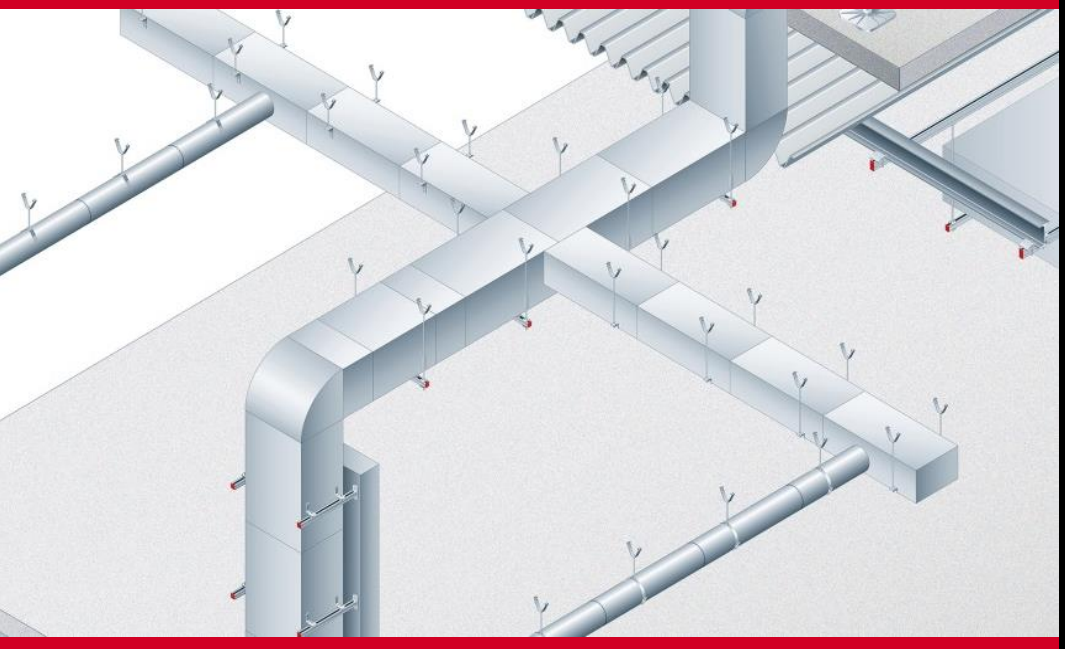
Installation Technical Manual

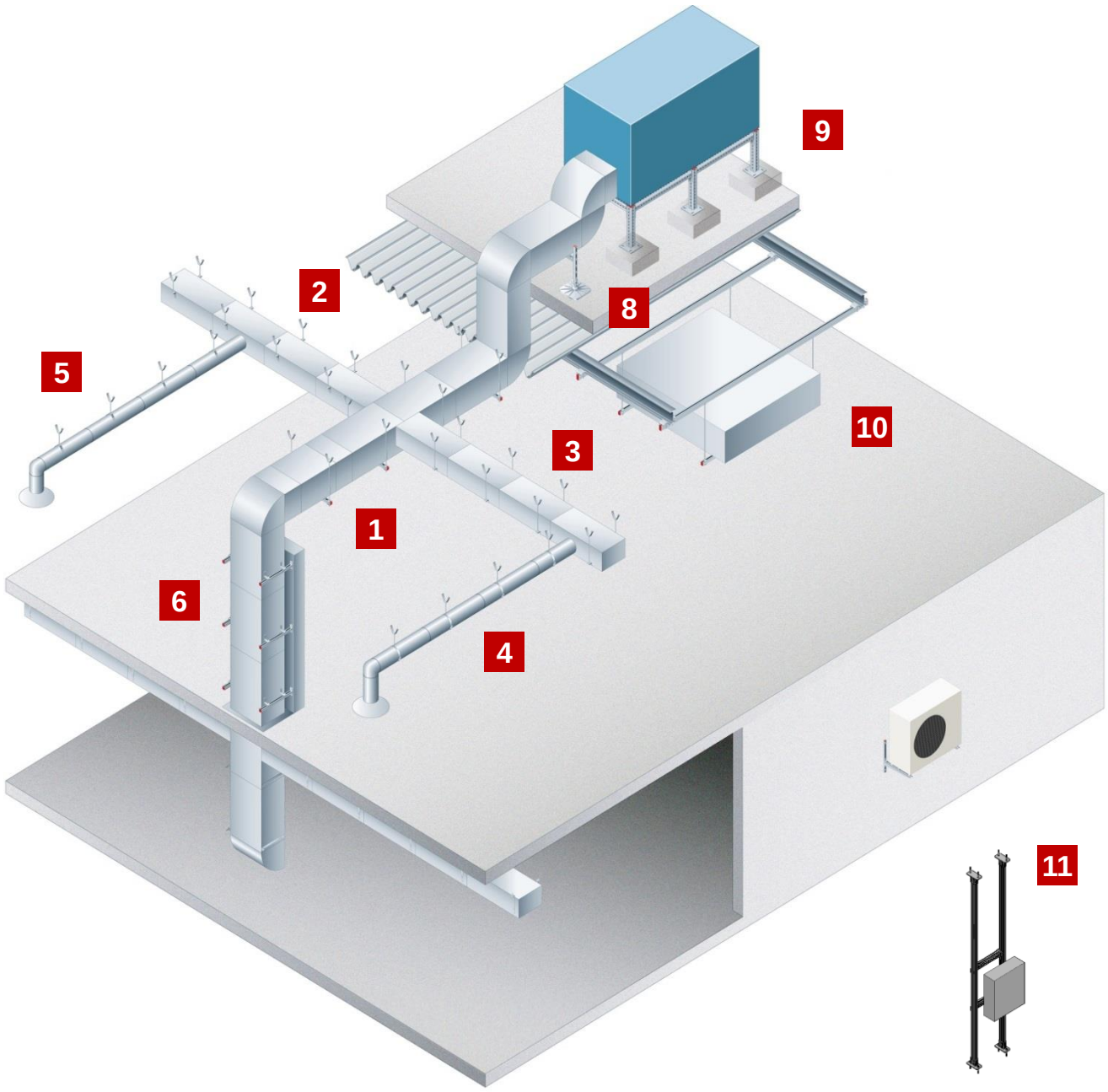
Typical Applications

Typical Sub-trade Applications

Ventilation Applications



Version 1.0 I October 2016



Ventilation is the general term applied to the system used to deliver either non-treated air or treated air by air-conditioning units to the places of final consumption.

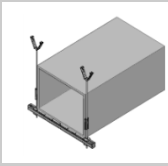
Several different principles are employed. Most widespread in central Europe are so called centralized systems where air is socked into ventilation unit either sitting on a roof top, or in plant room (air ducts connecting unit with outside from facade are needed) or in front of the building (rarely used).

The central unit (AC) is filtering inbound air, heating up or cooling down the air, moisturizing or drying the air. The unit generates typically noise since it is containing several engines and other mechanical equipment such as pumps and vibration units for cleaning filters.

The outbound air from the unit goes through noise dumping unit, which plays important role in noise reduction of the whole ventilation or AC system.

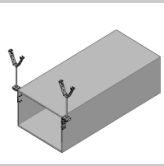
Air leaving the ventilation unit then blows through main (most of the cases square) backbone air ducts through main corridors and shafts. Several regulation sub-units might get employed closing / opening or reducing / increasing pressure in the system. From the main air ducts the air continues to floor distribution systems (often rounded ducts). The air is radiated in the places of final consumption through differend kind of radiation grids or units, which might regulate the pressure and volume of the delivered air.

Several other principles such as de-centralized or completely local units are used.



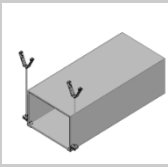
1 Trapeze on rods

Square air duct typically supported by piece of channel with sound insulation rubber inlay being hanged on two threaded rods with different base material attachments.



2 L-hangers

Square air duct fixed by two pieces of L-hangers on each side being fixed with self tapping (speedy) screws to the vertical wall of the air duct. Fixing in the base material is ensured by two pieces of threaded rods thorough bolting the L-hanger through sound insulation element and fixed by different base material attachments.



3 Z-hangers

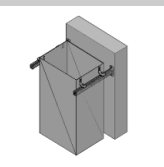
Square air duct fixed by two pieces of Z-hangers on each side being fixed with self tapping (speedy) screws to the vertical wall as well as for bottom of the air duct. Fixing in the base material is ensured by two pieces of threaded rods thorough bolting the Z-hanger through sound insulation element and fixed by different base material attachments.

4 Single fastening point - pipe rings

Rounded air duct clamped by pipe ring with sound insulation layer and fixed with threaded rod through various base material attachments to base material.

5 V-hangers

Rounded air duct fixed by one pieces of V-hangers on top being fixed with self tapping (speedy) screws to the wall of the air duct. Fixing in the base material is ensured by threaded rods thorough bolting the V-hanger through sound insulation element and fixed by different base material attachments.



6 Rising square duct brackets

Rising square duct going through shaft supported by two cantilever arms where four or more adjustable heavy L hangers are fixed using screw and wing nut. These L-hangers are fixed to air duct using self taping (speedy) screws in order to transfer weight of the air duct to the cantilever arms.

7 Wall spot fixture

Rising rounded air duct clamped by pipe ring with sound insulation layer and fixed with threaded rod through various base material attachments to base material.

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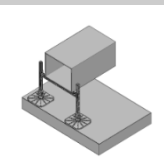
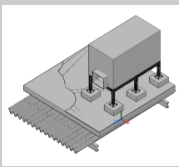


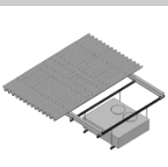
8 Goal post

Square air duct sitting on a frame made of channels. Between the air duct and channel is inserted sound insulation inlay in a channel. The whole frame is either fixed by base material attachment into base material or as in case of roof top frame fixed in load distribution plate sitting on the roof top layers.



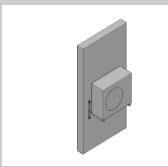
9 Roof top frame

3D frame designed to carry combination of Ventilation / AC unit weight, wind and snow loads. Frame is typically space braced and either freely sitting on the roof top layers on load distribution plates or fixed into weight balancing (ballast) concrete block or fixed to the superstructure of the building penetrating roof top layers.



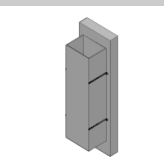
10 Suspended Secondary Structure

Designed sub-structure made of channels spanning distance between superstructure girders carrying weight of ventilation / AC unit underneath. Connection of the sub-structure to main girders is made using different base material attachments. The whole design has to respect weight distribution and need of the unit.



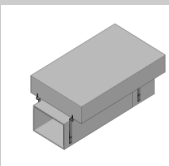
11 Wall bracket

Typically AC unit fixed on the wall by using various cantilever arms. Unit sitting on damping sound insulation elements. Cantilever arms fixed typically in vertical piece of channel being fixed by various base material attachments into base material.



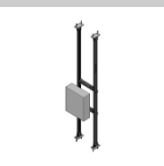
12 Wall mount

In places with lack of space (e.g. garages) square directly wall mounted air duct is used. The air duct is fixed by long L-hangers using self tapping (speedy) screws and tight to the wall by various anchors. The direct touch between the air duct and wall should be avoided or secured by sound insulation pad.



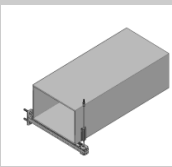
13 Ceiling mount

In places with lack of space (e.g. garages) square directly wall mounted air duct is used. The air duct is fixed by long L-hangers using self tapping (speedy) screws and tight to the ceiling by various anchors. The direct touch between the air duct and the ceiling should be avoided or secured by sound insulation pad.



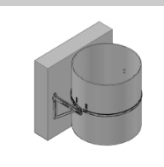
14 Plant room switch box

Frame structure typically braced between the floor and ceiling, supporting various devices, e.g. switch boxes



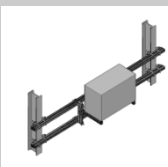
15 Wall-Ceiling trapeze

Square air duct typically supported by piece of cantilever arm (bracket) fixed to the wall with sound insulation rubber inlay being hanged on the other side by threaded rods with different base material attachments.



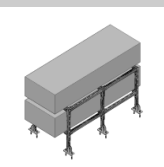
16 Heavy rounded duct riser

Heavy rounded duct clamped with ventilation pipe ring sitting on two heavy brackets. Load transfer ensured by set of 4 or more L-hangers screwed on the air duct as stoppers. Brackets are fixed with various base material attachments to the base material .



17 Radiation unit bearing secondary structure

Designed sub-structure spanning distance between super structure columns, carrying unit in defined place.



18 Plant room multi frame

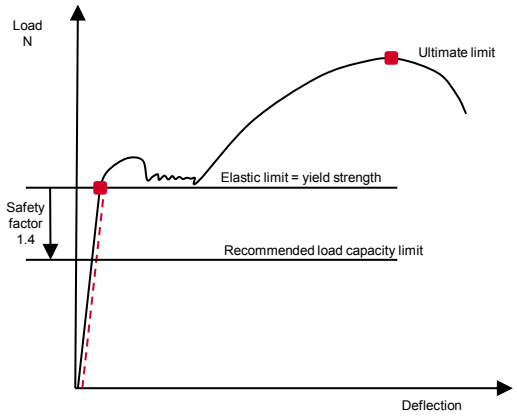
Designed 3D multi frame carrying different sections of ventilation/AC unit and inbound / outbound air ducts.

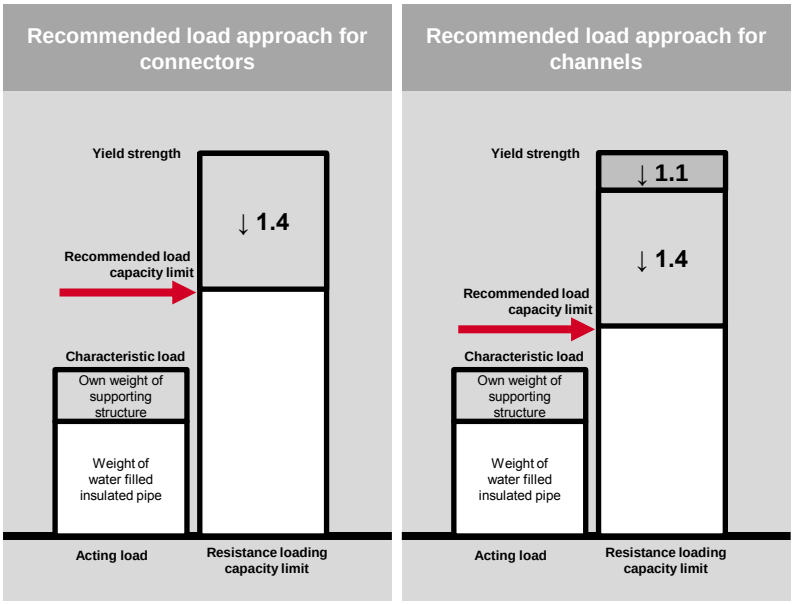
Terms of common cooperation / legal disclaimers

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

Loading capacity limit

All loading capacity limits in this manual are to be considered as recommended values.
Recommended values are calculated from the elastic limit equal to yield strength, with an applied material safety factor 1.0 for connectors or 1.1 for channels and an applied additional safety factor of 1.4.





Contents and overview of this manual

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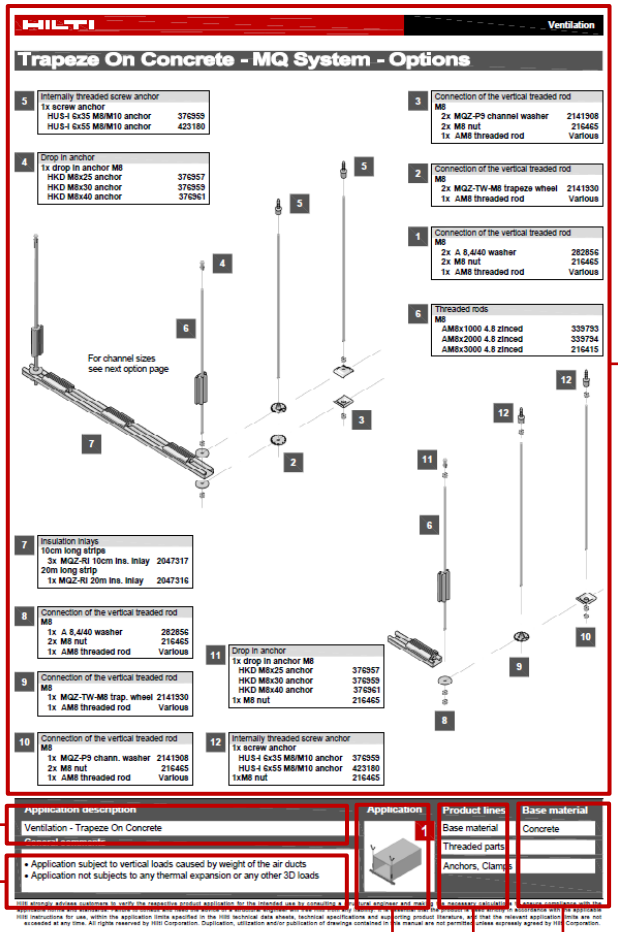
Ventilation applications – application options

An explanation of the information provided on each page



Illustrations showing options for the application
Shows the different possible combinations including bill of materials for each solution. Some of the solutions include practical tips, e.g. tools required for installation.

Application description
The general name of the application and a list of the typical situations it covers.

General comments and disclaimers

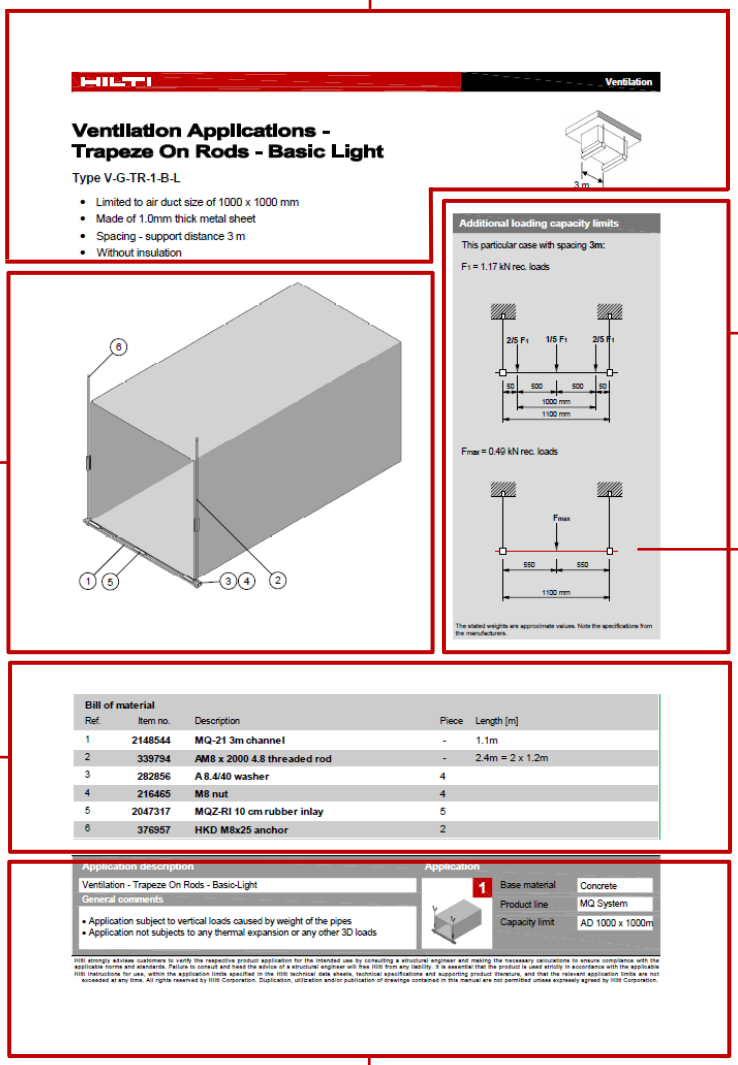
Type of application
Illustration showing the type of application.

Product lines
The main product lines used for this application.

Base material limitations
This combination of product may be used only on the base materials listed.

Ventilation applications – typical applications and examples

Type and limitations of the application
Max. sizes of particular pipes/ducts associated with the span and size of channel used.



ACAD 3D design
with references to the bill of materials.

Bill of materials for 1 unit
All item numbers and number of pieces of each item necessary to assemble 1 unit for this application.

Loading capacity information
1. Typical loading case.
2. Maximum loading capacity of the same structure with a single load acting in the center of the span.

Red color indicates the part that limits the entire application when maximum capacity is reached.

Data for the typical situation
Name, base material, system capacity limit.

