FIXED POINTS

BU Installation
Installation Technical Manual
Typical Applications
Product Line Applications

Version 1.2 **08.2019**

TERMS OF COMMON COOPERATION / LEGAL DISCLAIMER

The product loading capacities published in these Technical Data Sheets are only valid for the mentioned codes or technical data generation methods and the defined application conditions (e.g. ambient temperature load capacity not valid in case of fire, data not valid in support structures when mixed with third party products), assuming sufficient fastener, base material and building structure strength. Additional calculations, checks and releases by the responsible structural engineer might be needed to clarify the capacity of base material and building structure. Suitability of structures combining different products for specific applications needs to be verified by conducting a system design and calculation, using for example Hilti PROFIS software. In addition, it is crucial to fully respect the Instructions for Use and to assure clean, unaltered and undamaged state of all products at any time in order to achieve this loading capacity (e.g. misuse, modification, overload, corrosion). As products but also technical data generation methodologies evolve over time, technical data might change at any time without prior notice. We recommend to use the latest technical data sheets published by Hilti.

In any case the suitability of structures combining different products for specific applications need to be checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for any specific facility. This book only serves as an aid to interpret the suitability of structures combining different products for specific applications without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application. User must take all necessary and reasonable steps to prevent or limit damage. The suitability of structures combining different products for specific applications are only recommendations that need to be confirmed with a professional designer and/or structural engineers to ensure compliance with User` s specific jurisdiction and project requirements.

CONTENT AND OVERVIEW OF THIS MANUAL

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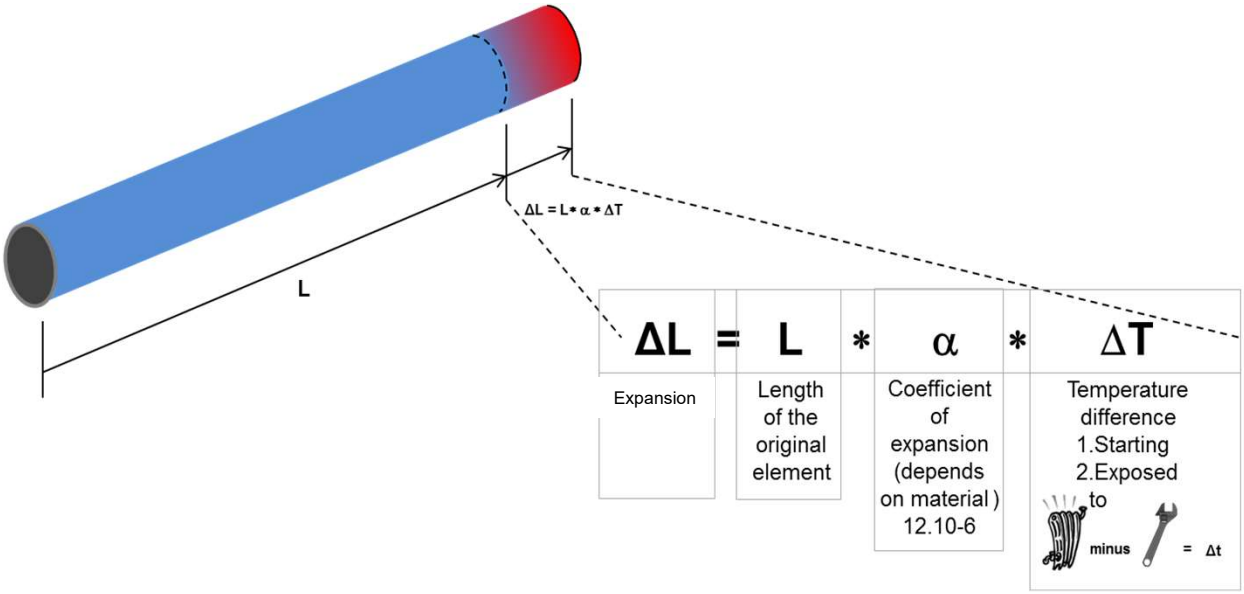
FIXED POINT - TECHNICAL BACKGROUND INFORMATION

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

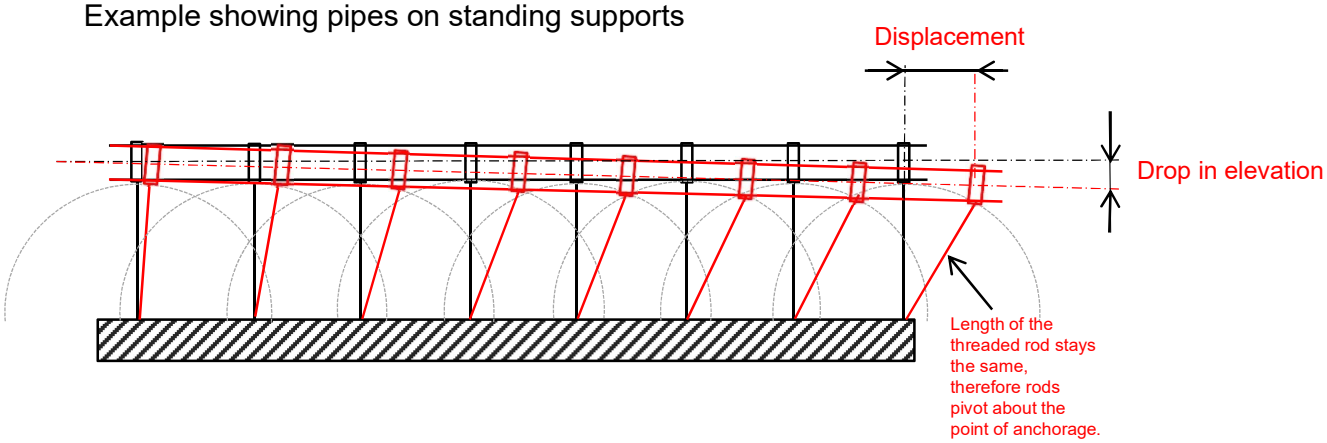
Material	Coefficient of expansion ,,α,,	Example for 10m, ΔT 50°C
Steel S 235 JR	0.0000111	5.55 mm
Stainless steel	0.000016	8.00 mm
Cast iron	0.0000105	5.25 mm
Copper SF-Cu	0.0000168	8.40 mm
Polyethylene PE 100	0.00018	90.0 mm

FIXED POINT - TECHNICAL BACKGROUND INFORMATION

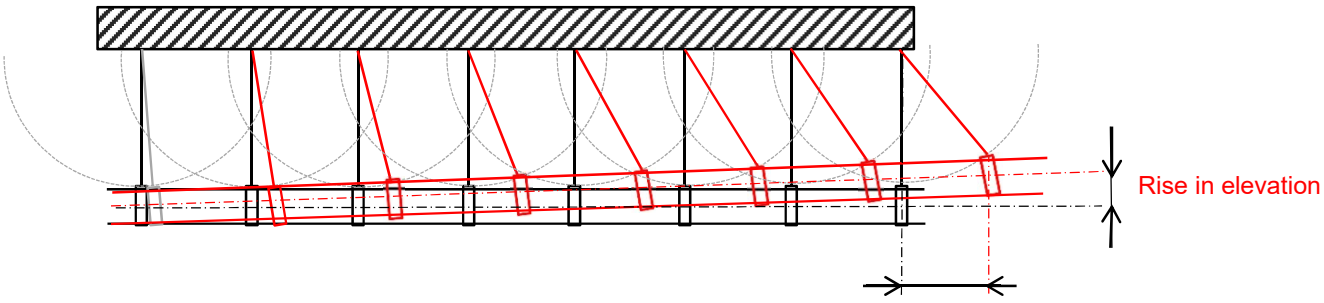
Expansion must be controlled

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



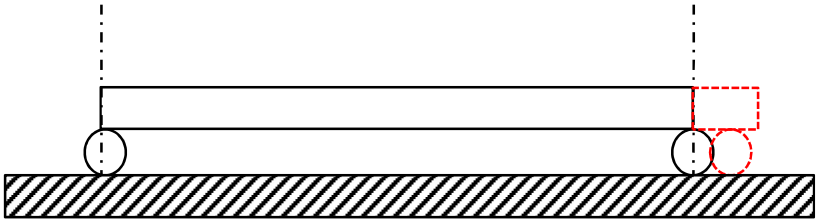
Both cases may lead to irreversible deformation, huge displacements, wrong load re-distribution and ultimately to chain reactions causing pipe collapse.

FIXED POINT - TECHNICAL BACKGROUND INFORMATION

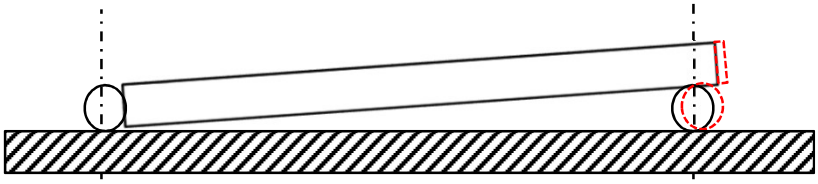
Uncontrolled expansion – impact on supports and surroundings

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

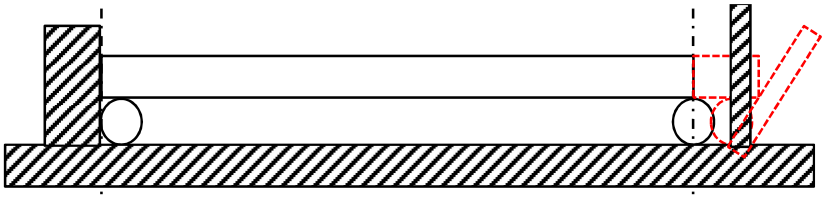
It may, by coincidence, have little effect, i.e. the pipe system is able to take up the movement.



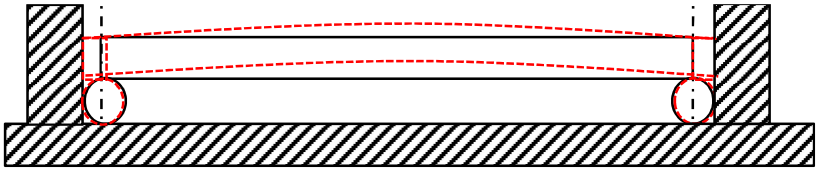
Some of the supports may become redundant.



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.

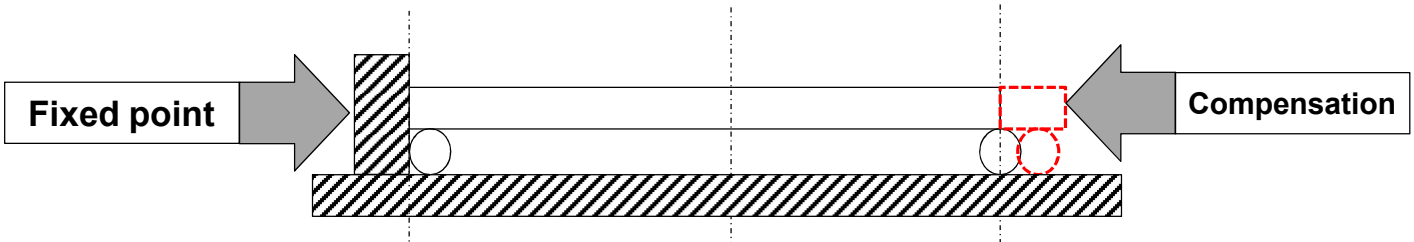


Ignoring the control of thermal expansion can have many more negative effects.
The cases above represent the majority of the problems encountered in the installation of pipes.

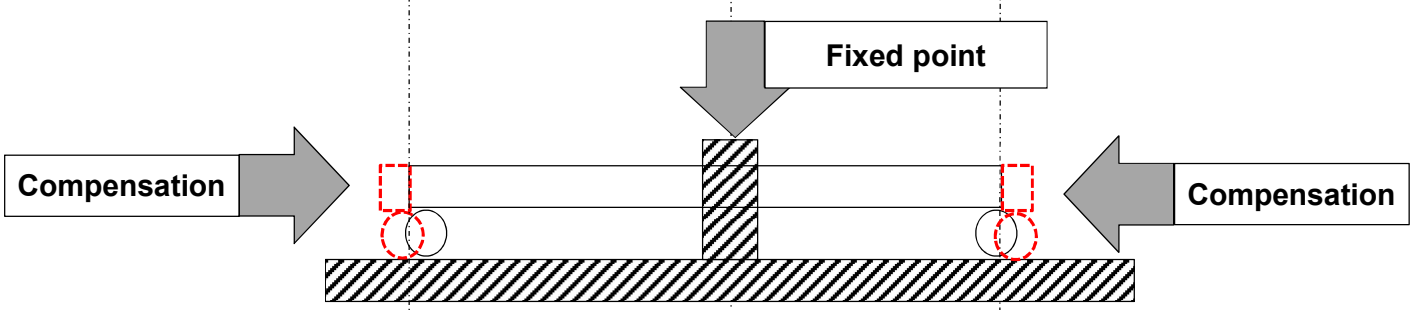
FIXED POINT - TECHNICAL BACKGROUND INFORMATION

Controlling expansion – methods used to control expansion
Expansion must be controlled. Its impact can then be predicted and calculated.

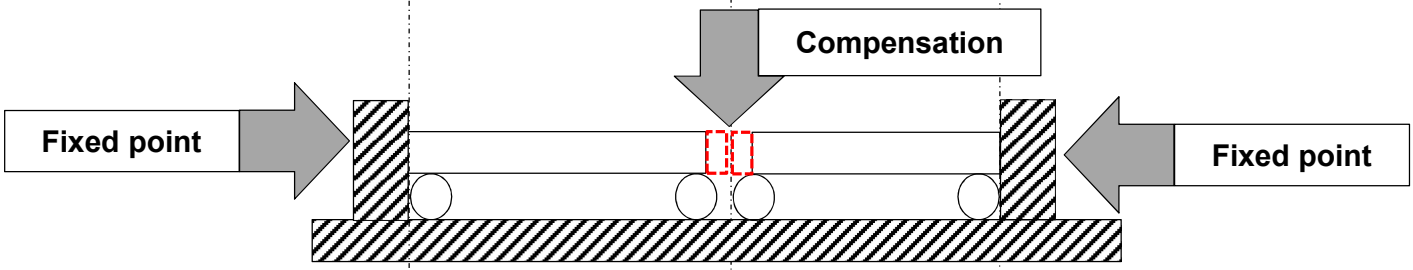
Fixed (anchor) point at one end, compensation for expansion at the other end.



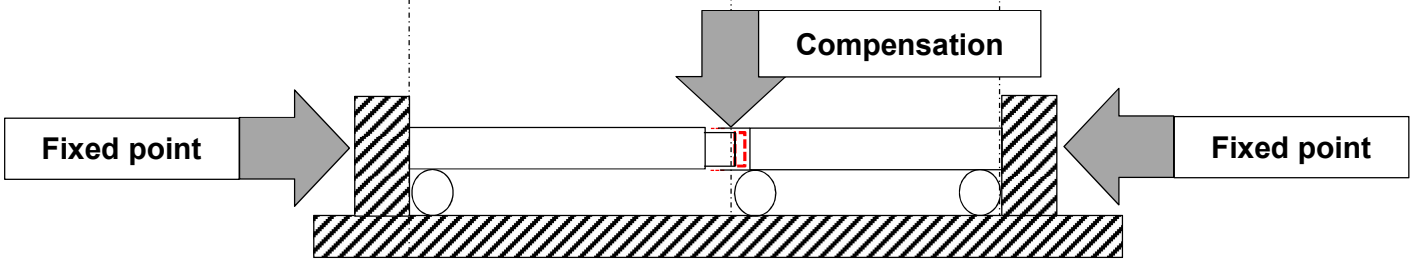
Fixed (anchor) point in the middle, compensation for expansion at both ends.



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.

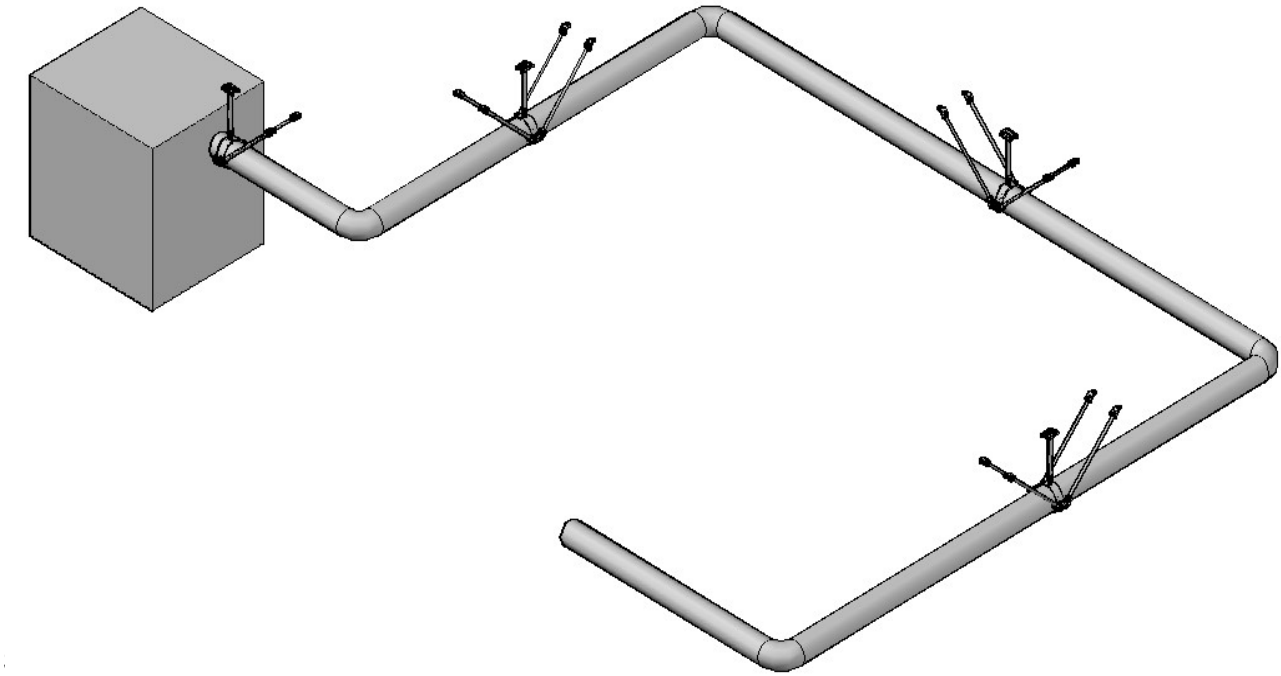


A system for controlling expansion always consists of a set of fixed points and a means of compensation.

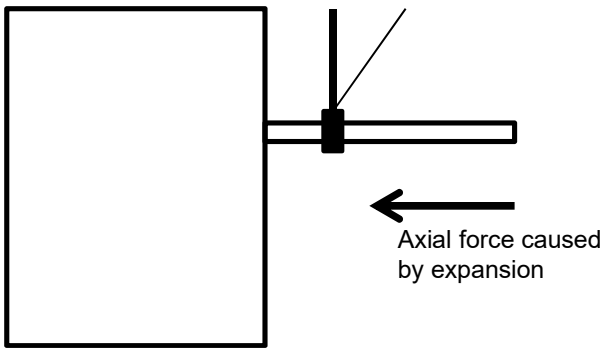
FIXED POINT - TECHNICAL BACKGROUND INFORMATION

Fixed points – placement - empirical rule

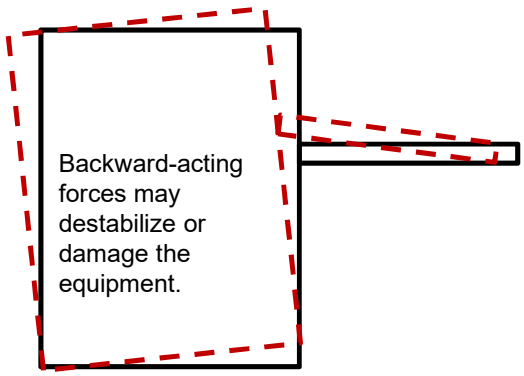
Generally, a good starting point is the following basic rule: For every straight section of pipe with a diameter of 2 ½" (76.1 mm) or more and a length of 10 m or more, expansion must be controlled by a fixed point in the middle of the run.



Plant room equipment with fixed point protection



Plant room equipment without fixed point protection



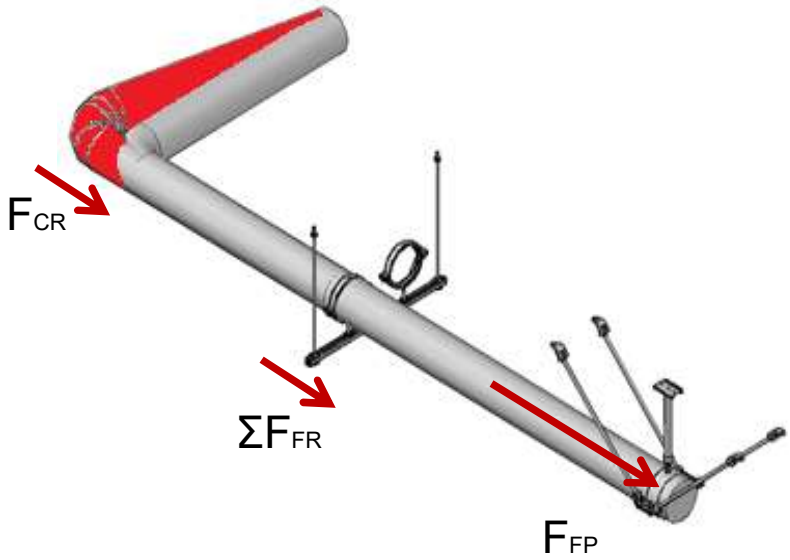
FIXED POINT - TECHNICAL BACKGROUND INFORMATION

Fixed points – 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:

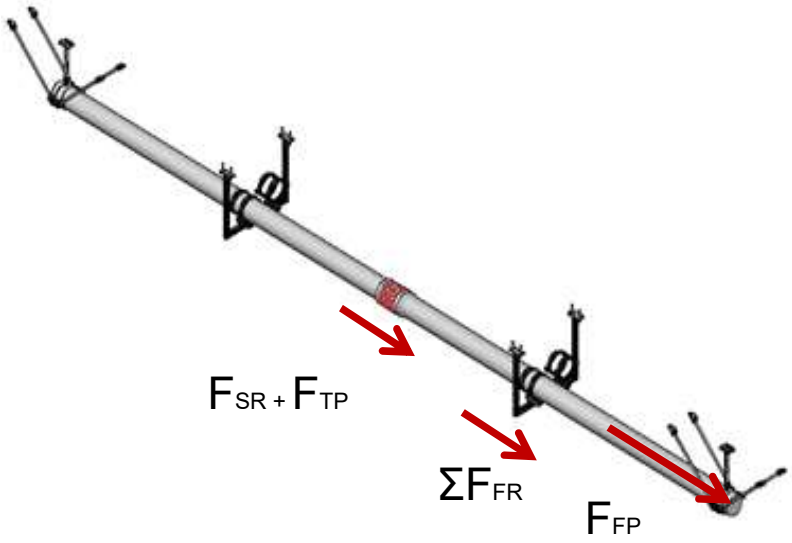
Loads generated at a fixed point by **natural compensation**:
- F_{CR} - Resistance to compensation (elbow, u-bend..)
- ΣF_{FR} - Friction at all pipe supports

Information about detailed calculation can obtain from Hilti engineering.



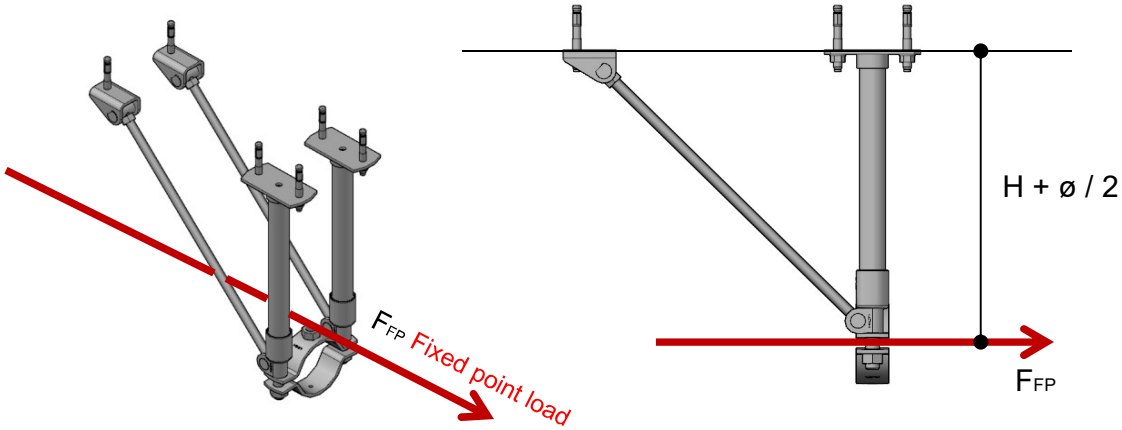
Loads generated at a fixed point by **technical compensation**:
- F_{SR} - Load generated by spring rate of the expansion joint
- F_{TP} - Media tubing pressure
- ΣF_{FR} - Friction at all pipe supports

Information about detailed calculation can be obtain from Hilti engineering.

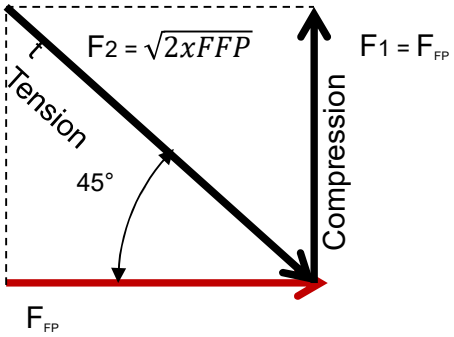


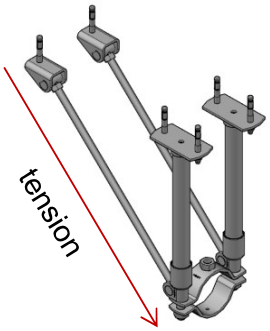
FIXED POINT - TECHNICAL BACKGROUND INFORMATION

Hilti fixed point load transfer principles

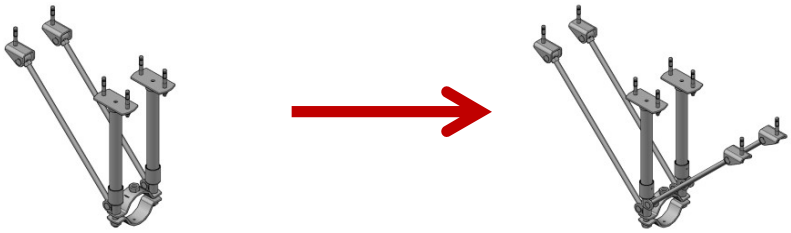


Most of the Hilti fixed point sets work on the stand and brace principle, thereby splitting the load into two parts on a triangular principle.





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.



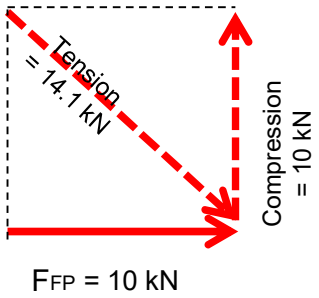
FIXED POINT - TECHNICAL BACKGROUND INFORMATION

Fixed point versus loading capacity of the structure

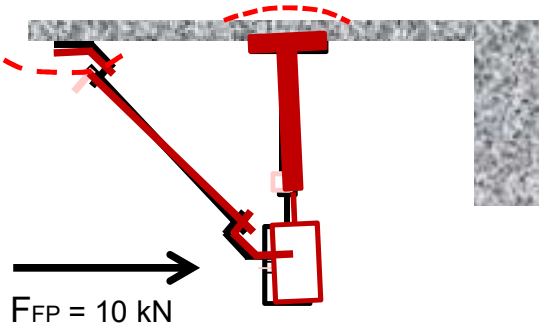
Placement of fixed points should always take the loading capacity of the building structure into account. The structural engineer responsible for the structure must always be consulted about the impact of the fixed point.

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.

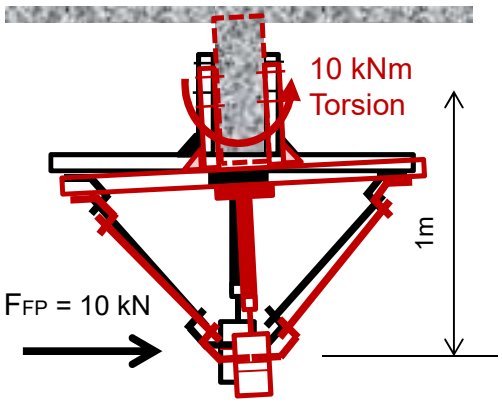
The cases are explained on the basis of a fixed point load of 10 kN acting on an arm at a distance of 1m from the supporting material.

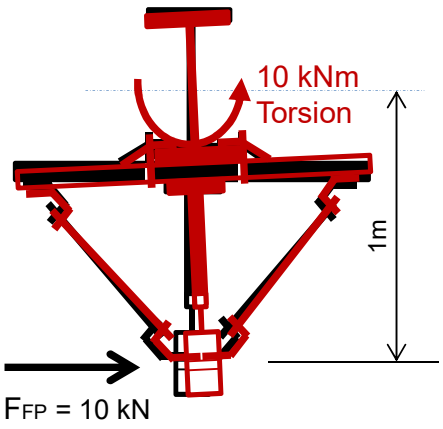


10 kN may exceed the spot loading capacity of a concrete slab and the loads acting in this way may pull out the entire anchor (fixed point).



