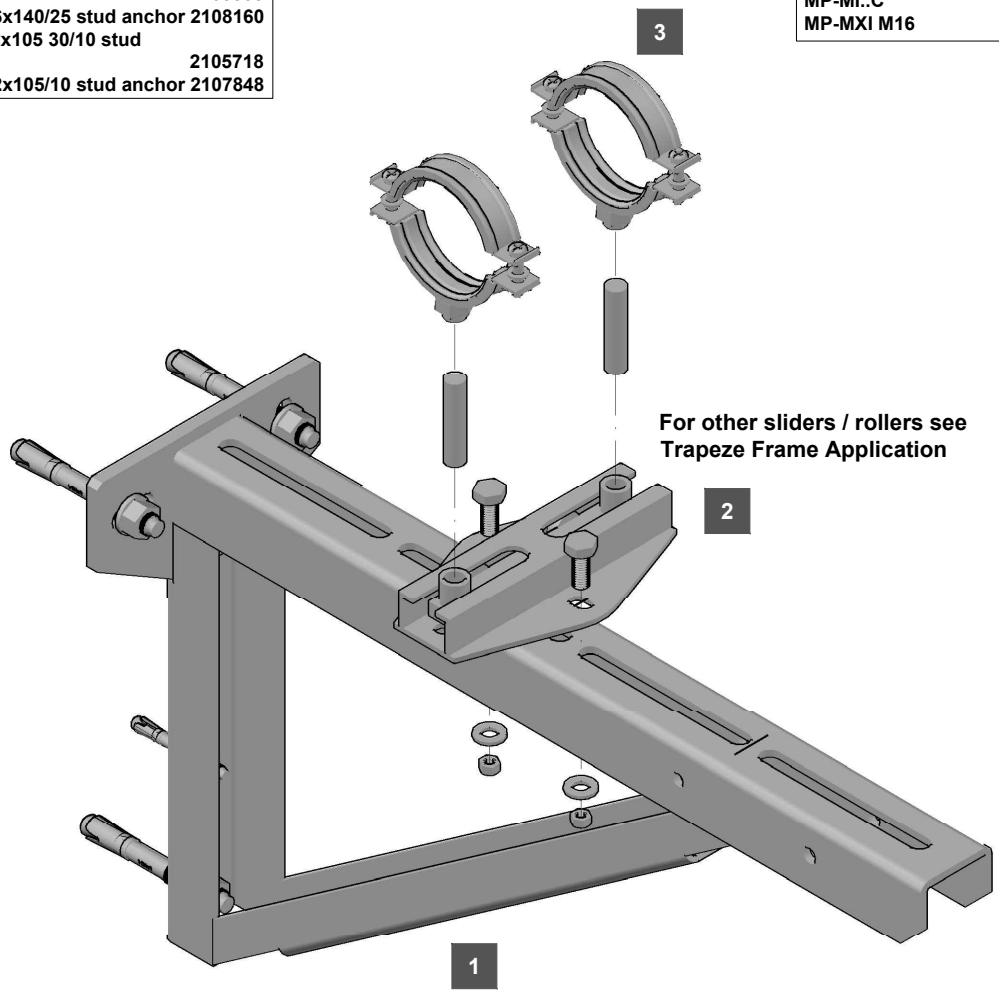
Heavy bracket	
1x Bracket	
MQK-H/550 bracket	**2048098**
or	
MQK-H/900 bracket	**2048099**
3x Anchor	
HST3 M16x135 35/15 stud anchor	**2105858**
HST2 M16x140/25 stud anchor	**2108160**
or	
2x HST3 M16x135 35/15 stud anchor	**2105858**
HST2 M16x140/25 stud anchor	**2108160**
1x HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

2

Double roller in bracket with M16 connection	
1x MRG-D6 M12/M16 roller	**334131**
2x M12x25 hexagon screw	**216458**
2x A13/24 washer	**282852**
2x M12 nut	**2184554**
2x AM 16 threaded bolts	
AM 16x60	**212634**
AM16x80	**216403**
AM16x100	**212635**
AM16x150	**212636**

3

M16 pipe clamps	
MP-U-I M8/10/O16	Sizes 9 - 170mm
MP-MI..C	**Sizes 4" - 244.5mm**
MP-MXI M16	**Sizes 4" - 508 mm**



For other sliders / rollers see Trapeze Frame Application

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
		Sliders / rollers	

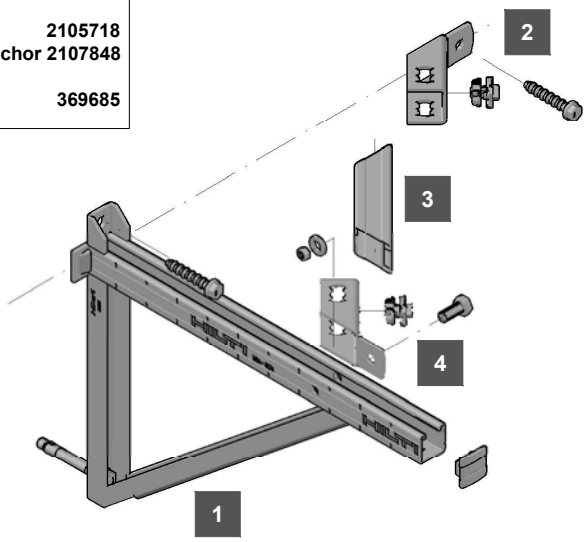
General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Cantilever Arm On Concrete - Side Bracing For MQK Heavy Brackets

Side (axial) bracing with channel for MQK-H300 and MQK-H550

1	Heavy bracket	
	1x Bracket	
	MQK-H/300 bracket	**2048096**
	or	
	MQK-H/550 bracket	**2048097**
	2x Anchors	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**
	1x Plastic end cap	
	MQZ-E41 end cap	**369685**



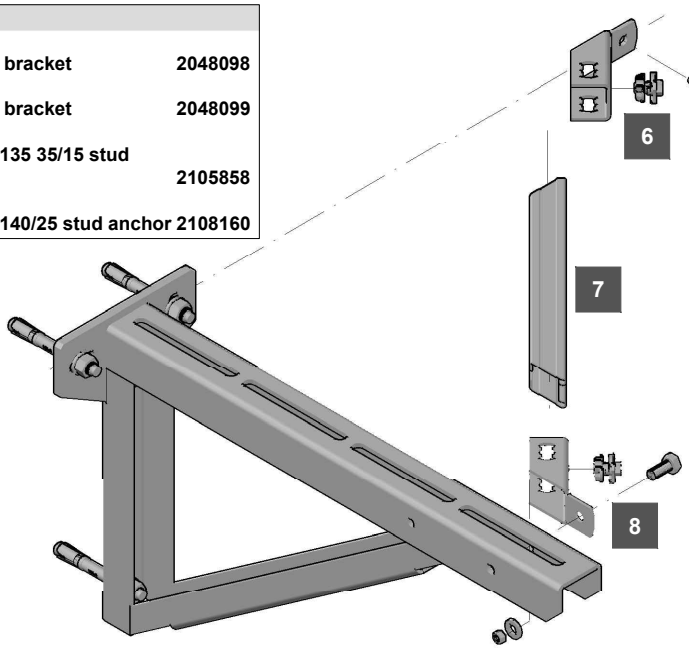
2	Base material brace connection MQP-45	
	1x MQP-45 channel base	**369649**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

3	Brace made of 41 mm format channel	
	MQ-41-L 2m channel	**2141966**
	MQ-41-L 3m channel	**2141965**
	MQ-41-L 6m channel	**2141964**
	MQ-41 2m channel	**304559**
	MQ-41 3m channel	**369591**
	MQ-41 6m channel	**369592**
	MQ-41/3 3m channel	**369596**
	MQ-41/3 6m channel	**369597**
	MQ-21D 3m channel	**369601**
	MQ-21D 6m channel	**369602**

4	Base material brace connection MQP-45	
	1x MQP-45 channel base	**369649**
	1x MQN-C push button	**2184368**
	1x M12x25 hexagon screw	**216458**
	1x A13/24 washer	**282852**
	1x M12 nut	**2184554**

Side (axial) bracing with channel for MQK-H750 and MQK-H900

5	Heavy bracket	
	1x Bracket	
	MQK-H/750 bracket	**2048098**
	or	
	MQK-H/900 bracket	**2048099**
	3x Anchors	
	HST3 M16x135 35/15 stud anchor	**2105858**
	or	
	HST2 M16x140/25 stud anchor	**2108160**



6	Base material brace connection MQP-45	
	1x MQP-45 channel base	**369649**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x90 35/15/5 screw anchor	**2079914**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

7	Brace made of 41 mm format channel	
	MQ-41-L 2m channel	**2141966**
	MQ-41-L 3m channel	**2141965**
	MQ-41-L 6m channel	**2141964**
	MQ-41 2m channel	**304559**
	MQ-41 3m channel	**369591**
	MQ-41 6m channel	**369592**
	MQ-41/3 3m channel	**369596**
	MQ-41/3 6m channel	**369597**
	MQ-21D 3m channel	**369601**
	MQ-21D 6m channel	**369602**

8	Base material brace connection MQP-45	
	1x MQP-45 channel base	**369649**
	1x MQN-C push button	**2184368**
	1x M12x25 hexagon screw	**216458**
	1x A13/24 washer	**282852**
	1x M12 nut	**2184554**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
General comments		Heavy brackets	
• Application subject to thermal expansionimpact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

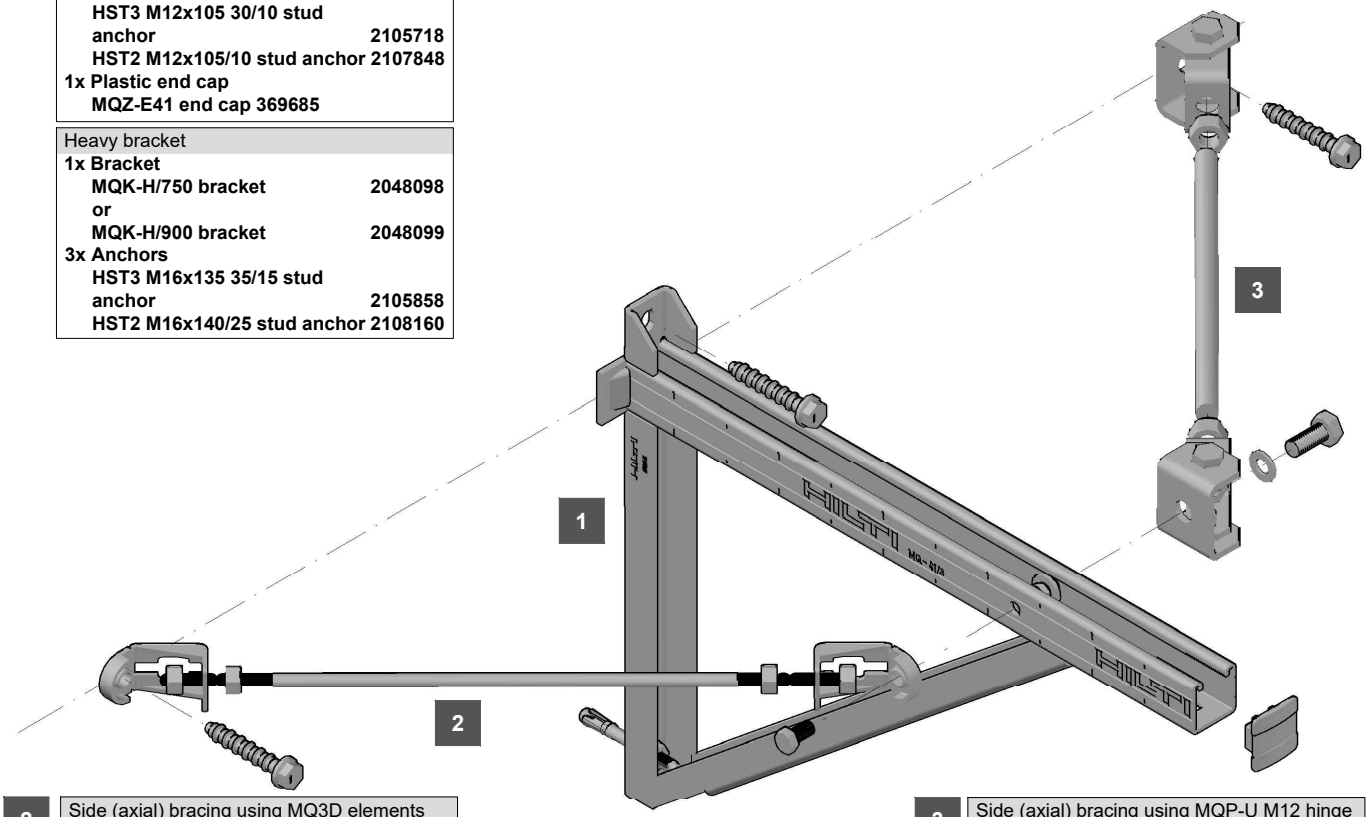
Heavy Cantilever Arm On Concrete - Side Bracing For MQK Heavy Brackets

Side (axial) bracing with threaded rod for MQK-H300, 550, 750, 900

1

Heavy bracket	
1x Bracket	
MQK-H/300 bracket	**2048096**
or	
MQK-H/550 bracket	**2048097**
2x Anchors	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
1x Plastic end cap	
MQZ-E41 end cap 369685	

Heavy bracket	
1x Bracket	
MQK-H/750 bracket	**2048098**
or	
MQK-H/900 bracket	**2048099**
3x Anchors	
HST3 M16x135 35/15 stud anchor	**2105858**
HST2 M16x140/25 stud anchor	**2108160**



2

Side (axial) bracing using MQ3D elements	
Base material brace connector	
1x MQ3D-A brace connector with removed screw	**369697**
2x M10 nut	**2184505**
1x Anchor	
HUS3-H 8x65 15/5/- screw anchor	**2079795**
or	
HST3 M10x90 30/10 stud anchor	**2105712**
HST2 M10x90/10 stud anchor	**2107847**
Brace	
1x AM10 threaded rod	
AM10x1000 t. rod	**339795**
AM10x2000 t. rod	**339796**
AM10x3000 t. rod	**216418**
Bracket brace connection	
1x MQ3D-A brace connector with removed screw	**369697**
1x A0.5/20 washer	**282851**
1x M10x25 hex. screw	**216454**
3x M10 nut	**2184505**

3

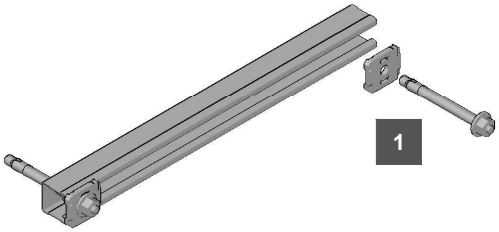
Side (axial) bracing using MQP-U M12 hinge	
Base material brace connection	
1x MQP-U M12 hinge	**284248**
1x Anchor	
HUS3-H 10x90 35/15/5 screw anchor	**2079914**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
2x M12 nut	**2184554**
Brace	
1x AM12 threaded rod	
AM12x1000 t. rod	**339797**
AM12x2000 t. rod	**216420**
AM12x3000 t. rod	**216421**
Bracket brace connection	
1x MQP-U M12 hinge	**284248**
1x M12x25 hexagon screw	**216458**
1x A13/24 washer	**282853**
3x M12 nut	**2184554**

Application description	Application	Product lines	Base material
Heating - Brackets	6	MQ system	Concrete
		Heavy brackets	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

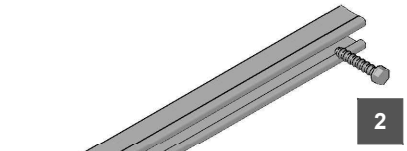
Riser Guides - Wall Rail - On Concrete



1 Through-bolt of MQ-41 with M12 stud anchor

1x HST3 M12x145 70/50	**2105851**
1x MQZ-L13 square washer	**369680**

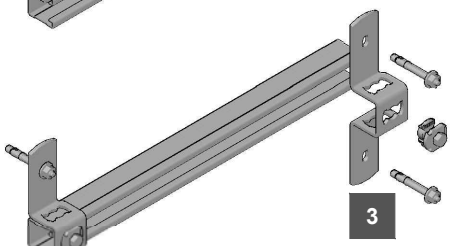
see following optional page for more sizes of channel



2 Screw anchor for back of the channel

1x HUS3 M10x70/-/- s. anchor 2079912

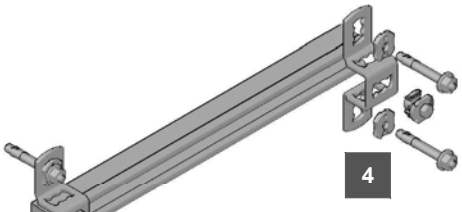
valid for all sizes of single channels



3 MQB-G clamp

1x MQB-G41 clamp	**369674**
1x MQN-C push button	**2184368**
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 M10x90/10 anchor	**2107847**

valid for 41mm channel format



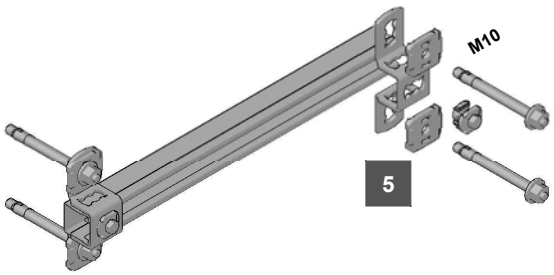
4 MQB clamps

for M10 only

1x MQB-41 clamp	**369668**
2x MQN-C push button	**2184368**
2x MQZ-U reduction washer	**369692**
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 M10x90/10 anchor	**2107847**

valid for 41mm channel format

see following optional page for more sizes of channel



5 MQB clamps

for M10

1x MQB-41 clamp	**369668**
1x MQN-C push button	**2184368**
2x MQZ-L11 square washer	**2199455**
2x HST3 M10x90 30/10 anchor	**2105712**
HST2 M10x90/10 anchor	**2107847**

for M12

1x MQB-41 clamp	**369668**
1x MQN-C push button	**2184368**
2x MQZ-L13 square washer	**2199456**
2x HST3 M12x105 30/10	**2105718**
HST2 M12x105/10 anchor	**2107848**

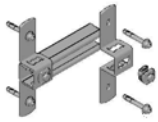
for M16

1x MQB-41 clamp	**369668**
1x MQN-C push button	**2184368**
2x MQZ-L17 square washer	**369681**
2x HST3 M16x135 35/15	**2105858**

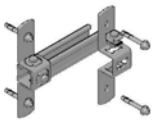
valid for 41mm channel format

see following optional page for more sizes of channel and respetive MQB clamp

All the clamps allow different positions of the channel in the clamp or even using back-to-back channels of the same format in the clamp

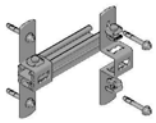


MQ-41 or MQ41/3 open to side



MQ-41 or MQ41/3 open up

MQ-41 or MQ41/3 open down

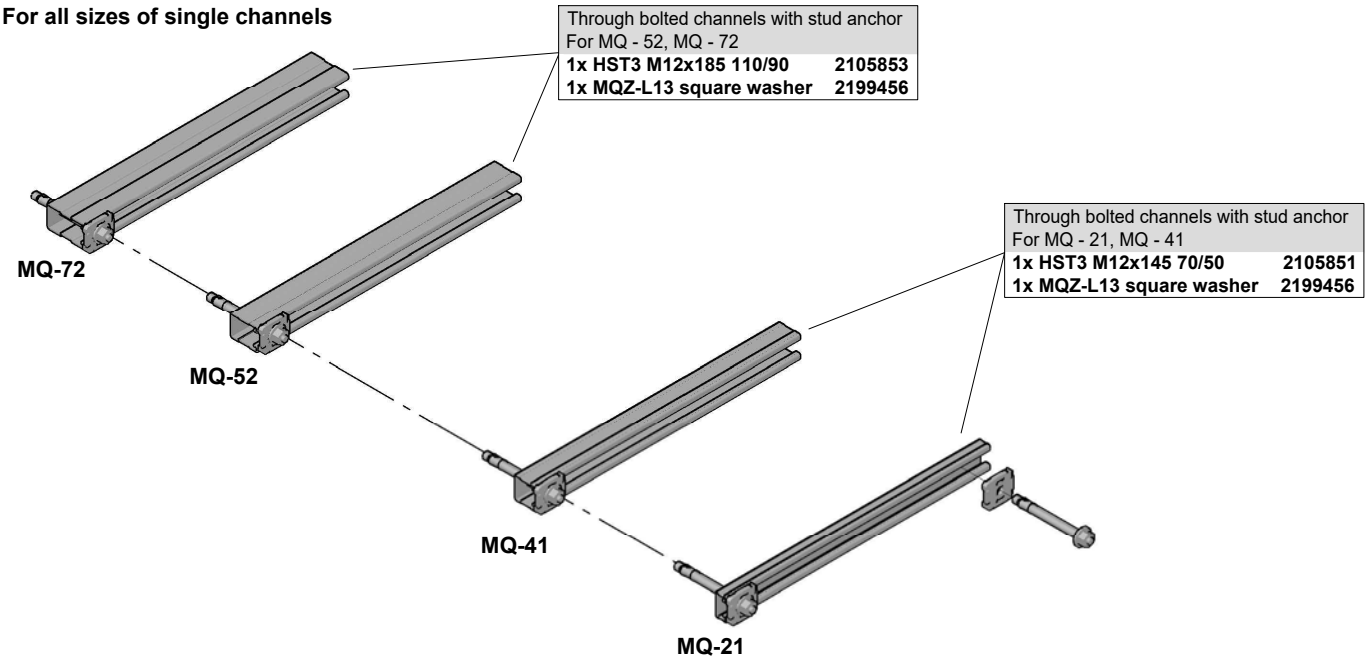


MQ-21D
Option to use 2x MQN push button for greater stability

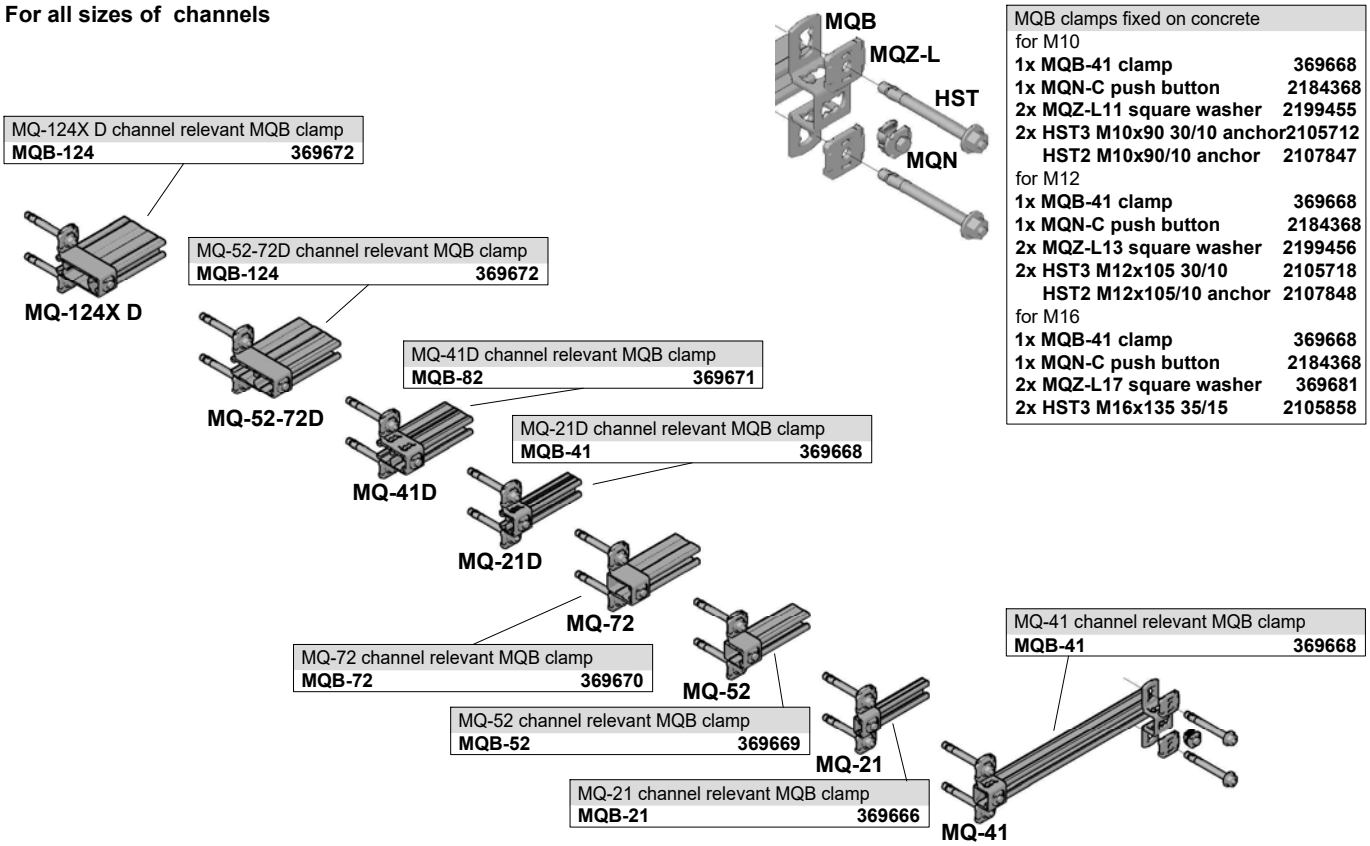
Application description	Application	Product lines	Base material
Heating - Riser Guides	7	Channels	Concrete
General comments		Clamps	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Anchors	

Riser Guides - Wall Rail On Concrete - Options 2

For all sizes of single channels



For all sizes of channels



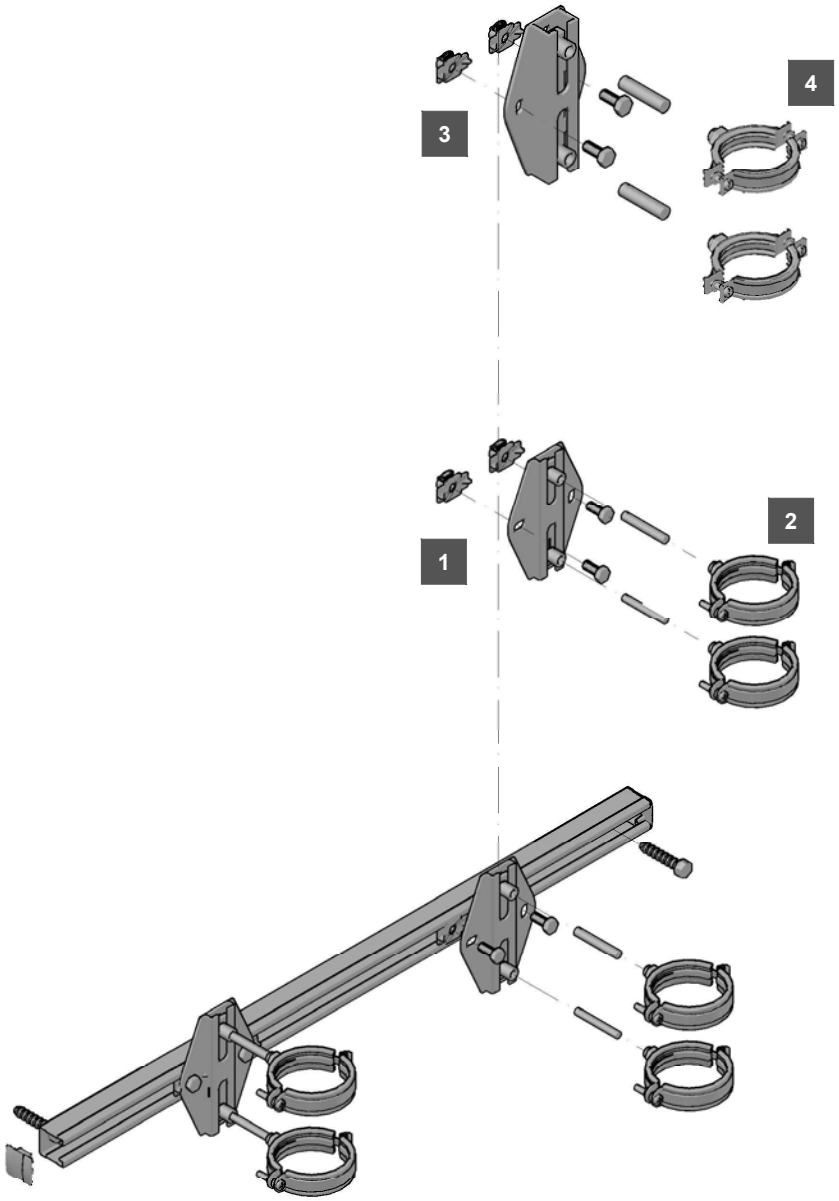
Application description	Application	Product lines	Base material
Heating - Riser Guides	7	Channels	Concrete
General comments		Clamps	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application		Anchors	

Riser Guides - Wall Rail - On Concrete

Fixing slider / roller on wall rail

3	Double Roller in Bracket with M16 Connection	
	1x MRG-D6 M12/M16 roller	**334131**
	2x MQM-M12 wing nut	**369627**
	2x M12x25 hexagon screw	**216458**
	2x M16 threaded bolts	
	AM16x60	**212634**
	AM16x80	**216403**
	AM16x100	**212635**
	AM16x150	**212636**
4	M16 Pipe Clamps	
	MP-U-I M8/10/O16	**Sizes 9 - 170mm**
	MP-MI..C	**Sizes 4" - 244.5mm**
	MP-MXI M16	**Sizes 4" - 508 mm**

1	Double Slider in Channel with M10 Connections	
	1x MSG 1.75 M8/M10 D slider	**248209**
	2x MQM-M10 wing nut	**369626**
	2x M10x25 hexagon screw	**216454**
	2x M10 threaded bolts	
	AM10x40	**216390**
	AM10x60	**216391**
	AM10x80	**216392**
	AM10x100	**216393**
	AM10x120	**216394**
	AM10x150	**216395**
	AM10x180	**216396**
2	M10 Pipe Clamps	
	MP-PI	**Sizes 11mm - 219mm**
	MP-L-I	**Sizes 9mm - 170mm**
	MP-HI	**Sizes 8mm - 172mm**
	MP-U-I	**Sizes 9mm - 170mm**
	MP-MI ... G	**Sizes 15mm - 168mm**
	MP-MXI M10/M12	**Sizes 60mm - 93mm**



Application description	Application	Product lines	Base material
Heating - Riser Guides	7	Channels	Concrete
General comments		Sliders / rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Guides - Off-set Frame - On Concrete

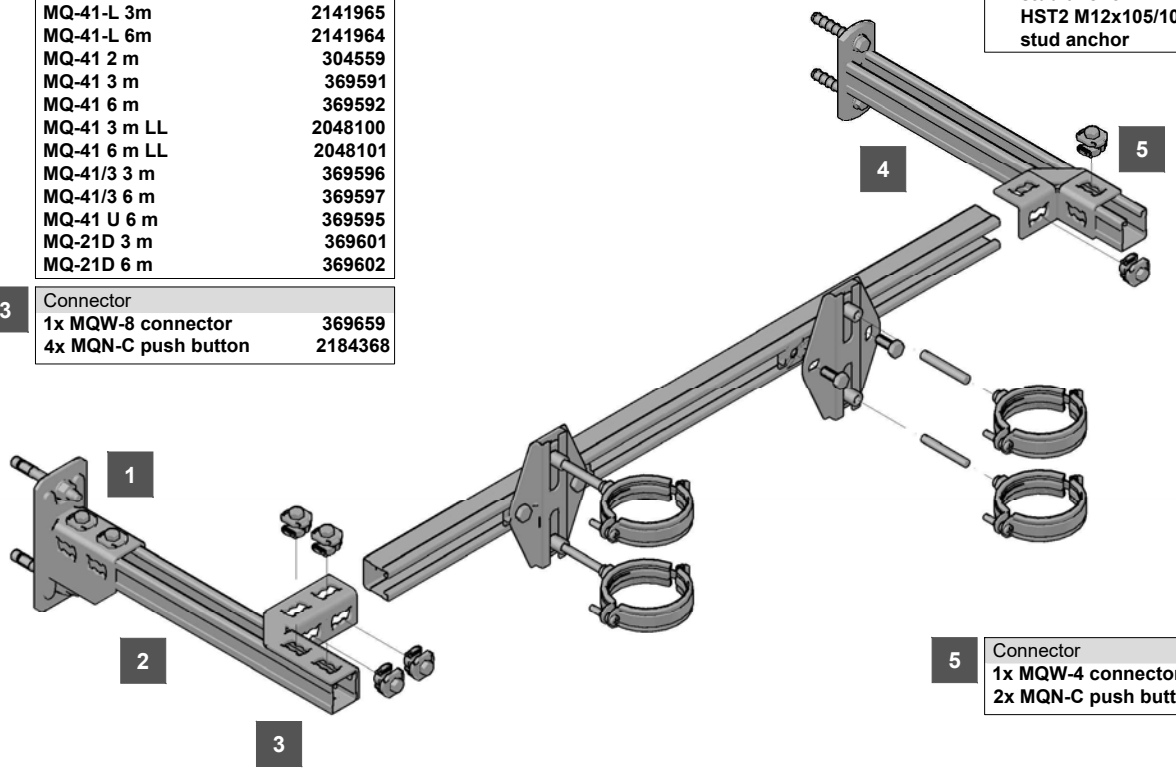
Using pre-fab. or assembled cantilever arms for off-set frame

1	Connection to concrete – channel base	
	1x MQP 21-72 channel base	369651
	2x MQN-C push button	2184368
	2x Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

2	41 format channels	
	MQ-41-L 2m	2141966
	MQ-41-L 3m	2141965
	MQ-41-L 6m	2141964
	MQ-41 2 m	304559
	MQ-41 3 m	369591
	MQ-41 6 m	369592
	MQ-41 3 m LL	2048100
	MQ-41 6 m LL	2048101
	MQ-41/3 3 m	369596
	MQ-41/3 6 m	369597
	MQ-41 U 6 m	369595
	MQ-21D 3 m	369601
	MQ-21D 6 m	369602

3	Connector	
	1x MQW-8 connector	369659
	4x MQN-C push button	2184368

4	41 format cantilever arms 2 hole base	
	1x MQK bracket	
	MQK-41/300	369609
	MQK-41/450	369610
	MQK-41/600	369611
	MQK-41/1000	369612
	MQK-41/3/300	370595
	MQK-41/3/450	370596
	MQK-41/3/600	370597
	MQK-21 D/300	369617
	MQK-21 D/450	369618
	MQK-21 D/600	369619
	2x Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

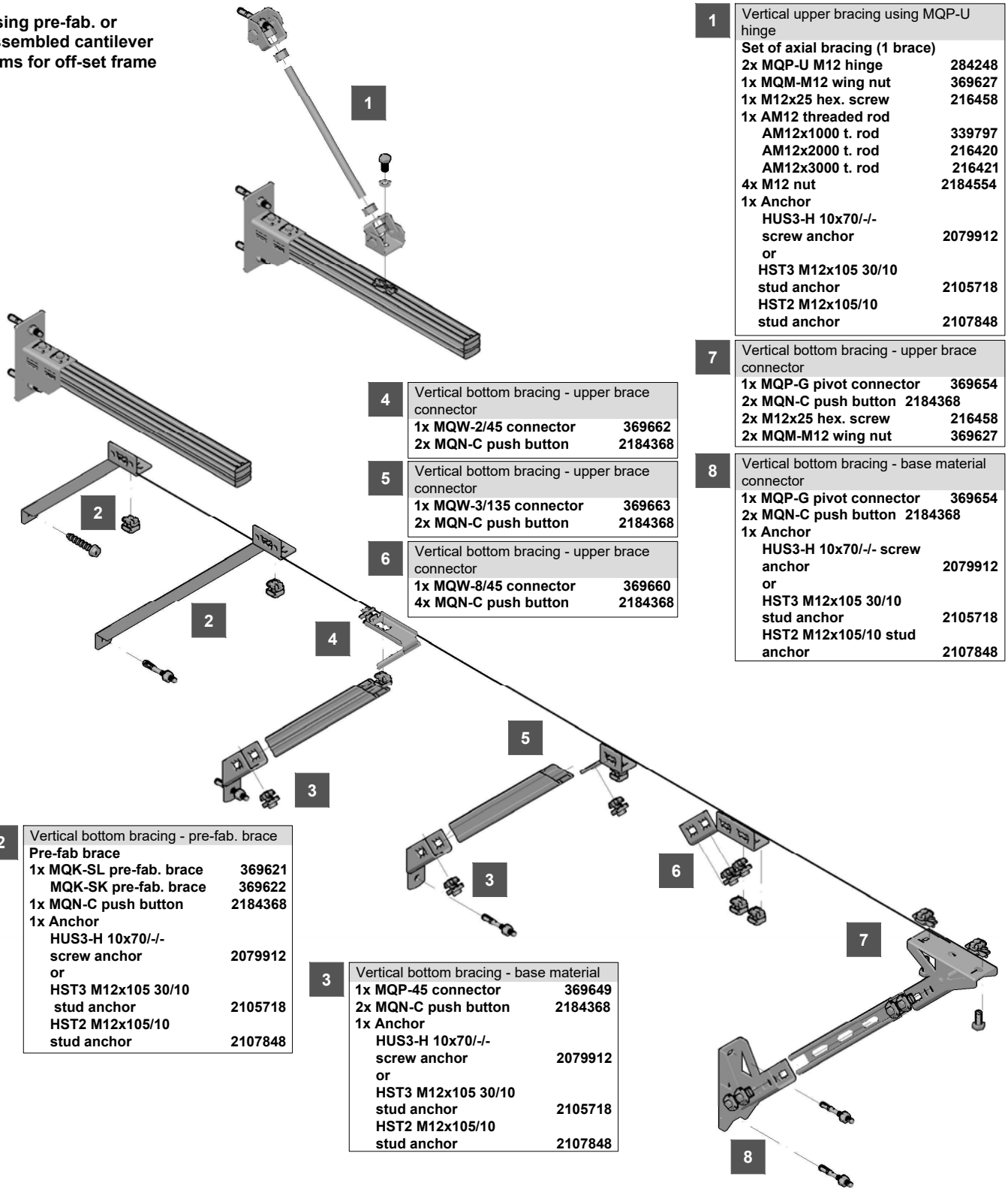


5	Connector	
	1x MQW-4 connector	369658
	2x MQN-C push button	2184368

Application description	Application	Product lines	Base material
Heating - Riser Guides	7	Channels	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Guides - Off-set Frame Vertical Bracing - On Concrete

Using pre-fab. or assembled cantilever arms for off-set frame



1	Vertical upper bracing using MQP-U hinge	
	Set of axial bracing (1 brace)	
	2x MQP-U M12 hinge	**284248**
	1x MQM-M12 wing nut	**369627**
	1x M12x25 hex. screw	**216458**
	1x AM12 threaded rod	
	AM12x1000 t. rod	**339797**
	AM12x2000 t. rod	**216420**
	AM12x3000 t. rod	**216421**
	4x M12 nut	**2184554**
	1x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

4	Vertical bottom bracing - upper brace connector	
	1x MQW-2/45 connector	**369662**
	2x MQN-C push button	**2184368**

5	Vertical bottom bracing - upper brace connector	
	1x MQW-3/135 connector	**369663**
	2x MQN-C push button	**2184368**

6	Vertical bottom bracing - upper brace connector	
	1x MQW-8/45 connector	**369660**
	4x MQN-C push button	**2184368**

7	Vertical bottom bracing - upper brace connector	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	2x M12x25 hex. screw	**216458**
	2x MQM-M12 wing nut	**369627**

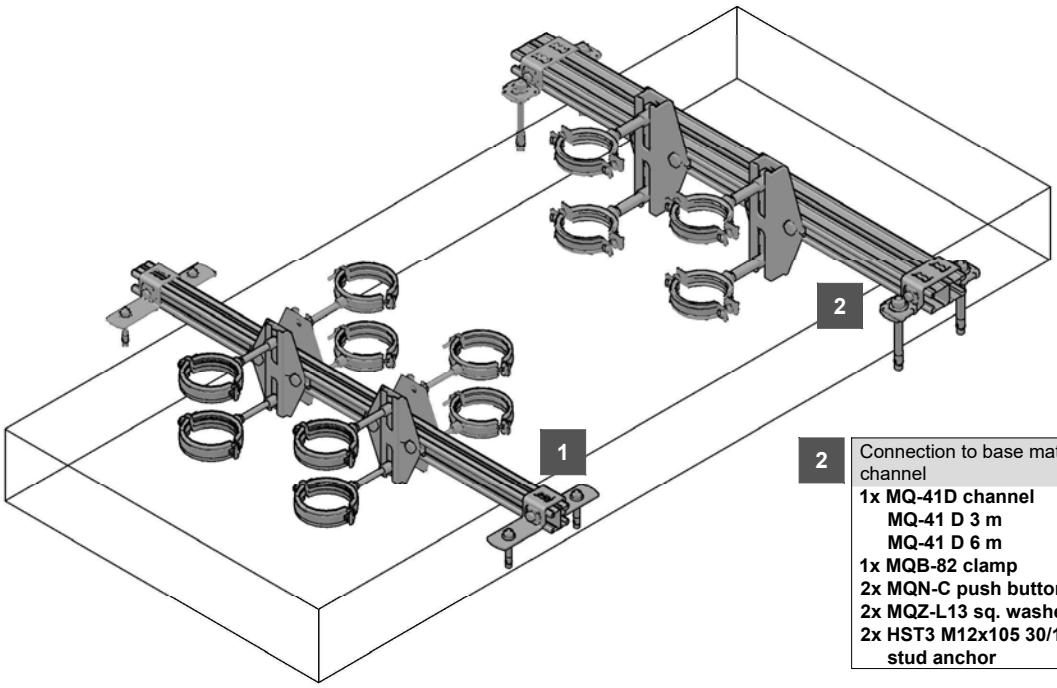
8	Vertical bottom bracing - base material connector	
	1x MQP-G pivot connector	**369654**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

2	Vertical bottom bracing - pre-fab. brace	
	Pre-fab brace	
	1x MQK-SL pre-fab. brace	**369621**
	MQK-SK pre-fab. brace	**369622**
	1x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

3	Vertical bottom bracing - base material	
	1x MQP-45 connector	**369649**
	2x MQN-C push button	**2184368**
	1x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

Application description	Application	Product lines	Base material
Heating - Riser Guides	7	MQ system	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Guides - Shaft Sub-structure - On Concrete

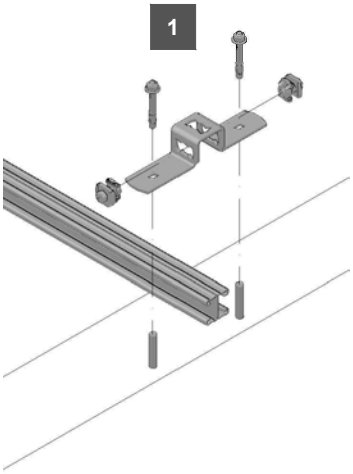


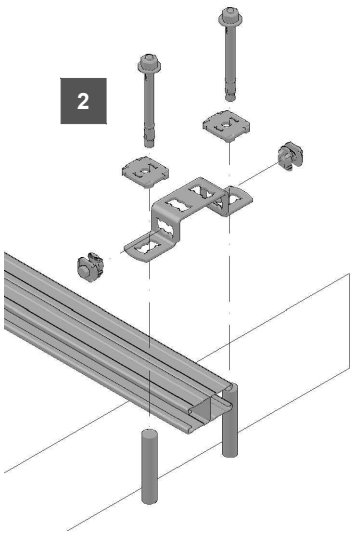
2 Connection to base material for 41D channel

1x MQ-41D channel	
MQ-41 D 3 m	**369603**
MQ-41 D 6 m	**369604**
1x MQB-82 clamp	**369671**
2x MQN-C push button	**2184368**
2x MQZ-L13 sq. washer	**2199456**
2x HST3 M12x105 30/10 stud anchor	**2105718**

1 Connection to base material for 41 format channels

1x MQ 41 mm format channel	
MQ-41-L 2m	**2141966**
MQ-41-L 3m	**2141965**
MQ-41-L 6m	**2141964**
MQ-41 2 m	**304559**
MQ-41 3 m	**369591**
MQ-41 6 m	**369592**
MQ-41 3 m LL	**2048100**
MQ-41 6 m LL	**2048101**
MQ-41/3 3 m	**369596**
MQ-41/3 6 m	**369597**
MQ-41 U 6 m	**369595**
MQ-21D 3 m	**369601**
MQ-21D 6 m	**369602**
1x MQB-G41 clamp	**369674**
1x MQN-C push button	**2184368**
2x HST3 M10x90 30/10 stud anchor	**2105712**





Application description	Application	Product lines	Base material
Heating - Riser Guides	7	Channels	Concrete
General comments		Sliders / rollers	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Guide On Steel - Shaft Made Of Structural Steel Profiles - Limited Space

Using MQ channels or MI Base plates

1

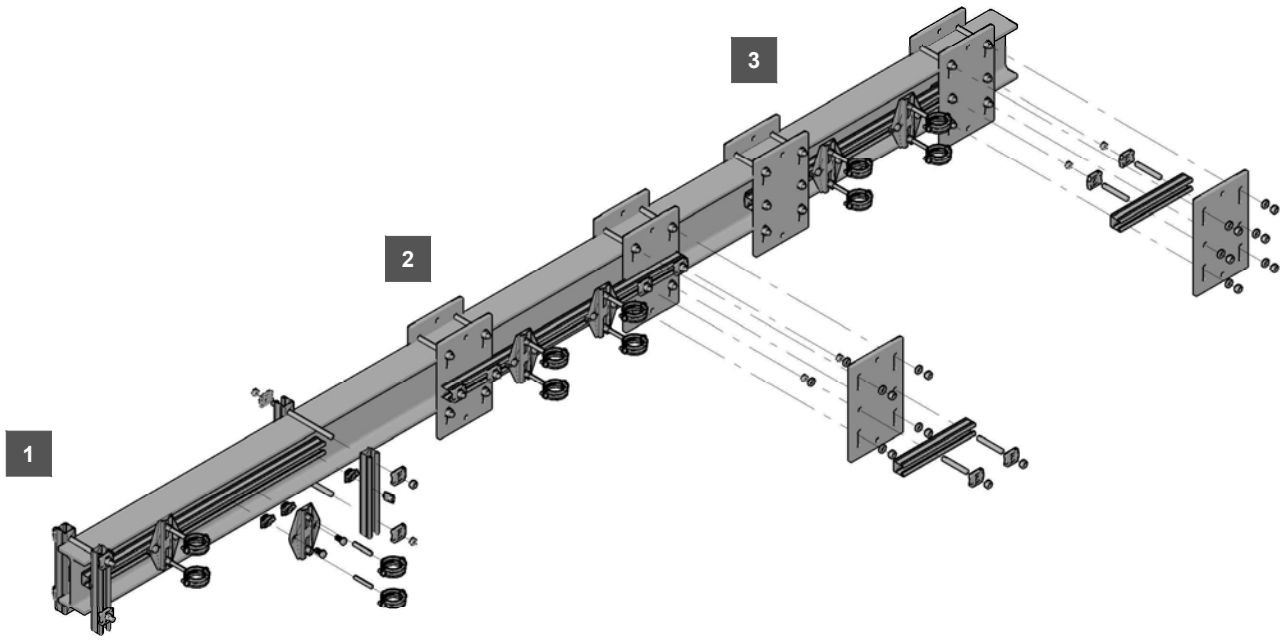
Guide fixed between flanges	
Boxing the I-beam	
4x Channel	
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
MQ-41/3 3m channel	**369596**
MQ-41/3 6m channel	**369597**
MQ-41/3 3m LL channel	**2048102**
MQ-41/3 6m LL channel	**2048103**
8x MQZ-L13 square washer	**369680**
4x AM12x1000 4.8 t-rod	**339797**
AM12x2000 4.8 t-rod	**216420**
AM12x3000 4.8 t-rod	**216421**
8x M12 nut	**2184554**
Connection og the h-channel to boxing	
2x MQM-M12 wing nut	**369627**
2x MQZ-S-F screw	**2063162**
H-channel	
1x Channel	
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
Slider incl. connection to h-channel	
BOM for 1 pcs of connection	
1x MSG 1,75 M8/M10D slider	**248209**
2x MQM-M10 wing nut	**369626**
2x M10x20 hex. head screw	**216453**
Pipe rings with M 10 connection head	

2

Guide fixed on base plates boxing the I-beam	
Boxing the I-beam	
For I-beam height 75-165mm	
4x MIB-SA base plate	**304821**
8x AM12x1000-HDG 8.8 th. rod	**419103**
16xA13/24 washer	**282852**
16xM12 nut	**2184554**
For I-beam height 165-235mm	
2x MIB-SB base plate	**304822**
4x AM12x1000-HDG 8.8 th. rod	**419103**
8x M12-F-SL WS 3/4 lock nut	**382897**
For I-beam height 235-300mm	
2x MIB-SC base plate	**304823**
4x AM12x1000-HDG 8.8 th. rod	**419103**
8x M12-F-SL WS 3/4 lock nut	**382897**
H-channel and the connection to boxing	
1x Channel	
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
4x MQZ-L13 square washer	**2199456**
4x AM12x1000 4.8 t-rod	**339797**
AM12x2000 4.8 t-rod	**216420**
AM12x3000 4.8 t-rod	**216421**
4x A13/24 washer	**282852**
8x M12 nut	**2184554**
Slider incl. connection to h-channel	
BOM for 1 pcs of connection	
1x MSG 1,75 M8/M10D slider	**248209**
2x MQM-M10 wing nut	**369626**
2x M10x20 hex. head screw	**216453**
Pipe rings with M 10 connection head	

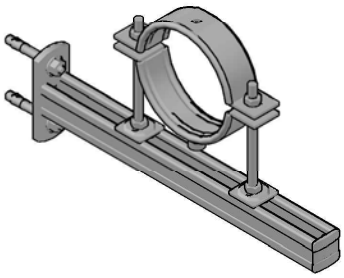
3

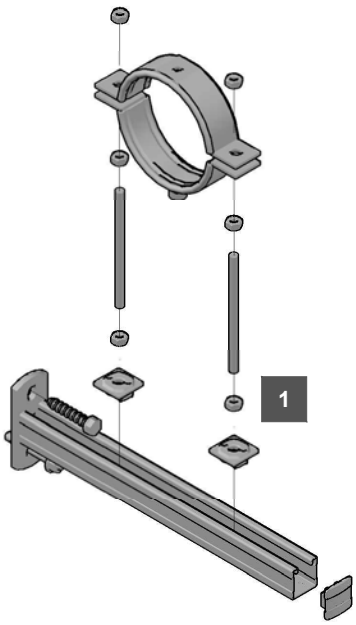
Guide fixed on b-plates between the flanges	
Boxing the I-beam	
For I-beam height 75-165mm	
4x MIB-SA base plate	**304821**
8x AM12x1000-HDG 8.8 th. rod	**419103**
16x A13/24 washer	**282852**
16x M12 nut	**2184554**
For I-beam height 165-235mm	
2x MIB-SB base plate	**304822**
4x AM12x1000-HDG 8.8 th. rod	**419103**
8x M12-F-SL WS 3/4 lock nut	**382897**
For I-beam height 235-300mm	
2x MIB-SC base plate	**304823**
4x AM12x1000-HDG 8.8 th. rod	**419103**
8x M12-F-SL WS 3/4 lock nut	**382897**
H-channel and the connection to boxing	
1x Channel	
MQ-41 2m channel	**304559**
MQ-41 3m channel	**369591**
MQ-41 6m channel	**369592**
4x MQZ-L13 square washer	**369680**
4x AM12x1000 4.8 t-rod	**339797**
AM12x2000 4.8 t-rod	**216420**
AM12x3000 4.8 t-rod	**216421**
4x A13/24 washer	**282852**
8x M12 nut	**2184554**
Slider incl. connection to h-channel	
BOM for 1 pcs of connection	
1x MSG 1,75 M8/M10D slider	**248209**
2x MQM-M10 wing nut	**369626**
2x M10x20 hex. head screw	**216453**
Pipe rings with M 10 connection head	



Application description	Application	Product lines	Base material
Heating - Riser Guide	7	MQ System	Steel
General comments		MI System	
• Application subject to thermal expansion, no seismic, no fatique, now high/low temperature impact • Loading and load impact must always be compared with 3D capacity limits fo every single part of the application		Sliders / rollers	

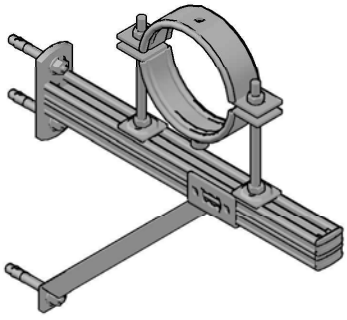
Plant Room Equipment Support - Splitter Frame Options

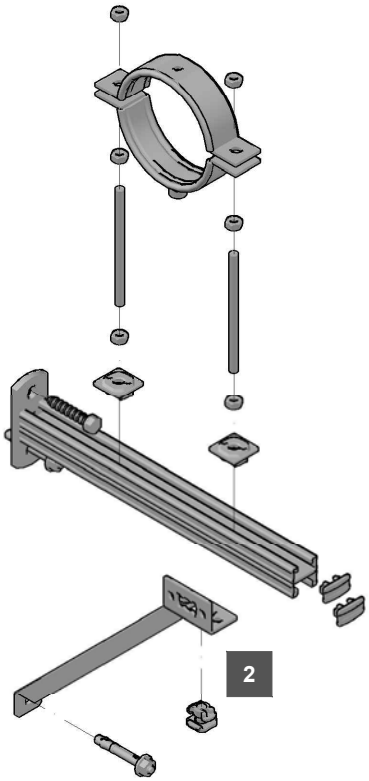




1

Splitter bracket (1 bracket)	
1x MQK bracket	
MQK-41/300	**369609**
MQK-41/450	**369610**
MQK-41/600	**369611**
MQK-41/1000	**369612**
MQK-41/3/300	**370595**
MQK-41/3/450	**370596**
MQK-41/3/600	**370597**
MQK-21 D/300	**369617**
MQK-21 D/450	**369618**
MQK-21 D/600	**369619**
2x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**
2x MQA-M16-B saddle nut	**2199454**
2x M16 threaded rod	
AM16x1000 ..m	**216422**
AM16x2000..m	**216423**
AM16x3000..m	**216424**
4x M16 hex. nut	**2184506**
1x MP-MXI pipe clamp >177.8 mm	