Naming convention used in the manuals of typical applications

After 10.2016

V	-	G	-	TR	-	1	-	B	-	L	-	GL
a		b		c		d		e		f		g

Sub-trade (a)

- **P** - Plumbing
- **H** - Heating
- **C** - Cooling
- **V** - Ventilation
- **S** - Sprinkler
- **D** - Drainage

Corrosion Protection (b)

- **G** - Galvanized
- **HDG** – Hot dipped galvanized
- **StS** – Stainless Steel

Specific number reference in library (d)

- **1 - 50** - MQ System
- **51 - 100** - MM system
- **101 - 150** - MI system
- **151 - 200** - MIQ System

Application sub-type (e)

- **B** – Basic
- **C** – Comfort
- **BS** – Basic Strategic
- **CS** – Comfort Strategic

Application sub-type (f)

- **L** – Light (<= 1 kN)
- **M** – Comfort (> 1 kN and <= 2kN)
- **H** – Heavy (> 2 kN)

Country (g)

- **GL** - Global
- **D** - Germany
- **ES** - Spain
- **F** – France
- **CZ** – Czech Republic
- **RU** – Russia
- …
- **EX** – Existing Profis typical

Type (c)

Ceiling:

- **TR** - Trapeze on Rods
- **TF** - Trapeze Frame
- **HR** - Head Rail
- **SFP** - Single Fastening Point
- **FP** - Fixed Point
- **CTL** - Ceiling Tree L
- **CTT** - Ceiling Tree T
- **NCZT** - Natural Compensation Zone Trapeze
- **AG** - Axial Guide
- **LH** - L-hanger
- **ZH** - Z-hanger
- **VH** - V-hanger
- **SSS** - Suspended Secondary Structure
- **CM** - Ceiling mount

Wall Ceiling:

- **WCT** - Wall Ceiling Trapeze
- **WCF** - Wall Ceiling Frame

Wall:

- **WR** - Wall Rail
- **CA** - Cantilever Arm (Bracket)
- **WSF** - Wall Spot Fixture
- **RG** - Riser Guide
- **WW** - Wall to Wall
- **RFP** - Riser Fixed Point
- **RSDB** - Rising Square Duct Brackets
- **WM** - Wall mount
- **HRDS** - Heavy Rounded Duct Riser
- **RUBSS** - Radiation Unit Bearing Secondary Structure

Wall Floor:

- **WFF** - Wall Floor Frame
- **PRSF** - Plant Room Splitter Frame
- **PRSB** - Plant Room Switch Box

Floor:

- **GP** - Goal Post (Floor Frame)
- **PR3D** - Plant Room 3D
- **PRSB** - Plant Room Switch Box
- **PRMF** - Plant Room Multi Frame
- **FTL** - Floor Tree L
- **FTT** - Floor Tree T
- **RTF** - Roof Top Frame
- **RTGP** - Roof top goal post

Note:

- **(B)** - Braced

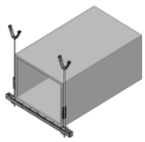
Technical background information

There is a couple of challenges when creating / designing air duct support structures and ventilation equipment supports. The major ones are:

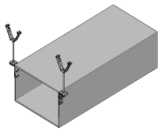
A. Transferring weight of the air ducts and equipment into base material

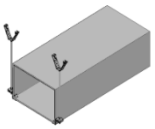
The design is explained on following applications:

1. Trapeze on rods

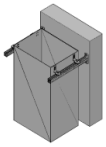


2. L / Z hangers





3. Rising square duct



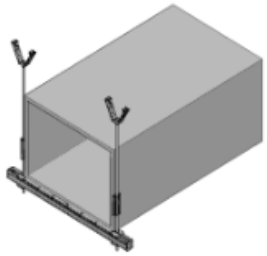
B. Avoid transmitting noise (caused by ventilation system) into building superstructure and secure noise level on allowed level

1. General noise reduction approach
2. Overview of Hilti noise reduction parts and their properties

C. Designing structures exposed to climatic loads - snow, wind

1. Climatic loads exposure and reference to EN's
2. General overview of Loading cases to be considered

A. Transferring weight of the air ducts and equipment into base material



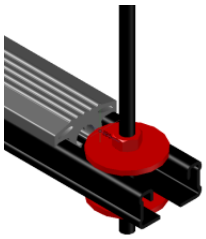
The design is explained on following applications:

1. Trapeze on rods

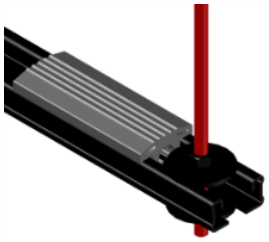
The application has several limiting factors:

a) Channel

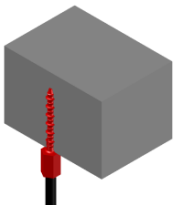
b) Connection of the threaded rod uprights



c) Threaded rods

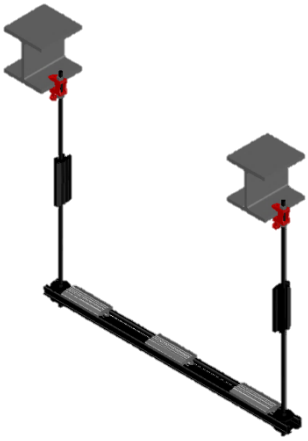


d) Base material connection - concrete



For the proper design follow Fastening Technology Manual

e) Base material connection - steel

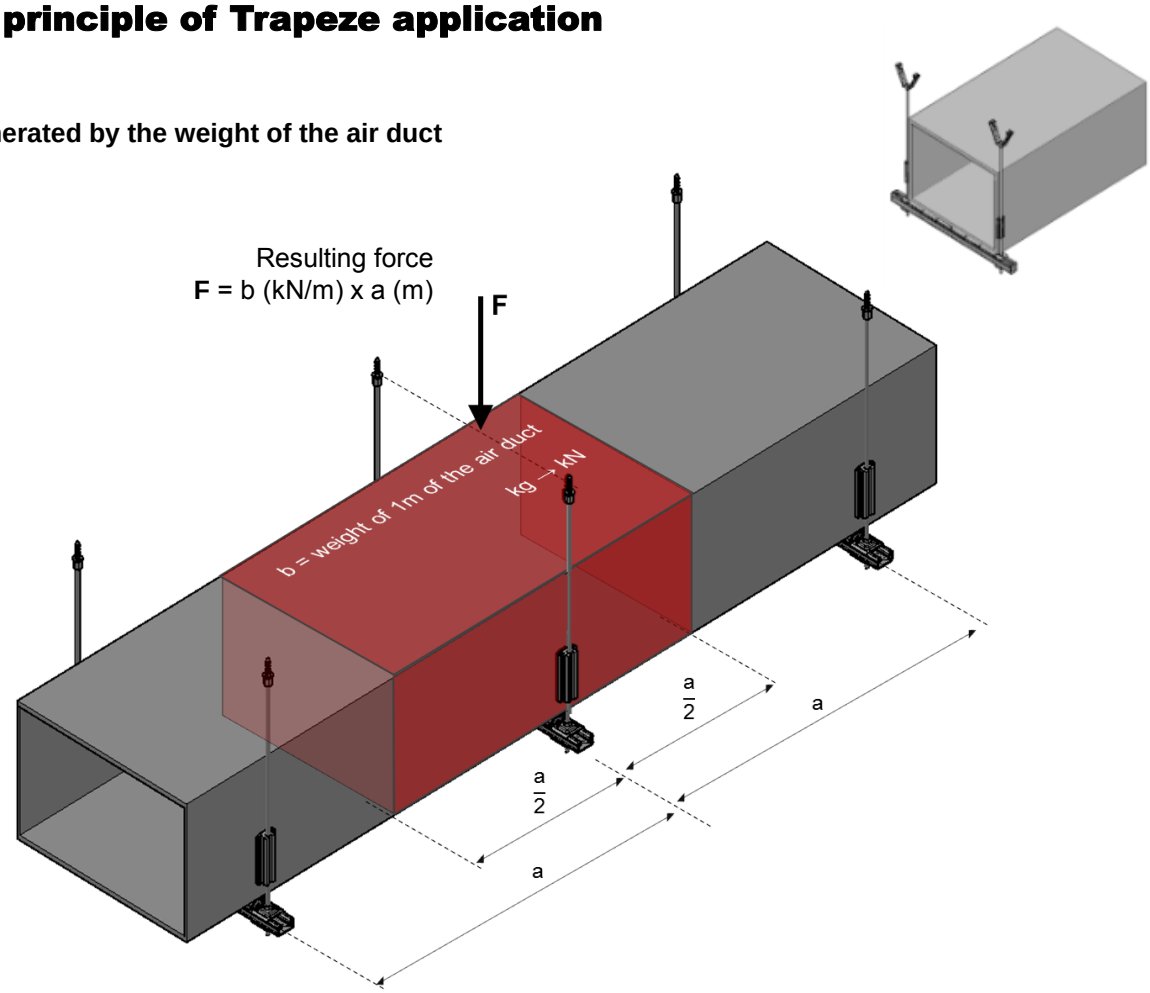


The most frequent limiting factors are:

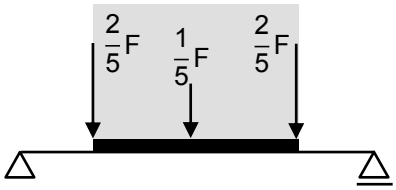
- 90% of the cases - Channel
- 10% of the cases - Anchor

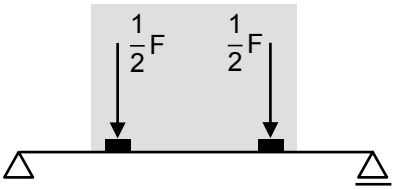
Design principle of Trapeze application

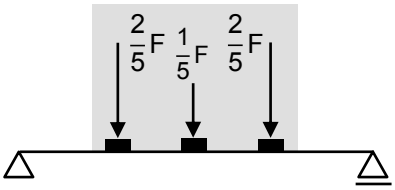
Loads generated by the weight of the air duct



Applying the load on a channel must reflect how the air duct sits on the channel







Technical reason:
The vertical wall of the air duct are much stiffer therefore the load impact is not uniformly distributed

Technical reason:
In case of using fragmented noise reduction elements, the load is acting on them and it is necessary to respect stiffness of the air duct

a. MM System Channels Technical Data - Selection

Weights and channel selection for air ducts without insulation

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from cold forming as per EN 1993-1-3: 2010-12: σD = fyk / γM where γM = 1,1.
- Square ventilation ducts according to DIN EN 1505 (zinced, folded)
- The stated weights are approximate values. Note the specifications from the manufacturers.

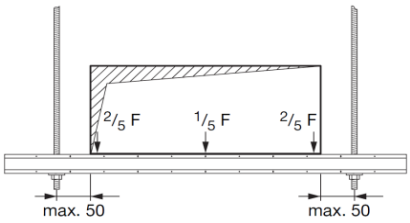
Channel selection table: wiegth specification for mounting distance of 3,0m.
- Weight in [kg / 3 m] calculated considering width/ height [mm] and sheet thickness [mm].
- Canal-connection Air duct connection parts (frame) are considered with a flat rate factor.

Used limits are:
- permissible stress capacity limit
- max allowable deflection of L /200.

Table is in kg for spacing of 3m

Sheet 0.75			Sheet 0.88						Sheet 1.0						Sheet 1.13						Sheet 1.25				
200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2240	2500	2800	3150	B/H
18.4	19.3	20.3	24.9	26.7	28.8	31.1	33.7	36.3	44.7	48.9	53.6	58.9	64.8	70.7	87.8	96.5	106.4	119.8	133.1	146.4					200
	20.3	21.3	26.1	27.9	30.0	32.3	34.9	37.5	46.2	50.3	55.0	60.3	66.2	72.1	89.4	98.1	108.0	121.3	134.7	148.0					224
		22.3	27.5	29.3	31.3	33.7	36.3	38.9	47.7	51.8	56.5	61.8	67.7	73.6	91.1	99.8	109.8	123.1	136.4	149.7					250
			29.0	30.8	32.9	35.2	37.8	40.4	49.5	53.6	58.3	63.6	69.5	75.4	93.1	101.8	111.8	125.1	138.4	151.7					280
				32.6	34.7	37.0	39.6	42.2	51.5	55.6	60.3	65.6	71.5	77.4	95.5	104.1	114.1	127.4	140.7	154.0					315
					36.8	39.1	41.7	44.3	53.9	58.0	62.7	68.0	73.9	79.8	98.1	106.8	116.8	130.1	143.4	156.7					355
						41.4	44.0	46.6	56.5	60.6	65.4	70.7	76.5	82.4	101.1	109.8	119.8	133.1	146.4	159.7					400
							46.6	49.2	59.5	63.6	68.3	73.6	79.5	85.4	104.5	113.1	123.1	136.4	149.7	163.0					450
								51.8	62.4	66.5	71.2	76.5	82.4	88.3	107.8	116.4	126.4	139.7	153.0	166.3					500
									65.9	70.1	74.8	80.1	86.0	91.8	111.8	120.4	130.4	143.7	157.0	170.3					560
										74.2	78.9	84.2	90.1	96.0	116.4	125.1	135.1	148.4	161.7	175.0					630
											83.6	88.9	94.8	100.7	121.7	130.4	140.4	153.7	167.0	180.3					710
												94.2	100.1	106.0	127.7	136.4	146.4	159.7	173.0	186.3					800
													106.0	111.9	134.4	143.0	153.0	166.3	179.6	192.9					900
														117.8	141.0	149.7	159.7	173.0	186.3	199.6					1000
															149.0	157.7	167.7	181.0	194.3	207.6					1120
															157.7	166.3	176.3	189.6	202.9						1250
															167.7	176.3	186.3	199.6	212.9						1400
															181.0	189.6	199.6	212.9	226.2						1600
															194.3	202.9	212.9	226.2	239.5						1800
															207.6	216.2	226.2	239.5	252.8						2000
															223.5	232.2	242.2	255.5							2240
															240.8	249.5	259.5	272.8							2500
															260.8	269.4	279.4	292.7							2800
															284.1	292.7	302.7	316.0							3150

MM-C-16
MM-C-30
MM-C-36
MM-C-45



Weights and channel selection for air ducts with insulation

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from cold forming as per EN 1993-1-3: 2010-12: σD = fyk / γM where γM = 1,1.
- Square ventilation ducts according to DIN EN 1505 (zinced, folded) with insulation (30mm aluminium laminated rock wool)
- The stated weights are approximate values. Note the specifications from the manufacturers.

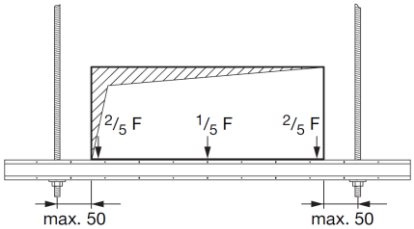
Channel selection table: wiegth specification for mounting distance of 3,0m.
- Weight in [kg / 3 m] calculated considering width/ height [mm] and sheet thickness [mm].
- Canal-connection Air duct connection parts (frame) are considered with a flat rate factor.

Used limits are:
- permissible stress capacity limit
- max allowable deflection of L /200.

Table is in kg for spacing of 3m

Sheet 0.75			Sheet 0.88						Sheet 1.0						Sheet 1.13						Sheet 1.25				
200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2240	2500	2800	3150	B/H
22.7	23.9	25.2	30.1	32.2	34.7	37.6	40.7	43.8	53.0	57.8	63.4	69.7	76.6	83.6	102.1	112.1	123.7	139.2	154.7	170.1					200
	25.1	26.4	31.6	33.7	36.3	39.1	42.2	45.3	54.6	59.5	65.1	71.3	78.3	85.3	103.9	114.0	125.6	141.0	156.5	172.0					224
		27.7	33.2	35.4	37.9	40.7	43.8	47.0	56.4	61.3	66.9	73.2	80.1	87.1	105.9	116.0	127.6	143.1	158.5	174.0					250
			35.1	37.3	39.8	42.6	45.7	48.8	58.5	63.4	69.0	75.2	82.2	89.2	108.3	118.3	129.9	145.4	160.8	176.3					280
				39.4	41.9	44.8	47.9	51.0	61.0	65.8	71.4	77.7	84.7	91.6	111.0	121.0	132.6	148.1	163.6	179.0					315
					44.5	47.3	50.4	53.5	63.8	68.6	74.2	80.5	87.4	94.4	114.1	124.1	135.7	151.2	166.6	182.1					355
						50.1	53.2	56.3	66.9	71.8	77.3	83.6	90.6	97.5	117.5	127.6	139.2	154.7	170.1	185.6					400
							56.3	59.5	70.4	75.2	80.8	87.1	94.1	101.0	121.4	131.5	143.1	158.5	174.0	189.5					450
								62.6	73.9	78.7	84.3	90.6	97.5	104.5	125.3	135.3	146.9	162.4	177.9	193.3					500
									78.0	82.9	88.5	94.8	101.7	108.7	129.9	140.0	151.6	167.0	182.5	198.0					560
										87.8	93.4	99.6	106.6	113.6	135.3	145.4	157.0	172.4	187.9	203.4					630
											98.9	105.2	112.2	119.1	141.5	151.6	163.2	178.6	194.1	209.6					710
												111.5	118.4	125.4	148.5	158.5	170.1	185.6	201.1						800
													125.4	132.4	156.2	166.3	177.9	193.3	208.8						900
														139.4	163.9	174.0	185.6	201.1	216.5						1000
															173.2	183.3	194.9	210.3	225.8						1120
															183.3	193.3	204.9	220.4	235.9						1250
															194.9	204.9	216.5	232.0	247.5						1400
															210.3	220.4	232.0	247.5							1600
															225.8	235.9	247.5	262.9							1800
															241.3	251.3	262.9	278.4							2000
															259.8	269.9	281.5	296.9							2240
															279.9	290.0	301.6	317.0							2500
															303.1	313.2	324.8								2800
															330.2	340.2	351.8								3150

MM-C-16
MM-C-30
MM-C-36
MM-C-45



a. MQ System Channels Technical Data - Selection

Weights and channel selection for air ducts without insulation

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from cold forming as per EN 1993-1-3: 2010-12: σD = fyk / γM where γM = 1,1.
- Square ventilation ducts according to DIN EN 1505 (zinced, folded)
- The stated weights are approximate values. Note the specifications from the manufacturers.

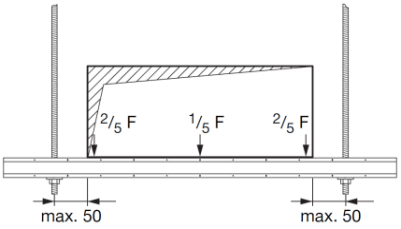
Channel selection table: wiegth specification for mounting distance of 3,0m.
- Weight in [kg / 3 m] calculated considering width/ height [mm] and sheet thickness [mm].
- Canal-connection Air duct connection parts (frame) are considered with a flat rate factor.

Used limits are:
- permissible stress capacity limit
- max allowable deflection of L /200.

Table is in kg for spacing of 3m

Sheet 0.75			Sheet 0.88						Sheet 1.0						Sheet 1.13						Sheet 1.25				
200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2240	2500	2800	3150	B/H
18.4	19.3	20.3	24.9	26.7	28.8	31.1	33.7	36.3	44.7	48.9	53.6	58.9	64.8	70.7	87.8	96.5	106.4	119.8	133.1	146.4	208.3	230.5	256.1	286.0	200
	20.3	21.3	26.1	27.9	30.0	32.3	34.9	37.5	46.2	50.3	55.0	60.3	66.2	72.1	89.4	98.1	108.0	121.3	134.7	148.0	210.3	232.5	258.2	288.0	224
		22.3	27.5	29.3	31.3	33.7	36.3	38.9	47.7	51.8	56.5	61.8	67.7	73.6	91.1	99.8	109.8	123.1	136.4	149.7	212.6	234.8	260.4	290.3	250
			29.0	30.8	32.9	35.2	37.8	40.4	49.5	53.6	58.3	63.6	69.5	75.4	93.1	101.8	111.8	125.1	138.4	151.7	215.1	237.3	262.9	292.8	280
				32.6	34.7	37.0	39.6	42.2	51.5	55.6	60.3	65.6	71.5	77.4	95.5	104.1	114.1	127.4	140.7	154.0	218.1	240.3	265.9	295.8	315
					36.8	39.1	41.7	44.3	53.9	58.0	62.7	68.0	73.9	79.8	98.1	106.8	116.8	130.1	143.4	156.7	221.5	243.7	269.3	299.2	355
						41.4	44.0	46.6	56.5	60.6	65.4	70.7	76.5	82.4	101.1	109.8	119.8	133.1	146.4	159.7	225.4	247.6	273.2	303.1	400
							46.6	49.2	59.5	63.6	68.3	73.6	79.5	85.4	104.5	113.1	123.1	136.4	149.7	163.0	229.6	251.8	277.4	307.3	450
								51.8	62.4	66.5	71.2	76.5	82.4	88.3	107.8	116.4	126.4	139.7	153.0	166.3	233.9	256.1	281.7	311.6	500
									65.9	70.1	74.8	80.1	86.0	91.8	111.8	120.4	130.4	143.7	157.0	170.3	239.0	261.2	286.8	316.7	560
										74.2	78.9	84.2	90.1	96.0	116.4	125.1	135.1	148.4	161.7	175.0	245.0	267.2	292.8	322.7	630
											83.6	88.9	94.8	100.7	121.7	130.4	140.4	153.7	167.0	180.3	251.8	274.0	299.6	329.5	710
												94.2	100.1	106.0	127.7	136.4	146.4	159.7	173.0	186.3	259.5	281.7	307.3	337.2	800
													106.0	111.9	134.4	143.0	153.0	166.3	179.6	192.9	268.1	290.3	315.9	345.7	900
														117.8	141.0	149.7	159.7	173.0	186.3	199.6	276.6	298.8	324.4	354.3	1000
															149.0	157.7	167.7	181.0	194.3	207.6	286.8	309.0	334.6	364.5	1120
															157.7	166.3	176.3	189.6	202.9	216.2	297.9	320.1	345.7	375.6	1250
															167.7	176.3	186.3	199.6	212.9	226.2	310.7	332.9	358.5	388.4	1400
															181.0	189.6	199.6	212.9	226.2	239.5	327.8	350.0	375.6	405.5	1600
															194.3	202.9	212.9	226.2	239.5	252.8	344.9	367.1	392.7	422.6	1800
															207.6	216.2	226.2	239.5	252.8	266.1	362.0	384.2	409.8	439.6	2000
															223.5	232.2	242.2	255.5	268.8	282.1	382.5	404.6	430.3	460.1	2240
															240.8	249.5	259.5	272.8	286.1	299.4	404.6	426.8	452.5	482.3	2500
															260.8	269.4	279.4	292.7	306.0	319.3	430.3	452.5	478.1	507.9	2800
															284.1	292.7	302.7	316.0	329.3	342.6	460.1	482.3	507.9	537.8	3150

MQ-21
MQ-41 L
MQ-41
MQ-41/3
MQ-52
MQ-72



Weights and channel selection for air ducts with insulation

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from cold forming as per EN 1993-1-3: 2010-12: σD = fyk / γM where γM = 1,1.
- Square ventilation ducts according to DIN EN 1505 (zinced, folded) with insulation (30mm aluminium laminated rock wool)
- The stated weights are approximate values. Note the specifications from the manufacturers.

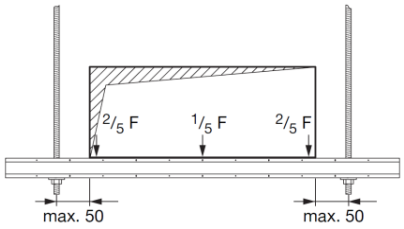
Channel selection table: wiegth specification for mounting distance of 3,0m.
- Weight in [kg / 3 m] calculated considering width/ height [mm] and sheet thickness [mm].
- Canal-connection Air duct connection parts (frame) are considered with a flat rate factor.

Used limits are:
- permissible stress capacity limit
- max allowable deflection of L /200.