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





Fixed Point On Concrete - MFP-CSL Fixed Point:

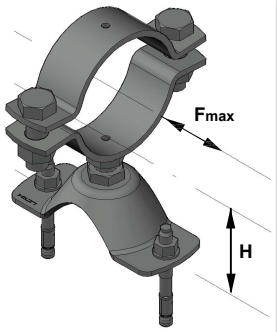
MFP-CSL without sound insulation

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

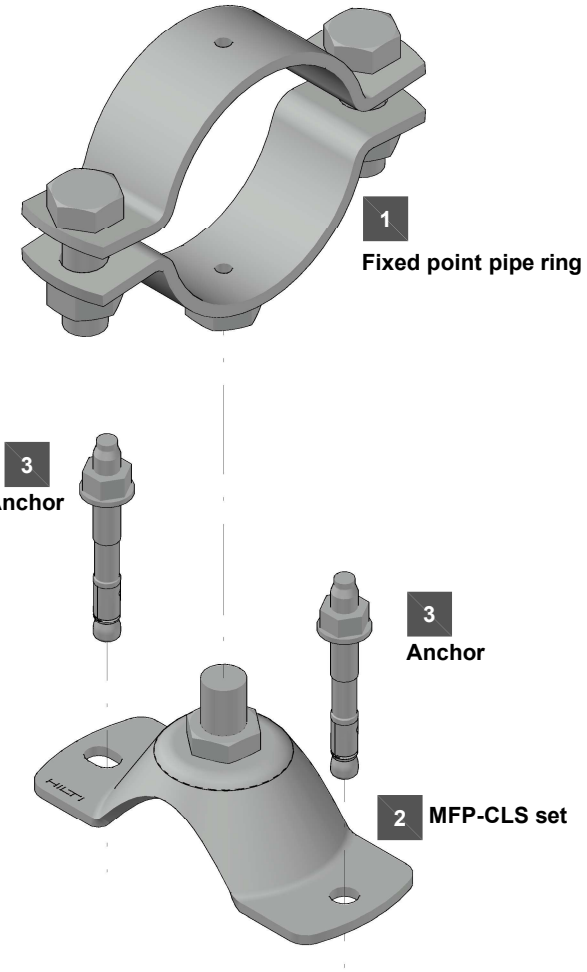
Recommended resitance
(safety factor 1.5 included):
F_{max} = 2.0 kN

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



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

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

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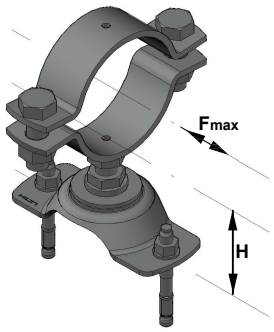
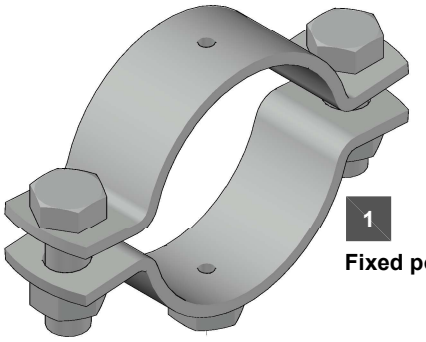
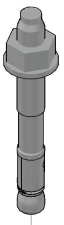
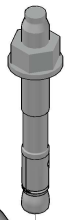




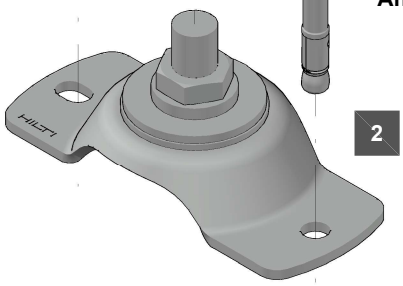
1 Fixed point pipe ring



3 Anchor



3 Anchor



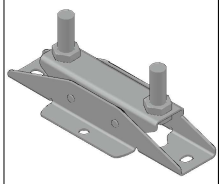
2 MFP-CLS-I set

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			

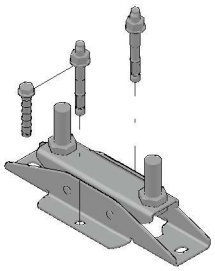
Fixed Point On Concrete - MFP-CL-I Fixed Point:

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



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Hmin = 115mm
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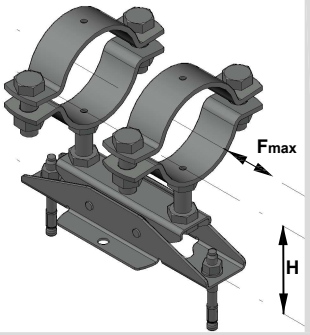

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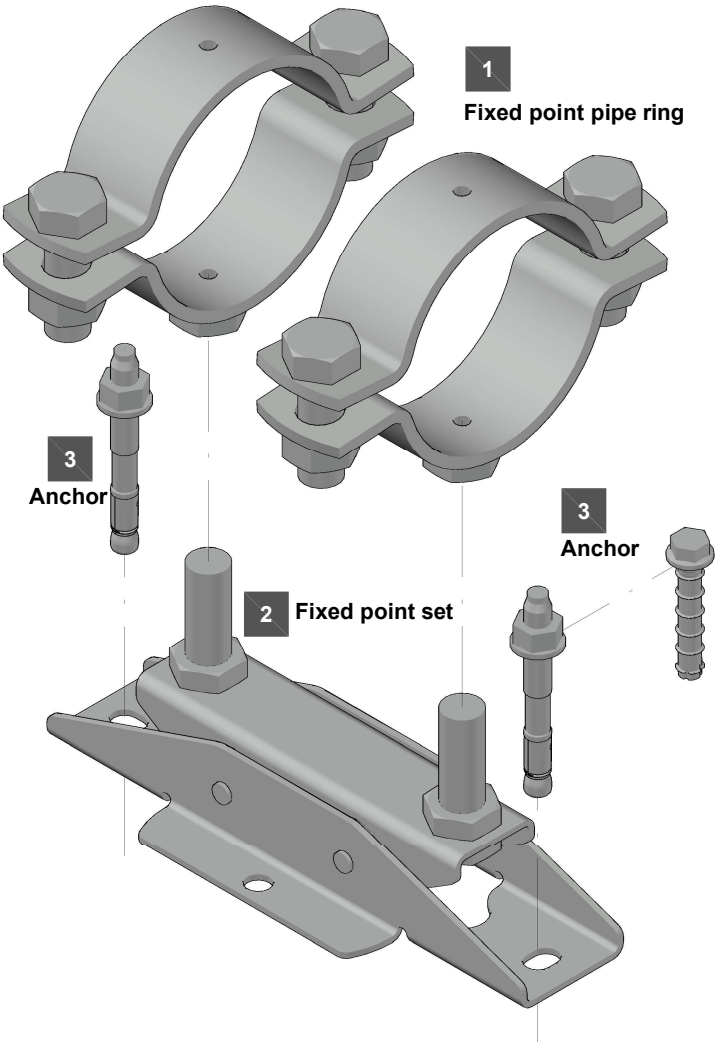
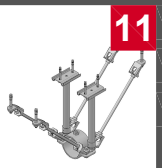


Application description	Application	Product lines	Base material
Heating - MFP-CL-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
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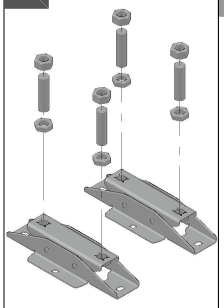
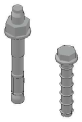
Fixed Point On Concrete - MFP-CLD-I Fixed Point:

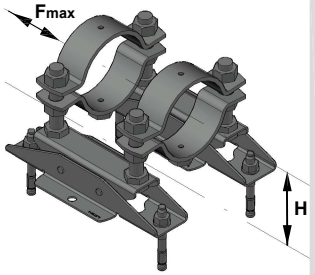
MFP-CL-I with sound insulation

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

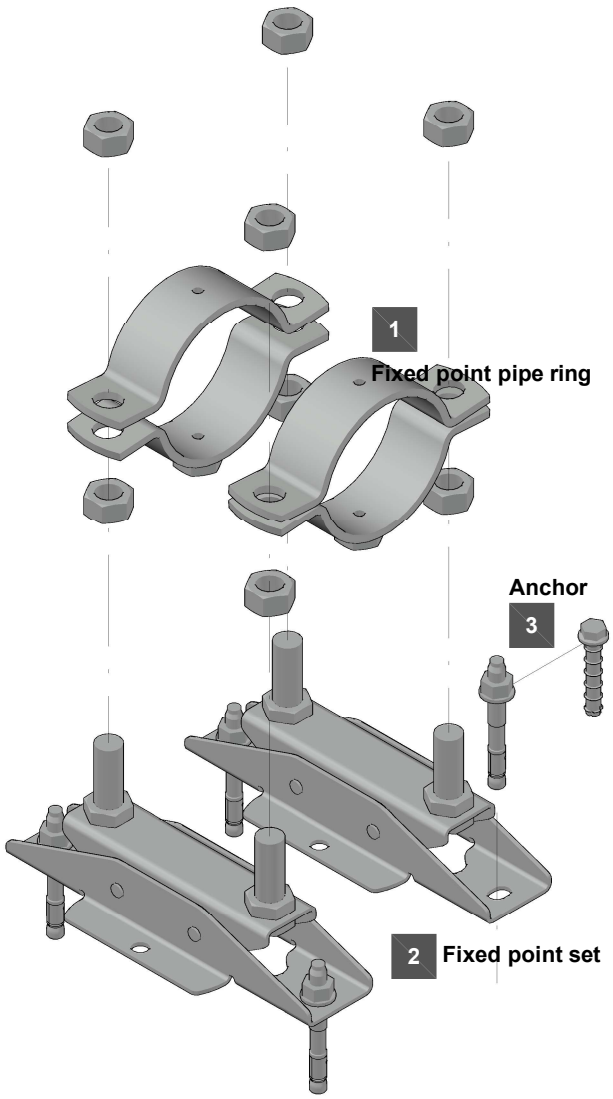
Recommended resitance
(safety factor 1.5 included):
F_{max} = 8.0kN

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

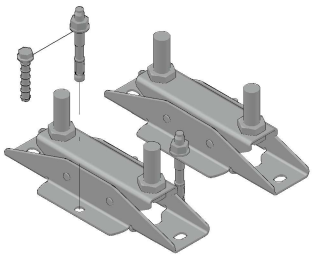


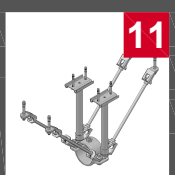
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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



Alternative anchor points

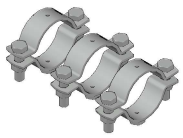


Application description	Application	Product lines	Base material
Heating - MFP-CLD-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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

Fixed Point On Concrete - MFP-CH Fixed Point:

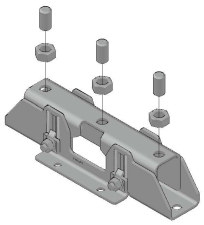
MFP-CH without sound insulation

1



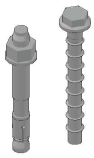
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 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

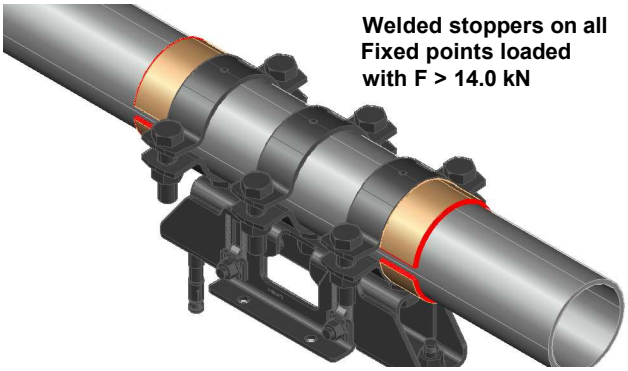


2	MFP-CH Fixed point set	
1x	MFP-CH set	2223015

3



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

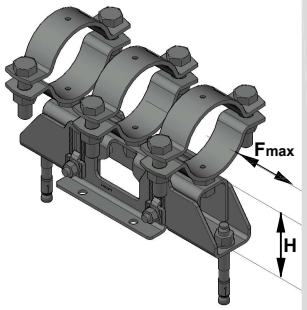


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

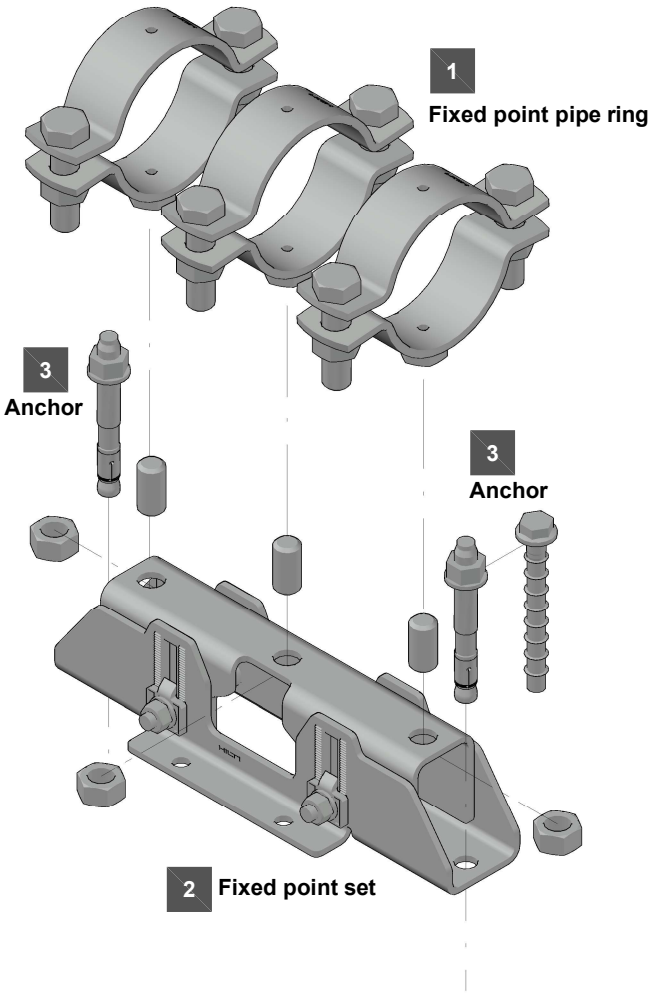
Recommended resitance
(safety factor 1.5 included):
F_{max} = 22 kN

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



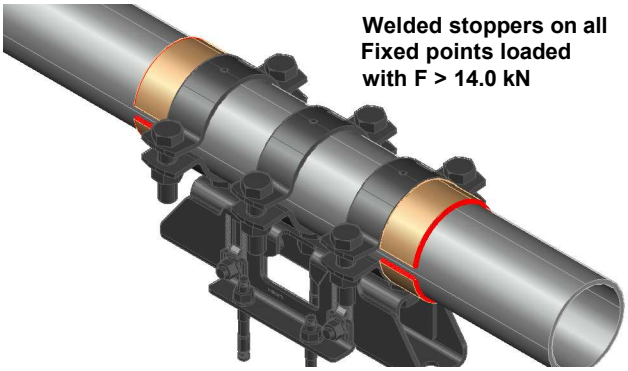
Application description	Application	Product lines	Base material
Heating - MFP-CH fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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

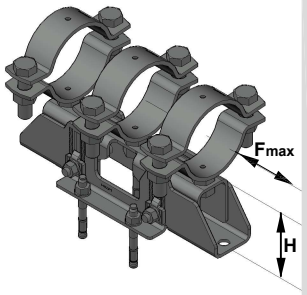


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

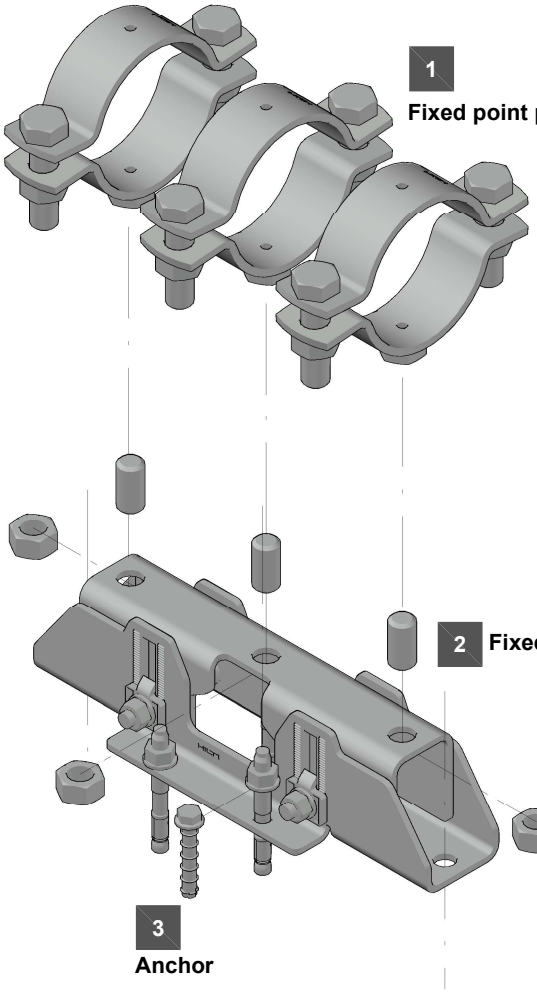
Recommended resitance
(safety factor 1.5 included):
F_{max} = 12 kN

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

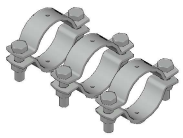
3 Anchor

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:

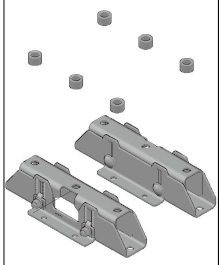
MFP-CHD without sound insulation

1



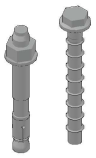
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20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

2

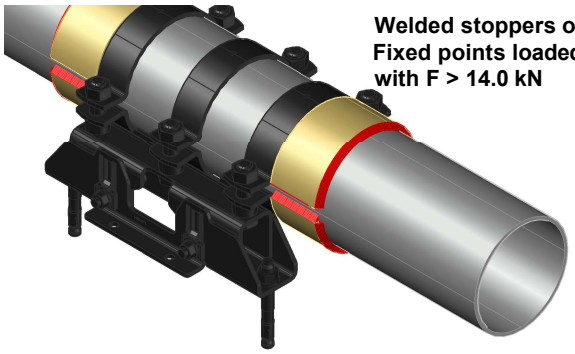


2	MFP-CHD Fixed point set	
1x	MFP-CHD set	2238264

3



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

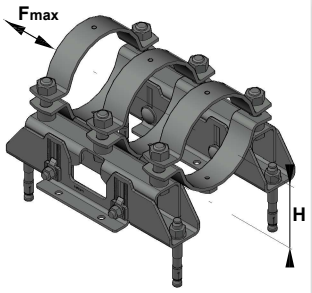


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

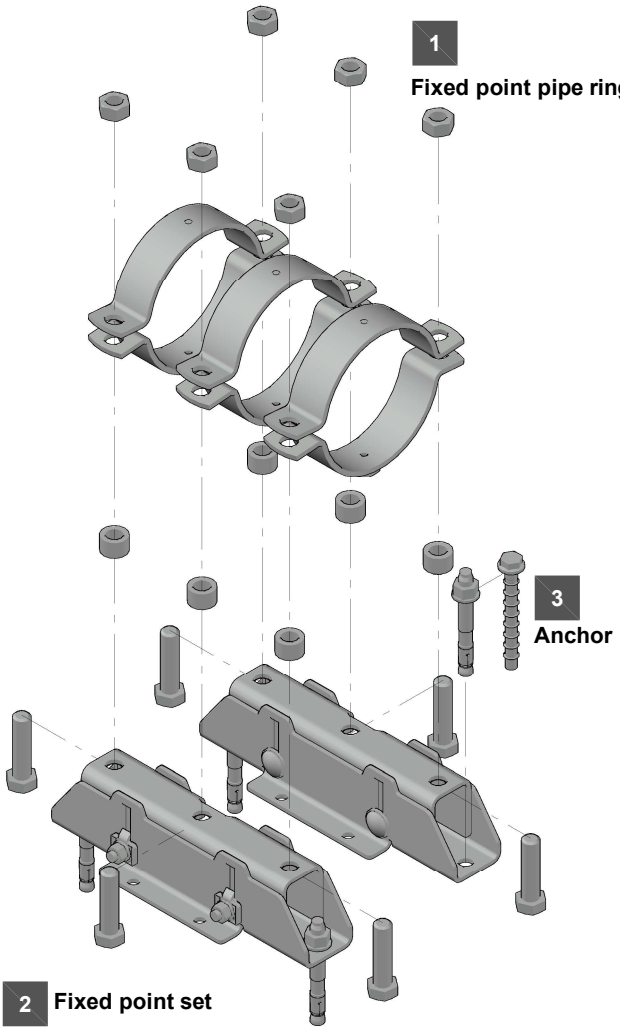
Recommended resitance
(safety factor 1.5 included):
F_{max} = 44 kN

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			

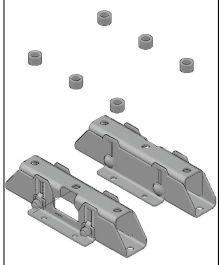
Fixed Point On Concrete - MFP-CHD Fixed Point (M12)
Fixed Point using alternative anchoring

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

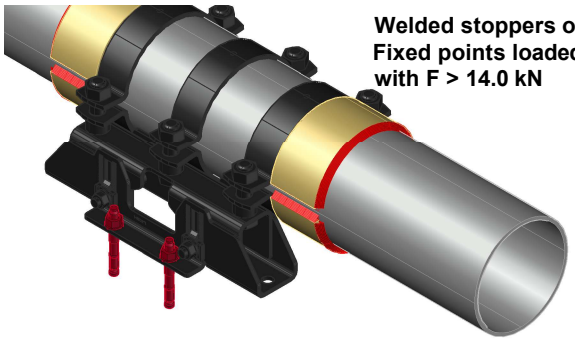
2



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

3

5	Anchors	
4x	HUS3-H 10x60 5/-/-	2079911
or		
4x	HST3 M12x85 10/-	2113978

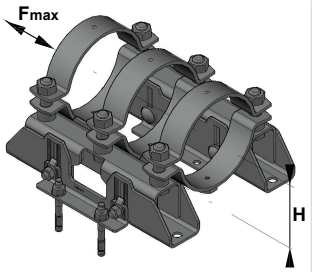


Welded stoppers on all Fixed points loaded with F > 14.0 kN

Resistance and limitations

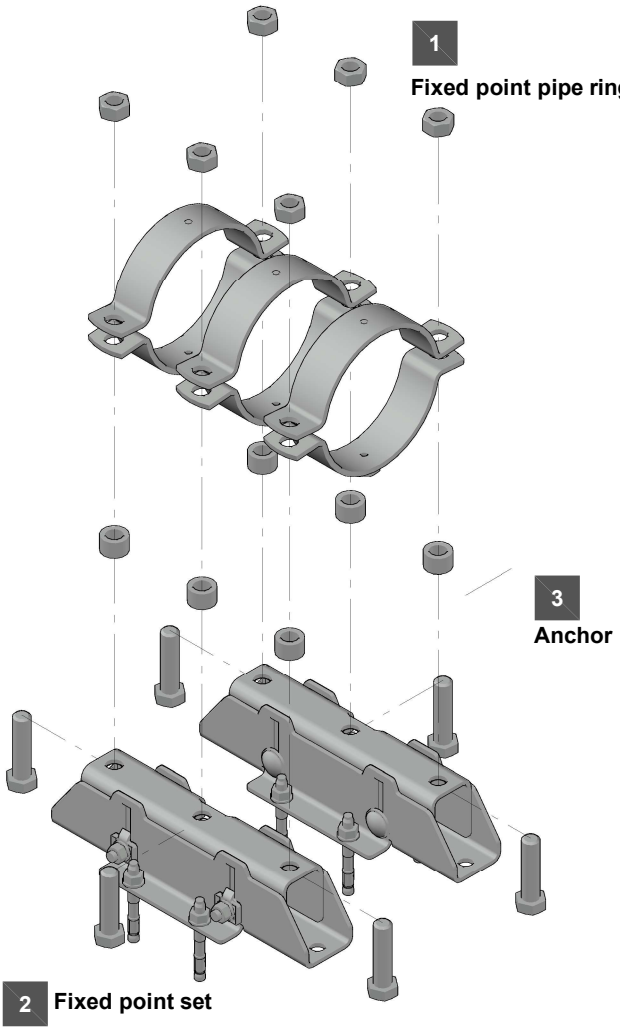
Recommended resitance
(safety factor 1.5 included):
F_{max} = 24 kN

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 fatigue 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	

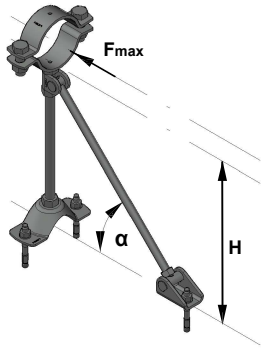
5			
5	Anchors		
3x	HUS3-H 10x90 35/15/5	2079914	
or			
3x	HST3 M12x85 10/-	2113978	

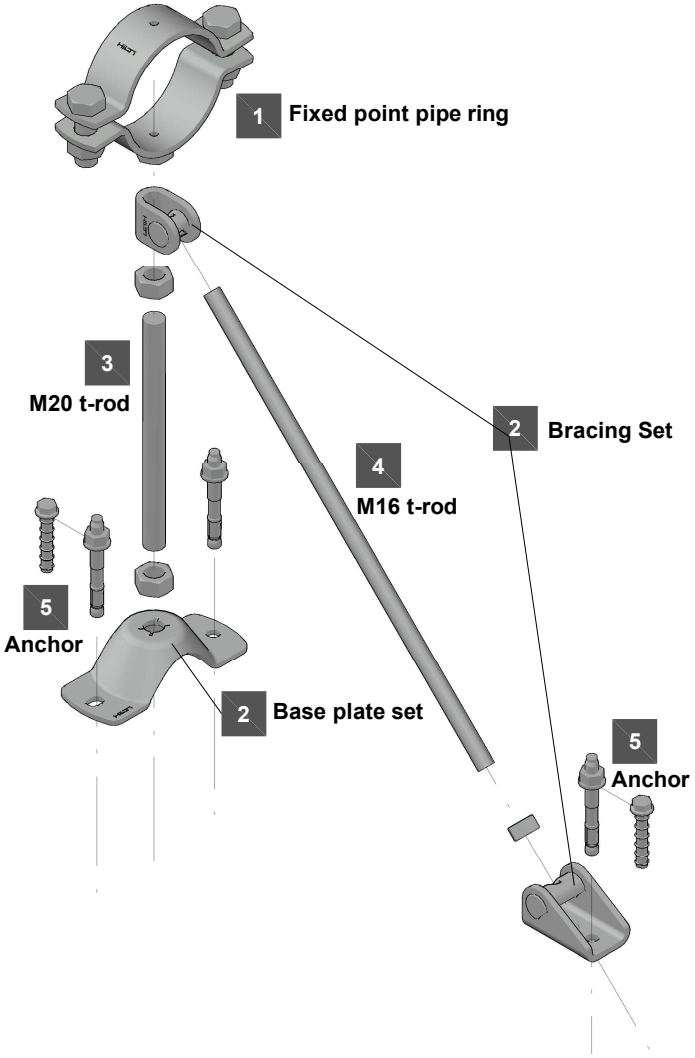
Resistance and limitations

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°

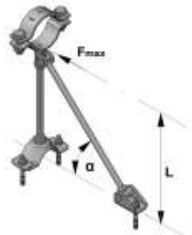
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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



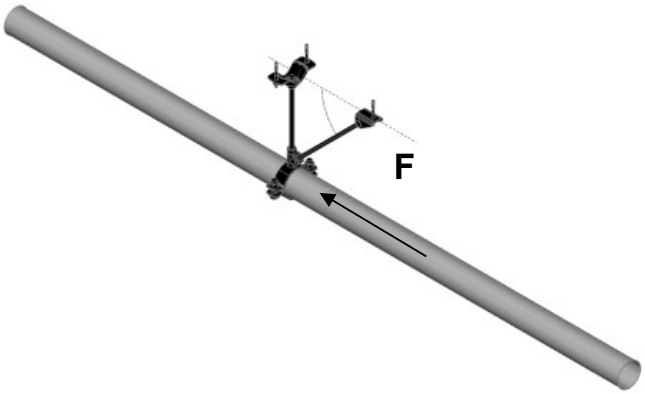


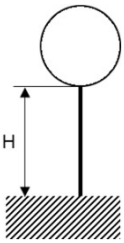
Application description	Application	Product lines	Base material
Heating - MFP-L fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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



MFP-L recommended loading capacity limits

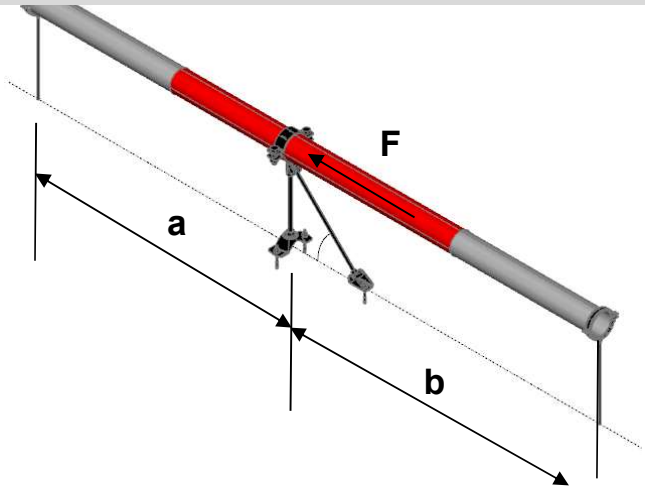
Hanging pipes - Recommended loading capacity

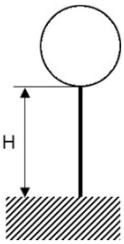




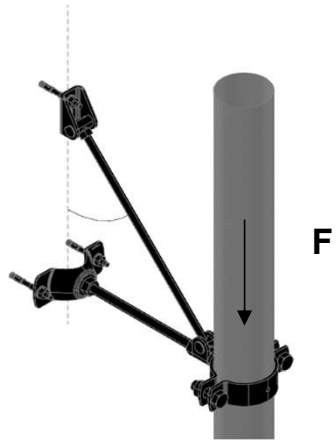
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

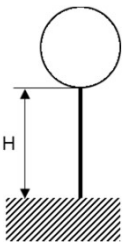
Supported pipes - Recommended loading capacity (Buckling check included)





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

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

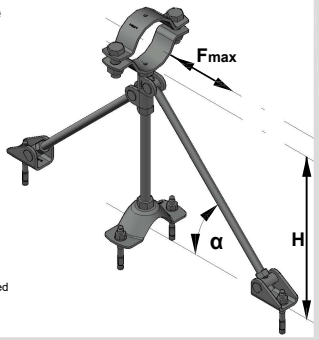
height above ground to base of pipe

α_{min} = 35°

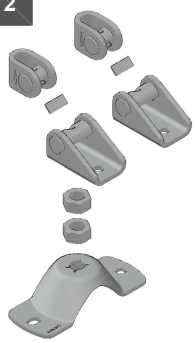
α_{max} = 45°

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



2



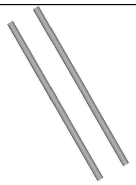
2	MFP-L2 Fixed point set	
1x	MFP-L2 set	2223123

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

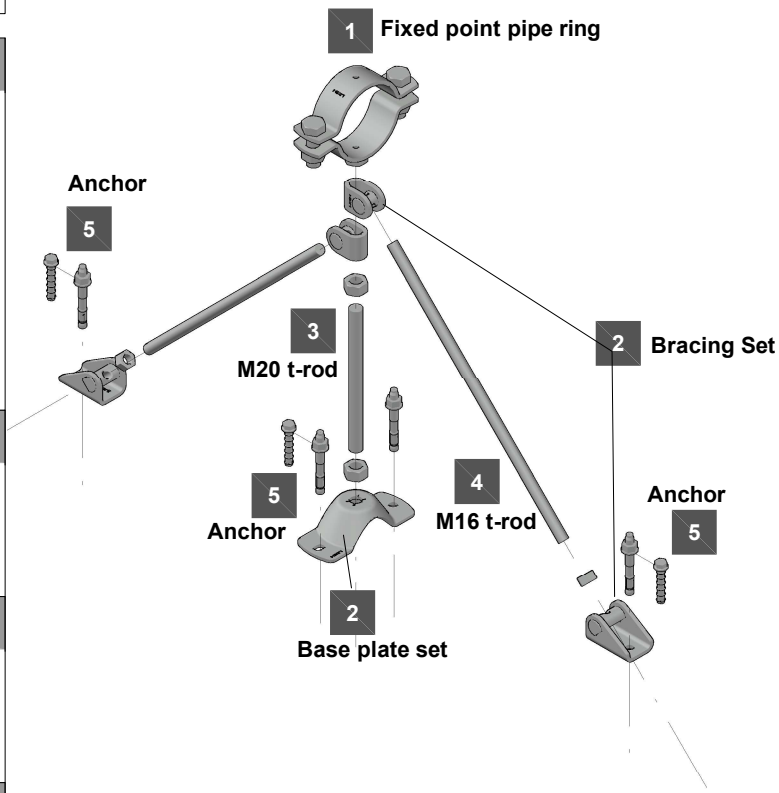
4



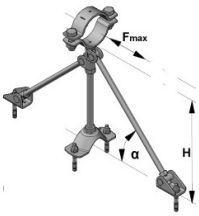
4	M16 Bracing Threaded Rod	
2x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

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

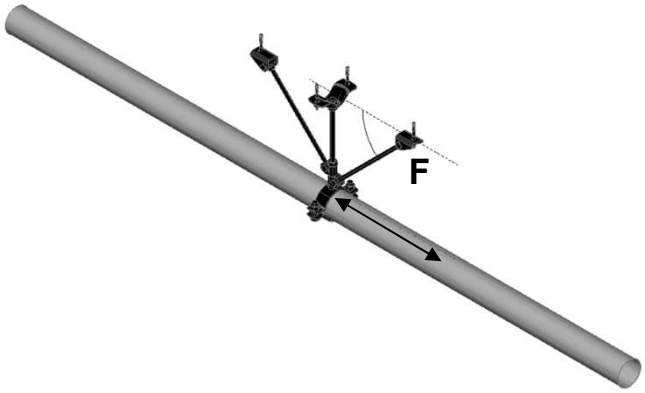


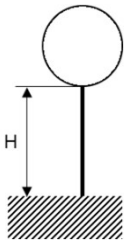
Application description	Application	Product lines	Base material
Heating - MFP-L2 fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-L2 recommended loading capacity limits

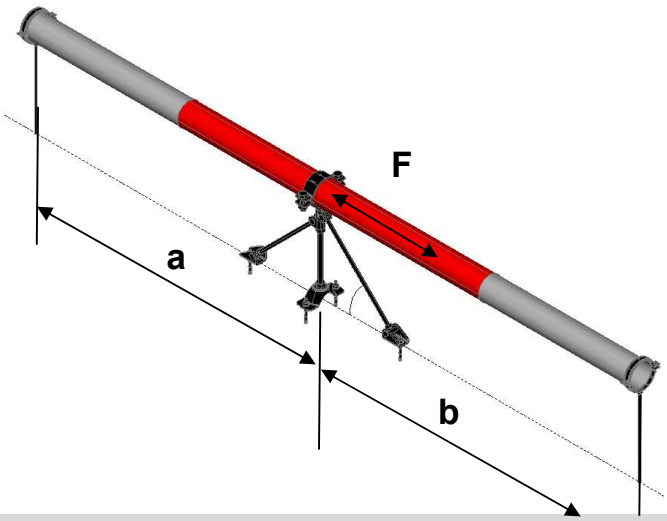
Hanging pipes - Recommended loading capacity

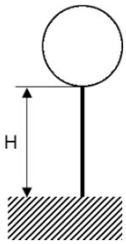




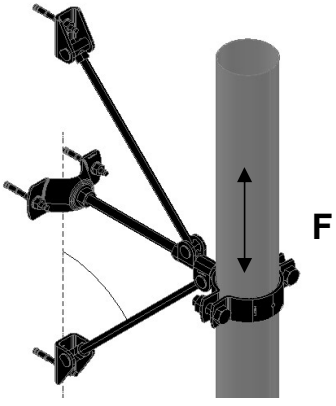
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

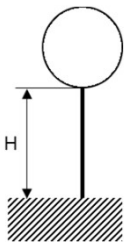
Supported pipes - Recommended loading capacity (Buckling check included)





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

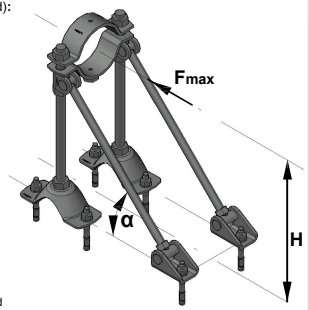
Height from base material to center of the pipe

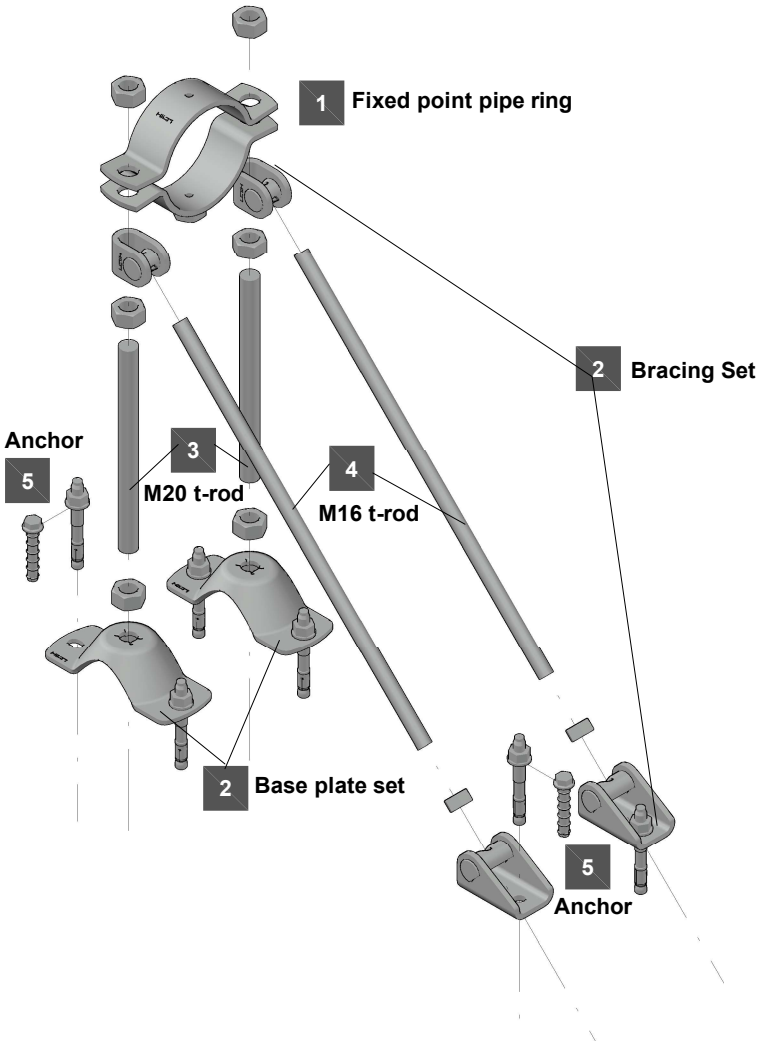
α_{min} = 35°

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.