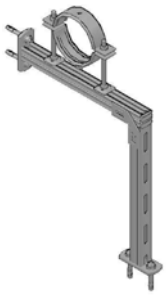


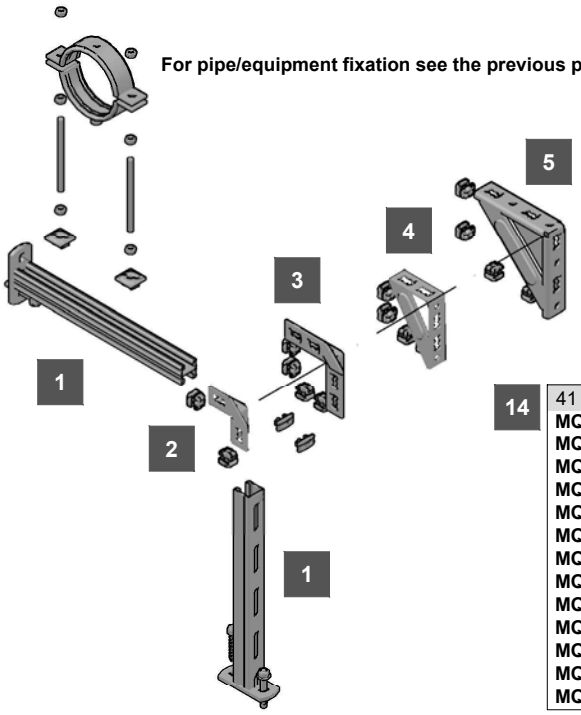
2

Vertical bracing – pre-fab. brace	
Pre-fab brace	
1x MQK-SL pre-fab. brace	**369621**
MQK-SK pre-fab. brace	**369622**
1x MQN-C push button	**2184368**
1x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

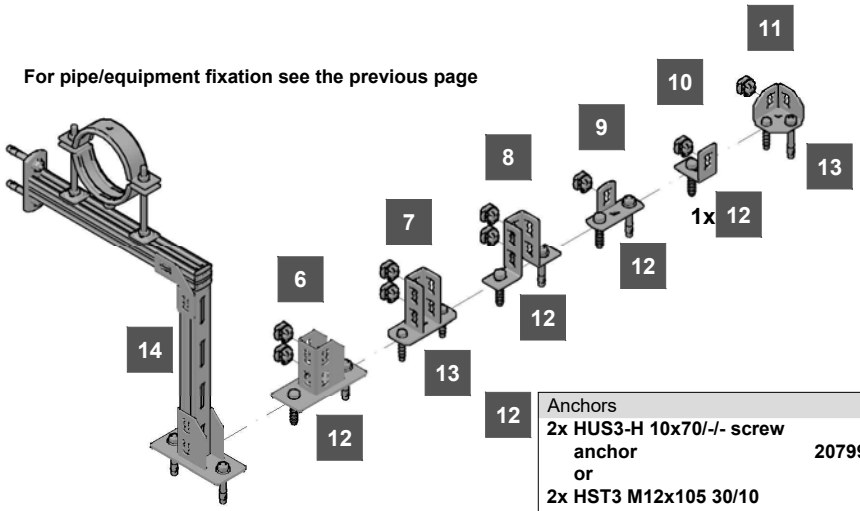
Application description	Application	Product lines	Base material
Heating - plant room equipment support: splitter frame	8	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Plant Room Equipment Support - Splitter Frame Options





14	41 format channels	
	MQ-41-L 2m	2141966
	MQ-41-L 3m	2141965
	MQ-41-L 6m	2141964
	MQ-41 2 m	304559
	MQ-41 3 m	369591
	MQ-41 6 m	369592
	MQ-41 3 m LL	2048100
	MQ-41 6 m LL	2048101
	MQ-41/3 3 m	369596
	MQ-41/3 6 m	369597
	MQ-41 U 6 m	369595
	MQ-21D 3 m	369601
	MQ-21D 6 m	369602



12	Anchors	
	2x HUS3-H 10x70/-/- screw anchor	2079912
	or	
	2x HST3 M12x105 30/10 stud anchor	2105718
	2x HST2 M12x105/10 stud anchor	2107848

1	MQK Bracket 41 mm format	
	BOM for 1 bracket	
	1x MQK bracket	
	MQK-41/300	369609
	MQK-41/450	369610
	MQK-41/600	369611
	MQK-41/1000	369612
	MQK-41/3/300	370595
	MQK-41/3/450	370596
	MQK-41/3/600	370597
	MQK-21 D/300	369617
	MQK-21 D/450	369618
	MQK-21 D/600	369619
	2x Anchor	
	HUS3-H 10x70/-/- screw anchor	2079912
	or	
	HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848

2	Connector	
	1x MQW-4 connector	369658
	2x MQN-C push button	2184368

3	Connector	
	1x MQW-8 connector	369659
	4x MQN-C push button	2184368

4	Connector	
	1x MQW-S1 connector	369664
	4x MQN-C push button	2184368

5	Connector	
	1x MQW-S2 connector	369665
	4x MQN-C push button	2184368

6	Base material connector	
	Connection to concrete – channel base	
	1x MQP 21-72 channel base	369651
	2x MQN-C push button	2184368

7	Base material connector	
	Connection to concrete – channel base	
	1x MQP-41 base m. c.	2141927
	2x MQN-C push button	2184368

8	Base material connector	
	Connection to concrete – channel base	
	1x MQV -2/2 D-14 channel b.	369639
	2x MQN-C push button	2184368

9	Base material connector	
	Connection to concrete – channel base	
	1x MQP 1/3 channel base	369647
	1x MQN-C push button	2184368

10	Base material connector	
	Connection to concrete – channel base	
	1x MQP 1/1 channel base	369646
	1x MQN-C push button	2184368

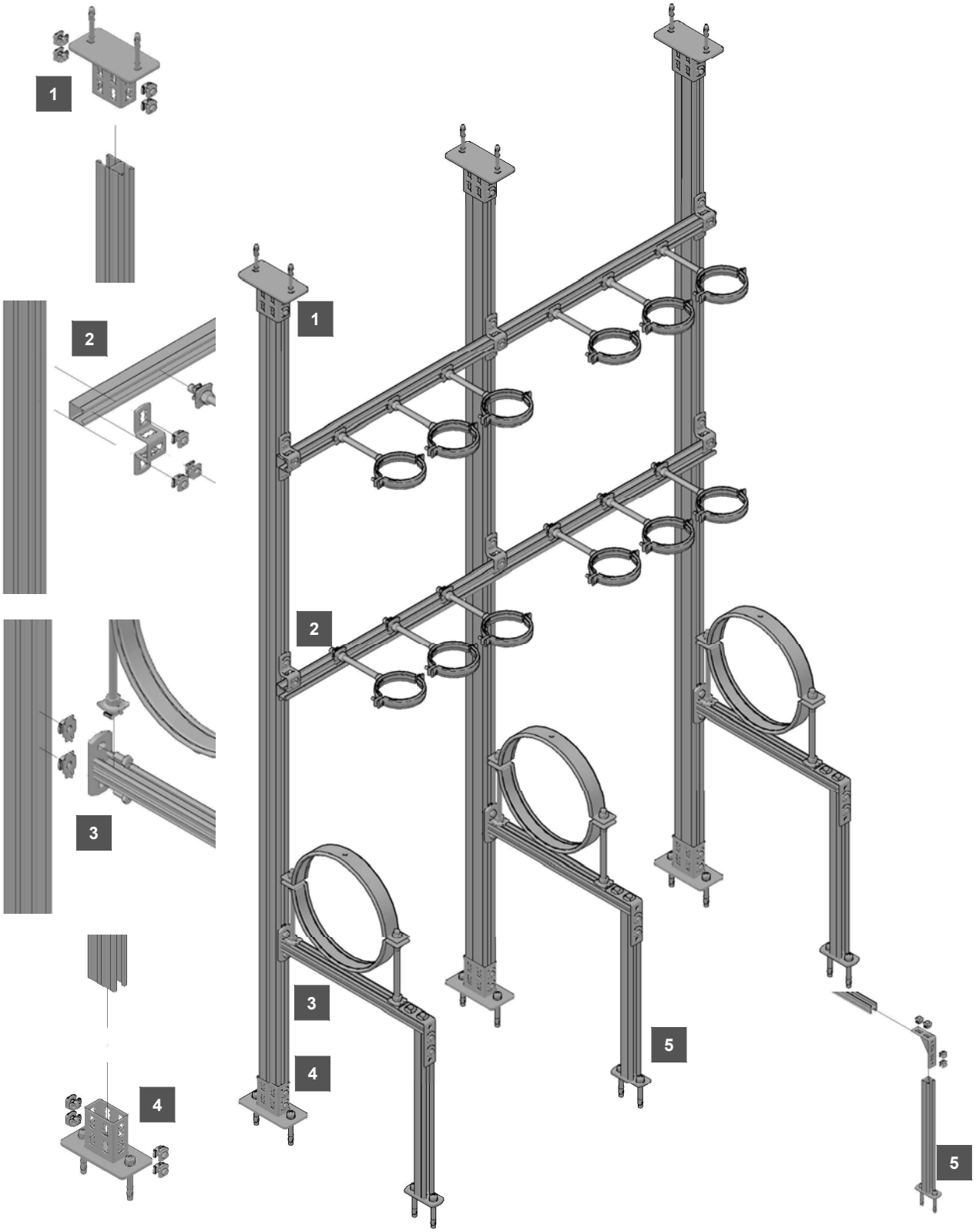
11	Base material connector	
	Connection to concrete – channel base	
	1x MQP 2/3 channel base	369648
	1x MQN-C push button	2184368

13	Anchors	
	2x HUS3-H 8x55/-/- screw anchor	2079794
	or	
	2x HST3 M10x90 30/10 stud anchor	2105712
	2x HST2 M10x90/10 stud anchor	2107847

Application description	Application	Product lines	Base material
Heating - plant room equipment support: splitter frame	8	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Plant Room Equipment Support - Splitter Frame Options

Multi splitter frame example

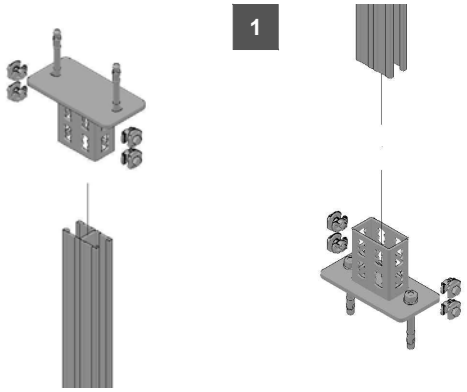


Application description	Application	Product lines	Base material
Heating - plant room equipment support: splitter frame	8	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

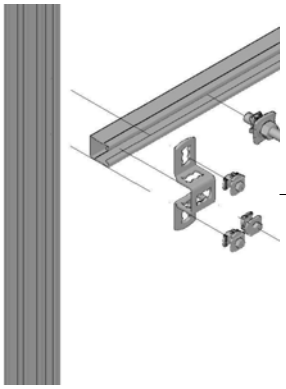
Plant Room Equipment Support - Splitter Frame Options

Multi splitter frame example

1

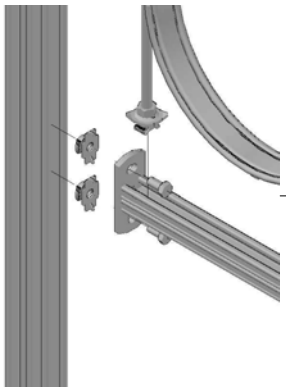


MQP 82 Channel base with associated channels	
1x MQP 82 channel base	**369652**
4x MQN-C push button	**2184368**
41D mm format channels	
MQ-41D 3m	**369603**
MQ-41D 6m	**369604**
2x Anchors	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**



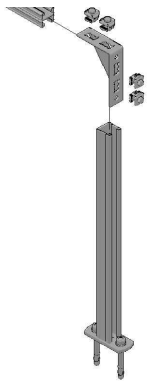
Cross connector	
1x MQB-41 cross connector	**369668**
3x MQN-C push button	**2184368**

41 format channels	
MQ-41-L 2m	**2141966**
MQ-41-L 3m	**2141965**
MQ-41-L 6m	**2141964**
MQ-41 2 m	**304559**
MQ-41 3 m	**369591**
MQ-41 6 m	**369592**
MQ-41 3 m LL	**2048100**
MQ-41 6 m LL	**2048101**
MQ-41/3 3 m	**369596**
MQ-41/3 6 m	**369597**
MQ-41 U 6 m	**369595**
MQ-21D 3 m	**369601**
MQ-21D 6 m	**369602**



Connection of bracket to channel	
1x MQK bracket	
2x M12x25 screw	**216458**
2x MQM-M12 wing nut	**369623**

MQK brackets	
MQK-21D brackets	
MQK-21 D/300	**369617**
MQK-21 D/450	**369618**
MQK-21 D/600	**369619**
MQK-41 brackets	
MQK-41/300	**369609**
MQK-41/450	**369610**
MQK-41/600	**369611**
MQK-41/1000	**369612**
MQK-41/3 brackets	
MQK-41/3/300	**370595**
MQK-41/3/450	**370596**
MQK-41/3/600	**370597**
MQK-72 brackets	
MQK-72/450	**369615**
MQK-72/600	**369616**
MQK-41D brackets	
MQK-41D/1000	**369620**



Node connection	
1x MQW-S1 connector	**369664**
4x MQN-C push button	**2184368**

Anchors for brackets on concrete	
2x Anchor	
HUS3-H 10x70/-/- screw anchor	**2079912**
or	
HST3 M12x105 30/10 stud anchor	**2105718**
HST2 M12x105/10 stud anchor	**2107848**

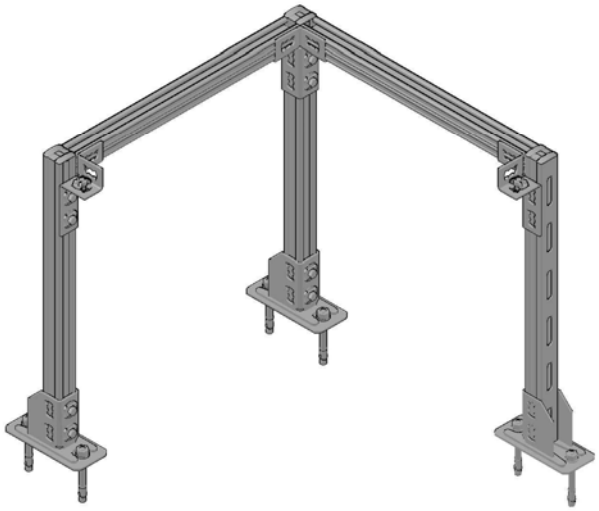
Application description	Application	Product lines	Base material
Heating - plant room equipment support: splitter frame	8	MQ System	Concrete
		Anchors	

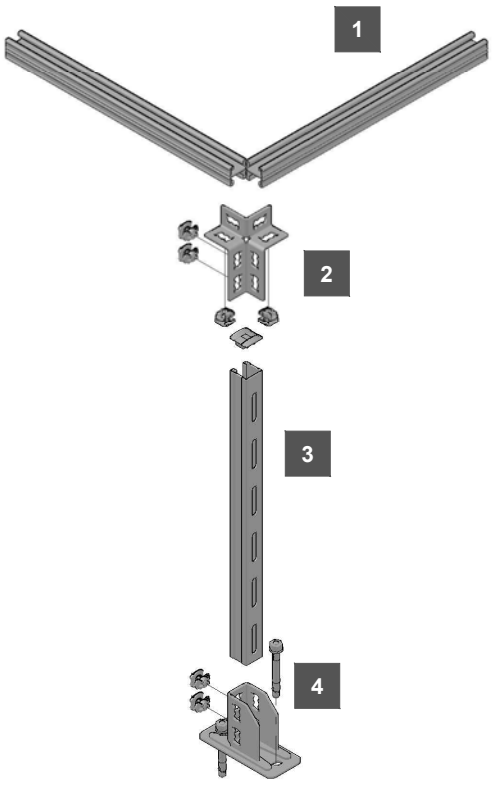
General comments

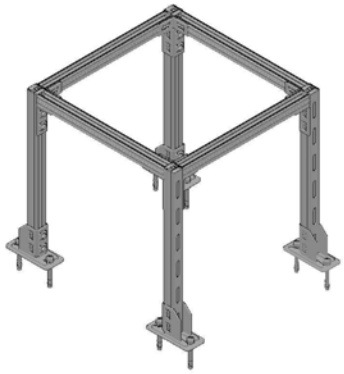
- Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Plant Romm Framing - Simple 3D Frame - Options

Simple 3D frame, e.g. for small boiler or heater







1	Channels most suitable for upper channels	
	21D format channels	
	MQ-21D 3 m	**369601**
	MQ-21D 6 m	**369602**
2	Node for 3 channels	
	1x MQV-3/3 D 3D connector	**369641**
	4x MQN-C push button	**2184368**
3	Channels suitable for vertical upright	
	41 format channels	
	MQ-41-L 2m	**2141966**
	MQ-41-L 3m	**2141965**
	MQ-41-L 6m	**2141964**
	MQ-41 2 m	**304559**
	MQ-41 3 m	**369591**
	MQ-41 6 m	**369592**
	MQ-41 3 m LL	**2048100**
	MQ-41 6 m LL	**2048101**
	MQ-41/3 3 m	**369596**
	MQ-41/3 6 m	**369597**
	MQ-41 U 6 m	**369595**
	MQ-21D 3 m	**369601**
	MQ-21D 6 m	**369602**
	1x Plastic end cap	
	MQZ-E41 end cap	**369685**
	21D format channels	
	MQ-21D 3 m	**369601**
	MQ-21D 6 m	**369602**
	2x Plastic end cap	
	MQZ-E21	**370598**
4	MQP 21-72 channel base	
	1x MQP 21-72 channel base	**369651**
	2x MQN-C push button	**2184368**
	2x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

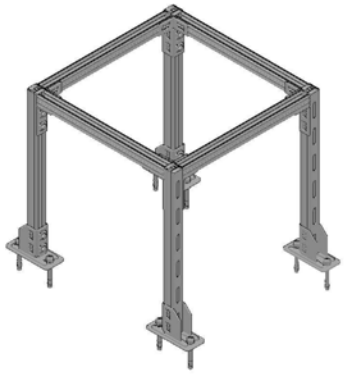
Application description	Application	Product lines	Base material
Heating - Plant Room Framing - 3D frame	9	MQ System	Concrete
		Anchors	

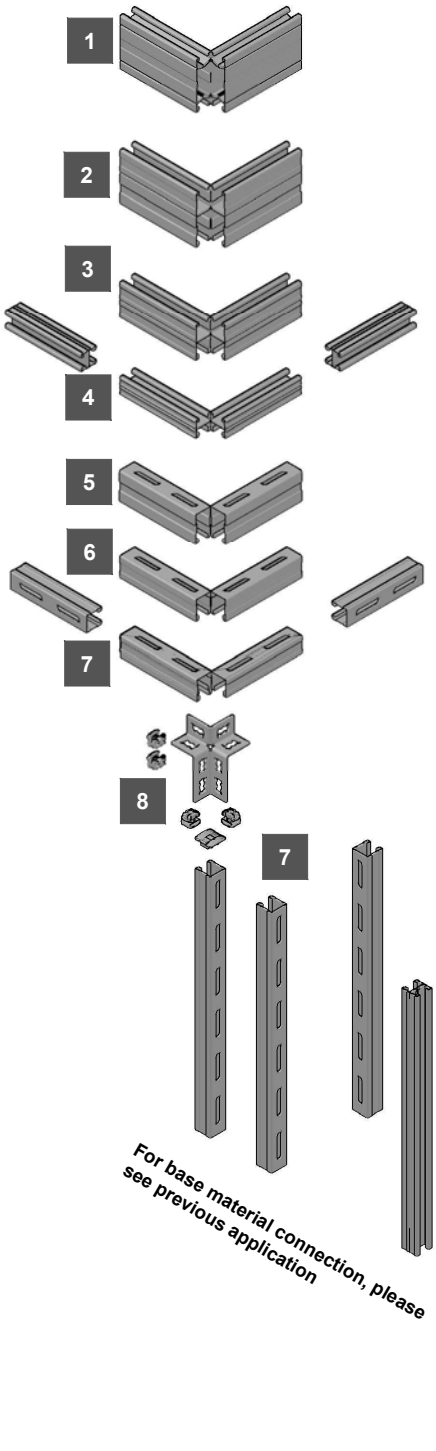
General comments

- Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Plant Romm Framing - Simple 3D Frame - Node Options

Simple 3D frame, e.g. for small boiler or heater





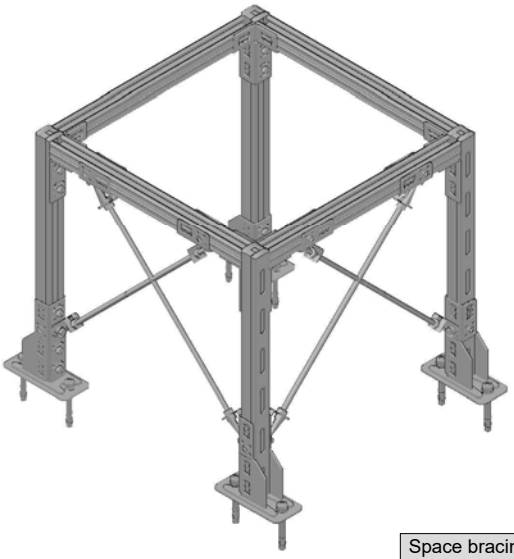
1	MQ-124X D channel for upper channel	
	MQ-124X D 6 m	**369606**
2	MQ-52-72 D channel for upper channel	
	MQ-52-72 D 3 m	**373799**
	MQ-52-72 D 6 m	**369605**
3	MQ-41D channels for upper channel	
	M**Q-41D 3 m**	**369603**
	MQ-41D 6 m	**369604**
4	MQ-21D channels for upper channel	
	MQ-21D 3 m	**369601**
	MQ-21D 6 m	**369602**
5	MQ-72 channels for upper channel	
	MQ-72 3 m	**373797**
	MQ-72 6 m	**369599**
	MQ-72 6 m U	**370593**
6	MQ-52 channels for upper channel	
	MQ-52 3 m	**373795**
	MQ-52 6 m	**369598**
7	Channels suitable for vertical upright and upper channel	
	41 format channels	
	MQ-41-L 2m	**2141966**
	MQ-41-L 3m	**2141965**
	MQ-41-L 6m	**2141964**
	MQ-41 2 m	**304559**
	MQ-41 3 m	**369591**
	MQ-41 6 m	**369592**
	MQ-41 3 m LL	**2048100**
	MQ-41 6 m LL	**2048101**
	MQ-41/3 3 m	**369596**
	MQ-41/3 6 m	**369597**
	MQ-41 U 6 m	**369595**
8	Node for 3 channels	
	1x MQV-3/3 D 3D connector	**369641**
	4x MQN-C push button	**2184368**

9	Channels most suitable for vertical upright	
	21D format channels	
	MQ-21D 3 m	**369601**
	MQ-21D 6 m	**369602**
10	Brackets MQK-41/21D for vertical upright with 2hole base	
	1x Bracket	
	MQK-41/300	**369609**
	MQK-41/450	**369610**
	MQK-41/600	**369611**
	MQK-41/1000	**369612**
	MQK-41/3/300	**370595**
	MQK-41/3/450	**370596**
	MQK-41/3/600	**370597**
	MQK-21 D/300	**369617**
	MQK-21 D/450	**369618**
	MQK-21 D/600	**369619**
	2x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**
11	Brackets MQK-41 for vertical upright with 4 hole base	
	1x Bracket	
	MQK-41/600/4	**369613**
	MQK-41/1000/4	**369614**
	2x Anchor	
	HUS3-H 10x70/-/- screw anchor	**2079912**
	or	
	HST3 M12x105 30/10 stud anchor	**2105718**
	HST2 M12x105/10 stud anchor	**2107848**

Application description	Application	Product lines	Base material
Heating - Plant Room Framing - 3D frame	9	MQ System	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the pipes Application not subects to any thermal expansion or any other 3D loads • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

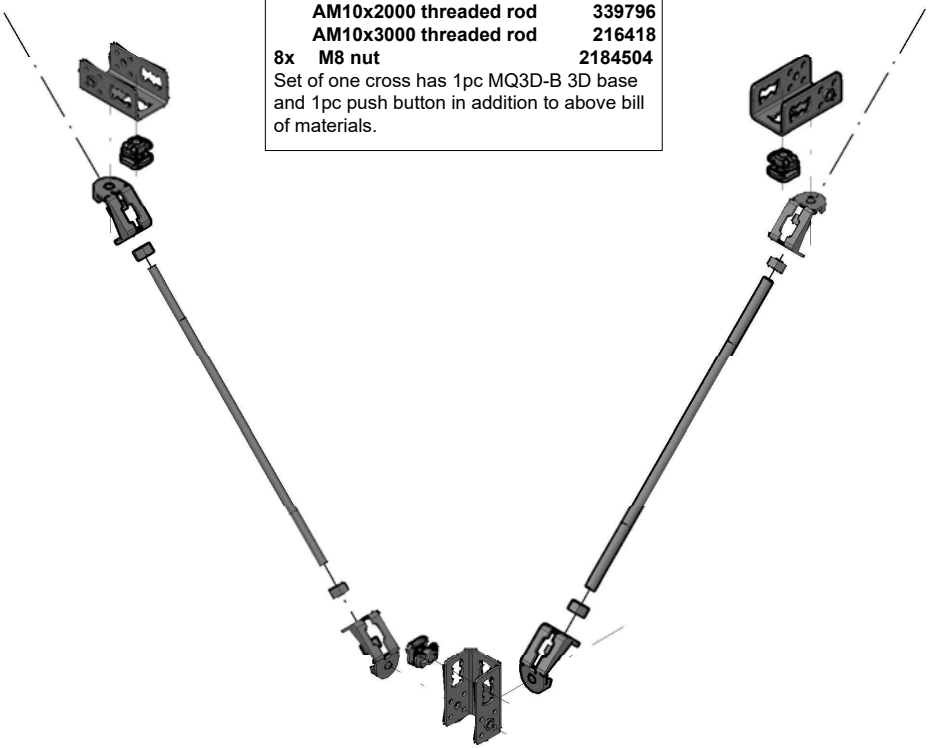
Plant Romm Framing - Simple 3D Frame - Space Bracing - Oprtions

Space bracing with MQ-3D elements using threaded rods



Space bracing set for one corner		
Set of braces (2 braces)		
3x	**MQ3D-B 3D base**	**369694**
3x	**MQN-C push button**	**2184368**
4x	**MQ3D-A brace connectorv**	**369697**
2x	**AM10 threaded rod**	
	AM10x1000 threaded rod	**339795**
	AM10x2000 threaded rod	**339796**
	AM10x3000 threaded rod	**216418**
8x	**M8 nut**	**2184504**

Set of one cross has 1pc MQ3D-B 3D base and 1pc push button in addition to above bill of materials.



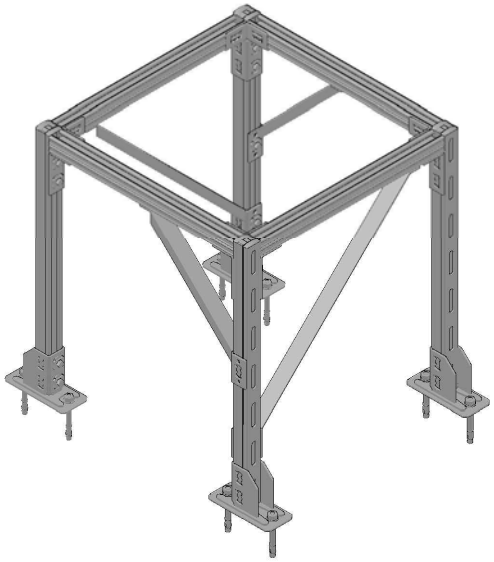
Application description	Application	Product lines	Base material
Heating - Plant Room Framing - 3D frame	9	MQ System	Concrete

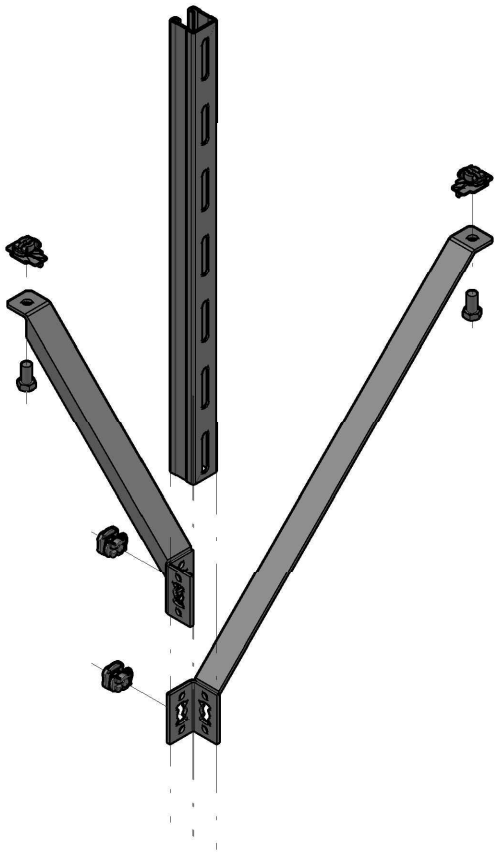
General comments

- Application subject to thermal expansion impact, no seismic, no fatigue, no high/low temperature impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Plant Romm Framing - Simple 3D Frame - Space Bracing - Oprtions

Space bracing using pre-fab braces





Space bracing set for one corner		
Set of space braces (2 braces)		
1x	**MQK-SK pre-fab. brace**	**369622**
1x	**MQK-SL pre-fab. brace**	**369621**
2x	**MQN-C push button**	**2184368**
2x	**M12x22 hex. screw**	**216457**
2x	**MQM-M12 wing nut**	**369627**

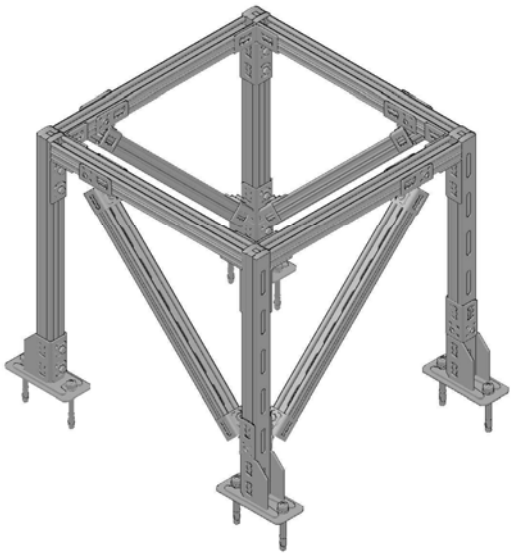
Application description	Application	Product lines	Base material
Heating - Plant Room Framing - 3D frame	9	MQ System	Concrete

General comments

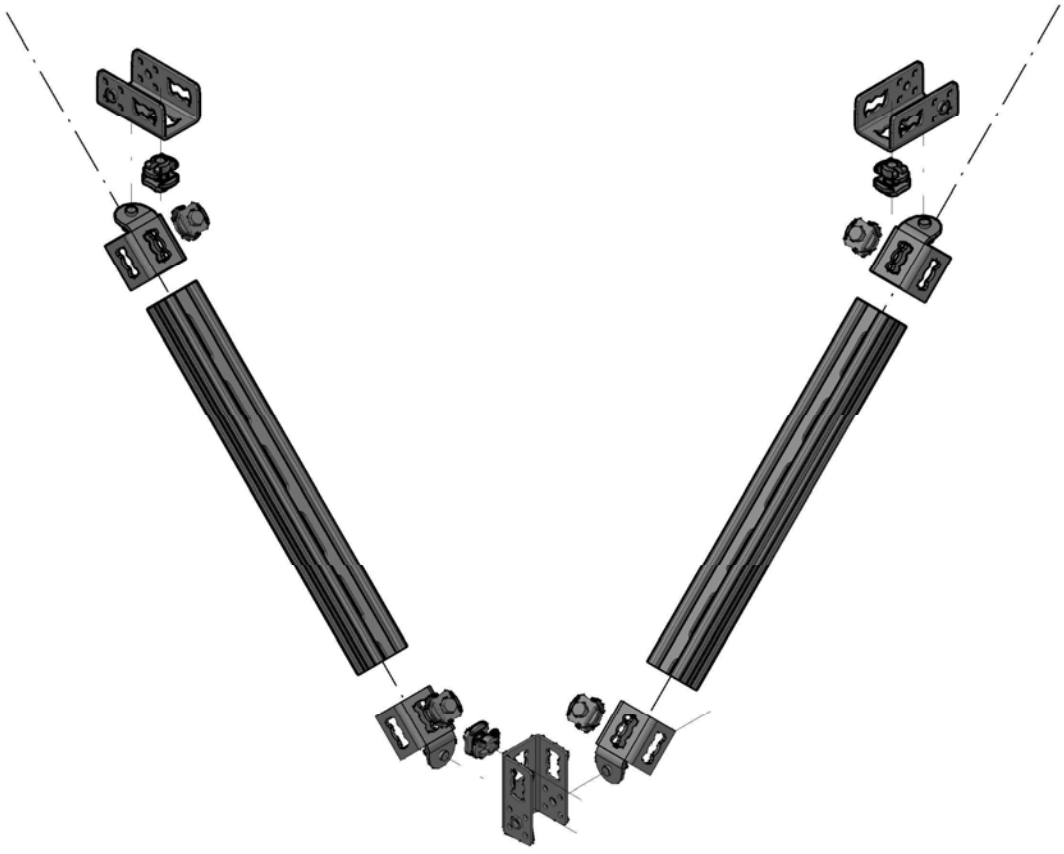
- Application subject to thermal expansion impact, no seismic, no fatigue, no high/low temperature impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Plant Romm Framing - Simple 3D Frame - Space Bracing - Oprtions

Space bracing using MQ3D elements and channels



Space bracing set for one corner	
Set of axial braces (2 braces)	
3x MQ3D-B 3D base	**369694**
7x MQN-C push button	**2184368**
4x MQ3D-W45 channel brace connector	**369696**
Channels format 41 mm which could be used for brace	
MQ-41-L 2m	**2141966**
MQ-41-L 3m	**2141965**
MQ-41-L 62	**2141966**
MQ-41 2 m	**304559**
MQ-41 3 m	**369591**
MQ-41 6 m	**369592**
MQ-41 3 m LL	**2048100**
MQ-41 6 m LL	**2048101**
MQ-41/3 3 m	**369596**
MQ-41/3 6 mv	**369597**
MQ-41 U 6 m	**369595**
MQ-21D 3 m	**369601**
MQ-21D 6 m	**369602**



Application description	Application	Product lines	Base material
Heating - Plant Room Framing - 3D frame	9	MQ System	Concrete

General comments

- Application subject to thermal expansion impact, no seismic, no fatigue, no high/low temperature impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

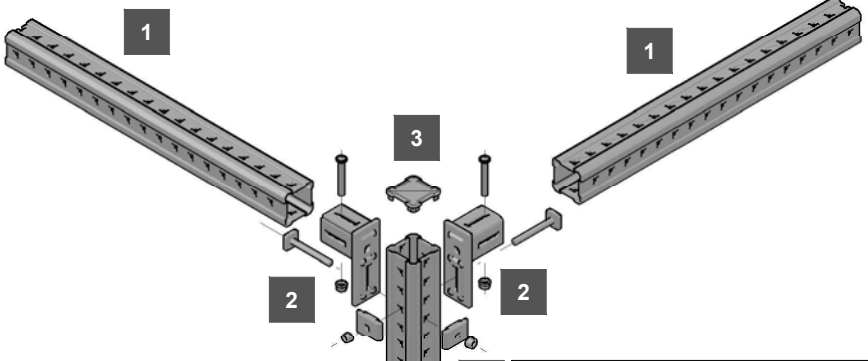
Plant Romm Framing - Simple 3D Frame - Heavy Load
MI System Frame - Oprtions

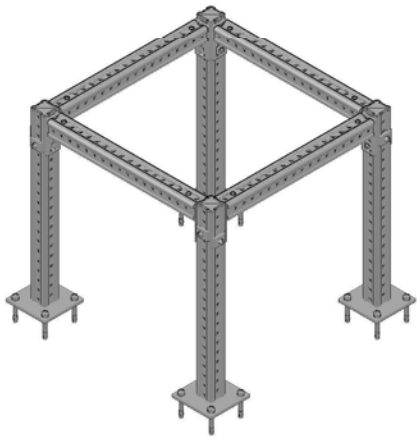
3D frame made of MI System

1	Channel (girder) for upper members	
	MI-90 3 m	**304798**
	MI-90 6 m	**304799**

2	90° connector for single-span beam	
	1x MIC-90-U-H	**2179533**
	Contains connectors, all through bolts, back plate and lock nut	

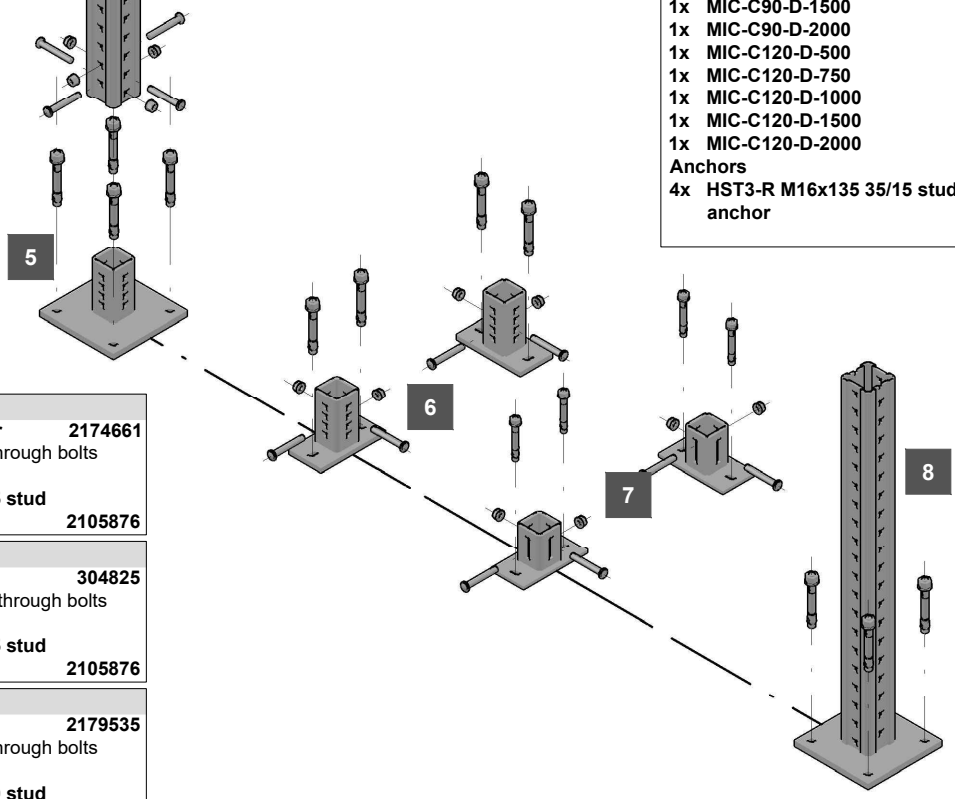
3	MI-90 channel (girder) plastic end cap	
	MIA-EC-90	**432077**





4	Channel (girder) for vertical upright members	
	MI-90 3 m	**304798**
	MI-90 6 m	**304799**

8	Bracket instead of assembled vertical upright	
	1x MIC-C90-D-500	**267789**
	1x MIC-C90-D-750	**267790**
	1x MIC-C90-D-1000	**267791**
	1x MIC-C90-D-1500	**267792**
	1x MIC-C90-D-2000	**267793**
	1x MIC-C120-D-500	**270468**
	1x MIC-C120-D-750	**270469**
	1x MIC-C120-D-1000	**270470**
	1x MIC-C120-D-1500	**270471**
	1x MIC-C120-D-2000	**270472**
	Anchors	
	4x HST3-R M16x135 35/15 stud anchor	**2105876**



5	Base material connector	
	1x MIC-C90-DH connector	**2174661**
	Contains connector and all through bolts	
	Anchors	
	4x HST3-R M16x135 35/15 stud anchor	**2105876**

6	Base material connector	
	1x MIC-C90-AA	**304825**
	Contains connectors and all through bolts	
	Anchors	
	2x HST3-R M16x135 35/15 stud anchor	**2105876**

7	Base material connector	
	1x MIC-C90-UH	**2179535**
	Contains connector and all through bolts	
	Anchors	
	2x HST3-R M12x105 30/10 stud anchor	**2105869**

Application description	Application	Product lines	Base material
Heating - plant room framing - 3D frame	9	MI System	Concrete
		Anchors	

General comments

- Application subject to thermal expansion impact, no seismic, no fatigue, no high/low temperature impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Plant Room Framing - Simple 3D Frame - Heavy Load MT System Frame - Options

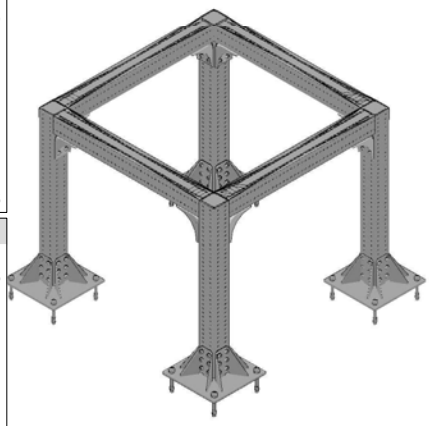
3D frame constructed from the MT System

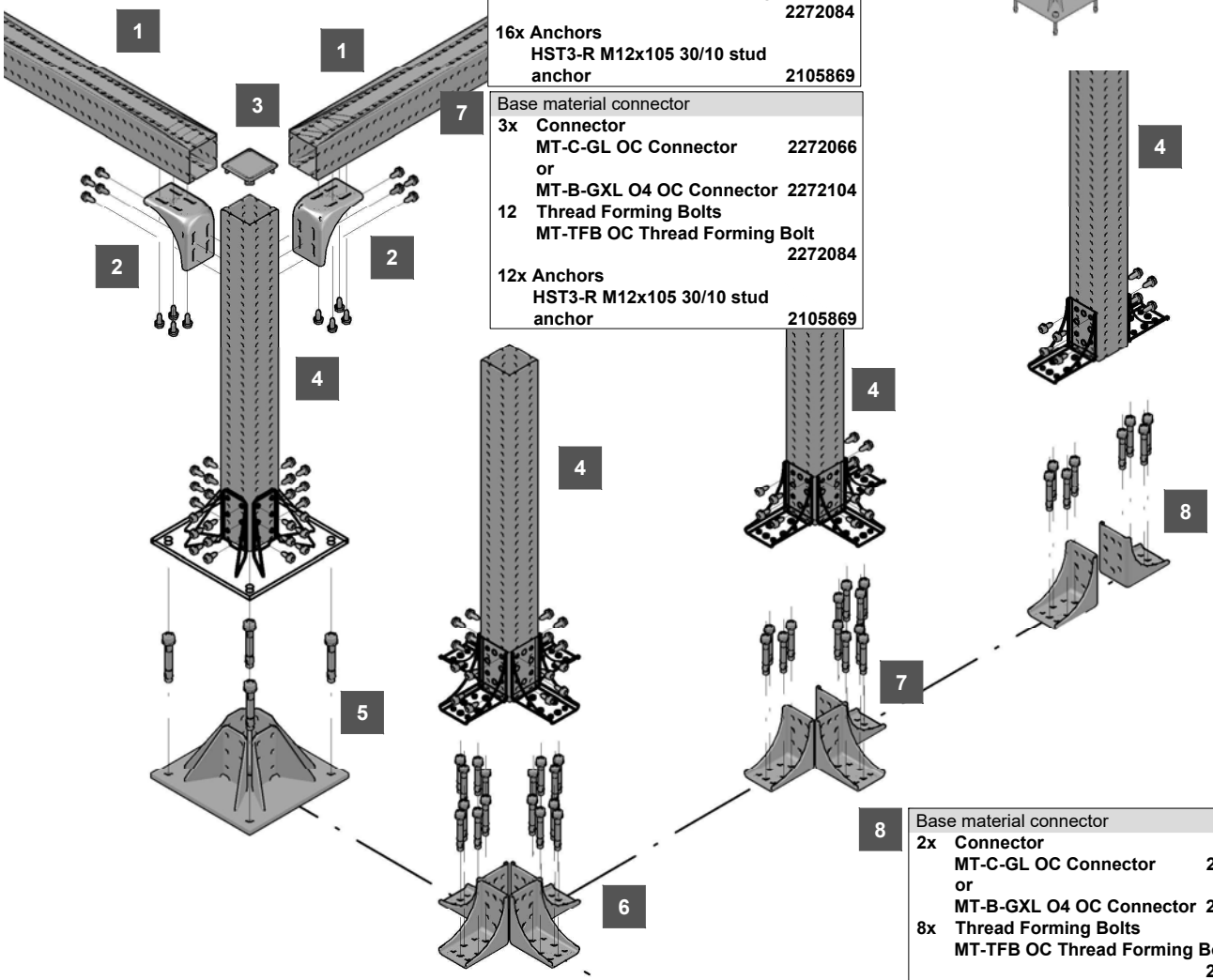
1	Closed Profile (Girder) for Upper Members	
	MT-90 OC 6m	**2268369**
2	90° connector for MT-90 Profile	
	1x MT-C-GL A OC Profile	**2272069**
	8x MT-TFB OC Thread Forming Bolt	**2272084**
3	MT-90 Plastic End Cap	
	MT-EC-90 Plastic End Cap	**2273699**
4	Closed Profile (girder) for Vertical Upright	
	MT-90 OC 6m	**2268369**

5	Base material connector	
	1x Connector	
	MT-B-GL O4 OC Connector	**2272103**
	or	
	MT-B-GXL O4 OC Connector	**2272104**
	24 Thread Forming Bolts	
	MT-TFB OC Thread Forming Bolt	**2272084**
	4x Anchors	
	HST3-R M16x135 35/15 stud anchor	**2105876**

6	Base material connector	
	4x Connector	
	MT-C-GL OC Connector	**2272066**
	or	
	MT-B-GXL O4 OC Connector	**2272104**
	16 Thread Forming Bolts	
	MT-TFB OC Thread Forming Bolt	**2272084**
	16x Anchors	
	HST3-R M12x105 30/10 stud anchor	**2105869**

7	Base material connector	
	3x Connector	
	MT-C-GL OC Connector	**2272066**
	or	
	MT-B-GXL O4 OC Connector	**2272104**
	12 Thread Forming Bolts	
	MT-TFB OC Thread Forming Bolt	**2272084**
	12x Anchors	
	HST3-R M12x105 30/10 stud anchor	**2105869**



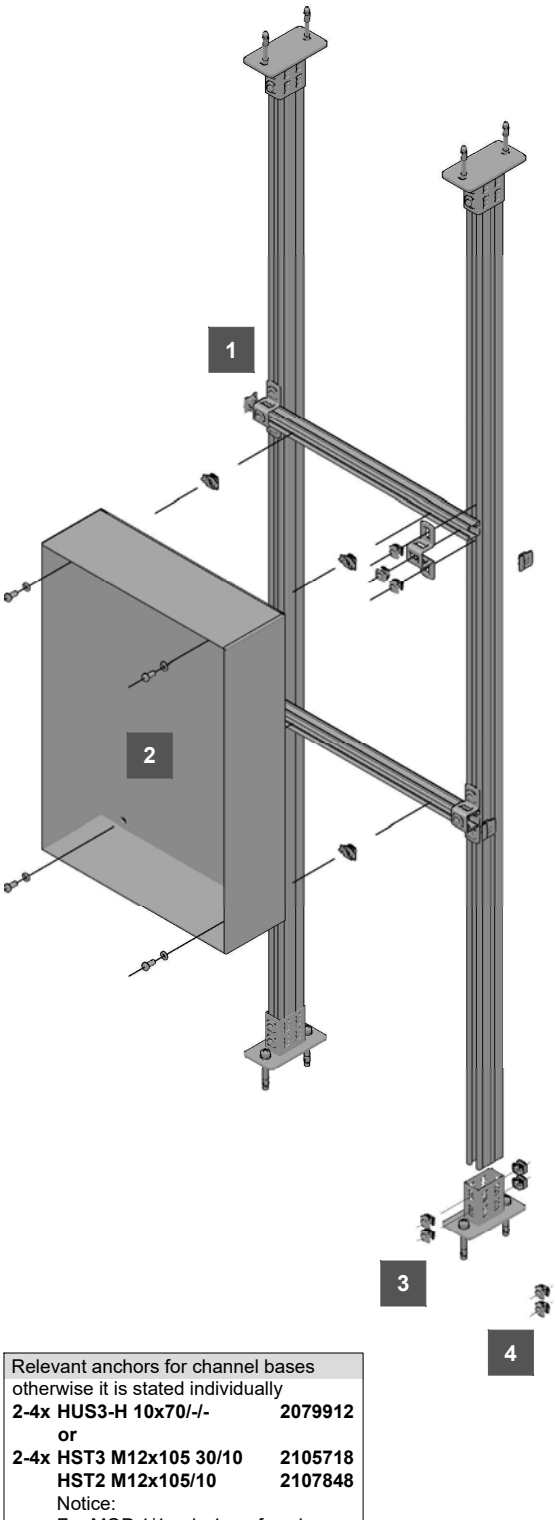


8	Base material connector	
	2x Connector	
	MT-C-GL OC Connector	**2272066**
	or	
	MT-B-GXL O4 OC Connector	**2272104**
	8x Thread Forming Bolts	
	MT-TFB OC Thread Forming Bolt	**2272084**
	8x Anchors	
	HST3-R M12x105 30/10 stud anchor	**2105869**

Application description	Application	Product lines	Base material
Heating - Plant Room Framing - 3D frame	9	MT System	Concrete
General comments		Anchors	
• Application subject to thermal expansion impact, no seismic, no fatigue, no high/low temperature impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

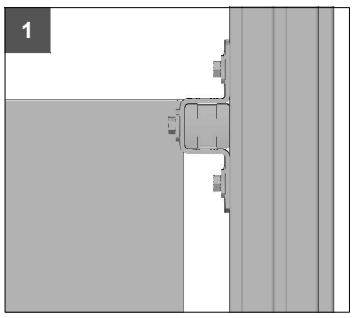
Heating - Plant Room Switch Box - Options

Switch box frame, floor to ceiling

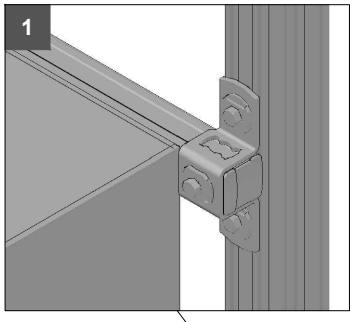


For cases where there is enough space

Side view



Isometric view



1 Cross connector for 1 fixing point

1x MQB-41 cross connector	369668
3x MQN-C push button	2184368

2 Connection of the switch box to channel

M8	
4x M8x25 hex. screw	216448
4x A8,4/16 washer	282850
4x MQM-M8 wing nut	369698
M10	
4x M10x25 hex. screw	216454
4x A10,5/20 washer	282851
4x MQM-M10 wing nut	369626
M12	
4x M12x25 hex. screw	216458
4x A13/24 washer	282852
4x MQM-M12 wing nut	369627

3 MQP 82 channel base with associated channels

1x MQP-82 channel base	369652
4x MQN-C push button	2184368
41D format channels	
MQ-41D 3m	369603
MQ-41D 6m	369604

4 Connection to concrete – channel base

1x MQP 21-72 channel base	369651
2x MQN-C push button	2184368

5 Connection to concrete – channel base

1x MQV -2/2 D-14 chan. base	369639
2x MQN-C push button	2184368

6 Connection to concrete – channel base

2x MQP 1/3 channel base	369647
2x MQN-C push button	2184368

7 Connection to concrete – channel base

2x MQP 1/1 channel base	369646
2x MQN-C push button	2184368

8 Base material connector

1x MQP-41 base m. c.	2141927
2x MQN-C push button	2184368
2x anchor	
HST3 M10x90 30/10	2105712
or HUS3-H 8x55	2079794

9 Base material connector

1x MQP-L-6/2 base m. c.	2141928
2x M10x20 hex. screw	216453
2x MQM-M10 wing nut	369626
2x anchor	
HST3 M10x90 30/10	2105712
or HUS3-H 8x55	2079794

41 format channels

MQ-41 2m	304559
MQ-41 3m	369591
MQ-41 6m	369592
MQ-41 3m LL	2048100
MQ-41 6m LL	2048101
MQ-41/3 3m	369596
MQ-41/3 6m	369597
MQ-41 U 6m	369595
MQ-21D 3m	369601
MQ-21D 6m	369602

Relevant anchors for channel bases otherwise it is stated individually

2-4x HUS3-H 10x70/-/-	2079912
or	
2-4x HST3 M12x105 30/10	2105718
HST2 M12x105/10	2107848

Notice:
For MQP 1/1 only 1pc of anchor

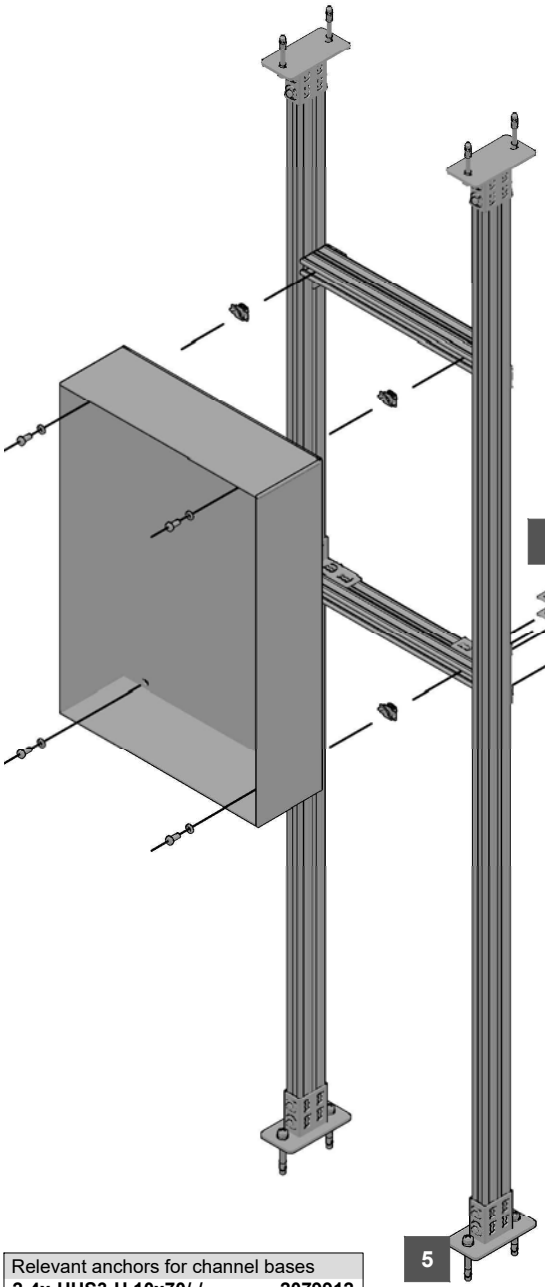
Application description	Application	Product lines	Base material
Heating - Switch Box Frame	10	MQ System	Concrete
		Anchors	