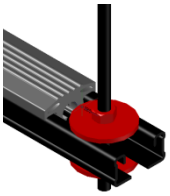
Table is in kg for spacing of 3m

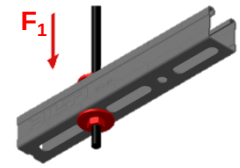
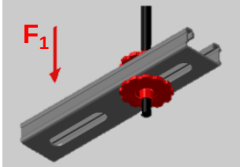
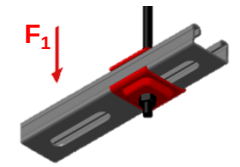
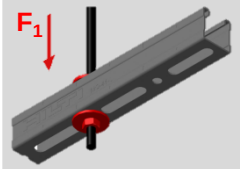
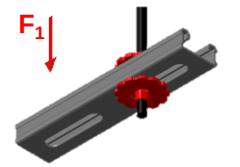
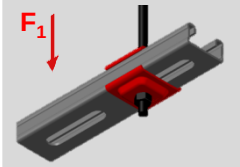
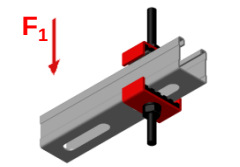
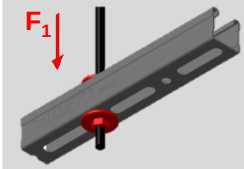
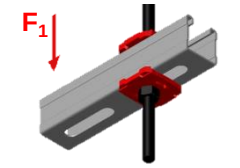
Sheet 0.75			Sheet 0.88						Sheet 1.0						Sheet 1.13						Sheet 1.25				
200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2240	2500	2800	3150	B/H
22.7	23.9	25.2	30.1	32.2	34.7	37.6	40.7	43.8	53.0	57.8	63.4	69.7	76.6	83.6	102.1	112.1	123.7	139.2	154.7	170.1	234.7	259.7	288.5	322.2	200
	25.1	26.4	31.6	33.7	36.3	39.1	42.2	45.3	54.6	59.5	65.1	71.3	78.3	85.3	103.9	114.0	125.6	141.0	156.5	172.0	237.0	262.0	290.8	324.5	224
		27.7	33.2	35.4	37.9	40.7	43.8	47.0	56.4	61.3	66.9	73.2	80.1	87.1	105.9	116.0	127.6	143.1	158.5	174.0	239.5	264.5	293.3	327.0	250
			35.1	37.3	39.8	42.6	45.7	48.8	58.5	63.4	69.0	75.2	82.2	89.2	108.3	118.3	129.9	145.4	160.8	176.3	242.3	267.3	296.2	329.9	280
				39.4	41.9	44.8	47.9	51.0	61.0	65.8	71.4	77.7	84.7	91.6	111.0	121.0	132.6	148.1	163.6	179.0	245.7	270.7	299.6	333.2	315
					44.5	47.3	50.4	53.5	63.8	68.6	74.2	80.5	87.4	94.4	114.1	124.1	135.7	151.2	166.6	182.1	249.6	274.6	303.4	337.1	355
						50.1	53.2	56.3	66.9	71.8	77.3	83.6	90.6	97.5	117.5	127.6	139.2	154.7	170.1	185.6	253.9	278.9	307.7	341.4	400
							56.3	59.5	70.4	75.2	80.8	87.1	94.1	101.0	121.4	131.5	143.1	158.5	174.0	189.5	258.7	283.7	312.5	346.2	450
								62.6	73.9	78.7	84.3	90.6	97.5	104.5	125.3	135.3	146.9	162.4	177.9	193.3	263.5	288.5	317.4	351.0	500
									78.0	82.9	88.5	94.8	101.7	108.7	129.9	140.0	151.6	167.0	182.5	198.0	269.3	294.3	323.1	356.8	560
										87.8	93.4	99.6	106.6	113.6	135.3	145.4	157.0	172.4	187.9	203.4	276.0	301.0	329.9	363.5	630
											98.9	105.2	112.2	119.1	141.5	151.6	163.2	178.6	194.1	209.6	283.7	308.7	337.6	371.2	710
												111.5	118.4	125.4	148.5	158.5	170.1	185.6	201.1	216.5	292.4	317.4	346.2	379.9	800
													125.4	132.4	156.2	166.3	177.9	193.3	208.8	224.3	302.0	327.0	355.8	389.5	900
														139.4	163.9	174.0	185.6	201.1	216.5	232.0	311.6	336.6	365.4	399.1	1000
															173.2	183.3	194.9	210.3	225.8	241.3	323.1	348.1	377.0	410.6	1120
															183.3	193.3	204.9	220.4	235.9	251.3	335.6	360.6	389.5	423.1	1250
															194.9	204.9	216.5	232.0	247.5	262.9	350.1	375.1	403.9	437.6	1400
															210.3	220.4	232.0	247.5	262.9	278.4	369.3	394.3	423.1	456.8	1600
															225.8	235.9	247.5	262.9	278.4	293.8	388.5	413.5	442.4	476.0	1800
															241.3	251.3	262.9	278.4	293.8	309.3	407.8	432.8	461.6	495.3	2000
															259.8	269.9	281.5	296.9	312.4	327.9	430.8	455.8	484.7	518.3	2240
															279.9	290.0	301.6	317.0	332.5	348.0	455.8	480.8	509.7	543.4	2500
															303.1	313.2	324.8	340.2	355.7	371.2	484.7	509.7	538.5		2800
															330.2	340.2	351.8	367.3	382.8	398.2	518.3	543.4	572.2		3150

MQ-21
MQ-41 L
MQ-41
MQ-41/3
MQ-52
MQ-72



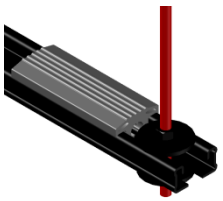
b. Connections of the vertical uprights - loading capacities

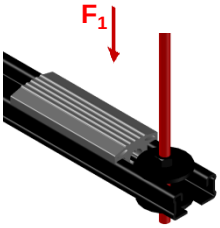


Picture	Size	BOM			Recommended loading capacity
		Item n.	Description	Pcs / m	F_1 kN
	M8	282856 216465 339793*	A 8,4/40 washer M8 nut AM8x1000 4.8 threaded rod	2 pcs 2 pcs 1 pcs	2.5 kN
		2142030 339793*	MQZ-TW-M8 trapeze wheel AM8x1000 threaded rod	2 pcs 1 pcs	2.5 kN
		2141908 216465 339793*	MQZ-P9 bored plate M8 nut AM8x1000 threaded rod	2 pcs 2 pcs 1 pcs	3.57 kN
	M10	282857 216466 339753*	A 10,5/40 washer M10 nut AM10x1000 4.8 threaded rod	2 pcs 2 pcs 1 pcs	3.0 kN
		2142031 339795*	MQZ-TW-M10 trapeze wheel AM10x1000 threaded rod	2 pcs 1 pcs	3.0 kN
		2141909 216466 339795*	MQZ-P11 bored plate M10 nut AM10x1000 threaded rod	2 pcs 2 pcs 1 pcs	3.57 kN
		369099 282851 216466 339795*	MAC-P33 Noise reduction set A 10.5/20 washer M10 nut AM10x1000 threaded rod	1 pcs 2 pcs 2 pcs 1 pcs	5.0 kN
	M12	282858 216467 339797*	A 13/40 washer M12 nut AM12x1000 4.8 threaded rod	2 pcs 2 pcs 1 pcs	
		369680 216467 339797*	MQZ-L13 Square washer M12 nut AM12x1000 4.8 threaded rod	2 pcs 2 pcs 1 pcs	7.14 kN

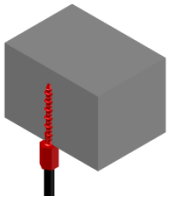
* or any other length of the same threaded rod

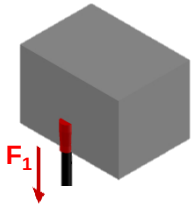
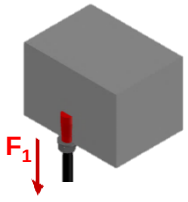
c. Vertical uprights - threaded rods - loading capacities



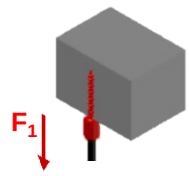
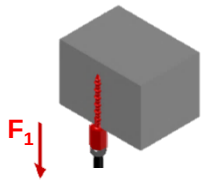
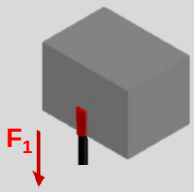
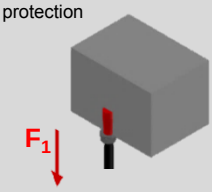
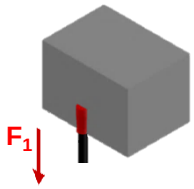
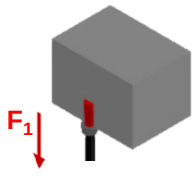
Picture	Size	Threaded rod		Recommended loading capacity
		Item number	Description	F_1 kN
	M8	339793 339794 216415	AM8x1000 4.8 zinced AM8x2000 4.8 zinced AM8x3000 4.8 zinced	7.52 kN
	M10	339795 339796 216418	AM10x1000 4.8 zinced AM10x2000 4.8 zinced AM10x3000 4.8 zinced	11.92 kN
	M12	339797 216420 216421	AM12x1000 4.8 zinced AM12x2000 4.8 zinced AM12x3000 4.8 zinced	17.34 kN

d. Base material connection – concrete - loading capacities



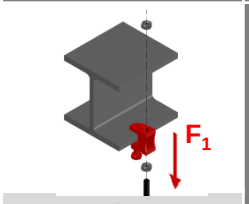
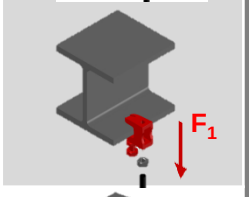
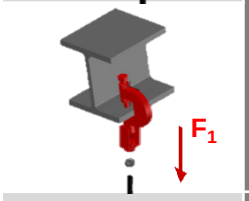
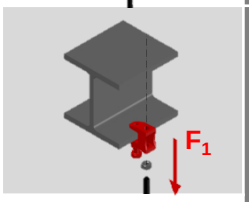
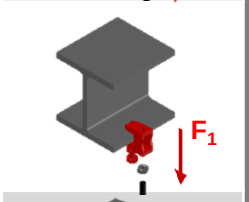
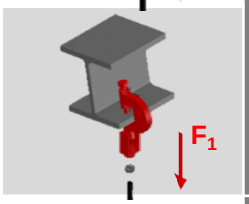
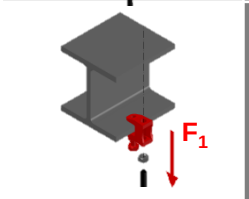
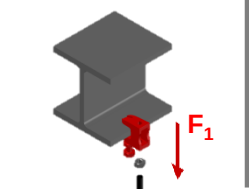
Picture	Size	BOM		Recommended loading capacity
		Item number	Description	F_1 kN
HKD M8 without rotation protection with condition that bottom part is rotation protected 	M8	376957 376958	HKD M8x25 HKD M8x25 bulk	1.4 kN*
HKD M8 with rotation protection 		376959 376960	HKD M8x30 HKD M8x30 bulk	2.0 kN*
		376961 376962	HKD M8x40 HKD M8x40 bulk	2.4 KN*

* Loading capacity of the anchor is limited to Concrete quality ≥C 20/25, no edge influence, no distance to other anchor and min thickness of the concrete slab - see Hilti Fastening Technology Manual for more details

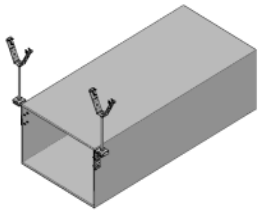
Picture	Size	BOM		Recommended loading capacity
		Item number	Description	F_1 kN
HUS-I without rotation protection with condition that bottom part is rotation protected  HUS-I with rotation protection 	M8 / M10	423180	HUS3-I 6x55 M8/M10	2.4 kN*
HKD M10 without rotation protection with condition that bottom part is rotation protected  HKD M10 with rotation protection 	M10	2037453 2037454	HKD M10x25 HKD M10x25 bulk	1.6 kN*
		376965 376966	HKD M10x30 HKD M10x30 bulk	2.4 kN*
		376967 378430	HKD M10x40 HKD M10x40 bulk	3.6kN*
HKD M12 without rotation protection with condition that bottom part is rotation protected  HKD M12 with rotation protection 	M12	378431 378432	HKD M12x25 HKD M12x25 bulk	1.9 kN*
		378544 378553	HKD M12x50 HKD M12x50 bulk	4.3 kN*

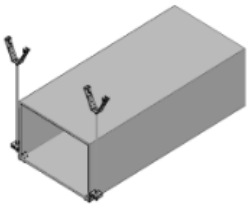
* Loading capacity of the anchor is limited to Concrete quality ≥C 20/25, no edge influence, no distance to other anchor and min thickness of the concrete slab - see Hilti Fastening Technology Manual for more details

e. Base material connection – steel - loading capacities

Picture	Size	BOM		Recommended loading capacity
		Item number	Description	F_1 kN
	M8	375956	MAB-9	1.2 kN
		2006878	MAB-M8	1.2 kN
		284238	MQT-G M8	(≤ 25°) (> 25°) 2,5 kN 1,5 kN
	M10	375957	MAB-11	2.5 kN
		2006879	MAB-M10	2.5 kN
		284239	MQT-G M10	(≤ 25°) (> 25°) 2,5 kN 1,5 kN
	M12	375958	MAB-13	3.5 kN
		2007210	MAB-M12	3.5 kN

2. L/Z - Hangers



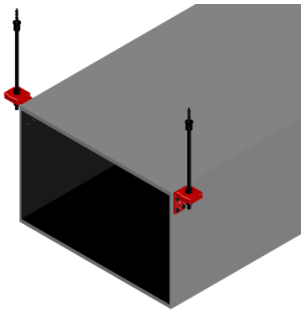


The application has several limiting factors:

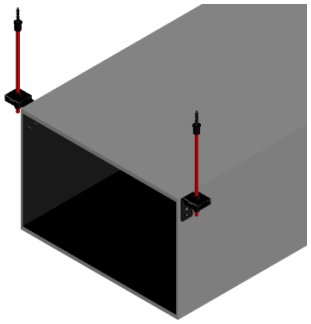
a. Self drilling/tapping screws

For the proper design follow Direct Fastening Technology Manual

b. L/Z - hangers

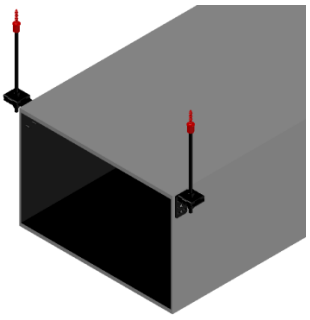


c. Threaded rods



see Trapeze applications

d. Base material connection

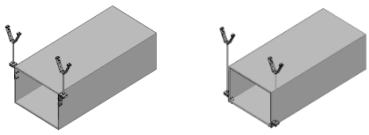


see Trapeze applications

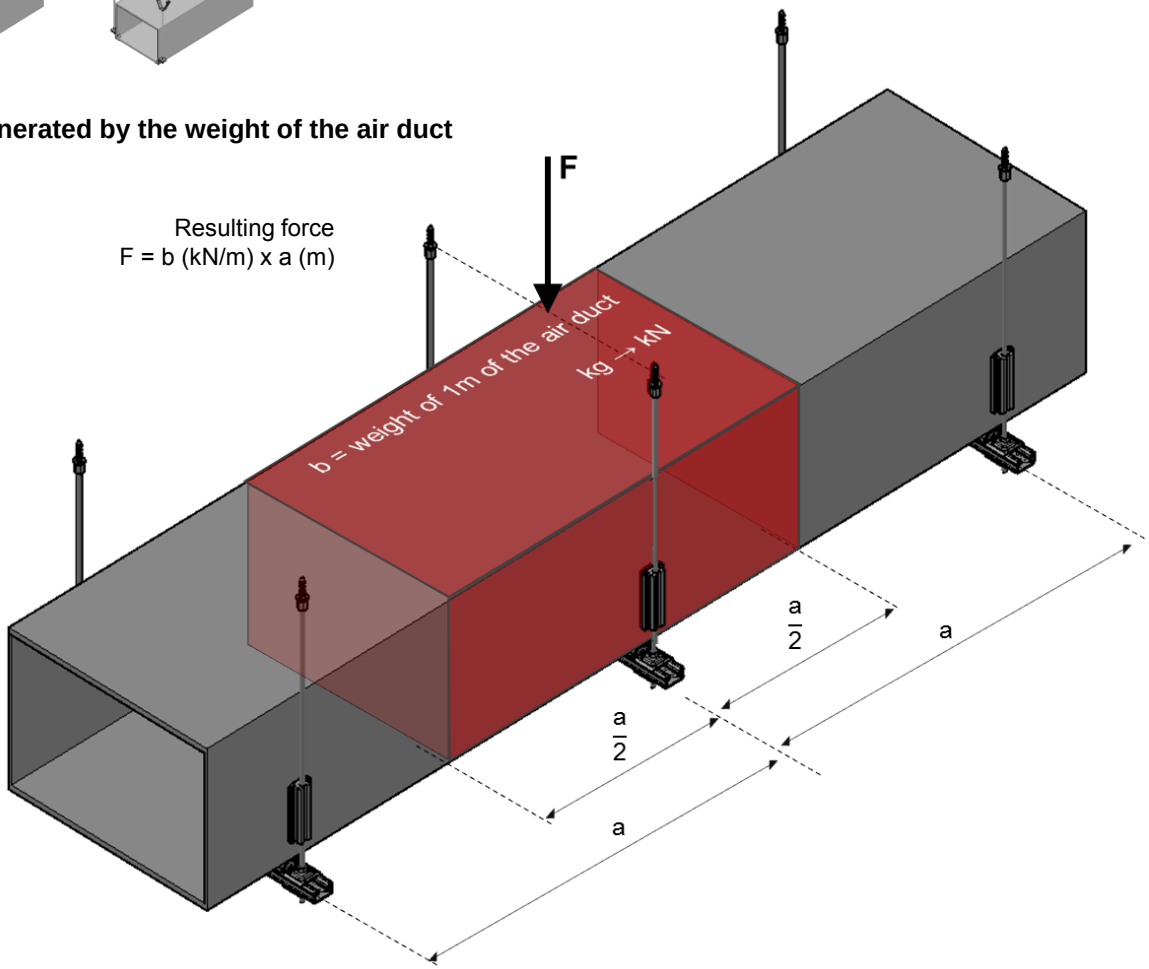
The most frequent limiting factors are:

- 90% of the cases L/Z hangers
- 10% of the cases Anchors

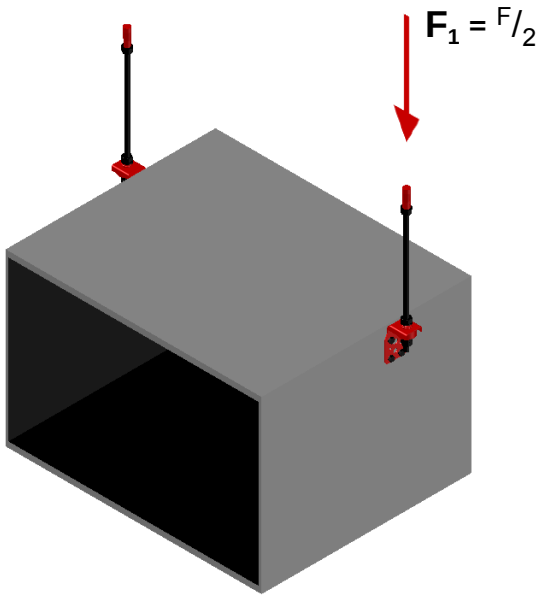
Design principle of L/Z - hanger application



Loads generated by the weight of the air duct

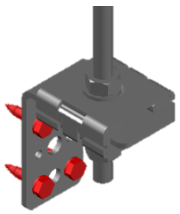


Applying the load on a channel must reflect how the air duct sits on the channel



a. Loading capacities of self drilling/tapping screws

For the proper design follow Direct Fastening Technology Manual



Self-drill screws S-MS

Fast and chipless fastening of ventilation ducts

Application:
- Screw fastenings on ventilation ducts and pipes
- Ideal fit with Hilti MVA-S air duct hangers and MVA-Z or MVA-L air duct brackets
- Fastening thin metal sheets (up to 2 x 1.00 mm)

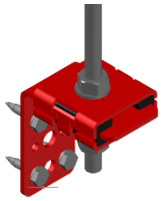
Advantages:
- Exceeds requirements of DIN EN 12237 regarding air duct leakage
- Meets max. screw length requirement of DIN EN 12097 for air duct installation and cleaning
- Chipless technology prevents corroding metal chips in air duct
- Sharp-point screw prevents skidding of screw for convenient fastening at an angle or at round air ducts
- Fast and efficient
- High load values

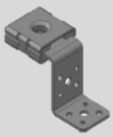
Technical data:

Screw diameter d	4 mm
Length - L	13 mm
Drilling capacity range DC	0.63 - 1 mm
Thickness fastened range MF	0.5 - 1 mm
Corrosion protection	Galvanic zinc-plated
Recess Types	Hex 7 mm, Torx 20, Square 2

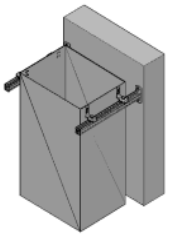
Type/head	Item Number	Item	Pkg Quantity	Thickness fastened	Screw Diameter	Length
	**406471**	**S-MS01Z 4.0 x 13 HEX**	750	2 x 1.0 mm	4 mm	13 mm
	**406472**	**S-MS01Z 4.0 x 13 TX**	1000	2 x 1.0 mm	4 mm	13 mm
	**406473**	**S-MS01Z 4.0 x 13 SQ**	1000	2 x 1.0 mm	4 mm	13 mm

b. Loading capacities of L/Z hangers



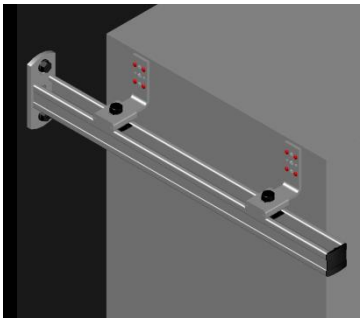
Picture	Size	BOM		Recommended loading capacity
		Item number	Description	F_1 kN
	L-Hangers	386535	MVA-L L-hanger	0.5 kN
		411500	MVA-LP 60 L-hanger	0.8 kN
		411501	MVA-LP 100 L-hanger	0.8 kN
		2047749	MVA-LH angle	0.8 kN
	Z-Hangers	386532	MVA-Z Z-hanger	0.5 kN
		411499	MVA-ZP Z-hanger	0.8 kN

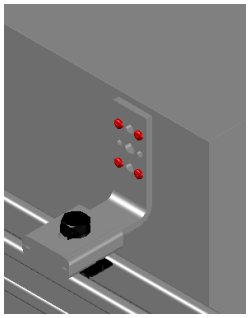
3. Rising square duct brackets

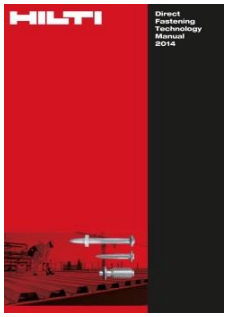


The application has several limiting factors:

a. Self drilling tapping screws

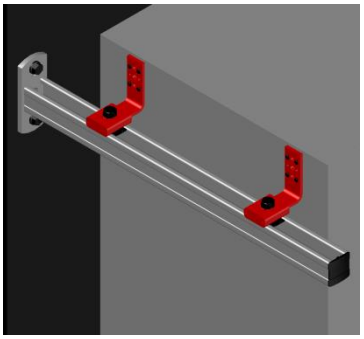






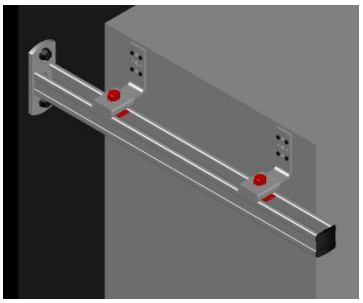
For the proper design follow Direct Fastening Technology Manual

b. L/Z - hangers



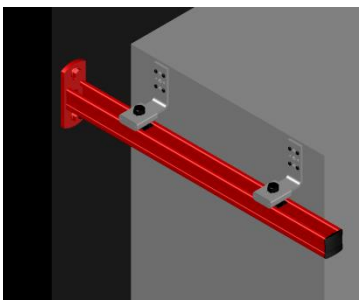
see L / Z hanger application

c. Connection to the bracket



capacity min 5 kN
will never limit the application

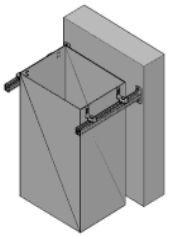
d. Bracket inclusive anchors



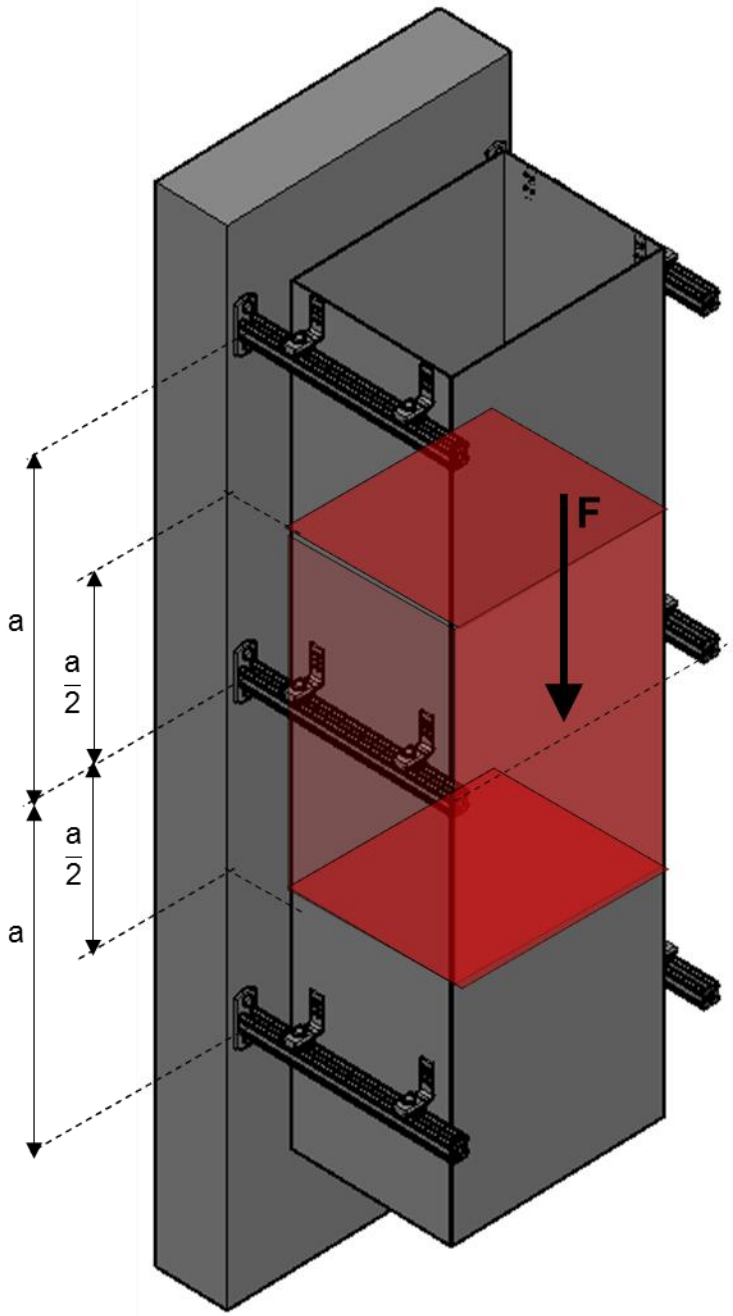
The most frequent limiting factors are:

- 50% of the cases L/Z hangers
- 50% of the cases Brackets

Design principle of rising square duct brackets



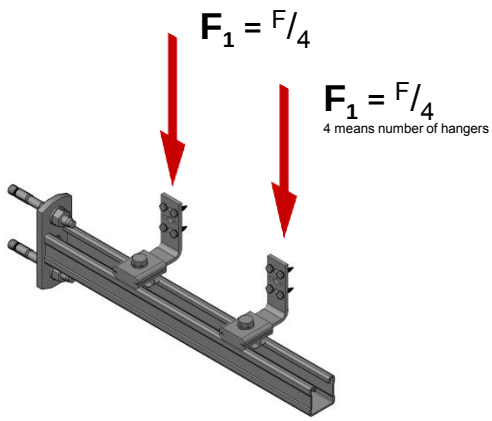
Loads generated by the weight of the air duct



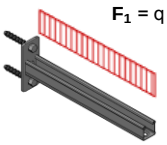
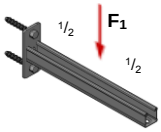
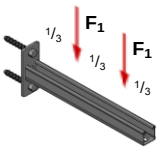
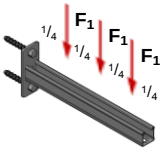
Resulting force
F = b (kN/m) x a (m)

d. Bracket inclusive anchors – loading capacities

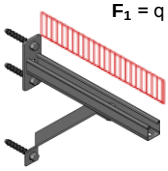
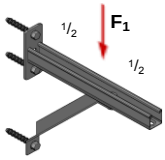
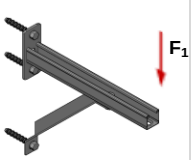
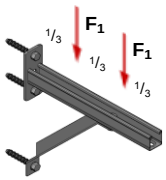
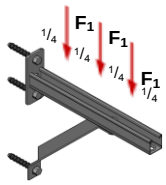
Applying the load on a bracket must reflect number of used L-hangers



Technical data for brackets MM without bracing (galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]
Bracket	**L [mm]**					
galvanized without brace		**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**
MM-B-30/200	200	870	870	430	430	290
MM-B-30/300	300	580	580	290	290	190
MM-B-36/300	300	1230	1230	610	610	410
MM-B-36/450	450	810	810	400	400	270
MM-B-36/600	600	610	610	300	300	200

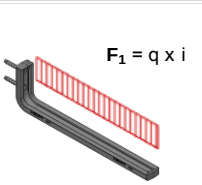
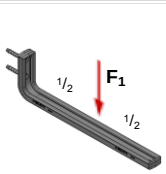
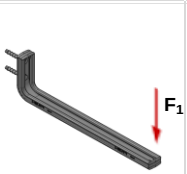
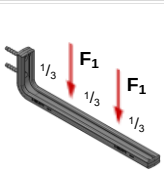
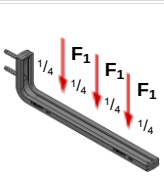
Technical data for brackets MM with bottom bracing - channel open section facing up (galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]
Bracket	**L [mm]**					
galvanized without brace		**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**	**HST3 M10 HUS3-H 8x65 15/5/-**
MM-B-30/200	200	4590	2730	2290	2050	1360
MM-B-30/300	300	3060	3060	1360	1530	1020
MM-B-36/300	300	3060	3060	1530	1530	1020
MM-B-36/450	450	2030	2030	1010	1010	670
MM-B-36/600	600	1520	1520	470	760	500

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from as per EN 1993 (**EC3**): 2010-12: σD = fyk / γM where γM = 1,0.

- Load values are for grade ≥ C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from a building component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status May 2014.
- The deflection (deformation) of L/150 was observed in all cases, this being measured ath the point of load application.

Technical data for brackets MQK-L without bracing (galvanized)

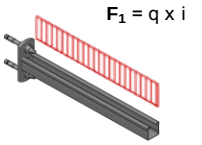
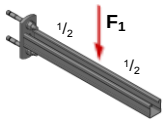
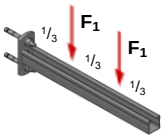
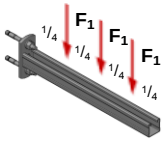
		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]
Bracket	**L [mm]**					
galvanized		**HST3 M10**	**HST3 M10**	**HST3 M10**	**HST3 M10**	**HST3 M10**
without brace		**HUS3-H 8**	**HUS3-H 8**	**HUS3-H 8**	**HUS3-H 8**	**HUS3-H 8**
MQK-L-21/200	200	768	768	412	384	256
MQK-L-21/300	300	534	534	281	267	178
MQK-L-21/450	450	365	365	188	182	122

* Sustainability of the bracket with the attachment HST3 M10 with h_{ef} min 60 mm or alternatively with the HUS3-H 8 with h_{ef} min 60 mm.

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from as per EN 1993 (**EC3**): 2010-12: σD = fyk / γM where γM = 1,0.

- Load values are for grade ≥ C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from a building component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status June 2016.
- The deflection (deformation) of L/150 was observed in all cases, this being measured at the point of load application.

Technical data for brackets MQK without bracing (galvanized)

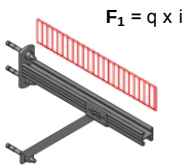
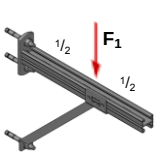
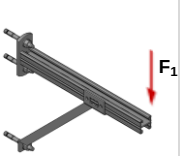
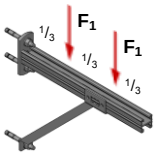
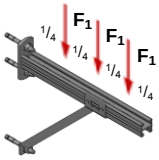
		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]
Bracket	**L [mm]**					
galvanized		**HST3 M12**	**HST3 M12**	**HST3 M12**	**HST3 M12**	**HST3 M12**
without brace		**HUS3-H 10**	**HUS3-H 10**	**HUS3-H 10**	**HUS3-H 10**	**HUS3-H 10**
MQK-21/300	300	546	546	284	273	182
MQK-21/450	450	370	370	188	185	123
MQK-41/300	300	2235	2235	1204	1117	745
MQK-41/450	450	1560	1560	822	780	520
MQK-41/600	600	1196	1196	622	598	399
MQK-41/1000	1000	581	697	218	327	211
MQK-41/3/300	300	2321	2321	1228	1161	774
MQK-41/3/450	450	1600	1600	832	800	533
MQK-41/3/600	600	1216	1216	626	608	405
MQK-41/600/4	600	1148	1148	596	574	383
MQK-41/1000/4	1000	581	697	218	327	211
MQK-72/450	450	4003	4003	2212	2001	1334
MQK-72/600	600	3143	3143	1699	1571	1048
MQK-21 D/300	300	2253	2253	1209	1127	751
MQK-21 D/450	450	1567	1567	823	784	522
MQK-21 D/600	600	1197	1197	574	598	399
MQK-41 D/1000	1000	2045	2045	1076	1022	682

* Sustainability of the bracket with the attachment HST3 M12 with h_{ef} min 70 mm or alternatively with the HUS3-H 10 with h_{ef} min 67 mm.

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from as per EN 1993 (**EC3**): 2010-12: σD = fyk / γM where γM = 1,0.

- Load values are for grade ≥ C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from abuilding component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status May 2016.
- The deflection (deformation) of L/150 was observed in all cases, this being measured at the point of load application.

Technical data for brackets MQK with pre-fab bracing (galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]	F_1 [N]
Bracket	**L [mm]**					
galvanized		**HST3 M12**	**HST3 M12**	**HST3 M12**	**HST3 M12**	**HST3 M12**
with pre-fab brace		**HUS3-H 10**	**HUS3-H 10**	**HUS3-H 10**	**HUS3-H 10**	**HUS3-H 10**
MQK-21/450 k	450	4266	2544	526	1881	1603
MQK-41/450 k	450	5463	5467	2383	2733	1822
MQK-41/600 l	600	5386	3440	2424	2516	1797
MQK-41/1000 l	1000	2052	3222	398	1611	1074
MQK-41/3/450 k	450	5459	5463	2725	2732	1821
MQK-41/3/600 l	600	5382	4445	2684	2693	1795
MQK-41/600/4 l	600	5386	3440	2424	2516	1797
MQK-41/1000/4 l	1000	2052	3222	398	1611	1074
MQK-72/450 k	450	5454	5458	2720	2729	1819
MQK-72/600 l	600	5375	5379	2678	2689	1793
MQK-21 D/450 k	450	5460	5463	2334	2732	1821
MQK-21 D/600 l	600	5382	3329	2395	2452	1795
MQK-41 D/1000 l	1000	3202	3202	1581	1601	1067

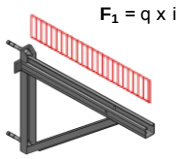
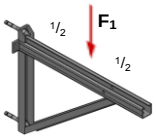
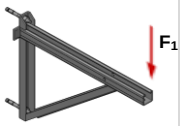
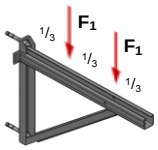
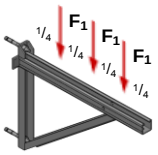
k = MQK-SK l = MQK-SL

* Sustainability of the bracket with the attachment HST3 M12 or alternatively with the HUS3-H 10x70 with h_{ef} min 46 mm.

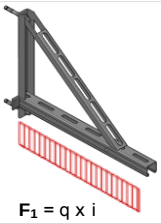
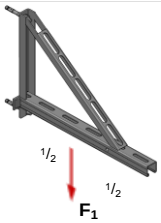
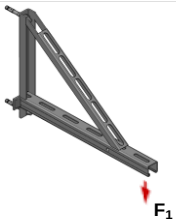
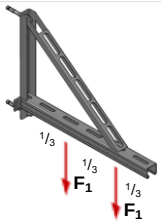
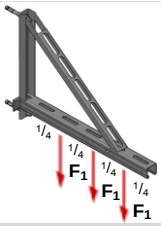
The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from as per EN 1993 (**EC3**): 2010-12: σD = fyk / γM where γM = 1,0.

- Load values are for grade ≥ C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from a building component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status May 2016.
- The deflection (deformation) of L/150 was observed in all cases, this being measured at the point of load application.

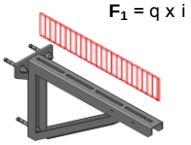
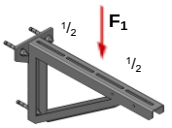
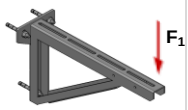
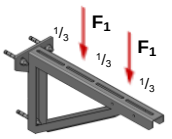
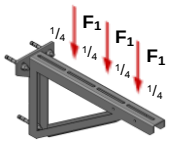
Technical data for bottom braced brackets MQK-H (hot dipped galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]
Bracket	**L [mm]**					
hot dipped galvanized integrated brace		**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**
MQK-H/300 HDG	300	7.45	7.36	3.68	3.61	2.42
MQK-H/550 HDG	550	6.94	5.37	3.58	3.49	2.36

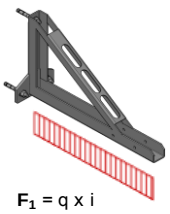
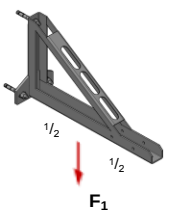
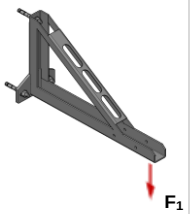
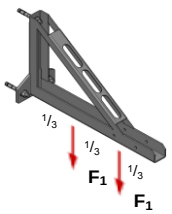
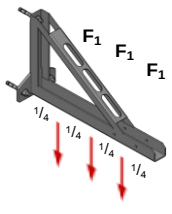
Technical data for upwards braced brackets MQK-H (hot dipped galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5
						
		F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]
Bracket	**L [mm]**					
hot dipped galvanized integrated brace		**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**	**HST3 M12 HUS3-H 10x90/35/15/5**
MQK-H/300 HDG	300	7.23	7.17	3.68	3.61	2.41

Technical data for bottom braced brackets MQK-H (hot dipped galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5 1/4
						
		F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]
Bracket	**L [mm]**					
hot dipped galvanized integrated brace		**HST3 M16**	**HST3 M16**	**HST3 M16**	**HST3 M16**	**HST3 M16**
MQK-H/750 HDG	750	12.29	11.07	6.12	6.15	4.1
MQK-H/900 HDG	900	10.78	7.85	6.94	4.7	3.25

Technical data for upwards braced brackets MQK-H (hot dipped galvanized)

		Type of load 1 Uniform	Type of load 2 Single	Type of load 3	Type of load 4	Type of load 5 1/4
						
		F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]	F_1 [kN]
Bracket	**L [mm]**					
hot dipped galvanized integrated brace		**HST3 M16**	**HST3 M16**	**HST3 M16**	**HST3 M16**	**HST3 M16**
MQK-H/750 HDG	750	6.88	6.87	3.41	3.44	2.29
MQK-H/900 HDG	900	7.71	7.7	3.22	3.85	2.57

The permissible stress σD / γG/Q where γ = 1,4. σD results from the higher yield strength (point) resulting from as per EN 1993 (**EC3**): 2010-12: σD = fyk / γM where γM = 1,0.

- Load values are for grade ≥ C20/25 concrete.
- The bracket's own weight has been considered.
- The load's apply only if the bracket is fastened away from a building component edge (fastenings made at component edges must be designed separately).
- Separate verification must be provided that forces are transferred to the respective base material, i.e. steel and concrete.
- The application guidelines in anchor approvals must be observed. Loading values according to approval status May 2016.
- The deflection (deformation) of L/150 was observed in all cases, this being measured at the point of load application.

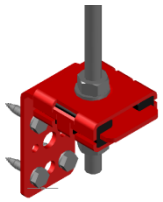
B. Transmitting noise

Avoid transmitting noise (caused by ventilation system) into building superstructure and secure noise level on allowed level.

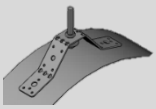
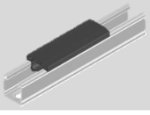
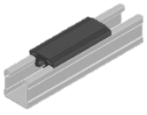
1. General noise reduction approach

Nowadays the noise protection requirements becoming important and very strict.
For an increased sound insulation it is even recommended in some European countries to reduce the noise coming from building service installations down to 20 dB(A) in rooms which require protection.
Securing noise on the allowable level is a very complex issue because numerous influencing factors need to be taken into consideration.
With regard to the supporting structure of an air duct the resonance frequency of the whole application is relevant.
Modeling of the individual air duct support dumping property is a scientific task which should be done for every individual version of air duct support. This would generate high effort and high cost and it is not a common praxis.
A simple noise control technic is the use of vibration isolation elements for the fixations of ventilation pipes and ducts.
This noise control technique has a wide application across the whole industry. It can produce a substantial noise reduction quickly and cheaply.
With the use of vibration isolation elements and the consideration of other measures the requirements can be fulfilled and verified by individual spot tests in the building for the whole system.

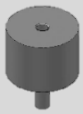
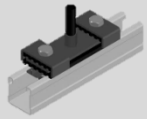
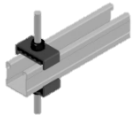
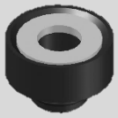
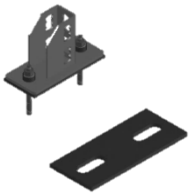
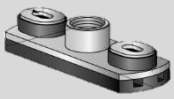
2. Overview of noise reduction parts and their properties



Simple dumping property of individual element:

Picture	Description	Item number	Noise reduction	Loading capacity
	**MVA-L L-hanger**	**386535**	12 dB	0.5 kN
	**MVA-LP 60 L-hanger**	**411500**	12 dB	0.8 kN
	**MVA-LP 100 L-hanger**	**411501**	12 dB	0.8 kN
	**MVA-LH angle**	**2047749**	12 dB	0.8 kN
	**MVA-Z Z-hanger**	**386532**	18 dB	0.5 kN
	**MVA-ZP Z-hanger**	**411499**	12 dB	0.8 kN
	**MVA-MS**	**386545**	18 dB	0.6 kN
	**MVA-S**	**386544**	18 dB	0.6 kN
	**MV-PI**	**Various**	Not defined	0.7 - 1.5 kN Depends on dimension
	**MM-RI 10 cm** **MM-RI 20m**	**418768** **418767**	13 dB	Not defined
	**MQZ-RI 10 cm** **MQZ-RI 20m**	**2047317** **2047316**	18 dB	Not defined

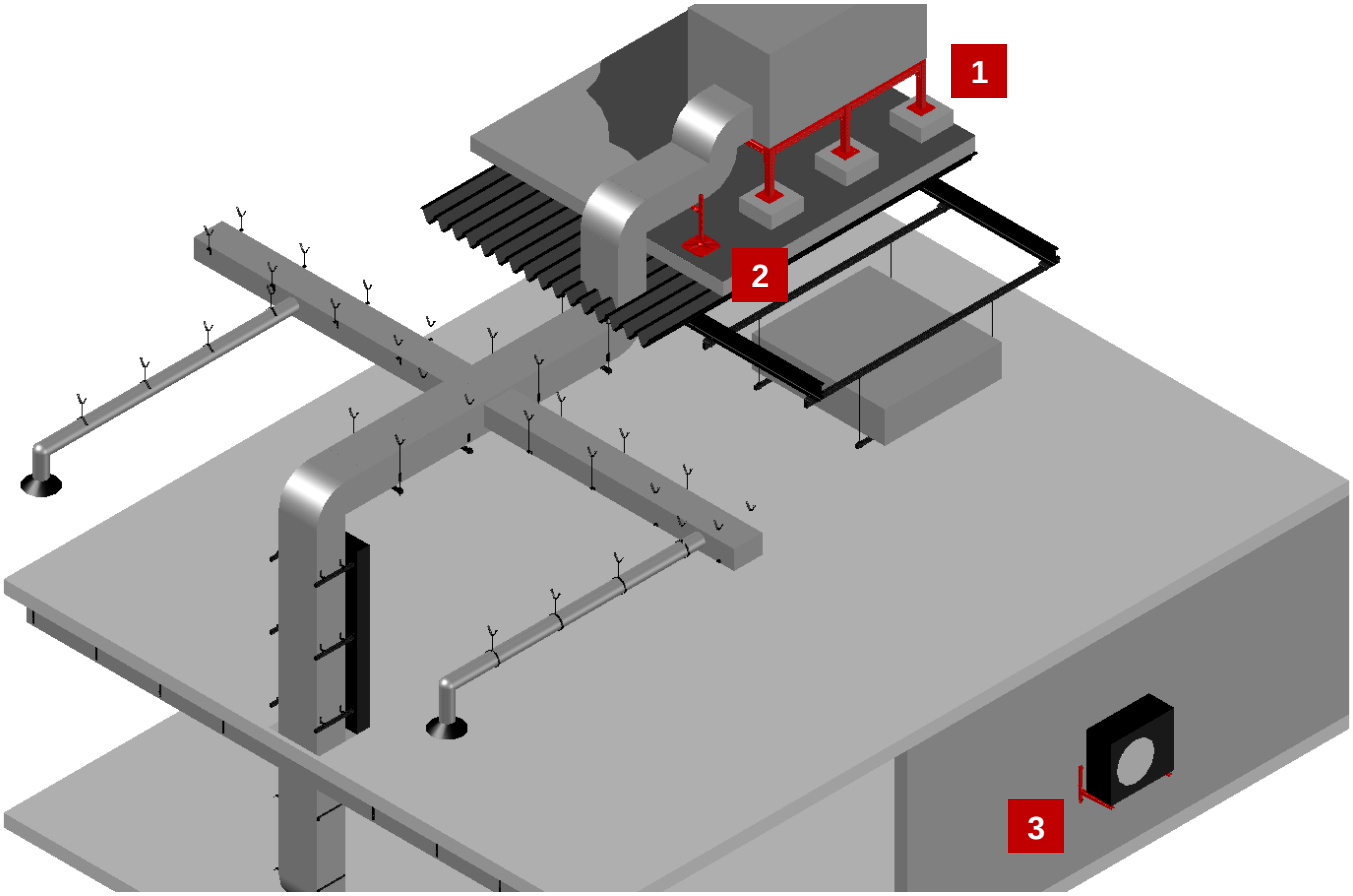
Simple dumping property of individual element:

Picture	Description	Item number	Noise reduction	Loading capacity
	**MVI-M8 T2** **MVI-M10 T2**	**386551** **386552**	Per DIN 4109	0.75 kN 0.70 kN
	**MVI-M8 T1** **MVI-M10 T1**	**386553** **386554**	Per DIN 4109	Compression only 0.75 kN 0.70 kN
	**MVI-TB**	**386550**	11 dB	Tension only 1.2 kN
	**MAC-RT-IG**	**369100**	Not defined	Per base plate
	**MAC-P363**	**369099**	10 dB	5 kN
	**MVI-B**	**386556**	18 dB	0.6 kN
	**MVI-P**	**386555**	Not defined	Not defined
	**MGS 2-I M10/M12** **MGS 2-I 1/2”** **MGS 2-I 3/4“**	**2076712** **2076713** **2076714**	Not defined	2 kN 2.6 kN 2.6 kN

C. Designing structures exposed to climatic loads – snow, wind

Some of the ventilation applications are in outdoor area such as:

1. **Roof top frames for ventilation unit or equipment**
2. **Goal post applications for inbound and outbound ducts**
3. **Wall brackets for different equipment**



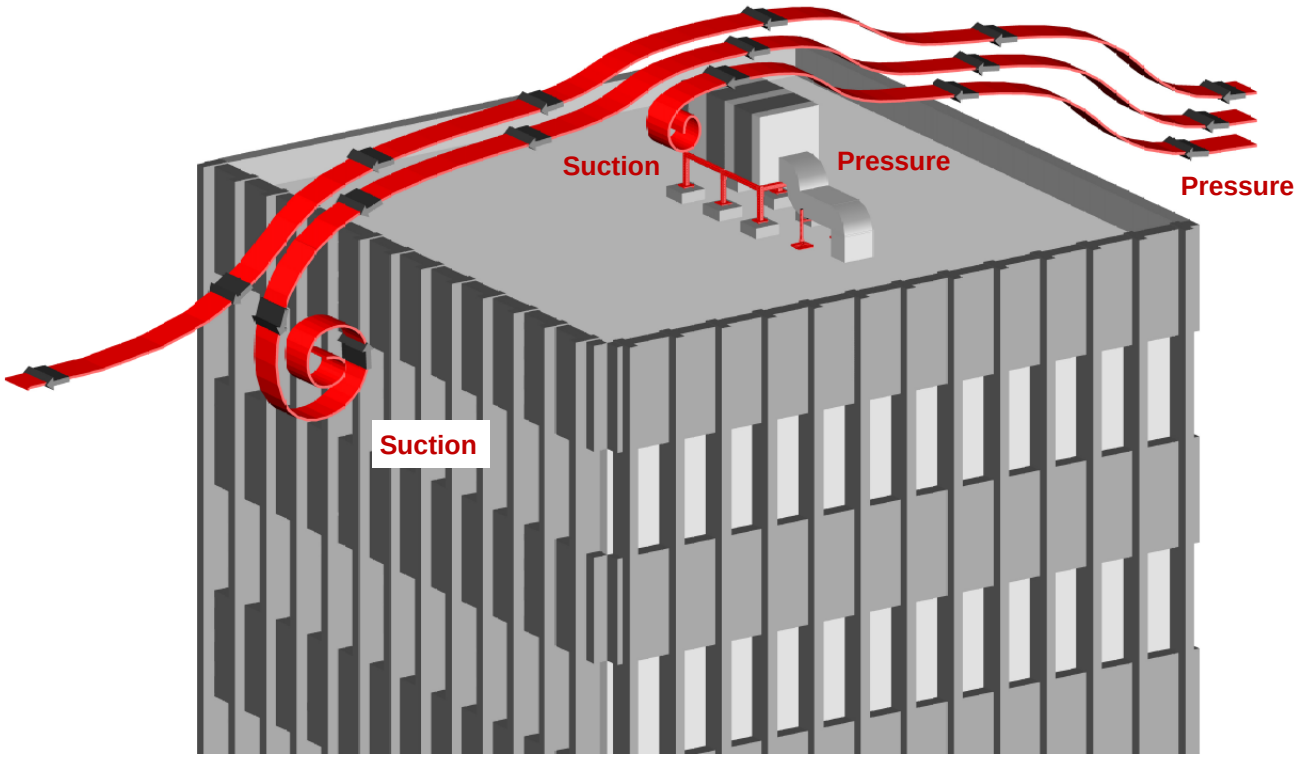
1. Climatic loads exposure and reference to EN's

Example: Roof top ventilation unit exposed to wind

Wind is exposing the building and related equipment to several actions:

a) **Wind pressure on a windward side**

b) **Wind suction on a leeward side**



Pressure and suction caused by the wind are resulting in the same direction. Suction loads generated by the wind might be in extreme cases even several times higher than the pressure loads.