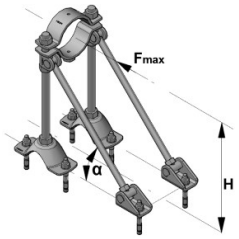
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





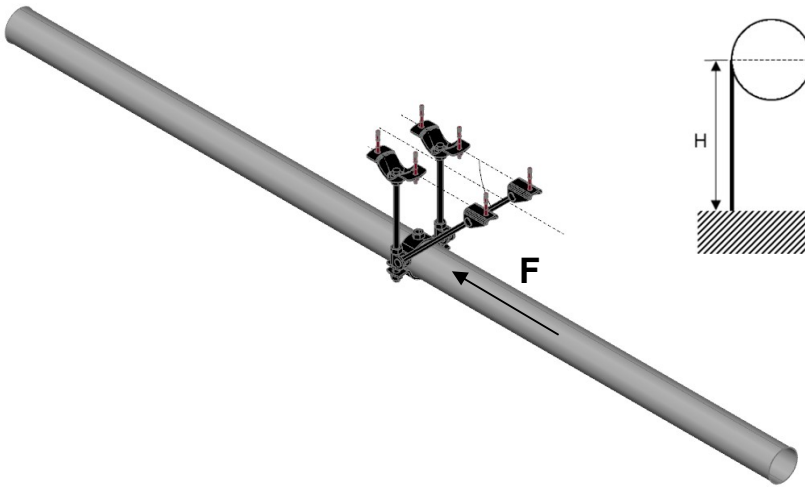
Application description	Application	Product lines	Base material
Heating - MFP-LD fixed point	11	Fixed point sets	Concrete
		Threaded parts	

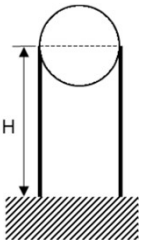
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-LD recommended loading capacity limits

Hanging pipes - Recommended loading capacity

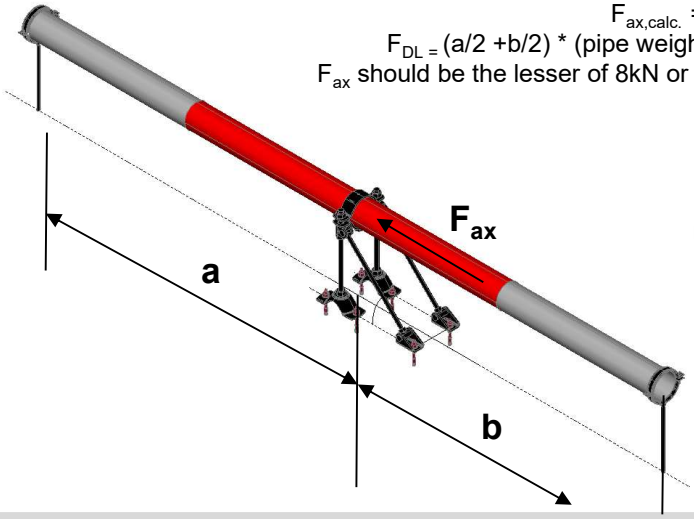


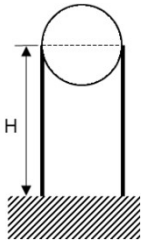


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

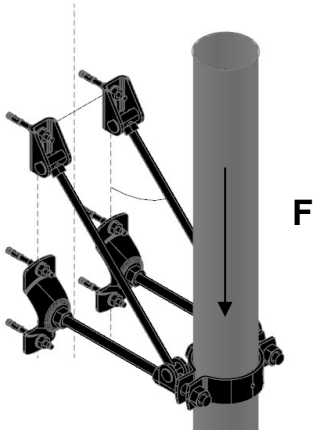
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or ($F_{B,max.} - F_{DL}$)

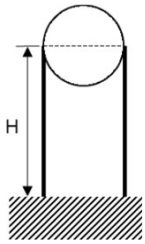




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

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

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

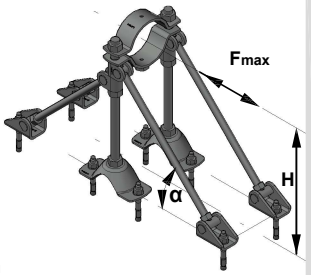
Height from base material to center of the pipe

α_{min} = 35°

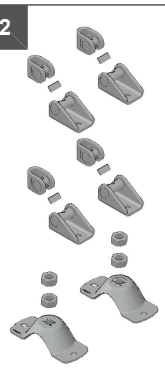
α_{max} = 45°

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

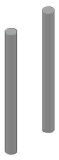


2



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



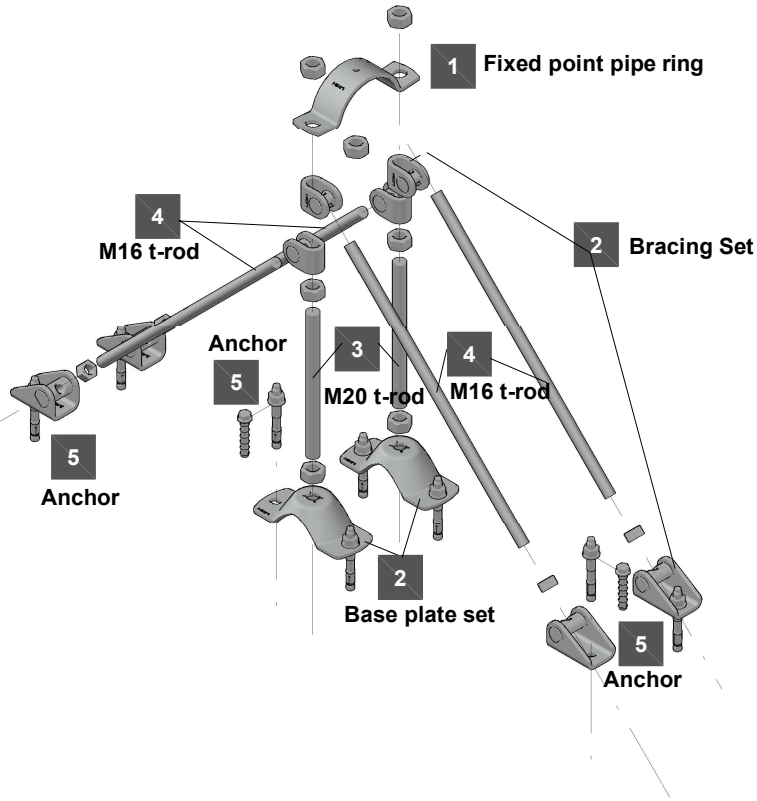
3	M20 Base Threaded Rod	
2x	AM20x1000 4.8 threaded rod	216425

4

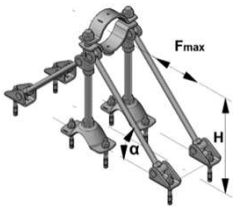
4	M16 Bracing Threaded Rod	
4x	AM16x1000 4.8 threaded rod	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5

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

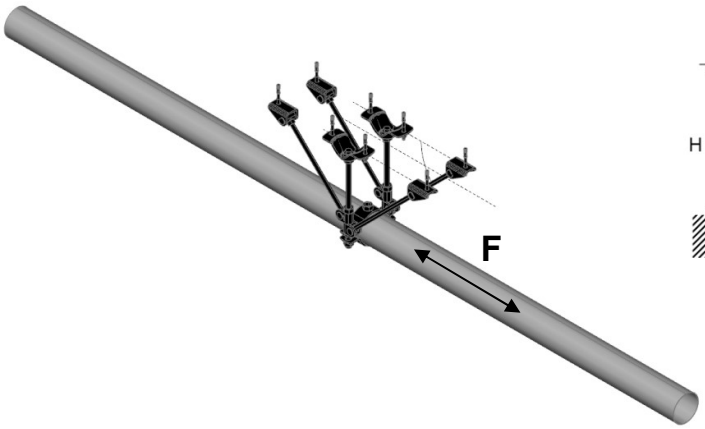


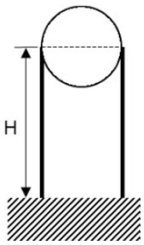
Application description	Application	Product lines	Base material
Heating - MFP-LD2 fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



MFP-LD2 recommended loading capacity limits

Hanging pipes - Recommended loading capacity

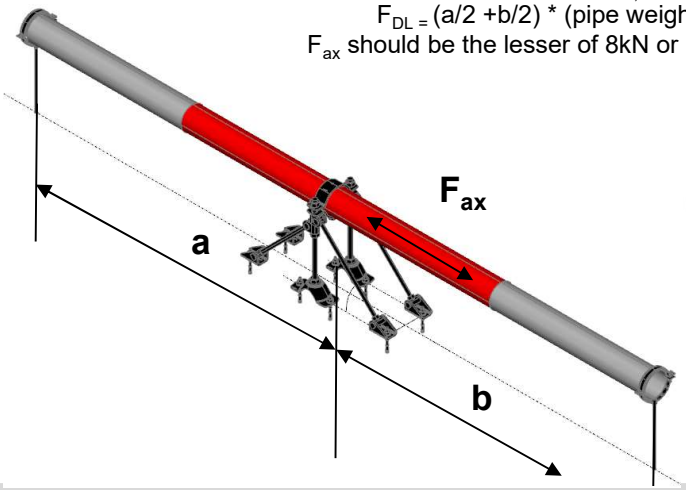


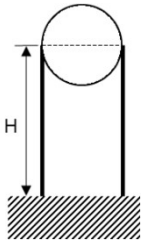


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

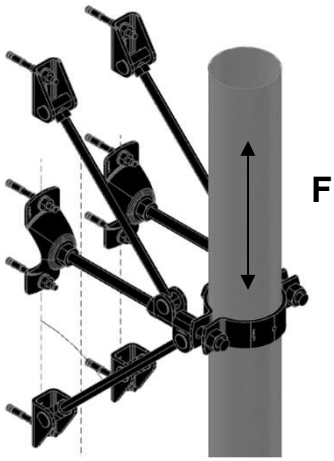
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or ($F_{B,max.} - F_{DL}$)

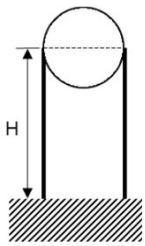




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

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	

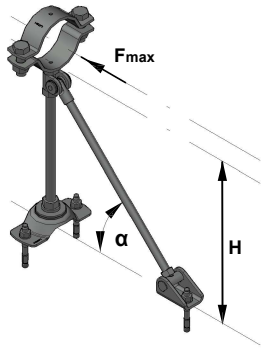
5			
5	Anchors		
3x	HUS3-H 10x90 35/15/5	2079914	
or			
3x	HST3 M12x85 10/-	2113978	

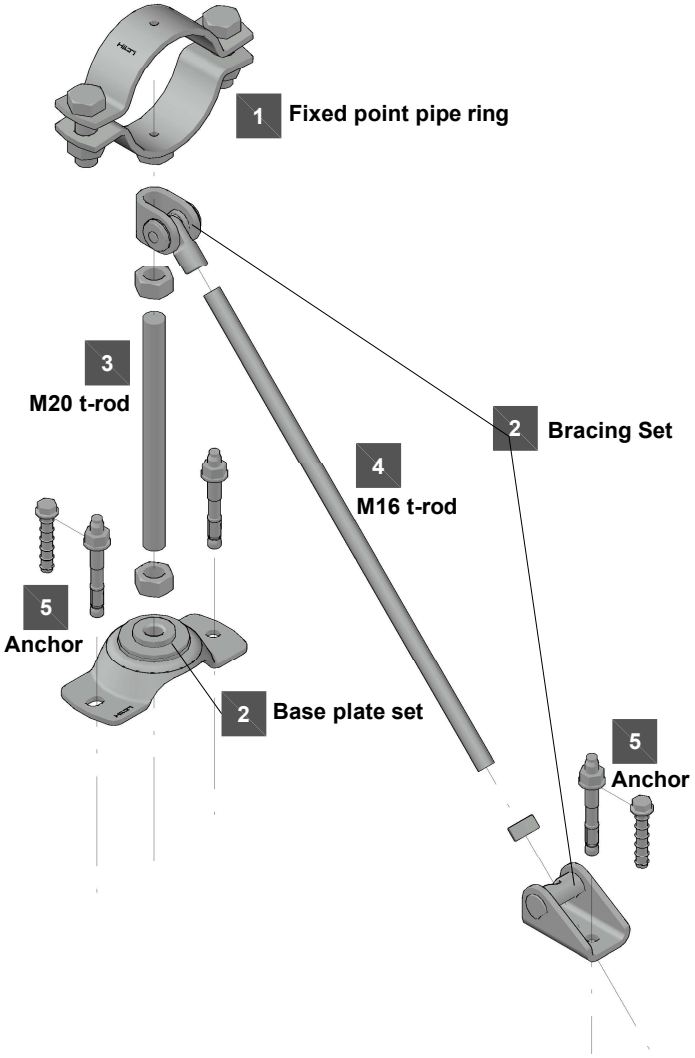
Resistance and limitations

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°

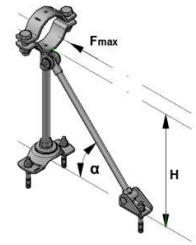
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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



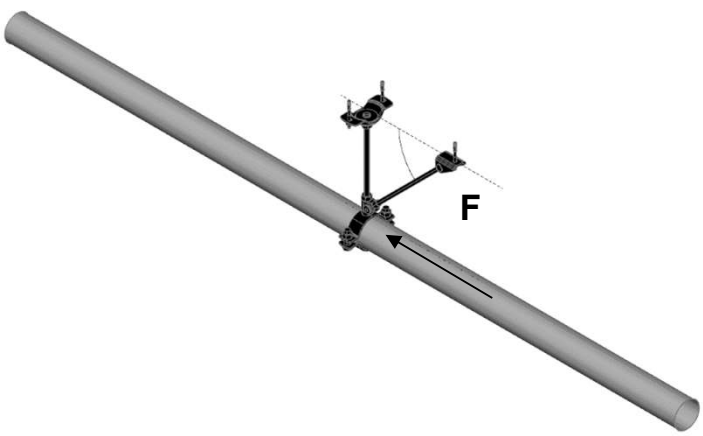


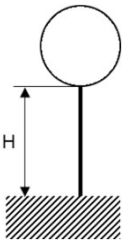
Application description	Application	Product lines	Base material
Heating - MFP-L-I fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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



MFP-L-I recommended loading capacity limits

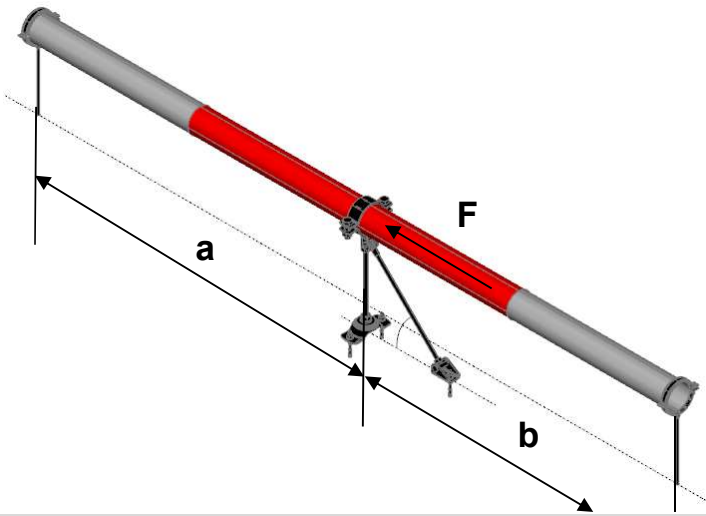
Hanging pipes - Recommended loading capacity

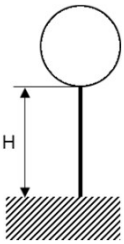




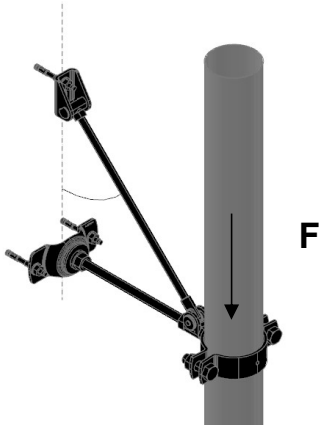
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

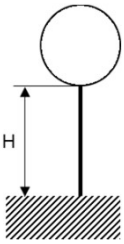
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





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

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

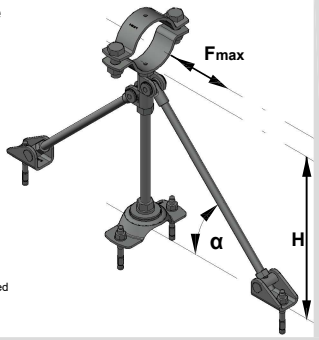
height above ground to base of pipe

α_{min} = 35°

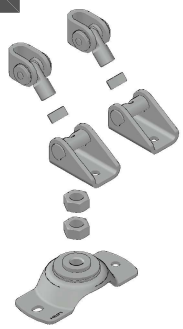
α_{max} = 45°

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



2



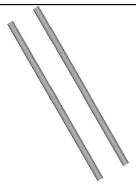
2	MFP-L2-I Fixed point set	
1x	MFP-L2-I set	2223127

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

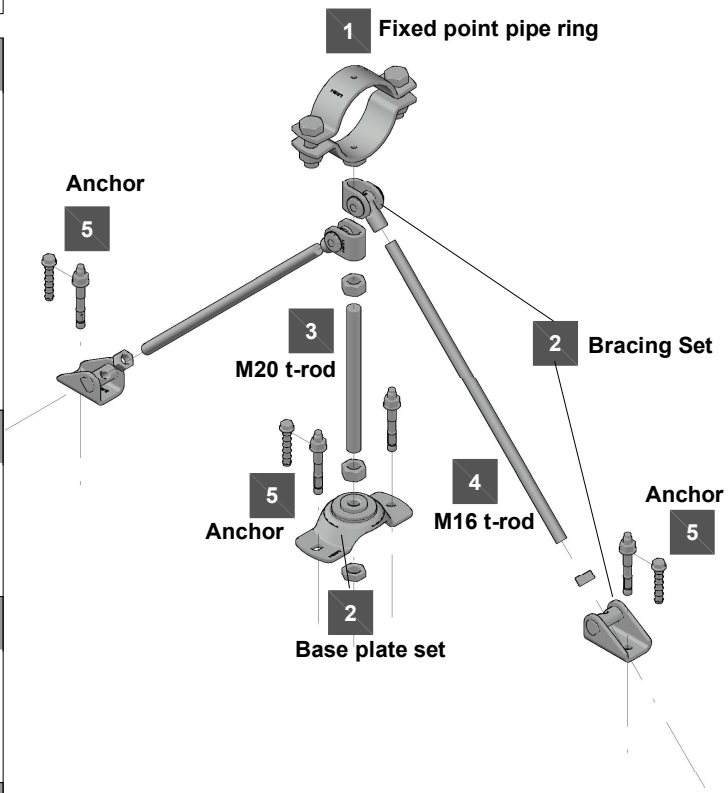
4



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

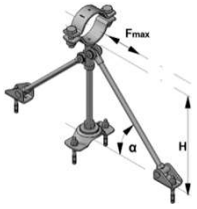
5

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



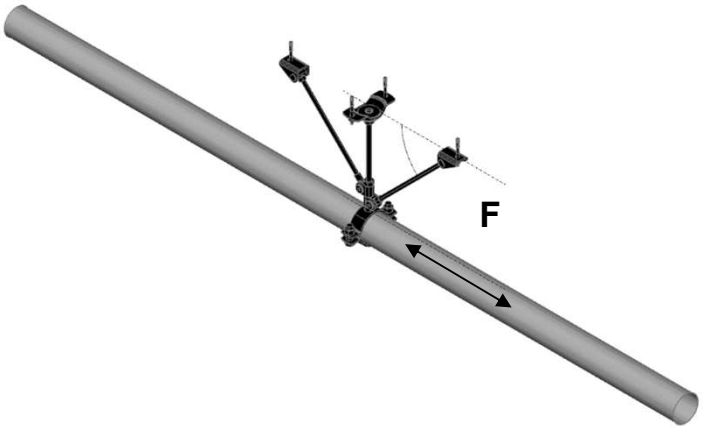
Application description	Application	Product lines	Base material
Heating - MFP-L2-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

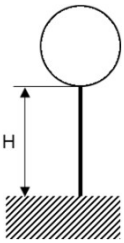
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-L2-I recommended loading capacity limits

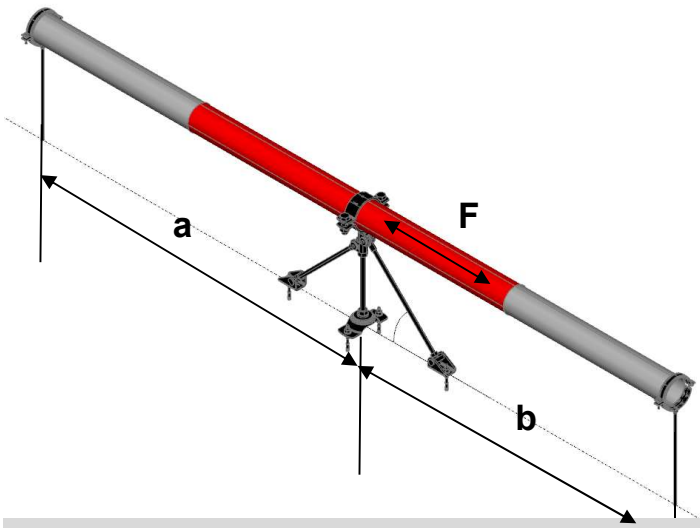
Hanging pipes - Recommended loading capacity

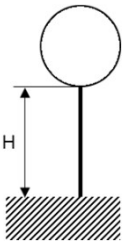




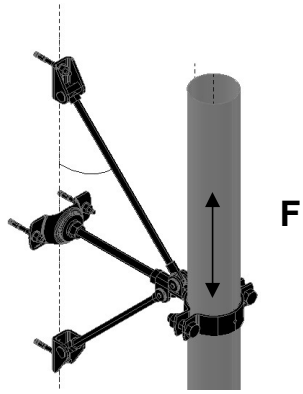
H [mm] up to	F [kN]
0	4.000
50	4.000
100	4.000
150	4.000
200	4.000
250	4.000
300	4.000
350	4.000
400	4.000
450	4.000
500	4.000

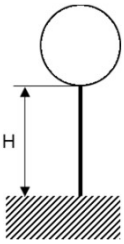
Supported pipes - Recommended loading capacity (Buckling check included)





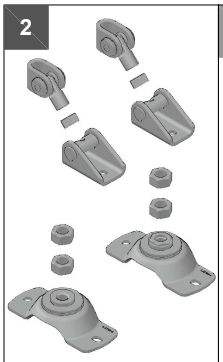
Rising pipes - Recommended loading capacity





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

MFP-LD-I with sound insulation

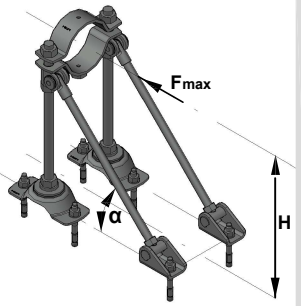
1		1	MFP-PC Fixed Point Pipe Ring
		1x	MFP-PC 73-78 M20 2227701 MFP-PC 88-93 M20 2227702 MFP-PC 100-105 M20 2227703 MFP-PC 108-115 M20 2227704 MFP-PC 125-133 M20 2227705 MFP-PC 134-142 M20 2227706 MFP-PC 154-162 M20 2227707 MFP-PC 162-170 M20 2227708 MFP-PC 192-200 M20 2227709 MFP-PC 213-221 M20 2227710 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 6x HST3 M12x85 10/- 2113978

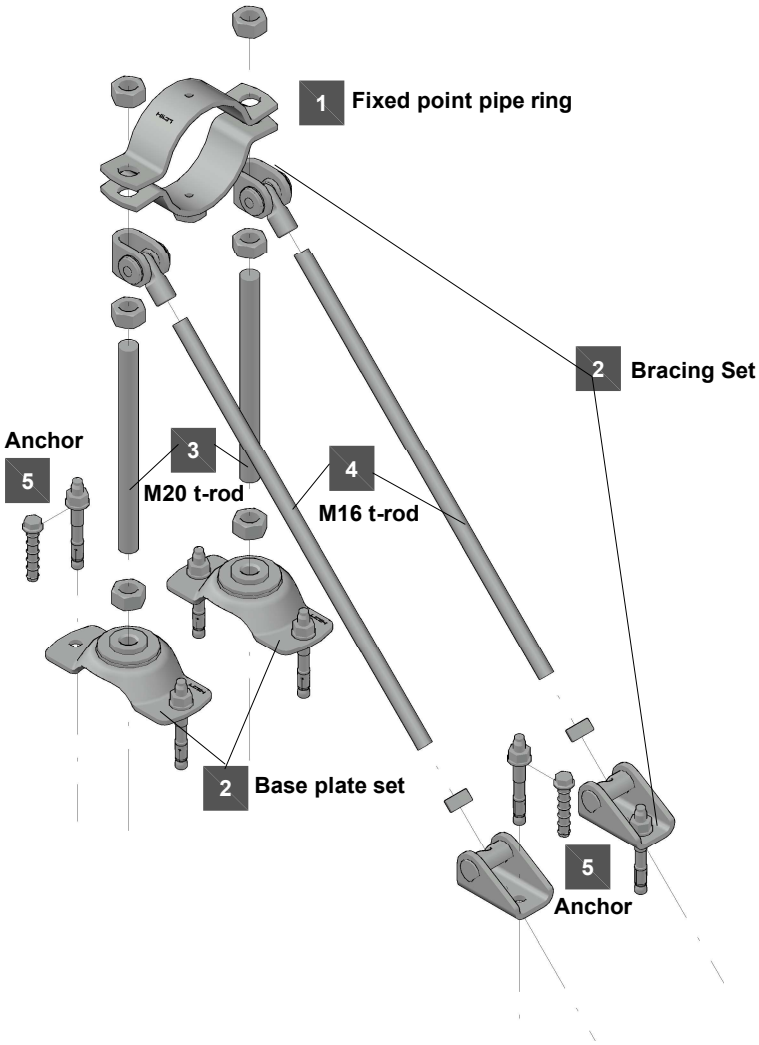
Resistance and limitations

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°

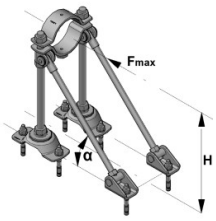
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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



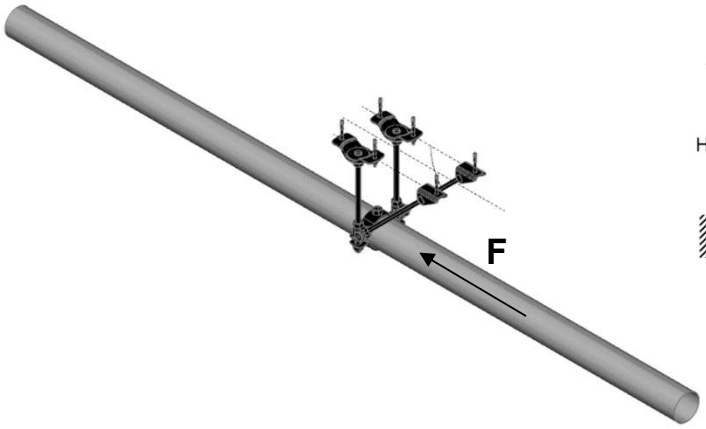


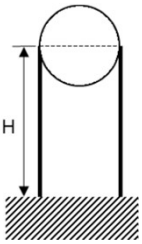
Application description	Application	Product lines	Base material
Heating - MFP-LD-I fixed point	 11	Fixed point sets	Concrete
General comments • Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for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



MFP-LD-I recommended loading capacity limits

Hanging pipes - Recommended loading capacity

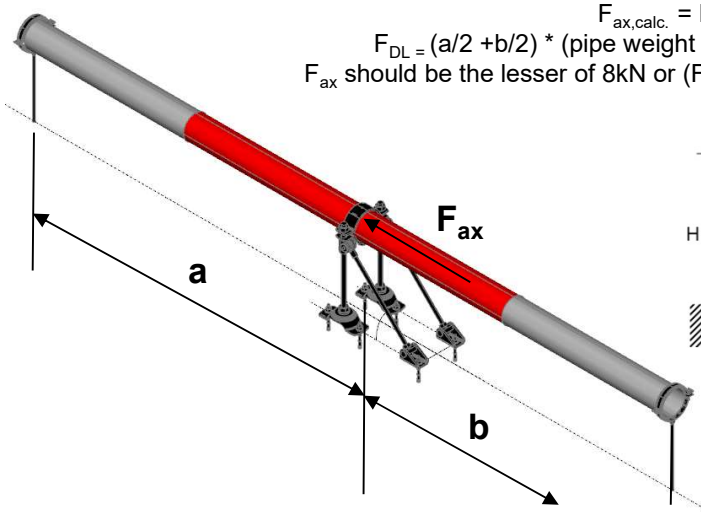


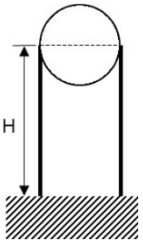


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

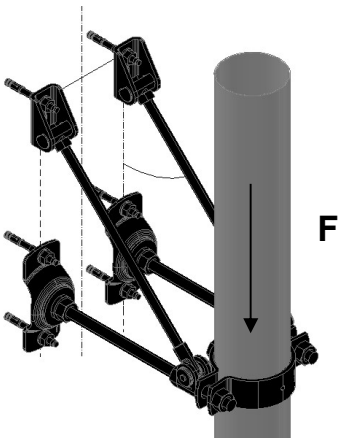
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or $(F_{B,max.} - F_{DL})$

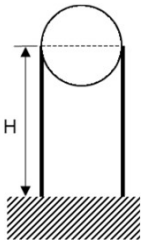




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

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	

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

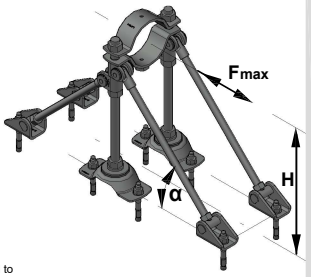
Height from base material to center of the pipe

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

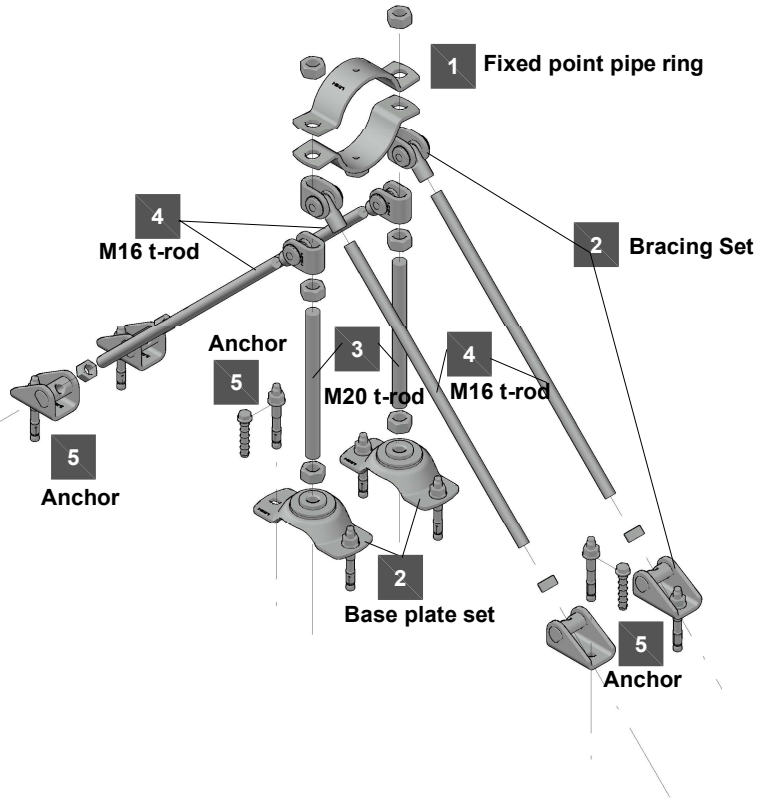


2			
2	MFP-LD2-IFixed point set		
1x	MFP-LD2-I fixed point set	2223128	
	The set contain:		
4x	MFP-BR-I M16 bracing set		
2x	MFP-BP-I M20 base plate set		