General comments

- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

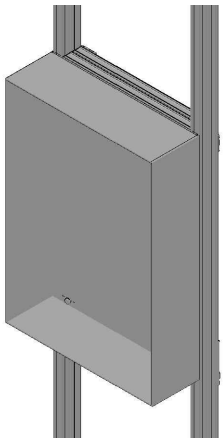
Heating - Plant Room Switch Box - Options

Switch box frame, floor to ceiling

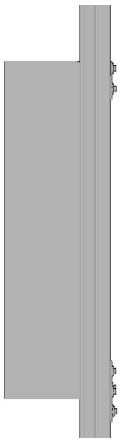


Space-saving solution

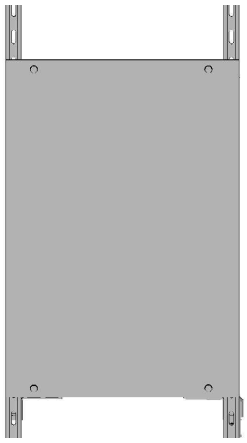
Isometric view

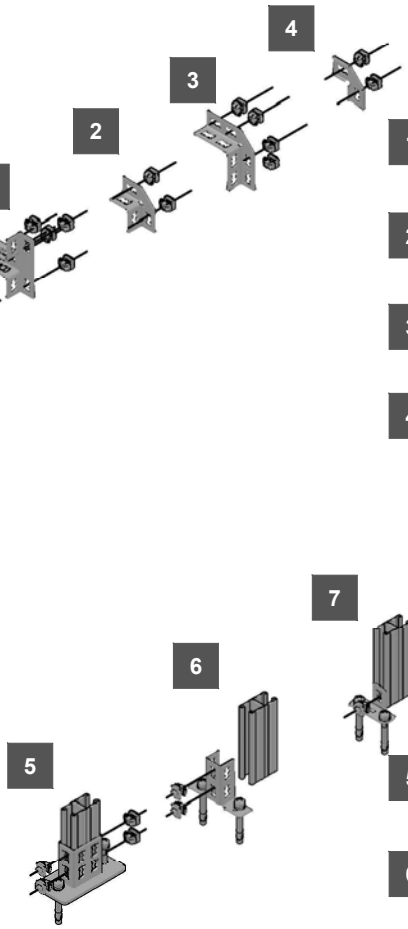


Side view



Front view





1	Connector		
	1x	MQV-3/2 D	369640
	4x	MQN-C push button	2184368
2	Connector		
	1x	MQW-4 connector	369658
	2x	MQN-C push button	2184368
3	Connector		
	1x	MQW-8 connector	369659
	4x	MQN-C push button	2184368
4	Connector		
	1x	MQW - P2 connector	369661
	2x	MQN-C push button	2184368
5	Connection to concrete – channel base		
	1x	MQP 82 channel base	369652
	4x	MQN-C push button	2184368
6	Connection to concrete – channel base		
	1x	MQV -2/2 D-14 chan. base	369639
	2x	MQN-C push button	2184368
7	Connection to concrete – channel base		
	2x	MQP 1/3 channel base	369647
	2x	MQN-C push button	2184368
8	Connection to concrete – channel base		
	2x	MQP 1/1 channel base	369646
	2x	MQN-C push button	2184368

Relevant anchors for channel bases		
2-4x	HUS3-H 10x70/-/-	2079912
	or	
2-4x	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

41D format channels		
	MQ-41D 3m	369603
	MQ-41D 6m	369604

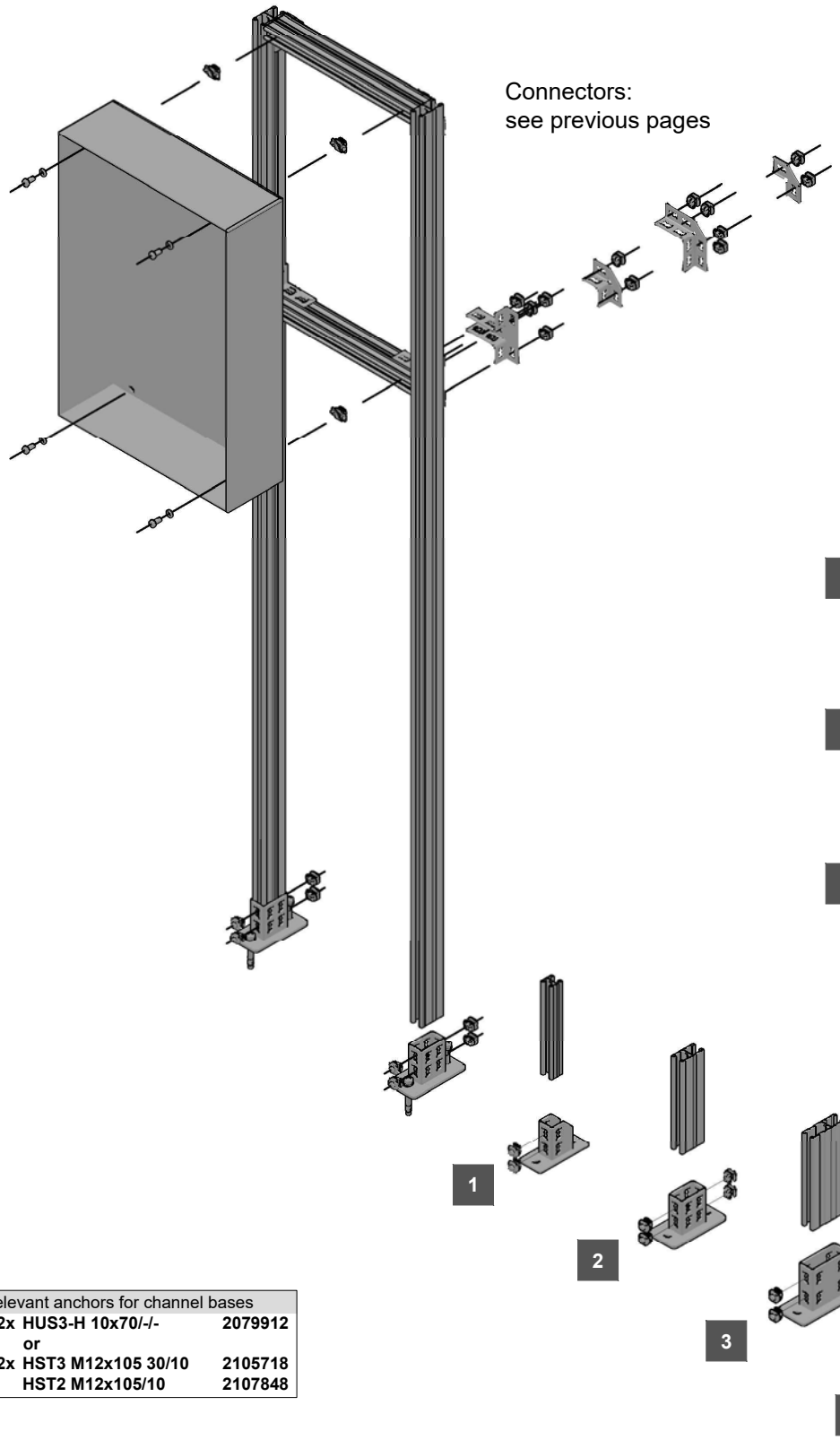
Application description	Application	Product lines	Base material
Heating - Switch Box Frame	10	MQ System	Concrete
		Anchors	

General comments

- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Heating - Plant Room Switch Box Frame - Options

Switch box frame, floor-mounted



1	MQP 21-72 channel base with MQ-21D	
	1x MQP 21-72 channel base	**369651**
	2x MQN-C push button	**2184368**
	21D format channels	
	MQ-21D 3m	**369601**
	MQ-21D 6m	**369602**

2	MQP 82 channel base with MQ-41D	
	1x MQP 82 channel base	**369652**
	4x MQN-C push button	**2184368**
	41D format channels	
	MQ-41D 3m	**369603**
	MQ-41D 6m	**369604**

3	MQP 124 channel base with associated channels	
	1x MQP 124 channel base	**369653**
	4x MQN-C push button	**2184368**
	52-72D and 124X D format channels	
	MQ-52-72 D 3m	**373799**
	MQ-52-72 D 6m	**369605**
	MQ-124X D 6m	**369606**

Relevant anchors for channel bases	
2x HUS3-H 10x70/-/-	**2079912**
or	
2x HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

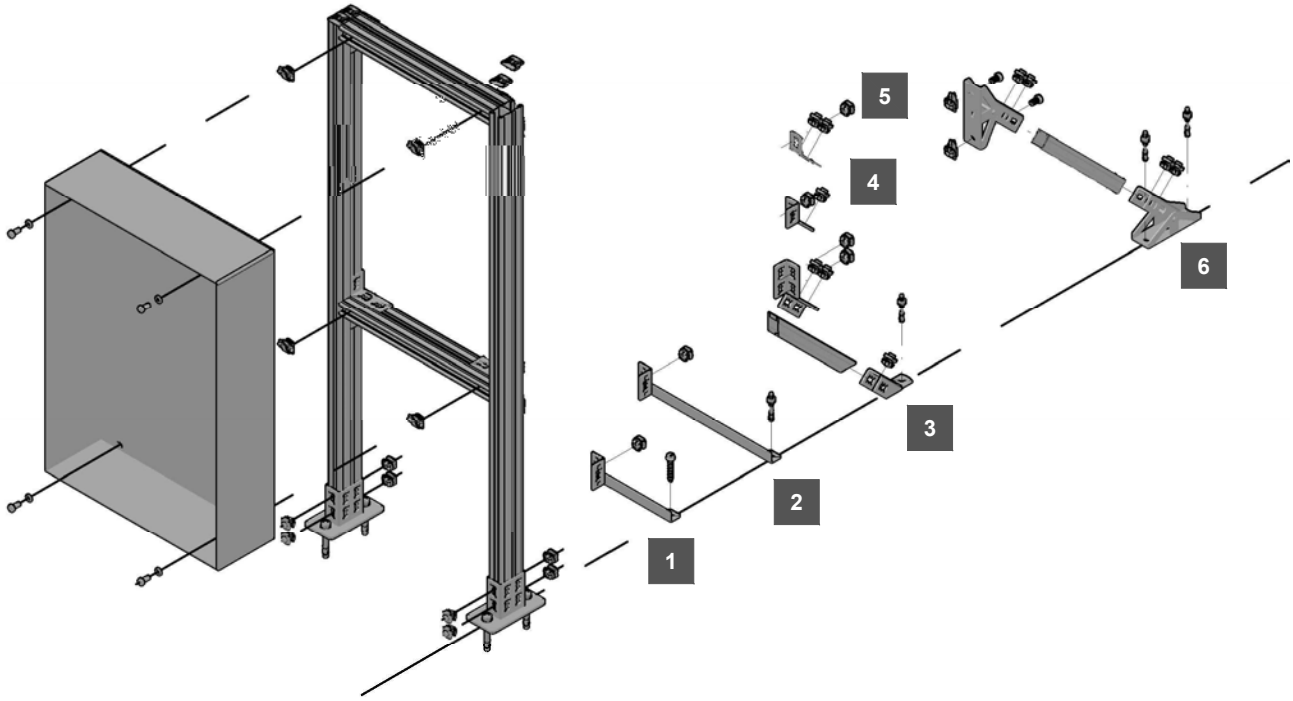
Application description	Application	Product lines	Base material
Heating - Switch Box Frame	10	MQ System	Concrete
		Anchors	

General comments

- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Heating - Plant Room Switch Box Frame - Stiffening Options

Switch box frame, floor-mounted



1 Short pre-fab. bracePre-fab brace

1x	**MQK-SK pre-fab. brace**	**369622**
1x	**MQN-C push button**	**2184368**
1x	**AnchorHUS3-H 10x70/-/-**	**2079912**
	or	
	HST3 M12x105 30/10	**2105718**
	HST2 M12x105/10	**2107848**

2 Long pre-fab. bracePre-fab brace

1x	**MQK-SL pre-fab. brace**	**369621**
1x	**MQN-C push button**	**2184368**
1x	**Anchor**	
	HUS3-H 10x70/-/-	**2079912**
	or	
	HST3 M12x105 30/10	**2105718**
	HST2 M12x105/10	**2107848**

3 Axial bracing using MQP-45 connector

Upper brace connection

1x	**MQW-8/45 connector**	**369660**
4x	**MQN-C push button**	**2184368**

Channel brace - 41 mm format channels

	MQ-41 3m	**369591**

Bottom brace connection

1x	**MQP-45 channel base**	**369649**
1x	**MQN-C push button**	**2184368**
1x	**Anchor**	
	HUS3-H 10x70/-/-	**2079912**
	or	
	HST3 M12x105 30/10	**2105718**
	HST2 M12x105/10	**2107848**

4 Upper brace connector

Upper brace connection alternative

1x	**MQW-3/135 connector**	**369663**
2x	**MQN-C push button**	**2184368**

5 Upper brace connector

Upper brace connection alternative

1x	**MQW-3/45 connector**	**369657**
2x	**MQN-C push button**	**2184368**

6 Axial bracing using MQP-G pivot connector

Upper brace connection

1x	**MQP-G pivot connector**	**369654**
2x	**MQN-C push button**	**2184368**
2x	**M12x25 hex. screw**	**216458**
2x	**MQM-M12 wing nut**	**369627**

Channel brace - 41 mm format channels

	MQ-41 3m	**369591**

Bottom brace connection

1x	**MQP-G pivot connector**	**369654**
2x	**MQN-C push button**	**2184368**
2x	**Anchor**	
	HUS3-H 10x70/-/-	**2079912**
	or	
	HST3 M12x105 30/10	**2105718**
	HST2 M12x105/10	**2107848**

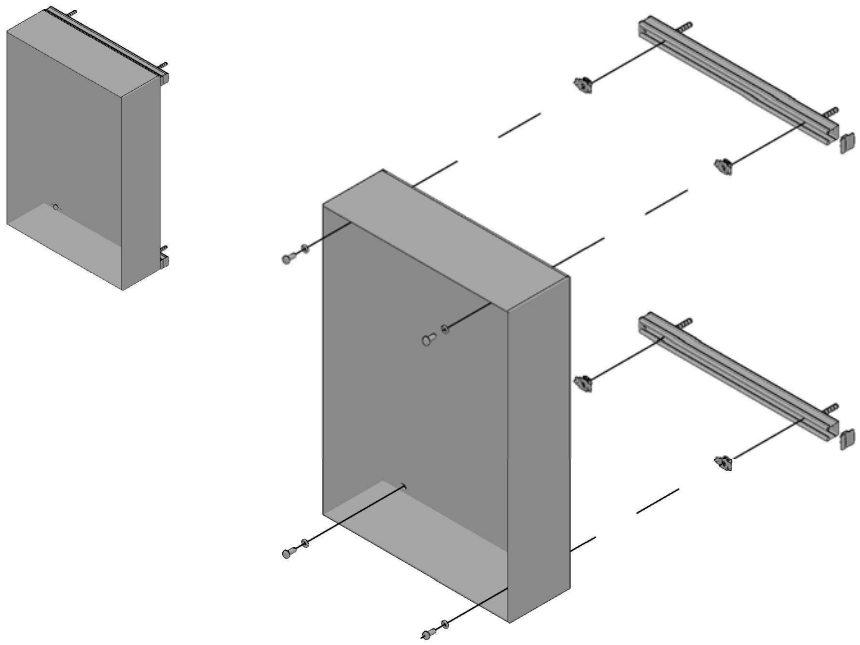
Application description	Application	Product lines	Base material
Heating - Switch Box Frame	10	MQ System	Concrete
		Anchors	

General comments

- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

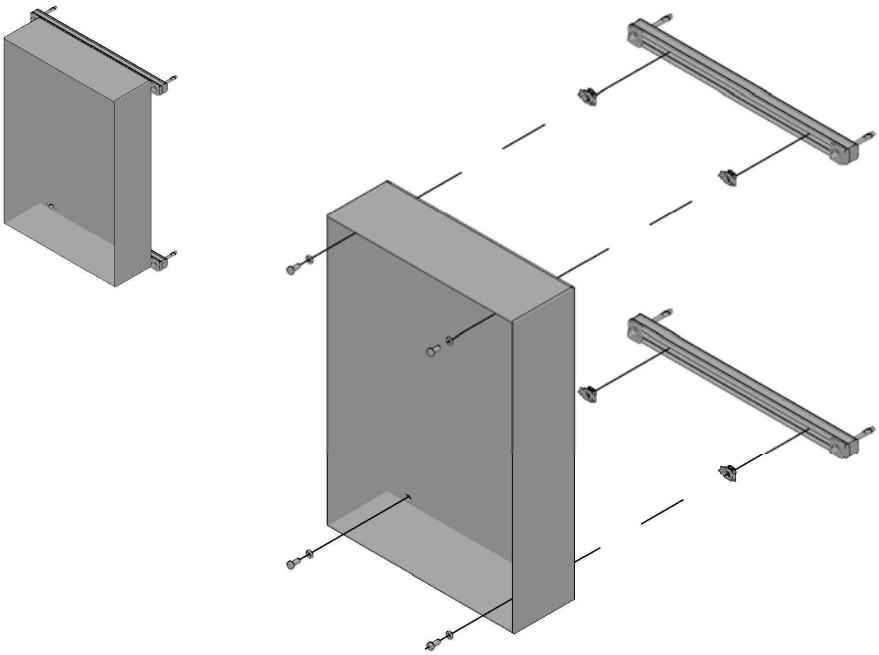
Heating - Plant Room Switch Box Frame - Wall Mounted - Options

Switch box on wall, with lateral adjustment on **concealed** channel



Switch box on wall rail – concealed channel	
Channel - 21 mm format channels	
2x MQ-21 2m	**2148545**
MQ-21 3m	**2148544**
MQ-21 6m	**2169925**
Channel -41 mm format channels	
2x MQ-41-L 2m	**2141966**
MQ-41-L 3m	**2141965**
MQ-41-L 6m	**2141964**
MQ-41 2m	**304559**
MQ-41 3m	**369591**
MQ-41 6m	**369592**
MQ-41 3m LL	**2048100**
MQ-41 6m LL	**2048101**
MQ-41/3 3m	**369596**
MQ-41/3 6m	**369597**
Plastic end cap	
4x MQZ-E21 end cap	**370598**
4x MQZ-E41 end cap	**369685**
Anchor	
4x HUS3-H 10x70/-/-	**2079912**
Switch box fastening	
M8	
4x M8x20 hex. screw	**216447**
4x A8,4/16 washer	**282850**
4x MQM-M8 wing nut	**369698**
M10	
4x M10x20 hex. screw	**216453**
4x A10,5/20 washer	**282851**
4x MQM-M10 wing nut	**369626**
M12	
4x M12x20 hex. screw	**216457**
4x A13/24 washer	**282852**
4x MQM-M12 wing nut	**369627**

Switch box on wall, with lateral adjustment on **projecting** channel



Switch box on wall rail – projecting channel	
Channel - 21 mm format channels	
2x MQ-21 2m	**2148545**
MQ-21 3m	**2148544**
MQ-21 6m	**2169925**
Channel -41 mm format channels	
2x MQ-41-L 2m	**2141966**
MQ-41-L 3m	**2141965**
MQ-41-L 6m	**2141964**
MQ-41 2m	**304559**
MQ-41 3m	**369591**
MQ-41 6m	**369592**
MQ-41 3m LL	**2048100**
MQ-41 6m LL	**2048101**
MQ-41/3 3m	**369596**
MQ-41/3 6m	**369597**
Plastic end cap	
4x MQZ-E21 end cap	**370598**
4x MQZ-E41 end cap	**369685**
Connection to the wall	
4x MQZ-L13 square washer	**369680**
4x HST3 M12x145 70/50	**2105851**
Switch box fastening	
See above	

Application description	Application	Product lines	Base material
Heating - Switch Box Frame Wall Mounted	10	MQ System	Concrete
		Anchors	

General comments

- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Fixed Point On Concrete - MFP-CSL Fixed Point:

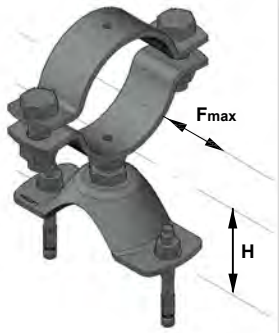
MFP-CSL without sound insulation

1		1	MFP-PC Fixed Point Pipe Ring
		1x	MFP-PC 21-22 M20 2227599 MFP-PC 25-27 M20 2227690 MFP-PC 28-30 M20 2227691 MFP-PC 31-33 M20 2227692 MFP-PC 33.5-36 M20 2227693 MFP-PC 39-41 M20 2227694 MFP-PC 42-45 M20 2227695 MFP-PC 47-50 M20 2227696 MFP-PC 53-56 M20 2227697 MFP-PC 57-61 M20 2227698 MFP-PC 62-66 M20 2227699 MFP-PC 68-72 M20 2227700 MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704
2		2	MFP-CSL Fixed point set
		1x	MFP-CSL set 2223016
3		3	Anchors
		2x	HUS3-H 10x90 35/15/5 2079914 or 2x HST3 M12x85 10/- 2113978

Resistance and limitations

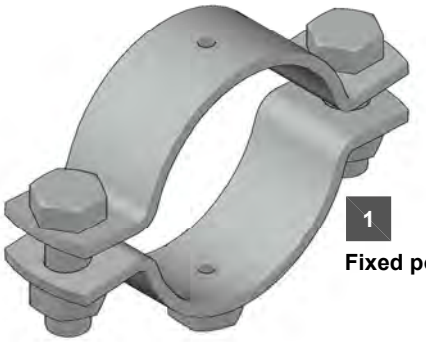
Recommended resitance
(safety factor 1.5 included):
F_{max} = 2.0 kN

H_{min} = 85 mm
H_{max} = 115 mm
height above ground to base of pipe

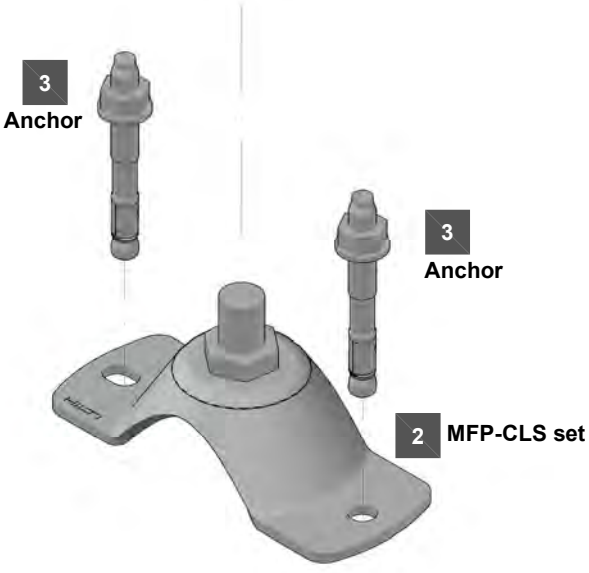


Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



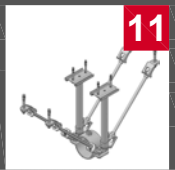
1 **Fixed point pipe ring**



3 **Anchor**

3 **Anchor**

2 **MFP-CLS set**

Application description	Application	Product lines	Base material
Heating - MFP-CSL fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Fixed Point On Concrete - MFP-CSL-I Fixed Point:

MFP-CSL-I with sound insulation

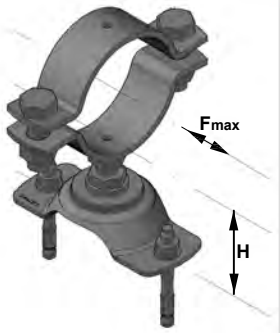
1		1	MFP-PC Fixed Point Pipe Ring
		1x	MFP-PC 21-22 M20 2227599 MFP-PC 25-27 M20 2227690 MFP-PC 28-30 M20 2227691 MFP-PC 31-33 M20 2227692 MFP-PC 33.5-36 M20 2227693 MFP-PC 39-41 M20 2227694 MFP-PC 42-45 M20 2227695 MFP-PC 47-50 M20 2227696 MFP-PC 53-56 M20 2227697 MFP-PC 57-61 M20 2227698 MFP-PC 62-66 M20 2227699 MFP-PC 68-72 M20 2227700 MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704

2		2	MFP-CSL-I Fixed point set
		1x	MFP-CSL-I set 2223017
3		3	Anchors
		2x	HUS3-H 10x90 35/15/5 2079914 or 2x HST3 M12x85 10/- 2113978

Resistance and limitations

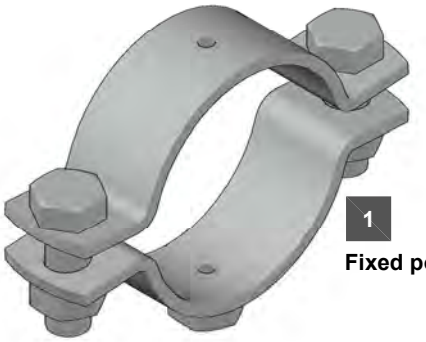
Recommended resitance
(safety factor 1.5 included):
F_{max} = 2.0 kN

H_{min} = 85 mm
H_{max} = 115 mm
height above ground to base of pipe

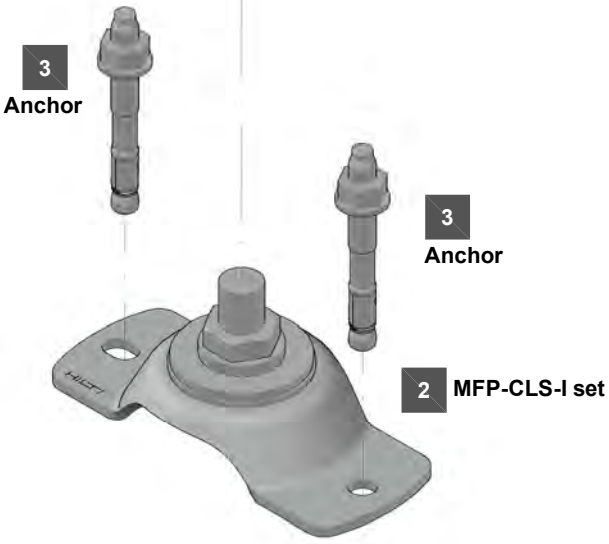


Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 **Fixed point pipe ring**



3 **Anchor**

3 **Anchor**

2 **MFP-CLS-I set**

Application description	Application	Product lines	Base material
Heating - MFP-CSL-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

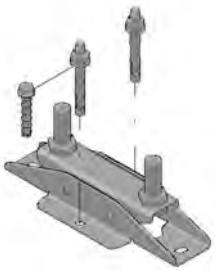
Fixed Point On Concrete - MFP-CL-I Fixed Point:

MFP-CL-I with sound insulation

1		1	MFP-PC Fixed Point Pipe Ring
		2x	MFP-PC 21-22 M20 — 2227599
			MFP-PC 25-27 M20 — 2227690
			MFP-PC 28-30 M20 — 2227691
			MFP-PC 31-33 M20 — 2227692
			MFP-PC 33.5-36 M20 — 2227693
			MFP-PC 39-41 M20 — 2227694
			MFP-PC 42-45 M20 — 2227695
			MFP-PC 47-50 M20 — 2227696
			MFP-PC 53-56 M20 — 2227697
			MFP-PC 57-61 M20 — 2227698
			MFP-PC 62-66 M20 — 2227699
			MFP-PC 68-72 M20 — 2227700
			MFP-PC 73-78 M20 — 2227701
			MFP-PC 88-93 M20 — 2227702
			MFP-PC 100-105 M20 — 2227703
			MFP-PC 108-115 M20 — 2227704
			MFP-PC 125-133 M20 — 2227705
			MFP-PC 134-142 M20 — 2227706
			MFP-PC 154-162 M20 — 2227707
			MFP-PC 162-170 M20 — 2227708

2		2	MFP-CL-I Fixed point set
		1x	MFP-CL-I set — 2223018
3		3	Anchors
		2x	HUS3-H 10x60 5/-/- — 2079911
		or	
		2x	HST3 M12x85 10/- — 2113978

Alternative anchor points



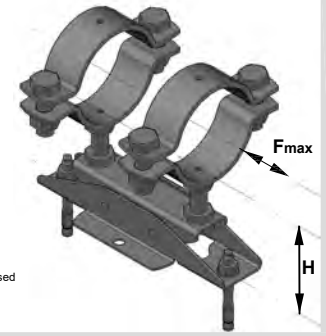
Resistance and limitations

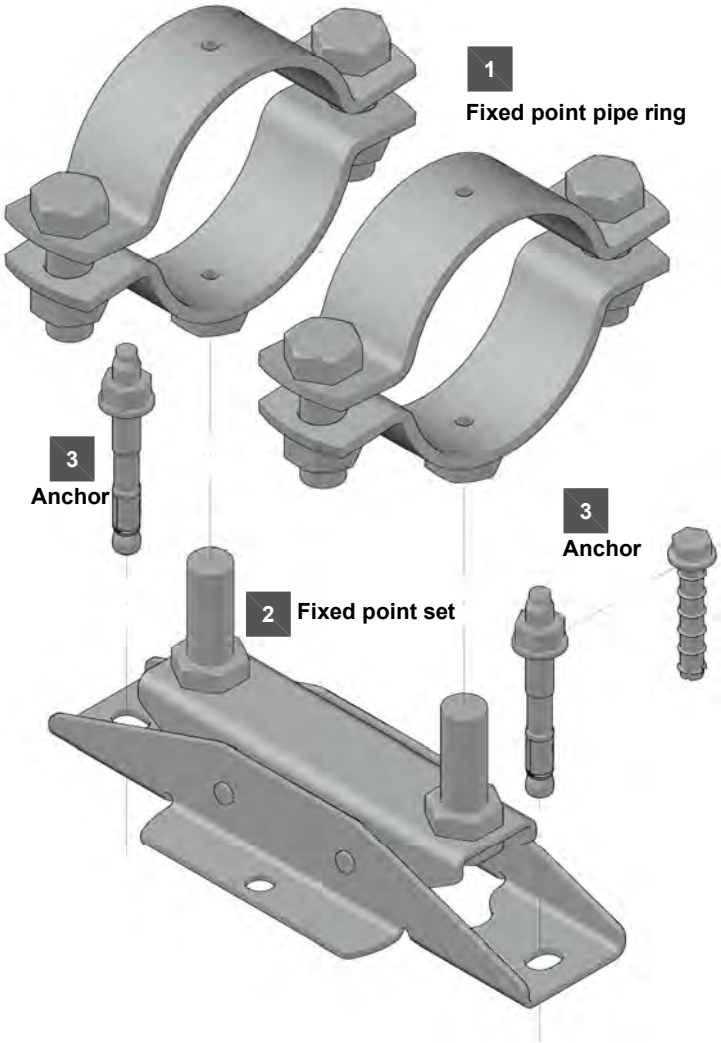
Recommended resitance
(safety factor 1.5 included):
F_{max} =4.0 kN

H_{min} = 85 mm
Hmin = 115mm
height above ground to base of pipe

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





Application description	Application	Product lines	Base material
Heating - MFP-CL-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

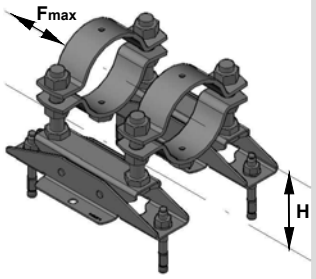
Fixed Point On Concrete - MFP-CLD-I Fixed Point:

MFP-CL-I with sound insulation

Resistance and limitations

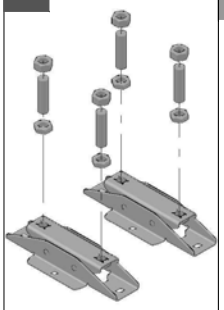
Recommended resitance
(safety factor 1.5 included):
F_{max} = 8.0kN

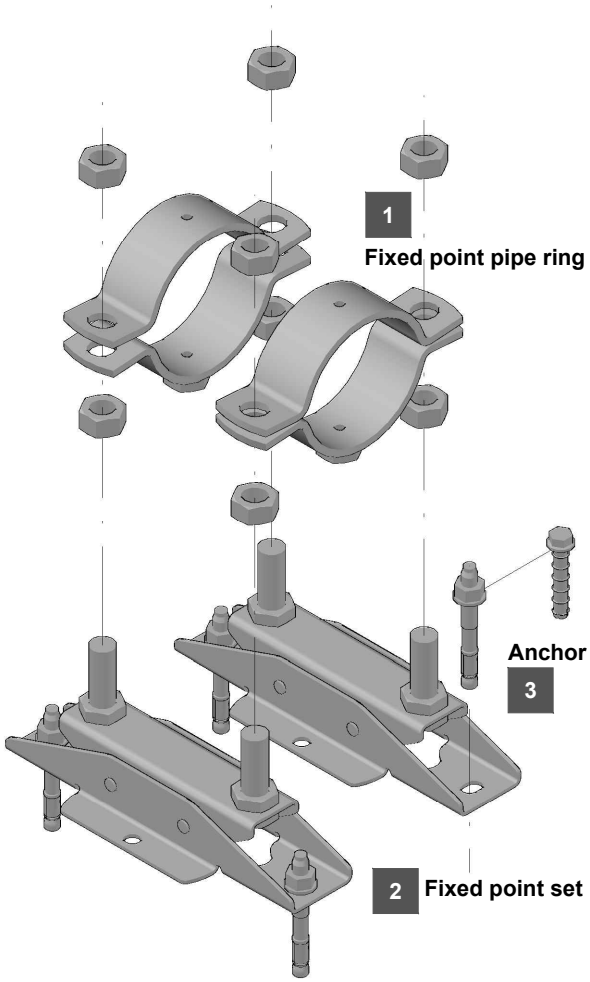
H_{min} = 95 mm
H_{max} = 175 mm
Height from base material to center of the pipe



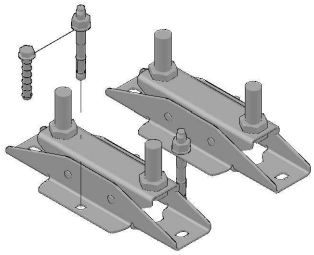
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

1		1	MFP-PC Fixed Point Pipe Ring
		2x	MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704 MFP-PC 125-133 M20 2227705 MFP-PC 134-142 M20 2227706 MFP-PC 154-162 M20 2227707 MFP-PC 162-170 M20 2227708 MFP-PC 192-200 M20 2227709 MFP-PC 213-221 M20 2227710
2		2	MFP-CLD-I Fixed point set
		1x	MFP-CLD-I set 2223014
3		3	Anchors
		4x	HUS3-H 10x60 5/-/- 2079911
		or	
		4x	HST3 M12x85 10/- 2113978



Alternative anchor points



Application description	Application	Product lines	Base material
Heating - MFP-CLD-I Fixed Point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Fixed Point On Concrete - MFP-CH Fixed Point:

MFP-CH without sound insulation

1

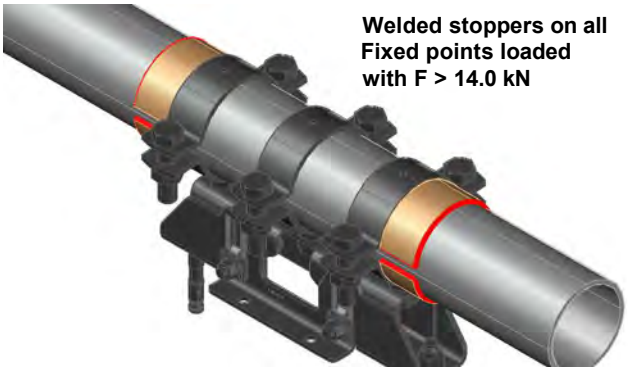
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP-CH Fixed point set	
1x	MFP-CH set	2223015

3

3	Anchors	
2x	HUS3-H 14x130 65/45/15	2079923
or		
2x	HST3 M16x135 35/15	2105858

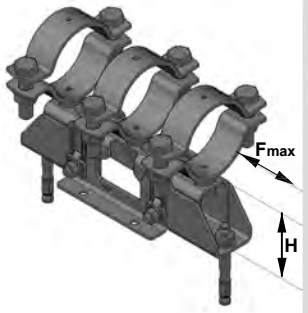


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

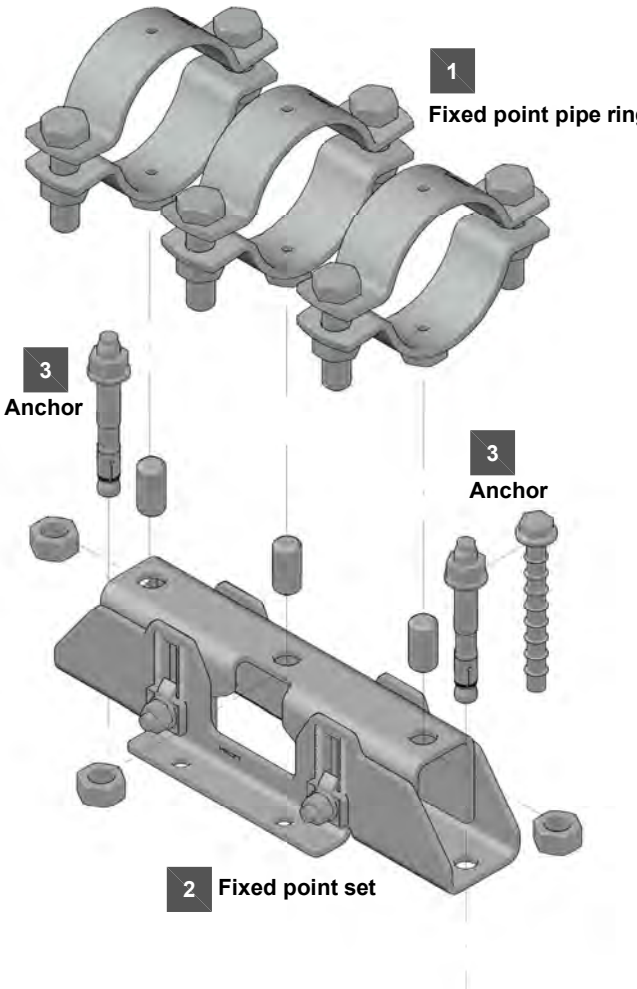
Recommended resitance
(safety factor 1.5 included):
F_{max} = 22 kN

H_{min} = 115 mm
H_{max} = 165 mm
height above ground to base of pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



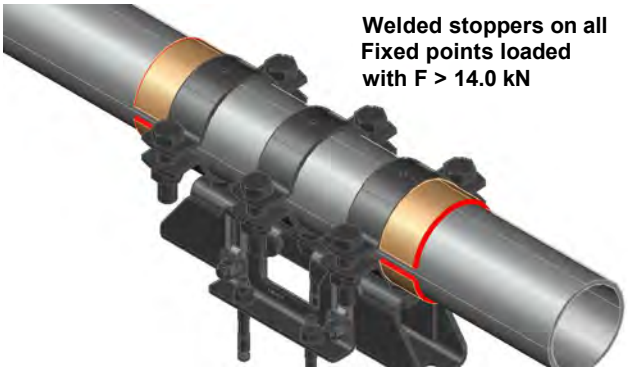
Application description	Application	Product lines	Base material
Heating - MFP-CH fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Fixed Point On Concrete - MFP-CH (M12) using alternative anchoring

MFP-CH without sound insulation

1		1	MFP-PC Fixed Point Pipe Ring
		3x	MFP-PC 21-22 M20 — 2227599
			MFP-PC 25-27 M20 — 2227690
			MFP-PC 28-30 M20 — 2227691
			MFP-PC 31-33 M20 — 2227692
			MFP-PC 33.5-36 M20 — 2227693
			MFP-PC 39-41 M20 — 2227694
			MFP-PC 42-45 M20 — 2227695
			MFP-PC 47-50 M20 — 2227696
			MFP-PC 53-56 M20 — 2227697
			MFP-PC 57-61 M20 — 2227698
			MFP-PC 62-66 M20 — 2227699
			MFP-PC 68-72 M20 — 2227700
			MFP-PC 73-78 M20 — 2227701
			MFP-PC 88-93 M20 — 2227702
			MFP-PC 100-105 M20 — 2227703
			MFP-PC 108-115 M20 — 2227704
			MFP-PC 125-133 M20 — 2227705
			MFP-PC 134-142 M20 — 2227706
			MFP-PC 154-162 M20 — 2227707
			MFP-PC 162-170 M20 — 2227708
			MFP-PC 192-200 M20 — 2227709
			MFP-PC 213-221 M20 — 2227710
			MFP-PC 242-250 M20 — 2227711
			MFP-PC 267-275 M20 — 2227712
			MFP-PC 318-326 M20 — 2227598

2		2	MFP-CH Fixed point set
		1x	MFP-CH set — 2223015
3		3	Anchors
		4x	HUS3-H 10x90 35/15/5 — 2079914
		or	
		4x	HST3 M12x105 30/10 — 2105718

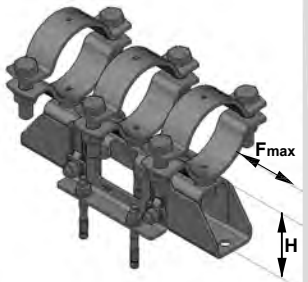


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

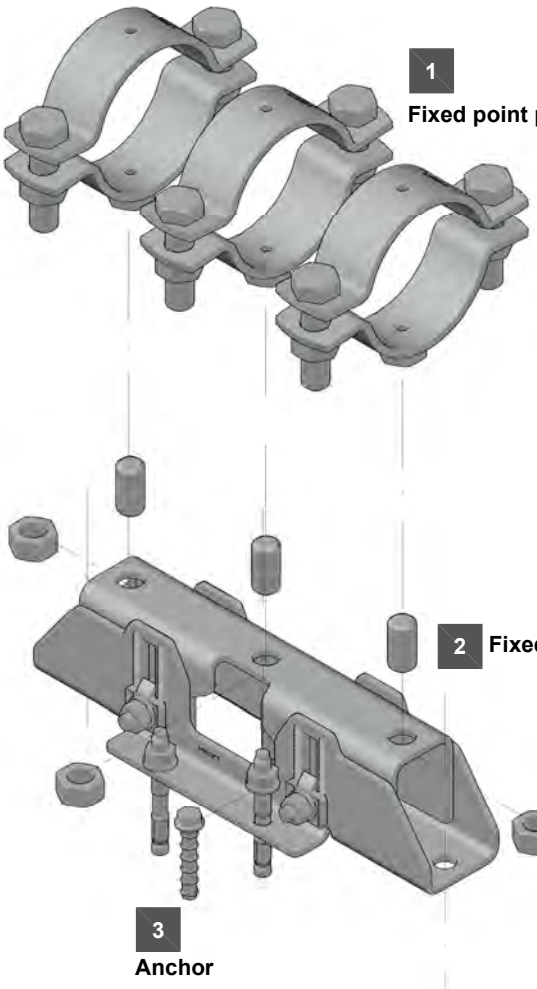
Recommended resitance
(safety factor 1.5 included):
F_{max} = 12 kN

H_{min} = 115 mm
H_{max} = 165 mm
height above ground to base of pipe



Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

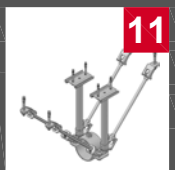
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 Fixed point pipe ring

2 Fixed point set

3 Anchor

Application description	Application	Product lines	Base material
Heating - MFP-CH fixed point with alternative M12 anchor points	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact			
• Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

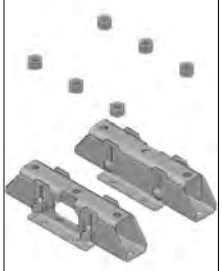
Fixed Point On Concrete - MFP-CHD Fixed Point:

MFP-CHD without sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710

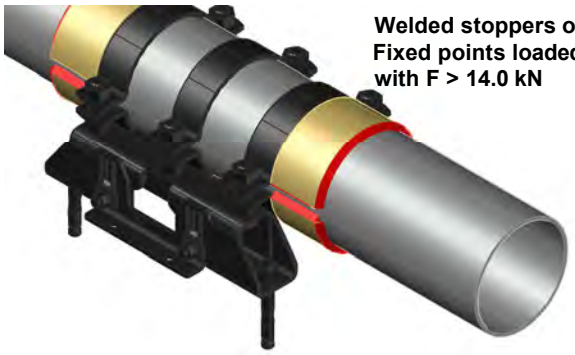
2



2	MFP-CHD Fixed point set	
1x	MFP-CHD set	2238264

3

5	Anchors	
4x	HUS3-H 14x130 65/45/15	2079923
or		
4x	HST3 M16x135 35/15	2105858

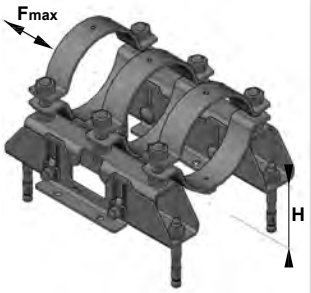


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

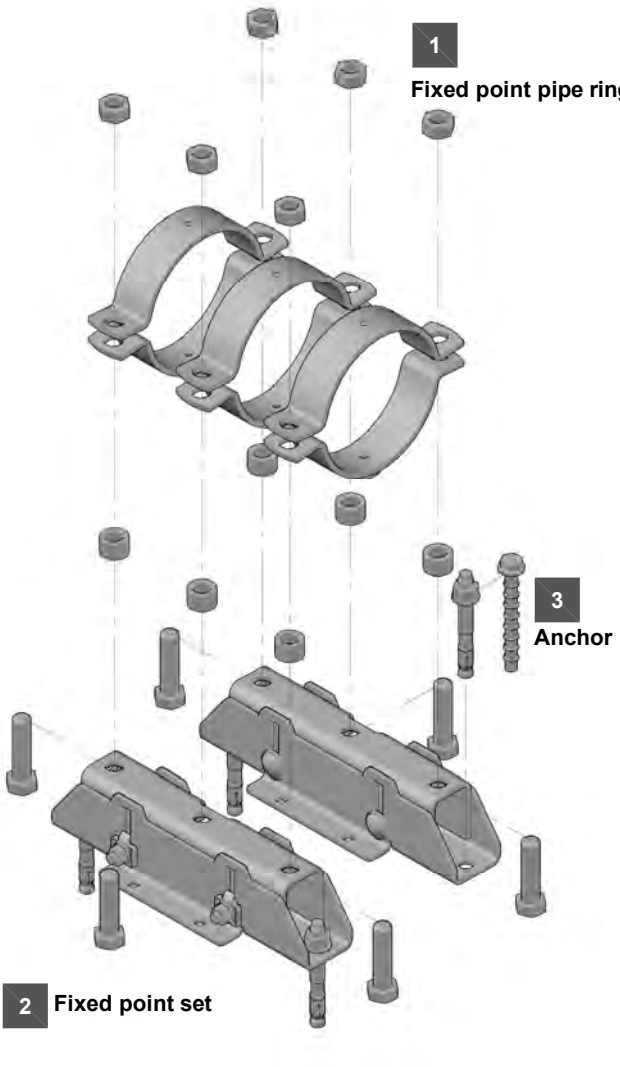
Recommended resitance
(safety factor 1.5 included):
F_{max} = 44 kN

H_{min} = 130 mmm
H_{max} = 180mm
Height from base material to center of the pipe



Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

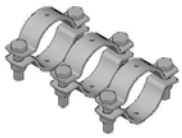


Application description	Application	Product lines	Base material
Heating - MFP-CHD fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Fixed Point On Concrete - MFP-CHD Fixed Point (M12)
Fixed Point using alternative anchoring

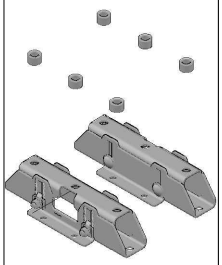
MFP-CHD without sound insulation

1



1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710

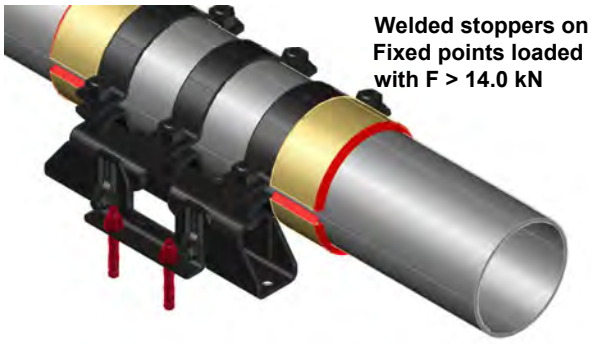
2



2	MFP-CHD Fixed point set	
1x	MFP-CHD set	2238264

3

5	Anchors	
8x	HUS3-H 10x60 5/-/-	2079911
or		
8x	HST3 M12x85 10/-	2113978

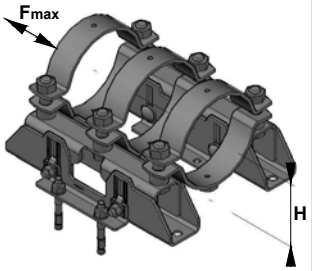


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

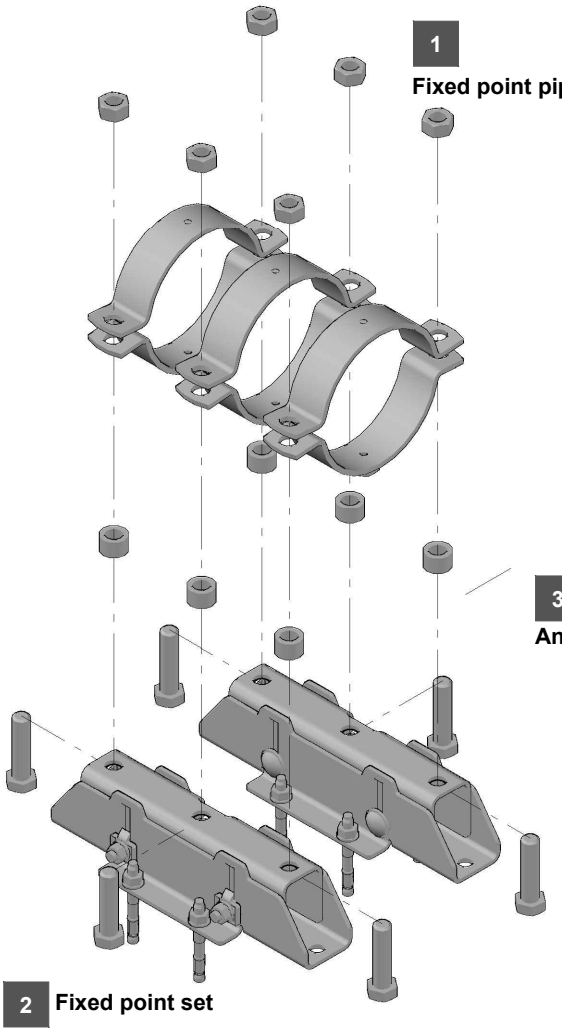
Recommended resitance
(safety factor 1.5 included):
F_{max} = 24 kN

H_{min} = 130 mmm
H_{max} = 180mm
Height from base material to center of the pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 **Fixed point pipe ring**

3 **Anchor**

2 **Fixed point set**

Application description	Application	Product lines	Base material
Heating - MFP-CHD fixed point with alternative anchor points	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Fixed Point On Concrete - MFP-L Fixed Point:

MFP-L without sound insulation

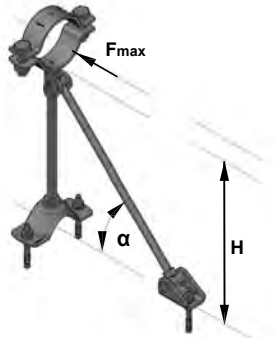
1		1	MFP-PC Fixed Point Pipe Ring
		1x	MFP-PC 21-22 M20 2227599 MFP-PC 25-27 M20 2227690 MFP-PC 28-30 M20 2227691 MFP-PC 31-33 M20 2227692 MFP-PC 33.5-36 M20 2227693 MFP-PC 39-41 M20 2227694 MFP-PC 42-45 M20 2227695 MFP-PC 47-50 M20 2227696 MFP-PC 53-56 M20 2227697 MFP-PC 57-61 M20 2227698 MFP-PC 62-66 M20 2227699 MFP-PC 68-72 M20 2227700 MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704 MFP-PC 125-133 M20 2227705 MFP-PC 134-142 M20 2227706
2		2	MFP-L Fixed point set
		1x	MFP-L set 2223121 The set contains: 1x MFP-BR M16 bracing set 1x MFP-BP M20 base plate set
3		3	M20 Base Threaded Rod
		1x	AM20x1000 4.8 threaded rod 216425
4		4	M16 Bracing Threaded Rod
		1x	AM16x1000 4.8 threaded rod 216422 AM16x2000 4.8 threaded rod 216423 AM16x3000 4.8 threaded rod 216424
5		5	Anchors
		3x	HUS3-H 10x90 35/15/5 2079914 or 3x HST3 M12x85 10/- 2113978