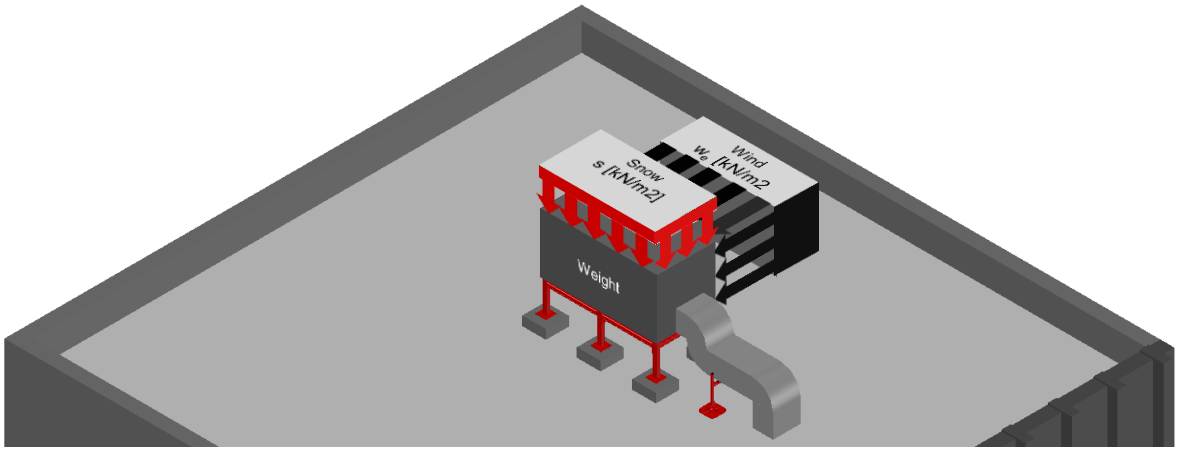
These loads must be balanced by weight of the unit. Many times the weight of the unit is not enough to balance it and it is necessary to fix the unit to the frame and use the weight of the frame as additional ballast to balance the wind loads.
The trends of pre-fab container sized units enlarged the sizes of the ventilation or AC units dramatically.
This means the generated loads by the wind are extremely high and in many cases have to be balanced by additional weight than just the unit and the frame.

Optimal would be to fix the frame to superstructure of the building, but it would mean penetration of the roof top layers and their re-sealing. The roof top systems nowadays improved a lot, but the re-sealing is still causing a lot of troubles and it is not very preferred method.

The most spread solution is to increase the weight and load distribution area by concrete blocks underneath of the frame's legs. Then wind loads would be balanced by weight of the unit, weight of the frame and weight of the concrete blocks.

This must be calculated by an experienced engineer since it a complicated process requiring several loops of re-designing and optimizing.

Example: Roof top ventilation unit exposed to wind



Three basic influences acting on the roof top ventilation unit:

a) **Snow** - characteristic value of the snow

Snow load in Europe is defined in:

DIN EN 1991-1- 3
Eurocode 1: Actions on structures
Part 1-3: General actions – Snow loads with its local annexes

→ Characteristic value of the snow s_k [kN/m^2]

$s = \mu_i * C_e * C_t * s_k$
C_e - exposure coefficient
C_t - thermal coefficient
μ_i - snow load shape coefficient
s_k - characteristic snow load value on the ground

b) **Wind** - peak velocity pressure

Wind load in Europe is defined in:

DIN EN 1991-1- 4
Eurocode 1: Actions on structures
Part 1-4: General actions – Wind actions with its local annexes

→ Peak velocity pressure q_p [kN/m^2]

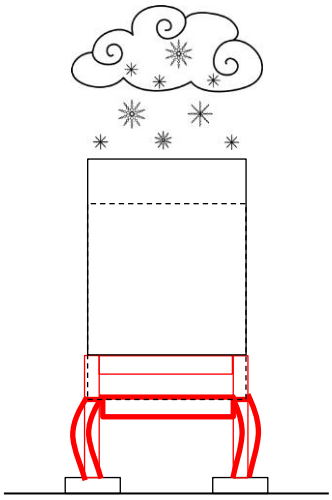
$w_e = q_p (z_e) * c_{pe}$
$q_p (z_e)$ - peak velocity pressure
z_e - reference height for external pressure
c_{pe} - pressure coefficient for external pressure

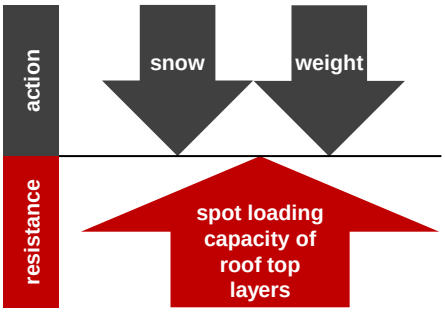
c) Weight of the unit and the frame

2. Load cases to be verified

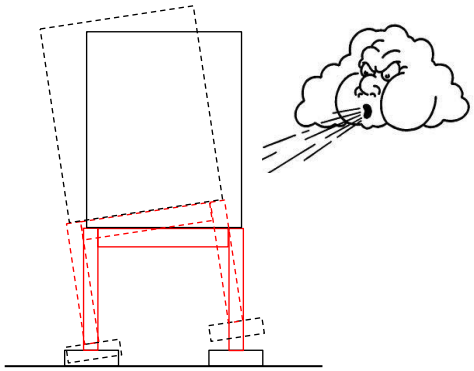
Following critical cases have to be verified and proven.

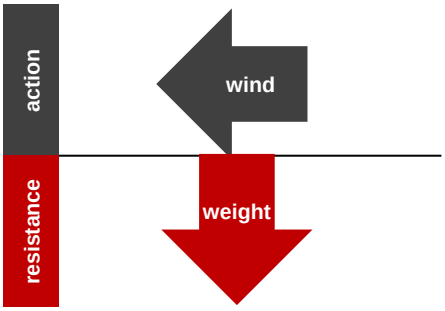
Snow + self weight



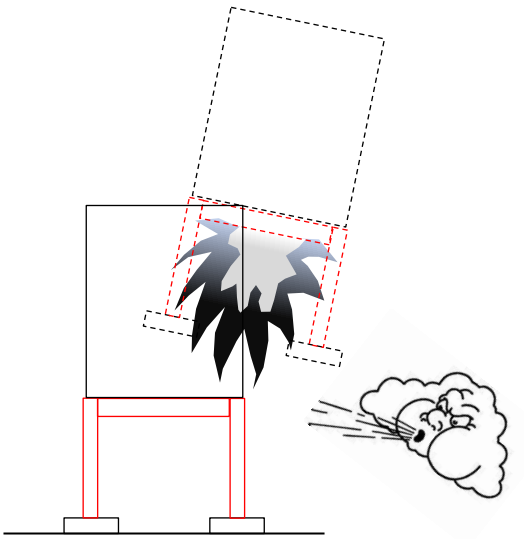


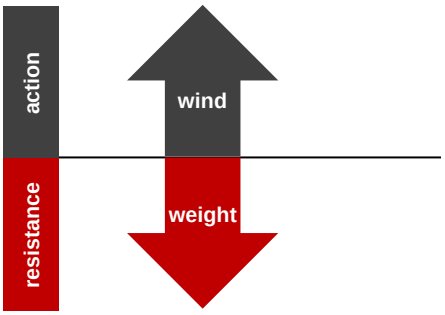
Flip over edge effect





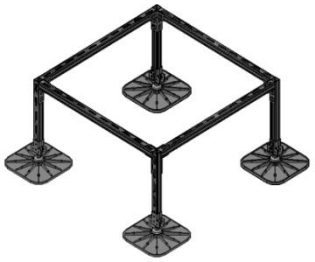
,,Flyaway,, effect



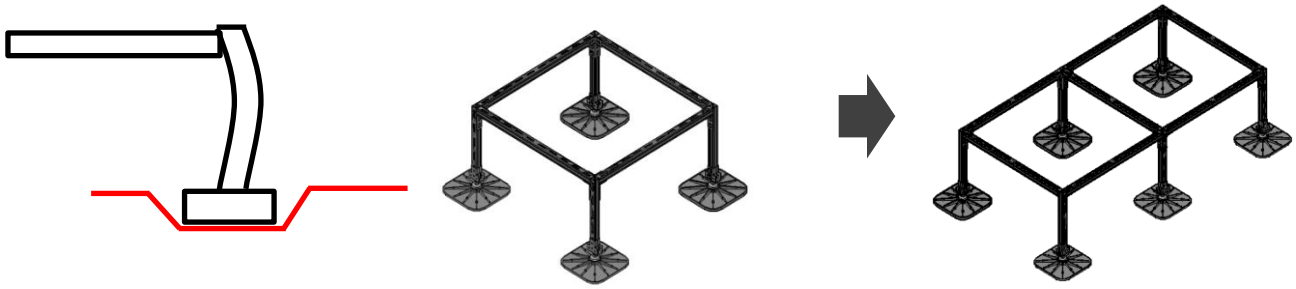


These loading cases have impact on:

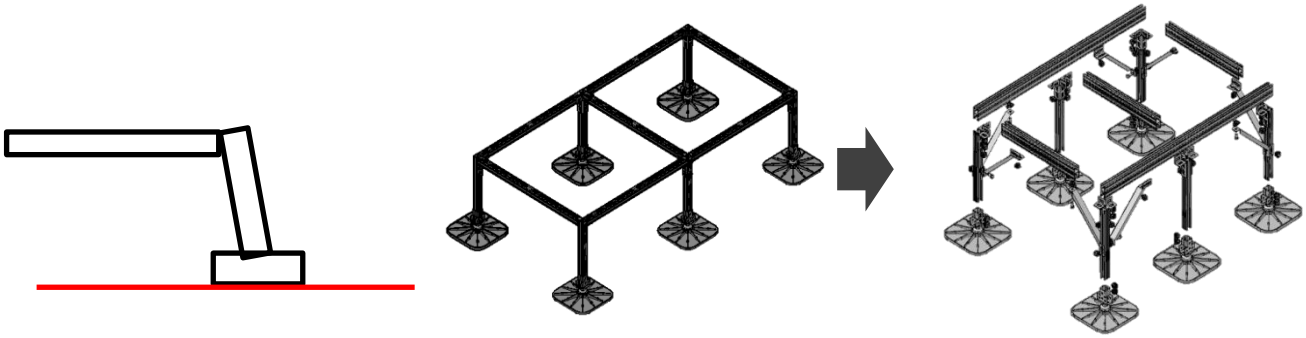
Size and shape of the frame



Number of legs - linked to spot loading capacity of the roof-top layers



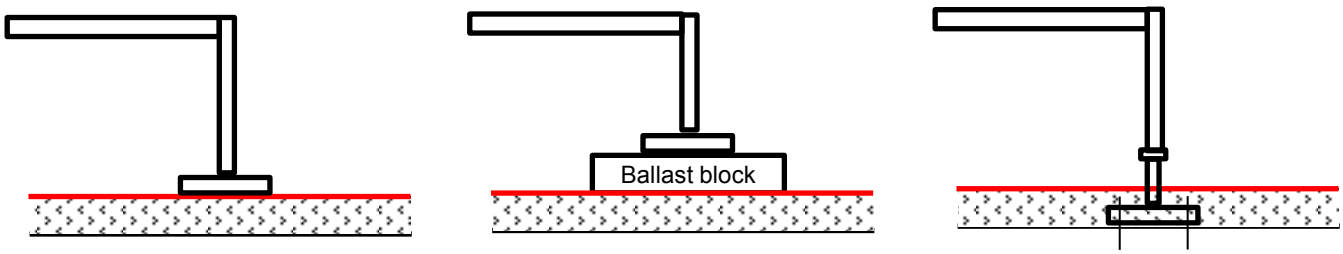
Need and direction of space bracing



Connection to the roof-top layers or superstructure of the building

Need of additional weight ballast

Necessity of connection of the unit on the frame



Trapeze On Concrete - MQ System - Options

5 Internally threaded screw anchor

1x screw anchor	
HUS-I 6x35 M8/M10 anchor	**376959**
HUS-I 6x55 M8/M10 anchor	**423180**

4 Drop in anchor

1x drop in anchor M8	
HKD M8x25 anchor	**376957**
HKD M8x30 anchor	**376959**
HKD M8x40 anchor	**376961**

3 Connection of the vertical treaded rod

M8	
2x MQZ-P9 channel washer	**2141908**
2x M8 nut	**216465**
1x AM8 threaded rod	**Various**

2 Connection of the vertical treaded rod

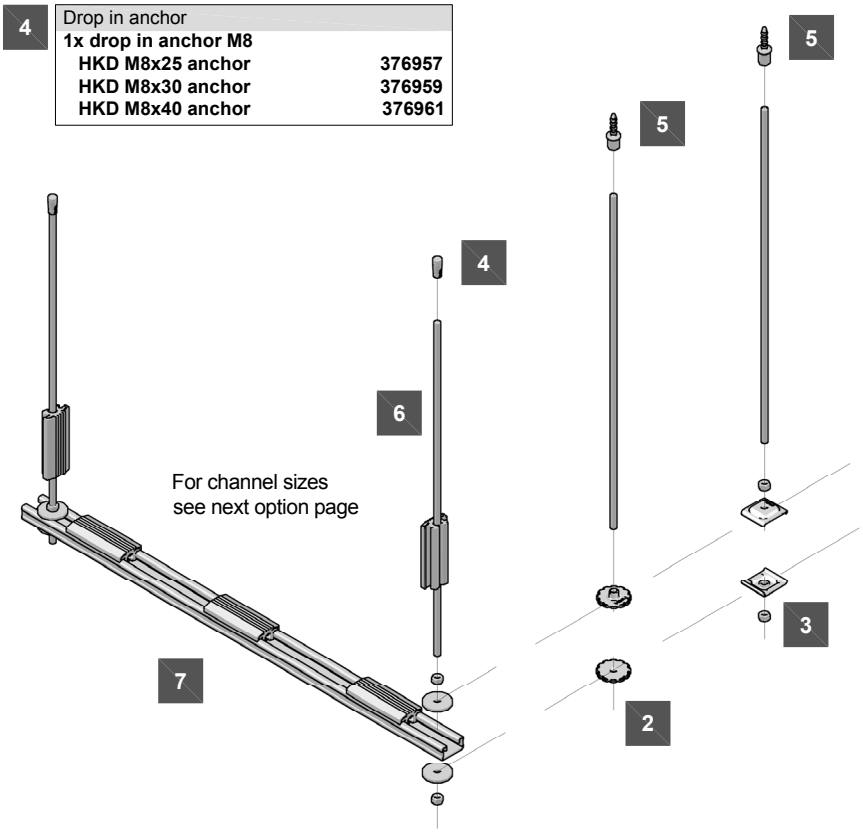
M8	
2x MQZ-TW-M8 trapeze wheel	**2141930**
1x AM8 threaded rod	**Various**

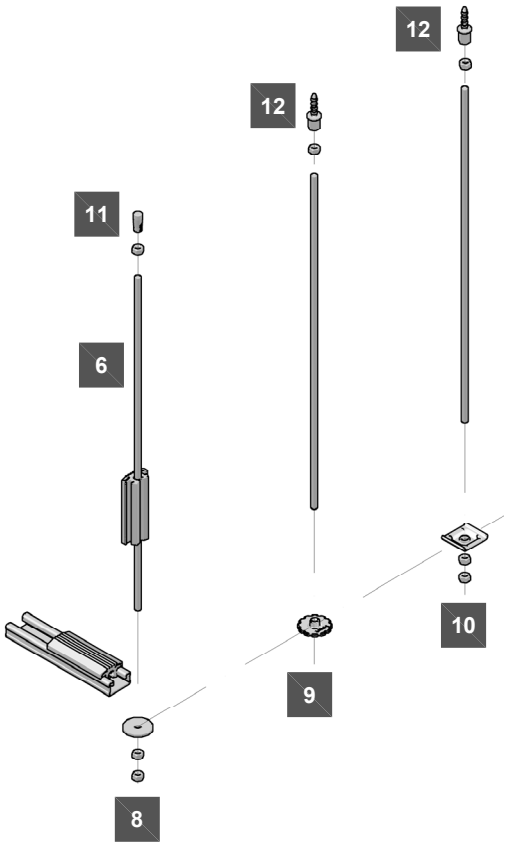
1 Connection of the vertical treaded rod

M8	
2x A 8,4/40 washer	**282856**
2x M8 nut	**216465**
1x AM8 threaded rod	**Various**

6 Threaded rods

M8	
AM8x1000 4.8 zinced	**339793**
AM8x2000 4.8 zinced	**339794**
AM8x3000 4.8 zinced	**216415**





7 Insulation inlays

10cm long strips	
3x MQZ-RI 10cm ins. inlay	**2047317**
20m long strip	
1x MQZ-RI 20m ins. inlay	**2047316**

8 Connection of the vertical treaded rod

M8	
1x A 8,4/40 washer	**282856**
2x M8 nut	**216465**
1x AM8 threaded rod	**Various**

9 Connection of the vertical treaded rod

M8	
1x MQZ-TW-M8 trap. wheel	**2141930**
1x AM8 threaded rod	**Various**

10 Connection of the vertical treaded rod

M8	
1x MQZ-P9 chann. washer	**2141908**
2x M8 nut	**216465**
1x AM8 threaded rod	**Various**

11 Drop in anchor

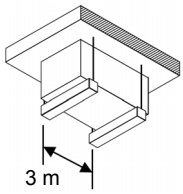
1x drop in anchor M8	
HKD M8x25 anchor	**376957**
HKD M8x30 anchor	**376959**
HKD M8x40 anchor	**376961**
1x M8 nut	**216465**

12 Internally threaded screw anchor

1x screw anchor	
HUS-I 6x35 M8/M10 anchor	**376959**
HUS-I 6x55 M8/M10 anchor	**423180**
1xM8 nut	**216465**

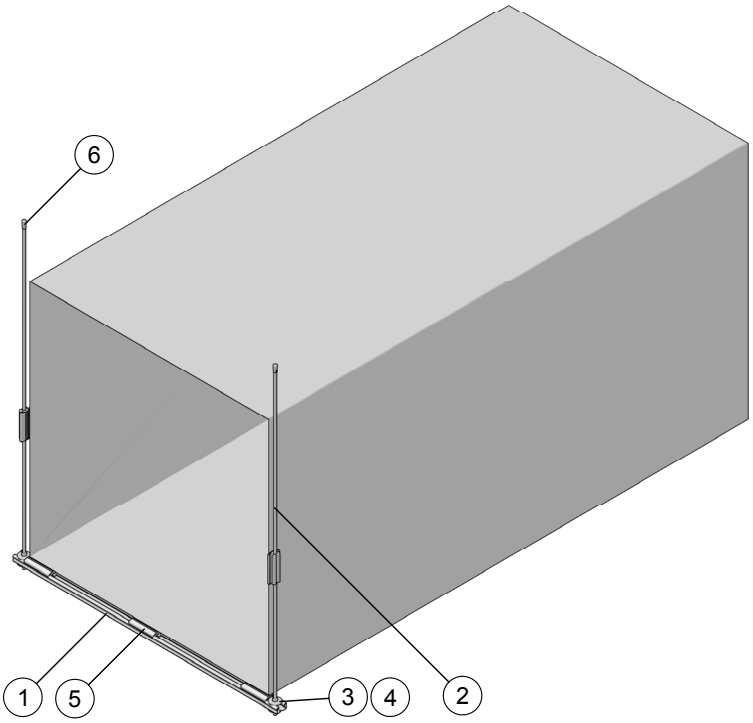
Application description	Application	Product lines	Base material
Ventilation - Trapeze On Concrete	1	Base material	Concrete
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Ventilation Applications - Trapeze On Rods - Basic - Light



Type V-G-TR-1-B-L-GL

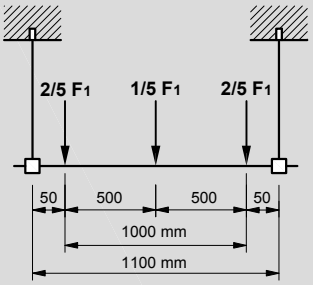
- Limited to air duct size of 1000 x 1000 mm
- Made of 1.0mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



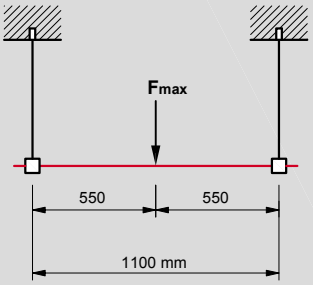
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.17 kN rec. loads



F_{max} = 0.49 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2148544**	**MQ-21 3m channel**	-	1.1m
2	**339794**	**AM8 x 2000 4.8 threaded rod**	-	2.4m = 2 x 1.2m
3	**282856**	**A 8.4/40 washer**	4	
4	**216465**	**M8 nut**	4	
5	**2047317**	**MQZ-RI 10 cm rubber inlay**	5	
6	**376957**	**HKD M8x25 anchor**	2	