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

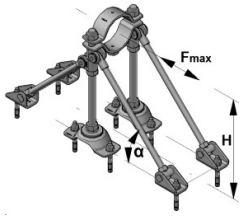
4			
4	M16 Bracing Threaded Rod		
4x	AM16x1000 4.8 threaded rod	216422	
	AM16x2000 4.8 threaded rod	216423	
	AM16x3000 4.8 threaded rod	216424	

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



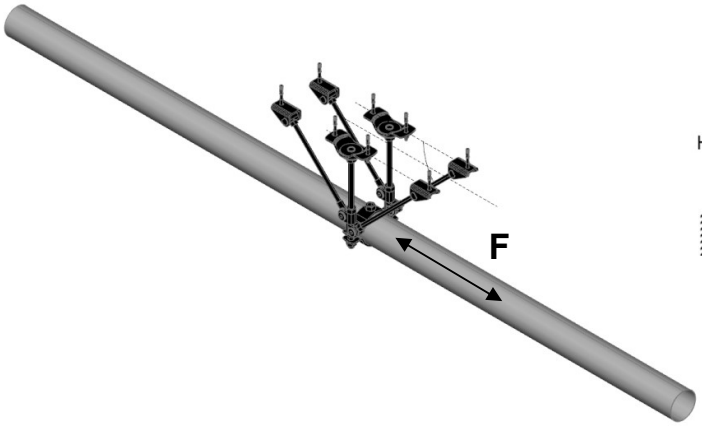
Application description	Application	Product lines	Base material
Heating - MFP-LD2-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

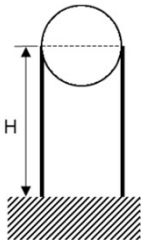
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



MFP-LD2-I recommended loading capacity limits

Hanging pipes - Recommended loading capacity

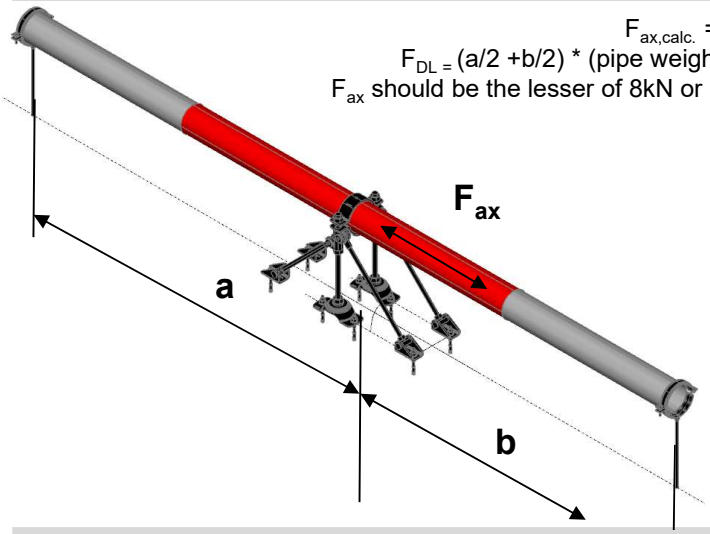


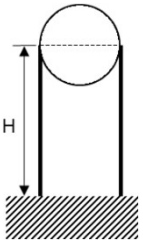


H [mm] up to	F [kN]
0	8.000
50	8.000
100	8.000
150	8.000
200	8.000
250	8.000
300	8.000
350	8.000
400	8.000
450	8.000
500	8.000

Supported pipes - Recommended loading capacity (Buckling check included)

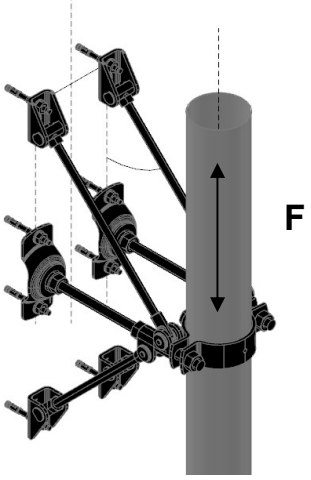
$F_{ax,calc.} = F_{B,max.} - F_{DL}$
$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$
F_{ax} should be the lesser of 8kN or $(F_{B,max.} - F_{DL})$

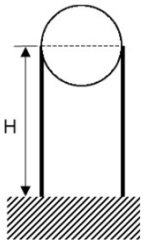




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	8.000	-
50	8.000	-
100	8.000	-
150	8.000	-
200	8.000	-
250	8.000	-
300	8.000	-
350	8.000	-
400	8.000	-
450	F_{ax}	11.971
500	F_{ax}	10.715

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

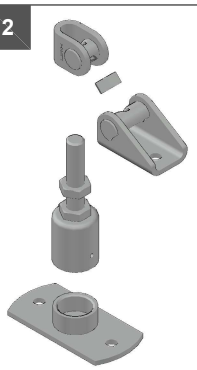
Fixed Point On Concrete - MFP-UL Fixed Point:

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

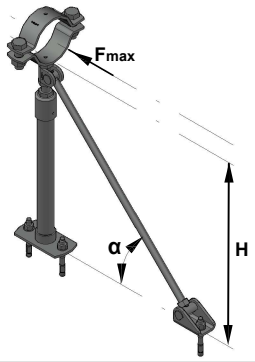
5	Anchors	
3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978

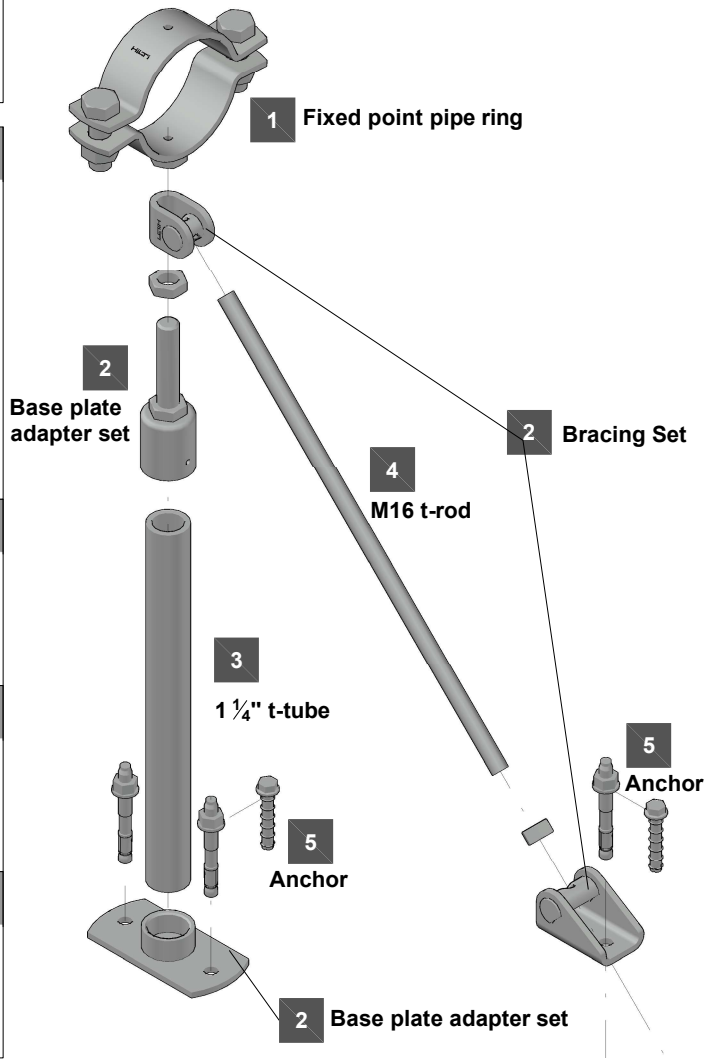
Resistance and limitations

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.

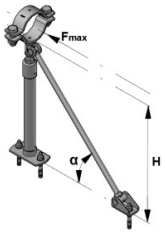
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





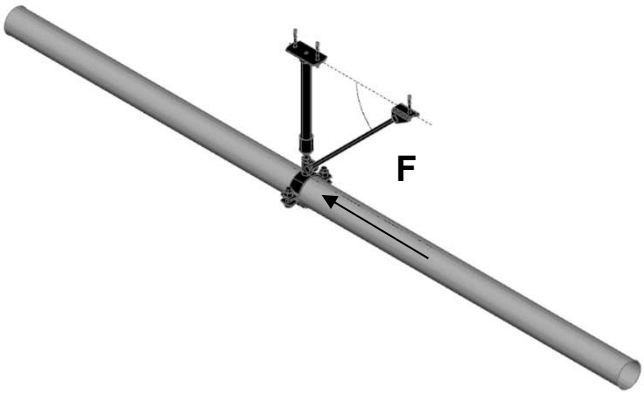
Application description	Application	Product lines	Base material
Heating - MFP-UL fixed point	11	Fixed point sets	Concrete
		Threaded parts	

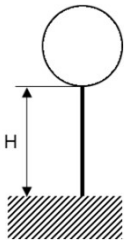
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



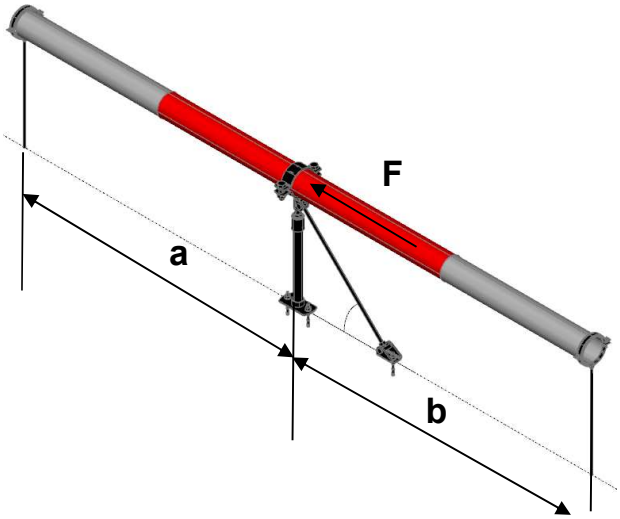
MFP-UL recommended loading capacity limits

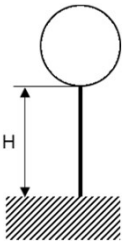
Hanging pipes - Recommended loading capacity



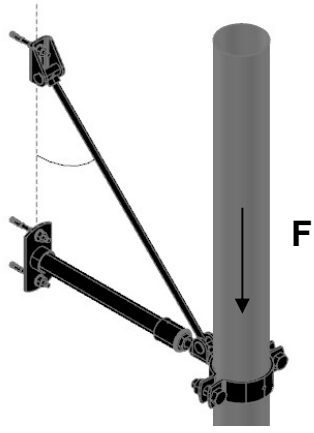


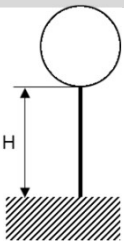
Supported pipes - Recommended loading capacity (Buckling check included)





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

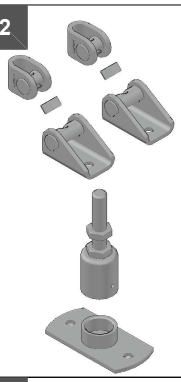
Fixed Point On Concrete - MFP-UL2 Fixed Point:

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

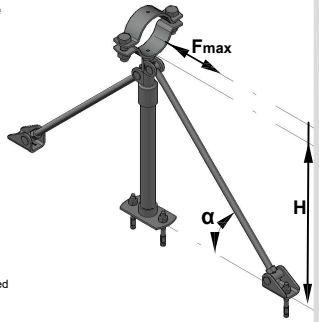
4x	HST3 M12x85 10/-	2113978

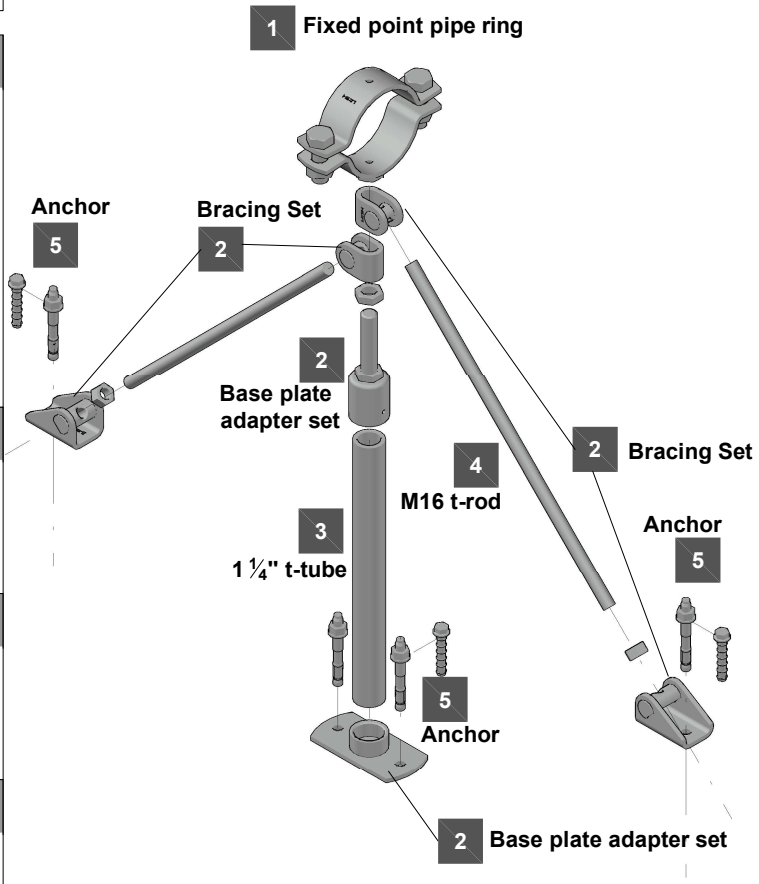
Resistance and limitations

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.

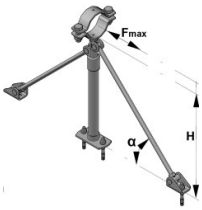
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





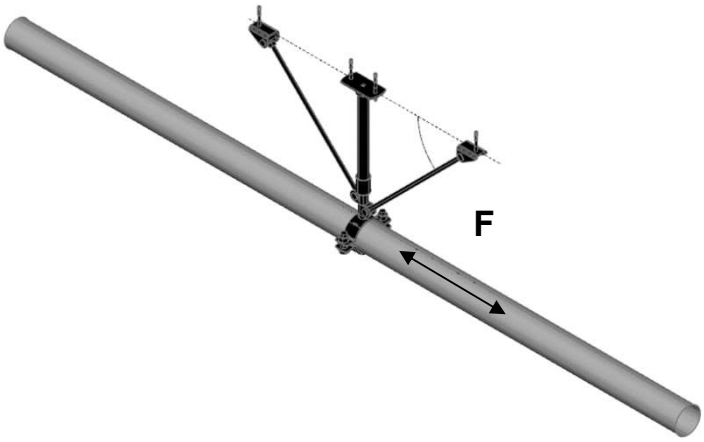
Application description	Application	Product lines	Base material
Heating - MFP-UL2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

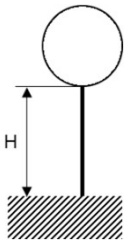
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



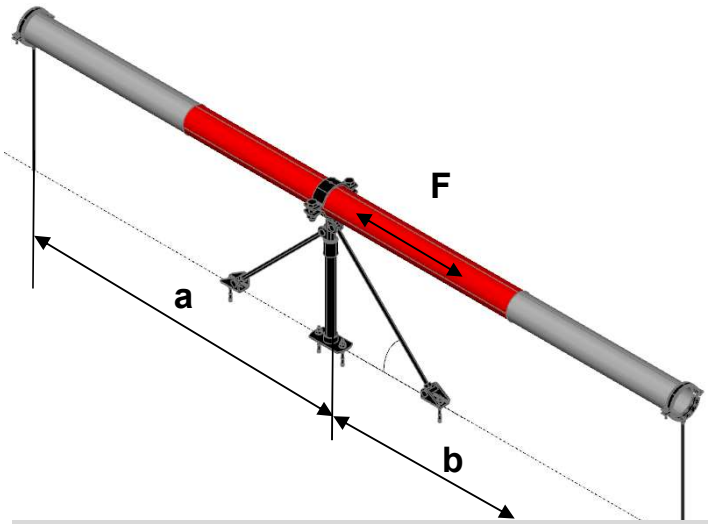
MFP-UL2 recommended loading capacity limits

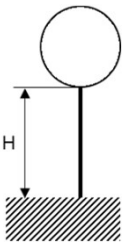
Hanging pipes - Recommended loading capacity



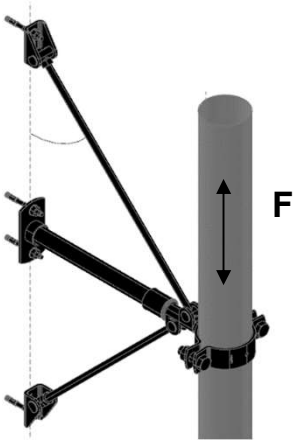


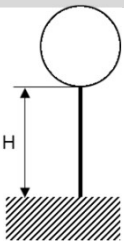
Supported pipes - Recommended loading capacity (Buckling check included)





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:

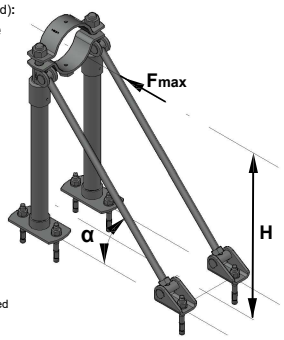
MFP-ULD without sound insulation

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°

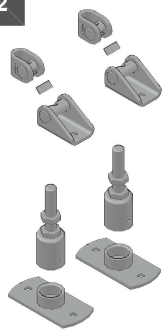
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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 

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 

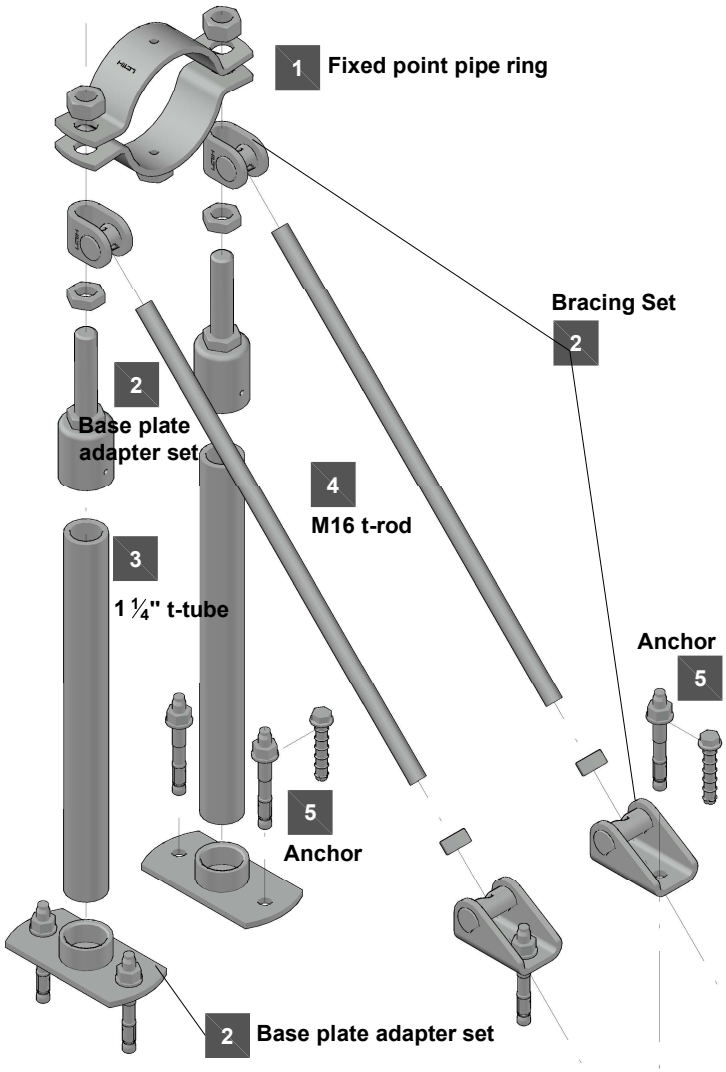
3	1 ¼" Threaded Tube	
2x	**GR-G 1 ¼"x 2000 4.6 threaded tube**	248532

4 

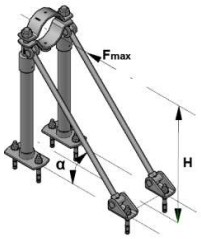
4	M16 Bracing Threaded Rod	
2x	**AM16x1000 4.8 threaded rod**	216422
	AM16x2000 4.8 threaded rod	216423
	AM16x3000 4.8 threaded rod	216424

5 

5	Anchors	
6x	**HUS3-H 10x90 35/15/5**	2079914
or		
6x	**HST3 M12x85 10/-**	2113978

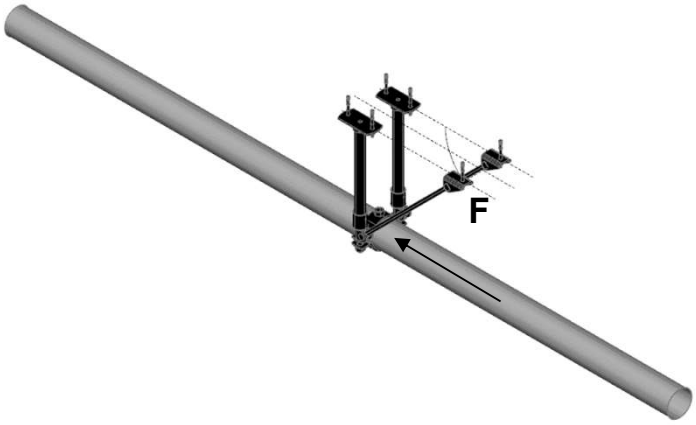


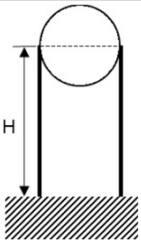
Application description	Application	Product lines	Base material
Heating - MFP-ULD fixed point	11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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



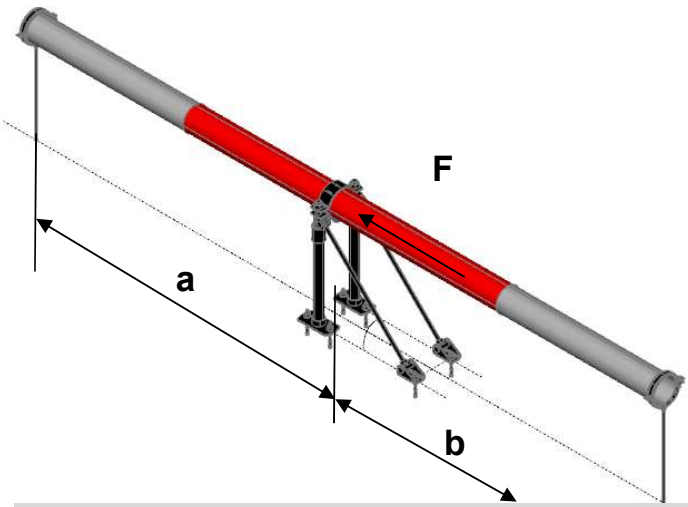
MFP-ULD recommended loading capacity limits

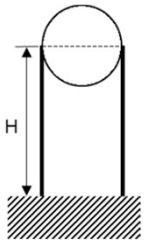
Hanging pipes - Recommended loading capacity



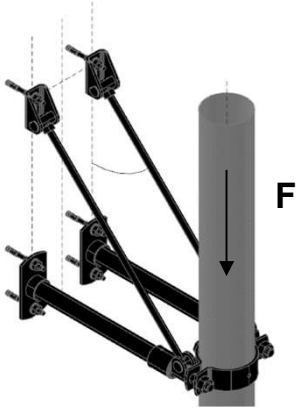


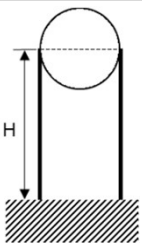
Supported pipes - Recommended loading capacity (Buckling check included)





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

1

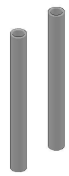
1	MFP-PC Fixed Point Pipe Ring	
1x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20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

2

2	MFP-ULD2 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



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

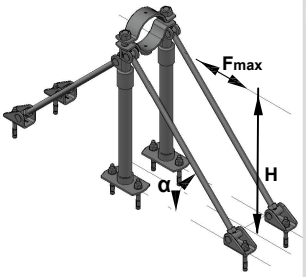
5	Anchors	
8x	HUS3-H 10x90 35/15/5	2079914
or		
8x	HST3 M12x85 10/-	2113978

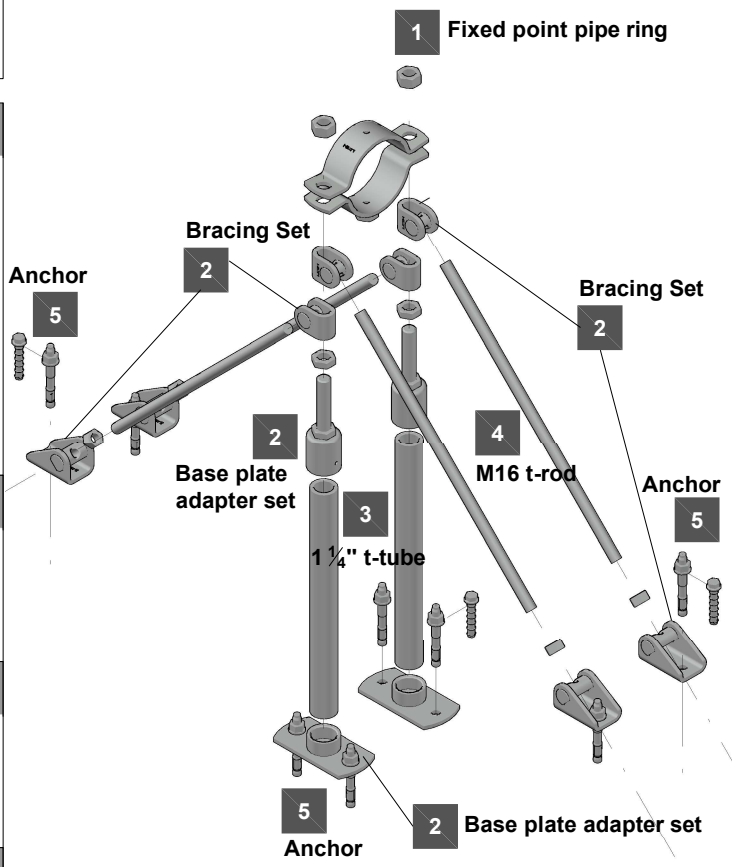
Resistance and limitations

Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
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.

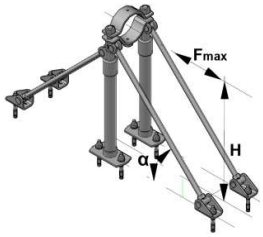
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





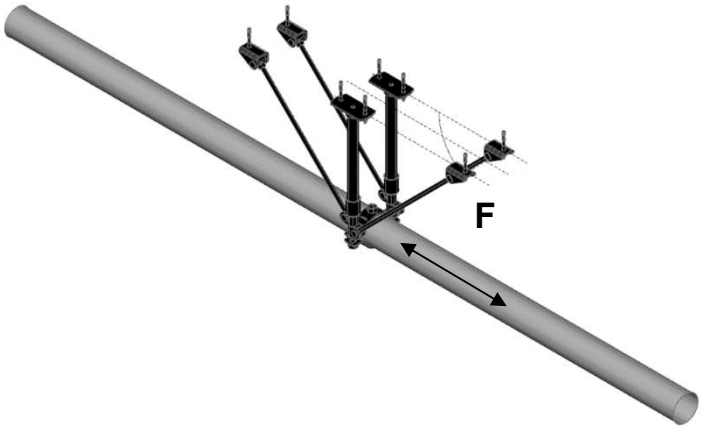
Application description	Application	Product lines	Base material
Heating - MFP-ULD2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

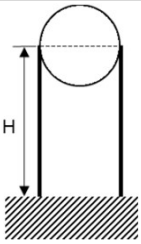
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



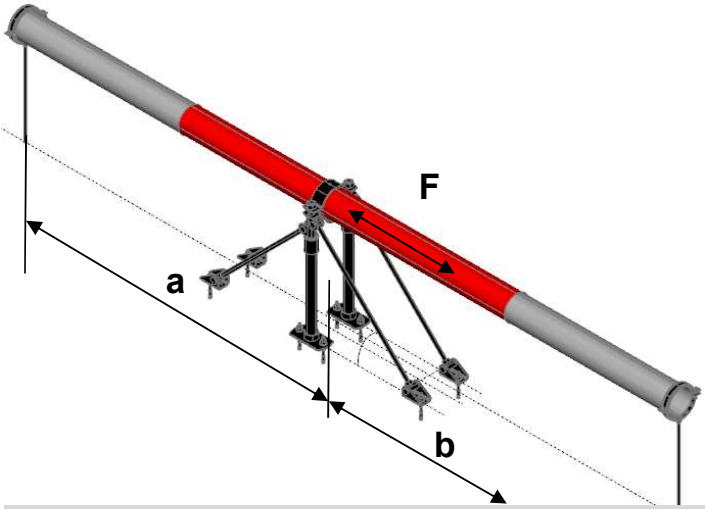
MFP-ULD2 recommended loading capacity limits

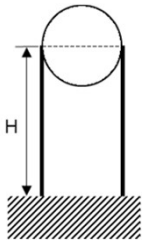
Hanging pipes - Recommended loading capacity



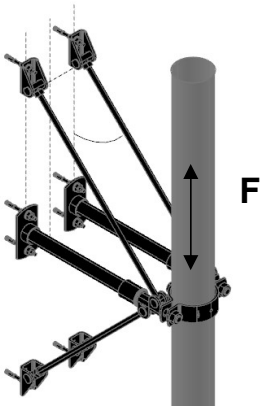


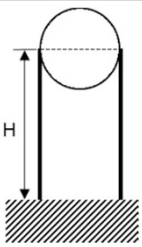
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity

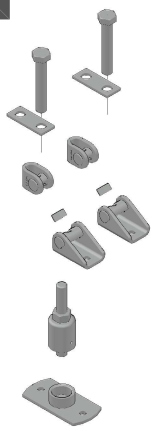
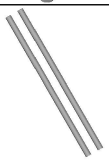




H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

Fixed Point On Concrete - MFP - UM Fixed Point:

MFP-UM without sound insulation

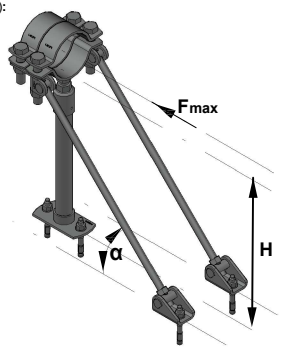
1		1	**MFP-PC Fixed Point Pipe Ring**
		2x	**MFP-PC 73-78 M20** 2227701
			MFP-PC 88-93 M20 2227702
			MFP-PC 100-105 M20 2227703
			MFP-PC 108-115 M20 2227704
			MFP-PC 125-133 M20 2227705
			MFP-PC 134-142 M20 2227706
			MFP-PC 154-162 M20 2227707
			MFP-PC 162-170 M20 2227708
			MFP-PC 192-200 M20 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

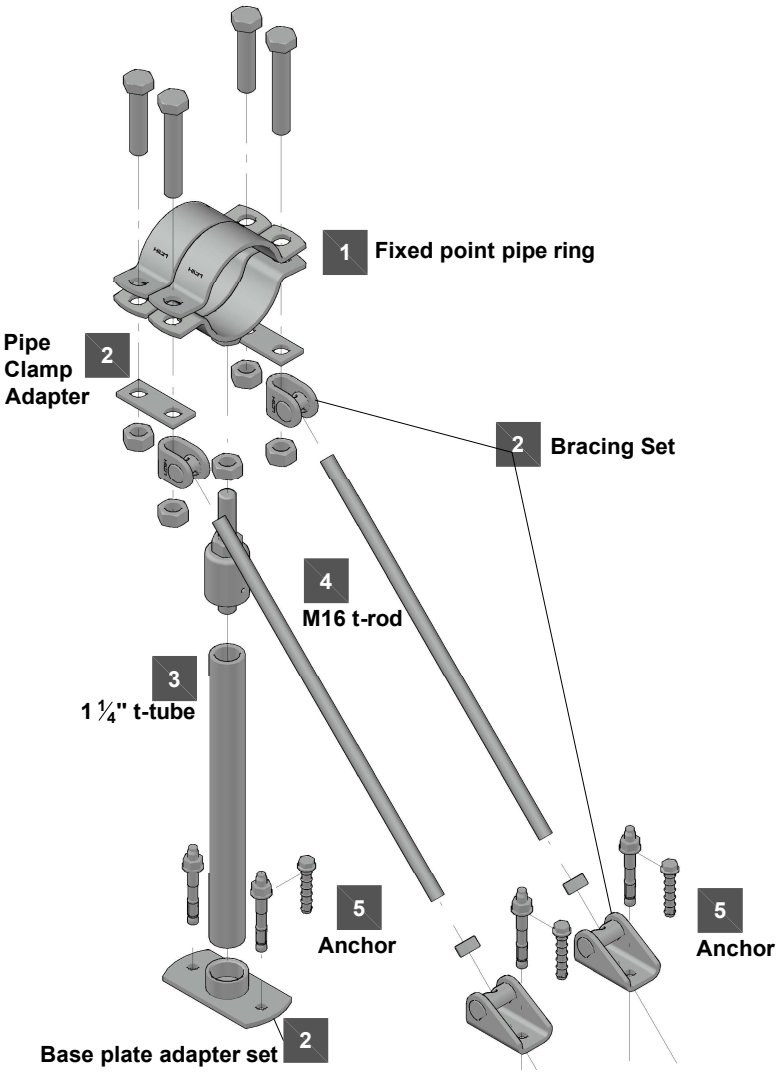
Resistance and limitations

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°

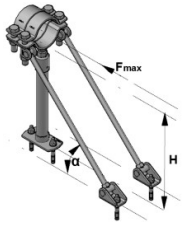
Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