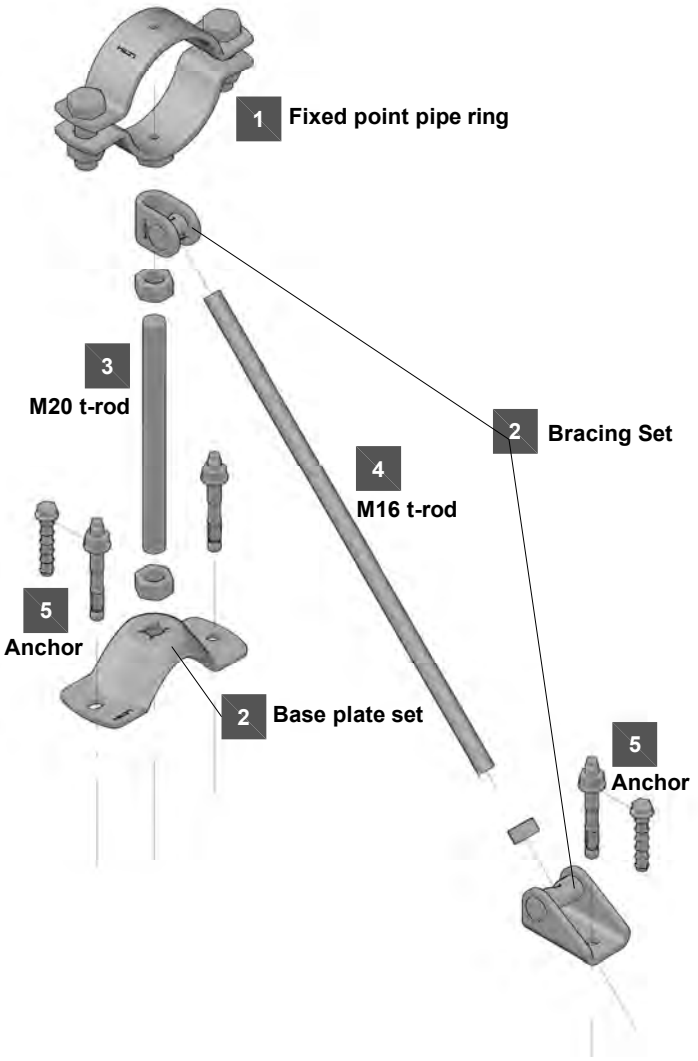
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 150
H_{max} = 500
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

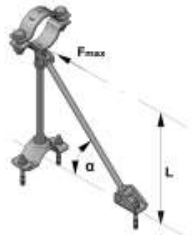
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



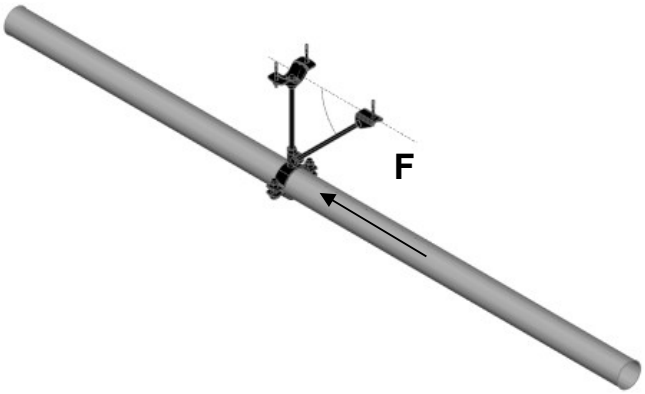


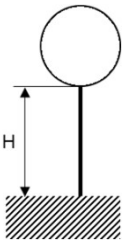
Application description	Application	Product lines	Base material
Heating - MFP-L fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-L recommended loading capacity limits

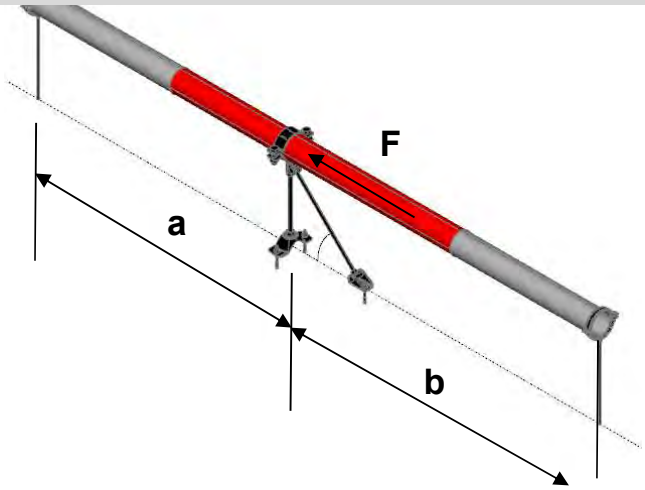
Hanging pipes - Recommended loading capacity

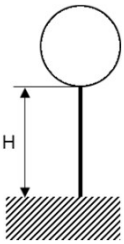




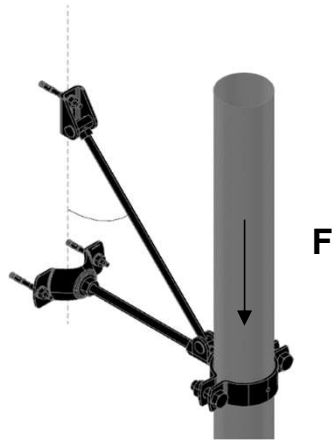
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

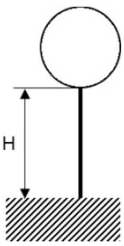
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





Fixed Point On Concrete - MFP-L2 Fixed Point:

MFP-L2 without sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2

2	MFP-L2 Fixed point set	
1x	MFP-L2 set	2223123

The set contain:
2x MFP-BR M16 bracing set
1x MFP-BP M20 base plate set

3

3	M20 Base Threaded Rod	
1x	AM20x1000 4.8 threaded rod	216425

4

4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

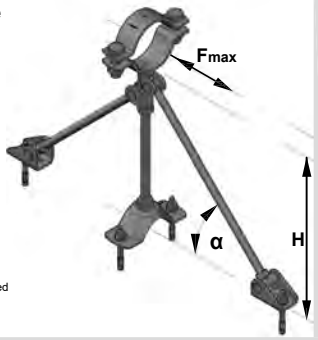
5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x85 10/-	2113978

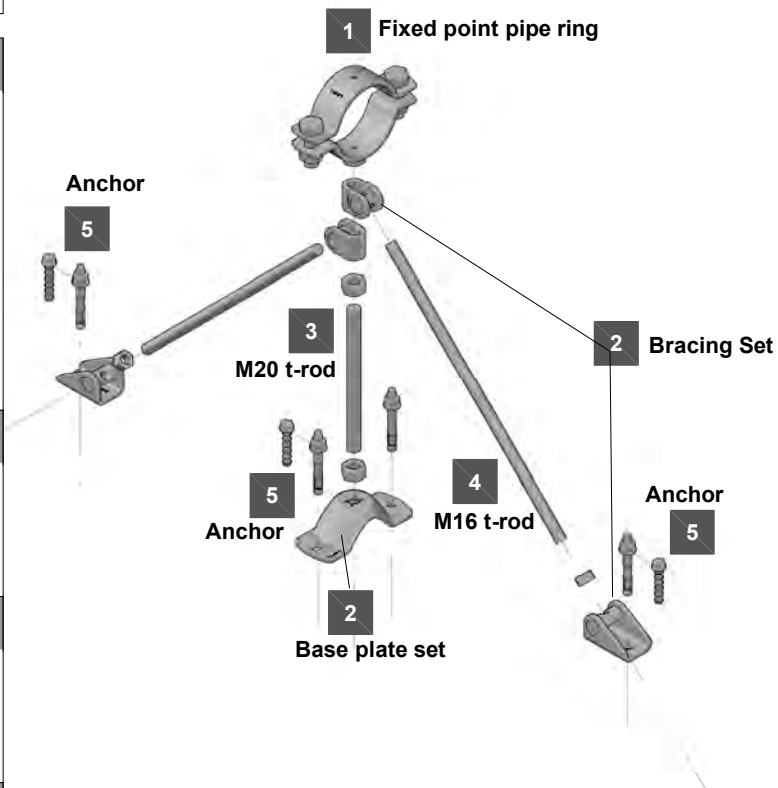
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 190 mm
H_{max} = 500 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

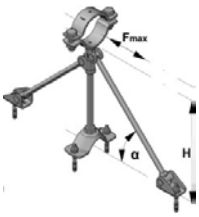
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





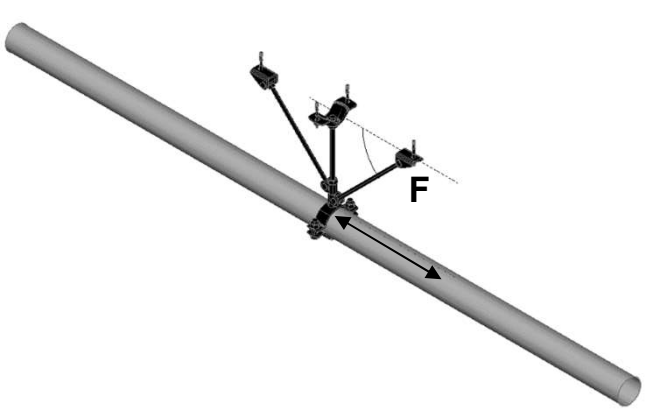
Application description	Application	Product lines	Base material
Heating - MFP-L2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

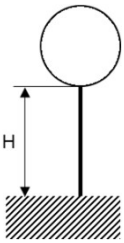
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-L2 recommended loading capacity limits

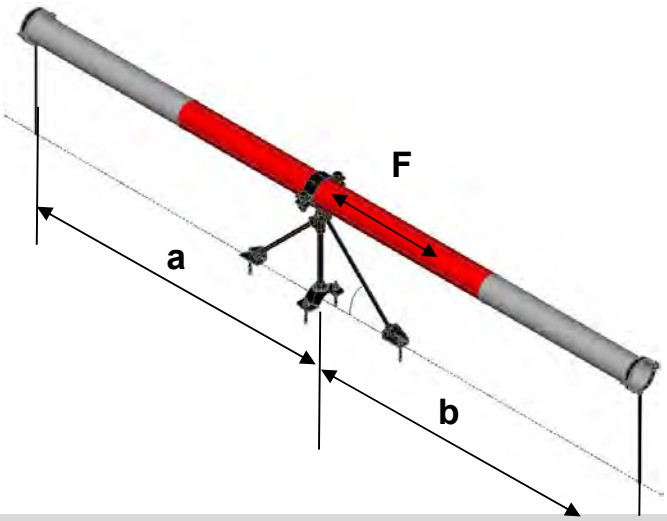
Hanging pipes - Recommended loading capacity

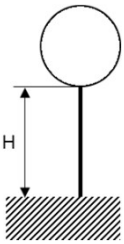




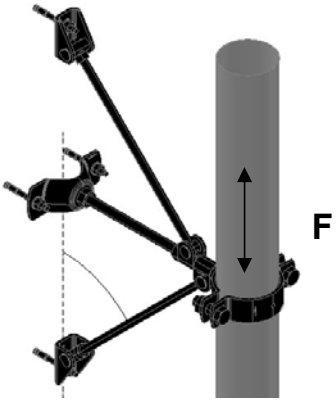
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

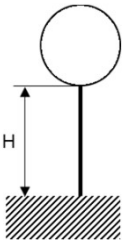
Supported pipes - Recommended loading capacity (Buckling check included)





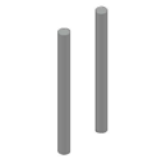
Rising pipes - Recommended loading capacity





Fixed Point On Concrete - MFP-LD Fixed Point:

MFP-LD without sound insulation

1		1	MFP-PC Fixed Point Pipe Ring
		1x	MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704 MFP-PC 125-133 M20 2227705 MFP-PC 134-142 M20 2227706 MFP-PC 154-162 M20 2227707 MFP-PC 162-170 M20 2227708 MFP-PC 192-200 M20 2227709 MFP-PC 213-221 M20 2227710 MFP-PC 242-250 M20 2227711 MFP-PC 267-275 M20 2227712 MFP-PC 318-326 M20 2227598
2		2	MFP-LD Fixed point set
		1x	MFP-LD fixed point set 2223122 The set contain: 2x MFP-BR M16 bracing set 2x MFP-BP M20 base plate set
3		3	M20 Base Threaded Rod
		2x	AM20x1000 4.8 threaded rod 216425
4		4	M16 Bracing Threaded Rod
		2x	AM16x1000 4.8 threaded rod 216422 AM16x2000 4.8 threaded rod 216423 AM16x3000 4.8 threaded rod 216424
5		5	Anchors
		6x	HUS3-H 10x90 35/15/5 2079914 or 6x HST3 M12x85 10/- 2113978

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 190 mm

H_{max} = 500 mm

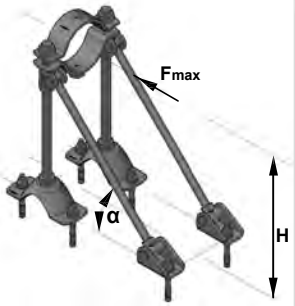
Height from base material to center of the pipe

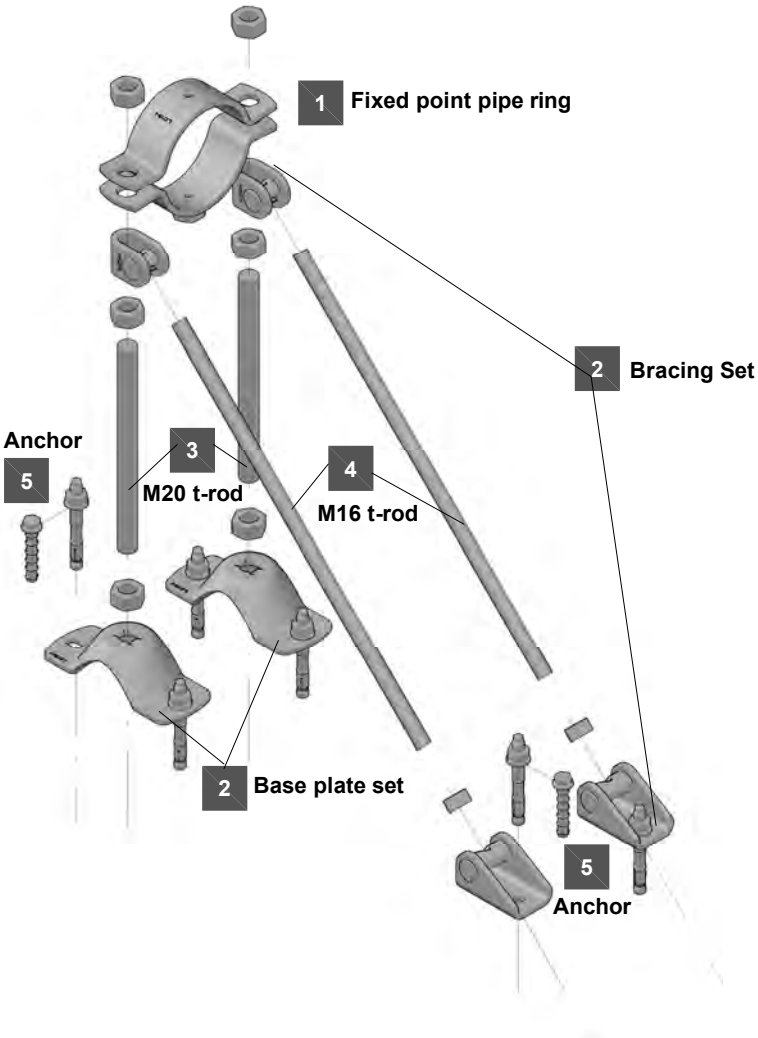
α_{min} = 35°

α_{max} = 45°

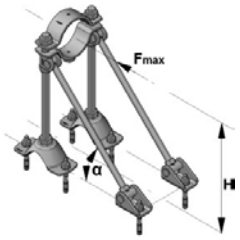
Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



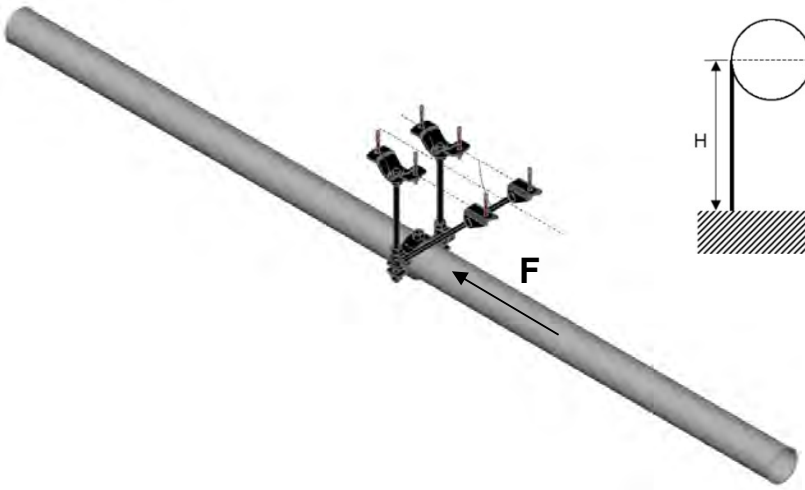


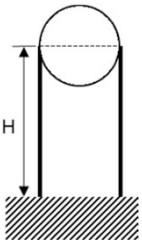
Application description	Application	Product lines	Base material
Heating - MFP-LD fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-LD recommended loading capacity limits

Hanging pipes - Recommended loading capacity

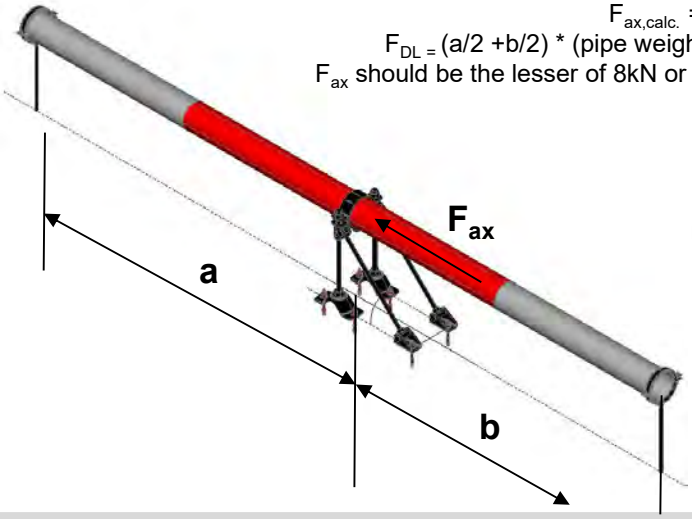


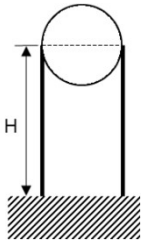


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

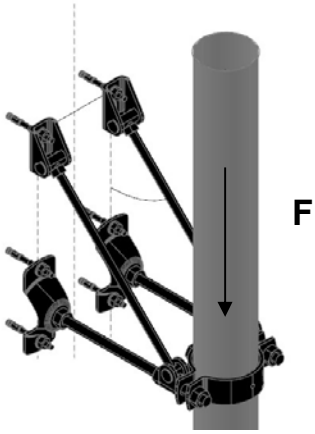
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or $(F_{B,max.} - F_{DL})$

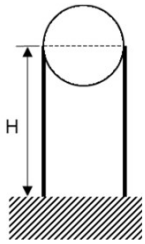




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Fixed Point On Concrete - MFP-LD2 Fixed Point:

MFP-LD2 without sound insulation

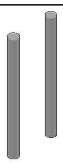
1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP-LD2 Fixed point set	
1x	MFP-LD2 fixed point set	2223124
The set contain:		
4x	MFP-BR M16 bracing set	
2x	MFP-BP M20 base plate set	

3

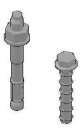


3	M20 Base Threaded Rod	
2x	AM20x1000 4.8 threaded rod	216425

4

4	M16 Bracing Threaded Rod	
4x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5



5	Anchors	
8x	HUS3-H 10x90 35/15/5	2079914
or		
8x	HST3 M12x85 10/-	2113978

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 190 mm

H_{max} = 500 mm

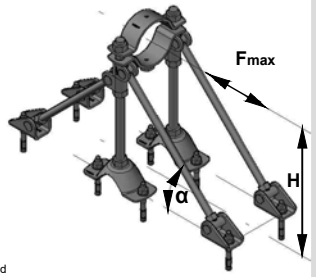
Height from base material to center of the pipe

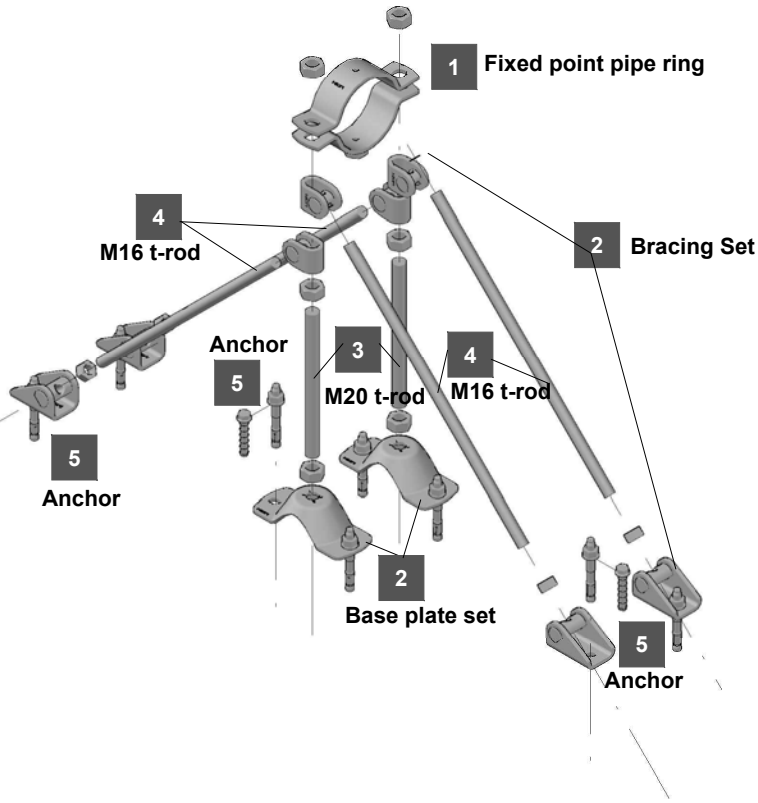
α_{min} = 35°

α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

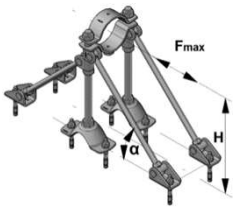
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





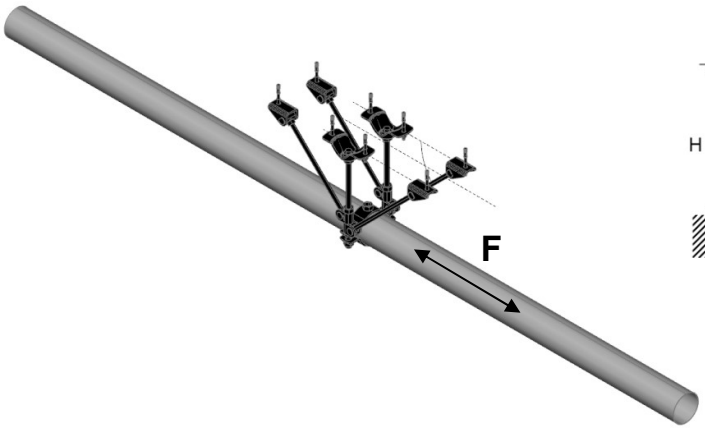
Application description	Application	Product lines	Base material
Heating - MFP-LD2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

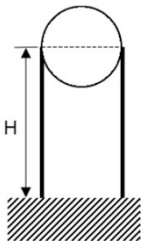
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-LD2 recommended loading capacity limits

Hanging pipes - Recommended loading capacity

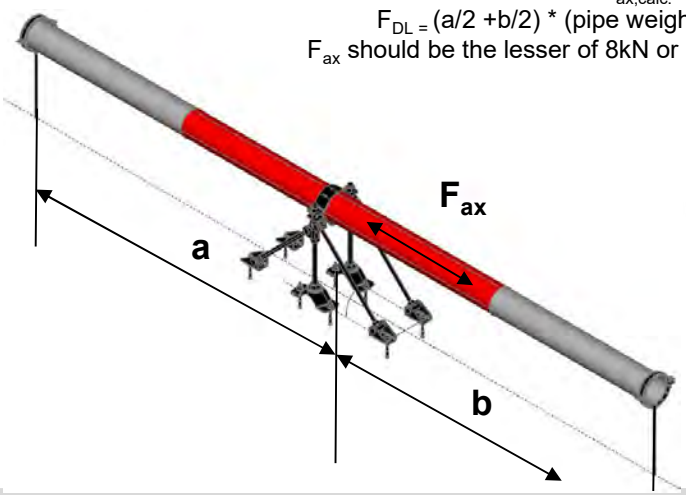


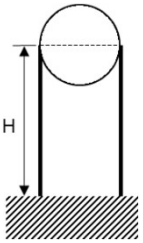


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

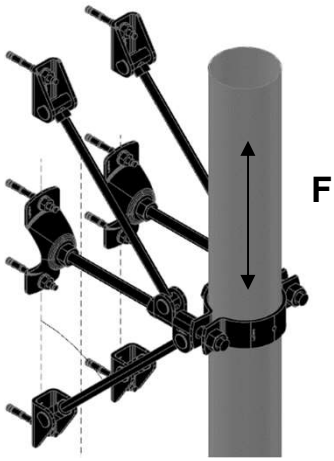
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or $(F_{B,max.} - F_{DL})$

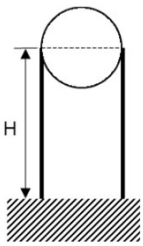




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Fixed Point On Concrete - MFP-L-I Fixed Point:

MFP-L-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2

2	MFP-L-I Fixed point set	
1x	MFP-L-I set	2223125

The set contains:
1x MFP-BR-I M16 bracing set
1x MFP-BP-I M20 base plate set

3

3	M20 Base Threaded Rod	
1x	AM20x1000 4.8 threaded rod	216425

4

4	M16 Bracing Threaded Rod	
1x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

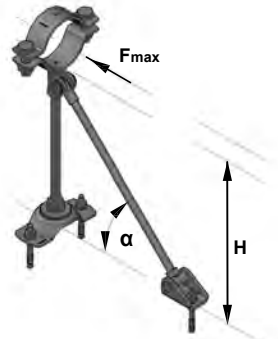
5	Anchors	
3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978

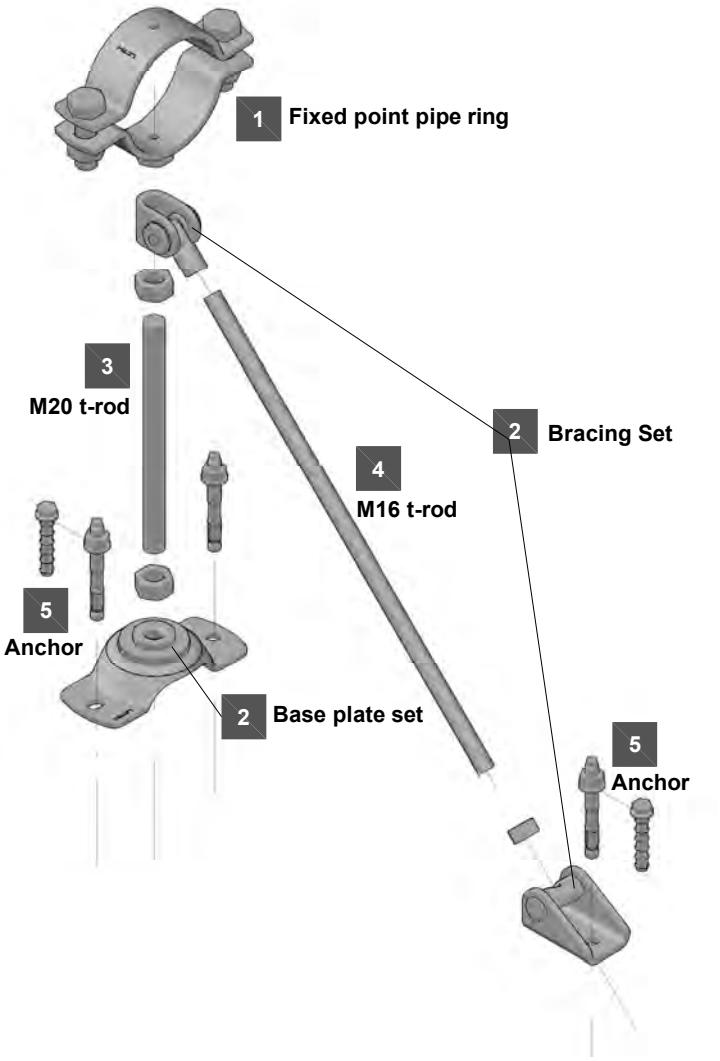
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 150 mm
H_{max} = 500 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

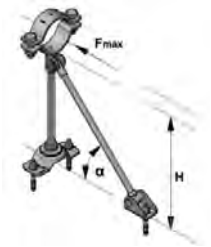
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





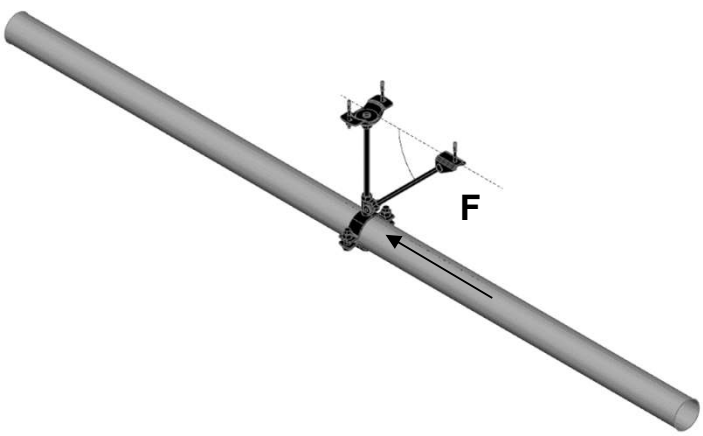
Application description	Application	Product lines	Base material
Heating - MFP-L-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

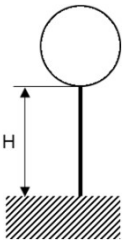
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-L-I recommended loading capacity limits

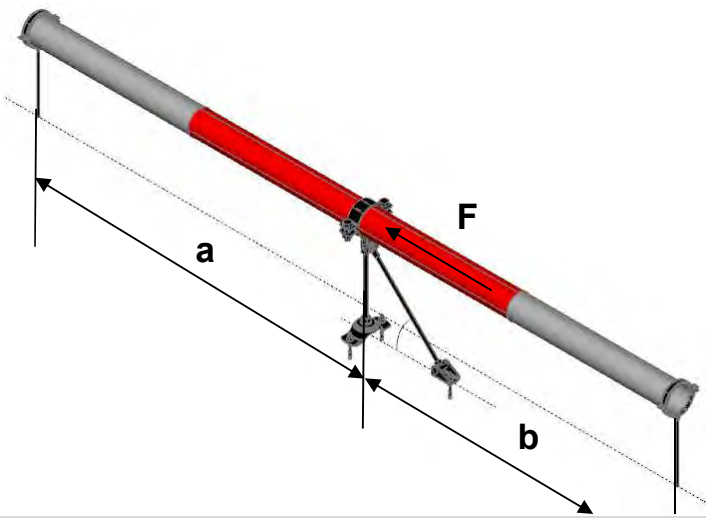
Hanging pipes - Recommended loading capacity

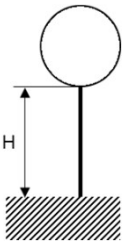




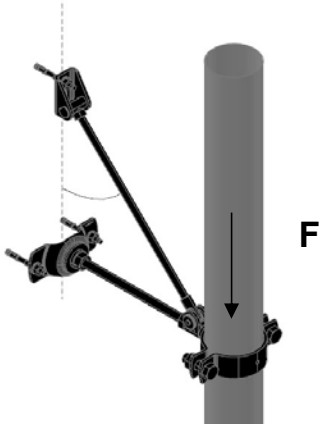
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

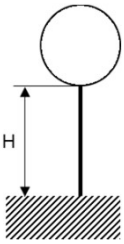
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





Fixed Point On Concrete - MFP-L2-I Fixed Point:

MFP-L2-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2

2	MFP-L2-I Fixed point set	
1x	MFP-L2-I set	2223127

The set contain:
2x MFP-BR-I M16 bracing set
1x MFP-BP M20 base plate set

3

3	M20 Base Threaded Rod	
1x	AM20x1000 4.8 threaded rod	216425

4

4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

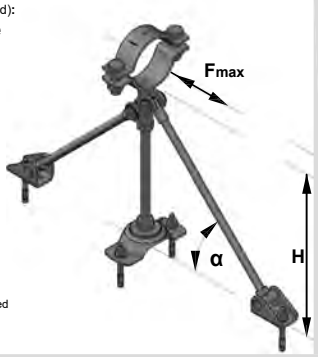
5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x85 10/-	2113978

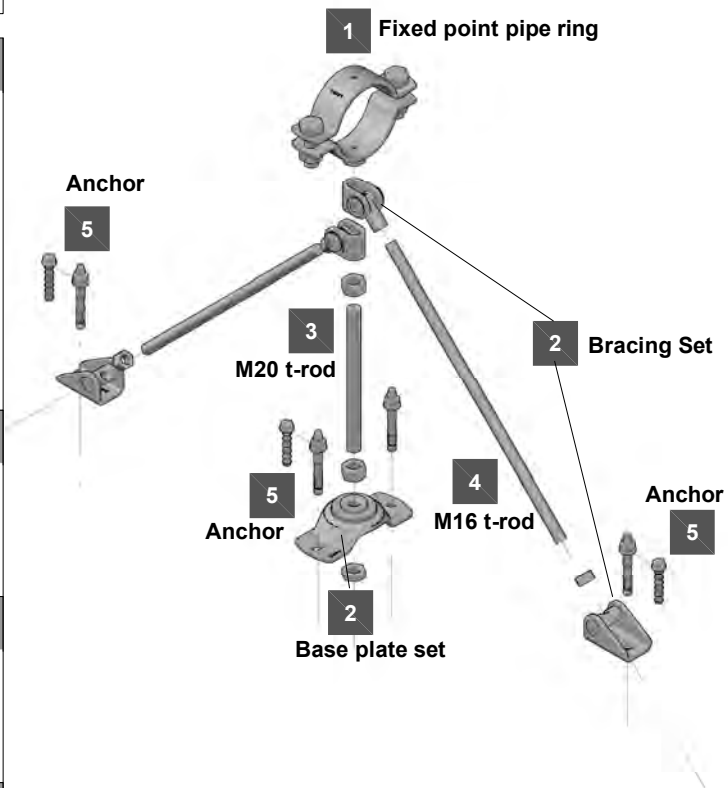
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 190
H_{max} = 500
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

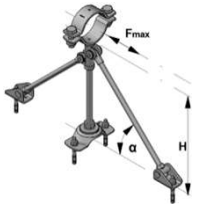
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





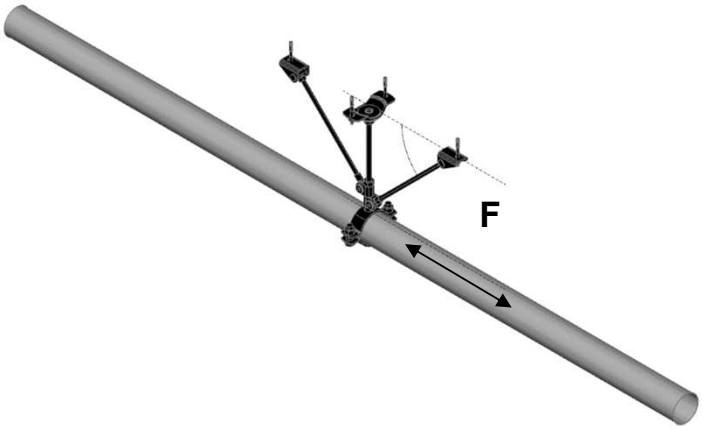
Application description	Application	Product lines	Base material
Heating - MFP-L2-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

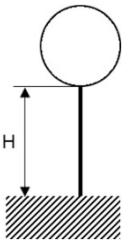
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-L2-I recommended loading capacity limits

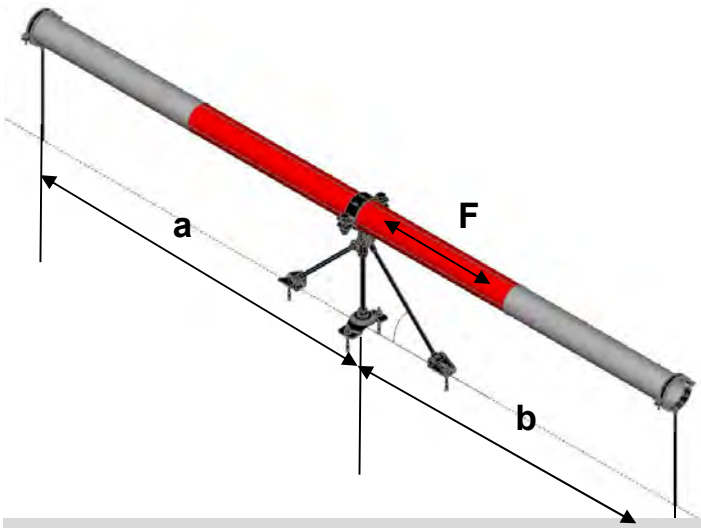
Hanging pipes - Recommended loading capacity

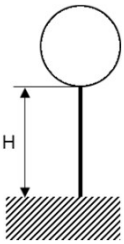




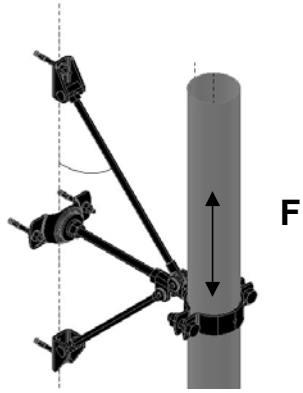
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

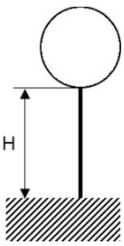
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





Fixed Point On Concrete - MFP-LD-I Fixed Point:

MFP-LD-I with sound insulation

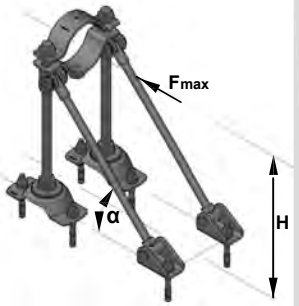
1		1	**MFP-PC** **Fixed Point Pipe Ring**
		1x	**MFP-PC 73-78 M20** **2227701** **MFP-PC 88-93 M20** **2227702** **MFP-PC 100-105 M20** **2227703** **MFP-PC 108-115 M20** **2227704** **MFP-PC 125-133 M20** **2227705** **MFP-PC 134-142 M20** **2227706** **MFP-PC 154-162 M20** **2227707** **MFP-PC 162-170 M20** **2227708** **MFP-PC 192-200 M20** **2227709** **MFP-PC 213-221 M20** **2227710** **MFP-PC 242-250 M20** **2227711** **MFP-PC 267-275 M20** **2227712** **MFP-PC 318-326 M20** **2227598**
2		2	**MFP-LD-I** **Fixed point set**
		1x	**MFP-LD-I fixed point set** **2223126** The set contain: 2x MFP-BR-I M16 bracing set 2x MFP-BP-I M20 base plate set
3		3	**M20 Base Threaded Rod**
		2x	**AM20x1000 4.8 threaded rod** **216425**
4		4	**M16 Bracing Threaded Rod**
		2x	**AM16x1000 4.8 threaded rod** **216422** **AM16x2000 4.8 threaded rod** **216423** **AM16x3000 4.8 threaded rod** **216424**
5		5	**Anchors**
		6x	**HUS3-H 10x90 35/15/5** **2079914** or **HST3 M12x85 10/-** **2113978**

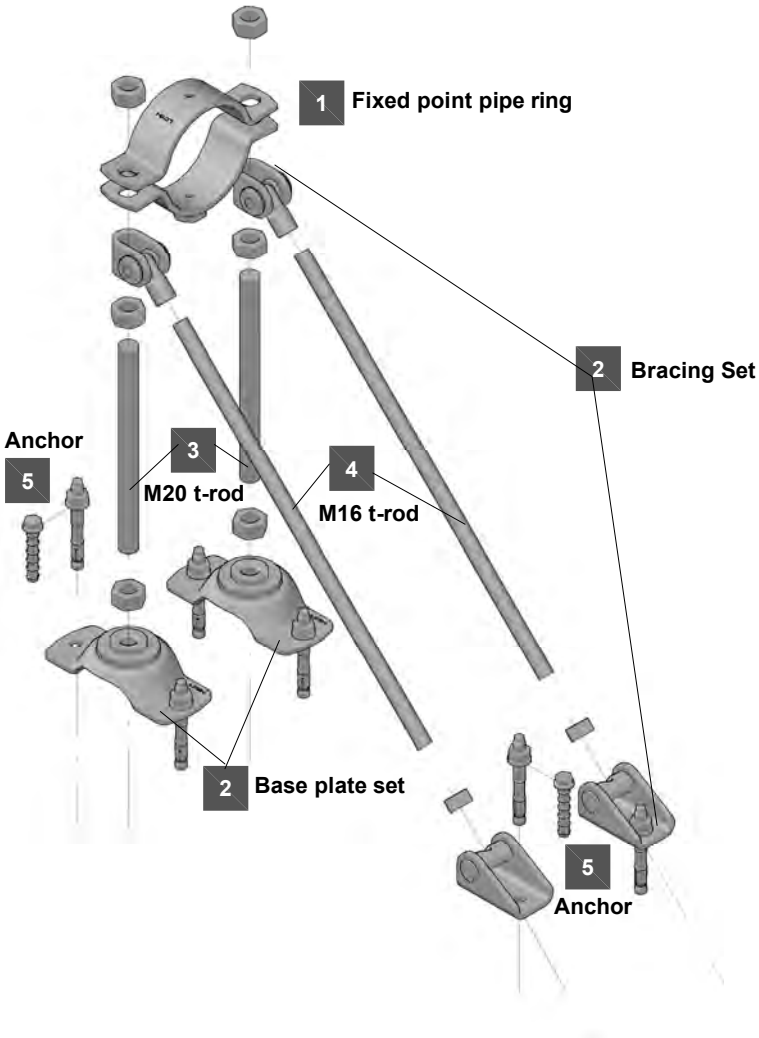
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 190 mm
H_{max} = 500 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

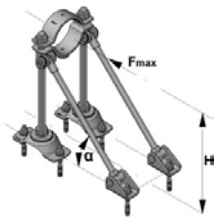
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



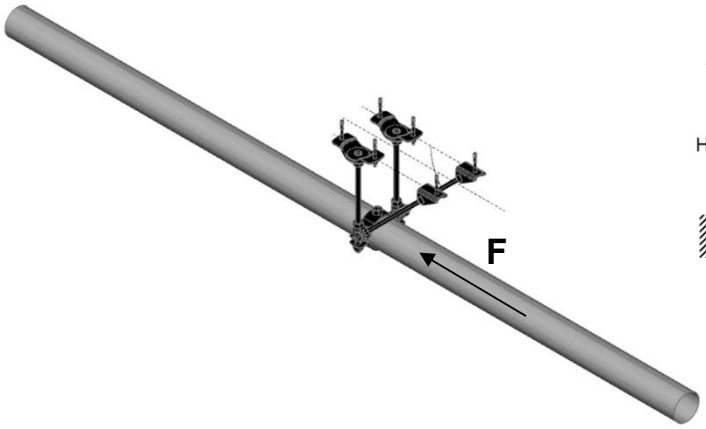


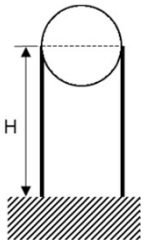
Application description	Application	Product lines	Base material
Heating - MFP-LD-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-LD-I recommended loading capacity limits

Hanging pipes - Recommended loading capacity

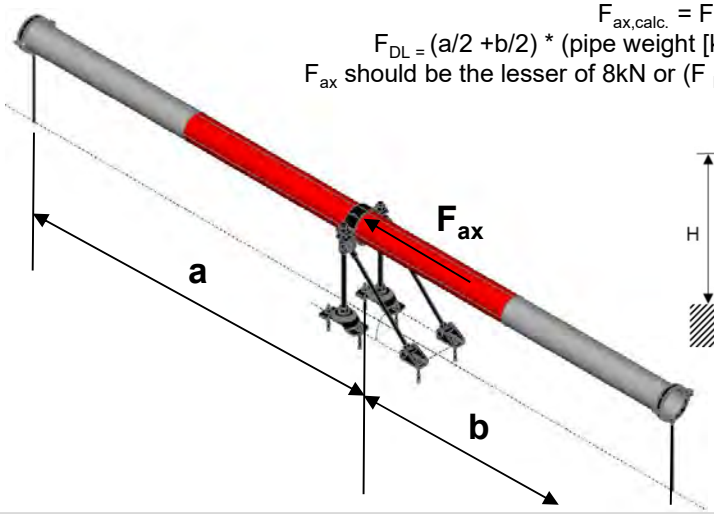


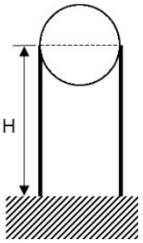


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

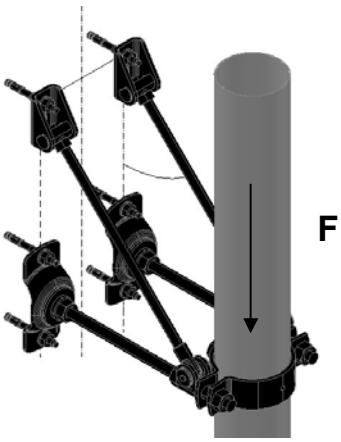
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or ($F_{B,max.} - F_{DL}$)

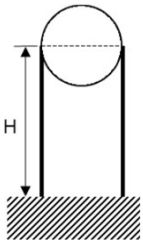




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Fixed Point On Concrete - MFP-LD2-I Fixed Point:

MFP-LD2-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP-LD2-IFixed point set	
1x	MFP-LD2-I fixed point set	2223128
The set contain:		
4x	MFP-BR-I M16 bracing set	
2x	MFP-BP-I M20 base plate set	

3

3	M20 Base Threaded Rod	
2x	AM20x1000 4.8 threaded rod	216425

4

4	M16 Bracing Threaded Rod	
4x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

5	Anchors	
8x	HUS3-H 10x90 35/15/5	2079914
or		
8x	HST3 M12x85 10/-	2113978

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 190

H_{max} = 500

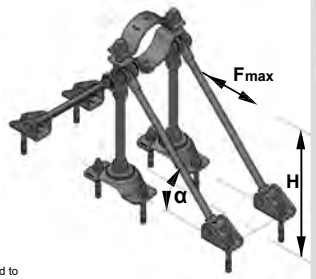
Height from base material to center of the pipe

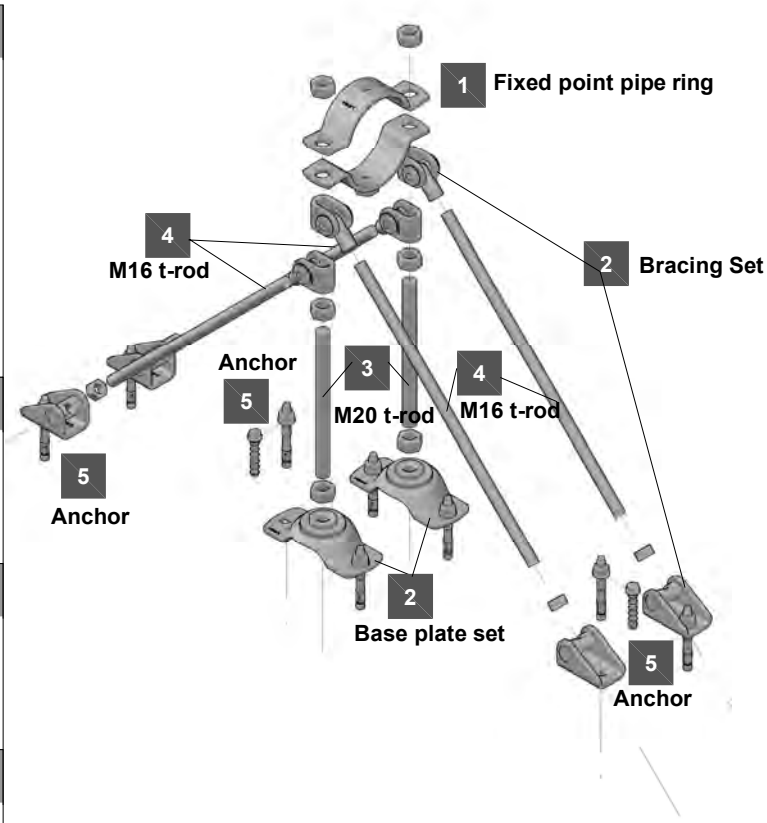
α_{min} = 35°

α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

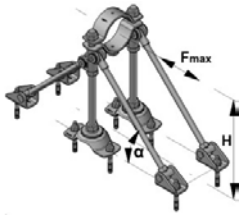
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





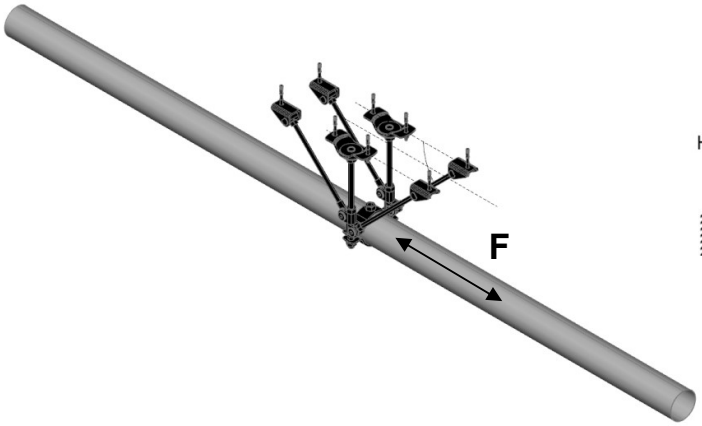
Application description	Application	Product lines	Base material
Heating - MFP-LD2-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

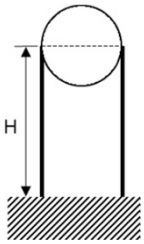
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-LD2-I recommended loading capacity limits

Hanging pipes - Recommended loading capacity

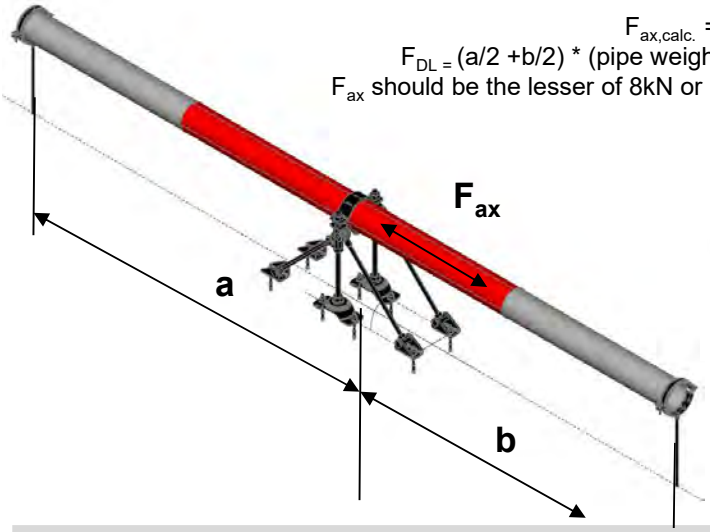


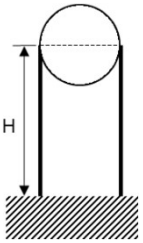


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

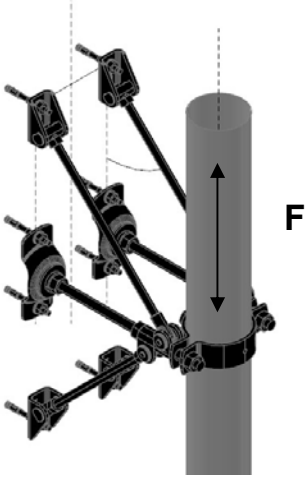
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or $(F_{B,max.} - F_{DL})$

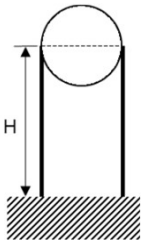




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Fixed Point On Concrete - MFP-UL Fixed Point:

MFP-UL without sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2

2	MFP-UL Fixed point set	
1x	MFP-UL set	2223129

The set contains:
1x MFP-BR M16 bracing set
1x MFP-BPA 1 ¼ base plate adapter set

3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
1x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

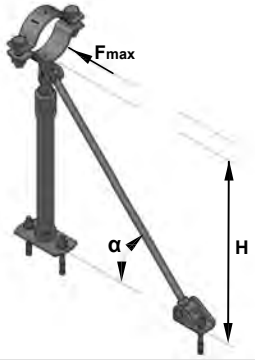
5	Anchors	
3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978

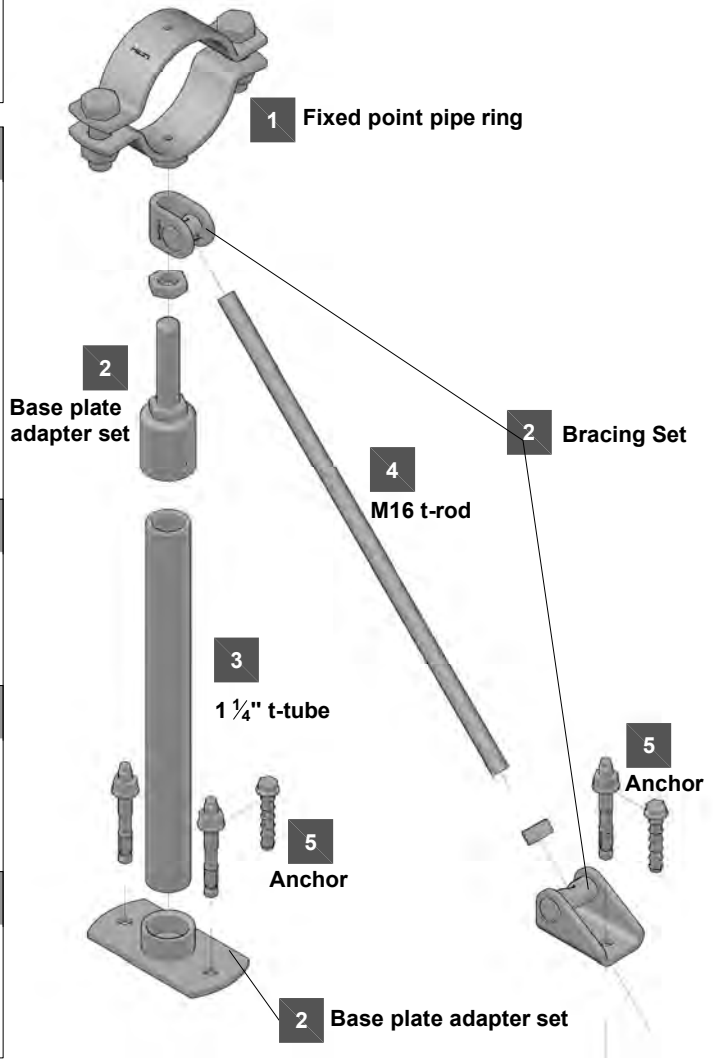
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