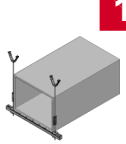
Application description

Ventilation - Trapeze On Rods - Basic-Light

General comments

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

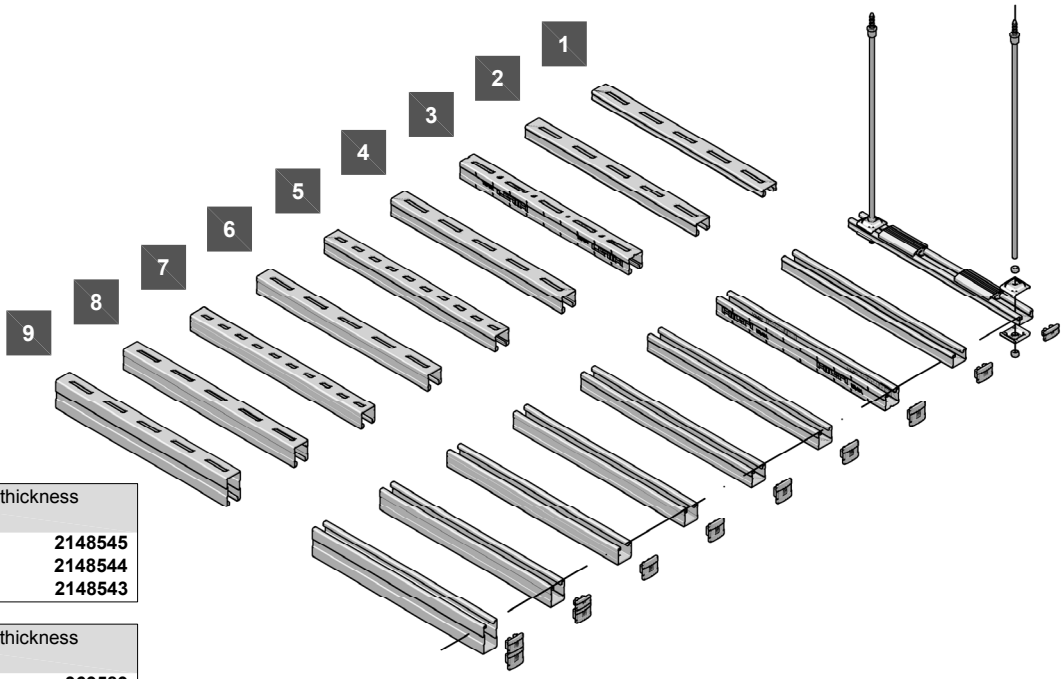
Application



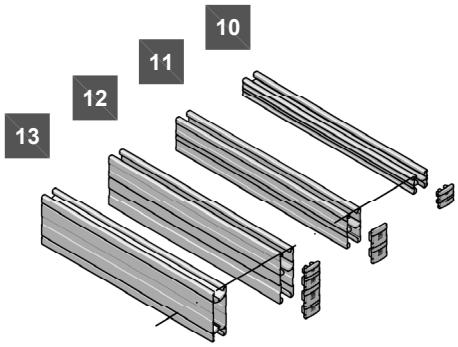
1

Base material	Concrete
Product line	MQ System
Capacity limit	AD 1000 x 1000m

Trapeze On Concrete - MQ System - Single Channel Sizes Options



1	21 format channels 2mm thickness Slots 63 x 13.5mm	
	MQ-21 2m channel	**2148545**
	MQ-21 3m channel	**2148544**
	MQ-21 6m channel	**2148543**
2	31 format channels 2mm thickness Slots 63 x 13.5mm	
	MQ-31 3m channel	**369589**
	MQ-31 6m channel	**369590**
3	41 format channels 1.5mm thickness Combined slots	
	MQ-41-L 2m channel	**2141966**
	MQ-41-L 3m channel	**2141965**
	MQ-41-L 6m channel	**2141964**
4	41 format channels 2mm thickness Slots 63 x 13.5mm	
	MQ-41 2m channel	**304559**
	MQ-41 3m channel	**369591**
	MQ-41 6m channel	**369592**
5	41 format channels 2mm thickness Slots 28 x 14mm	
	MQ-41 LL 3m channel	**2048100**
	MQ-41 LL 6m channel	**2048101**
6	31 format channels 3mm thickness Slots 63 x 13.5mm	
	MQ-41/3 3m channel	**369596**
	MQ-41/3 6m channel	**369597**
7	41 format channels 3mm thickness Slots 28 x 14mm	
	MQ-41/3 LL 3m channel	**2048102**
	MQ-41/3 LL 6m channel	**2048103**
8	52 format channels 2.5mm thickness Slots 63 x 13.5mm	
	MQ-52 3m channel	**373795**
	MQ-52 6m channel	**369598**
9	72 format channels 2.75mm thickness Slots 63 x 13.5mm	
	MQ-72 3m channel	**373797**
	MQ-72 6m channel	**369599**



10	41 format channels 2mm thickness Slots 40 x 13.5mm	
	MQ-21 D 3m channel	**369601**
	MQ-21 D 6m channel	**369602**
11	82 format channels 2mm thickness Slots 40 x 13.5mm	
	MQ-41 D 3m channel	**369603**
	MQ-41 D 6m channel	**369604**
12	124 format channels 2.5 and 2.75mm thickness Slots 63 x 13.5mm	
	MQ-52-72 D 3m channel	**373799**
	MQ-52-72 D 6m channel	**369605**
13	124 format channels 3mm thickness Without slots	
	MQ-124 X 3m channel	**369606**

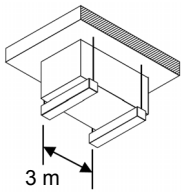
1	Plastic end cap for 21 channel **1x MQZ-E21 plastic end cap 370598**
2	Plastic end cap for 31 channel **1x MQZ-E31 plastic end cap 369686**
3 - 7	Plastic end cap for 41 channel **1x MQZ-E41 plastic end cap 369685**
8	Plastic end cap for 52 channel **1x MQZ-E21 plastic end cap 370598** **1x MQZ-E31 plastic end cap 369686**
9	Plastic end cap for 72 channel **1x MQZ-E31 plastic end cap 369686** **1x MQZ-E41 plastic end cap 369685**
10	Plastic end cap for 41 channel **2x MQZ-E21 plastic end cap 370598**
11	Plastic end cap for 82 channel **2x MQZ-E41 plastic end cap 369685**
12	Plastic end cap for 124 channel **1x MQZ-E21 plastic end cap 370598** **2x MQZ-E31 plastic end cap 369686** **1x MQZ-E41 plastic end cap 369685**
13	Plastic end cap for 124 channel **1x MQZ-E21 plastic end cap 370598** **1x MQZ-E31 plastic end cap 369686**

Application description	Application	Product lines	Base material
Ventilation - Trapeze On Concrete	1	Base material	Concrete
		Threaded parts	
		Anchors, Clamps	

General comments

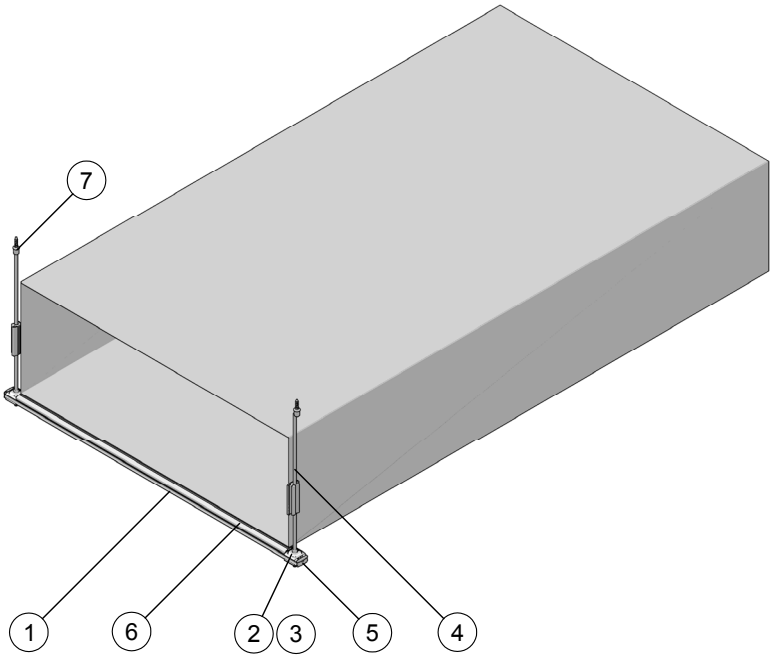
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Trapeze On Rods - Comfort - Medium



Type V-G-TR-2-C-M-GL

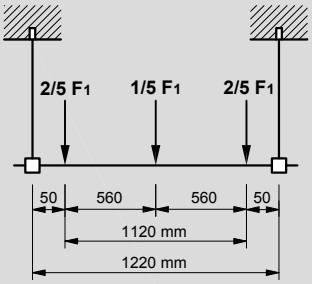
- Limited to air duct size of 1120 x 400 mm
- Made of 1.13 mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



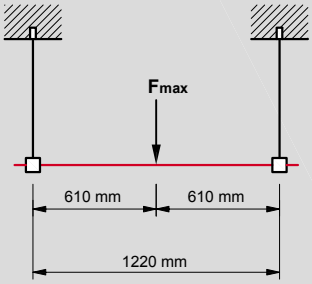
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.01 kN rec. loads



F_{max} = 0.31 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2148545**	**MQ-21 2m channel**	-	1.220 m
2	**2141908**	**MQZ-P9 channel washer**	4	
3	**216465**	**M8 nut**	4	
4	**339793**	**AM8x1000 4.8 threaded rod**	-	1.1m = 2 x 0.55m
5	**370598**	**MQZ-E21 plastic end cap**	2	
6	**2047316**	**MQZ-RI 20m rubber insulation inlay**	-	1.42m = 1.22m + 2 x 0.1m
7	**376959**	**HUS-I 6x35 M8/M10 screw anchor**	2	

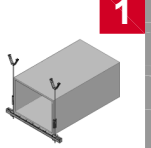
Application description

Ventilation - Trapeze On Rods - Comfort - Medium

General comments

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

Application

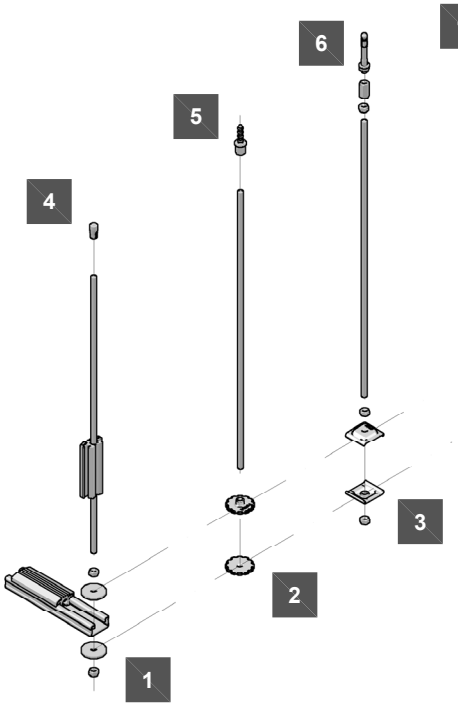


1

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.1120x400mm

Trapeze On Concrete - MQ System - Options M8, M10

M8 options



1 Connection of the vertical treaded rod

M8	
2x A 8,4/40 washer	282856
2x M8 nut	216465
1x AM8 threaded rod	Various

2 Connection of the vertical treaded rod

M8	
2x MQZ-TW-M8 trap. wheel	2141930
1x AM8 threaded rod	Various

3 Connection of the vertical treaded rod

M8	
2x MQZ-P9 channel washer	2141908
2x M8 nut	216465
1x AM8 threaded rod	Various

4 Drop in anchor

1x drop in anchor	
M8	
HKD M8x25 anchor	376957
HKD M8x30 anchor	376959
HKD M8x40 anchor	376961

5 Internally threaded screw anchor

1x screw anchor	
HUS-I 6x35 M8/M10 anchor	376959
HUS-I 6x55 M8/M10 anchor	423180

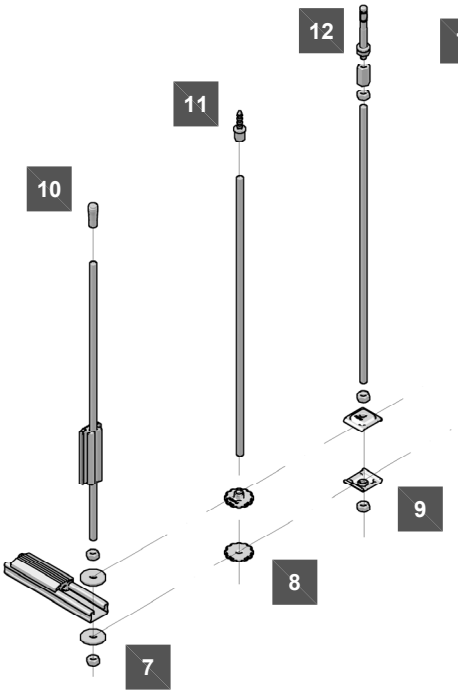
Threaded rods

M8	
AM8x1000 4.8 zinced	339793
AM8x2000 4.8 zinced	339794
AM8x3000 4.8 zinced	216415

6 Stud anchor and coupler

1x stud anchor	
HST3 M8x75 -/10	2105888
HST2 M8x75/10	2108161
1x M8x25 coupler	216703
1x M8 nut	216465

M10 options



7 Connection of the vertical treaded rod

M10	
2x A 10.5/40 washer	282862
2x M10 nut	216466
1x AM8 threaded rod	Various

8 Connection of the vertical treaded rod

M10	
2x MQZ-TW-M10 trap. wheel	2141931
1x AM10 threaded rod	Various

9 Connection of the vertical treaded rod

M10	
2x MQZ-P11 channel washer	2141909
2x M10 nut	216466
1x AM8 threaded rod	Various

10 Drop in anchor

1x drop in anchor	
M10	
HKD M10x40 anchor	378430
HKD M10x30 anchor	376965
HKD M10x25 anchor	2037453

11 Internally threaded screw anchor

1x screw anchor	
HUS-I 6x35 M8/M10 anchor	376959
HUS-I 6x55 M8/M10 anchor	423180

Threaded rods

M10	
AM10x1000 4.8 zinced	339795
AM10x2000 4.8 zinced	339796
AM10x3000 4.8 zinced	216418

12 Stud anchor and coupler

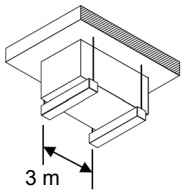
1x stud anchor	
HST3 M10x100 40/20	2105713
HST2 M10x100/20	2107840
1x M10x30 coupler	216704
1x M10 nut	216466

Application description	Application	Product lines	Base material
Ventilation - Trapeze On Concrete	1	Base material	Concrete
		Threaded parts	
		Anchors, Clamps	

General comments

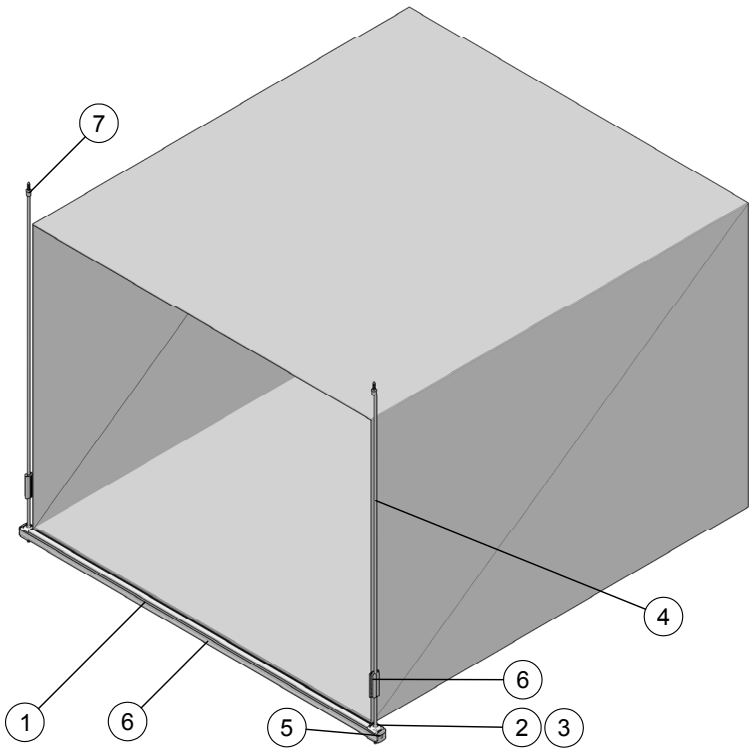
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Trapeze On Rods - Comfort - Medium



Type V-G-TR-3-C-M-GL

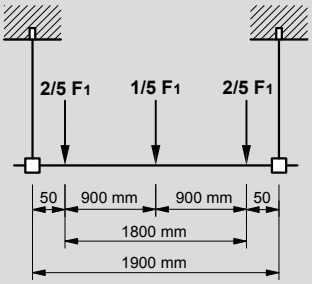
- Limited to air duct size of 1800 x 1400 mm
- Made of 1.13 mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



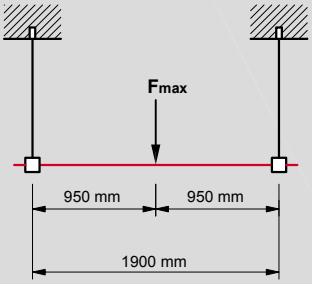
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 2.13 kN rec. loads



F_{max} = 0.56 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2141966**	**MQ-41-L 2m channel**	-	1.9 m
2	**2141908**	**MQZ-P9 channel washer**	4	
3	**216465**	**M8 nut**	4	
4	**339794**	**AM8x2000 4.8 threaded rod**	-	3.3m = 2 x 1.65m
5	**369685**	**MQZ-E41 plastic end cap**	2	
6	**2047316**	**MQZ-RI 20m rubber insulation inlay**	-	2.0m = 1.80m + 2 x 0.1m
7	**376959**	**HUS-I 6x35 M8/M10 screw anchor**	2	

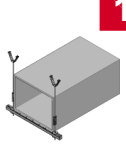
Application description

Ventilation - Trapeze On Rods - Comfort - Medium

General comments

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

Application

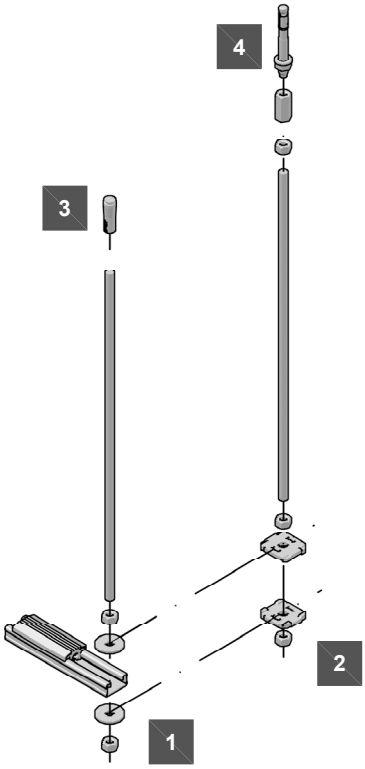


1

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.1800x1400mm

Trapeze On Concrete - MQ System - Options M12, M16

M12 options



1	Connection of the vertical treaded rod	
	M12	
	2x A 13/40 washer	**282858**
	2x M12 nut	**216467**
	1x AM12 threaded rod	**Various**

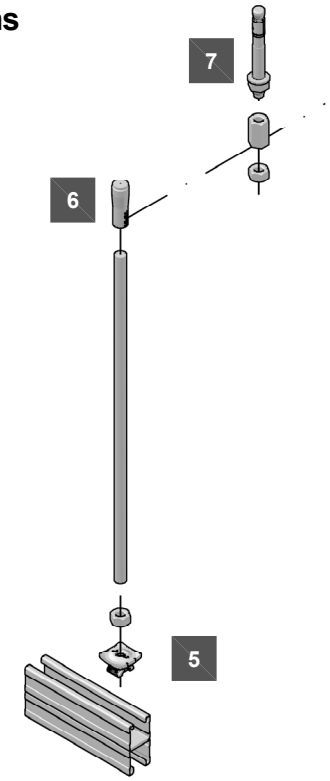
2	Connection of the vertical treaded rod	
	M12	
	2x MQZ-L13 square washer	**369680**
	2x M12 nut	**216467**
	1x AM12 threaded rod	**Various**

3	Drop in anchor	
	1x drop in anchor	
	M12	
	HKD M12x50 anchor	**378553**
	HKD M12x25 anchor	**378431**

Threaded rods	
M12	
AM12x1000 4.8 zinced	**339797**
AM12x2000 4.8 zinced	**216420**
AM12x3000 4.8 zinced	**216421**

4	Stud anchor and coupler	
	1x stud anchor	
	HST3 M12x115 40/20	**2105719**
	HST2 M12x115/20	**2107849**
	1x M12x40 coupler	**216705**
	1x M12 nut	**216467**

M16 options



5	Connection of the vertical treaded rod	
	M16	
	1x MQA-M16-B saddle nut	**369632**
	2x M16 nut	**216468**
	1x AM16 threaded rod	**Various**

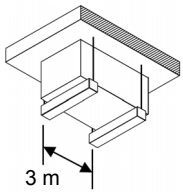
6	Drop in anchor	
	1x drop in anchor	
	M16	
	HKD M16x65 anchor	**382941**

Threaded rods	
M16	
AM16x1000 4.8 zinced	**216422**
AM16x2000 4.8 zinced	**216423**
AM16x3000 4.8 zinced	**216424**

7	Stud anchor and coupler	
	1x stud anchor	
	HST3 M16x145 45/25	**2105859**
	HST2 M16x140/25	**2108160**
	1x M16x40 coupler	**216706**
	1x M16 nut	**216468**

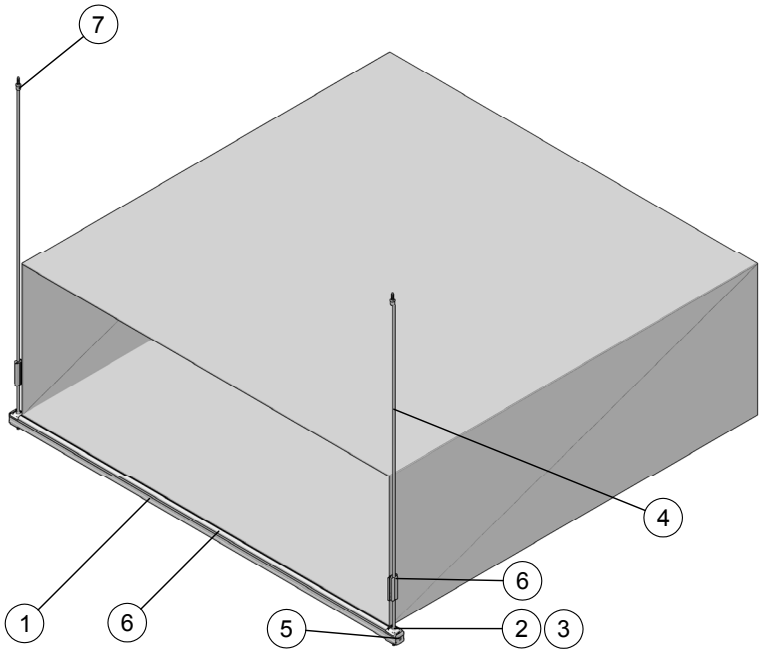
Application description	Application	Product lines	Base material
Ventilation - Trapeze On Concrete	1	Base material	Concrete
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Ventilation Applications - Trapeze On Rods - Comfort - Medium



Type V-G-TR-4-C-M-GL

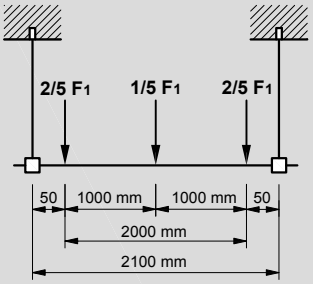
- Limited to air duct size of 2000 x 710 mm
- Made of 1.13 mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



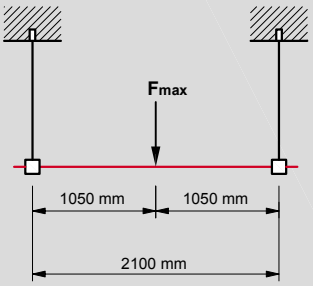
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.803 kN rec. loads



F_{max} = 0.46 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2141966**	**MQ-41-L 2m channel**	-	2.1 m
2	**2141908**	**MQZ-P9 channel washer**	4	
3	**216465**	**M8 nut**	4	
4	**339794**	**AM8x2000 4.8 threaded rod**	-	3.3m = 2 x 1.65m
5	**369685**	**MQZ-E41 plastic end cap**	2	
6	**2047316**	**MQZ-RI 20m rubber insulation inlay**	-	2.2m = 2.00m + 2 x 0.1m
7	**376959**	**HUS-I 6x35 M8/M10 screw anchor**	2	