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



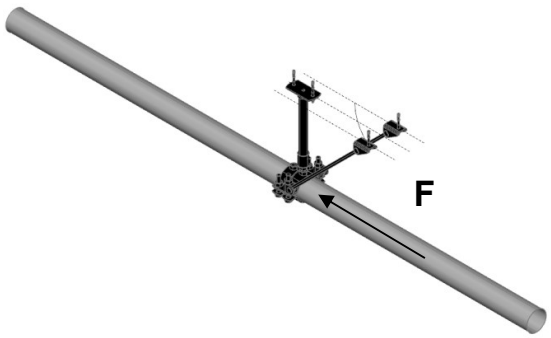


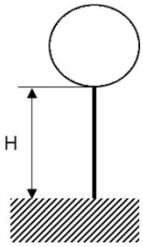
Application description	Application	Product lines	Base material
Heating - MFP-UM fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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



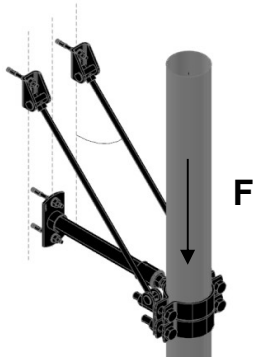
MFP-UM recommended loading capacity limits

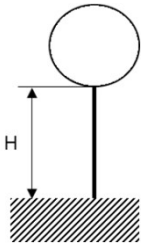
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





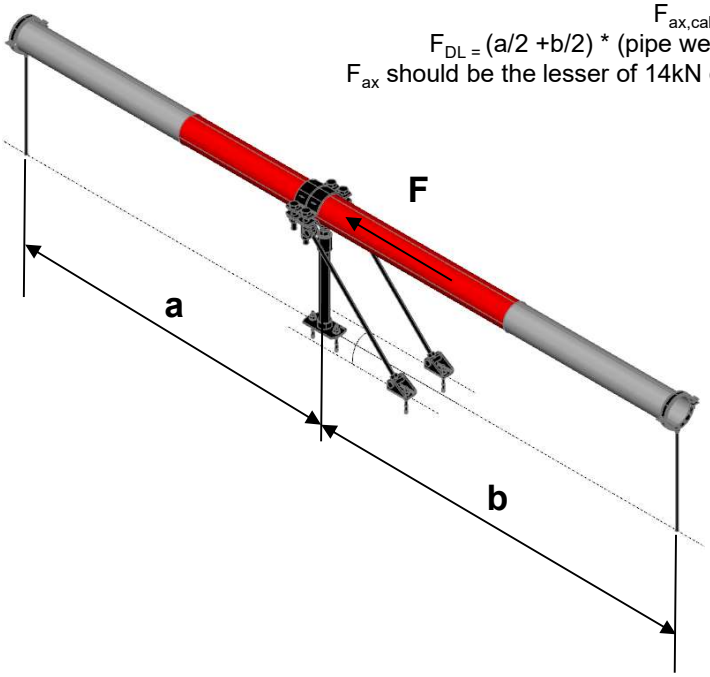
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

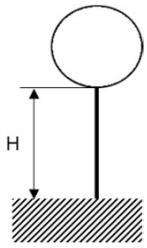
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

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

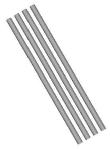
The set contains:

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

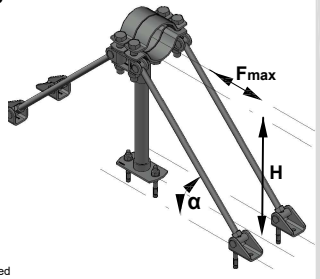
height above ground to base of pipe

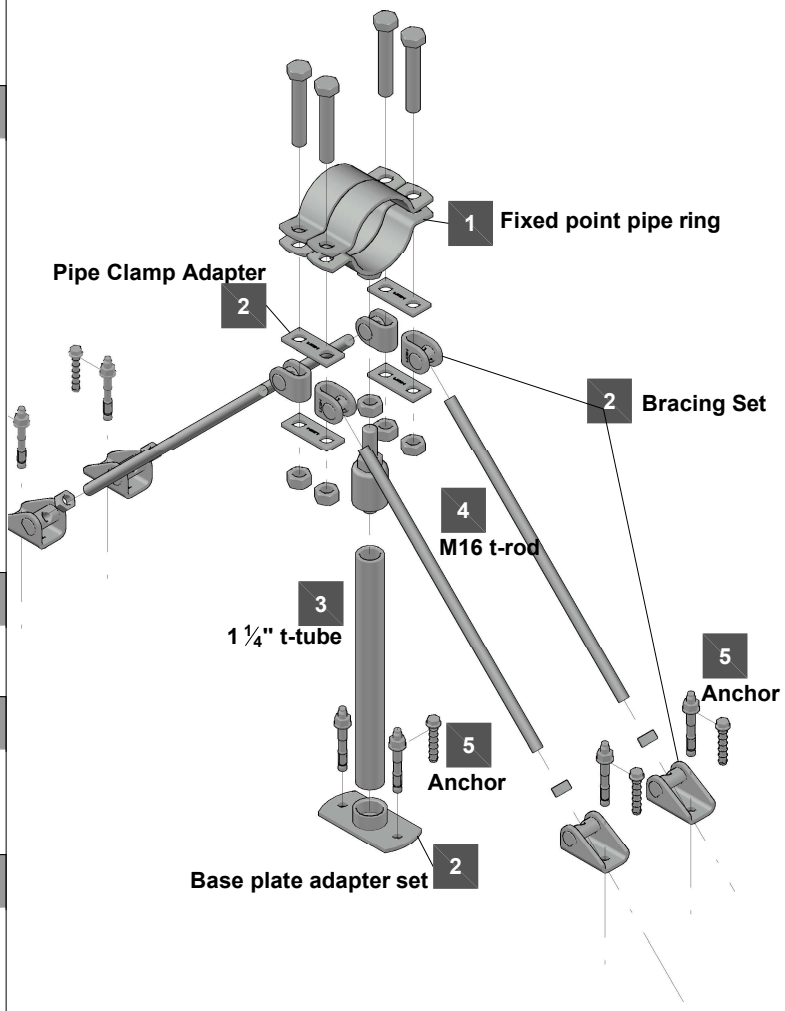
α_{min} = 35°

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

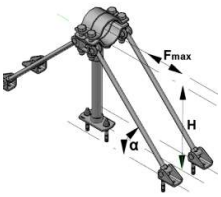




Application description	Application	Product lines	Base material
Heating - MFP-UM2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

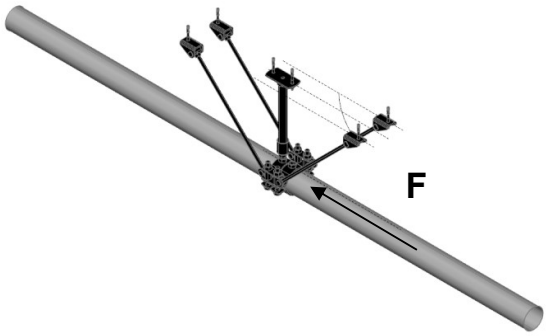
General comments

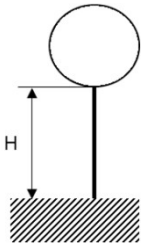
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



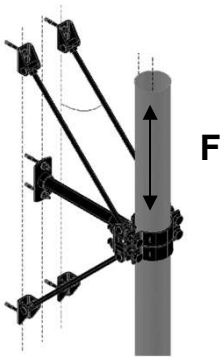
MFP-UM2 recommended loading capacity limits

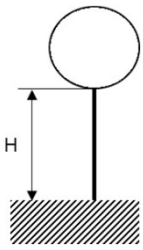
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





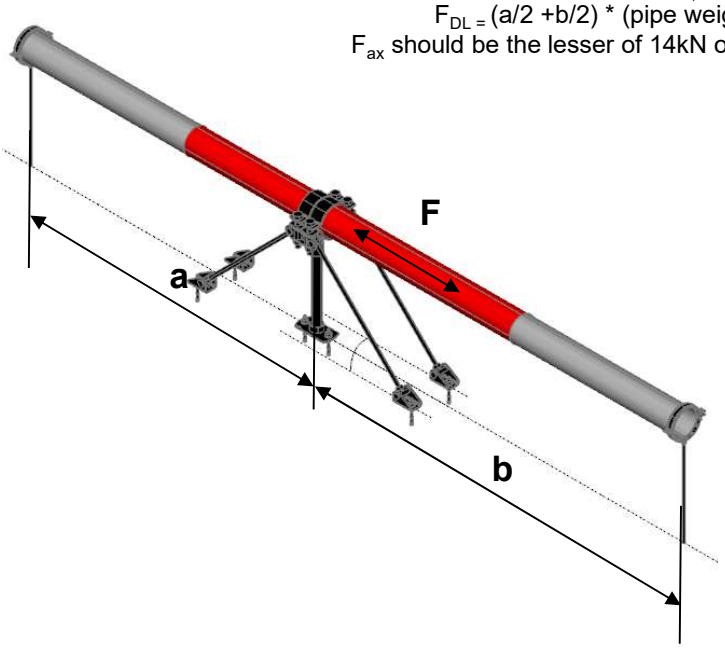
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

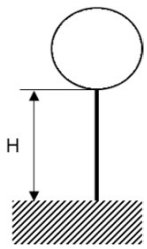
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$

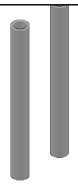
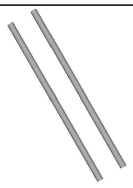
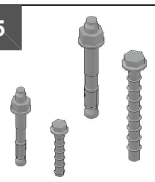


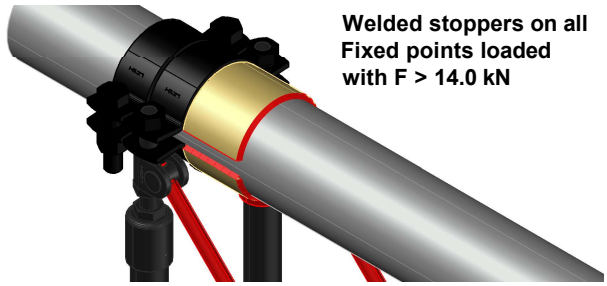


H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	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



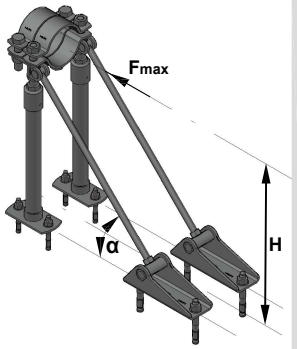
Welded stoppers on all Fixed points loaded with F > 14.0 kN

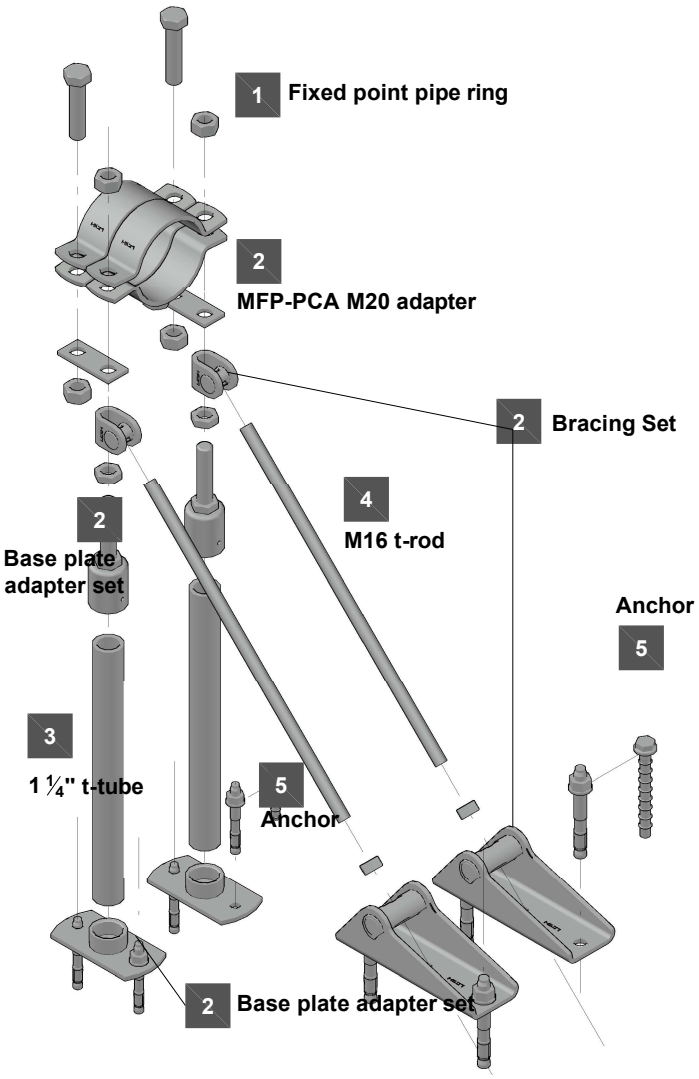
Resistance and limitations

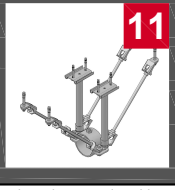
Recommended resitance (safety factor 1.5 included):
F_{max} = For loading capacity cases, see the reverse page
H_{min} = 200 mm
H_{max} = 2000 mm
Height from base material to center of the pipe
α_{min} = 35°
α_{max} = 45°

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.

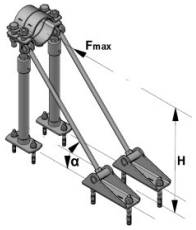
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





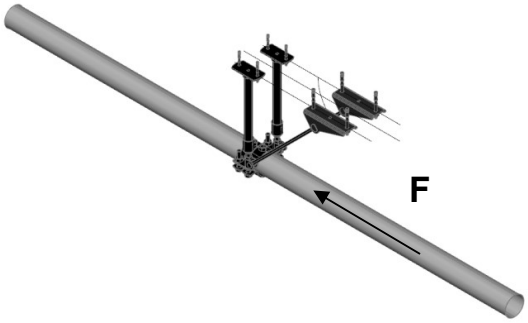
Application description	Application	Product lines	Base material
Heating - MFP-UHD fixed point	 11	Fixed point sets	Concrete
		Threaded parts	

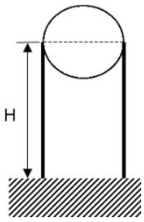
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



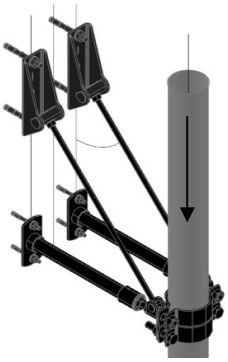
MFP-UHD recommended loading capacity limits

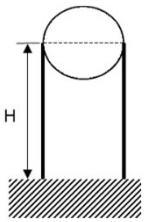
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





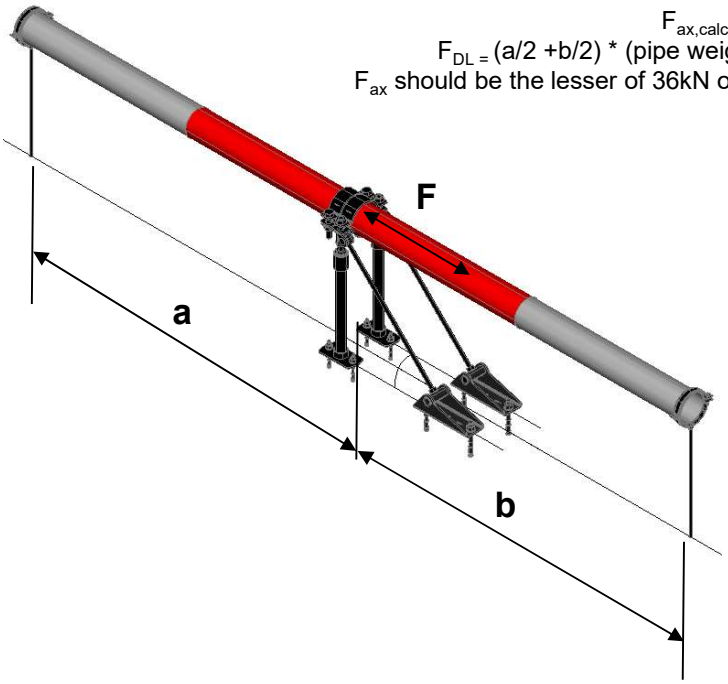
H [mm] up to	F [kN]
0	36.000
500	36.000
550	36.000
600	36.000
650	36.000
700	36.000
750	36.000
800	36.000
850	34.953
900	32.850
950	30.953
1000	29.235
1100	26.247
1200	23.739
1250	22.632
1300	21.608
1400	19.777
1500	18.190
1600	16.803
1750	15.024
1800	14.499
1900	13.534
2000	12.669

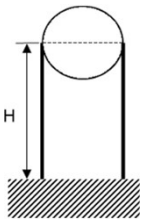
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

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}	39.928

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

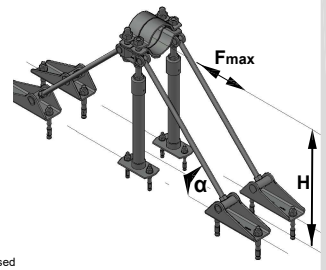
Height from base material to center of the pipe

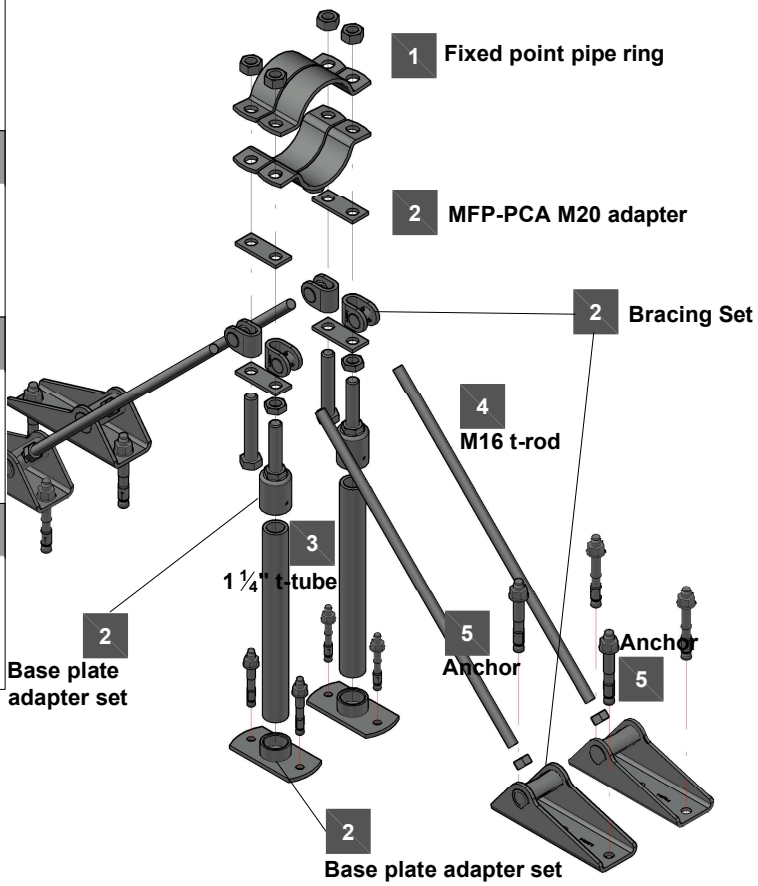
α_{min} = 35°

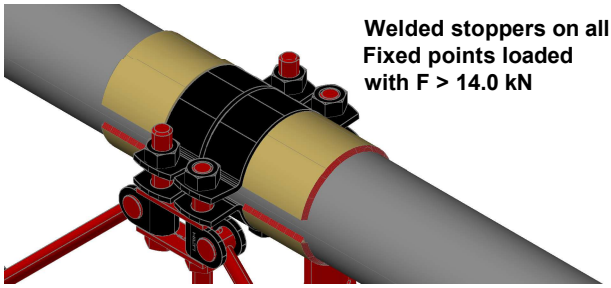
α_{max} = 45°

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



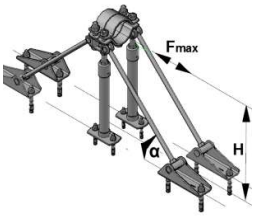




Welded stoppers on all Fixed points loaded with F > 14.0 kN

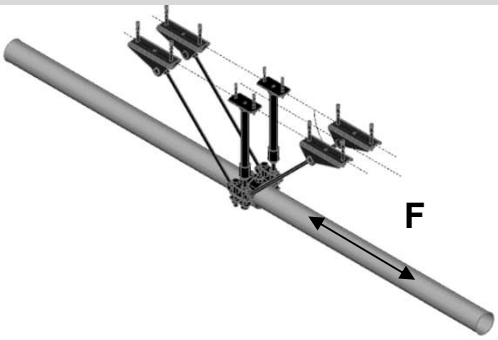
Application description	Application	Product lines	Base material
Heating - MFP-UHD2 fixed point	11	Fixed point sets	Concrete
		Threaded parts	

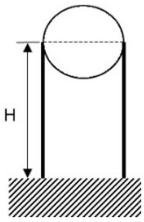
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



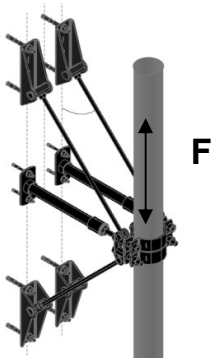
MFP-UHD2 recommended loading capacity limits

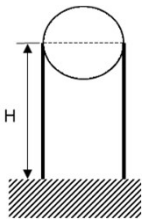
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





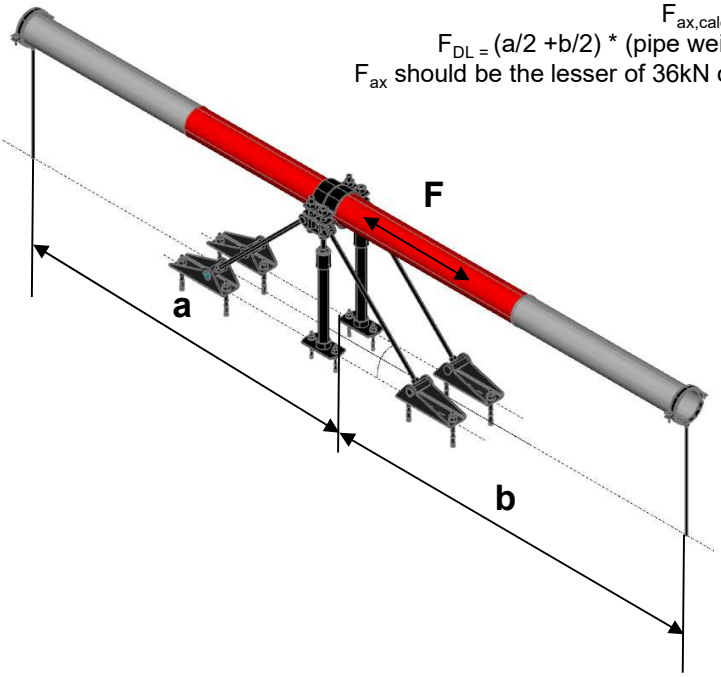
H [mm] up to	F [kN]
0	36.000
500	36.000
550	36.000
600	36.000
650	36.000
700	36.000
750	36.000
800	36.000
850	34.953
900	32.850
950	30.953
1000	29.235
1100	26.247
1200	23.739
1250	22.632
1300	21.608
1400	19.777
1500	18.190
1600	16.803
1750	15.024
1800	14.499
1900	13.534
2000	12.669

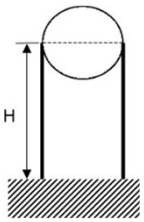
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

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}	39.928

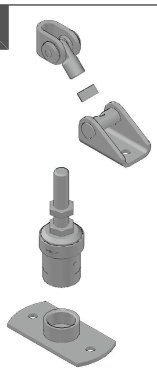
Fixed Point On Concrete - MFP-UL-I Fixed Point:

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

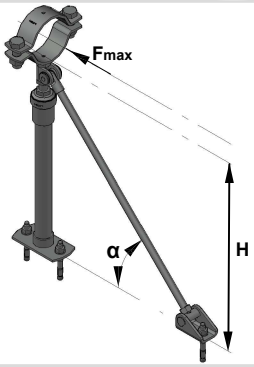
5	Anchors	
3x	HUS3-H 10x90 35/15/5	2079914
or		
3x	HST3 M12x85 10/-	2113978

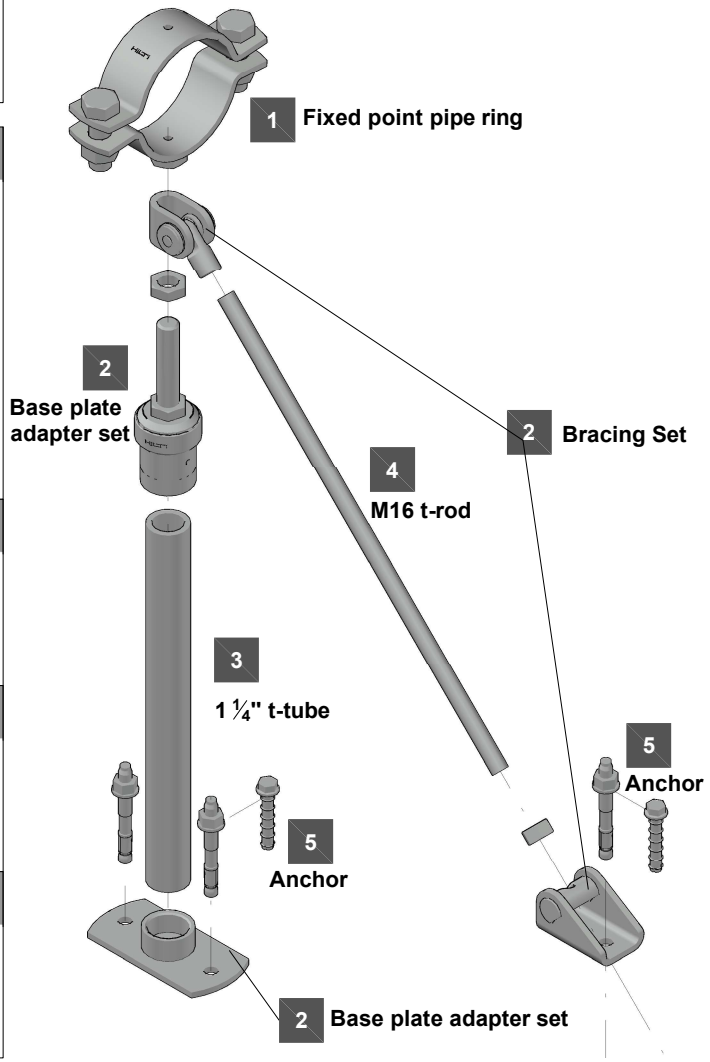
Resistance and limitations

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.

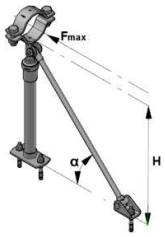
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





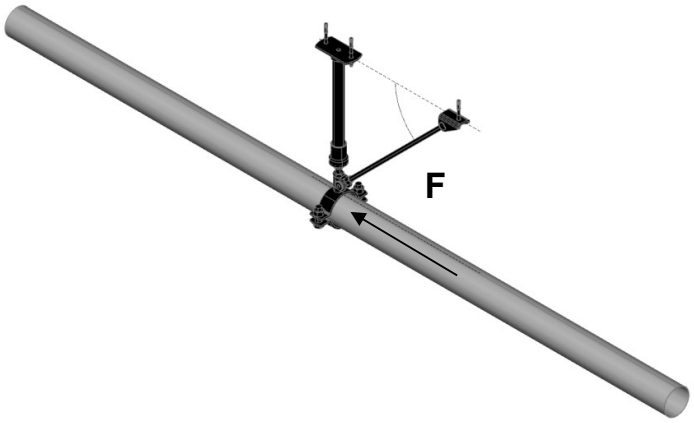
Application description	Application	Product lines	Base material
Heating - MFP-UL-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

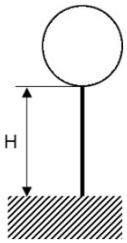
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



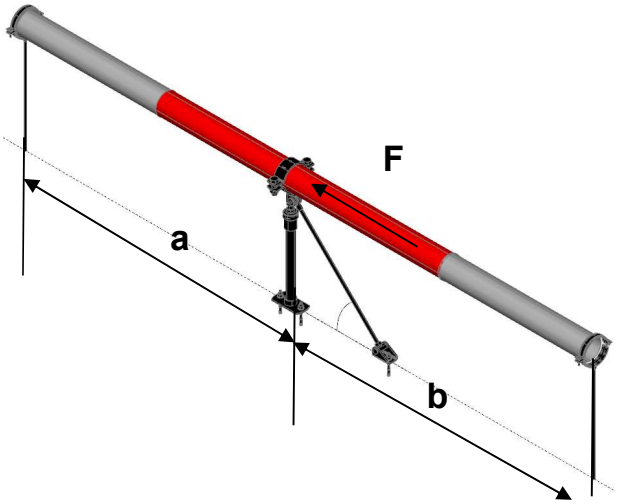
MFP-UL-I recommended loading capacity limits

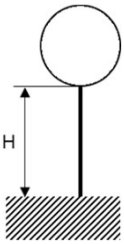
Hanging pipes - Recommended loading capacity



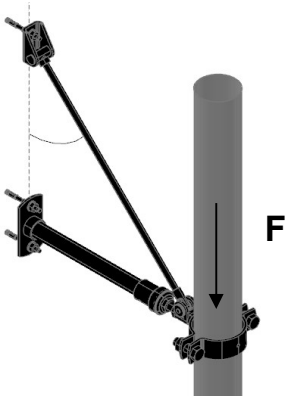


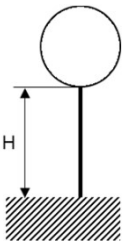
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity





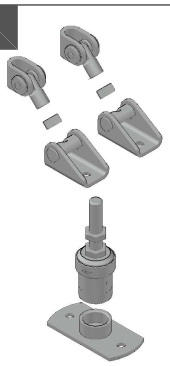
H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

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

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 

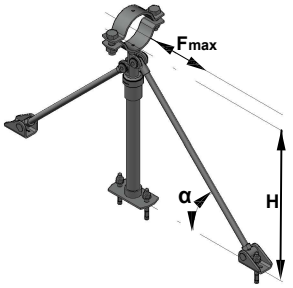
5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x85 10/-	2113978

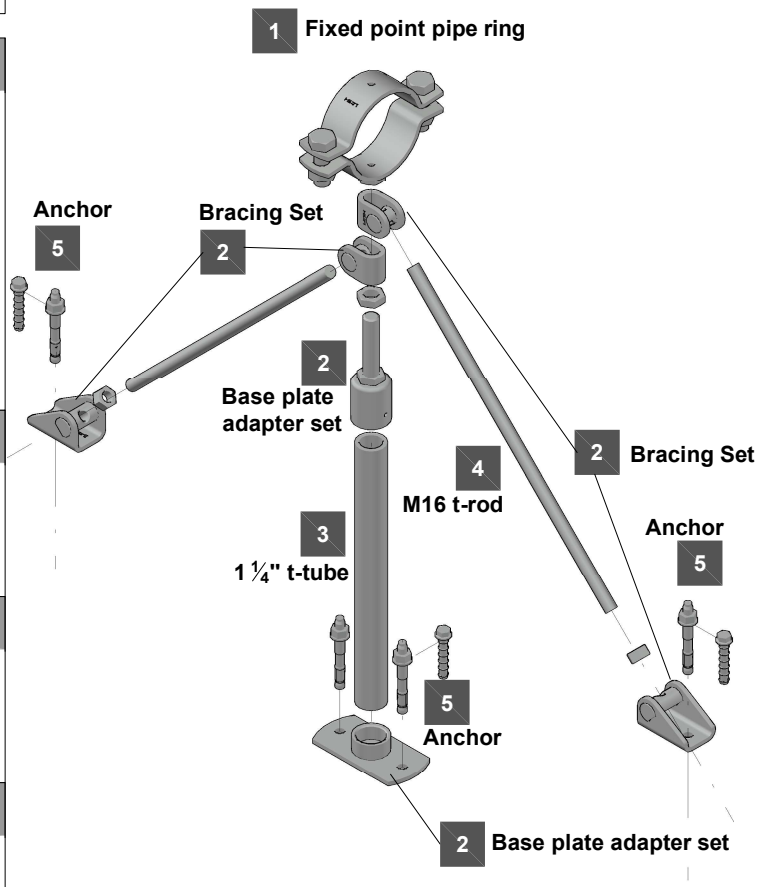
Resistance and limitations

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.