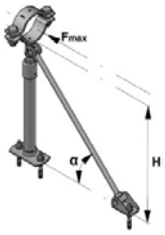
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





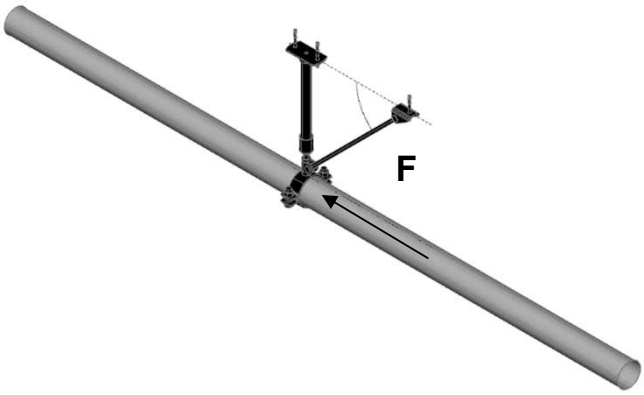
Application description	Application	Product lines	Base material
Heating - MFP-UL fixed point	11	Fixed point sets	Concrete
		Threaded parts	

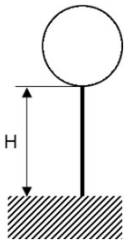
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



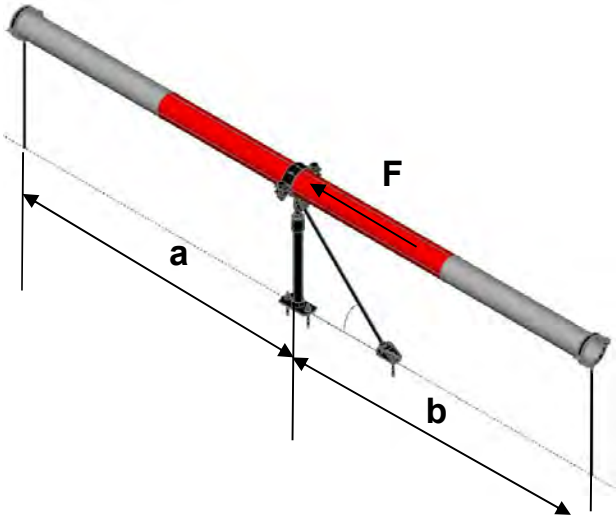
MFP-UL recommended loading capacity limits

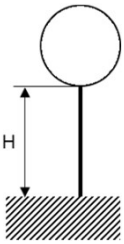
Hanging pipes - Recommended loading capacity



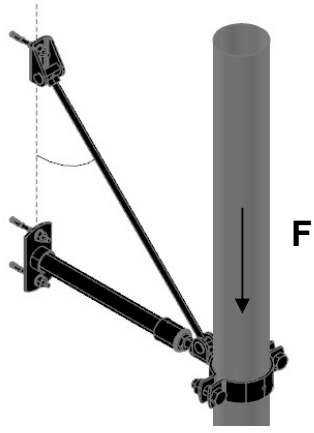


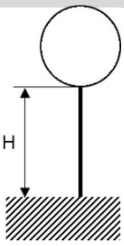
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

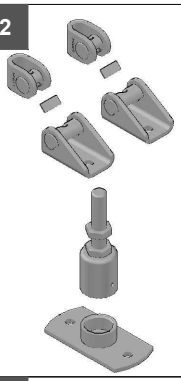
Fixed Point On Concrete - MFP-UL2 Fixed Point:

MFP-UL2 without sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2



2	MFP-UL2 Fixed point set	
1x	MFP-UL2 set	2223131

The set contains:
2x MFP-BR M16 bracing set
1x MFP-BPA 1 ¼ base plate adapter set

3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914

or

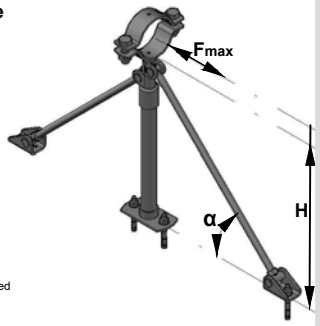
4x	HST3 M12x85 10/-	2113978

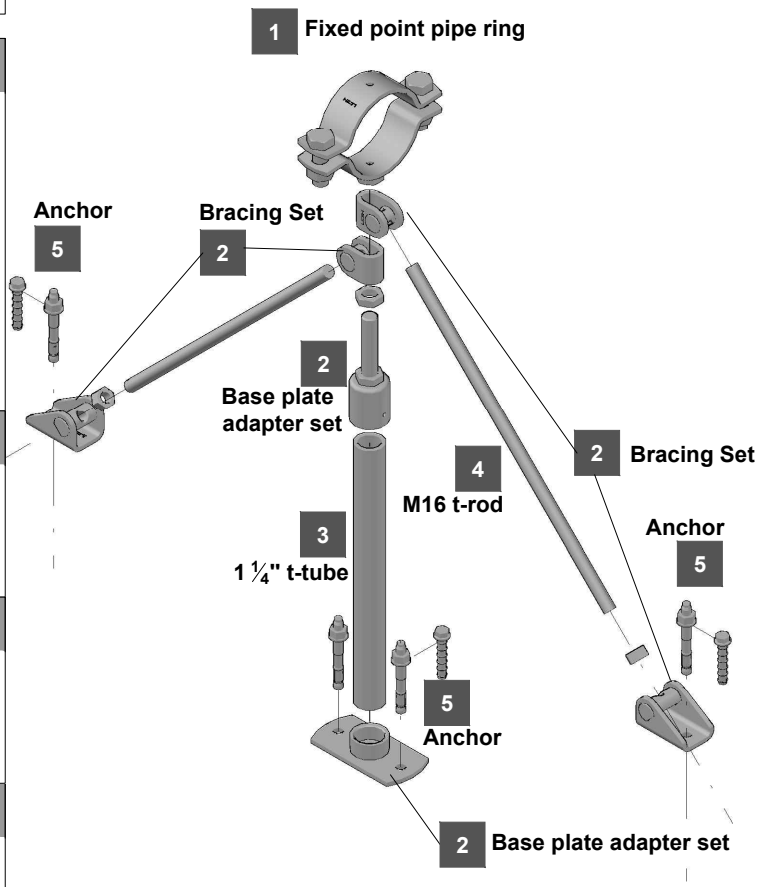
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 225 mm
H_{max} = 2000 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

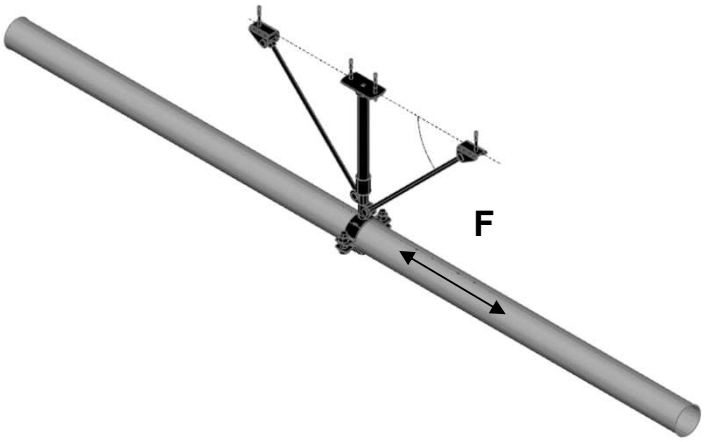


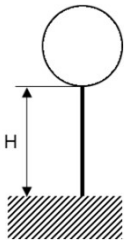


Application description	Application	Product lines	Base material
Heating - MFP-UL2 fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

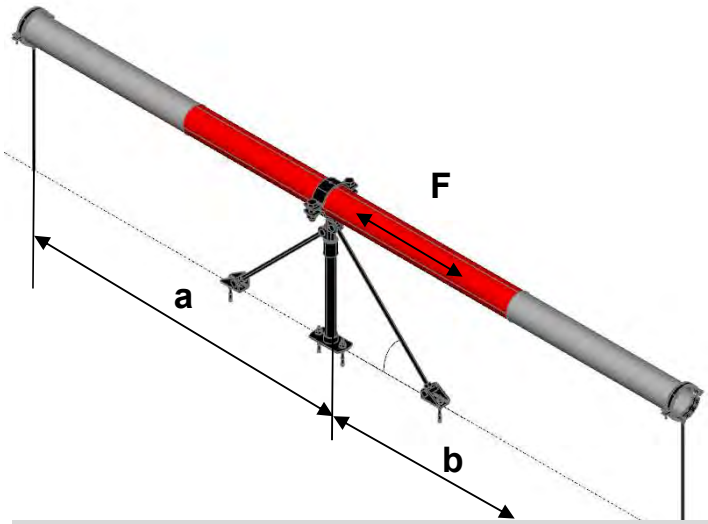
MFP-UL2 recommended loading capacity limits

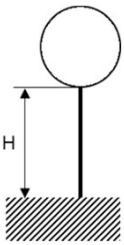
Hanging pipes - Recommended loading capacity



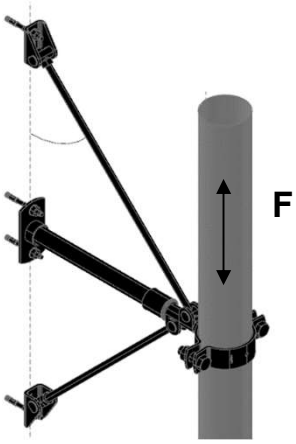


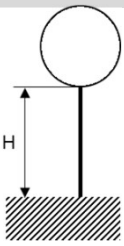
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

Fixed Point On Concrete - MFP-ULD Fixed Point:

MFP-ULD without sound insulation

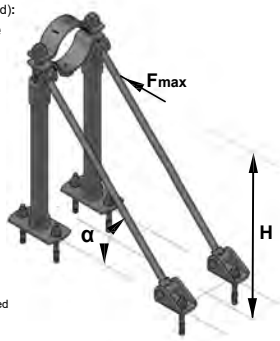
1		1	**MFP-PC Fixed Point Pipe Ring**
		1x	**MFP-PC 73-78 M20** 2227701
			MFP-PC 88-93 M20 2227702
			MFP-PC 100-105 M20 2227703
			MFP-PC 108-115 M20 2227704
			MFP-PC 125-133 M20 2227705
			MFP-PC 134-142 M20 2227706
			MFP-PC 154-162 M20 2227707
			MFP-PC 162-170 M20 2227708
			MFP-PC 192-200 M20 2227709
			MFP-PC 213-221 M20 2227710
			MFP-PC 242-250 M20 2227711
			MFP-PC 267-275 M20 2227712
			MFP-PC 318-326 M20 2227598
2		2	**MFP-ULD Fixed point set**
		1x	**MFP-ULD set** 2223130
			The set contains:
		2x	MFP-BR M16 bracing set
		2x	MFP-BPA 1 ¼ base plate adapter set
3		3	**1 ¼" Threaded Tube**
		2x	**GR-G 1 ¼"x 2000 4.6 threaded tube** 248532
4		4	**M16 Bracing Threaded Rod**
		2x	**AM16x1000 4.8 threaded rod** 216422
			AM16x2000 4.8 threaded rod 216423
			AM16x3000 4.8 threaded rod 216424
5		5	**Anchors**
		6x	**HUS3-H 10x90 35/15/5** 2079914
			or
		6x	**HST3 M12x85 10/-** 2113978

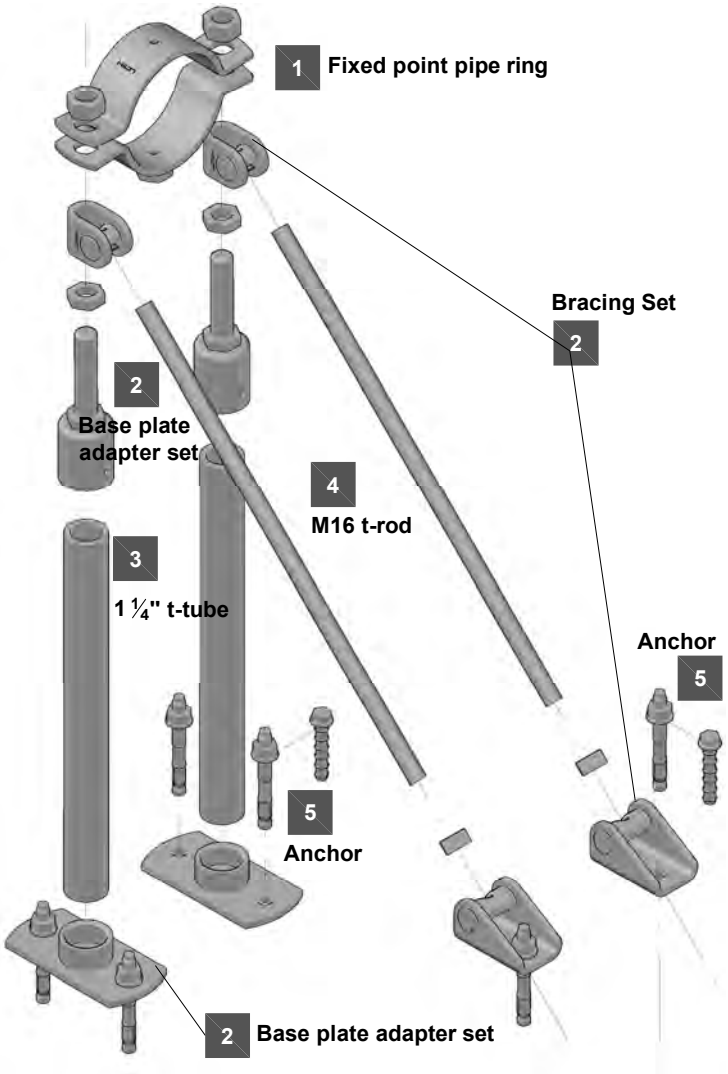
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

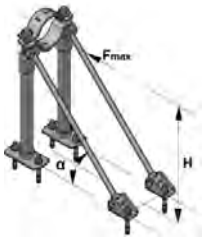
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



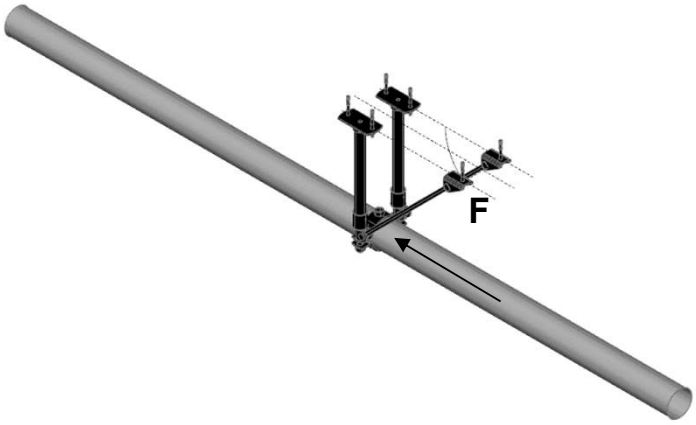


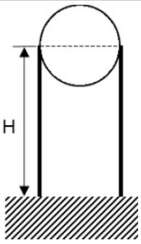
Application description	Application	Product lines	Base material
Heating - MFP-ULD fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



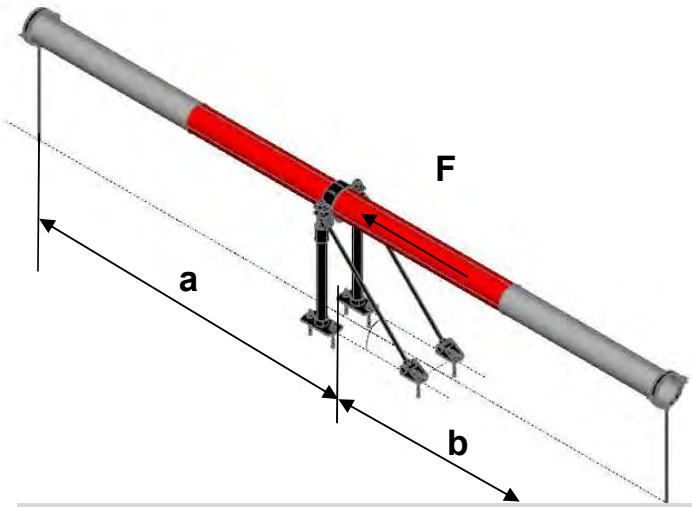
MFP-ULD recommended loading capacity limits

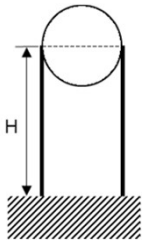
Hanging pipes - Recommended loading capacity



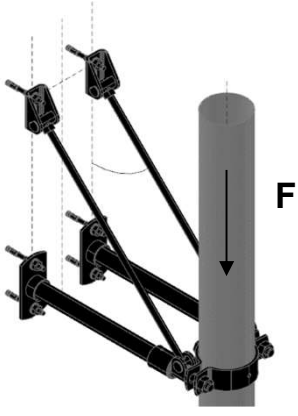


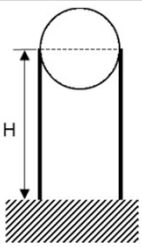
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Fixed Point On Concrete - MFP-ULD2 Fixed Point:

MFP-ULD2 without sound insulation

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

L_{min} = 225 mm

L_{max} = 2000 mm

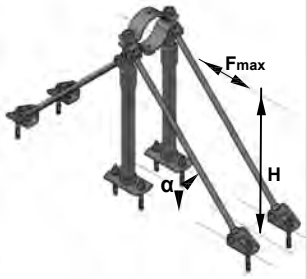
Height from base material to center of the pipe

α_{min} = 35°

α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 MFP-PC Fixed Point Pipe Ring

1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2 MFP-ULD2 Fixed point set

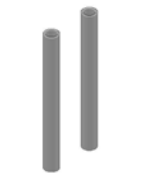
1x MFP-ULD2 set 2223132

The set contains:

4x MFP-BR M16 bracing set

2x MFP-BPA 1 ¼ base plate adapter set

3 1 ¼" Threaded Tube



2x GR-G 1 ¼"x 2000 4.6 threaded tube 248532

4 M16 Bracing Threaded Rod

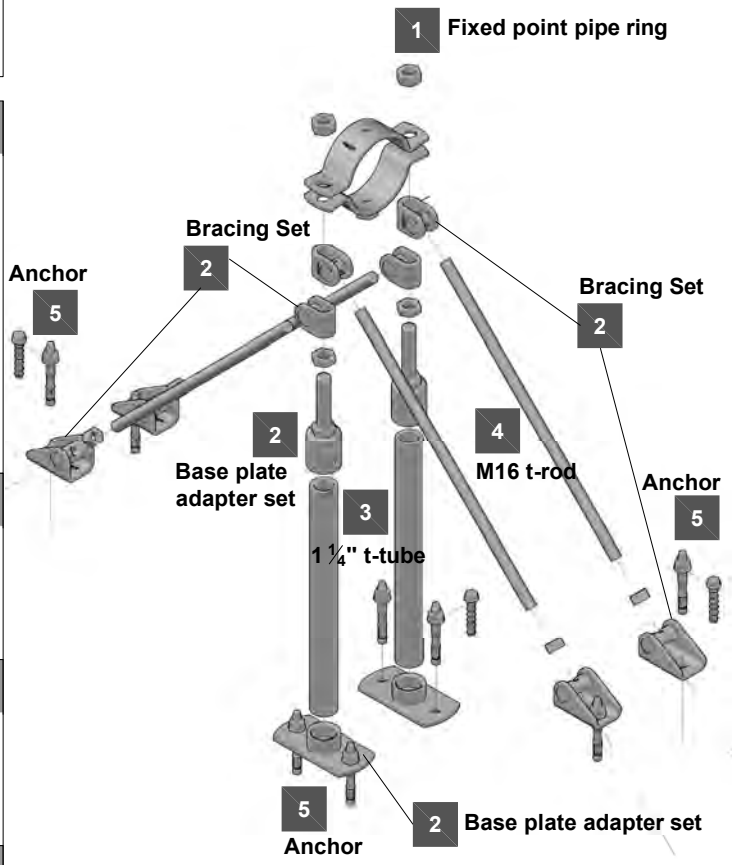
4x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5 Anchors

8x HUS3-H 10x90 35/15/5 2079914

or

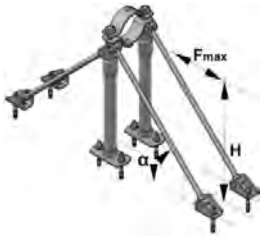
8x HST3 M12x85 10/- 2113978



Application description	Application	Product lines	Base material
Heating - MFP-ULD2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

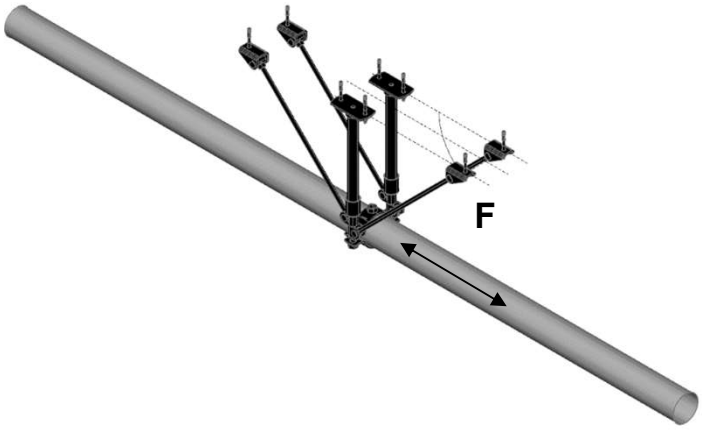
General comments

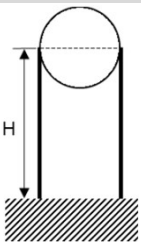
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



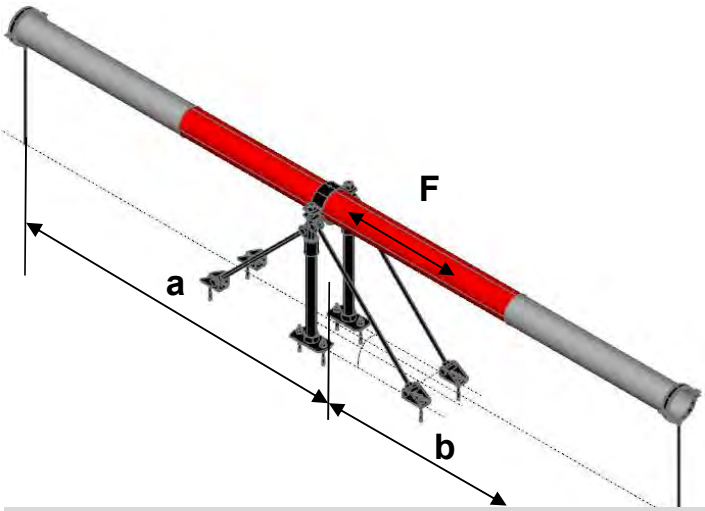
MFP-ULD2 recommended loading capacity limits

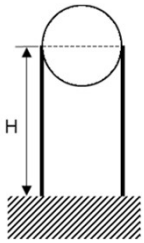
Hanging pipes - Recommended loading capacity



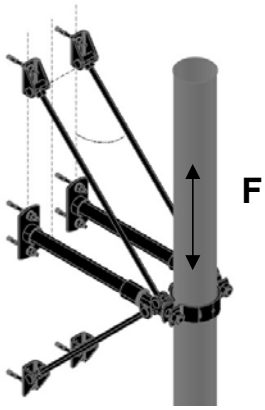


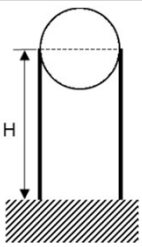
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Fixed Point On Concrete - MFP - UM Fixed Point:

MFP-UM without sound insulation

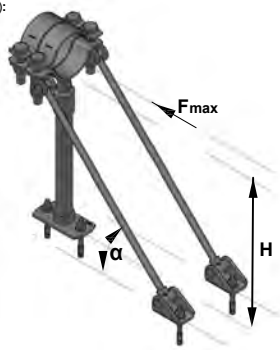
1		1	**MFP-PC Fixed Point Pipe Ring**
		2x	**MFP-PC 73-78 M20** 2227701
			MFP-PC 88-93 M20 2227702
			MFP-PC 100-105 M20 2227703
			MFP-PC 108-115 M20 2227704
			MFP-PC 125-133 M20 2227705
			MFP-PC 134-142 M20 2227706
			MFP-PC 154-162 M20 2227707
			MFP-PC 162-170 M20 2227708
			MFP-PC 192-200 M20 2227709
			MFP-PC 213-221 M20 2227710
			MFP-PC 242-250 M20 2227711
			MFP-PC 267-275 M20 2227712
			MFP-PC 318-326 M20 2227598
2		2	**MFP - UM Fixed point set**
		1x	**MFP-UM set** 2238272
			The set contains:
			2x MFP-BR M16 bracing set
			1x MFP-BPA 1 ¼ base plate adapter set
			1x MFP-PCA adapter
3		3	**1 ¼" Threaded Tube**
		1x	**GR-G 1 ¼"x 2000 4.6 threaded tube** 248532
4		4	**M16 Bracing Threaded Rod**
		2x	**AM16x1000 4.8 threaded rod** 216422
			AM16x2000 4.8 threaded rod 216423
			AM16x3000 4.8 threaded rod 216424
5		5	**Anchors**
		4x	**HUS3-H 10x110 55/35/25** 2079916
			or
		4x	**HST3 M12/105 30/10** 2105718

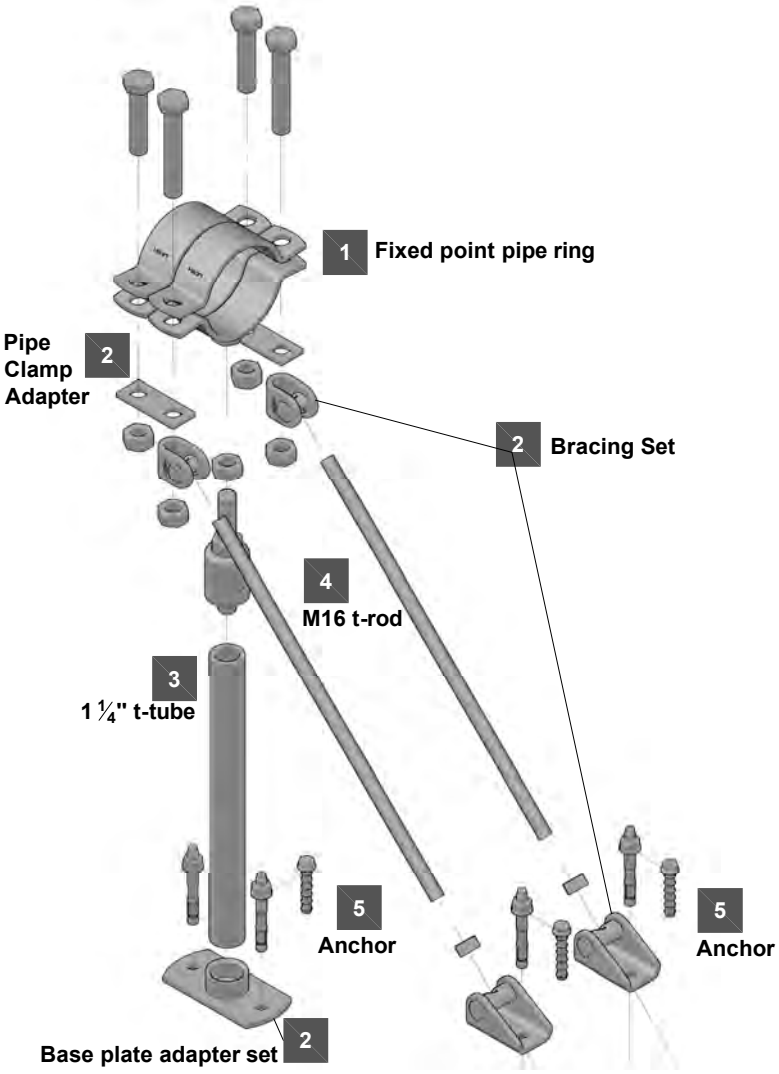
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 175mm
H_{max} = 2000mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

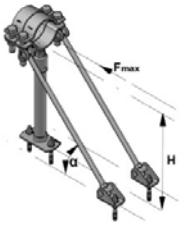
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



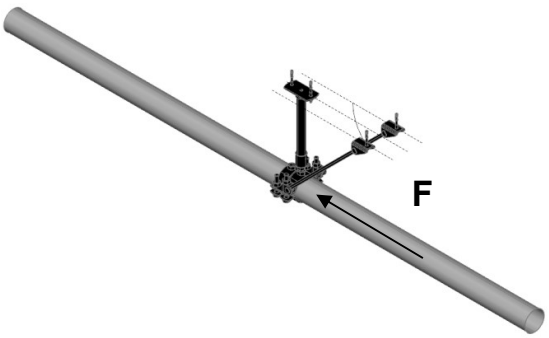


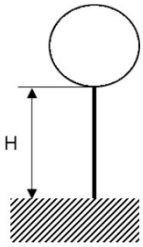
Application description	Application	Product lines	Base material
Heating - MFP-UM fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



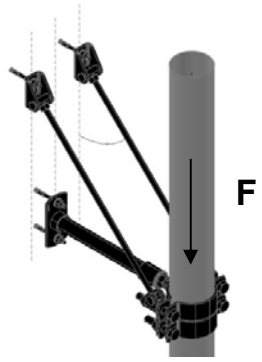
MFP-UM recommended loading capacity limits

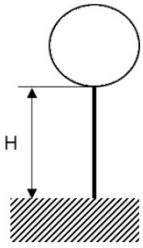
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





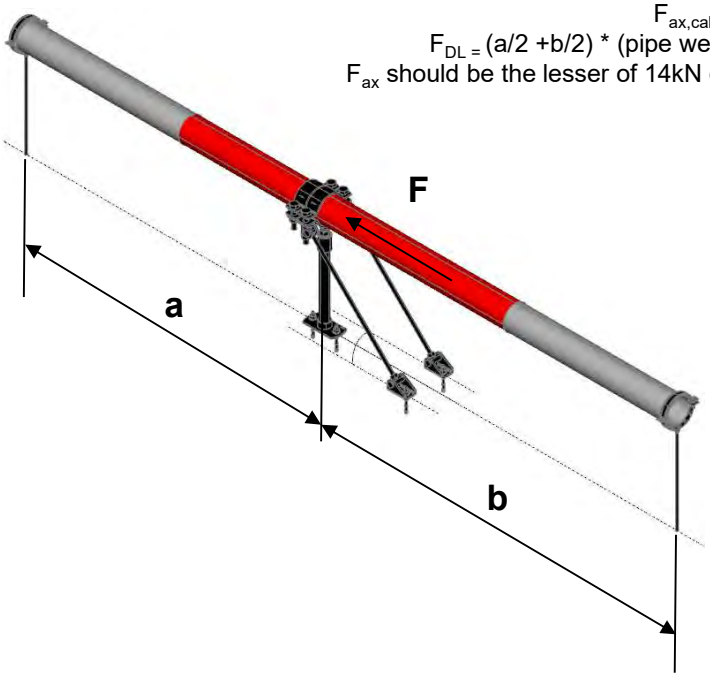
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

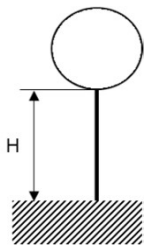
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	F_{ax}	9.095
1600	F_{ax}	8.401
1750	F_{ax}	7.512
1800	F_{ax}	7.249
1900	F_{ax}	6.767
2000	F_{ax}	6.334

Fixed Point On Concrete - MFP - UM2 Fixed Point:

MFP-UM2 without sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
2x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP - UM2 Fixed point set	
1x	MFP-UM2 set	2238273

The set contains:

- 4x MFP-BR M16 bracing set
- 1x MFP-BPA 1 ¼ base plate adapter set
- 2x MFP-PCA adapter

3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
4x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

5	Anchors	
6x	HUS3-H 10x110 55/35/25	2079916
or		
6	HST3 M12/105 30/10	2105718

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 175mm

H_{max} = 2000mm

height above ground to base of pipe

α_{min} = 35°

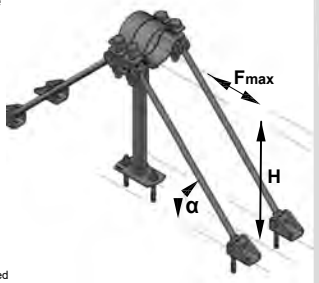
α_{max} = 45°

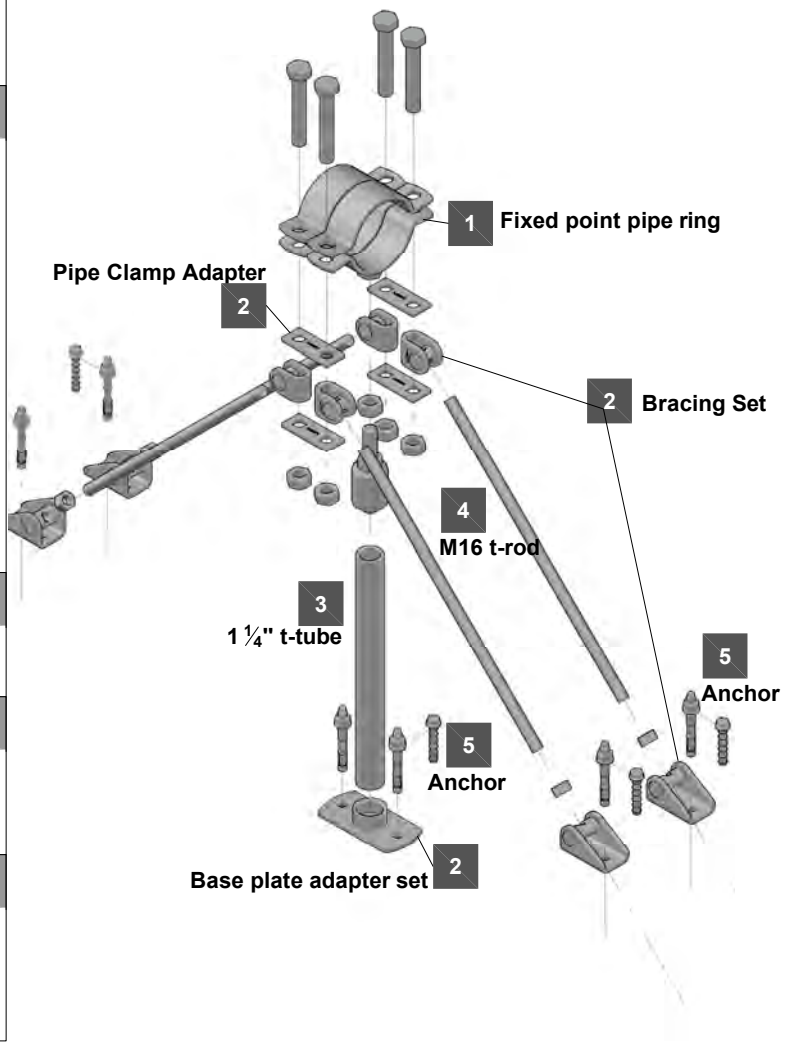
Validity of the capacity limits:

- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:

- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





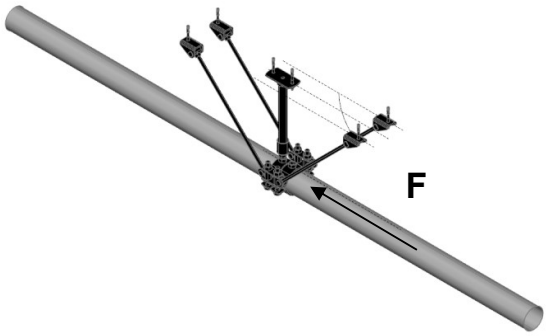
Application description	Application	Product lines	Base material
Heating - MFP-UM2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

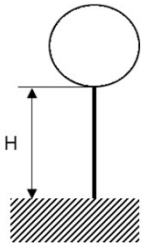
General comments

- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

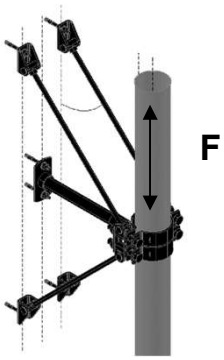
MFP-UM2 recommended loading capacity limits

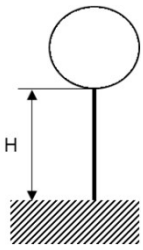
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





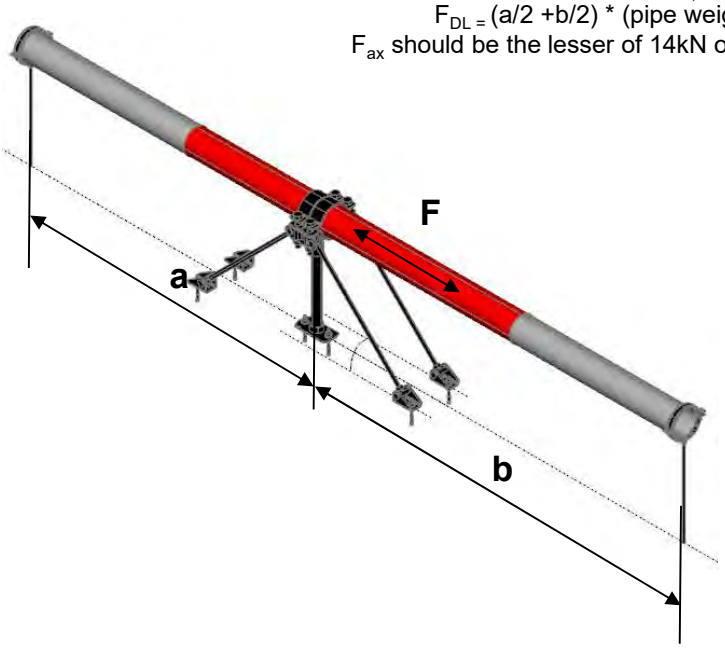
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

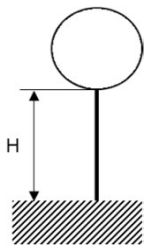
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or ($F_{B,max.} - F_{DL}$)

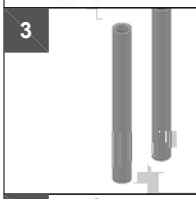
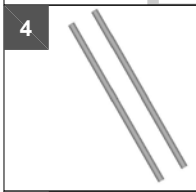


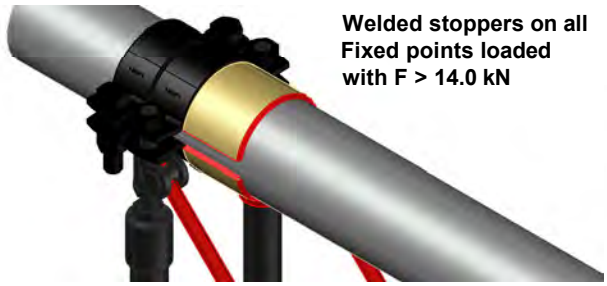


H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	F_{ax}	9.095
1600	F_{ax}	8.401
1750	F_{ax}	7.512
1800	F_{ax}	7.249
1900	F_{ax}	6.767
2000	F_{ax}	6.334

Fixed Point On Concrete - MFP-UHD Fixed Point:

MFP-UHD without sound insulation

1		1	**MFP-PC Fixed Point Pipe Ring**
		2x	MFP-PC 73-78 M20 — 2227701
			MFP-PC 88-93 M20 — 2227702
			MFP-PC 100-105 M20 — 2227703
			MFP-PC 108-115 M20 — 2227704
			MFP-PC 125-133 M20 — 2227705
			MFP-PC 134-142 M20 — 2227706
			MFP-PC 154-162 M20 — 2227707
			MFP-PC 162-170 M20 — 2227708
			MFP-PC 192-200 M20 — 2227709
			MFP-PC 213-221 M20 — 2227710
			MFP-PC 242-250 M20 — 2227711
			MFP-PC 267-275 M20 — 2227712
			MFP-PC 318-326 M20 — 2227598
2		2	**MFP-UHD Fixed point set**
		1x	**MFP-UHD set** — 2223138
			The set contains:
			2x MFP-BRH M16 bracing set
			2x MFP-BPA 1 ¼ base plate adapter set
			1x MFP-PCA M20 adapter
3		3	**1 ¼" Threaded Tube**
		2x	**GR-G 1 ¼"x 2000 4.6 threaded tube** — 248532
4		4	**M16 Bracing Threaded Rod**
		2x	**AM16x1000 4.8 threaded rod** — 216422
			AM16x2000 4.8 threaded rod — 216423
			AM16x3000 4.8 threaded rod — 216424
5		5	**Anchors**
		4x	**HUS3-H 10x110 55/35/25** — 2079916
		4x	**HUS3-H 14x130 65/45/15** — 2079923
			or
		4x	**HST3 M12/105 30/10** — 2105718
		4x	**HST3 M16x135 35/15** — 2105858



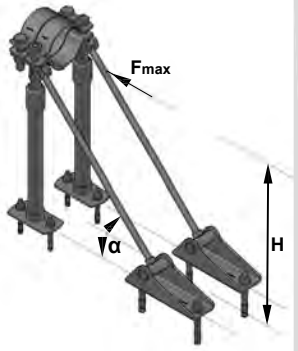
Welded stoppers on all Fixed points loaded with F > 14.0 kN

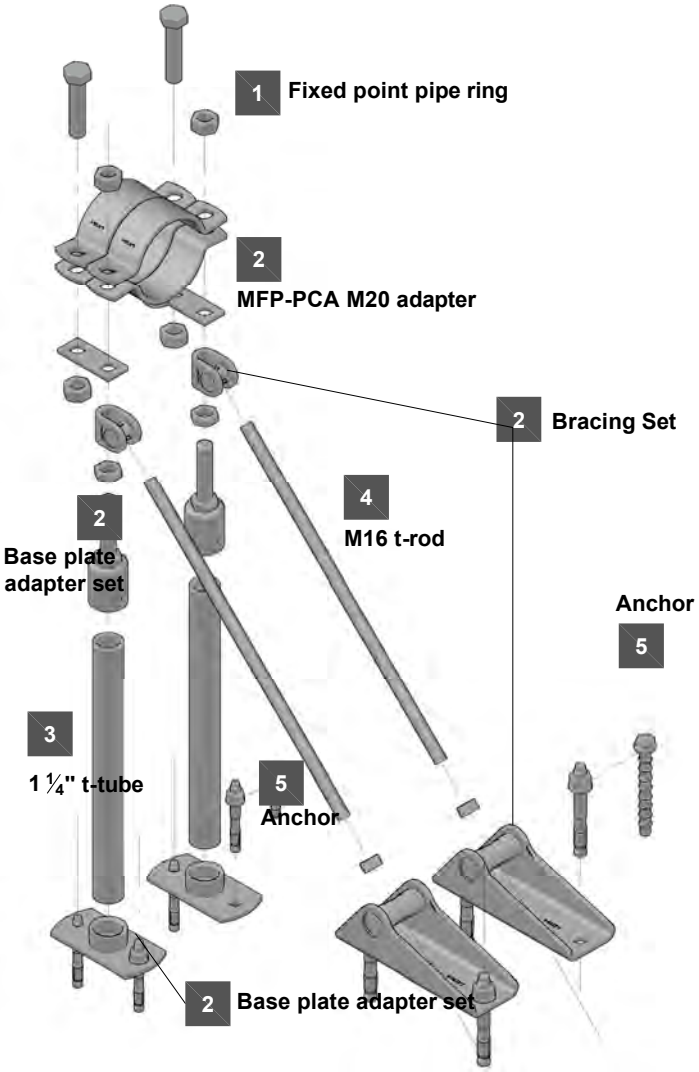
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 200 mm
H_{max} = 2000 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

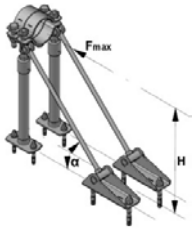
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



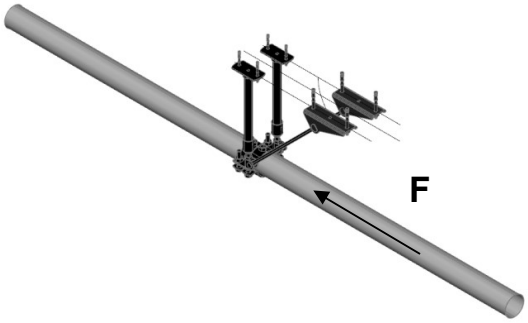


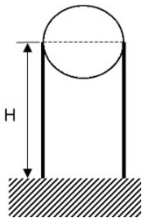
Application description	Application	Product lines	Base material
Heating - MFP-UHD fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



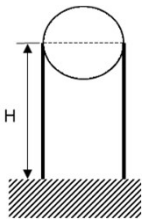
MFP-UHD recommended loading capacity limits

Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity



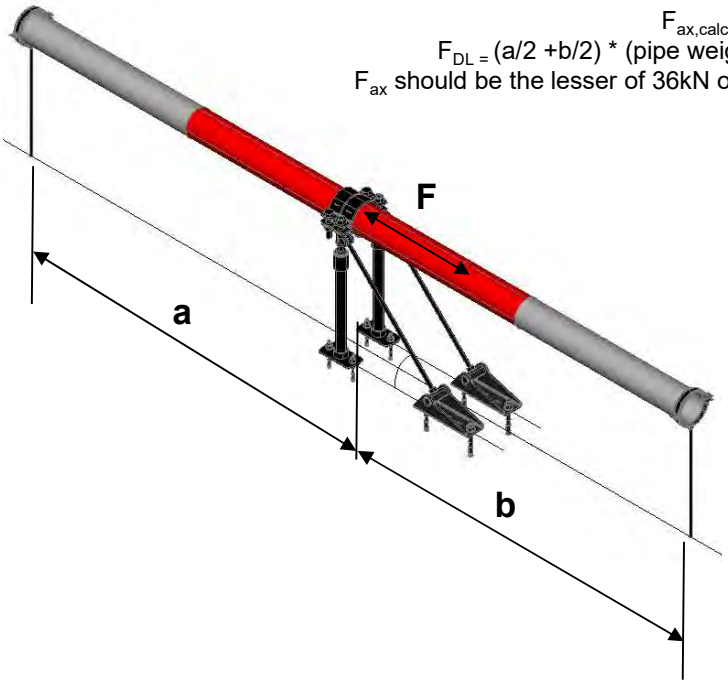
H [mm] up to	F [kN]
0	36.000
500	36.000
550	36.000
600	36.000
650	36.000
700	36.000
750	36.000
800	36.000
850	34.953
900	32.850
950	30.953
1000	29.235
1100	26.247
1200	23.739
1250	22.632
1300	21.608
1400	19.777
1500	18.190
1600	16.803
1750	15.024
1800	14.499
1900	13.534
2000	12.669

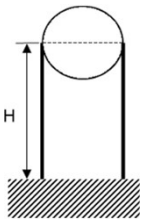
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 36kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	36.000	
500	36.000	
550	36.000	
600	36.000	
650	36.000	
700	36.000	
750	F_{ax}	39.928
800	F_{ax}	37.299
850	F_{ax}	34.953
900	F_{ax}	32.850
950	F_{ax}	30.953
1000	F_{ax}	29.235
1100	F_{ax}	26.247
1200	F_{ax}	23.739
1250	F_{ax}	22.632
1300	F_{ax}	21.608
1400	F_{ax}	19.777
1500	F_{ax}	18.190
1600	F_{ax}	16.803
1750	F_{ax}	15.024
1800	F_{ax}	14.499
1900	F_{ax}	13.534
2000	F_{ax}	12.669

Fixed Point On Concrete - MFP-UHD2 Fixed Point:

MFP-UHD2 without sound insulation

1		1	**MFP-PC Fixed Point Pipe Ring**
		2x	**MFP-PC 73-78 M20** 2227701
			MFP-PC 88-93 M20 2227702
			MFP-PC 100-105 M20 2227703
			MFP-PC 108-115 M20 2227704
			MFP-PC 125-133 M20 2227705
			MFP-PC 134-142 M20 2227706
			MFP-PC 154-162 M20 2227707
			MFP-PC 162-170 M20 2227708
			MFP-PC 192-200 M20 2227709
			MFP-PC 213-221 M20 2227710
			MFP-PC 242-250 M20 2227711
			MFP-PC 267-275 M20 2227712
			MFP-PC 318-326 M20 2227598
2		2	**MFP-UHD2 Fixed point set**
		1x	**MFP-UHD2 set** 2223139
			The set contains:
			4x MFP-BRH M16 bracing set
			2x MFP-BPA 1 ¼ base plate adapter set
			2x MFP-PCA M20 adapter
3		3	**1 ¼" Threaded Tube**
		2x	**GR-G 1 ¼"x 2000 4.6 threaded tube** 248532
4		4	**M16 Bracing Threaded Rod**
		4x	**AM16x1000 4.8 threaded rod** 216422
			AM16x2000 4.8 threaded rod 216423
			AM16x3000 4.8 threaded rod 216424
5		5	**Anchors**
		4x	**HUS3-H 10x110 55/35/25** 2079916
		8x	**HUS3-H 14x130 65/45/15** 2079923
			or
		4x	**HST3 M12x85 10/-** 2113978
		8x	**HST3 M16x135 35/15** 2105858

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 200 mm

L_{max} = 2000 mm

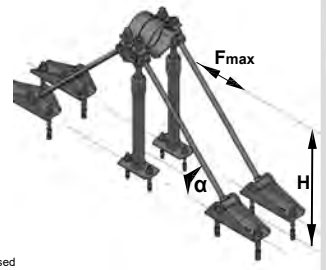
Height from base material to center of the pipe

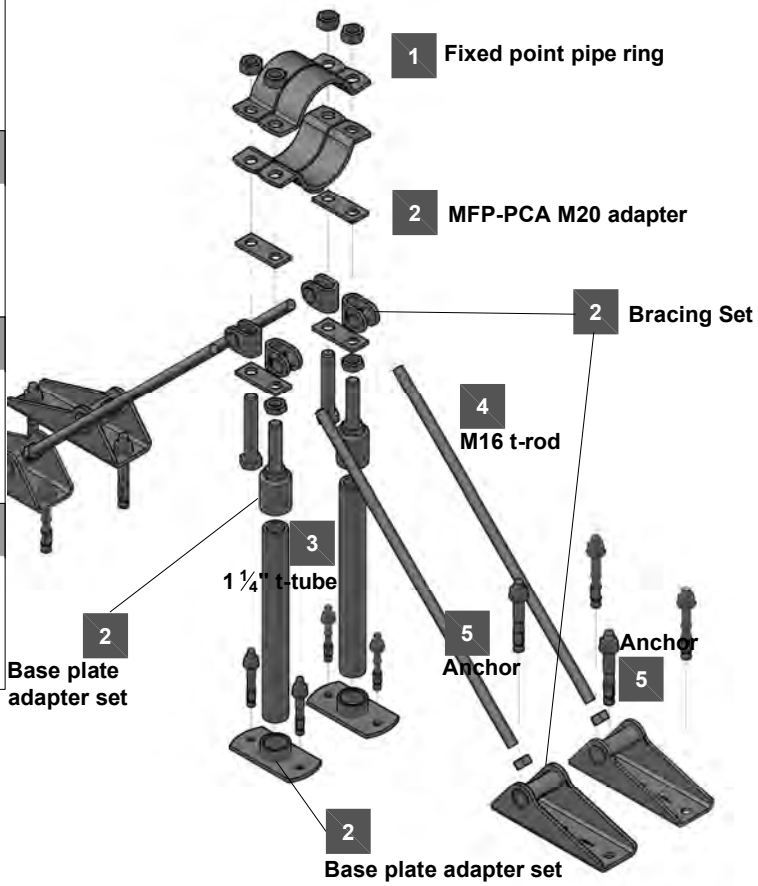
α_{min} = 35°

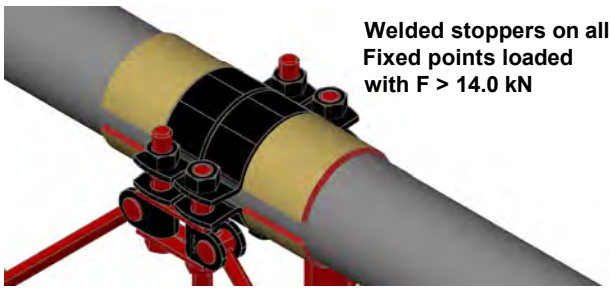
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

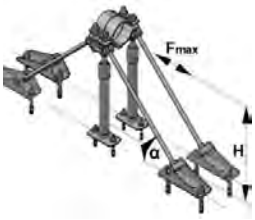






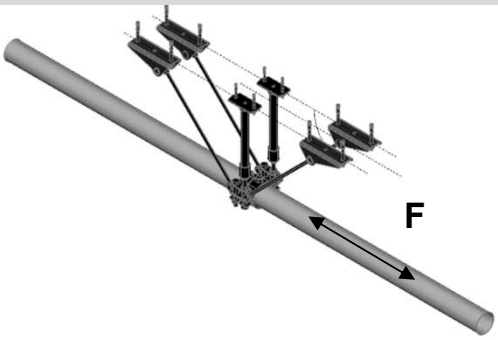
Welded stoppers on all Fixed points loaded with F > 14.0 kN

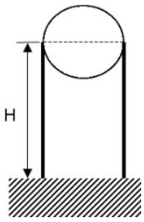
Application description	Application	Product lines	Base material
Heating - MFP-UHD2 fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact			
• Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



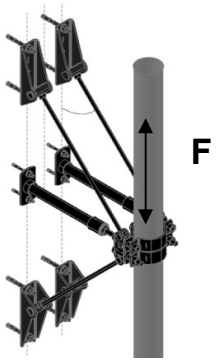
MFP-UHD2 recommended loading capacity limits

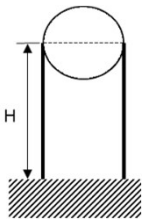
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