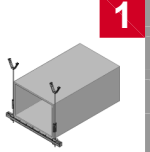
Application description

Ventilation - Trapeze On Rods - Comfort - Medium

General comments

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

Application

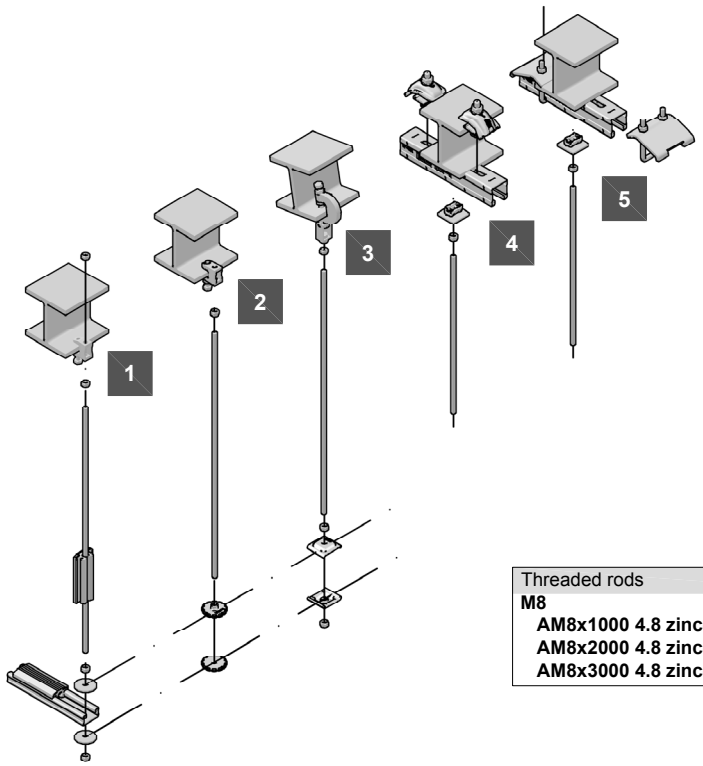


1

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.2000x710mm

Trapeze On Steel - MQ System - Options M8, M10

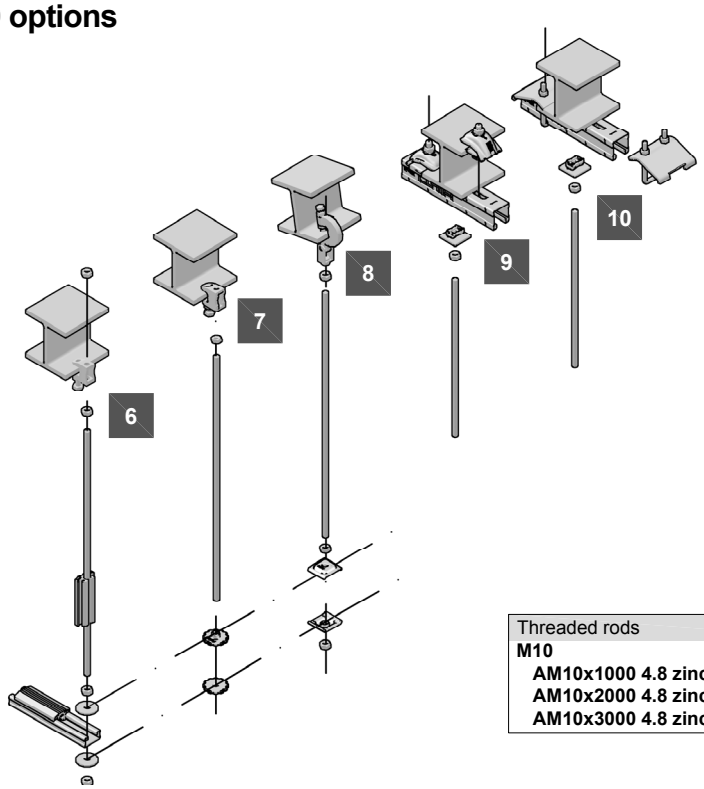
M8 options



Threaded rods	
M8	
AM8x1000 4.8 zinced	**339793**
AM8x2000 4.8 zinced	**339794**
AM8x3000 4.8 zinced	**216415**

1	**Connecting M8 threaded rods to structural steel with unthreaded beam clamp**	
	1x MAB-9 beam clamp	**375956**
	2x M8 nut	**216465**
2	Connecting M8 threaded rods to **structural steel with threaded beam clamp**	
	1x MAB-M8 beam clamp	**2006878**
	1x M8 nut	**216465**
3	Connecting M8 threaded rods to inclined structural steel with threaded beam clamp	
	1xMQT-G M8 beam clamp	**284238**
	1xM8 nut	**216465**
4	Connecting M8 threaded rods to structural steel centrically with channel	
	2x MQT-U beam clamp	**2115454**
	1x MQ-41 3m channel	**369591**
	1x MQA-M8 saddle nut	**369629**
	1x M8 nut	**216465**
5	Connecting M8 threaded rods to structural steel centrically with channel	
	2x MQT-21-41 beam clamp	**369675**
	1x MQ-41 3m …m channel	**369591**
	1x MQA-M8 saddle nut	**369629**
	1x M8 nut	**216465**

M10 options

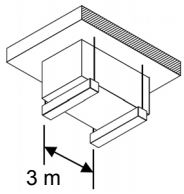


Threaded rods	
M10	
AM10x1000 4.8 zinced	**339795**
AM10x2000 4.8 zinced	**339796**
AM10x3000 4.8 zinced	**216418**

6	**Connecting M10 threaded rods to structural steel with unthreaded beam clamp**	
	1x MAB-11 beam clamp	**375957**
	2x M10 nut	**216466**
7	Connecting M10 threaded rods to **structural steel with threaded beam clamp**	
	1x MAB-M10 beam clamp	**2006879**
	1x M10 nut	**216466**
8	Connecting M10 threaded rods to inclined structural steel with threaded beam clamp	
	1x MQT-G M10 beam clamp	**284239**
	1x M10 nut	**216466**
9	Connecting M10 threaded rods to structural steel centrically with channel	
	2x MQT-U beam clamp	**2115454**
	1x MQ-41 3m channel	**369591**
	1x MQA-M10 saddle nut	**369630**
	1x M10 nut	**216466**
10	Connecting M10 threaded rods to structural steel centrically with channel	
	2x MQT-21-41 beam clamp	**369675**
	1x MQ-41 3m channel	**369591**
	1x MQA-M10 saddle nut	**369630**
	1x M10 nut	**216466**

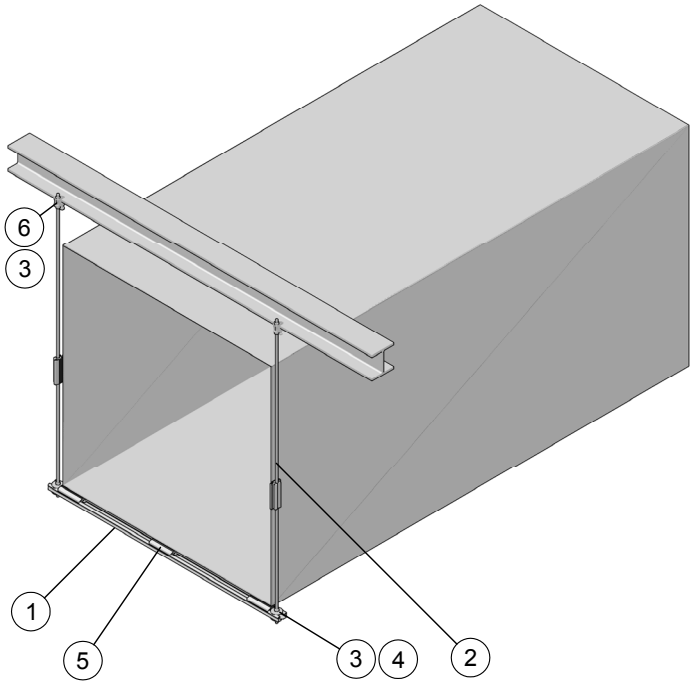
Application description	Application	Product lines	Base material
Ventilation - Trapeze On Steel	1	Base material	Steel
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Ventilation Applications - Trapeze On Rods - Basic - Light



Type V-G-TR-5-B-L-GL

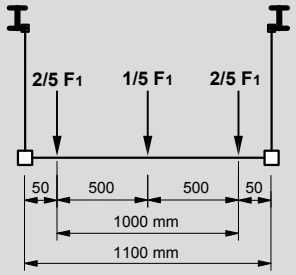
- Limited to air duct size of 1000 x 1000 mm
- Made of 1.0mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



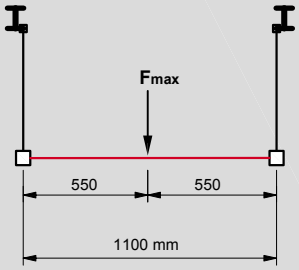
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.17 kN rec. loads



F_{max} = 0.49 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2148544**	**MQ-21 3m channel**	-	1.1m
2	**339794**	**AM8 x 2000 4.8 threaded rod**	-	2.4m = 2x 1.2m
3	**282856**	**A 8.4/40 washer**	4	
4	**216465**	**M8 nut**	8	
5	**2047317**	**MQZ-RI 10 cm rubber inlay**	5	
6	**375956**	**MAB-9 beam clamp**	2	

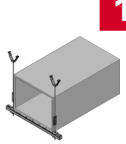
Application description

Ventilation - Trapeze On Rods - Basic - Light

General comments

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

Application

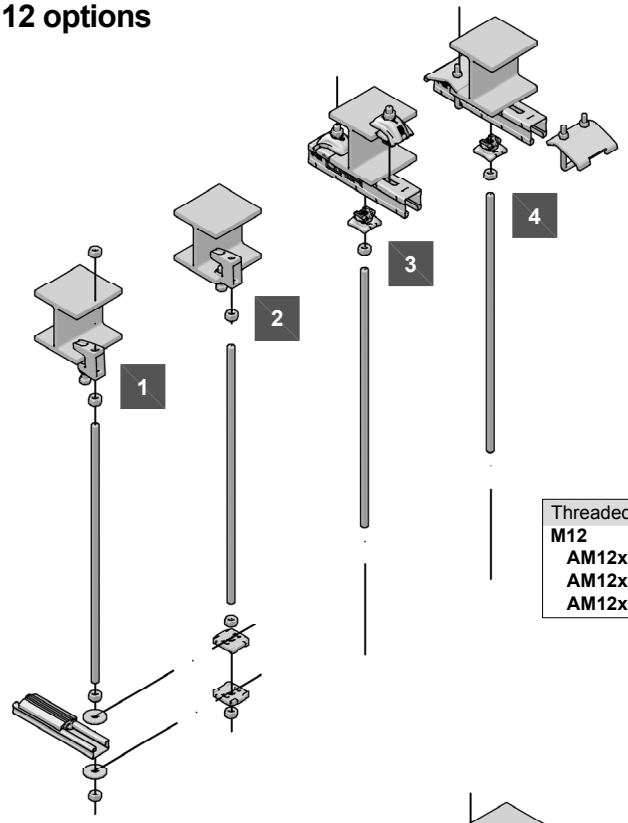


1

Base material	Steel
Product line	MQ System
Capacity limit	A.D.1000x1000mm

Trapeze On Steel - MQ System - Options M12, M16

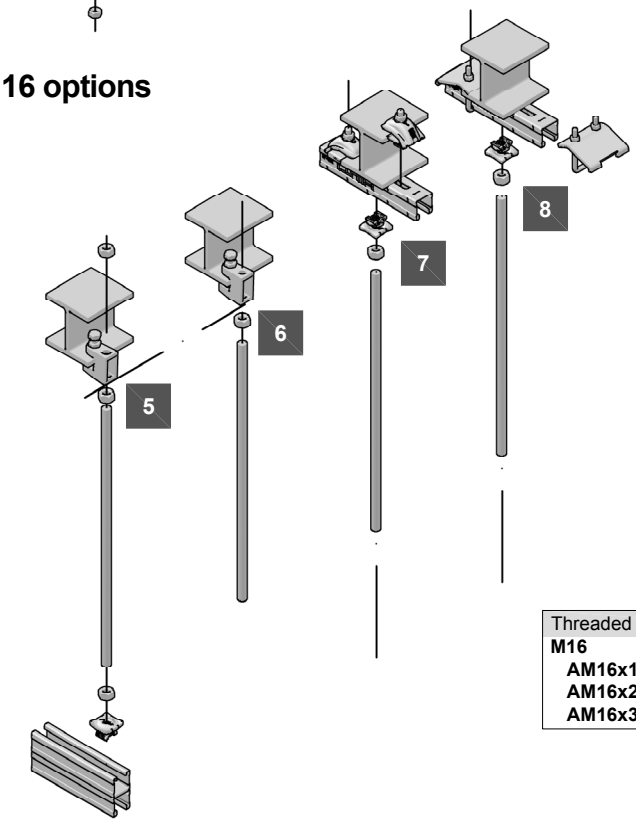
M12 options



Threaded rods	
M12	
AM12x1000 4.8 zinced	**339797**
AM12x2000 4.8 zinced	**216420**
AM12x3000 4.8 zinced	**216421**

1	**Connecting M12 threaded rods to structural steel with unthreaded beam clamp**	
	1x MAB-13 beam clamp	**375958**
	2x M12 nut	**216467**
2	Connecting M12 threaded rods to **structural steel with threaded beam clamp**	
	1x MAB-M12 beam clamp	**2007210**
	1x M12 nut	**216467**
3	Connecting M12 threaded rods to structural steel centrically with channel	
	2x MQT-U beam clamp	**2115454**
	1x MQ-41 3m …m channel	**369591**
	1x MQA-M12-B saddle nut	**369631**
	1x M12 nut	**216467**
4	Connecting M12 threaded rods to structural steel centrically with channel	
	2x MQT-21-41 beam clamp	**369675**
	1x MQ-41 3m …m channel	**369591**
	1x MQA-M12-B saddle nut	**369631**
	1x M12 nut	**216467**

M16 options



Threaded rods	
M16	
AM16x1000 4.8 zinced	**216422**
AM16x2000 4.8 zinced	**216423**
AM16x3000 4.8 zinced	**216424**

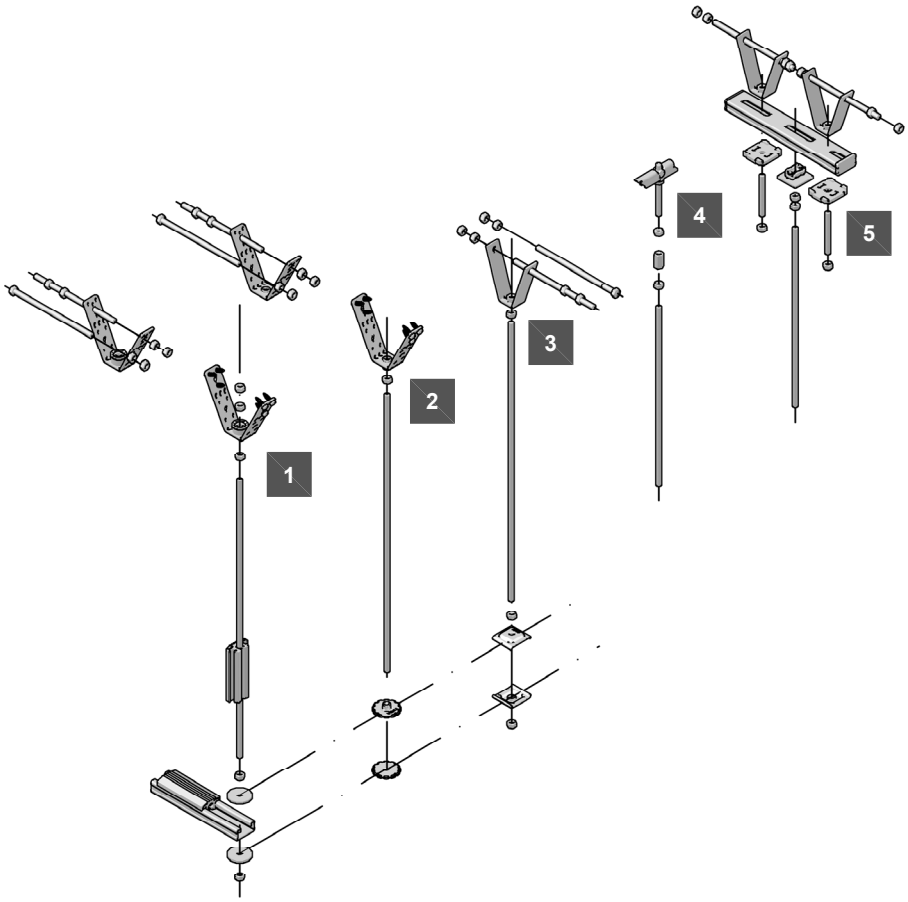
5	**Connecting M16 threaded rods to structural steel with unthreaded beam clamp**	
	1x MAB-17 beam clamp	**228155**
	2x M16 nut	**216468**
6	Connecting M16 threaded rods to **structural steel with threaded beam clamp**	
	1x MAB-M16 beam clamp	**2007211**
	1x M16 nut	**216468**
7	Connecting M16 threaded rods to structural steel centrically with channel	
	2x MQT-U beam clamp	**2115454**
	1x MQ-41 3m …m channel	**369591**
	1x MQA-M16-B saddle nut	**369632**
	1x M16 nut	**216468**
8	Connecting M16 threaded rods to structural steel centrically with channel	
	2x MQT-21-41 beam clamp	**369675**
	1x MQ-41 3m …m channel	**369591**
	1x MQA-M16-B saddle nut	**369632**
	1x M16 nut	**216468**

Application description	Application	Product lines	Base material
Ventilation - Trapeze On Steel	1	Base material	Steel
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Trapeze On PMS - MQ System - Options M8

M8 option

Threaded rods	
M8	
AM8x1000 4.8 zinced	**339793**
AM8x2000 4.8 zinced	**339794**
AM8x3000 4.8 zinced	**216415**



5 2xV-hangers fixed channel and dropped t-rod

2x MF-TSH M8 V-hanger	**229006**
11x M8 nut	**216465**
5x AM8x1000…m thr. rod	**339793**
2x MQZ-L9 sq. washer	**369678**
1x MQ-21 3m channel	**2148544**
1x MQA-M 8 saddle nut	**369629**

4 Toggle anchor

1x MF-SKD M8/100 togg. an.	**230604**
2x M8 nut	**216465**
1x M8x25 hex. coupler	**216703**
1x AM8x1000…m thr. rod	**339793**

3 V-Hanger with welded hex-nut through-bolted V

1x MF-TSH M8 V-hanger	**229006**
1x M8 nut	**216465**
1x AM8x1000 fixed t-rod	**339793**
Through-bolt version 1-t-rod	
1x AM8x1000 fixed t-rod	**339793**
4x M8 nut	**216465**
Through-bolt ver. 2-long h-head screw	
1x M8x120 4.8 hex. head sc.	**2063165**
2x M8 nut	**216465**

2 V-Hanger with integrated hex nut

1x MVA-MS M8 V-hanger	**386558**
3x M8 nut	**216465**
1x AM8x1000 threaded rod	**339793**
Through- self-tapping screws	
6x S-MS 01Z 4.0x13 S-screw	**406471**
Through-bolt version 1-t-rod	
1x AM8x1000 fixed t-rod	**339793**
4x M8 nut	**216465**
Through-bolt ver. 2-long h-head screw	
1x M8x120 4.8	**2063165**
2x M8 nut	**216465**

1 V-Hanger with integrated sound insulation element

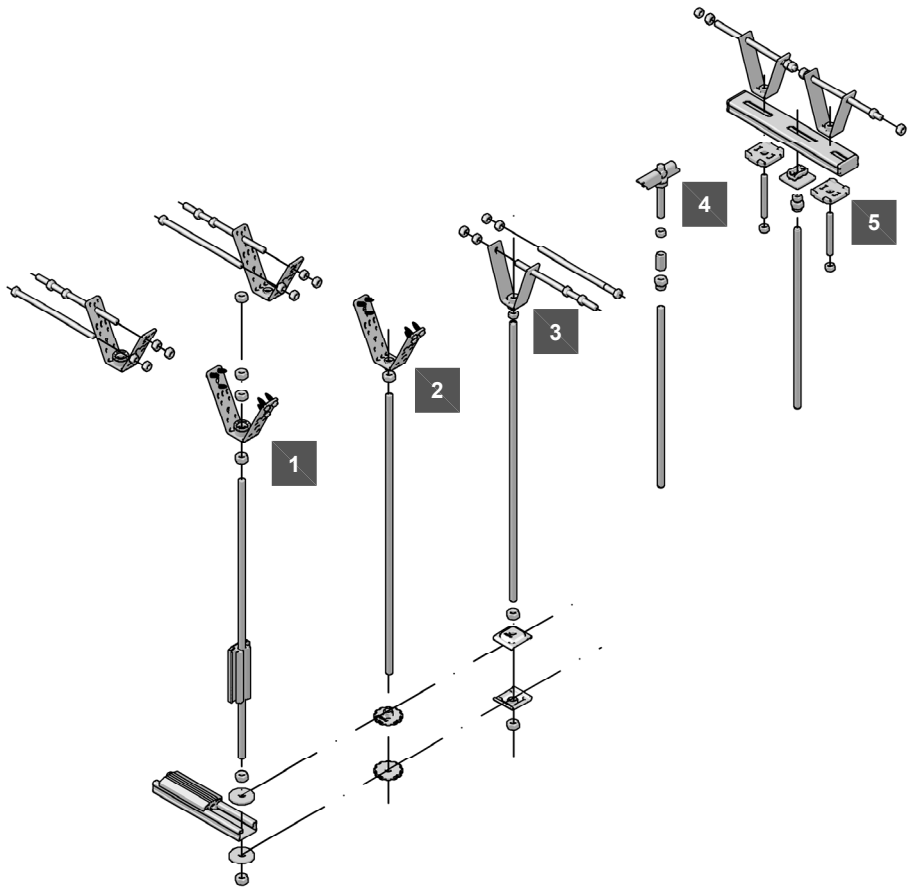
1x MVA-MS V-hanger	**386545**
3x M8 nut	**216465**
1x AM8x1000 threaded rod	**339793**
Through self-tapping screws	
6x S-MS 01Z 4.0x13 S-screw	**406471**
Through-bolt version 1-t-rod	
1x AM8x1000 fixed t-rod	**339793**
4x M8 nut	**216465**
Through-bolt ver. 2-long h-head screw	
1x M8x120 4.8	**2063165**
2x M8 nut	**216465**

Application description	Application	Product lines	Base material
Ventilation - Trapeze On PMS	1	Base material	PMS
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Trapeze On PMS - MQ System - Options M10

M10 option

Threaded rods	
M10	
AM10x1000 4.8 zinced	**339795**
AM10x2000 4.8 zinced	**339796**
AM10x3000 4.8 zinced	**216418**



5 2xV-hangers fixed channel and dropped t-rod

2x	**MF-TSH M10 V-hanger**	**229007**
11x	**M10 nut**	**216466**
5x	**AM10x1000…m thr. rod**	**339793**
2x	**MQZ-L11 sq. washer**	**369679**
1x	**MQ-21 3m channel**	**2148544**
1x	**MQA-M8 saddle nut**	**369630**

4 Toggle anchor

1x	**MF-SKD M10/100 togg. a.**	**230608**
2x	**M10 nut**	**216466**
1x	**M10x30 hex. coupler**	**216704**
1x	**AM10x1000 fixed t-rod**	**339795**

3 V-Hanger with welded hex-nut through-bolted V

1x	**MF-TSH M10 V-hanger**	**229007**
1x	**M10 nut**	**216466**
1x	**AM10x1000 fixed t-rod**	**339795**
Through-bolt version 1-t-rod		
1x	**AM8x1000 fixed t-rod**	**339794**
4x	**M8 nut**	**216465**
Through-bolt ver. 2-long h-head screw		
1x	**M8x120 4.8 hex. head sc.**	**2063165**
2x	**M8 nut**	**216465**

2 V-Hanger with integrated hex nut

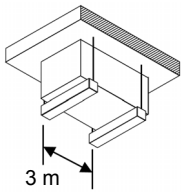
1x	**MVA-MS M10 V-hanger**	**386559**
3x	**M10 nut**	**216466**
1x	**AM10x1000 threaded rod**	**339795**
Through- self-tapping screws		
6x	**S-MS 01Z 4.0x13 S-screw**	**406471**
Through-bolt version 1-t-rod		
1x	**AM8x1000 fixed t-rod**	**339793**
4x	**M8 nut**	**216465**
Through-bolt ver. 2-long h-head screw		
1x	**M8x120 4.8**	**2063165**
2x	**M8 nut**	**216465**

1 V-Hanger with integrated sound insulation element

1x	**MVA-MS V-hanger**	**386545**
3x	**M10 nut**	**216466**
1x	**AM10x1000 threaded rod**	**339795**
Through self-tapping screws		
6x	**S-MS 01Z 4.0x13 S-screw**	**406471**
Through-bolt version 1-t-rod		
1x	**AM8x1000 fixed t-rod**	**339794**
4x	**M8 nut**	**216465**
Through-bolt ver. 2-long h-head screw		
1x	**M8x120 4.8**	**2063165**
2x	**M8 nut**	**216465**