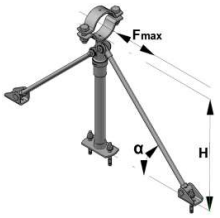
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





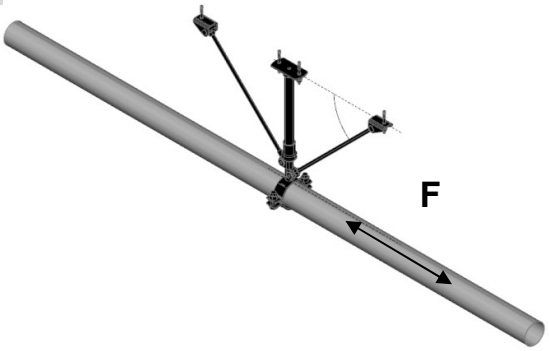
Application description	Application	Product lines	Base material
Heating - MFP-UL2-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

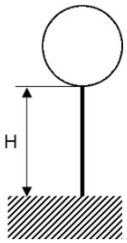
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



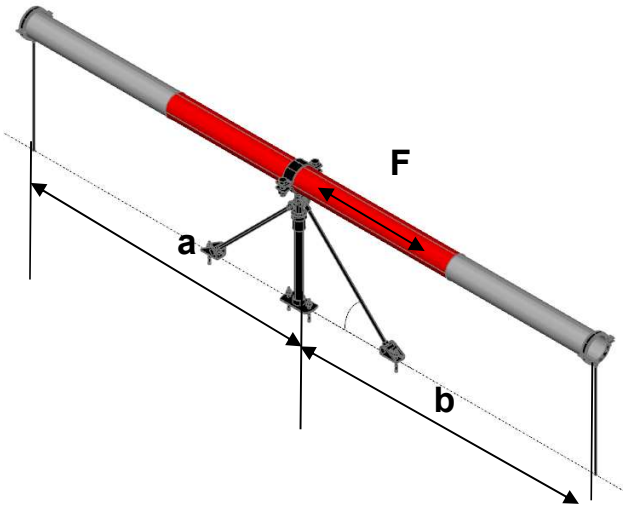
MFP-UL2-I recommended loading capacity limits

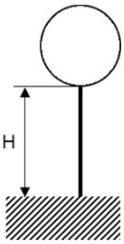
Hanging pipes - Recommended loading capacity



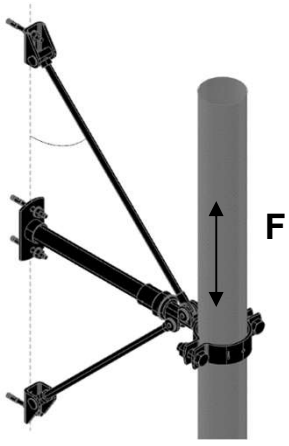


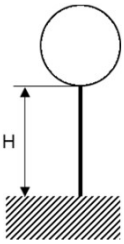
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity

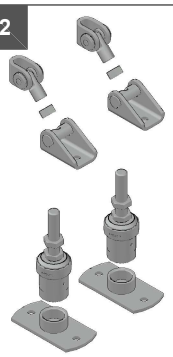
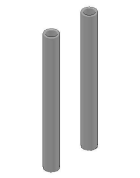




H [mm] up to	F [kN]
0	4.000
500	4.000
550	4.000
600	4.000
650	4.000
700	4.000
750	4.000
800	4.000
850	4.000
900	4.000
950	4.000
1000	4.000
1100	4.000
1200	4.000
1250	4.000
1300	4.000
1400	4.000
1500	4.000
1600	4.000
1750	4.000
1800	4.000
1900	4.000
2000	4.000

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

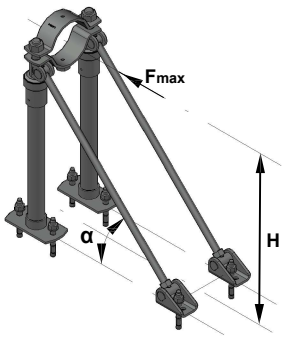
Height from base material to center of the pipe

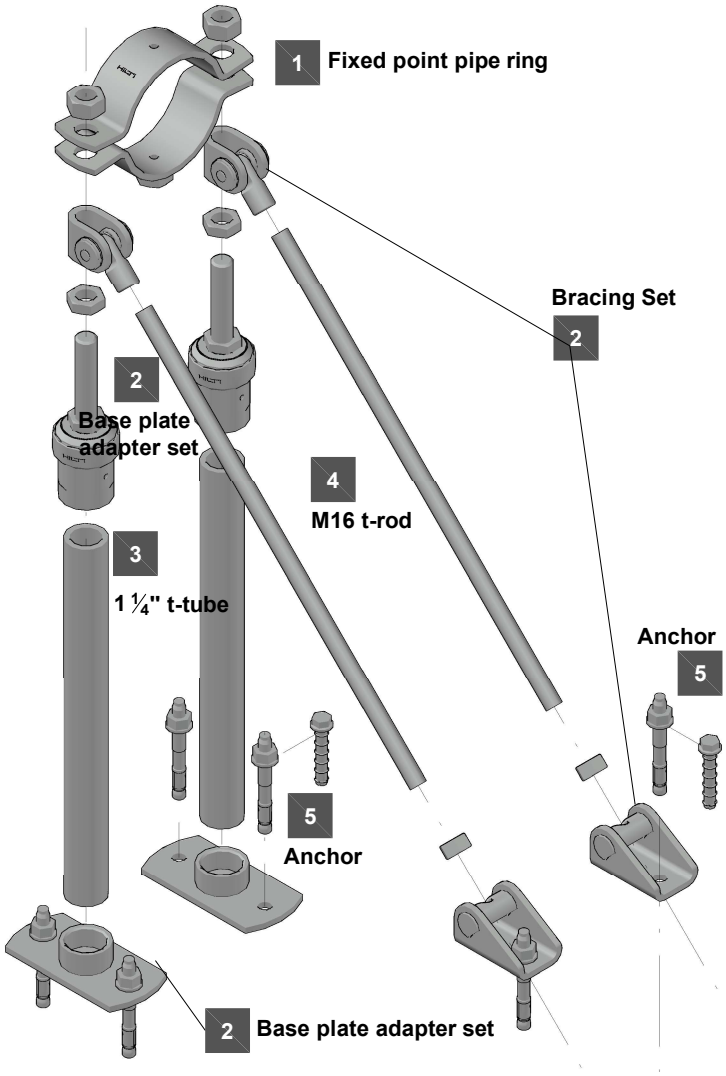
α_{min} = 35°

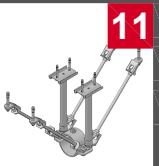
α_{max} = 45°

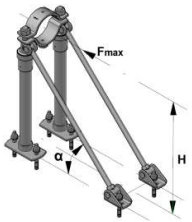
Validity of the capacity limits:
- Temperature limits: see the chapter „Temperature influence„ of this manual„.
- Published allowable loads for applications are based on static loading conditions.

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



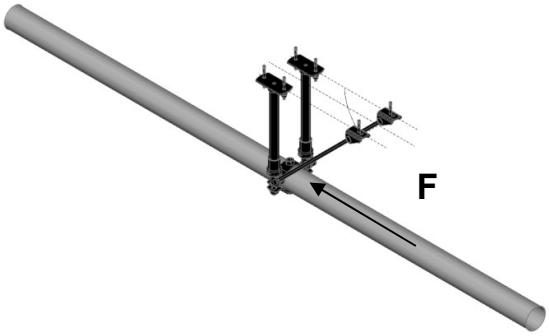


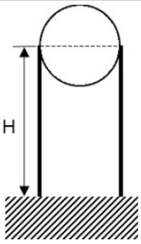
Application description	Application	Product lines	Base material
Heating - MFP-ULD-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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



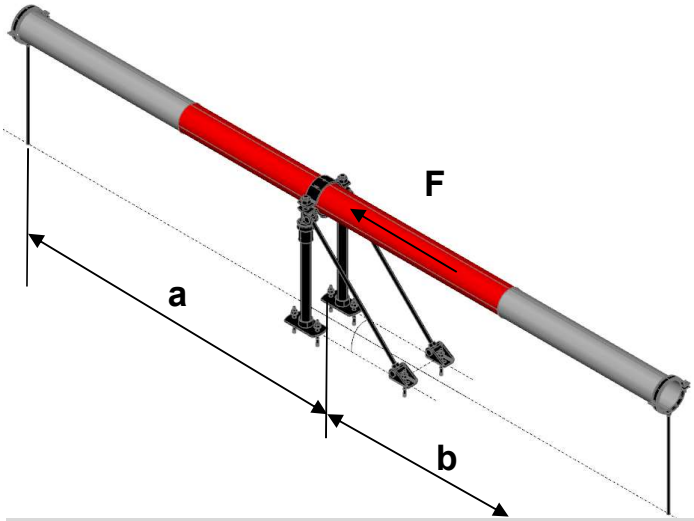
MFP-ULD-I recommended loading capacity limits

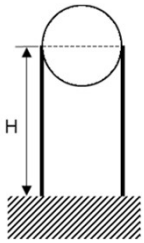
Hanging pipes - Recommended loading capacity



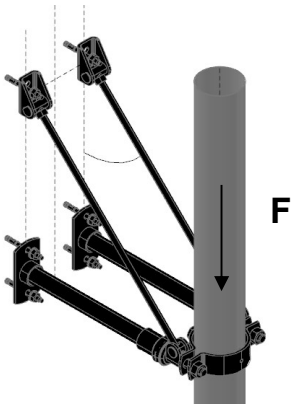


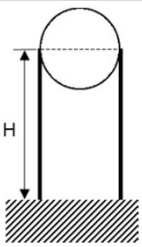
Supported pipes - Recommended loading capacity (Buckling check included)





Rising pipes - Recommended loading capacity



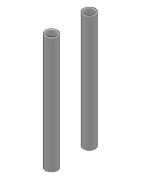


H [mm] up to	F [kN]
0	8.000
500	8.000
550	8.000
600	8.000
650	8.000
700	8.000
750	8.000
800	8.000
850	8.000
900	8.000
950	8.000
1000	8.000
1100	8.000
1200	8.000
1250	8.000
1300	8.000
1400	8.000
1500	8.000
1600	8.000
1750	8.000
1800	8.000
1900	8.000
2000	8.000

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

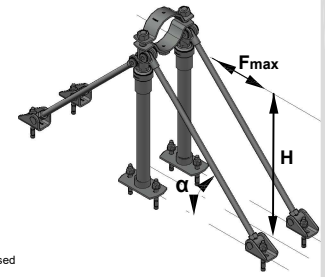
Height from base material to center of the pipe

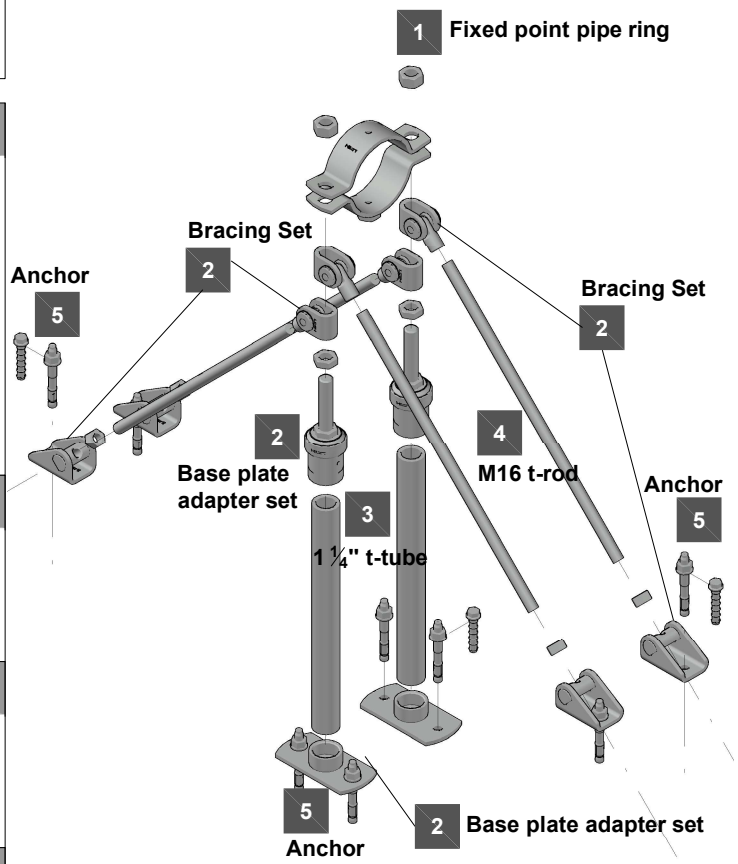
α_{min} = 35°

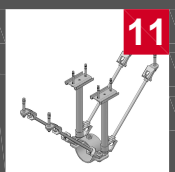
α_{max} = 45°

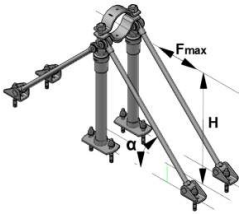
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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



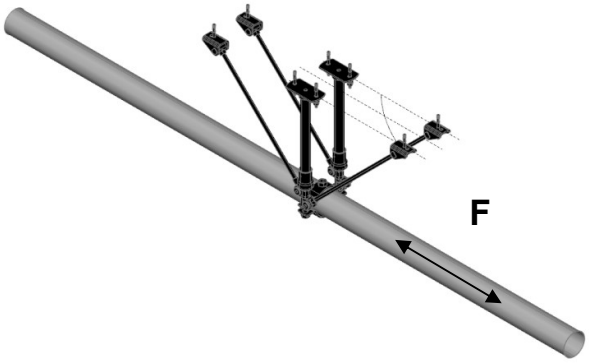


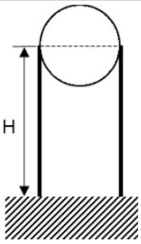
Application description	Application	Product lines	Base material
Heating - MFP-ULD2-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



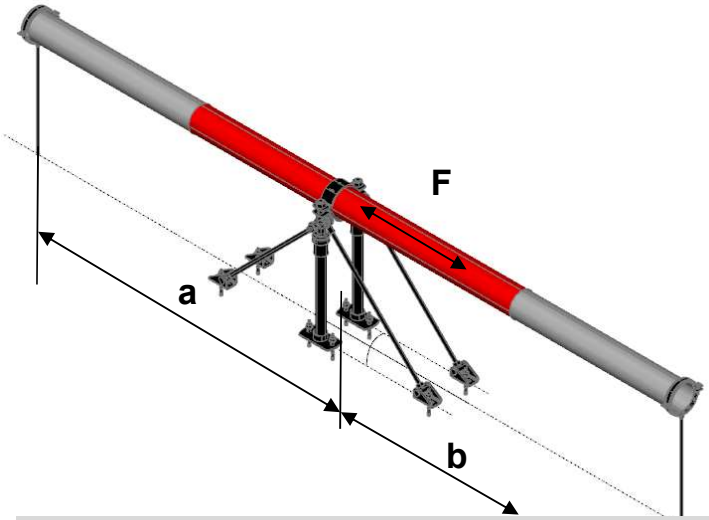
MFP-ULD2-I recommended loading capacity limits

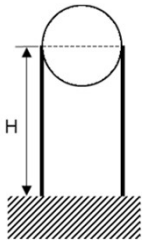
Hanging pipes - Recommended loading capacity



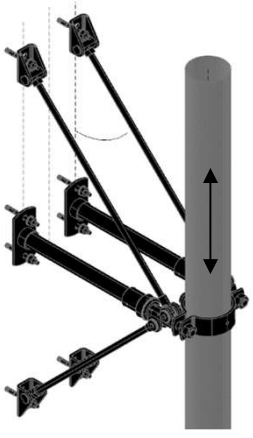


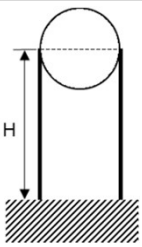
Supported pipes - Recommended loading capacity (Buckling check included)





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

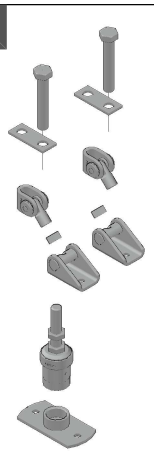
Fixed Point On Concrete - MFP - UM - I Fixed Point:

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



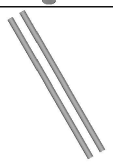
2	MFP- UM-I Fixed point set	
1x	MFP-UM - I set	2238274

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

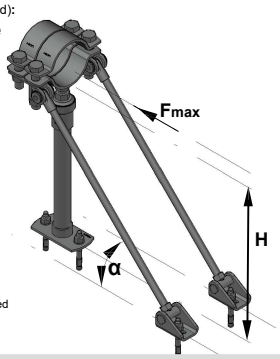
5	Anchors	
4x	HUS3-H 10x90 35/15/5	2079914
or		
4x	HST3 M12x85 10/-	2113978

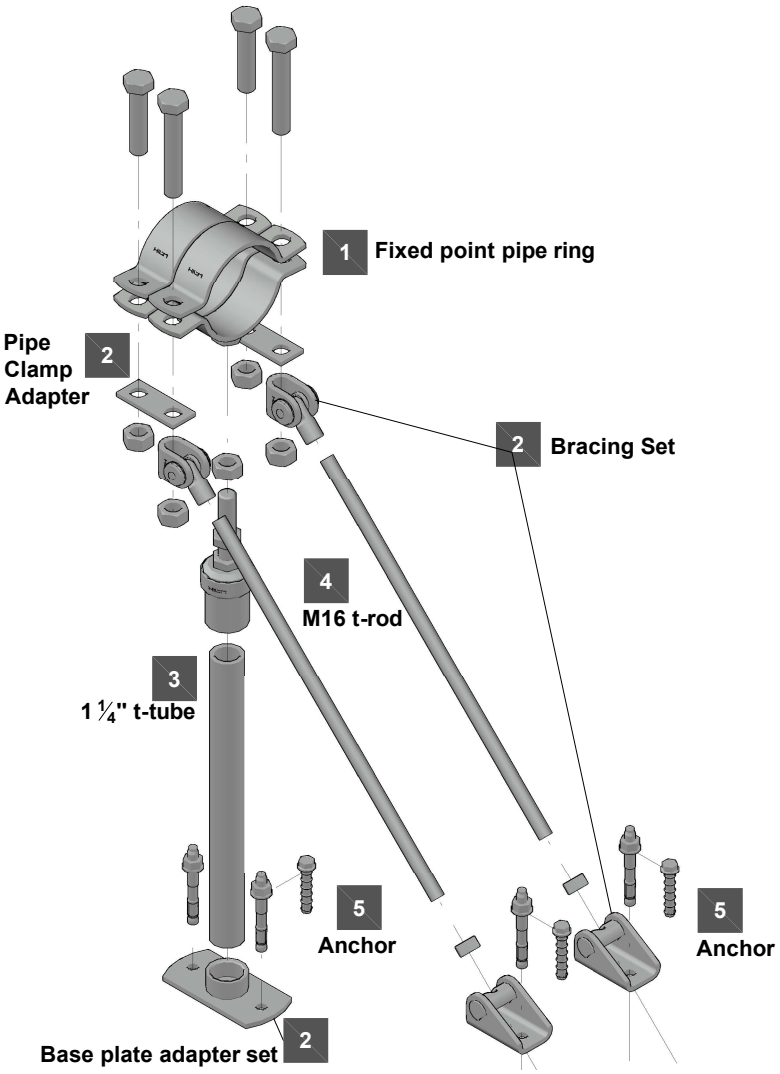
Resistance and limitations

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.

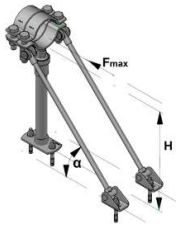
Disclamier:
- Load not applicable in any other than designated direction
- Load must be applied in the direction, that threaded rod is exposed to tension (as pictured)
- Any lateral load expose must be individually evaluated





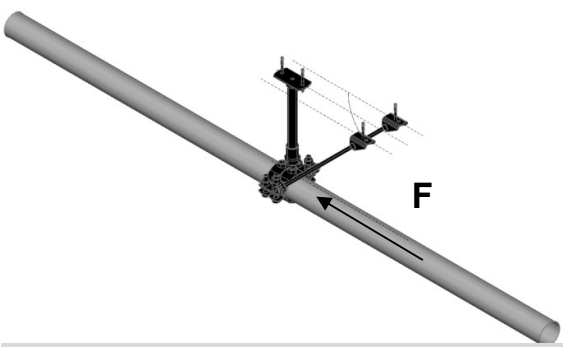
Application description	Application	Product lines	Base material
Heating - MFP-UM-I fixed point	11	Fixed point sets	Concrete
		Threaded parts	

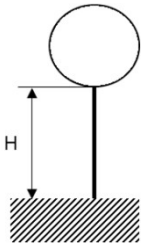
General comments
- Application subject to thermal expansion impact, no seismic, no fatique impact
- Loading and load impact must always be compared with 3D capacity limits for every single part of the application



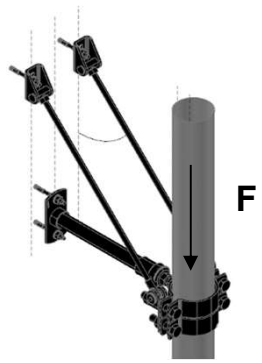
MFP-UM-I recommended loading capacity limits

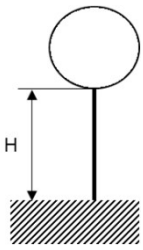
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





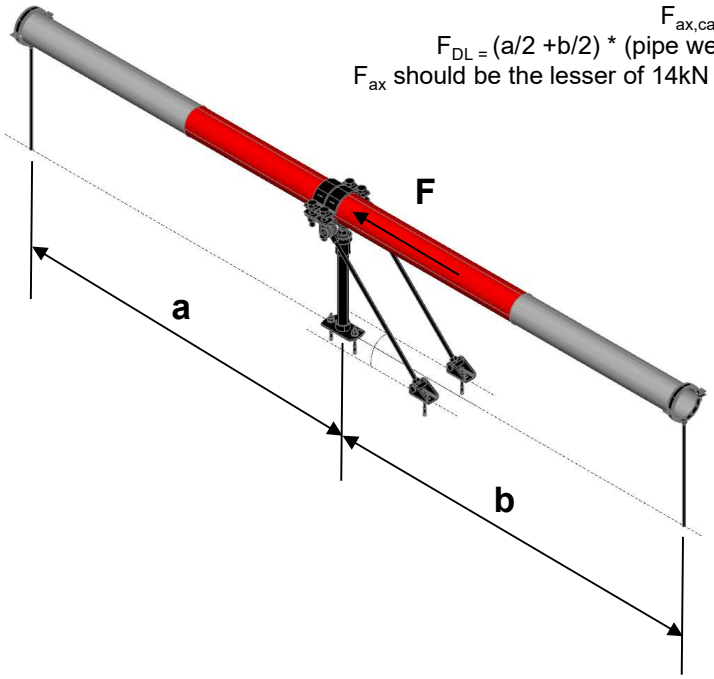
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

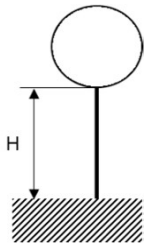
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or ($F_{B,max.} - F_{DL}$)

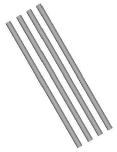




H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	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

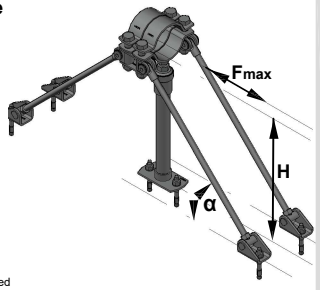
H_{min} = 175mm

H_{max} = 2000mm

height above ground to base of pipe

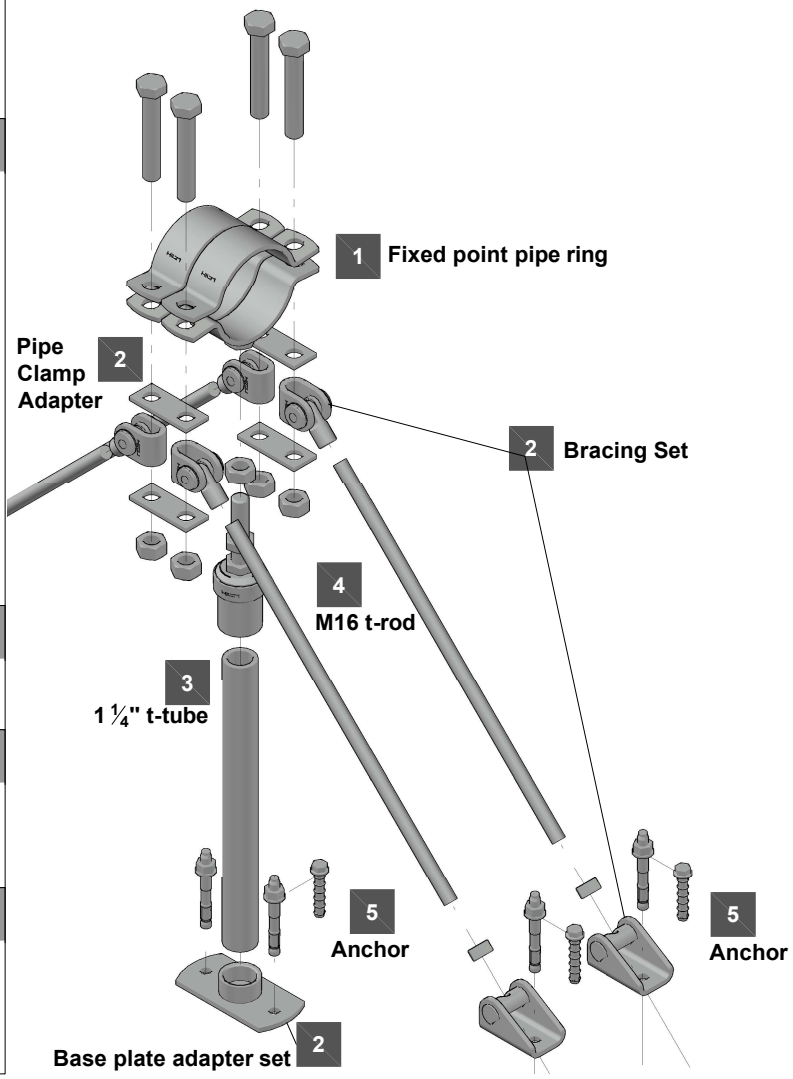
α_{min} = 35°

α_{max} = 45°

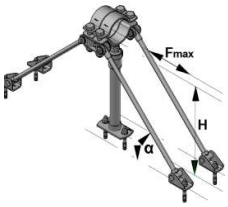


Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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

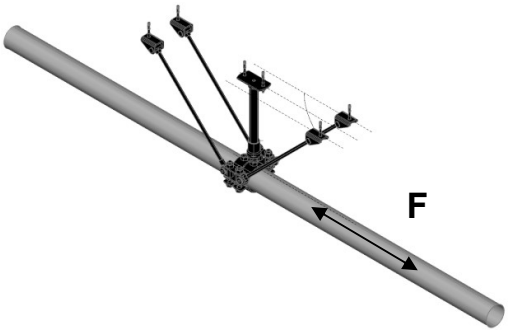


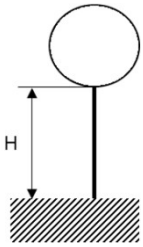
Application description	Application	Product lines	Base material
Heating - MFP-UM2-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity limits for every single part of the application			



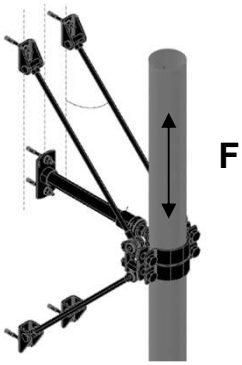
MFP-UM2-I recommended loading capacity limits

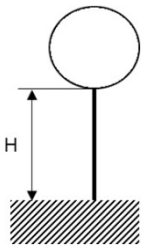
Hanging pipes - Recommended loading capacity





Rising pipes - Recommended loading capacity





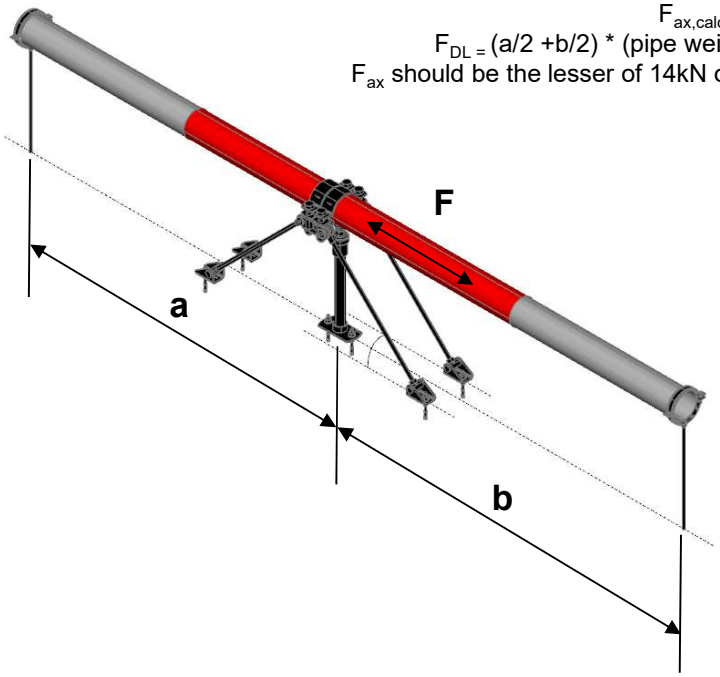
H [mm] up to	F [kN]
0	14.000
500	14.000
550	14.000
600	14.000
650	14.000
700	14.000
750	14.000
800	14.000
850	14.000
900	14.000
950	14.000
1000	14.000
1100	13.123
1200	11.869
1250	11.316
1300	10.804
1400	9.889
1500	9.095
1600	8.401
1750	7.512
1800	7.249
1900	6.767
2000	6.334

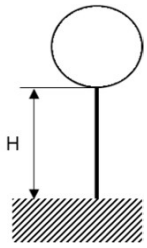
Supported pipes - Recommended loading capacity (Buckling check included)

$F_{ax,calc.} = F_{B,max.} - F_{DL}$

$F_{DL} = (a/2 + b/2) * (\text{pipe weight [kN] per m})$

F_{ax} should be the lesser of 14kN or $(F_{B,max.} - F_{DL})$

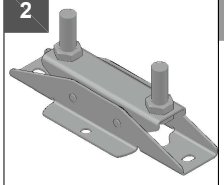
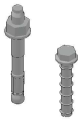


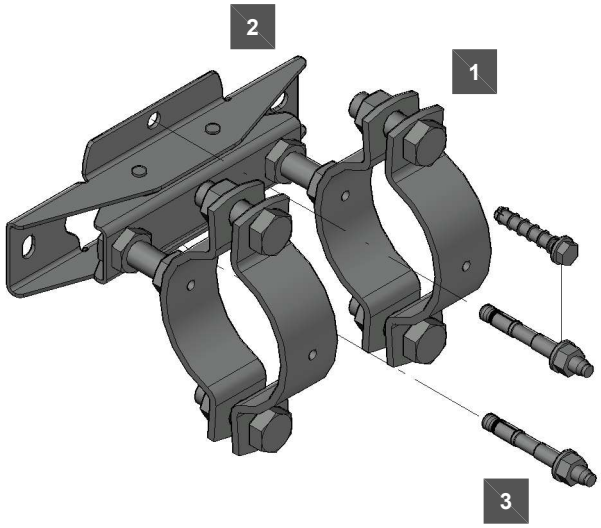


H [mm] up to	F [kN]	$F_{B,max.}$ [kN]
0	14.000	
500	14.000	
550	14.000	
600	14.000	
650	14.000	
700	14.000	
750	14.000	
800	14.000	
850	F_{ax}	17.477
900	F_{ax}	16.425
950	F_{ax}	15.477
1000	F_{ax}	14.618
1100	F_{ax}	13.123
1200	F_{ax}	11.869
1250	F_{ax}	11.316
1300	F_{ax}	10.804
1400	F_{ax}	9.889
1500	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

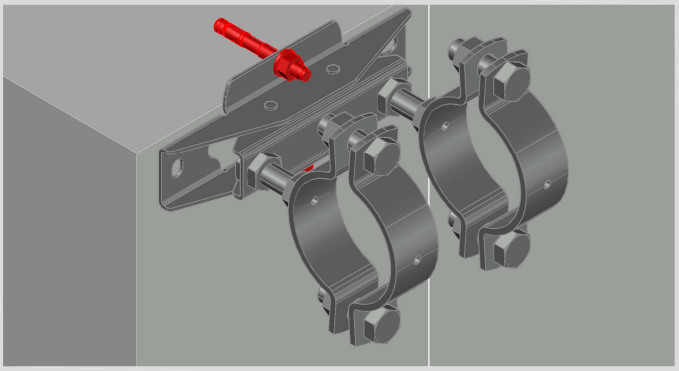
Fixed Point On Concrete - MFP-CL-I fixation on concrete column:

MFP-CL-I with sound insulation

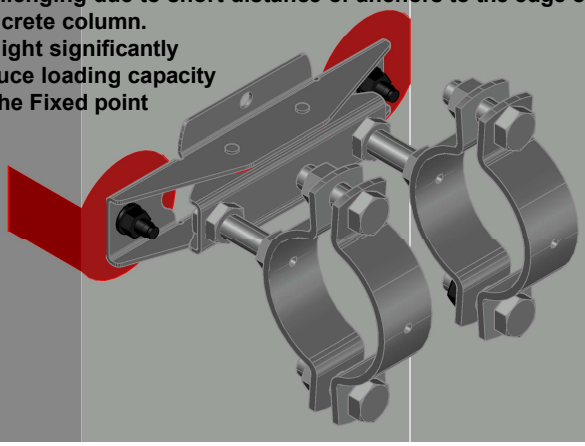
1		1	MFP-PC Fixed Point Pipe Ring
		2x	MFP-PC 21-22 M20 2227599 MFP-PC 25-27 M20 2227690 MFP-PC 28-30 M20 2227691 MFP-PC 31-33 M20 2227692 MFP-PC 33.5-36 M20 2227693 MFP-PC 39-41 M20 2227694 MFP-PC 42-45 M20 2227695 MFP-PC 47-50 M20 2227696 MFP-PC 53-56 M20 2227697 MFP-PC 57-61 M20 2227698 MFP-PC 62-66 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