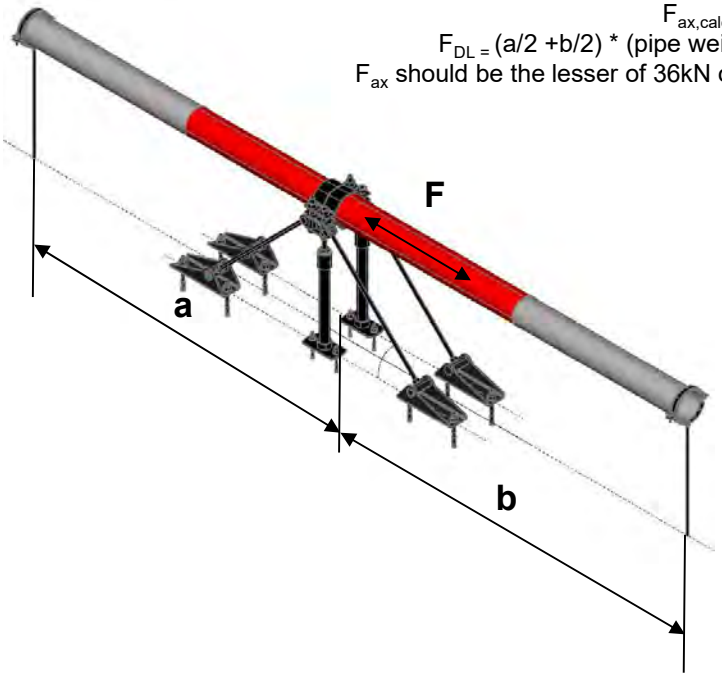
H [mm] up to	F [kN]
0	36.000
500	36.000
550	36.000
600	36.000
650	36.000
700	36.000
750	36.000
800	36.000
850	34.953
900	32.850
950	30.953
1000	29.235
1100	26.247
1200	23.739
1250	22.632
1300	21.608
1400	19.777
1500	18.190
1600	16.803
1750	15.024
1800	14.499
1900	13.534
2000	12.669

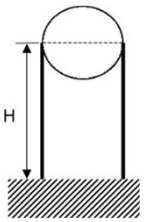
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 36kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	36.000	
500	36.000	
550	36.000	
600	36.000	
650	36.000	
700	36.000	
750	F_{ax}	39.928
800	F_{ax}	37.299
850	F_{ax}	34.953
900	F_{ax}	32.850
950	F_{ax}	30.953
1000	F_{ax}	29.235
1100	F_{ax}	26.247
1200	F_{ax}	23.739
1250	F_{ax}	22.632
1300	F_{ax}	21.608
1400	F_{ax}	19.777
1500	F_{ax}	18.190
1600	F_{ax}	16.803
1750	F_{ax}	15.024
1800	F_{ax}	14.499
1900	F_{ax}	13.534
2000	F_{ax}	12.669

Fixed Point On Concrete - MFP-UL-I Fixed Point:

MFP-UL-I with sound insulation

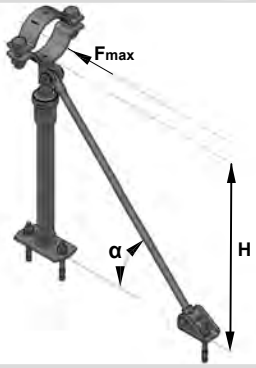
1		1	MFP-PC Fixed Point Pipe Ring
		1x	MFP-PC 21-22 M20 2227599 MFP-PC 25-27 M20 2227690 MFP-PC 28-30 M20 2227691 MFP-PC 31-33 M20 2227692 MFP-PC 33.5-36 M20 2227693 MFP-PC 39-41 M20 2227694 MFP-PC 42-45 M20 2227695 MFP-PC 47-50 M20 2227696 MFP-PC 53-56 M20 2227697 MFP-PC 57-61 M20 2227698 MFP-PC 62-66 M20 2227699 MFP-PC 68-72 M20 2227700 MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704 MFP-PC 125-133 M20 2227705 MFP-PC 134-142 M20 2227706
2		2	MFP-UL-I Fixed point set
		1x	MFP-UL-I set 2223133 The set contains: 1x MFP-BR M16 bracing set 1x MFP-BPA-I 1 ¼ base plate adapter set
3		3	1 ¼" Threaded Tube
		1x	GR-G 1 ¼"x 2000 4.6 threaded tube 248532
4		4	M16 Bracing Threaded Rod
		1x	AM16x1000 4.8 threaded rod 216422 AM16x2000 4.8 threaded rod 216423 AM16x3000 4.8 threaded rod 216424
5		5	Anchors
		3x	HUS3-H 10x90 35/15/5 2079914 or 3x HST3 M12x85 10/- 2113978

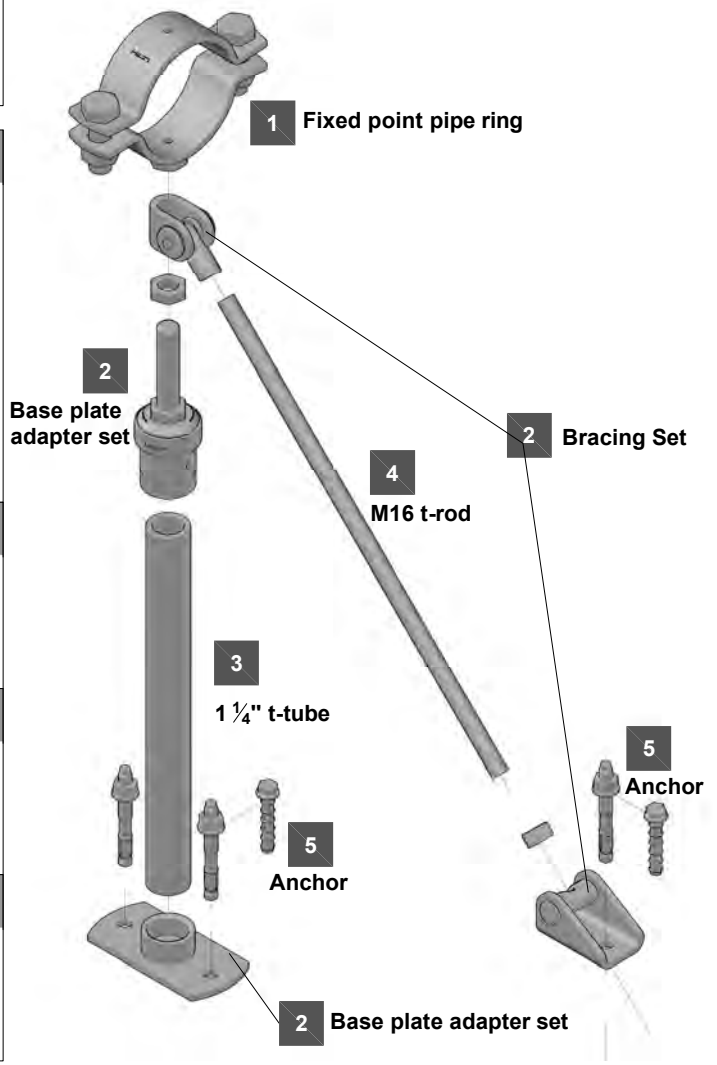
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

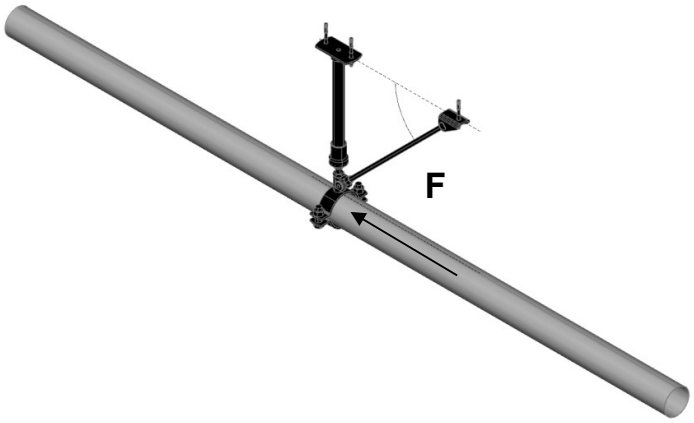


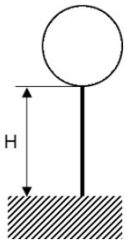


Application description	Application	Product lines	Base material
Heating - MFP-UL-I fixed point		Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

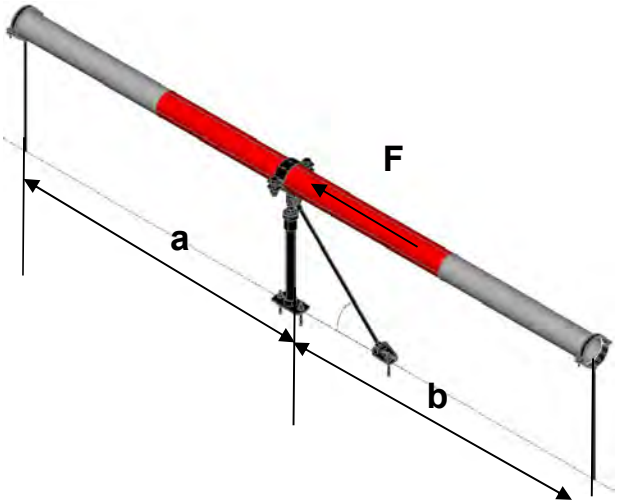
MFP-UL-I recommended loading capacity limits

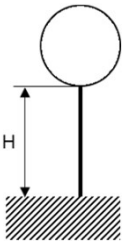
Hanging pipes - Recommended loading capacity



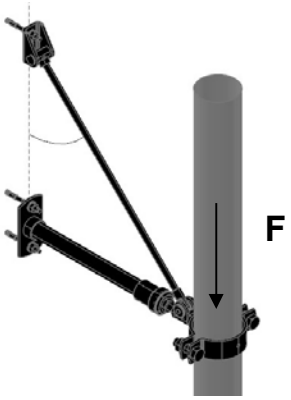


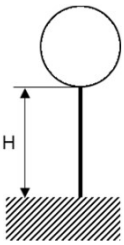
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

Fixed Point On Concrete - MFP-UL2-I Fixed Point:

MFP-UL2-I with sound insulation

1			
1	MFP-PC Fixed Point Pipe Ring		
1x	MFP-PC 21-22 M20	2227599	
	MFP-PC 25-27 M20	2227690	
	MFP-PC 28-30 M20	2227691	
	MFP-PC 31-33 M20	2227692	
	MFP-PC 33.5-36 M20	2227693	
	MFP-PC 39-41 M20	2227694	
	MFP-PC 42-45 M20	2227695	
	MFP-PC 47-50 M20	2227696	
	MFP-PC 53-56 M20	2227697	
	MFP-PC 57-61 M20	2227698	
	MFP-PC 62-66 M20	2227699	
	MFP-PC 68-72 M20	2227700	
	MFP-PC 73-78 M20	2227701	
	MFP-PC 88-93 M20	2227702	
	MFP-PC 100-105 M20	2227703	
	MFP-PC 108-115 M20	2227704	
	MFP-PC 125-133 M20	2227705	
	MFP-PC 134-142 M20	2227706	

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 225 mm

H_{max} = 2000 mm

height above ground to base of pipe

α_{min} = 35°

α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

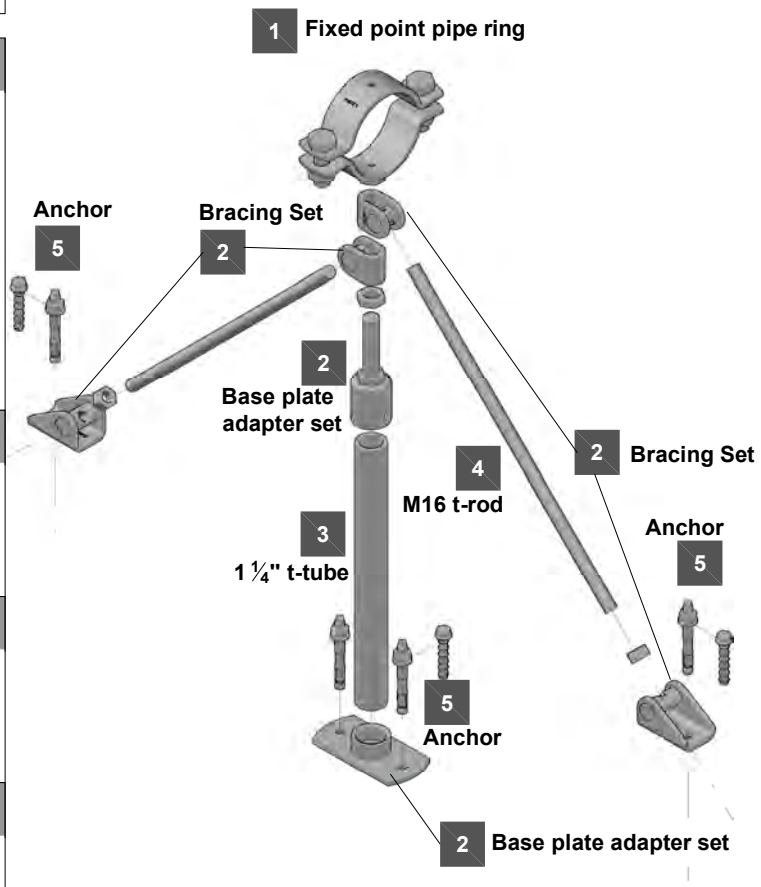
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

2			
2	MFP-UL2-I Fixed point set		
1x	MFP-UL2-I set	2223135	
The set contains:			
2x	MFP-BR-I M16 bracing set		
1x	MFP-BPA-I 1 ¼ base plate adapter set		

3			
3	1 ¼" Threaded Tube		
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532	

4			
4	M16 Bracing Threaded Rod		
2x	AM16x1000 4.8 threaded rod	216422	
	AM16x2000 4.8 threaded rod	216423	
	AM16x3000 4.8 threaded rod	216424	

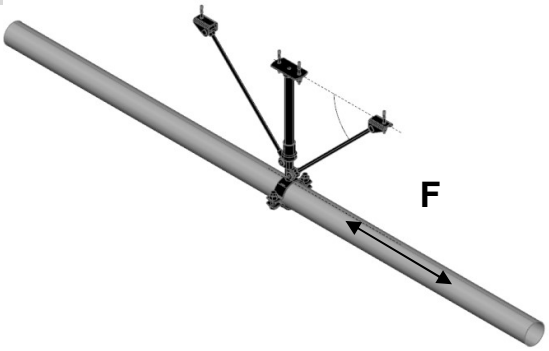
5			
5	Anchors		
4x	HUS3-H 10x90 35/15/5	2079914	
or			
4x	HST3 M12x85 10/-	2113978	

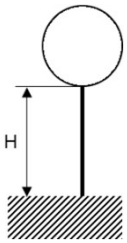


Application description	Application	Product lines	Base material
Heating - MFP-UL2-I fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact			
• Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

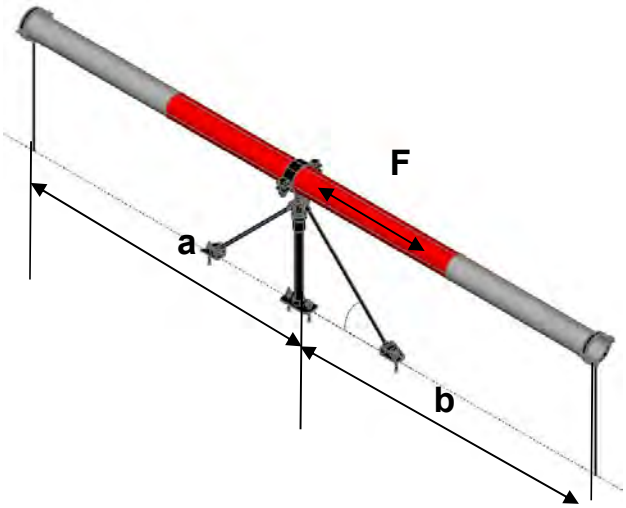
MFP-UL2-I recommended loading capacity limits

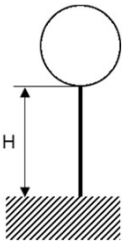
Hanging pipes - Recommended loading capacity



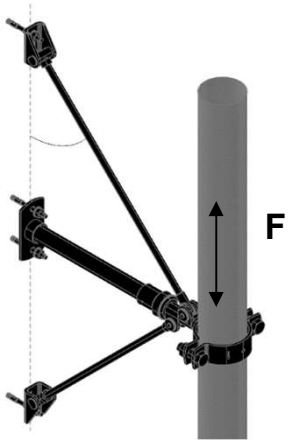


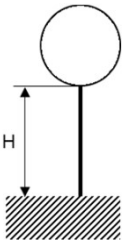
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





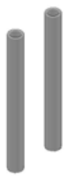
H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

Fixed Point On Concrete - MFP-ULD-I Fixed Point:

MFP-ULD-I with sound insulation

1	1 MFP-PC Fixed Point Pipe Ring		
	1x	MFP-PC 73-78 M20	2227701
		MFP-PC 88-93 M20	2227702
		MFP-PC 100-105 M20	2227703
		MFP-PC 108-115 M20	2227704
		MFP-PC 125-133 M20	2227705
		MFP-PC 134-142 M20	2227706
		MFP-PC 154-162 M20	2227707
		MFP-PC 162-170 M20	2227708
		MFP-PC 192-200 M20	2227709
		MFP-PC 213-221 M20	2227710
		MFP-PC 242-250 M20	2227711
		MFP-PC 267-275 M20	2227712
		MFP-PC 318-326 M20	2227598

2	2 MFP-ULD-I Fixed point set		
	1x	MFP-ULD-I set	2223134
	The set contains:		
	2x	MFP-BR-I M16 bracing set	
	2x	MFP-BPA-I 1 ¼ base plate adapter set	

3	3 1 ¼" Threaded Tube		
	2x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4	4 M16 Bracing Threaded Rod		
	2x	AM16x1000 4.8 threaded rod	216422
		AM16x2000 4.8 threaded rod	216423
		AM16x3000 4.8 threaded rod	216424

5	5 Anchors		
	6x	HUS3-H 10x90 35/15/5	2079914
	or		
	6x	HST3 M12x85 10/-	2113978

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 185 mm

H_{max} = 2000 mm

Height from base material to center of the pipe

α_{min} = 35°

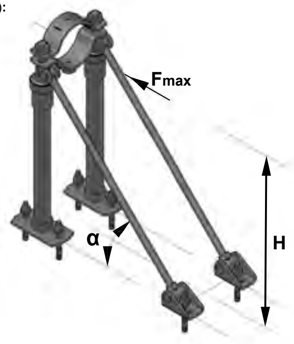
α_{max} = 45°

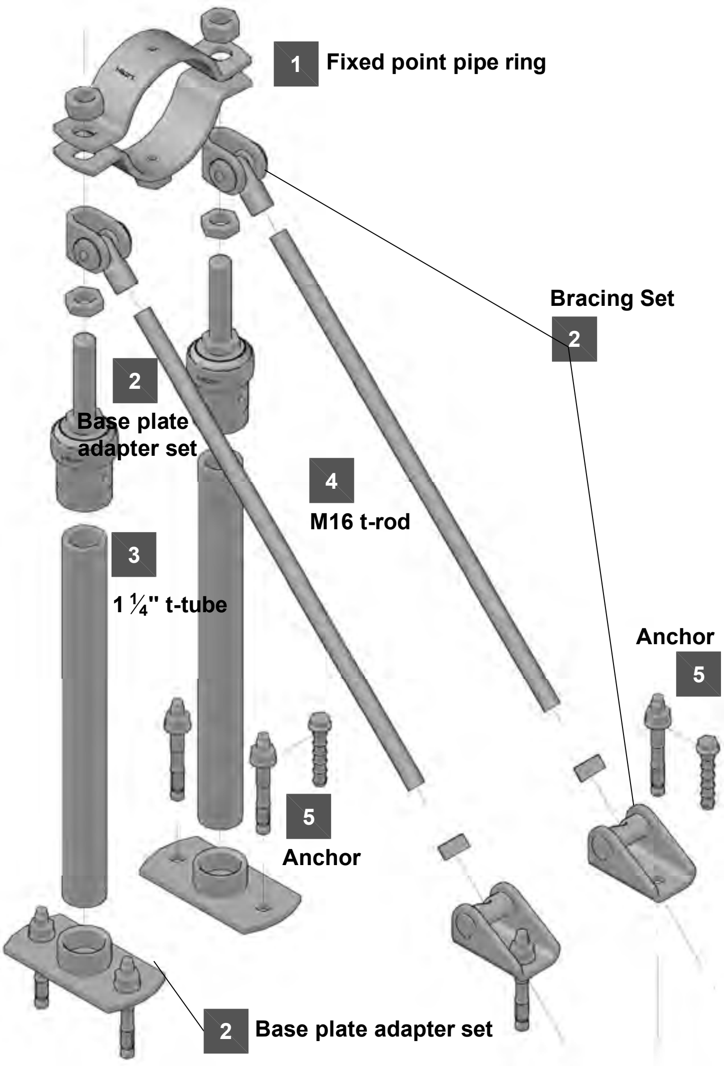
Validity of the capacity limits:

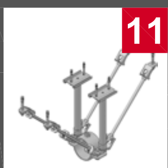
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

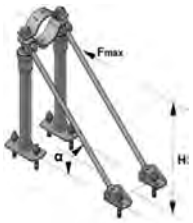
Disclamier:

- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



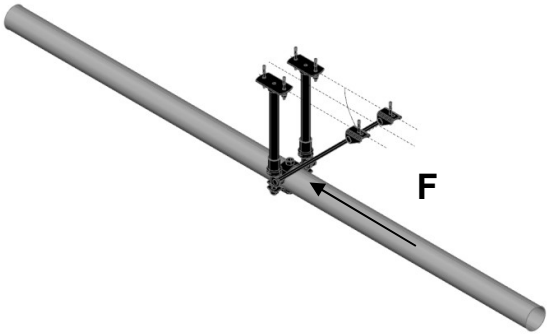


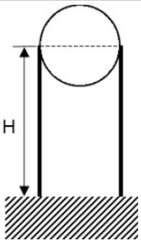
Application description	Application	Product lines	Base material
Heating - MFP-ULD-I fixed point		Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



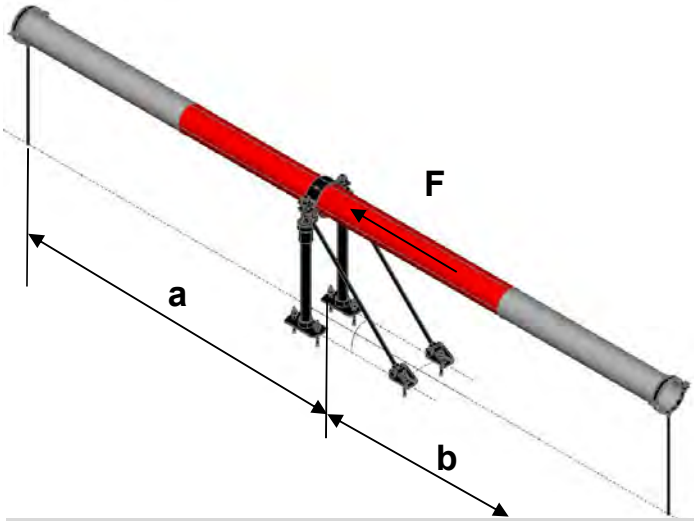
MFP-ULD-I recommended loading capacity limits

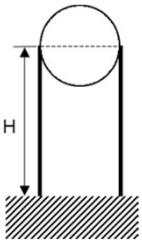
Hanging pipes - Recommended loading capacity



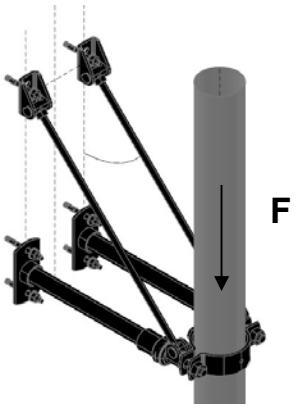


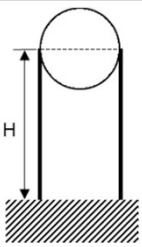
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity



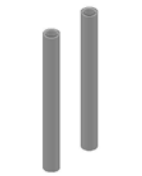


H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Fixed Point On Concrete - MFP-ULD2-I Fixed Point:

MFP-ULD2-I with sound insulation

1		1	**MFP-PC Fixed Point Pipe Ring**
		1x	**MFP-PC 73-78 M20** 2227701
			MFP-PC 88-93 M20 2227702
			MFP-PC 100-105 M20 2227703
			MFP-PC 108-115 M20 2227704
			MFP-PC 125-133 M20 2227705
			MFP-PC 134-142 M20 2227706
			MFP-PC 154-162 M20 2227707
			MFP-PC 162-170 M20 2227708
			MFP-PC 192-200 M20 2227709
			MFP-PC 213-221 M20 2227710
			MFP-PC 242-250 M20 2227711
			MFP-PC 267-275 M20 2227712
			MFP-PC 318-326 M20 2227598

2		2	**MFP-ULD2-I Fixed point set**
		1x	**MFP-ULD2-I set** 2223136
			The set contains:
		4x	**MFP-BR-I M16 bracing set**
		2x	**MFP-BPA-I 1 ¼ base plate adapter set**
3		3	**1 ¼" Threaded Tube**
		2x	**GR-G 1 ¼"x 2000 4.6 threaded tube** 248532
4		4	**M16 Bracing Threaded Rod**
		4x	**AM16x1000 4.8 threaded rod** 216422
			AM16x2000 4.8 threaded rod 216423
			AM16x3000 4.8 threaded rod 216424
5		5	**Anchors**
		8x	**HUS3-H 10x90 35/15/5** 2079914
			or
		8x	**HST3 M12x85 10/-** 2113978

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 225 mm

H_{max} = 2000 mm

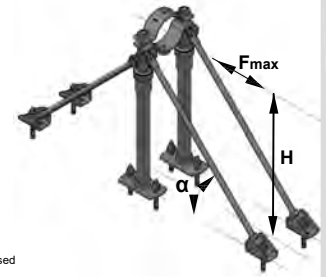
Height from base material to center of the pipe

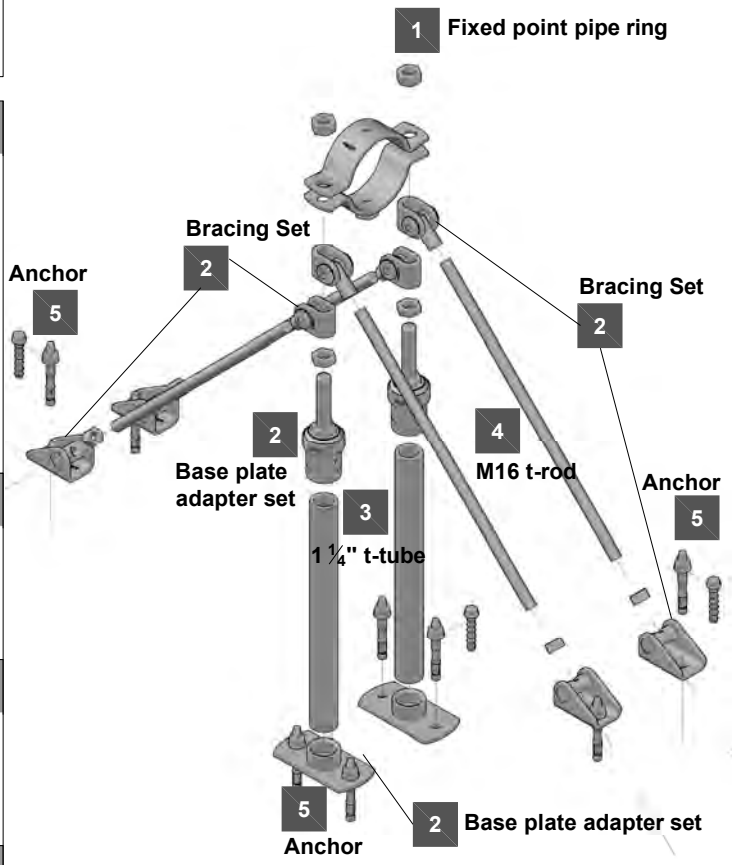
α_{min} = 35°

α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

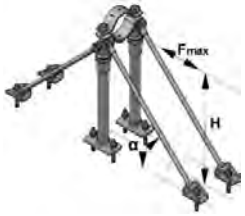
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





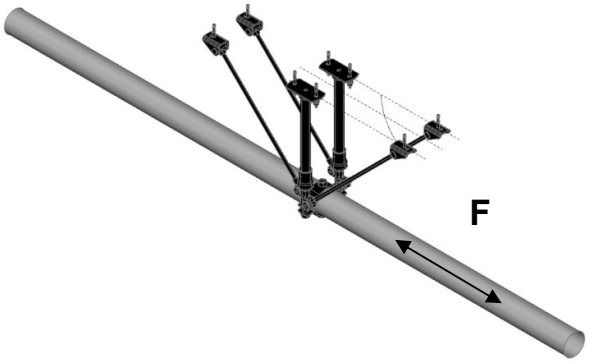
Application description	Application	Product lines	Base material
Heating - MFP-ULD2-I fixed point	 11	Fixed point sets	Concrete
		Threaded parts	

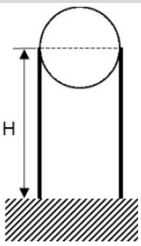
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



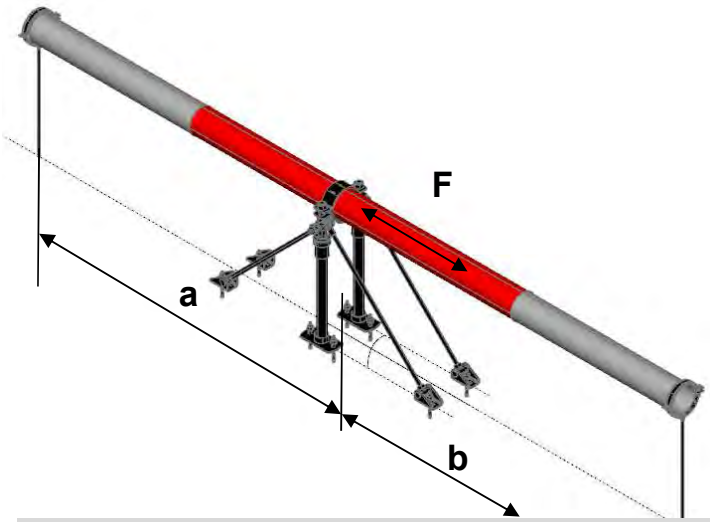
MFP-ULD2-I recommended loading capacity limits

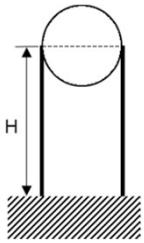
Hanging pipes - Recommended loading capacity



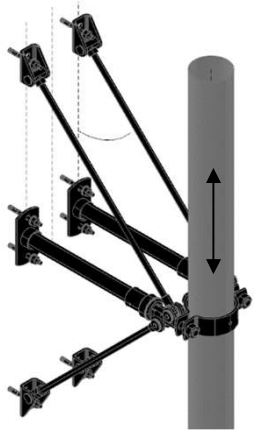


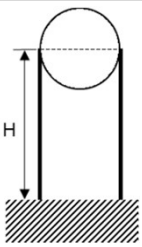
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Fixed Point On Concrete - MFP - UM - I Fixed Point:

MFP-UM-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
2x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP- UM-I Fixed point set	
1x	MFP-UM - I set	2238274

The set contains:
2x MFP-BR-I M16 bracing set:
1x MFP-BPA-I 1 ¼ base plate adapter set
1x MFP-PCA adapter

3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

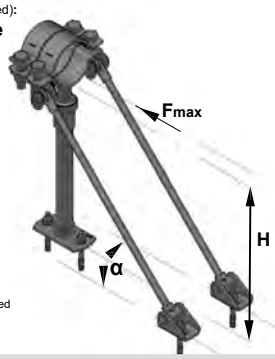
5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x85 10/-	2113978

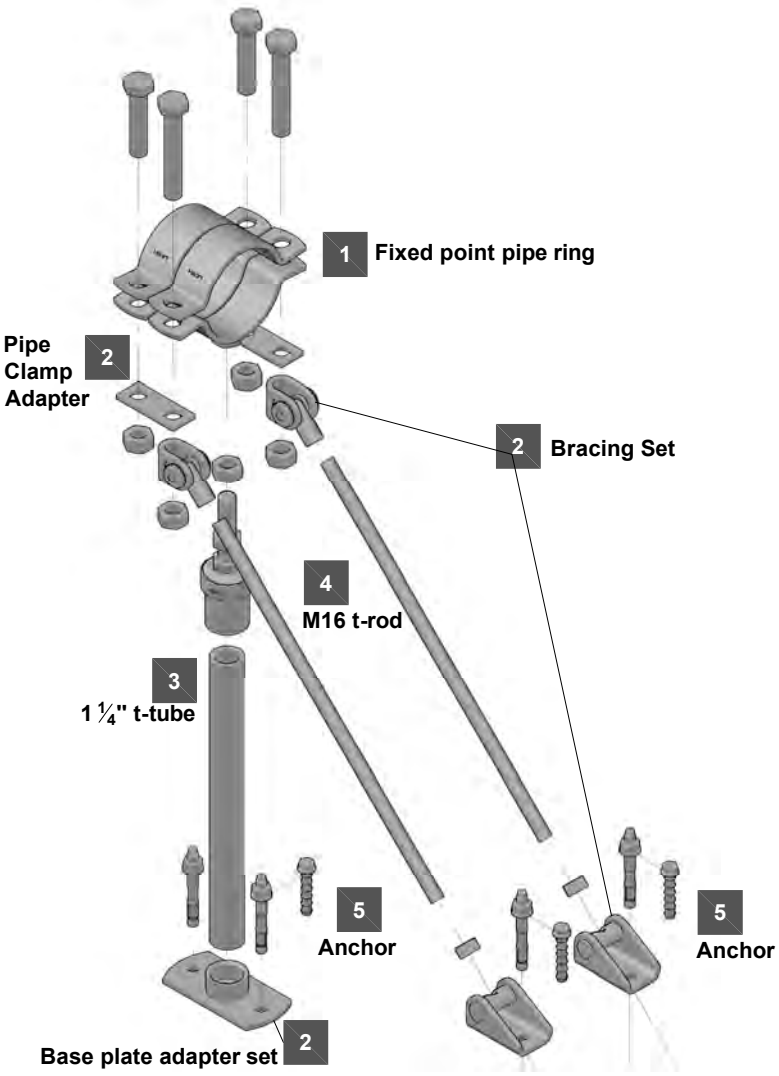
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 175mm
H_{max} = 2000mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



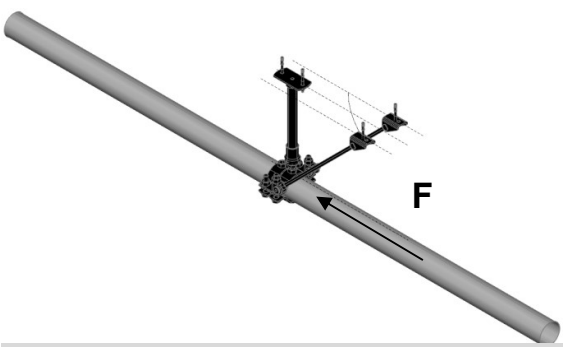


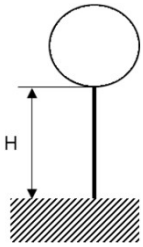
Application description	Application	Product lines	Base material
Heating - MFP-UM-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

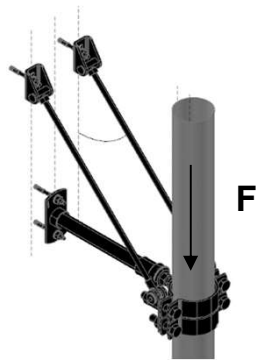
MFP-UM-I recommended loading capacity limits

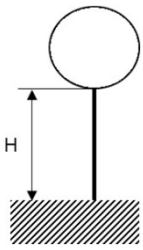
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





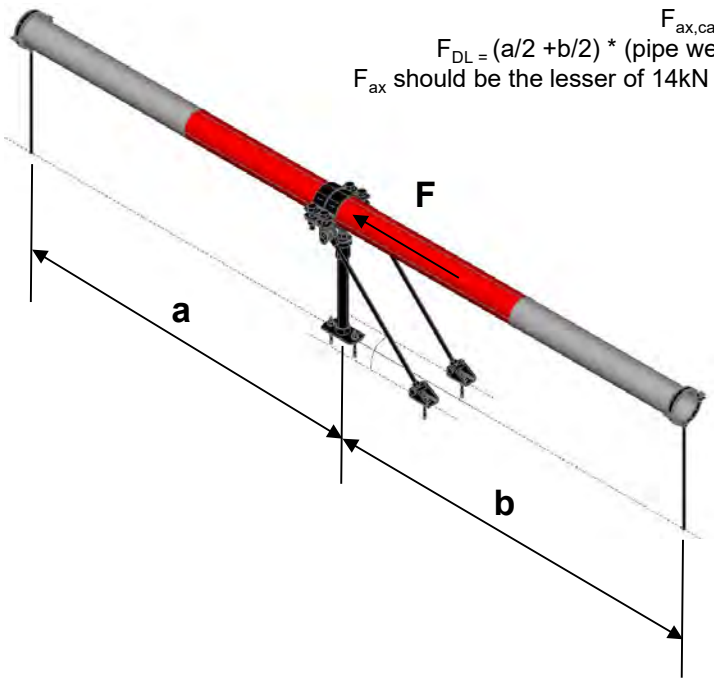
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

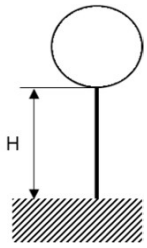
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	F_{ax}	9.095
1600	F_{ax}	8.401
1750	F_{ax}	7.512
1800	F_{ax}	7.249
1900	F_{ax}	6.767
2000	F_{ax}	6.334

Fixed Point On Concrete - MFP - UM2 - I Fixed Point:

MFP-UM2-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
2x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP - UM2-I Fixed point set	
1x	MFP-UM2 - I set	2238275

The set contains:
4x MFP-BR-I M16 bracing set:
1x MFP-BPA-I 1 ¼ base plate adapter set
2x MFP-PCA adapter

3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
4x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

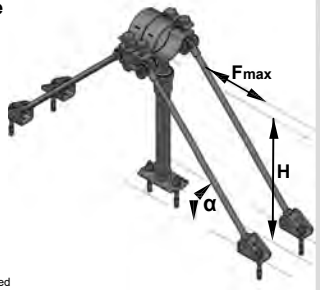
5	Anchors	
6x	HUS3-H 10x90 35/15/5	2079914
or		
6x	HST3 M12x85 10/-	2113978

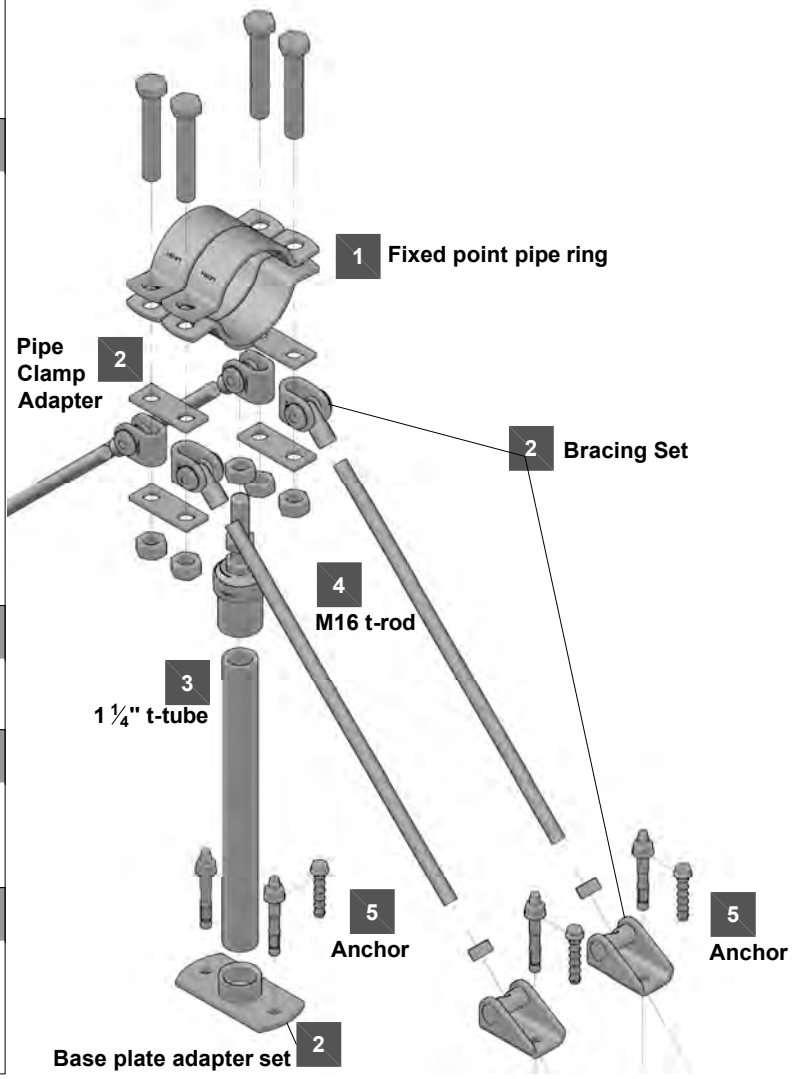
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 175mm
H_{max} = 2000mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



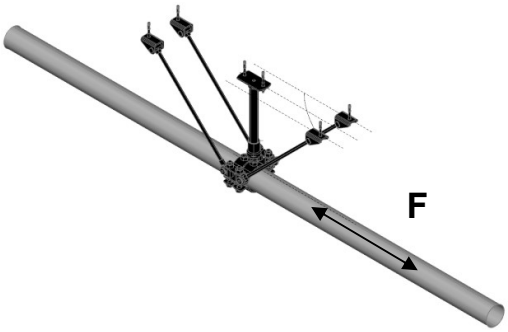


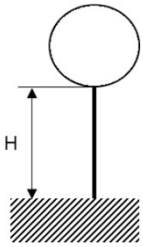
Application description	Application	Product lines	Base material
Heating - MFP-UM2-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

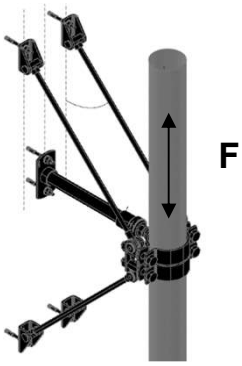
MFP-UM2-I recommended loading capacity limits

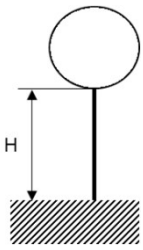
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





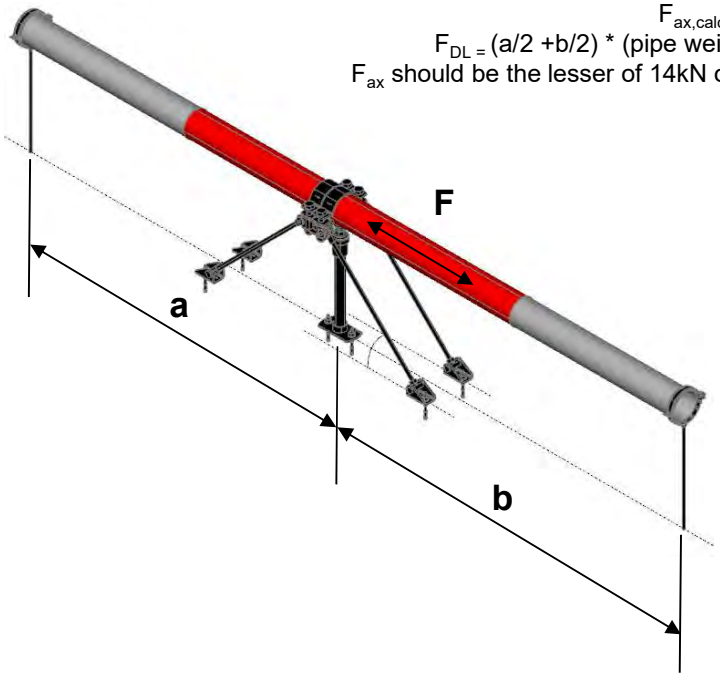
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

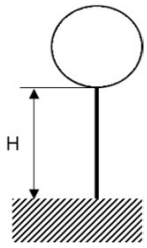
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	F_{ax}	9.095
1600	F_{ax}	8.401
1750	F_{ax}	7.512
1800	F_{ax}	7.249
1900	F_{ax}	6.767
2000	F_{ax}	6.334

Riser Fixed Point On Concrete - MFP-CSL Fixed Point:

MFP-CSL without sound insulation

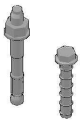
1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704

2

2	MFP-CSL Fixed point set	
1x	MFP-CSL set	2223016

3

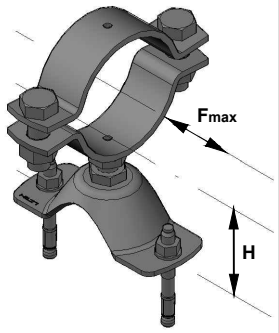


3	Anchors	
2x	HUS3-H 10x90 35/15/5	2079914
or		
2x	HST3 M12x85 10/-	2113978

Resistance and limitations

Recommended resitance
(safety factor 1.5 included):
F_{max} = 2.0 kN

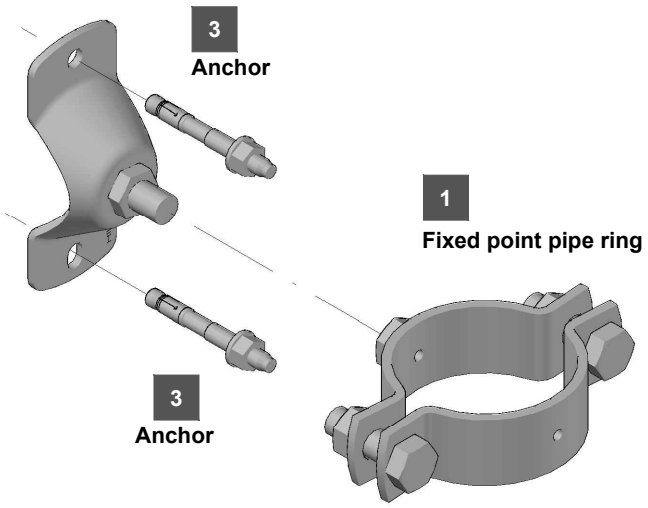
H_{min} = 85 mm
H_{max} = 115 mm
height above ground to base of pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

2 MFP-CLS set



Application description	Application	Product lines	Base material
Heating - MFP-CSL Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Fixed Point On Concrete - MFP-CSL-I Fixed Point:

MFP-CSL-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704

2

2	MFP-CSL-I Fixed point set	
1x	MFP-CSL-I set	2223017

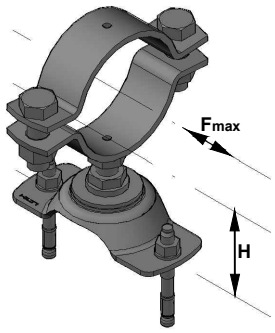
3

3	Anchors	
2x	HUS3-H 10x90 35/15/5	2079914
or		
2x	HST3 M12x85 10/-	2113978

Resistance and limitations

Recommended resitance
(safety factor 1.5 included):
F_{max} = 2.0 kN

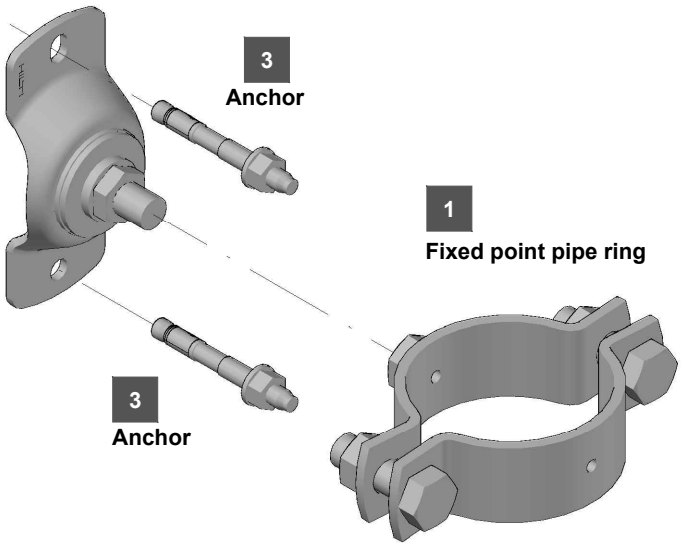
H_{min} = 85 mm
H_{max} = 115 mm
height above ground to base of pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

2 MFP-CLS-I set



Application description	Application	Product lines	Base material
Heating - MFP-CSL-I Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

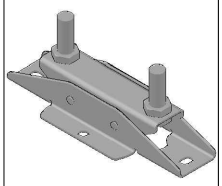
Riser Fixed Point On Concrete - MFP-CL-I Fixed Point:

MFP-CL-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
2x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708

2

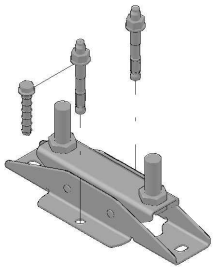


2	MFP-CL-I Fixed point set	
1x	MFP-CL-I set	2223018

3

3	Anchors	
2x	HUS3-H 10x60 5/-/-	2079911
or		
2x	HST3 M12x85 10/-	2113978

Alternative anchor points



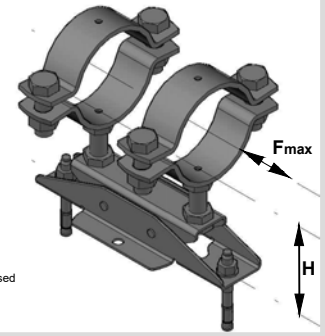
Resistance and limitations

Recommended resitance
(safety factor 1.5 included):
F_{max} =4.0 kN

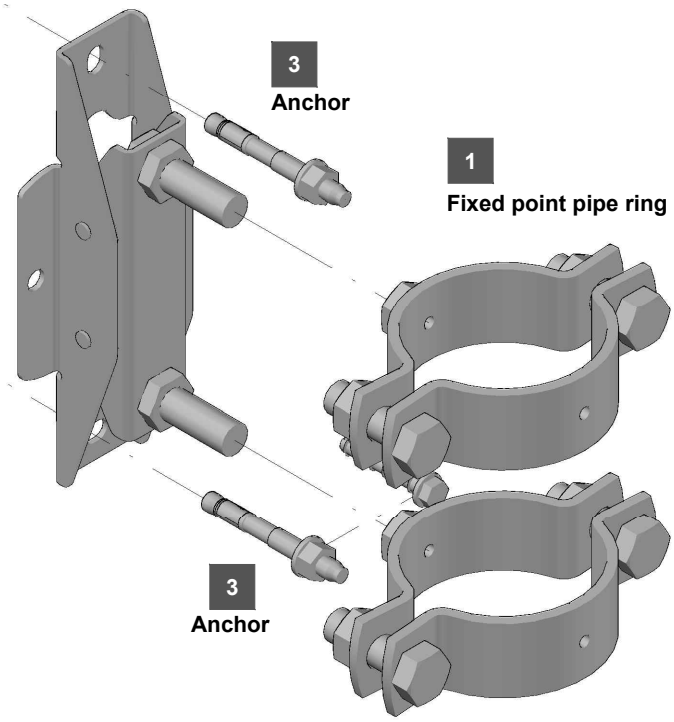
H_{min} = 85 mm
Hmin = 115mm
height above ground to base of pipe

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



2 Fixed point set



Application description	Application	Product lines	Base material
Heating - MFP-CL-I Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

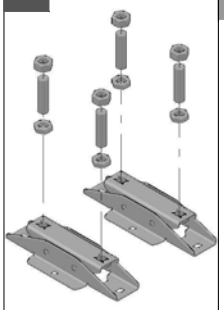
Riser Fixed Point On Concrete - MFP-CLD-I Fixed Point:

MFP-CL-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
2x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710

2



2	MFP-CLD-I Fixed point set	
1x	MFP-CLD-I set	2223014

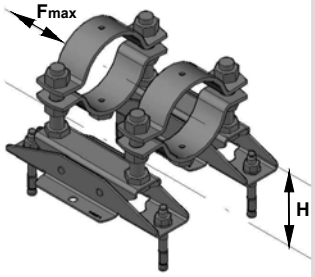
3

3	Anchors	
4x	HUS3-H 10x60 5/-/-	2079911
or		
4x	HST3 M12x85 10/-	2113978

Resistance and limitations

Recommended resitance
(safety factor 1.5 included):
F_{max} = 8.0kN

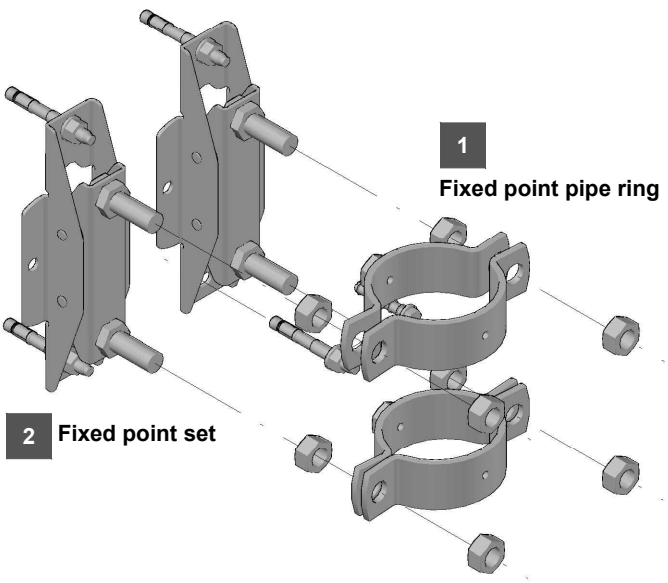
H_{min} = 95 mm
H_{max} = 175 mm
Height from base material to center of the pipe



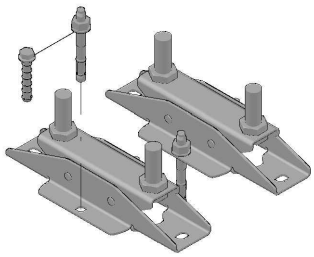
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

Anchor
3



Alternative anchor points

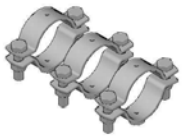


Application description	Application	Product lines	Base material
Heating - MFP-CLD-I Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Fixed Point On Concrete - MFP-CH Fixed Point:

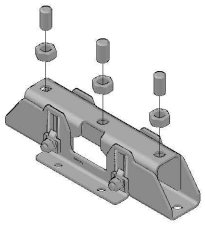
MFP-CH without sound insulation

1



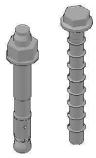
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2



2	MFP-CH Fixed point set	
1x	MFP-CH set	2223015

3



3	Anchors	
2x	HUS3-H 14x130 65/45/15	2079923
or		
2x	HST3 M16x135 35/15	2105858

Welded stoppers on all Fixed points loaded with F > 14.0 kN

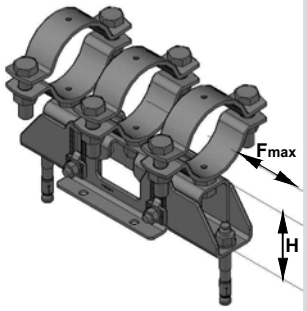
Resistance and limitations

Recommended resitance
(safety factor 1.5 included):
F_{max} = 22 kN

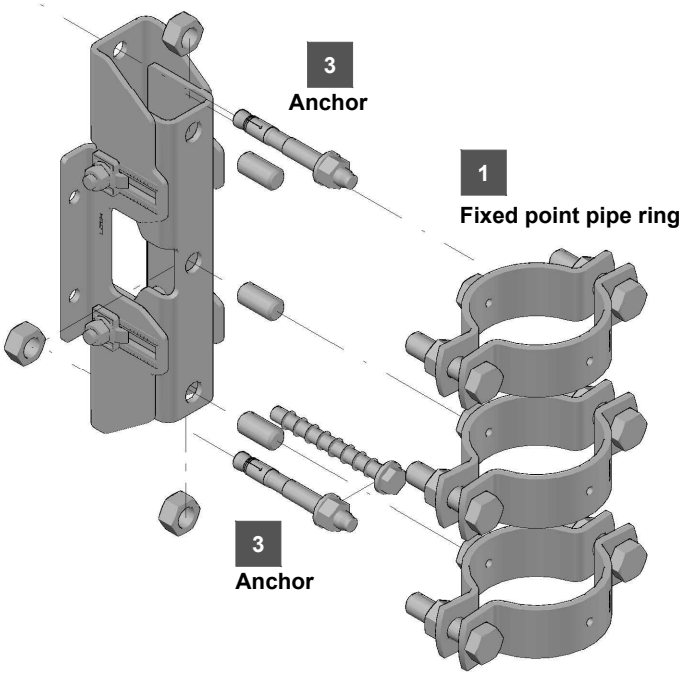
H_{min} = 115 mm
H_{max} = 165 mm
height above ground to base of pipe

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



2 Fixed point set

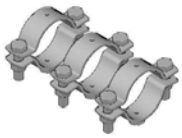


Application description	Application	Product lines	Base material
Heating - MFP-CH Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Fixed Point On Concrete - MFP-CH (M12) using alternative anchoring

MFP-CH without sound insulation

1

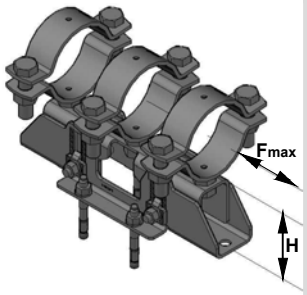


1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

Resistance and limitations

Recommended resitance
(safety factor 1.5 included):
F_{max} = 12 kN

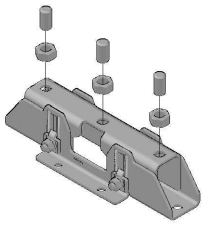
H_{min} = 115 mm
H_{max} = 165 mm
height above ground to base of pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

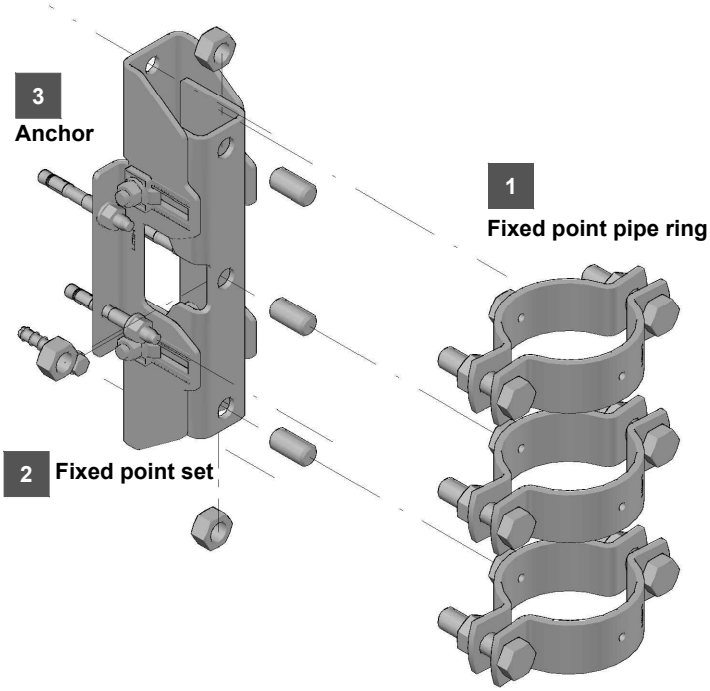
2



2	MFP-CH Fixed point set	
1x	MFP-CH set	2223015

3

3	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x105 30/10	2105718



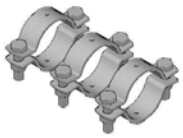
Welded stoppers on all Fixed points loaded with F > 14.0 kN

Application description	Application	Product lines	Base material
Heating - MFP-CH Riser Fixed Point with Alternative M12 Anchor Points	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Fixed Point On Concrete - MFP-CHD Fixed Point:

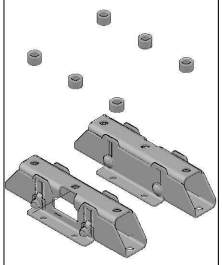
MFP-CHD without sound insulation

1



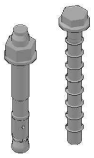
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710

2



2	MFP-CHD Fixed point set	
1x	MFP-CHD set	2238264

3



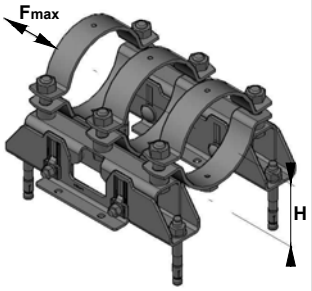
5	Anchors	
4x	HUS3-H 14x130 65/45/15	2079923
or		
4x	HST3 M16x135 35/15	2105858

Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

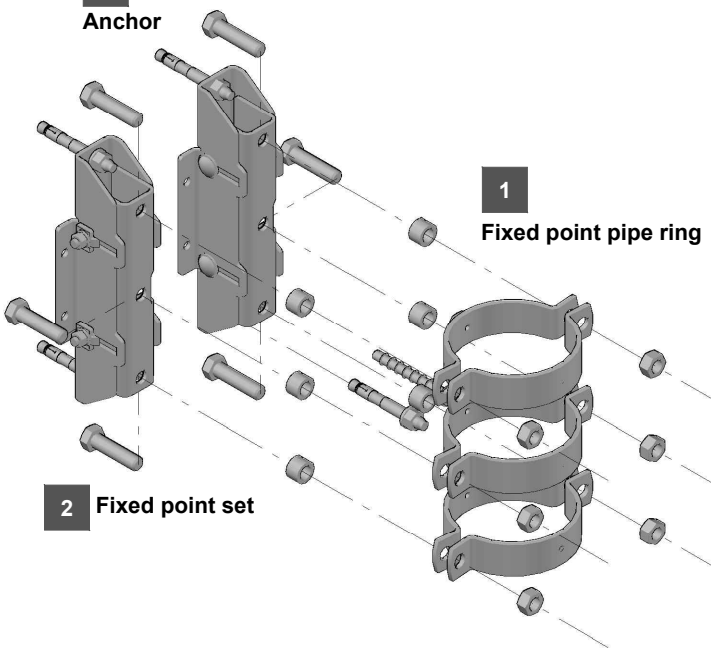
Recommended resitance
(safety factor 1.5 included):
F_{max} = 44 kN

H_{min} = 130 mmm
H_{max} = 180mm
Height from base material to center of the pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated

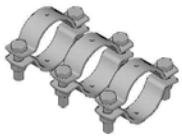


Application description	Application	Product lines	Base material
Heating - MFP-CHD Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

Riser Fixed Point On Concrete - MFP-CHD Fixed Point (M12) Fixed Point using alternative anchoring

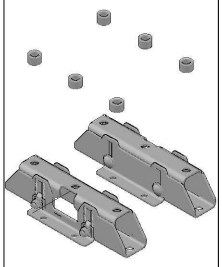
MFP-CHD without sound insulation

1



1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710

2



2	MFP-CHD Fixed point set	
1x	MFP-CHD set	2238264

3

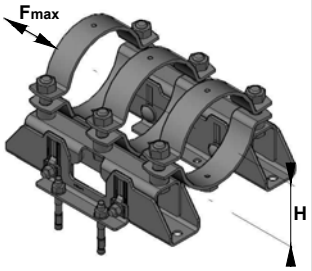
5	Anchors	
8x	HUS3-H 10x60 5/-/-	2079911
or		
8x	HST3 M12x85 10/-	2113978

Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

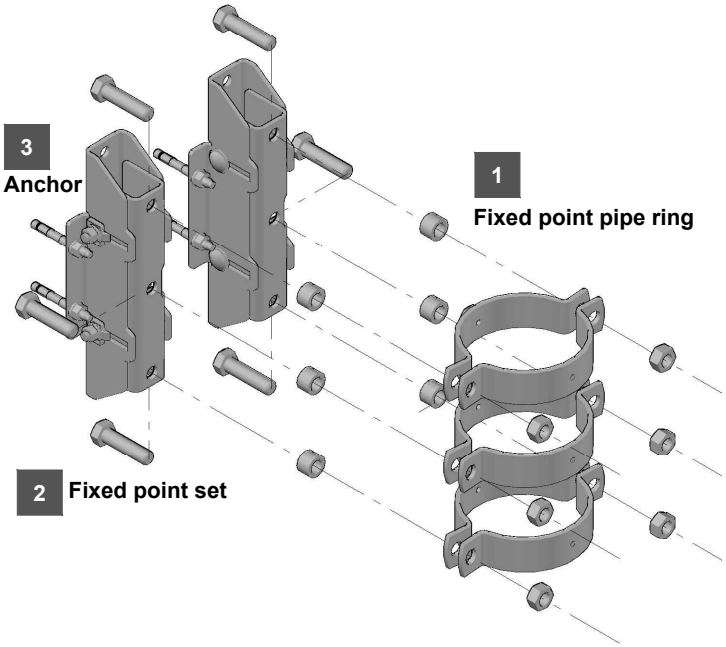
Recommended resitance
(safety factor 1.5 included):
F_{max} = 24 kN

H_{min} = 130 mmm
H_{max} = 180mm
Height from base material to center of the pipe



Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



Application description	Application	Product lines	Base material
Heating - MFP-CHD Riser Fixed Point with Alternative Anchor Points	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			

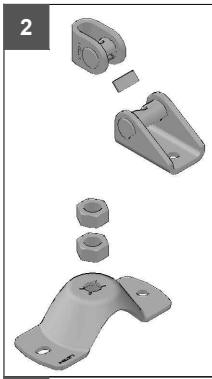
Riser Fixed Point On Concrete - MFP-L Fixed Point:

MFP-L without sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2



2	MFP-L Fixed point set	
1x	MFP-L set	2223121

The set contains:
1x MFP-BR M16 bracing set
1x MFP-BP M20 base plate set

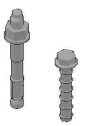
3

3	M20 Base Threaded Rod	
1x	AM20x1000 4.8 threaded rod	216425

4

4	M16 Bracing Threaded Rod	
1x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5



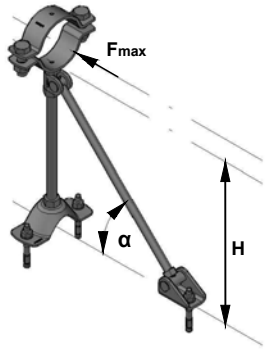
5	Anchors	
3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978

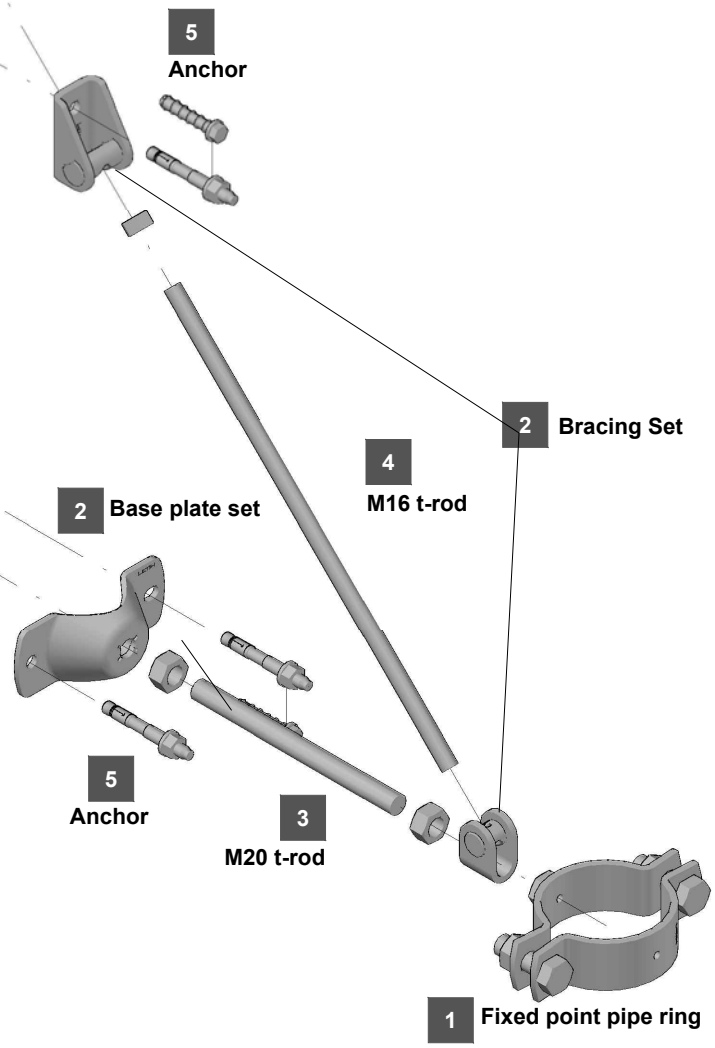
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 150
H_{max} = 500
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

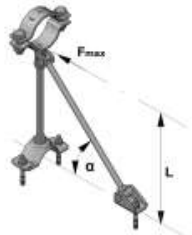
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





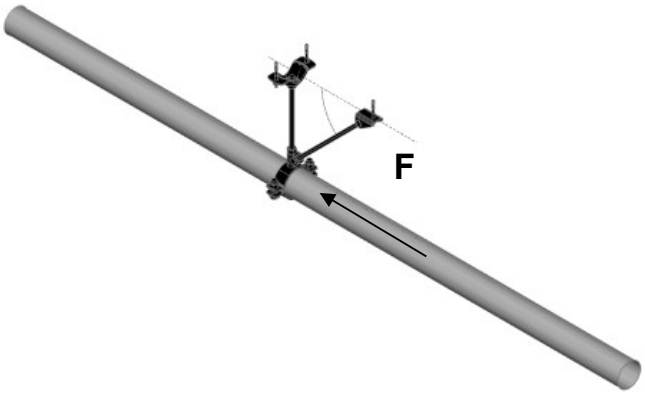
Application description	Application	Product lines	Base material
Heating - MFP-L Riser Fixed Point	12	Fixed point sets	Concrete
		Threaded parts	

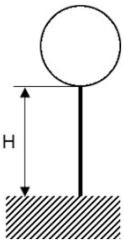
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-L recommended loading capacity limits

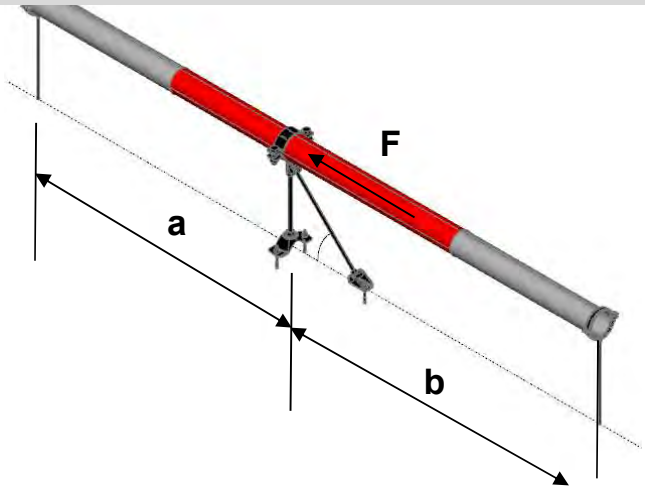
Hanging pipes - Recommended loading capacity

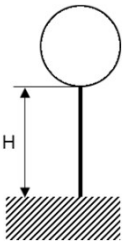




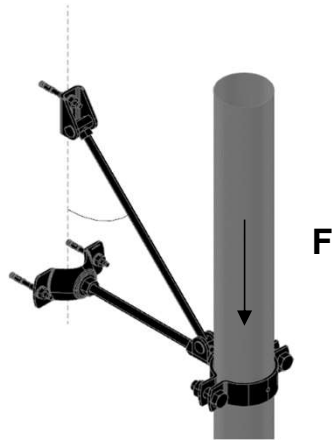
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

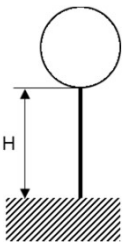
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





Riser Fixed Point On Concrete - MFP-LD Fixed Point:

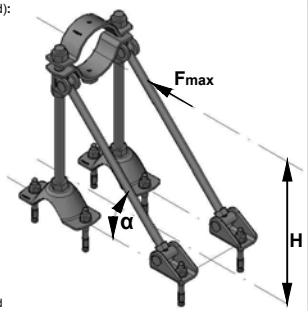
MFP-LD without sound insulation

Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 190 mm
H_{max} = 500 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

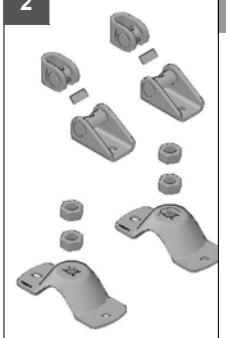
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 MFP-PC Fixed Point Pipe Ring

1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

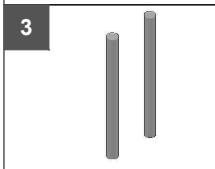
2 MFP-LD Fixed point set



1x	**MFP-LD fixed point set**	**2223122**

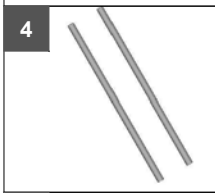
The set contain:
2x MFP-BR M16 bracing set
2x MFP-BP M20 base plate set

3 M20 Base Threaded Rod



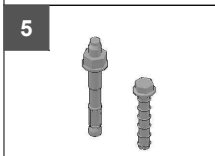
2x	**AM20x1000 4.8 threaded rod**	**216425**

4 M16 Bracing Threaded Rod

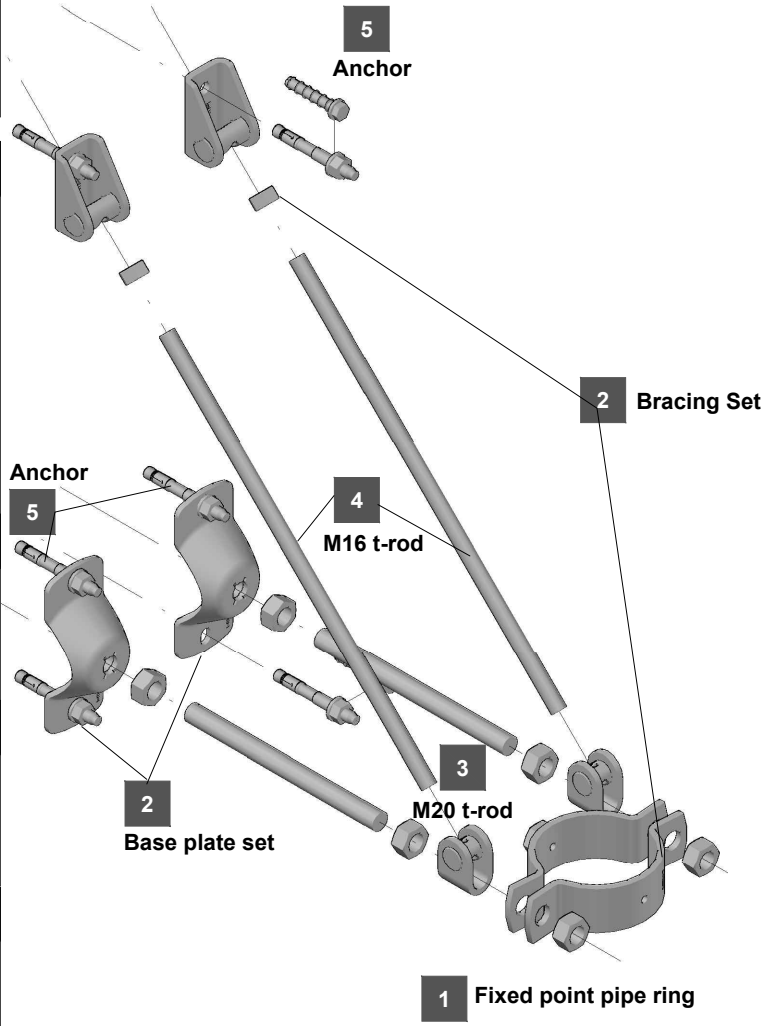


2x	**AM16x1000 4.8 threaded rod**	**216422**
	AM16x2000 4.8 threaded rod	**216423**
	AM16x3000 4.8 threaded rod	**216424**

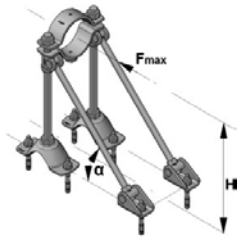
5 Anchors



6x	**HUS3-H 10x90 35/15/5**	**2079914**
or		
6x	**HST3 M12x85 10/-**	**2113978**

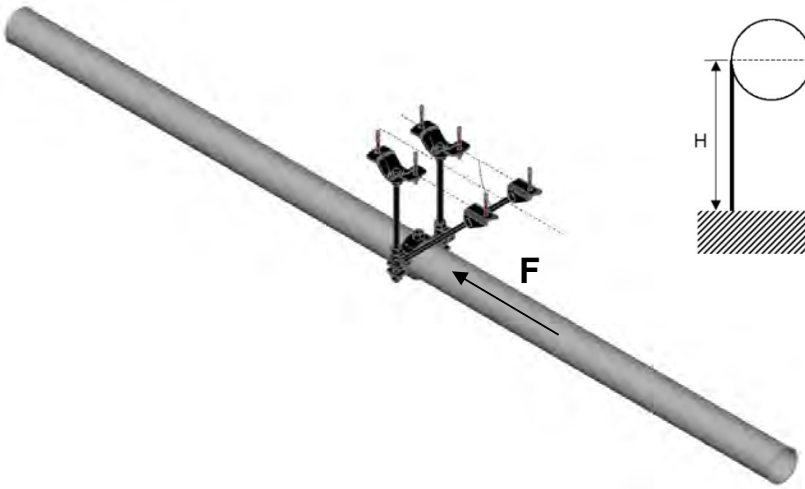


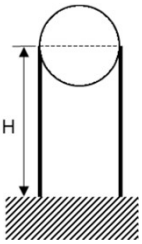
Application description	Application	Product lines	Base material
Heating - MFP-LD Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-LD recommended loading capacity limits

Hanging pipes - Recommended loading capacity

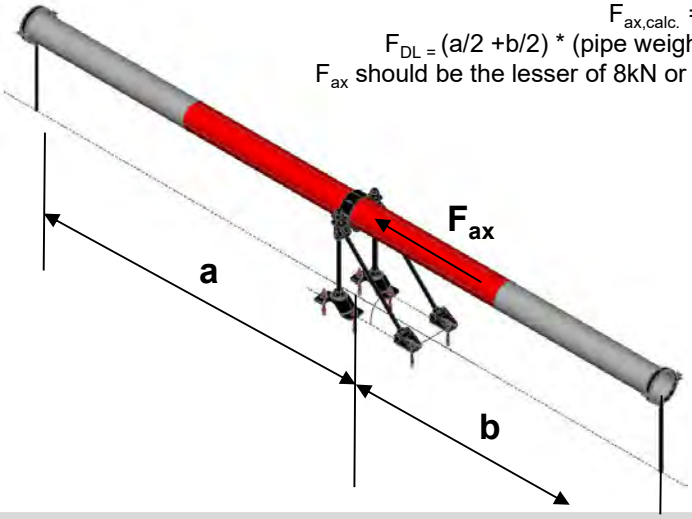


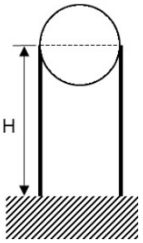


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

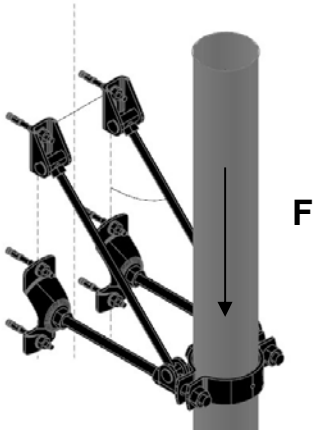
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or $(F_{B,max.} - F_{DL})$

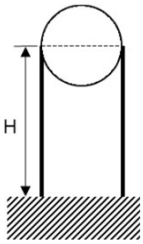




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Riser Fixed Point On Concrete - MFP-L-I Fixed Point:

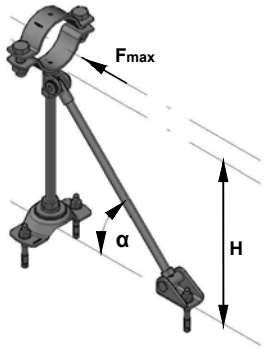
MFP-L-I with sound insulation

Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 150 mm
H_{max} = 500 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

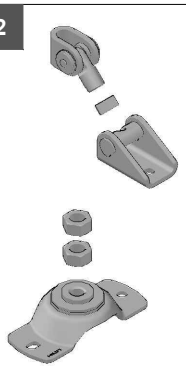
Disclaimer:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 MFP-PC Fixed Point Pipe Ring

1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2 MFP-L-I Fixed point set



1x MFP-L-I set 2223125

The set contains:
1x MFP-BR-I M16 bracing set
1x MFP-BP-I M20 base plate set

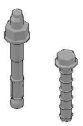
3 M20 Base Threaded Rod

1x AM20x1000 4.8 threaded rod 216425

4 M16 Bracing Threaded Rod

1x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

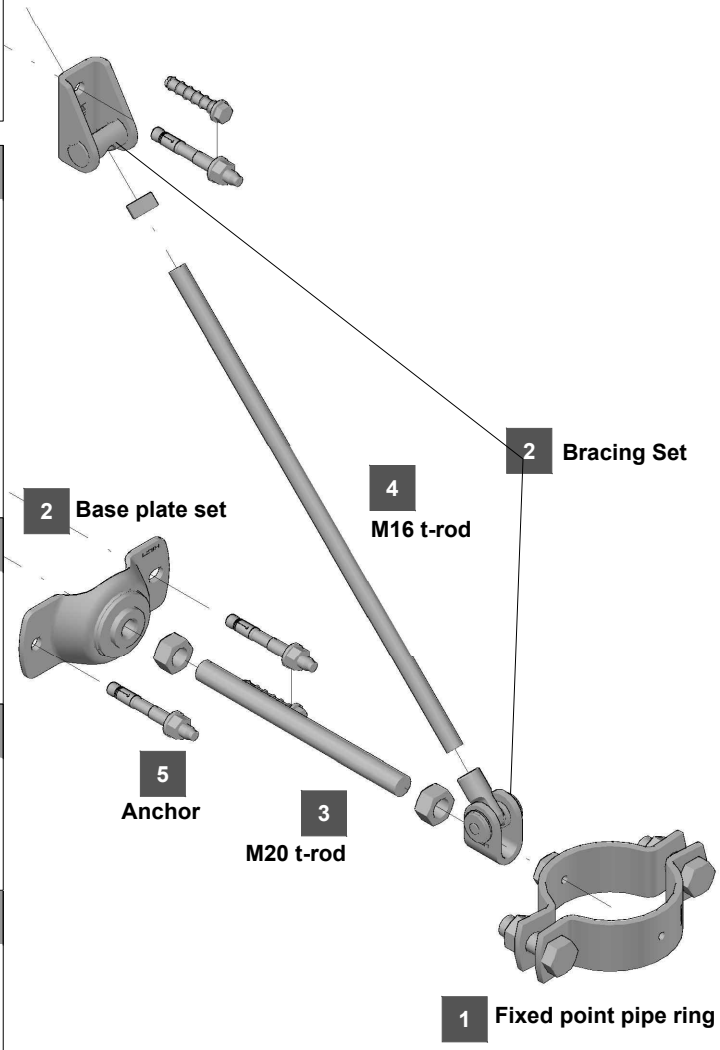
5 Anchors



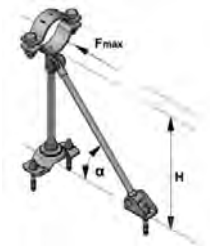
3x HUS3-H 10x90 35/15/5 2079914

or

3x HST3 M12x85 10/- 2113978

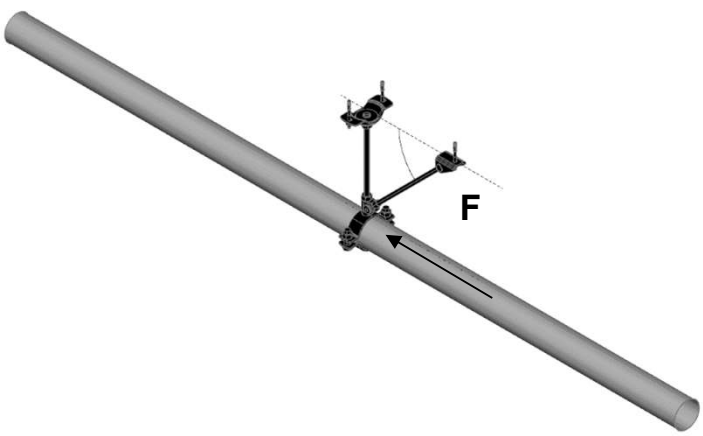


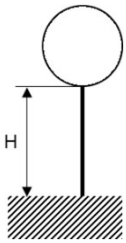
Application description	Application	Product lines	Base material
Heating - MFP-L-I Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-L-I recommended loading capacity limits

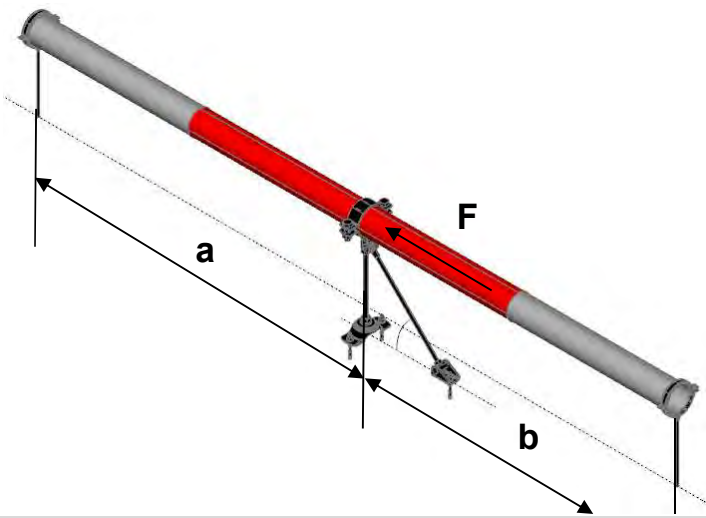
Hanging pipes - Recommended loading capacity

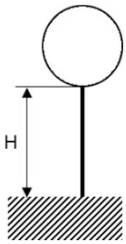




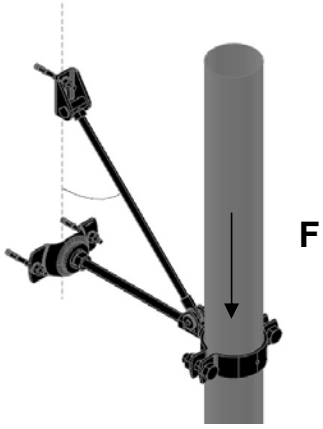
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

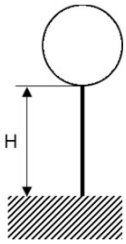
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





Riser Fixed Point On Concrete - MFP-LD-I Fixed Point:

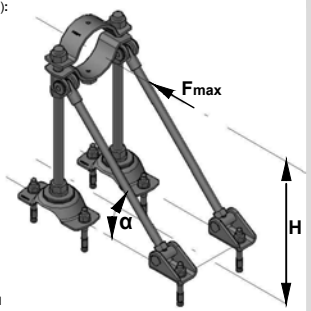
MFP-LD-I with sound insulation

Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 190 mm
H_{max} = 500 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

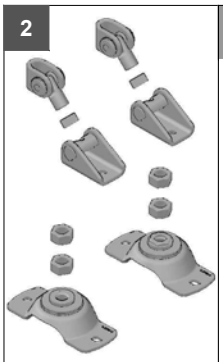
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 MFP-PC Fixed Point Pipe Ring

1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

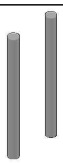
2 MFP-LD-I Fixed point set



1x	MFP-LD-I fixed point set	2223126

The set contain:
2x MFP-BR-I M16 bracing set
2x MFP-BP-I M20 base plate set

3 M20 Base Threaded Rod



2x	AM20x1000 4.8 threaded rod	216425

4 M16 Bracing Threaded Rod

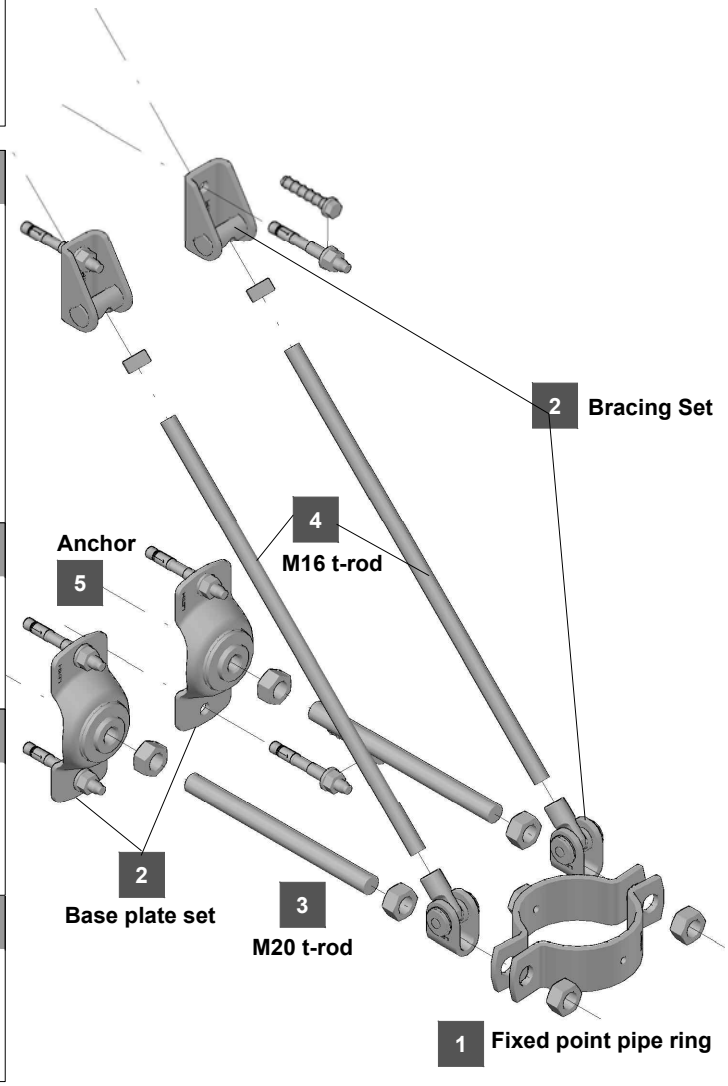
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5 Anchors

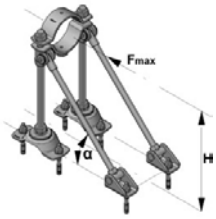
6x	HUS3-H 10x90 35/15/5	2079914

or

6x	HST3 M12x85 10/-	2113978

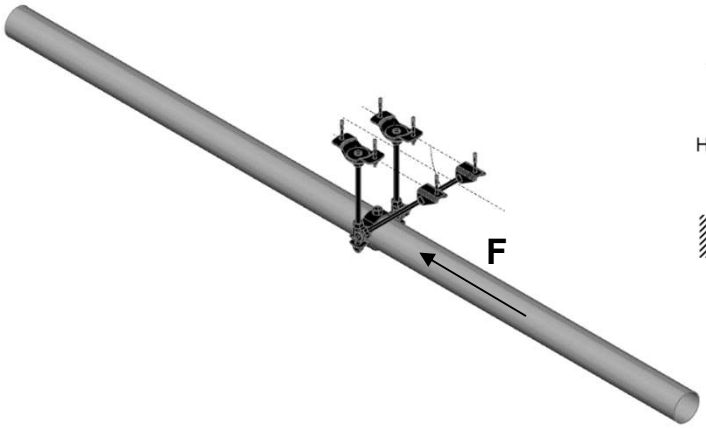


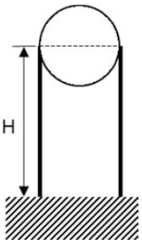
Application description	Application	Product lines	Base material
Heating - MFP-LD-I Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-LD-I recommended loading capacity limits

Hanging pipes - Recommended loading capacity

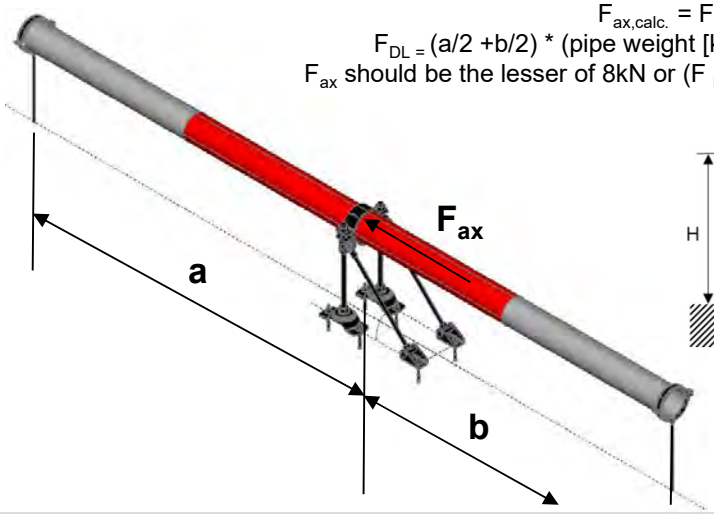


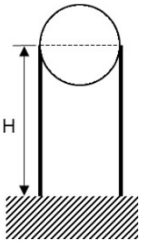


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

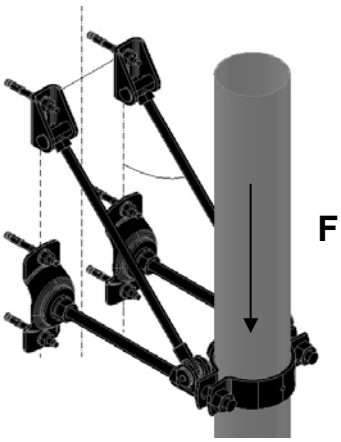
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or ($F_{B,max.} - F_{DL}$)

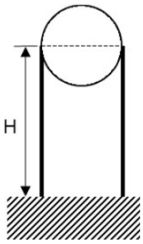




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Riser Fixed Point On Concrete - MFP-UL Fixed Point:

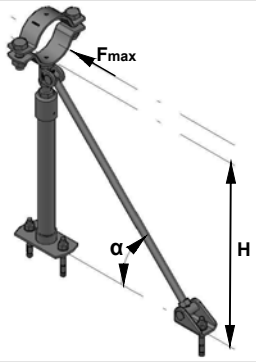
MFP-UL without sound insulation

Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

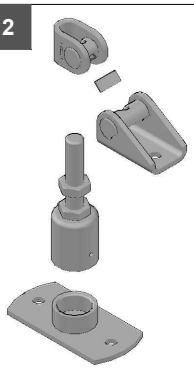
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 — MFP-PC Fixed Point Pipe Ring

1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2 — MFP-UL Fixed point set



1x	MFP-UL set	2223129

The set contains:
1x MFP-BR M16 bracing set
1x MFP-BPA 1 ¼ base plate adapter set

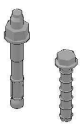
3 — 1 ¼" Threaded Tube

1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

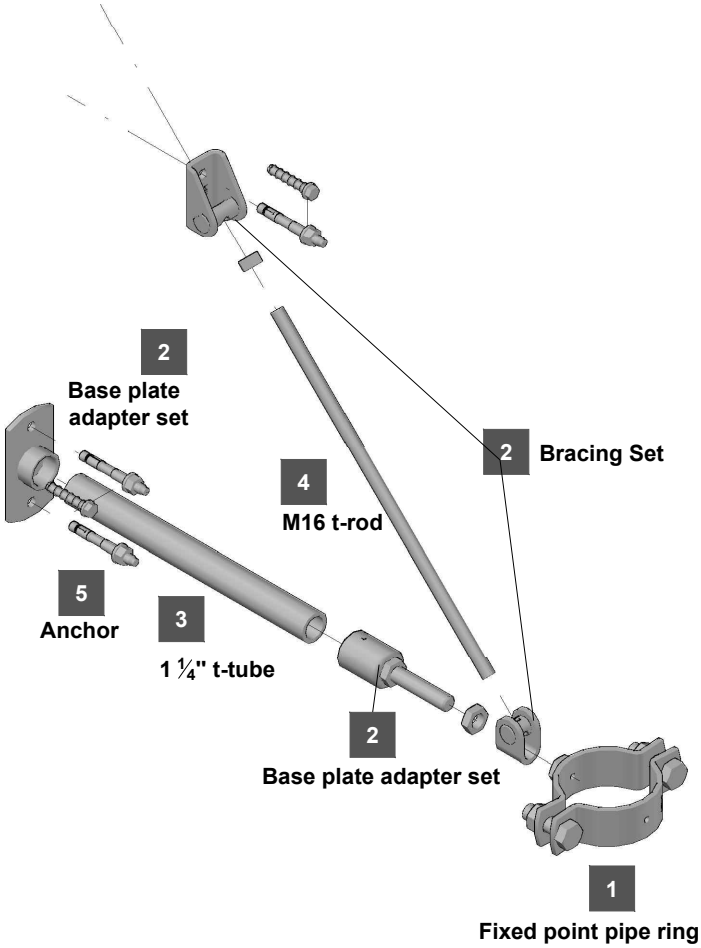
4 — M16 Bracing Threaded Rod

1x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5 — Anchors

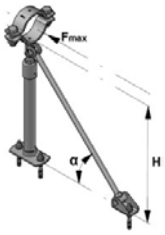


3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978



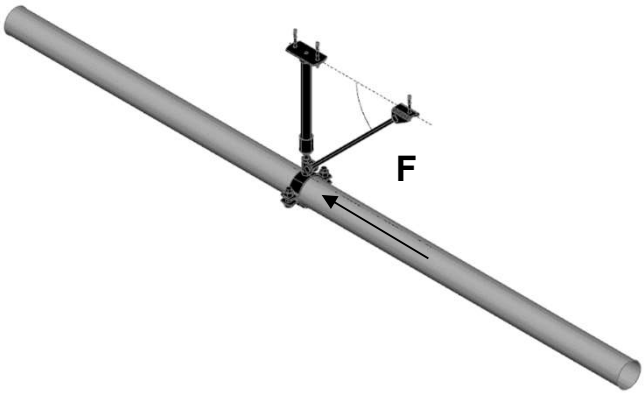
Application description	Application	Product lines	Base material
Heating - MFP-UL Riser Fixed Point	12	Fixed point sets	Concrete
		Threaded parts	

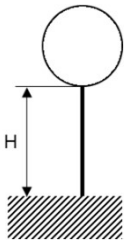
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



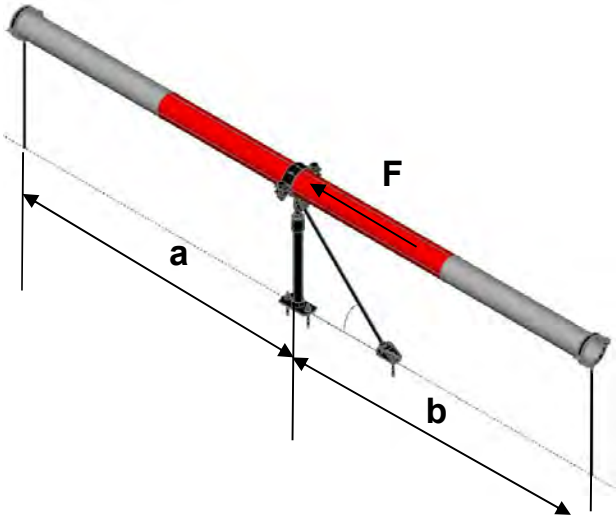
MFP-UL recommended loading capacity limits

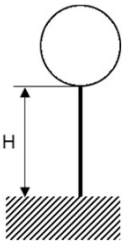
Hanging pipes - Recommended loading capacity



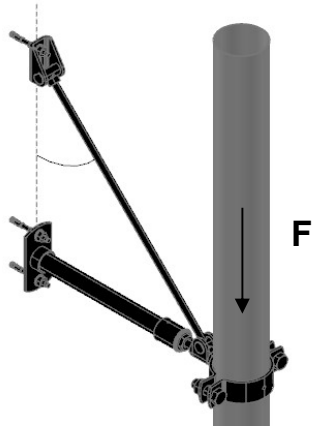


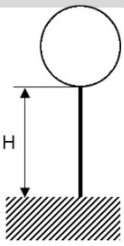
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

Riser Fixed Point On Concrete - MFP-ULD Fixed Point:

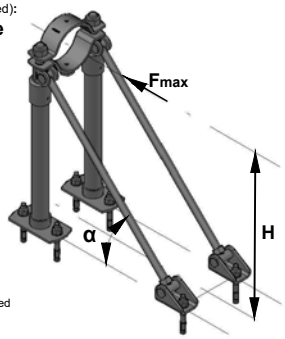
MFP-ULD without sound insulation

Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

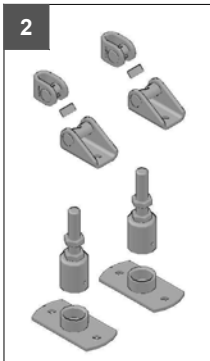
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



1 — MFP-PC Fixed Point Pipe Ring

1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

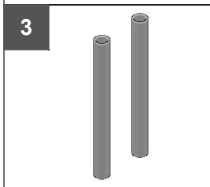
2 — MFP-ULD Fixed point set



1x	**MFP-ULD set**	**2223130**

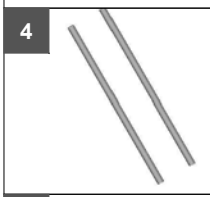
The set contains:
2x MFP-BR M16 bracing set
2x MFP-BPA 1 ¼ base plate adapter set

3 — 1 ¼" Threaded Tube



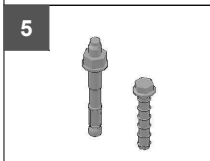
2x	**GR-G 1 ¼"x 2000 4.6 threaded tube**	**248532**

4 — M16 Bracing Threaded Rod



2x	**AM16x1000 4.8 threaded rod**	**216422**
	AM16x2000 4.8 threaded rod	**216423**
	AM16x3000 4.8 threaded rod	**216424**

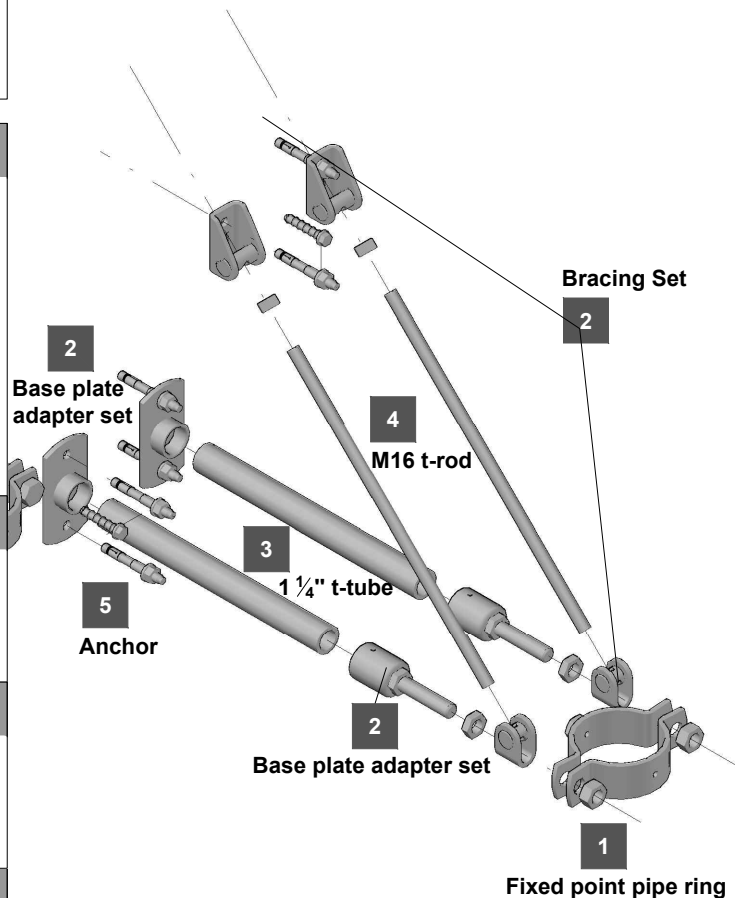
5 — Anchors



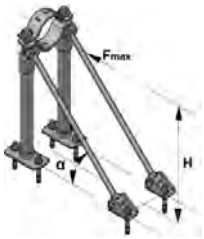
6x	**HUS3-H 10x90 35/15/5**	**2079914**

or

6x	**HST3 M12x85 10/-**	**2113978**

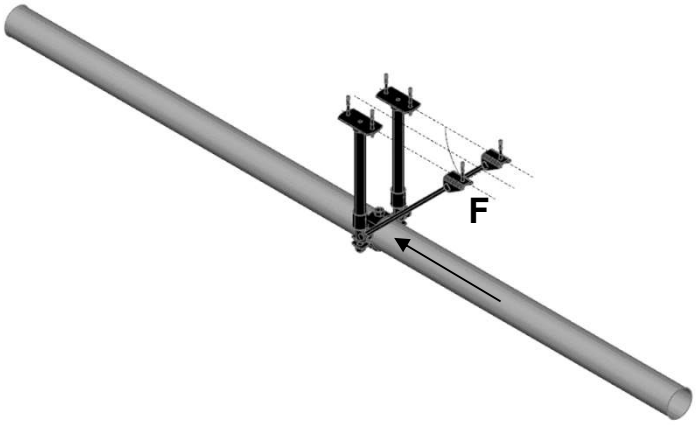


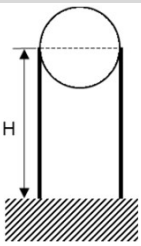
Application description	Application	Product lines	Base material
Heating - MFP-ULD Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



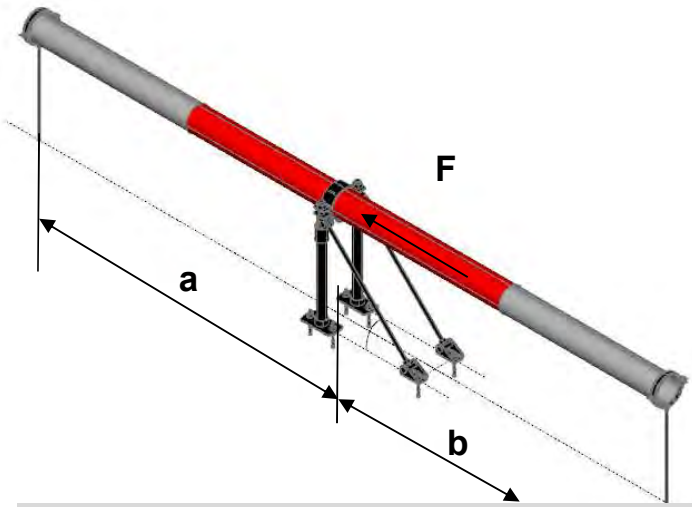
MFP-ULD recommended loading capacity limits

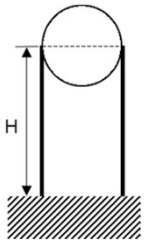
Hanging pipes - Recommended loading capacity



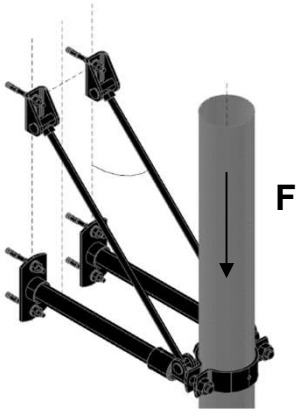


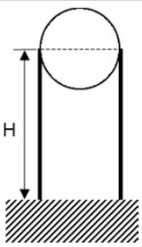
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity



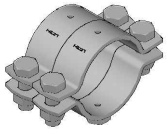


H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Riser Fixed Point On Concrete - MFP-UM Fixed Point:

MFP-UM without sound insulation

1



1	**MFP-PC Fixed Point Pipe Ring**	
2x	**MFP-PC 73-78 M20**	**2227701**
	MFP-PC 88-93 M20	**2227702**
	MFP-PC 100-105 M20	**2227703**
	MFP-PC 108-115 M20	**2227704**
	MFP-PC 125-133 M20	**2227705**
	MFP-PC 134-142 M20	**2227706**
	MFP-PC 154-162 M20	**2227707**
	MFP-PC 162-170 M20	**2227708**
	MFP-PC 192-200 M20	**2227709**
	MFP-PC 213-221 M20	**2227710**
	MFP-PC 242-250 M20	**2227711**
	MFP-PC 267-275 M20	**2227712**
	MFP-PC 318-326 M20	**2227598**

2

2	**MFP - UM Fixed point set**	
1x	**MFP-UM set**	**2238272**

The set contains:

2x MFP-BR M16 bracing set

1x MFP-BPA 1 ¼ base plate adapter set

1x MFP-PCA adapter

3

3	**1 ¼" Threaded Tube**	
1x	**GR-G 1 ¼"x 2000 4.6 threaded tube**	**248532**

4

4	**M16 Bracing Threaded Rod**	
2x	**AM16x1000 4.8 threaded rod**	**216422**
	AM16x2000 4.8 threaded rod	**216423**
	AM16x3000 4.8 threaded rod	**216424**

5

5	**Anchors**	
4x	**HUS3-H 10x110 55/35/25**	**2079916**
or		
4x	**HST3 M12/105 30/10**	**2105718**

Resistance and limitations

Recommended resitance (safety factor 1.5 included):

F_{max} = For loading capacity cases, see the reverse page

H_{min} = 175mm

H_{max} = 2000mm

height above ground to base of pipe

α_{min} = 35°

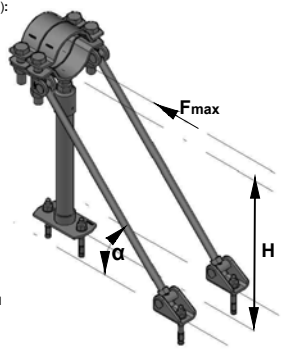
α_{max} = 45°

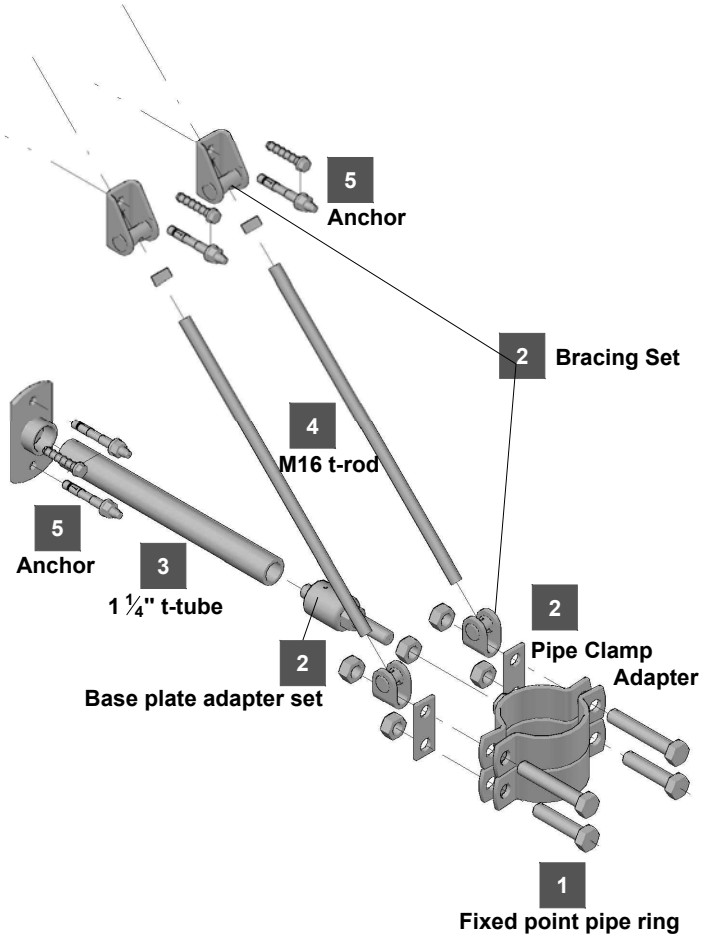
Validity of the capacity limits:

- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

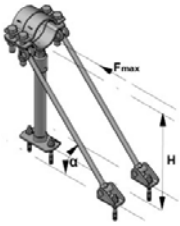
Disclamier:

- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



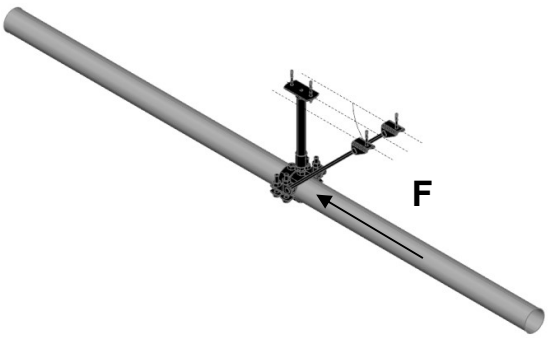


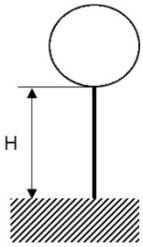
Application description	Application	Product lines	Base material
Heating - MFP-UM Riser Fixed Point	12	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



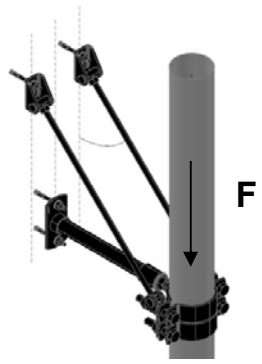
MFP-UM recommended loading capacity limits

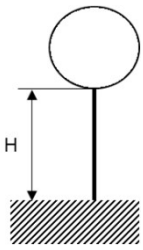
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





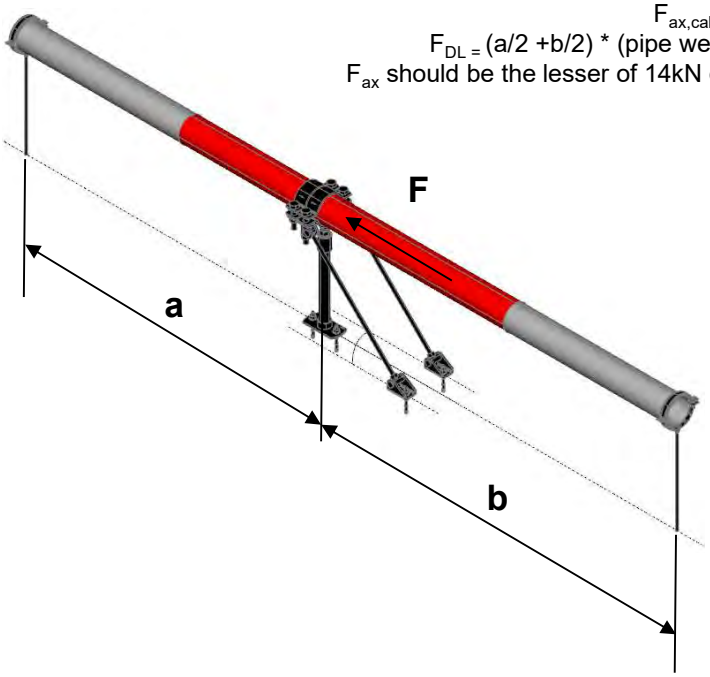
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

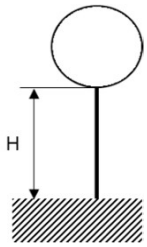
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	F_{ax}	9.095
1600	F_{ax}	8.401
1750	F_{ax}	7.512
1800	F_{ax}	7.249
1900	F_{ax}	6.767
2000	F_{ax}	6.334

Riser Fixed Point On Concrete - MFP-UHD Fixed Point:

MFP-UHD without sound insulation

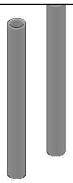
1 

1	**MFP-PC Fixed Point Pipe Ring**	
2x	**MFP-PC 73-78 M20**	**2227701**
	MFP-PC 88-93 M20	**2227702**
	MFP-PC 100-105 M20	**2227703**
	MFP-PC 108-115 M20	**2227704**
	MFP-PC 125-133 M20	**2227705**
	MFP-PC 134-142 M20	**2227706**
	MFP-PC 154-162 M20	**2227707**
	MFP-PC 162-170 M20	**2227708**
	MFP-PC 192-200 M20	**2227709**
	MFP-PC 213-221 M20	**2227710**
	MFP-PC 242-250 M20	**2227711**
	MFP-PC 267-275 M20	**2227712**
	MFP-PC 318-326 M20	**2227598**

2 

2	**MFP-UHD Fixed point set**	
1x	**MFP-UHD set**	**2223138**

The set contains:
2x MFP-BRH M16 bracing set
2x MFP-BPA 1 ¼ base plate adapter set
1x MFP-PCA M20 adapter

3 

3	**1 ¼" Threaded Tube**	
2x	**GR-G 1 ¼"x 2000 4.6 threaded tube**	**248532**

4 

4	**M16 Bracing Threaded Rod**	
2x	**AM16x1000 4.8 threaded rod**	**216422**
	AM16x2000 4.8 threaded rod	**216423**
	AM16x3000 4.8 threaded rod	**216424**

5 

5	**Anchors**	
4x	**HUS3-H 10x110 55/35/25**	**2079916**
4x	**HUS3-H 14x130 65/45/15**	**2079923**
or		
4x	**HST3 M12/105 30/10**	**2105718**
4x	**HST3 M16x135 35/15**	**2105858**

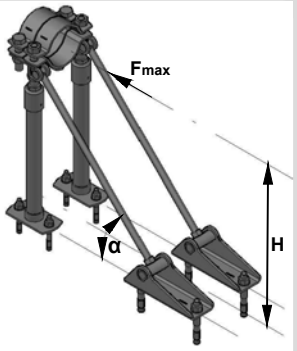
Welded stoppers on all Fixed points loaded with F > 14.0 kN

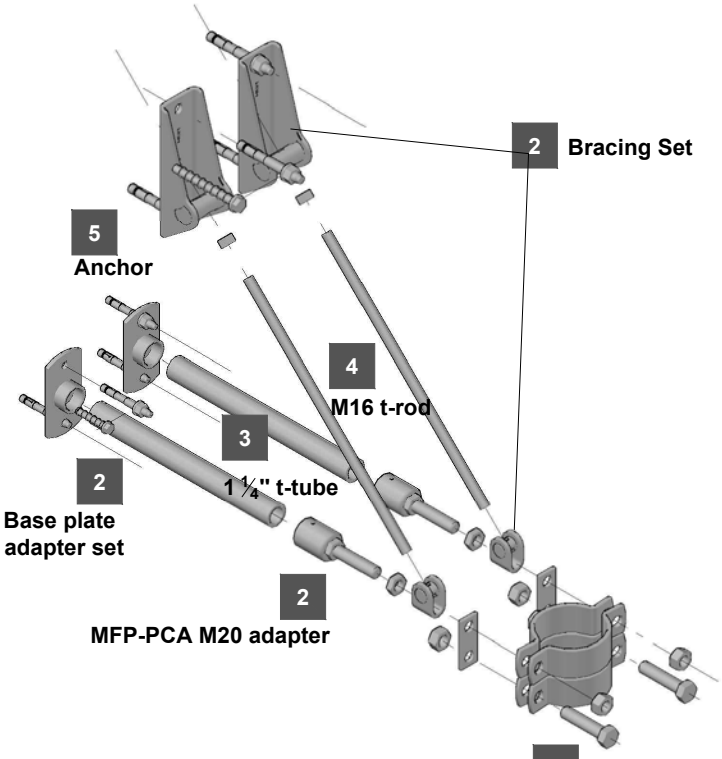
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 200 mm
H_{max} = 2000 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

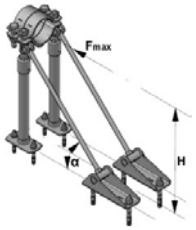
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





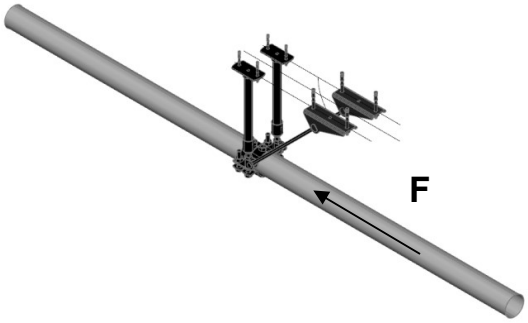
Application description	Application	Product lines	Base material
Heating - MFP-UHD Riser Fixed Point	12	Fixed point sets	Concrete
		Threaded parts	

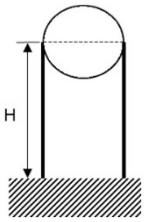
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



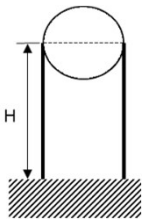
MFP-UHD recommended loading capacity limits

Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity



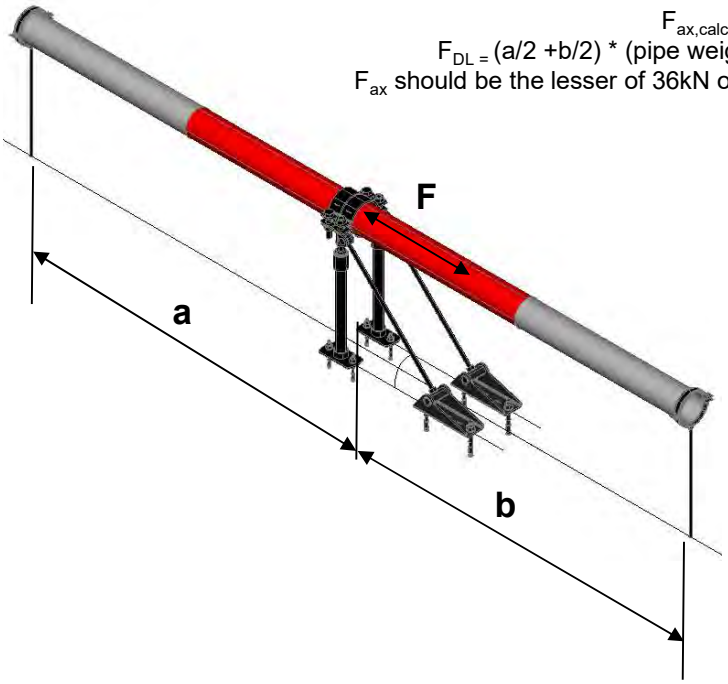
H [mm] up to	F [kN]
0	36.000
500	36.000
550	36.000
600	36.000
650	36.000
700	36.000
750	36.000
800	36.000
850	34.953
900	32.850
950	30.953
1000	29.235
1100	26.247
1200	23.739
1250	22.632
1300	21.608
1400	19.777
1500	18.190
1600	16.803
1750	15.024
1800	14.499
1900	13.534
2000	12.669

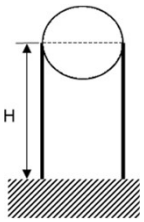
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 36kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	36.000	
500	36.000	
550	36.000	
600	36.000	
650	36.000	
700	36.000	
750	F_{ax}	39.928
800	F_{ax}	37.299
850	F_{ax}	34.953
900	F_{ax}	32.850
950	F_{ax}	30.953
1000	F_{ax}	29.235
1100	F_{ax}	26.247
1200	F_{ax}	23.739
1250	F_{ax}	22.632
1300	F_{ax}	21.608
1400	F_{ax}	19.777
1500	F_{ax}	18.190
1600	F_{ax}	16.803
1750	F_{ax}	15.024
1800	F_{ax}	14.499
1900	F_{ax}	13.534
2000	F_{ax}	12.669

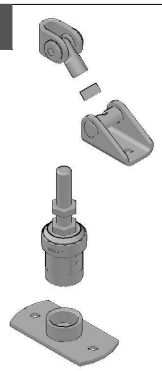
Riser Fixed Point On Concrete - MFP-UL-I Fixed Point:

MFP-UL-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 62-66 M20	2227699
	MFP-PC 68-72 M20	2227700
	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706

2



2	MFP-UL-I Fixed point set	
1x	MFP-UL-I set	2223133

The set contains:
1x MFP-BR M16 bracing set
1x MFP-BPA-I 1 ¼ base plate adapter set

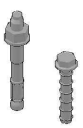
3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
1x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5



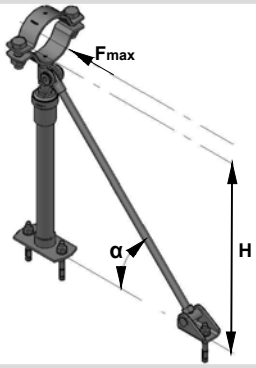
5	Anchors	
3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978

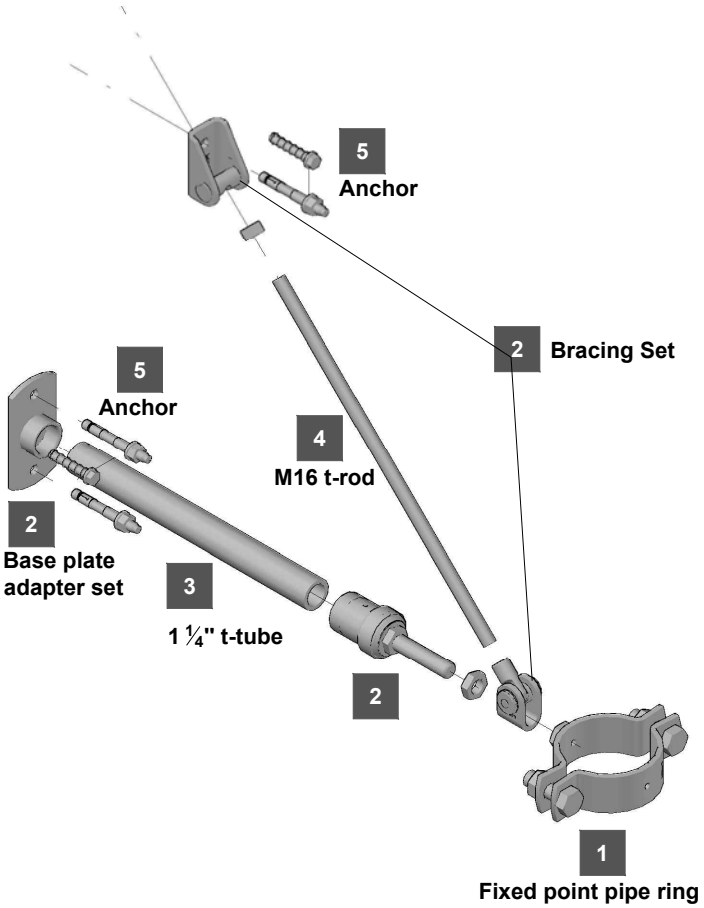
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



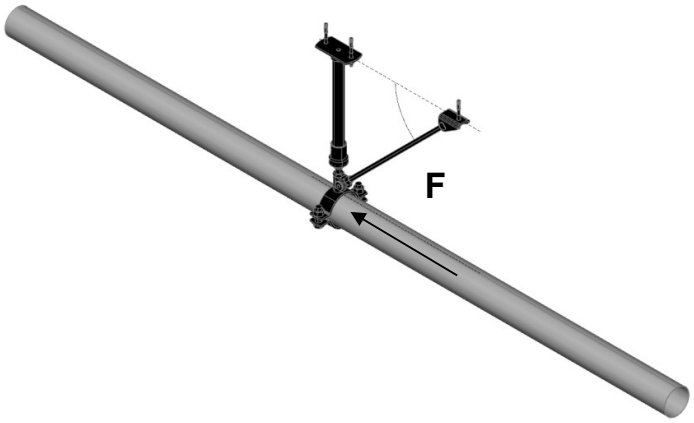


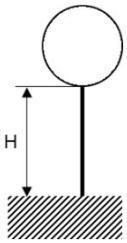
Application description	Application	Product lines	Base material
Heating - MFP-UL-I Riser Fixed Point	12	Fixed point sets	Concrete
		Threaded parts	

General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

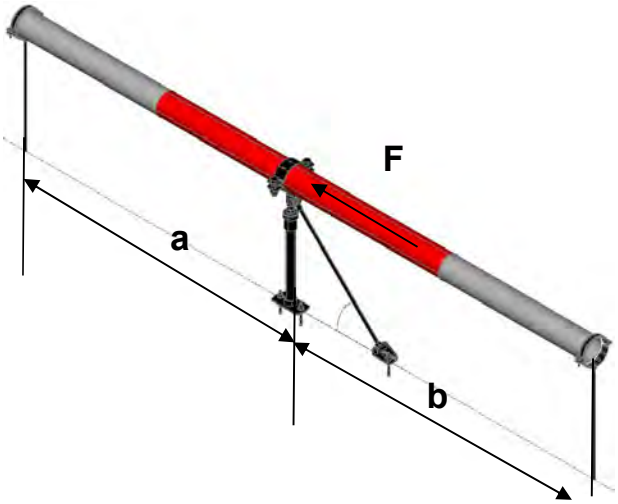
MFP-UL-I recommended loading capacity limits

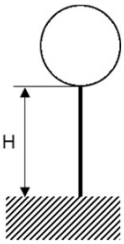
Hanging pipes - Recommended loading capacity



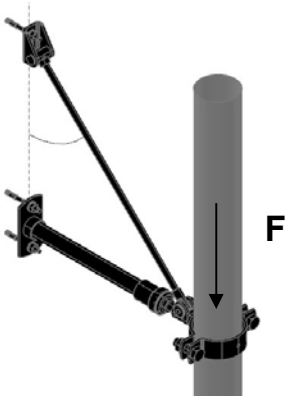


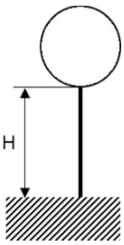
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

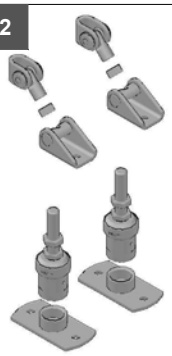
Riser Fixed Point On Concrete - MFP-ULD-I Fixed Point:

MFP-ULD-I with sound insulation

1

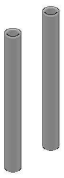
1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2



2	MFP-ULD-I Fixed point set	
1x	MFP-ULD-I set	2223134
The set contains:		
2x	MFP-BR-I M16 bracing set	
2x	MFP-BPA-I 1 ¼ base plate adapter set	

3

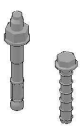


3	1 ¼" Threaded Tube	
2x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5



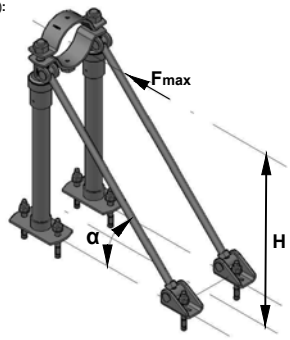
5	Anchors	
6x	HUS3-H 10x90 35/15/5	2079914
or		
6x	HST3 M12x85 10/-	2113978

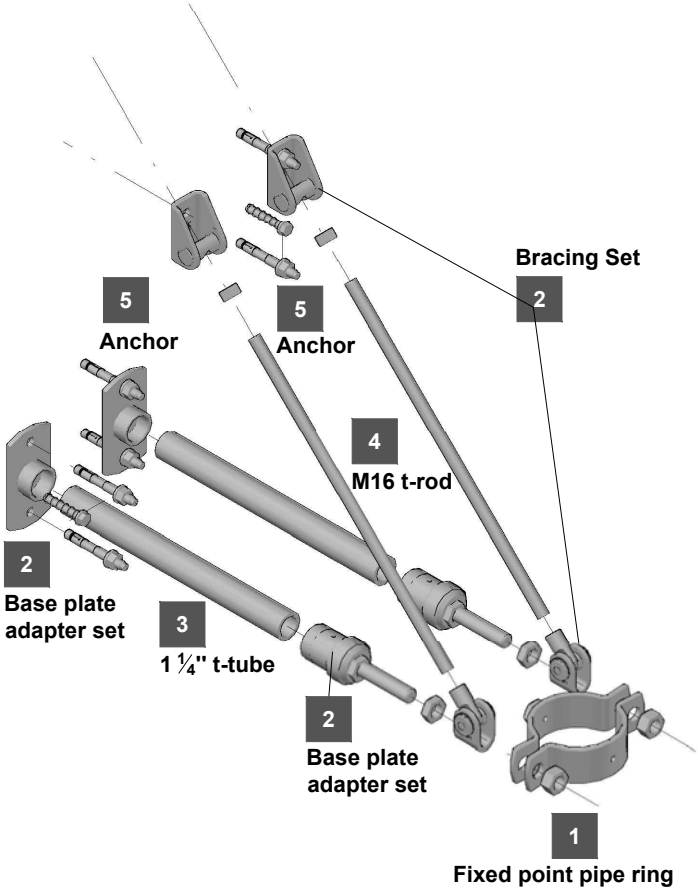
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 185 mm
H_{max} = 2000 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





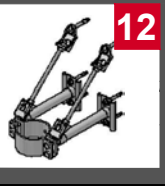
Application description

Heating - MFP-ULD-I Riser Fixed Point

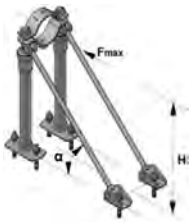
General comments

- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Application

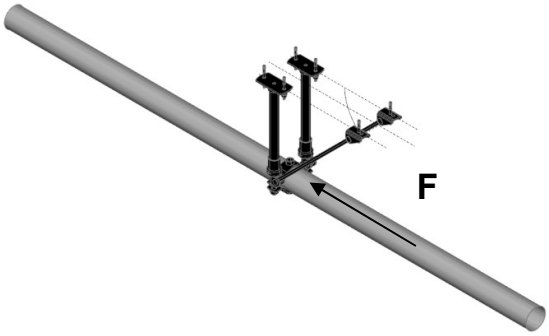


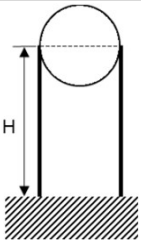
Product lines	Base material
Fixed point sets	Concrete
Threaded parts	



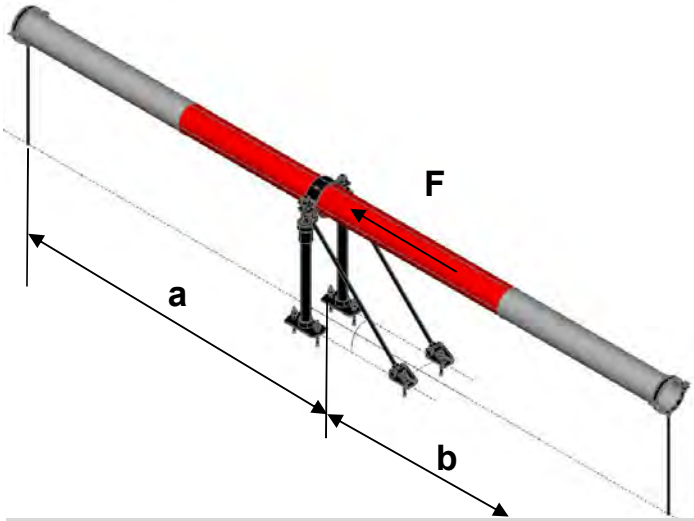
MFP-ULD-I recommended loading capacity limits

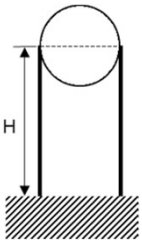
Hanging pipes - Recommended loading capacity



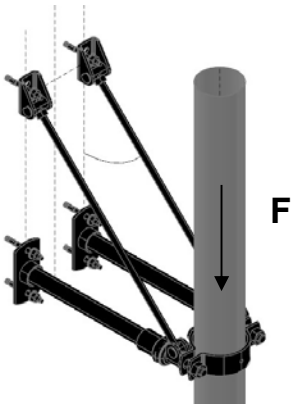


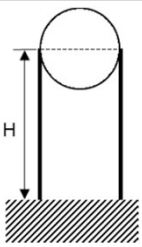
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Riser Fixed Point On Concrete - MFP-UM-I Fixed Point:

MFP-UM-I with sound insulation

1

1	MFP-PC Fixed Point Pipe Ring	
2x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20	2227710
	MFP-PC 242-250 M20	2227711
	MFP-PC 267-275 M20	2227712
	MFP-PC 318-326 M20	2227598

2

2	MFP- UM-I Fixed point set	
1x	MFP-UM - I set	2238274

The set contains:
2x MFP-BR-I M16 bracing set:
1x MFP-BPA-I 1 ¼ base plate adapter set
1x MFP-PCA adapter

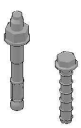
3

3	1 ¼" Threaded Tube	
1x	GR-G 1 ¼"x 2000 4.6 threaded tube	248532

4

4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5



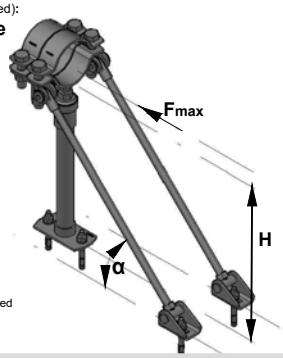
5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x85 10/-	2113978

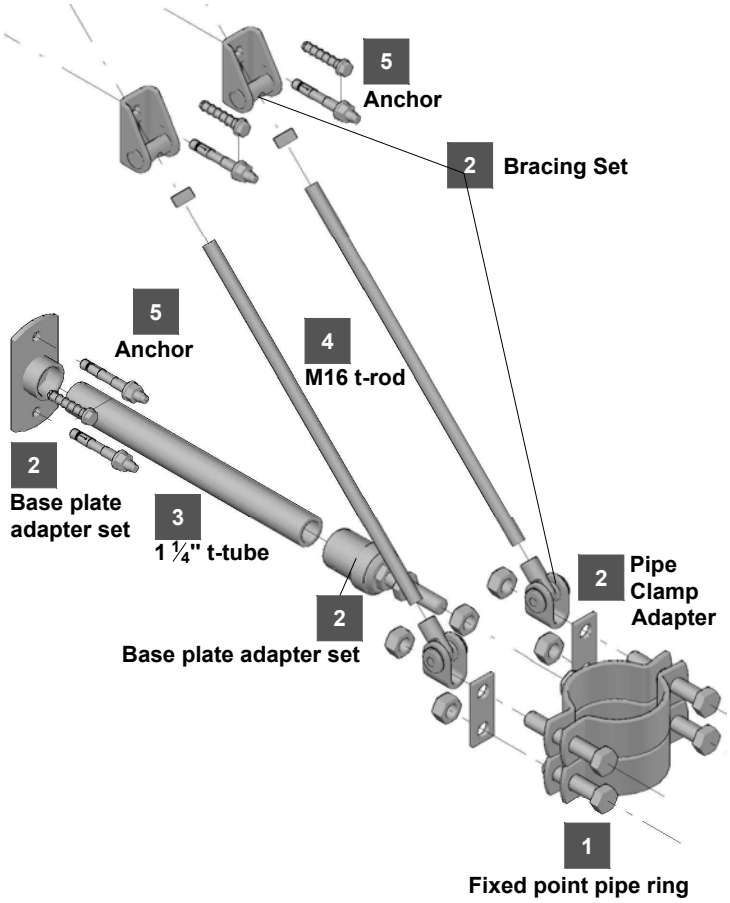
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 175mm
H_{max} = 2000mm
height above ground to base of pipe
α_{min} = 35°
α_{max} = 45°

Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated



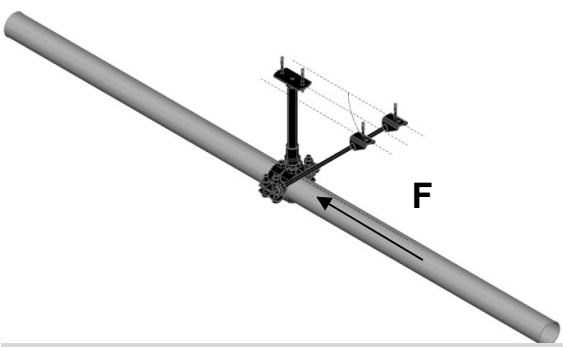


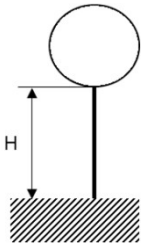
Application description	Application	Product lines	Base material
Heating - MFP-UM-I Riser Fixed Point	12	Fixed point sets	Concrete
		Threaded parts	

General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

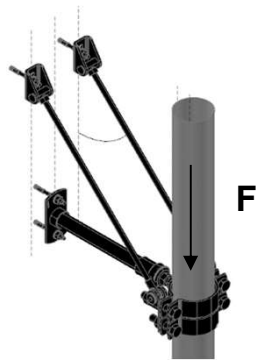
MFP-UM-I recommended loading capacity limits

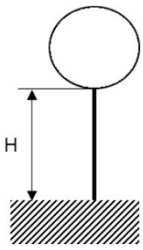
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





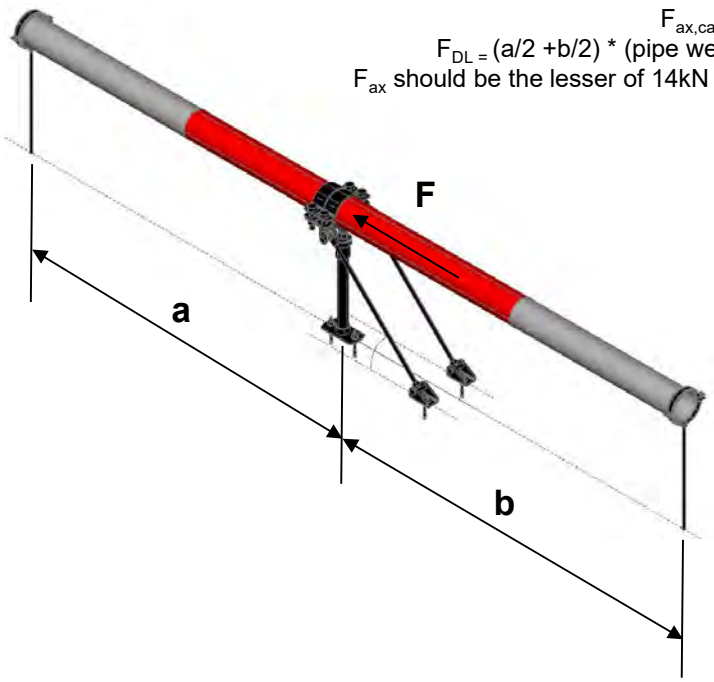
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

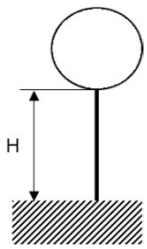
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$





H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	F_{ax}	9.095
1600	F_{ax}	8.401
1750	F_{ax}	7.512
1800	F_{ax}	7.249
1900	F_{ax}	6.767
2000	F_{ax}	6.334

Primary Heating Media Collector Bracket - MIQ System Frame - Options

1 MIQ collector frame

BOM for entire application without pipe ring and sliders / rollers connections

Base material connector

4x MIQC-C90 base connector (incl. connectivity parts) upper screw are not used **2120144**

Anchors

16x HST3-R M16x135 35/15 stud anchor **2105876**

Vertical girder

2x MIQ-90 3m…cm girder **2119866**

Horizontal girder

2x MIQ-90 3m…cm girder **2119866**

Angle connector

Bracket connectors

2x MIC-90-LH bracket connector (pair) without screws **2048107**

Connectivity parts for bracket connector

8x MIA-EH90 through bolt **304887**

8x MIA-TP serrated plate **305707**

8x M12-F-SL-WS 3/4" lock nut **382897**

2 Bracket connector

BOM for 1 connection

Bracket connectors

1x MIC-90-LH bracket connector (pair) without screws **2048107**

Connectivity parts for bracket connector

4x MIA-EH90 through bolt **304887**

4x MIA-TP serrated plate **305707**

4x M12-F-SL-WS 3/4" lock nut **382897**

3 MIQ 90°‹ connector fitted in open section of the girder

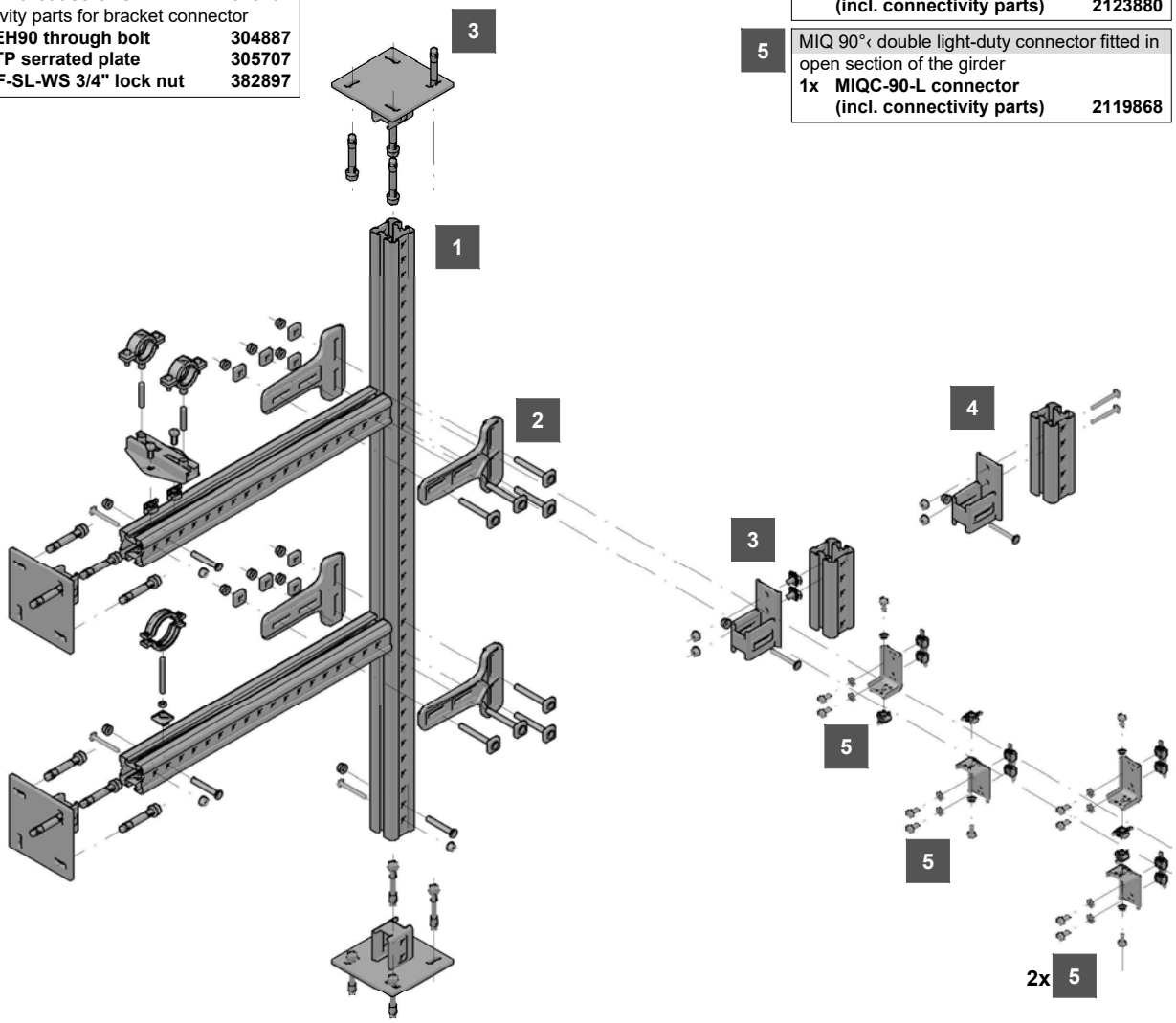
1x MIQC-90-HT connector (incl. connectivity parts) **2123881**

4 MIQ 90°‹ connector – through bolted through open side of the girder

1x MIQC-90-HS connector (incl. connectivity parts) **2123880**

5 MIQ 90°‹ double light-duty connector fitted in open section of the girder

1x MIQC-90-L connector (incl. connectivity parts) **2119868**



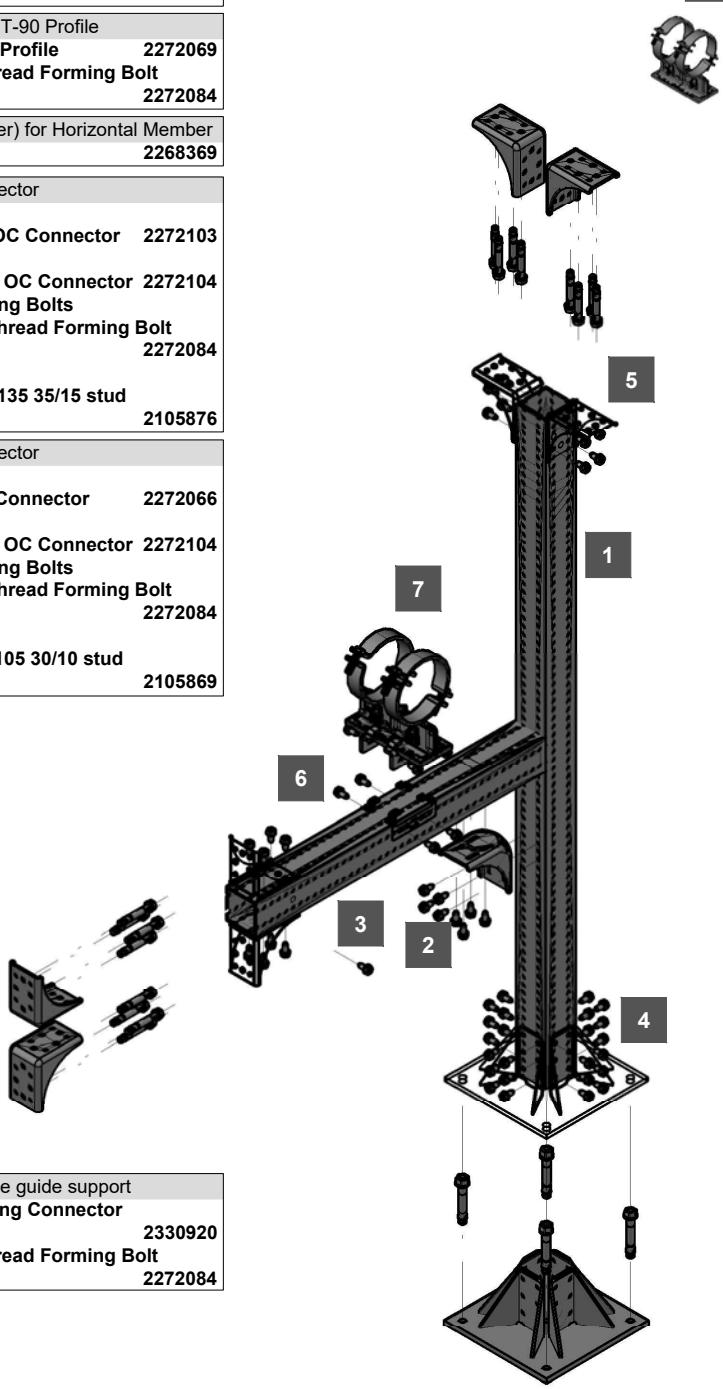
Application description	Application	Product lines	Base material
Heating - Primary heating media collector bracket	13	MIQ System	Concrete
		Sliders / rollers	
		Anchors	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Primary Heating Media Collector Bracket - MT System Frame - Sliding Support - Options

1	Closed Profile (Girder) for Vertical Upright	
	MT-90 OC 6m	**2268369**
2	90° connector for MT-90 Profile	
	1x MT-C-GL A OC Profile	**2272069**
	8x MT-TFB OC Thread Forming Bolt	**2272084**
3	Closed Profile (girder) for Horizontal Member	
	MT-90 OC 6m	**2268369**
4	Base material connector	
	1x Connector	
	MT-B-GL O4 OC Connector	**2272103**
	or	
	MT-B-GXL O4 OC Connector	**2272104**
	24 Thread Forming Bolts	
	MT-TFB OC Thread Forming Bolt	**2272084**
	4x Anchors	
	HST3-R M16x135 35/15 stud anchor	**2105876**
5	Base material connector	
	2x Connector	
	MT-C-GL OC Connector	**2272066**
	or	
	MT-B-GXL O4 OC Connector	**2272104**
	8x Thread Forming Bolts	
	MT-TFB OC Thread Forming Bolt	**2272084**
	8x Anchors	
	HST3-R M12x105 30/10 stud anchor	**2105869**



6	MT-FPS-SF OC Line guide support	
	2x Pipe Shoe Sliding Connector	
	MT-FPS-SF OC	**2330920**
	4x MT-TFB OC Thread Forming Bolt	**2272084**

7	MP-PS Pipe shoes	
	MP-PS L2-2 21-26 1/2" OC	**2330973**
	MP-PS L2-2 26-31 3/4" OC	**2330974**
	MP-PS L2-2 32-37 1" OC	**2330975**
	MP-PS L2-2 38-44 1-1/4" OC	**2330976**
	MP-PS L2-2 45-51 1-1/2" OC	**2330977**
	MP-PS L2-2 52-58 OC	**2330978**
	MP-PS L2-2 59-65 2" OC	**2330979**
	MP-PS L2-2 68-74 OC	**2330980**
	MP-PS L2-2 75-81 2-1/2" OC	**2330981**
	MP-PS L2-2 88-94 3" OC	**2330982**
	MP-PS L2-2 100-108 3-1/2" OC	**2330983**
	MP-PS L2-2 110-118 4" OC	**2330984**
	MP-PS L2-2 125-133 OC	**2330985**
	MP-PS L2-2 136-144 5" OC	**2330986**
	MP-PS L2-2 152-162 OC	**2330987**
	MP-PS L2-2 163-173 6" OC	**2330988**
	MP-PS L2-2 192-202 7" OC	**2330989**
	MP-PS L2-2 217-227 8" OC	**2330990**
	MP-PS L2-2 244-254 OC	**2330991**
	MP-PS L2-2 267-277 10" OC	**2330992**
	MP-PS L2-2 318-328 12" OC	**2330993**
	MP-PS M2-2 21-26 1/2" OC	**2330994**
	MP-PS M2-2 26-31 3/4" OC	**2330995**
	MP-PS M2-2 32-37 1" OC	**2330996**
	MP-PS M2-2 38-44 1-1/4" OC	**2330997**
	MP-PS M2-2 45-51 1-1/2" OC	**2330998**
	MP-PS M2-2 52-58 OC	**2330970**
	MP-PS M2-2 59-65 2" OC	**2330971**
	MP-PS M2-2 68-74 OC	**2330972**
	MP-PS M2-2 75-81 2-1/2" OC	**2330999**
	MP-PS M2-2 88-94 3" OC	**2331000**
	MP-PS M2-2 100-108 3-1/2" OC	**2331001**
	MP-PS M2-2 110-118 4" OC	**2331002**
	MP-PS M2-2 125-133 OC	**2331003**
	MP-PS M2-2 136-144 5" OC	**2331004**
	MP-PS M2-2 152-162 OC	**2331005**
	MP-PS M2-2 163-173 6" OC	**2331006**
	MP-PS M2-2 192-202 7" OC	**2331007**
	MP-PS M2-2 217-227 8" OC	**2331008**
	MP-PS M2-2 244-254 OC	**2331009**
	MP-PS M2-2 267-277 10" OC	**2331010**
	MP-PS M2-2 318-328 12" OC	**2331011**
	MP-PS H2-2 21-26 1/2" OC	**2331012**
	MP-PS H2-2 26-31 3/4" OC	**2331013**
	MP-PS H2-2 32-37 1" OC	**2331014**
	MP-PS H2-2 38-44 1-1/4" OC	**2331015**
	MP-PS H2-2 45-51 1-1/2" OC	**2331016**
	MP-PS H2-2 52-58 OC	**2331017**
	MP-PS H2-2 59-65 2" OC	**2331018**
	MP-PS H2-2 68-74 OC	**2331019**
	MP-PS H2-2 75-81 2-1/2" OC	**2331020**
	MP-PS H2-2 88-94 3" OC	**2331021**
	MP-PS H2-2 100-108 3-1/2" OC	**2331022**
	MP-PS H2-2 110-118 4" OC	**2331023**
	MP-PS H2-2 125-133 OC	**2331024**
	MP-PS H2-2 136-144 5" OC	**2331025**
	MP-PS H2-2 152-162 OC	**2331026**
	MP-PS H2-2 163-173 6" OC	**2331027**
	MP-PS H2-2 192-202 7" OC	**2331028**
	MP-PS H2-2 217-227 8" OC	**2331029**
	MP-PS H2-2 244-254 OC	**2331030**
	MP-PS H2-2 267-277 10" OC	**2331031**
	MP-PS H2-2 318-328 12" OC	**2331032**

For other types of Pipe Shoes go to www.Hilti.group

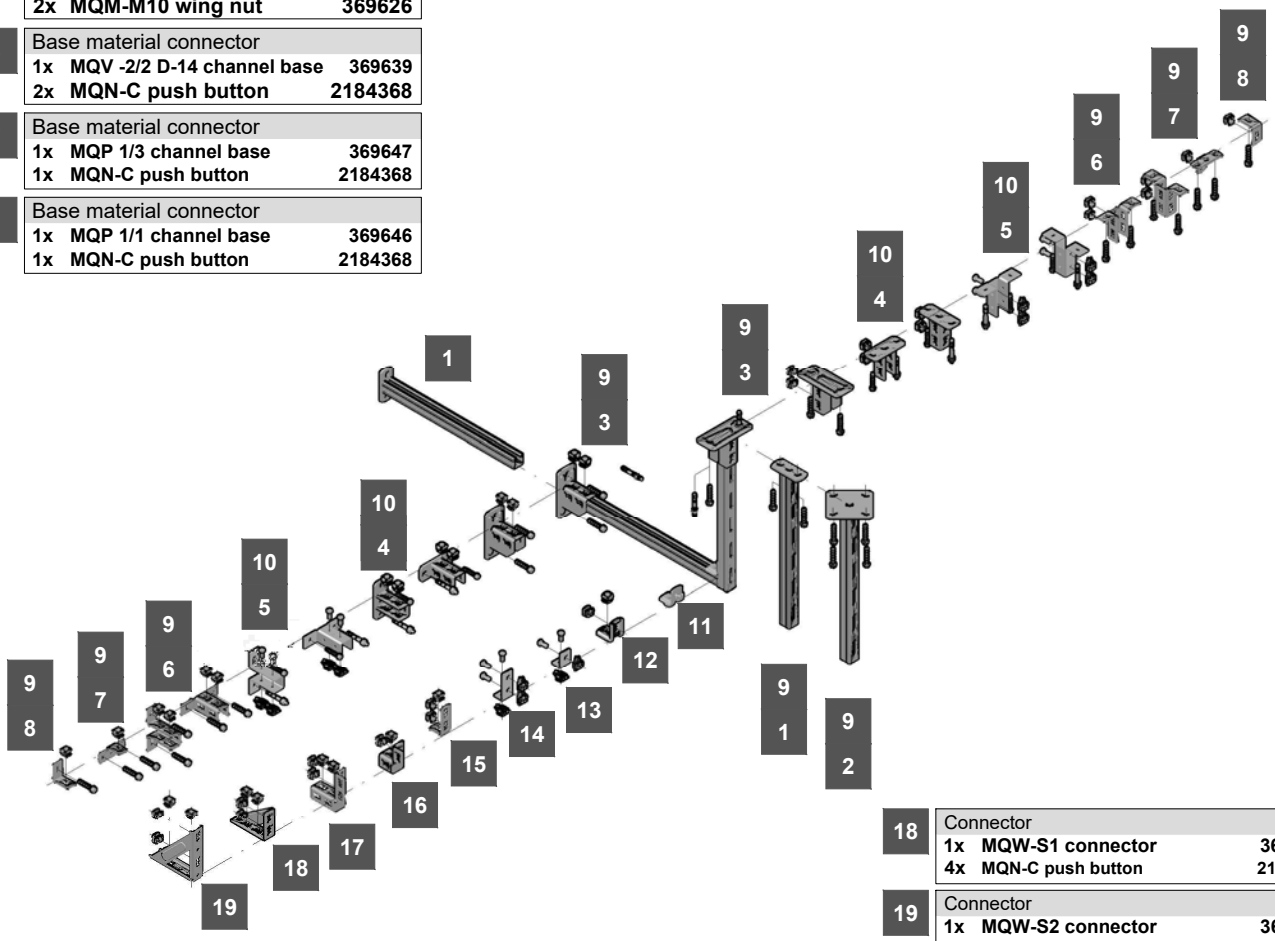
Application description	Application	Product lines	Base material
Heating - Primary Heating Media Collector Bracket	13	MT System	Concrete
		Pipe Shoes	
		Anchors	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

Various Other Applications - MQ System Wall-ceiling Frame - Options

1	41 format cantilever arms 2 hole base	
	MQK-41/300	369609
	MQK-41/450	369610
	MQK-41/600	369611
	MQK-41/1000	369612
	MQK-41/3/300	370595
	MQK-41/3/450	370596
	MQK-41/3/600	370597
	MQK-21 D/300	369617
	MQK-21 D/450	369618
	MQK-21 D/600	369619
2	41 format cantilever arms 4 hole base	
	MQK-41/600/4	369613
	MQK-41/1000/4	369614
3	Base material connector	
	1x MQP 21-72 channel base	369651
	2x MQN-C push button	2184368
4	Base material connector	
	1x MQP-41 base material c.	2141927
	2x MQN-C push button	2184368
5	Base material connector	
	1x MQP-L-6/2 base materialc.	2141928
	2x M10x20 hex. screw	216453
	2x MQM-M10 wing nut	369626
6	Base material connector	
	1x MQV -2/2 D-14 channel base	369639
	2x MQN-C push button	2184368
7	Base material connector	
	1x MQP 1/3 channel base	369647
	1x MQN-C push button	2184368
8	Base material connector	
	1x MQP 1/1 channel base	369646
	1x MQN-C push button	2184368
9	Relevant anchors for channel bases	
	2x HUS3-H 10x70/-/- screw anchor	2079912
	or	
	2x HST3 M12x105 30/10 stud anchor	2105718
	HST2 M12x105/10 stud anchor	2107848
10	Relevant anchors for channel bases	
	2x HUS3-H 8x55	2079794
	or	
	2x HST3 M10x90 30/10	2105712
11	Connector	
	1x MQW-Q2 connector	369655
12	Connector	
	1x MQW-H2 angle	2141929
	2x MQN-C push button	2184368
13	Connector	
	1x MQW-L-1/1 angle	2142020
	2x M10x20 hex.screw	216453
	2x MQM-M10 wing nut	369626
14	Connector	
	1x MQW-L-2/1 angle	2142021
	3x M10x20 hex.screw	216453
	3x MQM-M10 wing nut	369626
15	Connector	
	1x MQW-3 connector	369656
	3x MQN-C push button	2184368
16	Connector	
	1x MQW-4 connector	369658
	2x MQN-C push button	2184368
17	Connector	
	1x MQW-8 connector	369650
	4x MQN-C push button	2184368



18	Connector	
	1x MQW-S1 connector	369664
	4x MQN-C push button	2184368
19	Connector	
	1x MQW-S2 connector	369665
	4x MQN-C push button	2184368

Application description	Application	Product lines	Base material
Heating - Various Other Applications	14	MQ System	Concrete
		Sliders / rollers	
		Anchors	

General comments

- Application subject to thermal expansionimpact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application

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