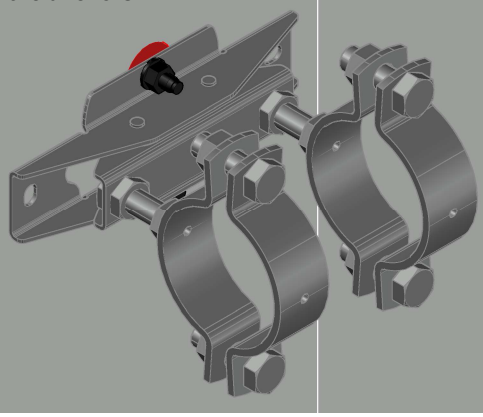
Assembled application

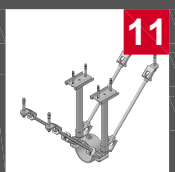


Using standard anchor point with M12 anchors might be challenging due to short distance of anchors to the edge of concrete column.
It might significantly reduce loading capacity of the Fixed point



Using of alternative anchor points of MFP-CL-I will not reduce loading capacity of the fixed point and avoid edge distance influence on the anchors

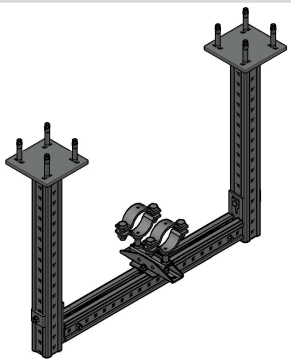


Application description	Application	Product lines	Base material
Heating - MFP-CL-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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

Fixed Point On MI/MIQ structure - MFP-CL-I :

MFP-CL-I with sound insulation

Assembled application



1	Brackets MIC-C90-DH for concrete	
Bracket (Cantilever arm)		
1x	MIC-C90-DH-500	2203572
	MIC-C90-DH-750	2203573
	MIC-C90-DH-1000	2203574
	MIC-C90-DH-1500	2203575
	MIC-C90-DH-2000	2203576
Anchors		
4x	HST3-R M16x135 35/15	2105876

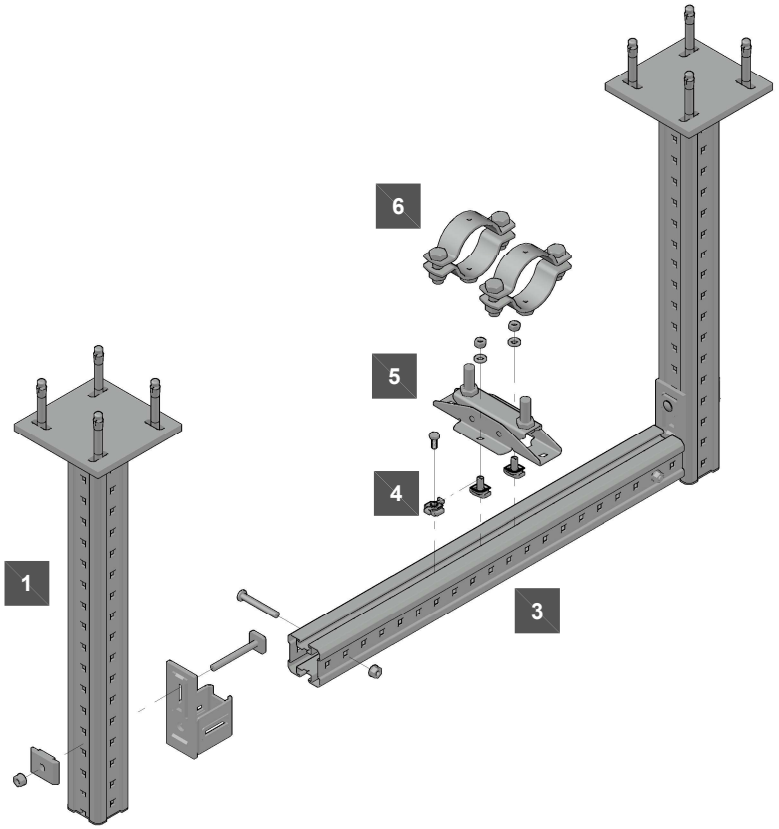
2	Connector MIQC-90-MI MIQ-90 fixed on MI-90	
1x	MIQC-90-MI	2140257
Connector includes all connecting hardware		

3	Girders MIQ-90	
	MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867

4	Fixing the Fixed point set to MI girder	
Alternative 1		
	MIQA-T t-bolt washer and nut included	2120142
Alternative 2		
	MIQM-M12 wing nut	2120275
	M12x20-F hex. screw	2131566

5	MFP-CL-I Fixed point set	
	MFP-CL-I set	2223018

6	MFP-PC Fixed Point Pipe Ring	
	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



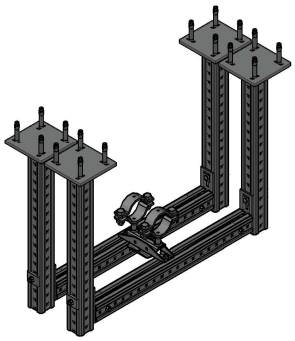
This page of the manual does not provide any loading capacity or resistance of the structure.
The purpose of this page is an inspiration how to create fix point in non-standard cases.
In order to verify the whole structure, proper loads have to be applied and the whole structure has to be calculated

Application description	Application	Product lines	Base material
Heating - MFP-CL-I fixed point fixed on MIQ structure	11	Fixed point sets	MI/MIQ structure
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 MI/MIQ structure - MFP-CL-I:

MFP-CL-I with sound insulation

Assembled application



1	Brackets MIC-C90-DH for concrete	
Bracket (Cantilever arm)		
1x	MIC-C90-DH-500	2203572
	MIC-C90-DH-750	2203573
	MIC-C90-DH-1000	2203574
	MIC-C90-DH-1500	2203575
	MIC-C90-DH-2000	2203576
Anchors		
4x	HST3-R M16x135 35/15	2105876

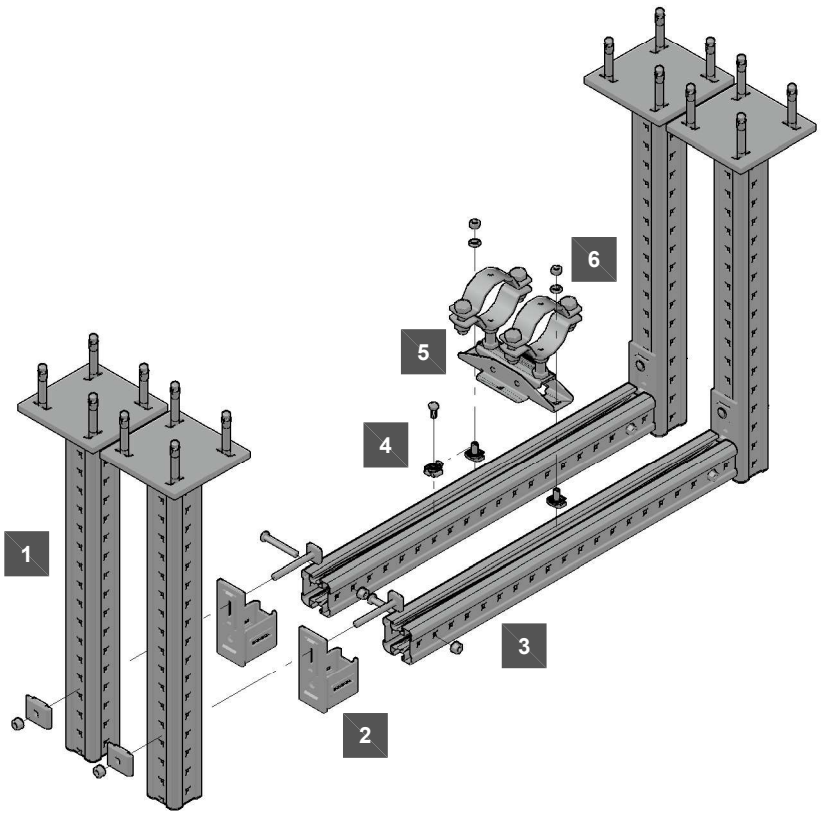
2	Connector MIQC-90-MI MIQ-90 fixed on MI-90	
1x	MIQC-90-MI	2140257
Connector includes all connecting hardware		

3	Girders MIQ-90	
	MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867

4	Fixing the Fixed point set to MI girder	
Alternative 1		
	MIQA-T t-bolt washer and nut included	2120142
Alternative 2		
	MIQM-M12 wing nut	2120275
	M12x20-F hex. screw	2131566

5	MFP-CL-I Fixed point set	
	MFP-CL-I set	2223018

6	MFP-PC Fixed Point Pipe Ring	
	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



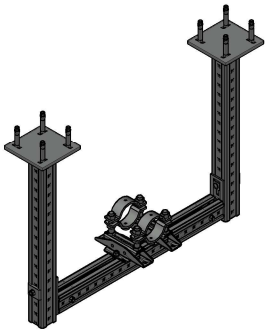
This page of the manual does not provide any loading capacity or resistance of the structure.
The purpose of this page is an inspiration how to create fix point in non-standard cases.
In order to verify the whole structure, proper loads have to be applied and the whole structure has to be calculated

Application description	Application	Product lines	Base material
Heating - MFP-CL-I fixed point fixed on MIQ structure	11	Fixed point sets	MI/MIQ structure
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 MI/MIQ structure - MFP-CLD-I:

MFP-CL-I with sound insulation

Assembled application



1	Brackets MIC-C90-DH for concrete	
Bracket (Cantilever arm)		
1x	MIC-C90-DH-500	2203572
	MIC-C90-DH-750	2203573
	MIC-C90-DH-1000	2203574
	MIC-C90-DH-1500	2203575
	MIC-C90-DH-2000	2203576
Anchors		
4x	HST3-R M16x135 35/15	2105876

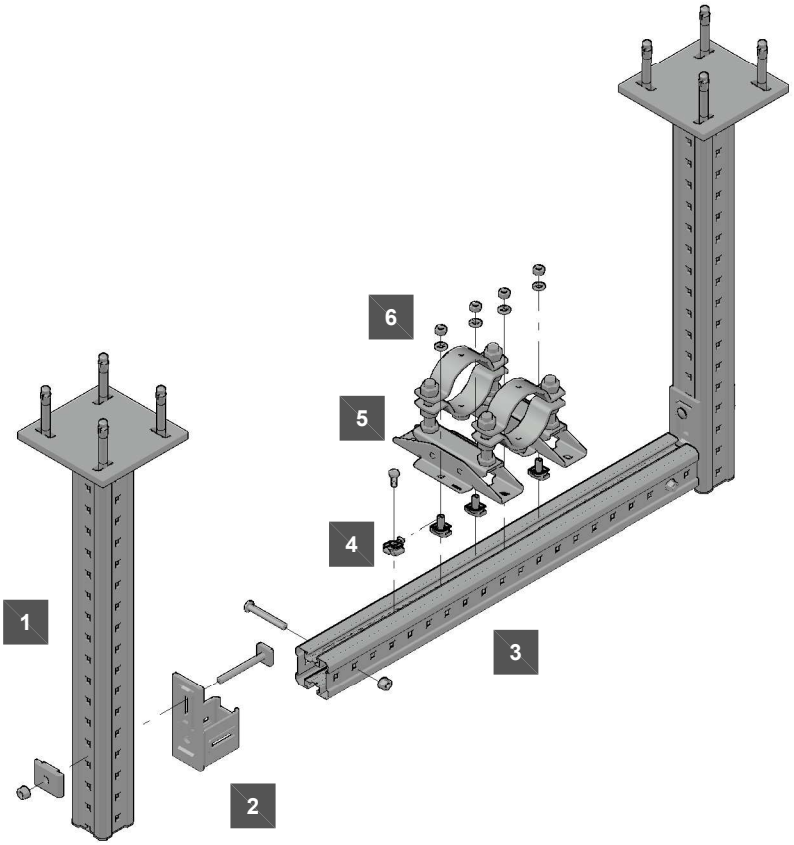
2	Connector MIQC-90-MI MIQ-90 fixed on MI-90	
1x	MIQC-90-MI	2140257
Connector includes all connecting hardware		

3	Girders MIQ-90	
	MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867

4	Fixing the Fixed point set to MI girder	
Alternative 1		
	MIQA-T t-bolt washer and nut included	2120142
Alternative 2		
	MIQM-M12 wing nut	2120275
	M12x20-F hex. screw	2131566

5	MFP-CLD-I Fixed point set	
1x	MFP-CLD-I set	2223014

6	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



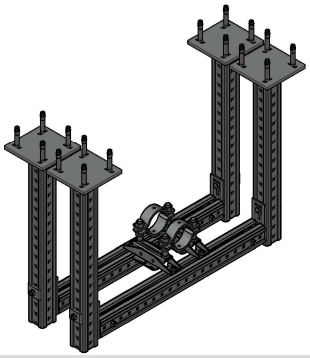
This page of the manual does not provide any loading capacity or resistance of the structure.
The purpose of this page is an inspiration how to create fix point in non-standard cases.
In order to verify the whole structure, proper loads have to be applied and the whole structure has to be calculated

Application description	Application	Product lines	Base material
Heating - MFP-CLD-I fixed point	11	Fixed point sets	MI/MIQ structure
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 MI/MIQ structure - MFP-CLD-I:

MFP-CL-I with sound insulation

Assembled application



1	Brackets MIC-C90-DH for concrete	
Bracket (Cantilever arm)		
1x	MIC-C90-DH-500	2203572
	MIC-C90-DH-750	2203573
	MIC-C90-DH-1000	2203574
	MIC-C90-DH-1500	2203575
	MIC-C90-DH-2000	2203576
Anchors		
4x	HST3-R M16x135 35/15	2105876

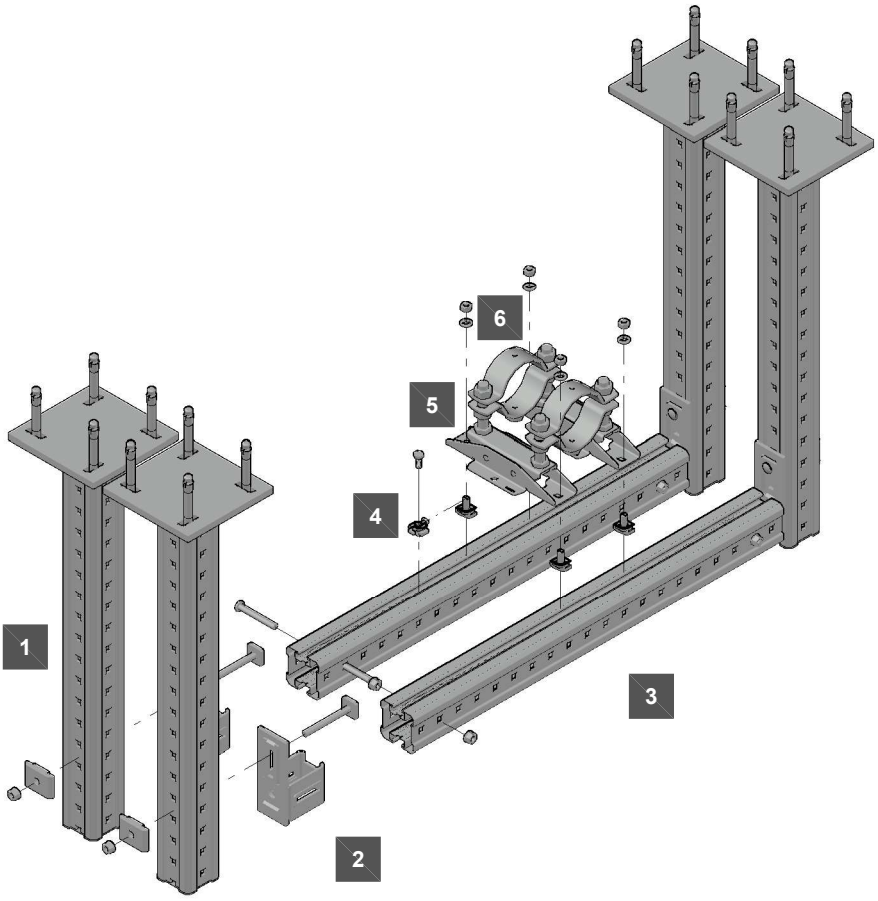
2	Connector MIQC-90-MI MIQ-90 fixed on MI-90	
1x	MIQC-90-MI	2140257
Connector includes all connecting hardware		

3	Girders MIQ-90	
	MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867

4	Fixing the Fixed point set to MI girder	
Alternative 1		
	MIQA-T t-bolt washer and nut included	2120142
Alternative 2		
	MIQM-M12 wing nut	2120275
	M12x20-F hex. screw	2131566

5	MFP-CLD-I Fixed point set	
1x	MFP-CLD-I set	2223014

6	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



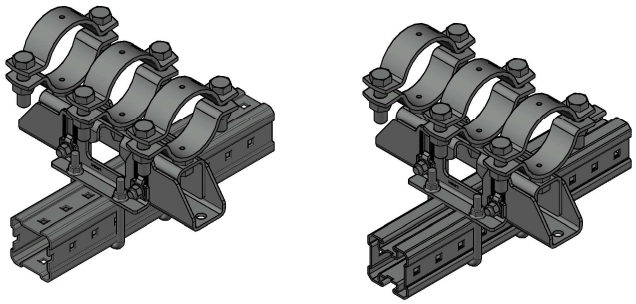
This page of the manual does not provide any loading capacity or resistance of the structure.
The purpose of this page is an inspiration how to create fix point in non-standard cases.
In order to verify the whole structure, proper loads have to be applied and the whole structure has to be calculated

Application description	Application	Product lines	Base material
Heating - MFP-CLD-I fixed point on MI/MIQ structure	11	Fixed point sets	MI/MIQ structure
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 Fixed On MI/MIQ System Structure - MFP-CH:

MFP-CH without sound insulation

Assembled application

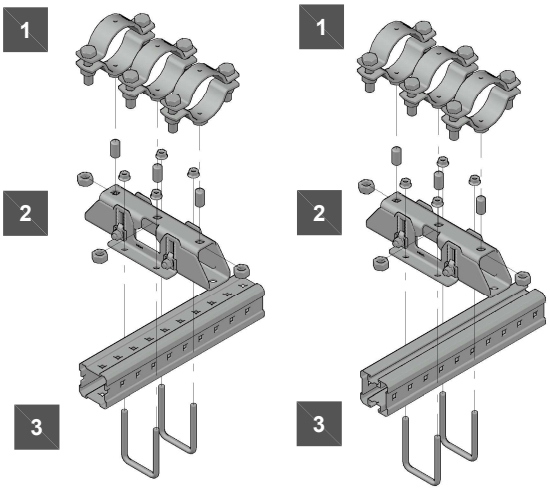


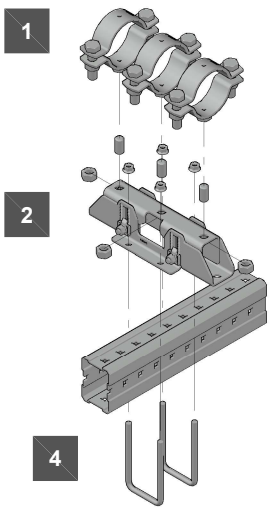
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 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	MFP-CH Fixed point set	
1x	MFP-CH set	2223015

3	U-bolts for fixation on MI-90 or MIQ-90 girder	
1x	MIA-BO90-M12 connector	304840

4	U-bolts for fixation on MI-120	
1x	MIA-BO120-M12 connector	304841



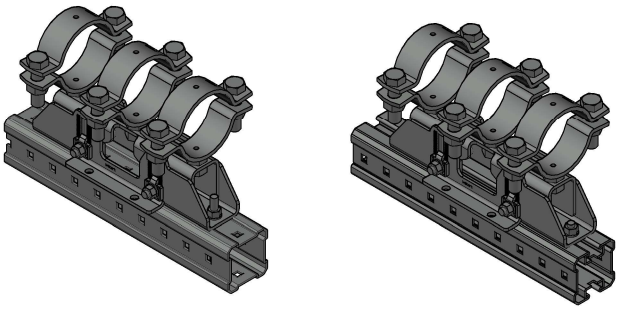


Application description	Application	Product lines	Base material
Heating - MFP-CH fixed point fixed on MI / MIQ girders	11	Fixed point sets	MI/MIQ structure
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must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

Fixed Point Fixed On MI/MIQ System Structure - MFP-CH:

MFP-CH without sound insulation

Assembled application



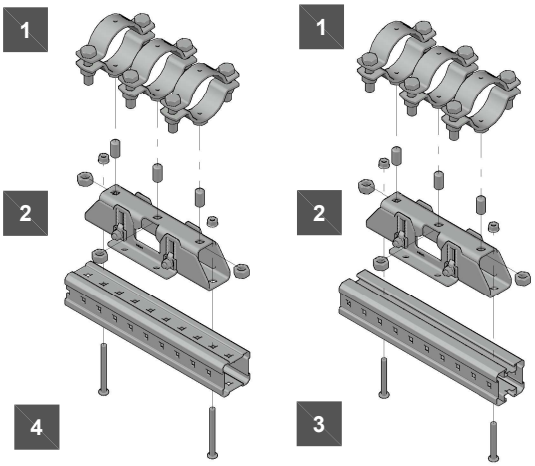
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 21-22 M20	2227599
	MFP-PC 25-27 M20	2227690
	MFP-PC 28-30 M20	2227691
	MFP-PC 31-33 M20	2227692
	MFP-PC 33.5-36 M20	2227693
	MFP-PC 39-41 M20	2227694
	MFP-PC 42-45 M20	2227695
	MFP-PC 47-50 M20	2227696
	MFP-PC 53-56 M20	2227697
	MFP-PC 57-61 M20	2227698
	MFP-PC 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

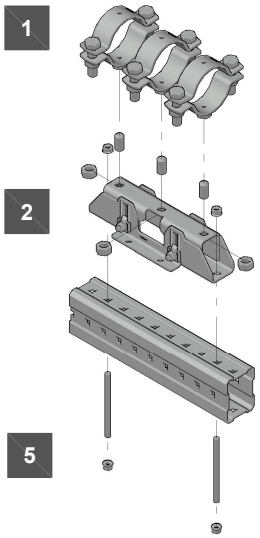
2	MFP-CH Fixed point set	
1x	MFP-CH set	2223015

3	Screw to fix MFP-CH on MIQ-90 girder	
2x	MIA-OH90 one hand screw	304889

4	Screw to fix MFP-CH on MI-90 girder	
2x	MIA-OH120 one hand srew	304890

5	Screw to fix MFP-CH on MI-120 girder	
2x	AM12x1000 8.8 HDG…m	419103
4x	M12-F-SL WS3/4 nut	382897





Application description	Application	Product lines	Base material
Heating - MFP-CH fixed point fixed on MI / MIQ girders	11	Fixed point sets	MI/MIQ structure
		Threaded parts	

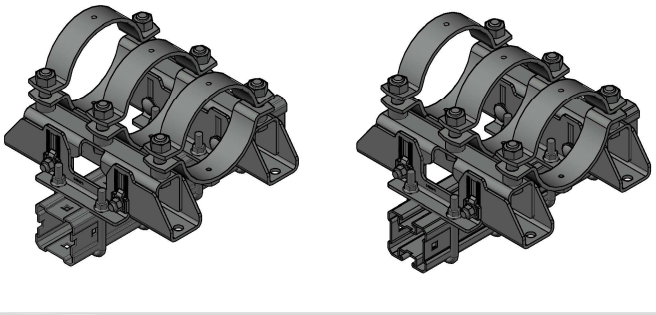
General comments

- 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

Fixed Point On MI / MIQ structure - MFP-CHD:

MFP-CHD without sound insulation

Assembled application

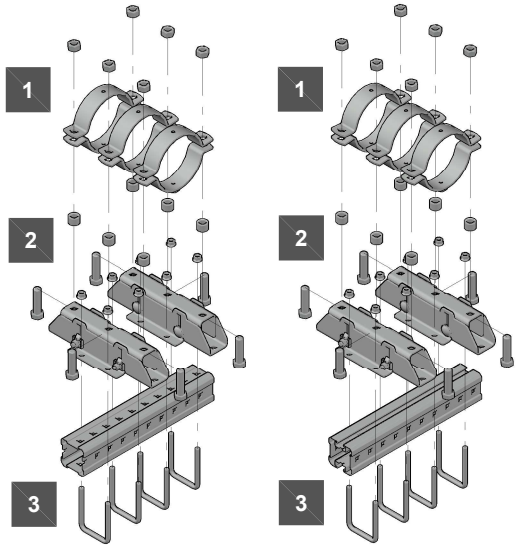


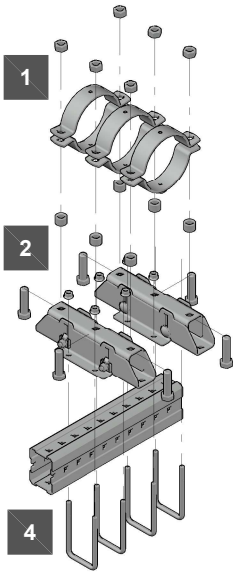
1	MFP-PC Fixed Point Pipe Ring	
3x	MFP-PC 73-78 M20	2227701
	MFP-PC 88-93 M20	2227702
	MFP-PC 100-105 M20	2227703
	MFP-PC 108-115 M20	2227704
	MFP-PC 125-133 M20	2227705
	MFP-PC 134-142 M20	2227706
	MFP-PC 154-162 M20	2227707
	MFP-PC 162-170 M20	2227708
	MFP-PC 192-200 M20	2227709
	MFP-PC 213-221 M20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

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

3	U-bolts for fixation on MI-90 or MIQ-90 girder	
1x	MIA-BO90-M12 connector	304840

4	U-bolts for fixation on MI-120	
1x	MIA-BO120-M12 connector	304841



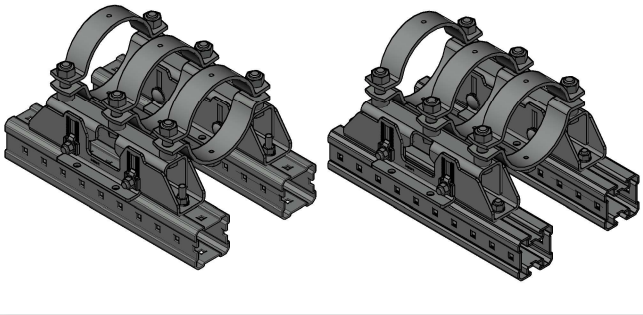


Application description	Application	Product lines	Base material
Heating - MFP-CHD fixed point fixed on MI / MIQ structure	11	Fixed point sets	MI / MIQ System
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must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

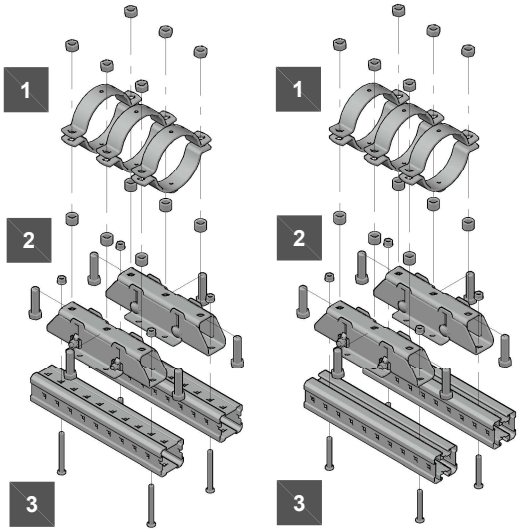
Fixed Point On MI / MIQ structure - MFP-CHD:

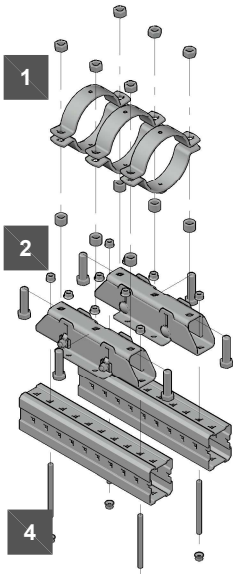
MFP-CHD without sound insulation

Assembled application



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	MFP-CHD Fixed point set		
1x	MFP-CHD set	2238264	
3	Screw to fix MFP-CH on MIQ-90 girder		
2x	MIA-OH90 one hand screw	304889	
4	Screw to fix MFP-CH on MI-90 girder		
2x	MIA-OH120 one hand srew	304890	
5	Screw to fix MFP-CH on MI-120 girder		
2x	AM12x1000 8.8 HDG…m	419103	
4x	M12-F-SL WS3⁄4 nut	382897	



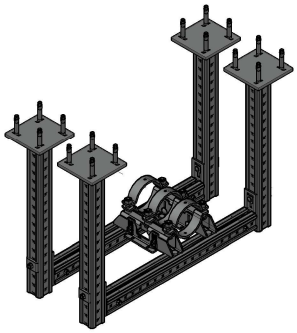


Application description	Application	Product lines	Base material
Heating - MFP-CHD fixed point fixed on MI / MIQ structure	11	Fixed point sets	MI / MIQ System
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must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

Fixed Point On MI / MIQ structure - MFP-CHD:

MFP-CHD without sound insulation

Assembled application



1	Brackets MIC-C90-DH for concrete	
Bracket (Cantilever arm)		
1x	MIC-C90-DH-500	2203572
	MIC-C90-DH-750	2203573
	MIC-C90-DH-1000	2203574
	MIC-C90-DH-1500	2203575
	MIC-C90-DH-2000	2203576
Anchors		
4x	HST3-R M16x135 35/15	2105876

2	Connector MIQC-90-MI MIQ-90 fixed on MI-90	
1x	MIQC-90-MI	2140257
Connector includes all connecting hardware		

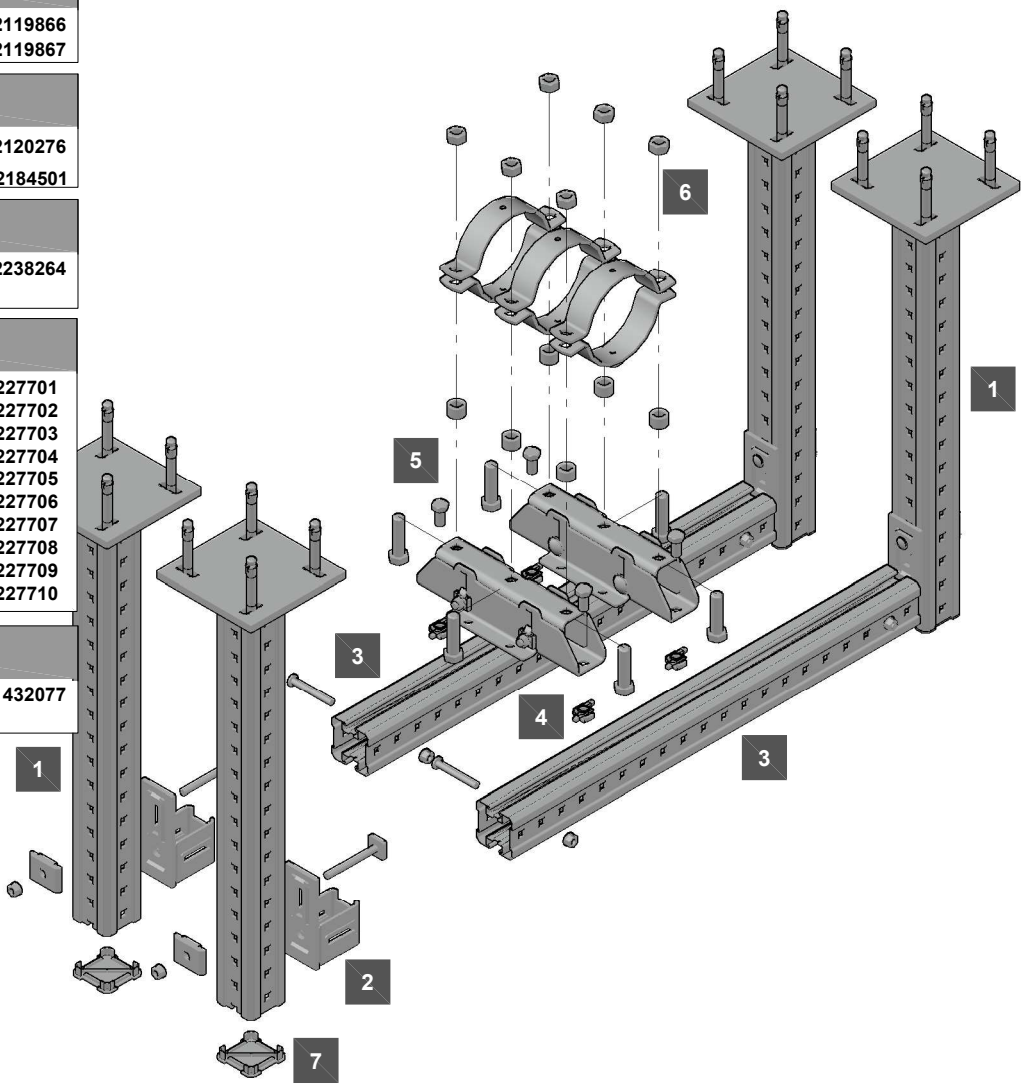
3	Girders MIQ-90	
	MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867

4	Fixation to on MIQ-90 girder	
2x	MIQM-M16 wing nut	2120276
2x	M16X30 hex. head screw	2184501

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

6	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

7	Plastic end caps	
	MIA-EC	432077



Application description	Application	Product lines	Base material
Heating - MFP-CHD fixed point fixed on MI / MIQ structure	11	Fixed point sets	MI / MIQ System
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 with longer distance than H_{max}:

MFP-CSL spec 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	AM20 Threaded Rod	
	1x	AM20 x 1000 threaded rod	216425
3	2	MFP-CSL Fixed point set	
	1x	MFP-CSL set	2223016
4	3	Anchors	
	2x	HUS3-H 10x90 35/15/5	2079914
	or		
	2x	HST3 M12x85 10/-	2113978

Resistance and limitations

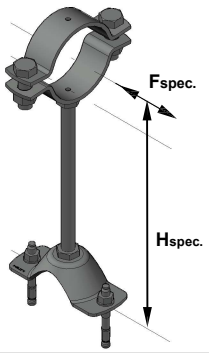
H_{spec}

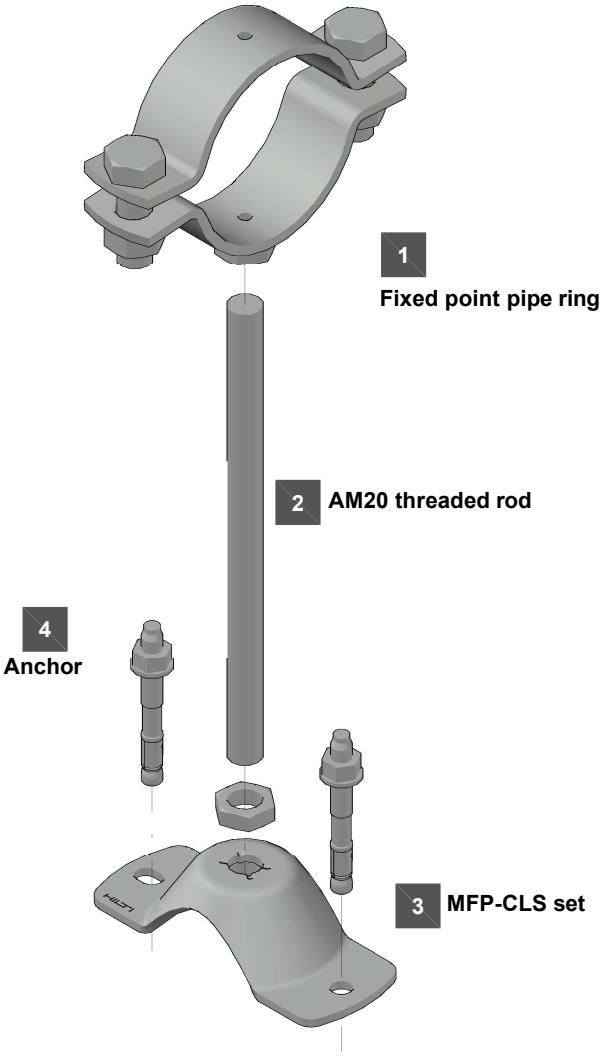
height from base material to the center of the pipe

Recommended resitance
(safety factor 1.4 included):
F_{spec} = for loading capacity cases, see the reverse page

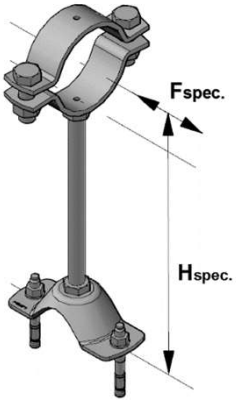
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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-CSL spec. fixed point - longer distance	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-CSL with longer distance recommended loading capacity limits

$H_{spec.}$ [mm]	F [kN]
125	2.000
130	1.923
140	1.786
150	1.667
160	1.563
170	1.471
180	1.389
190	1.316
200	1.250
210	1.190
220	1.136
230	1.087
240	1.042
250	1.000
260	0.962
270	0.926
280	0.893
290	0.862
300	0.833

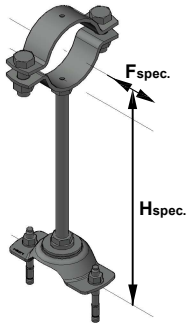
Fixed Point On Concrete - MFP-CSL-I with longer distance than H_{max}:

MFP-CSL-I with sound insulation

Resistance and limitations

H_{spec}
height from base material to the center of the pipe

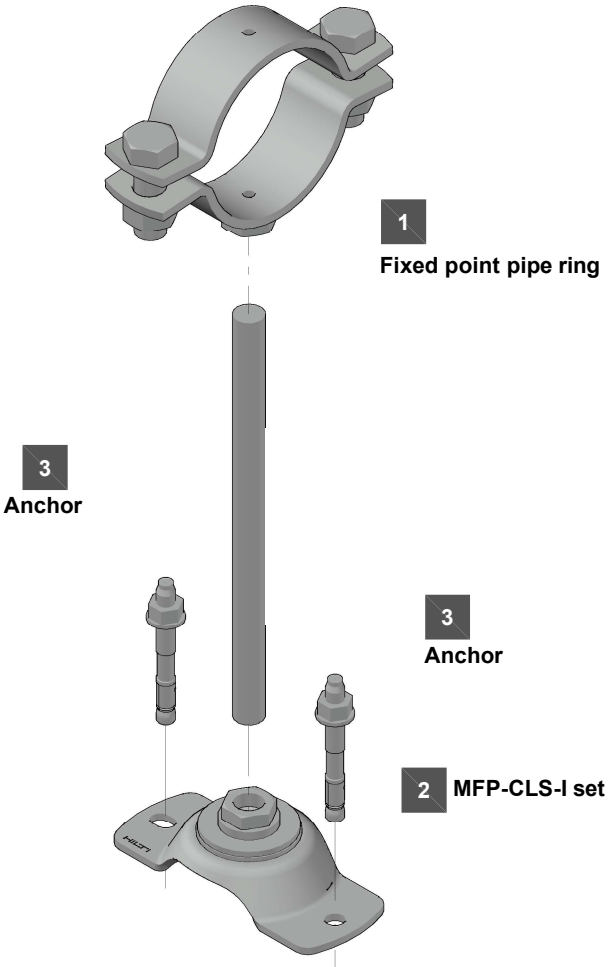
Recommended resitance
(safety factor 1.4 included):
F_{spec} = for loading capacity cases, see the reverse page

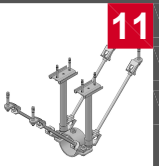


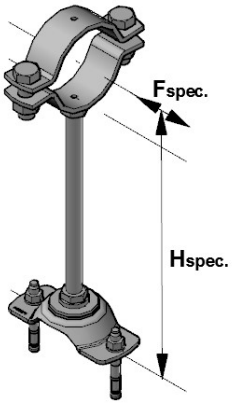
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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
		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	AM20 Threaded Rod
		1x	AM20 x 1000 threaded rod 216425
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



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			



MFP-CSL-I with longer distance recommended loading capacity limits

$H_{spec.}$ [mm]	F [kN]
125	2.000
130	1.923
140	1.786
150	1.667
160	1.563
170	1.471
180	1.389
190	1.316
200	1.250
210	1.190
220	1.136
230	1.087
240	1.042
250	1.000
260	0.962
270	0.926
280	0.893
290	0.862
300	0.833

Fixed Point On Concrete - MFP-CL-I with longer distance than H_{max}:

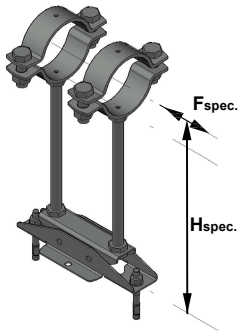
MFP-CL-I with sound insulation

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	AM20 Threaded Rod
	2x	AM20 x 1000 threaded rod	216425
3		2	MFP-CL-I Fixed point set
	1x	MFP-CL-I set	2223018
4		3	Anchors
	2x	HUS3-H 10x60 5/-/-	2079911
		or	
	2x	HST3 M12x85 10/-	2113978

Resistance and limitations

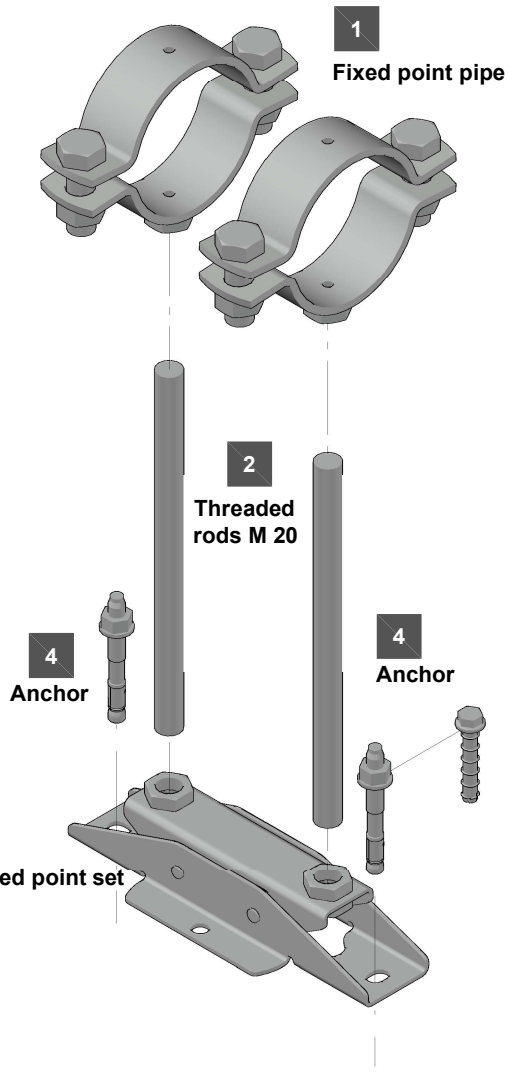
H_{spec}
height from base material to the center of the pipe

Recommended resitance
(safety factor 1.4 included):
F_{spec} = for loading capacity cases, see the reverse page

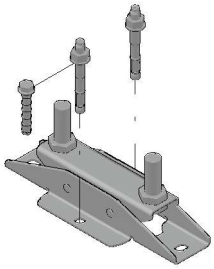


Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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

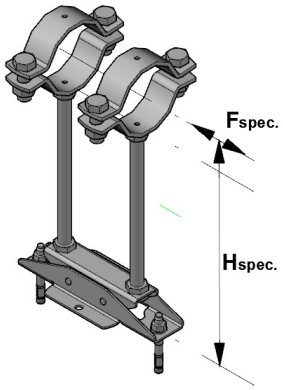


Alternative anchor points



Application description	Application	Product lines	Base material
Heating - MFP-CL-I fixed point - longer distance	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

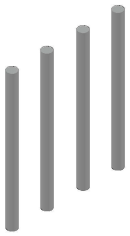
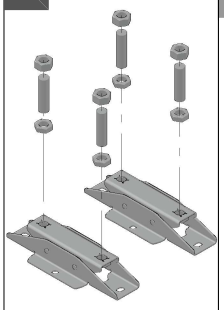


MFP-CL-I with longer distance recommended loading capacity limits

$H_{spec.}$ [mm]	F [kN]
125	4.000
130	3.846
140	3.571
150	3.333
160	3.125
170	2.941
180	2.778
190	2.632
200	2.500
210	2.381
220	2.273
230	2.174
240	2.083
250	2.000
260	1.923
270	1.852
280	1.786
290	1.724
300	1.667

Fixed Point On Concrete - MFP-CLD-I with longer distance than H_{max}: :

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	**AM20** **Threaded Rod**
		4x	**AM20 x 1000 threaded rod** **216425**
3		2	**MFP-CLD-I** **Fixed point set**
		1x	**MFP-CLD-I set** **2223014** The 4x M20 bolts from the original package remain unused
4		3	**Anchors**
		4x	**HUS3-H 10x60 5/-/-** **2079911** or **HST3 M12x85 10/-** **2113978**

Resistance and limitations

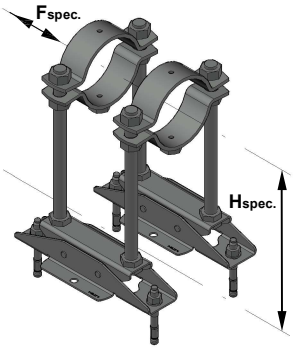
H_{spec}

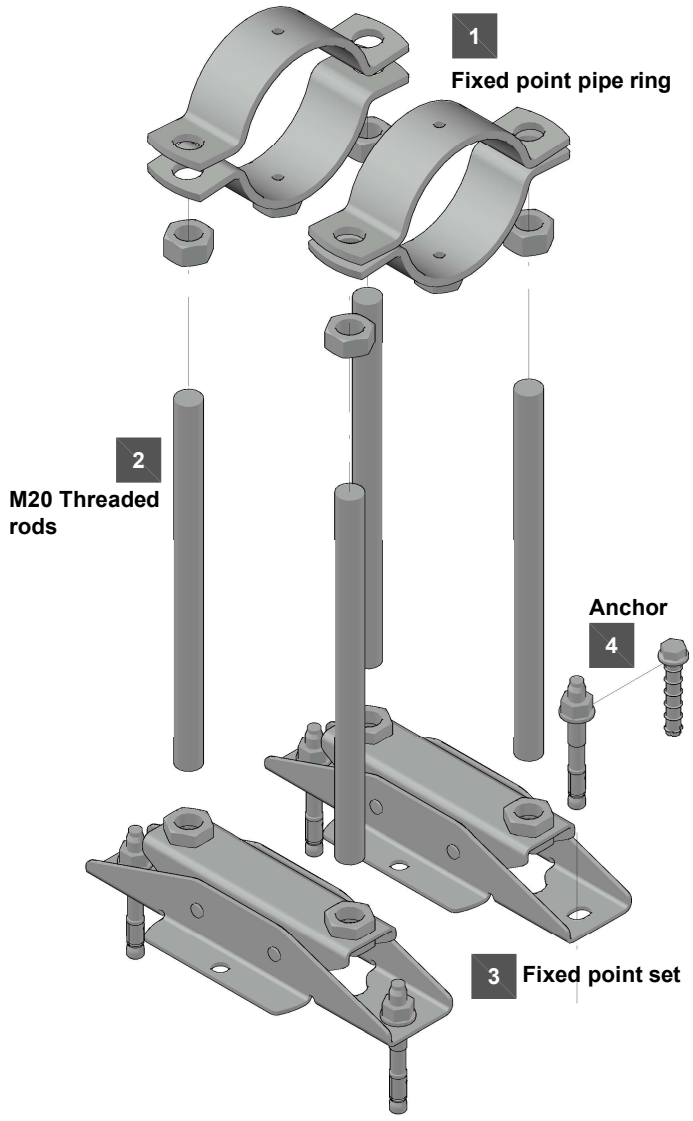
height above ground to the center the of pipe

Recommended resitance
(safety factor 1.4 included):
F_{spec} = for loading capacity cases, see the reverse page

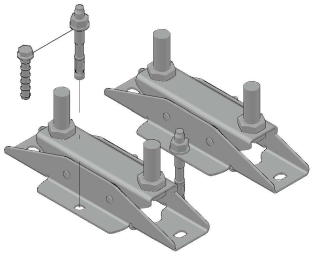
Validity of the capacity limits:
- Temperature limits: see the chapter ,,Temperature influence,, of this manual,,.
- Published allowable loads for applications are based on static loading conditions.

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

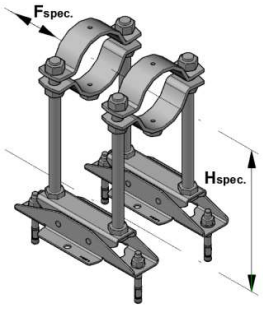




Alternative anchor points



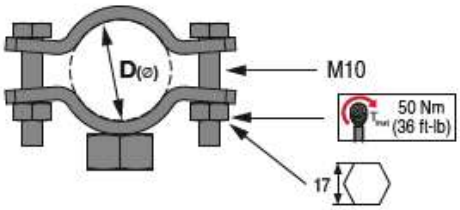
Application description	Application	Product lines	Base material
Heating - MFP-CLD-I fixed point	 11	Fixed point sets	Concrete
General comments		Threaded parts	
• Application subject to thermal expansion impact, no seismic, no fatique impact • Loading and load impact must always be compared with 3D capacity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

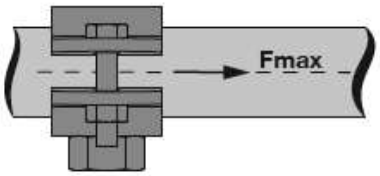


MFP-CL-I with longer distance recommended loading capacity limits

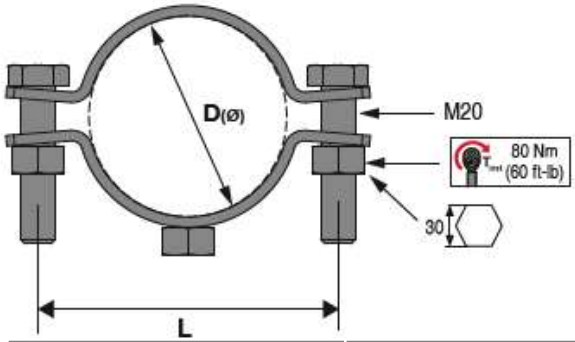
$H_{spec.}$ [mm]	F [kN]
125	8.000
130	7.692
140	7.143
150	6.667
160	6.250
170	5.882
180	5.556
190	5.263
200	5.000
210	4.762
220	4.545
230	4.348
240	4.167
250	4.000
260	3.846
270	3.704
280	3.571
290	3.448
300	3.333

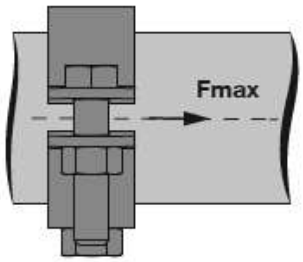
PIPE CLAMPS LOADING CAPACITY





Item number	Description	D (⌀)	Fmax
2227599	MFP-PC M20 21-22	21-22	4kN
2227690	MFP-PC M20 25-27	25-27	4kN
2227691	MFP-PC M20 28-30	28-30	4kN
2227692	MFP-PC M20 31-33	31-33	4kN
2227693	MFP-PC M20 34-36	34-36	6.5kN
2227694	MFP-PC M20 39-41	39-41	6.5kN
2227695	MFP-PC M20 42-45	42-45	6.5kN
2227696	MFP-PC M20 47-50	47-50	6.5kN
2227697	MFP-PC M20 53-56	53-56	6.5kN
2227698	MFP-PC M20 57-61	57-61	8kN
2227699	MFP-PC M20 62-66	62-66	8kN
2227700	MFP-PC M20 68-72	68-72	8kN

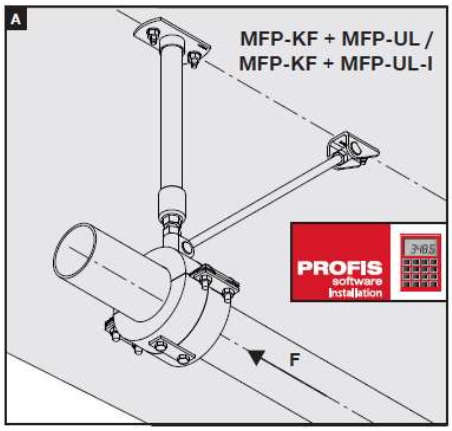




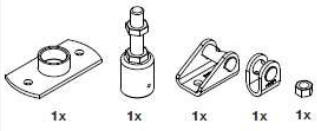
Item number	Description	D (⌀)	Fmax
2227701	MFP-PC M20 73-78	73-78	8kN
2227702	MFP-PC M20 88-93	88-93	8kN
2227703	MFP-PC M20 100-105	100-105	8kN
2227704	MFP-PC M20 108-115	108-115	8kN
2227705	MFP-PC M20 125-133	125-133	8kN
2227706	MFP-PC M20 134-142	134-142	8kN
2227707	MFP-PC M20 154-162	154-162	8kN
2227708	MFP-PC M20 162-170	162-170	8kN
2227709	MFP-PC M20 192-200	192-200	8kN
2227710	MFP-PC M20 213-221	213-221	8kN
2227711	MFP-PC M20 242-250	242-250	8kN
2227712	MFP-PC M20 267-275	267-275	8kN
2227598	MFP-PC M20 318-326	318-326	8kN

KF FIXED POINTS OVERVIEW

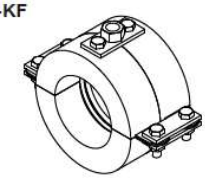
A



1x Set MFP-UL # 2223129 /
1x Set MFP-UL-I # 2223133



1x MFP-KF



3x HST3-M12x85 #2113978 /
HUS3-H 10x90 #2079914

1x AM-M16 4.8

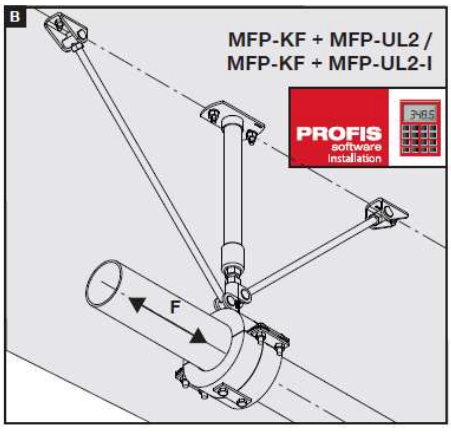
1x GR-G 1 1/4"

MFP-KF + MFP-UL / MFP-UL-I

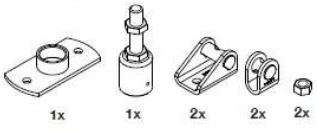
#	Name	Fmax (N)
2238671	MFP-KF 76	2.000
2238672	MFP-KF 89	2.500
2238673	MFP-KF 114	3.000
2238674	MFP-KF 133	3.500
2238675	MFP-KF 140	3.500
2238676	MFP-KF 159	4.000
2238677	MFP-KF 168	4.000
2238678	MFP-KF 219	4.000
2238679	MFP-KF 273	4.000

KF 30/40
#335218

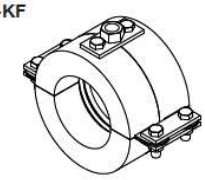
B



1x Set MFP-UL2 # 2223131 /
1x Set MFP-UL2-I # 2223135

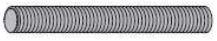


1x MFP-KF

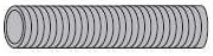


4x HST3-M12x85 #2113978 /
HUS3-H 10x90 #2079914

2x AM-M16 4.8



1x GR-G 1 1/4"

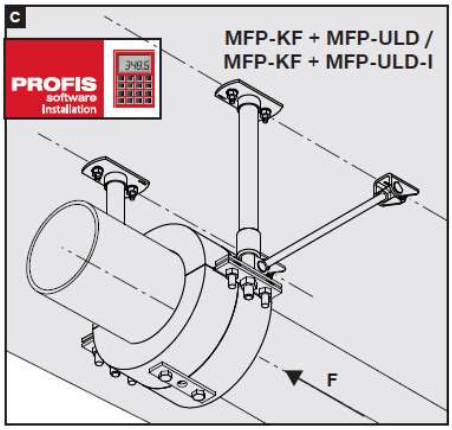


MFP-KF + MFP-UL2 / MFP-UL2-I

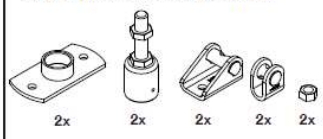
#	Name	Fmax (N)
2238671	MFP-KF 76	2.000
2238672	MFP-KF 89	2.500
2238673	MFP-KF 114	3.000
2238674	MFP-KF 133	3.500
2238675	MFP-KF 140	3.500
2238676	MFP-KF 159	4.000
2238677	MFP-KF 168	4.000
2238678	MFP-KF 219	4.000
2238679	MFP-KF 273	4.000

KF 30/40
#335218

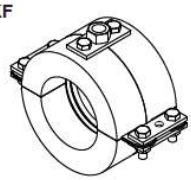
C



1x Set MFP-ULD # 2223130 /
1x Set MFP-ULD-I # 2223134



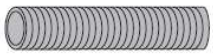
1x MFP-KF



6x HST3-M12x85 #2113978 /
HUS3-H 10x90 #2079914

2x AM-M16 4.8

2x GR-G 1 1/4"

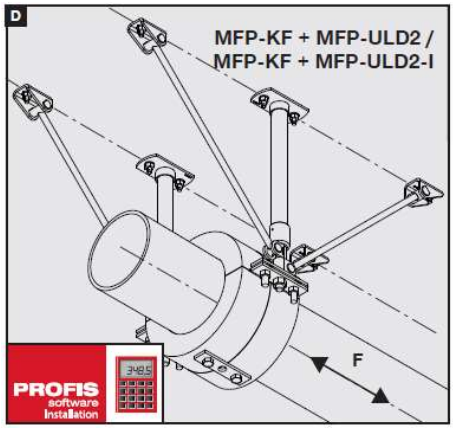


MFP-KF + MFP-ULD / MFP-ULD-I

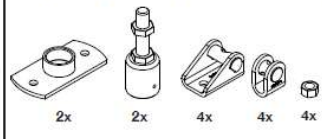
#	Name	Fmax (N)
2238678	MFP-KF 219	9.000
2238679	MFP-KF 273	12.000
2238680	MFP-KF 324	14.000
2238681	MFP-KF 356	14.000
2238682	MFP-KF 368	14.000
2238683	MFP-KF 406	14.000
2238684	MFP-KF 457	14.000
2238685	MFP-KF 508	14.000
2238670	MFP-KF 609	14.000

KF 30/40
#335218

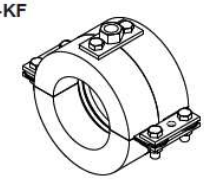
D



1x Set MFP-ULD2 # 2223132 /
1x Set MFP-ULD2-I # 2223136



1x MFP-KF



8x HST3-M12x85 #2113978 /
HUS3-H 10x90 #2079914

4x AM-M16 4.8

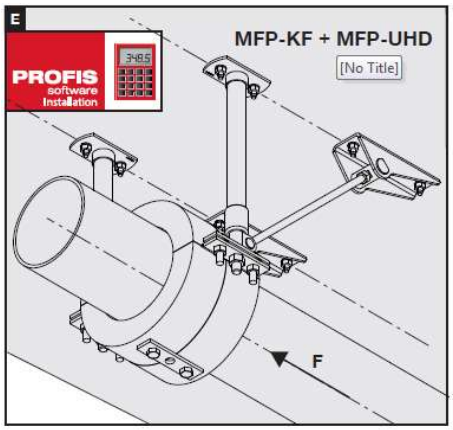
2x GR-G 1 1/4"

MFP-KF + MFP-ULD2 / MFP-ULD2-I

#	Name	Fmax (N)
2238678	MFP-KF 219	9.000
2238679	MFP-KF 273	12.000
2238680	MFP-KF 324	14.000
2238681	MFP-KF 356	14.000
2238682	MFP-KF 368	14.000
2238683	MFP-KF 406	14.000
2238684	MFP-KF 457	14.000
2238685	MFP-KF 508	14.000
2238670	MFP-KF 609	14.000

KF 30/40
#335218

KF FIXED POINTS OVERVIEW

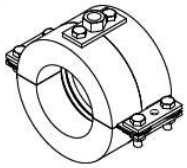


1x Set MFP-UHD
2223138

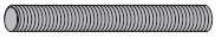
4x HST3-M12 x 85
2113978 /
HUS3-H 10 x 90
2079914

4x HST3-M16 x 135
2105858 /
HUS3-H 14 x 130
2079923

1x MFP-KF



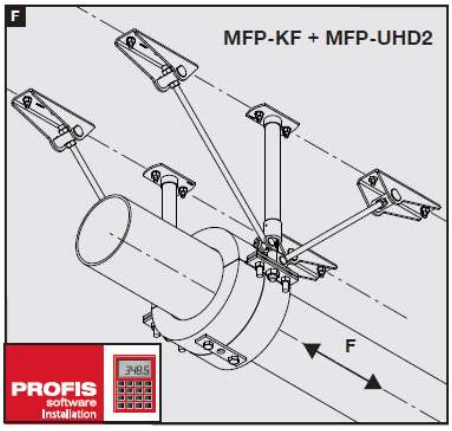
2x AM-M16 4.8



2x GR-G 1 1/4"

MFP-KF + MFP-UHD			
#	Name		Fmax (N)
2238678	MFP-KF	219	9.000
2238679	MFP-KF	273	12.000
2238680	MFP-KF	324	14.500
2238681	MFP-KF	356	16.500
2238682	MFP-KF	368	16.500
2238683	MFP-KF	406	18.000
2238684	MFP-KF	457	18.000
2238685	MFP-KF	508	20.000
2238670	MFP-KF	609	20.000

KF 30/40
#335218

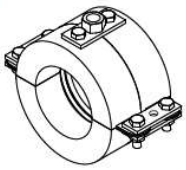


1x Set MFP-UHD2
2223140

4x HST3-M12 x 85
2113978 /
HUS3-H 10 x 90
2079914

8x HST3-M16 x 135
2105858 /
HUS3-H 14 x 130
2079923

1x MFP-KF



4x AM-M16 4.8

2x GR-G 1 1/4"

MFP-KF + MFP-UHD2			
#	Name		Fmax (N)
2238678	MFP-KF	219	9.000
2238679	MFP-KF	273	12.000
2238680	MFP-KF	324	14.500
2238681	MFP-KF	356	16.500
2238682	MFP-KF	368	16.500
2238683	MFP-KF	406	18.000
2238684	MFP-KF	457	18.000
2238685	MFP-KF	508	20.000
2238670	MFP-KF	609	20.000

KF 30/40
#335218

Temperature influence on NON-SOUND insulated fixed points

Stress impact (ref. Eurocode 3):
For intermediate values – please use linear interpolation
100°C – reduction factor 1.00
200°C – reduction factor 1.00
300°C – reduction factor 1.00
400°C – reduction factor 1.02
500°C – reduction factor 1.19
600°C – reduction factor 2.30
> 600°C – Eurocode 3 not applicable please refer to following chapter
,,Fixed Points – Fire Resistance Loading Capacity,,

Serviceability impact (ref. Eurocode 3):
For intermediate values – please use linear interpolation
100°C - deformation factor 1.00
200°C - deformation factor 1.10
300°C - deformation factor 1.25
400°C - deformation factor 1.43
500°C - deformation factor 1.67
600°C - deformation factor 3.23
> 600°C – Eurocode 3 not applicable please refer to following chapter
,,Fixed Points – Fire Resistance Loading Capacity,,

Constant elevated temperature will lead to tarnish colors on the galvanized surface. This starts at about 120°C on electro-galvanized surfaces and at about 250°C on hot-dip galvanized products.

This statement is based on external assessment, Eurocode 3 specification and more than 20 years experience of Hilti selling installation channel systems parts worldwide.

This confirmation regarding the maximal working temperature for Hilti installation products which do not include any non-steel components does not constitute any warranty.

Temperature influence on SOUND insulated fixed points

Hilti Fixed Points use EPDM as material for the sound insulation component.

EPDM temperature resistance
- max 120°C long-term exposure
- short-term moderate increase (up to 10 hours) can be accepted.

Temperature increases beyond 10 hours will not affect the load capacity of the sound insulating component. An accelerated aging of the material, depending on the level of the temperature, is expected. This causes a premature hardening and embrittlement, which ultimately leads to significant deterioration of the sound insulation properties of the material.
This statement is based on external assessment, manufacturers data and more than 30 years' experience of Hilti selling installation system parts worldwide.
This confirmation regarding the maximal recommended working temperature for Hilti installation products with sound insulation component does not constitute any warranty.

FIXED POINTS - FIRE RESISTANCE LOADING CAPACITY

For temperatures > 600°C

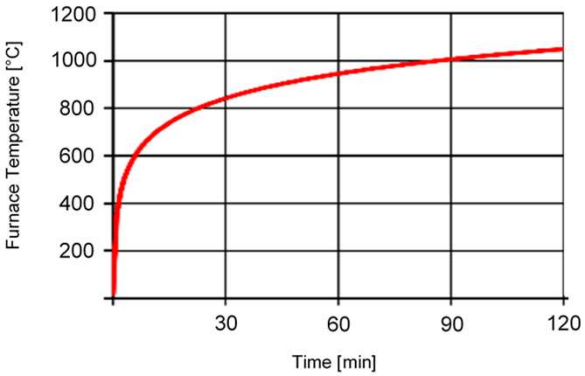
Studies made by MFPA Leipzig GmbH (Germany) showed that thin wall profiles exposed to temperatures above 600°C behave differently (and more critical especially regarding deformation) than predicted by Eurocode EC3-1-2 fire resistance design approach and expressed invalidity of the EC3-1-2 for these cases.

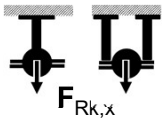
This statement was followed by investigations and series of tests to find optimal evaluation of these cases. It resulted in harmonized design method

EAD 280016-00-0602 from February 2018
PRODUCTS RELATED TO INSTALLATION SYSTEMS SUPPORTING TECHNICAL EQUIPMENT FOR BUILDING SERVICES SUCH AS PIPES, CONDUITS, DUCTS AND CABLES

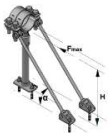
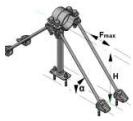
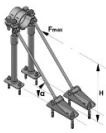
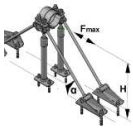
However the EAD is not covering fixed point applications, but lessons learned from ETA approvals were used and considered defining the loading capacity limits of the fixed points under fire.
The temperature curve used for the loading capacity limits refer to EN 1363

Standard Fire Test Heating Curve





Fire resistance values covering gravity support function of the Fixed Point only

$F_{Rk,x}$	 MFP-CL-I	 MFP-CLD-I	 MFP-UM	 MFP-UM2	 MFP-UHD	 MFP-UHD2
	kN	kN	kN	kN	kN	kN
	for sizes 21-326	for sizes 73-326	for sizes 73-326	for sizes 73-326	for sizes 73-326	for sizes 73-326
F30	4.3	5.0	5.0	5.0	5.0	5.0
F60	2.1	3.2	3.2	3.2	3.2	3.2
F90	1.4	2.6	2.6	2.6	2.6	2.6
F120	1.0	2.3	2.3	2.3	2.3	2.3

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