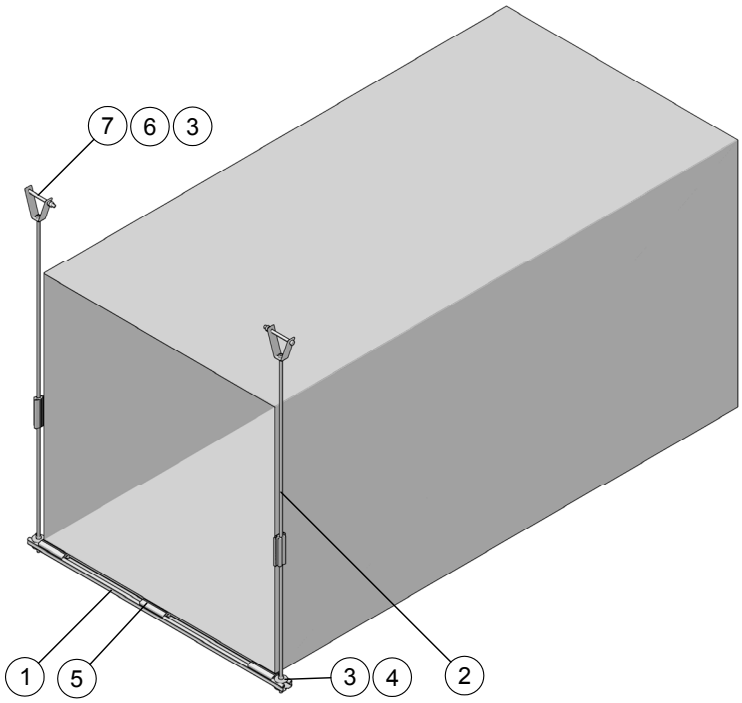
Application description	Application	Product lines	Base material
Ventilation - Trapeze On PMS	1	Base material	PMS
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Ventilation Applications - Trapeze On Rods - Basic - Light



Type V-G-TR-6-B-L-GL

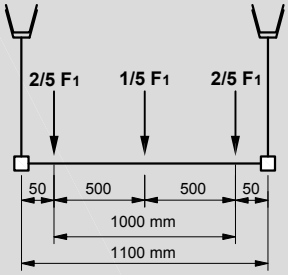
- Limited to air duct size of 1000 x 1000 mm
- Made of 1.0mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



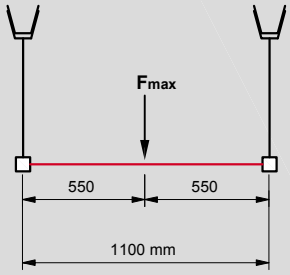
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.17 kN rec. loads



F_{max} = 0.49 kN rec. loads
The spot loading capacity of **PMS** (**P**rofiled **M**etal **S**heet) should be checked in addition



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2148544**	**MQ-21 3m channel**	-	1.1m
2	**339794**	**AM8 x 2000 4.8 threaded rod**	-	2.4m = 2x 1.2m
3	**282856**	**A 8.4/40 washer**	4	
4	**216465**	**M8 nut**	8	
5	**2047317**	**MQZ-RI 10 cm rubber inlay**	5	
6	**2063165**	**M8x120 4.8 hex. Head screw**	2	
7	**229006**	**MF-TSH M8 V-hanger**	2	

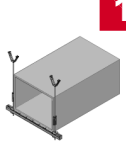
Application description

Ventilation - Trapeze On Rods - Basic - light

General comments

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

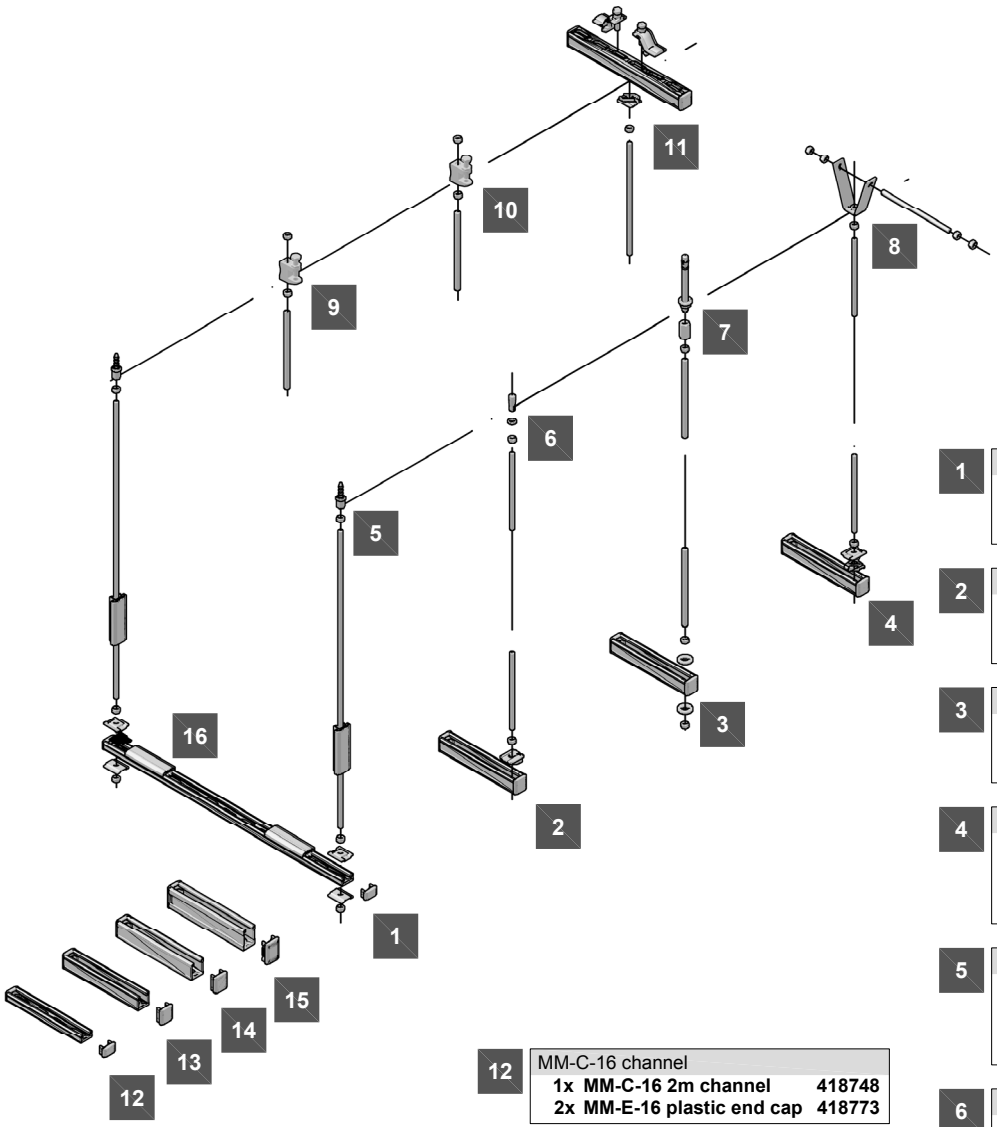
Application



1

Base material	PMS
Product line	MQ System
Capacity limit	A.D.1000x1000mm

Trapeze On Concrete, Steel, PMS - MM System - Options



1 M8 threaded rod connection to channel

2x	MM-CW-8 square washer	418769
2x	M8 nut	216465
1x	M8x1000 …m t-rod	339793

2 M8 threaded rod connection to channel

1x	MM-S M8 saddle nut	418760
1x	M8 nut	216465
1x	AM8x1000 …m t-rod	339793

3 M8 threaded rod connection to channel

2x	A8,4/28 washer	282861
2x	M8 nut	216465
1x	AM8x1000 …m t-rod	339793

4 M8 threaded rod connection to channel

1x	MM-CW 8 square washer	418769
1x	MM-WN M8 wing nut	418765
1x	M8 nut	216465
1x	AM8x1000 …m t-rod	339793

5 M8 threaded rod connection to channel

1x	MM-CW-8 square washer	418769
1x	MM-WN M8 wing nut	418765
1x	M8 nut	216465
1x	AM8x1000 …m t-rod	339793

6 M8 threaded rod connection to concrete

1x	drop in anchor	
	HKD M8x25 anchor	376957
	HKD M8x30 anchor	376959
	HKD M8x40 anchor	376961
1x	A 8,4/16 washer	282850
1x	M8 nut	216465

7 M8 threaded rod connection to concrete

1x	stud anchor and coupler	
	HST3 M8x95 -/30 anchor	2105889
1x	M8x25 hex. coupler	216703
1x	M8 nut	216465

8 M8 threaded rod connection to concrete

1x	MF-TSH M8 V-hanger	386545
1x	M8 nut	216465
1x	AM8x1000 fixed t-rod	339793
Through-bolt version 1-t-rod		
1x	AM8x1000 fixed t-rod	339793
4x	M8 nut	216465

9 Connecting M8 threaded rods to structural steel with unthreaded beam clamp

1x	MAB-9 beam clamp	375956
2x	M8 nut	216465

10 Connecting M8 threaded rods to structural steel with threaded beam clamp

1x	MAB-M8 beam clamp	2006878
1x	M8 nut	216465

11 Centric connection to steel profile

2x	MM-T-16-36 beam clamp	418763
1x	MM-C-30 2m channel	418749
1x	MM-S M8 saddle nut	418760
1x	M8 nut	216465

12 MM-C-16 channel

1x	MM-C-16 2m channel	418748
2x	MM-E-16 plastic end cap	418773

13 MM-C-30 channel

1x	MM-C-30 2m channel	418749
	MM-C-30 3m M10 channel	418776
2x	MM-E-30 plastic end cap	418774

14 MM-C-36 channel

1x	MM-C-36 2m channel	418750
	MM-C-36 3m M10 channel	418751
2x	MM-E-36 plastic end cap	418775

15 MM-C-45 channel

1x	MM-C-45 3m channel	2048104
	MM-C-45 6m channel	2048105
2x	MM-E-45 plastic end cap	2048095

16 MM system sound insulation channel inlay

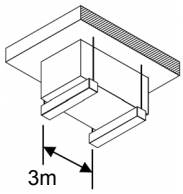
	MM-RI 10 cm ins. inlay	418768
	MM-RI 20 m ins. inlay	418767

Application description	Application	Product lines	Base material
Ventilation - Trapeze On Concrete, Steel, PMS - MM System	1	Base material	Concrete
		Threaded parts	Steel
		Anchors, Clamps	PMS

General comments

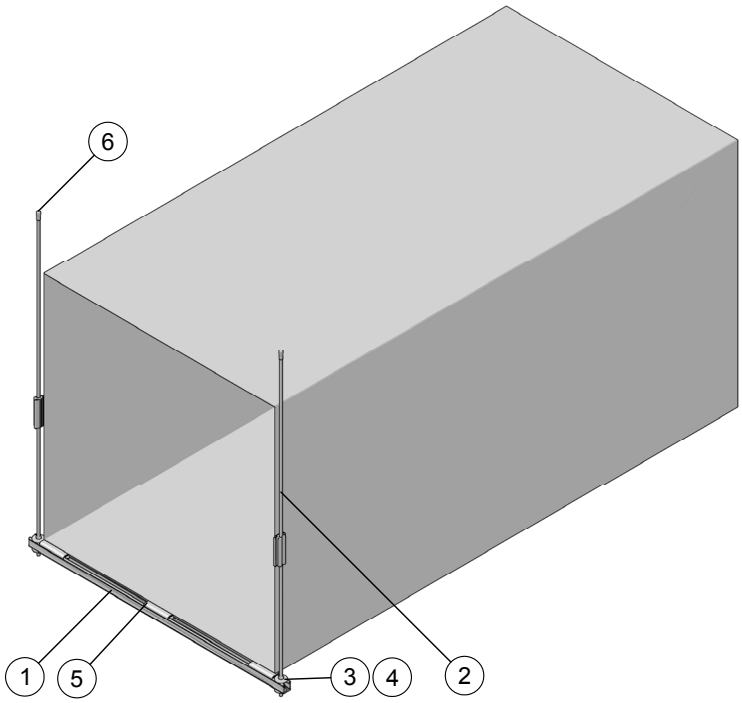
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Trapeze On Rods - Basic - Light



Type V-G-TR-52-B-L-GL

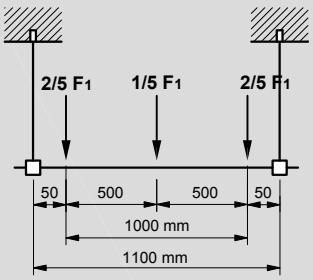
- Limited to air duct size of 1000 x 1000 mm
- Made of 1.0mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



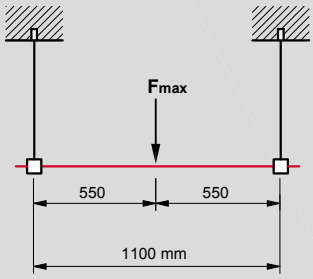
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.17 kN rec. loads



F_{max} = 0.46 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**418749**	**MM-C-30 2m channel**	-	1.1m
2	**339794**	**AM8 x 2000 4.8 threaded rod**	-	2.4m = 2x 1.2m
3	**282856**	**A 8.4/40 washer**	4	
4	**216465**	**M8 nut**	8	
5	**418768**	**MM-RI 10cm rubber inlay**	5	
6	**376959**	**HKD M8x30 anchor**	2	

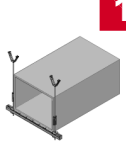
Application description

Ventilation - Trapeze On Rods - Basic - Light

General comments

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

Application



1

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.1000x1000mm

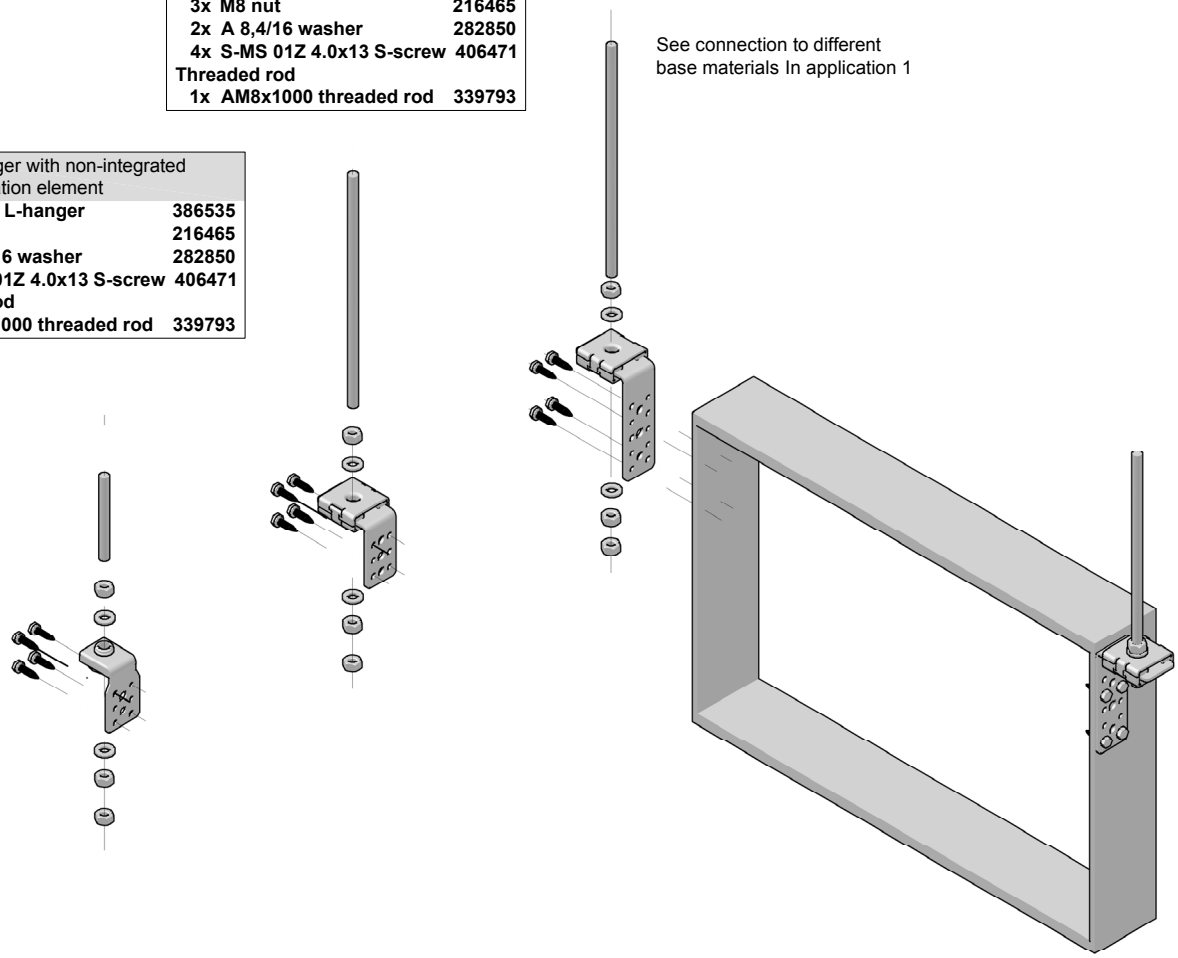
Ventilation - L-Hangers - M8 Options

Long L-hanger with integrated sound insulation element	
1x MVA-LP 100 L-hanger	**411501**
3x M8 nut	**216465**
2x A 8,4/16 washer	**282850**
4x S-MS 01Z 4.0x13 S-screw	**406471**
Threaded rod	
1x AM8x1000 threaded rod	**339793**

Short L-hanger with integrated sound insulation element	
1x MVA-LP 60 L-hanger	**411500**
3x M8 nut	**216465**
2x A 8,4/16 washer	**282850**
4x S-MS 01Z 4.0x13 S-screw	**406471**
Threaded rod	
1x AM8x1000 threaded rod	**339793**

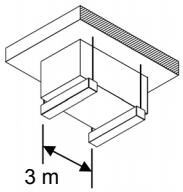
Short L-hanger with non-integrated sound insulation element	
1x MVA-L L-hanger	**386535**
3x M8 nut	**216465**
2x A 8,4/16 washer	**282850**
4x S-MS 01Z 4.0x13 S-screw	**406471**
Threaded rod	
1x AM8x1000 threaded rod	**339793**

See connection to different base materials In application 1



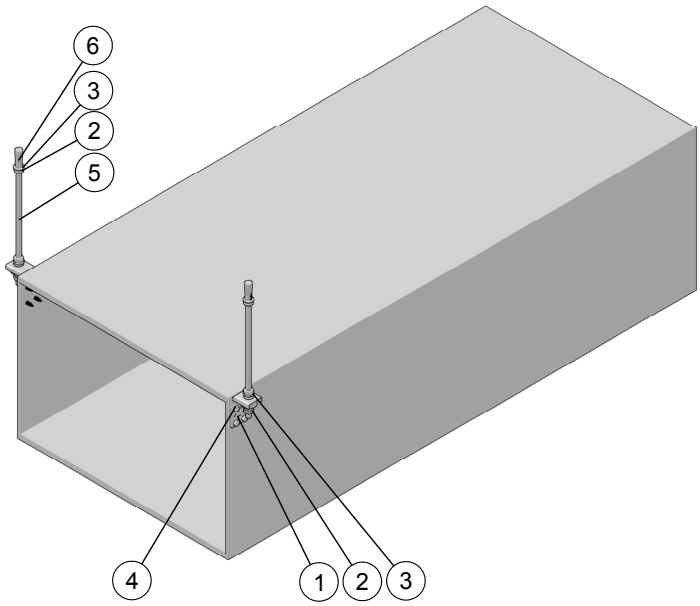
Application description	Application	Product lines	Base material
Ventilation - L-Hangers	2	Base material	Concrete
General comments		Threaded parts	Steel
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	PMS

Ventilation Applications - L-Hangers - Basic - Light



Type V-G-LH-1-B-L-GL

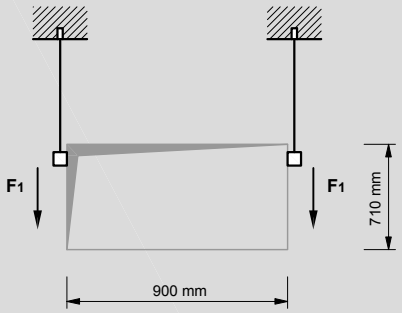
- Limited to square duct 710 x 900 mm
- Made of 1.0mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated



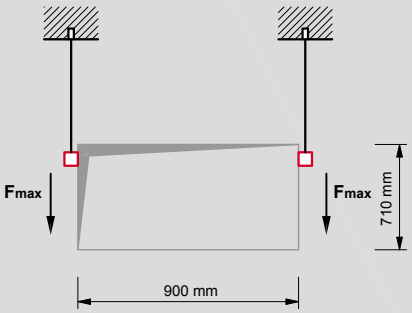
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.47 kN rec. loads



Maximal limit
F_{max} = 0.5 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386535**	**MVA-L L-hanger**	2	
2	**216465**	**M8 nut**	8	
3	**282850**	**A 8,4/16 washer**	6	
4	**406471**	**S-MS 01Z 4.0x13 S-screw**	8	
5	**339793**	**AM8x1000 threaded rod**	-	2 x 0.5m
6	**376959**	**HKD M8x30 anchor**	2	

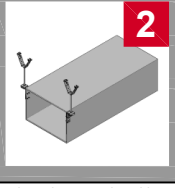
Application description

Ventilation - L-Hangers - Basic - Light

General comments

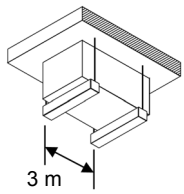
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application



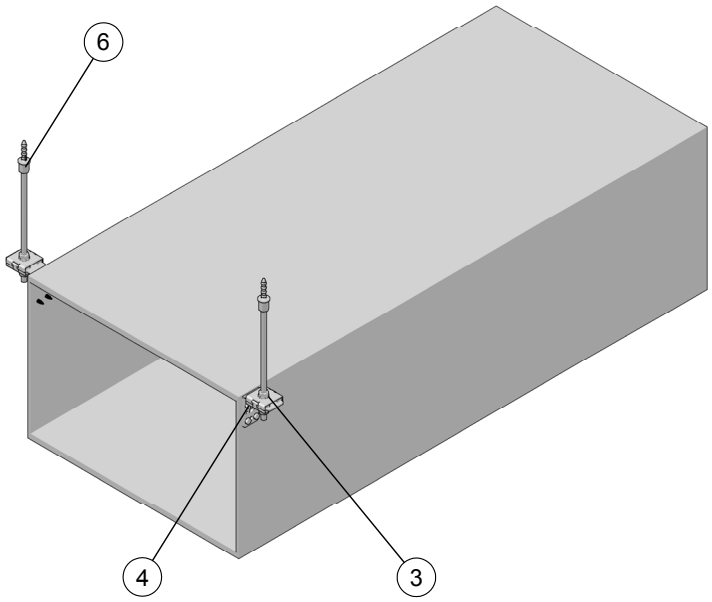
Base material	Concrete
Product line	L-Hangers
Capacity limit	0.5 kN

Ventilation Applications - L-Hangers - Comfort - Light



Type V-G-LH-2-C-L-GL

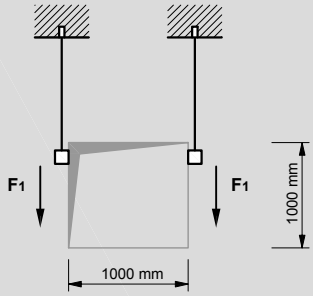
- Limited to square duct 1000 x 1000 mm
- Made of 1.0 mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated



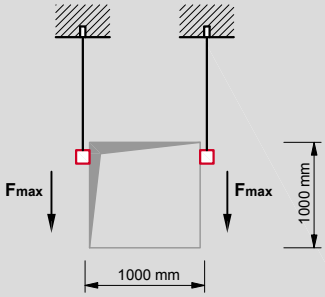
Additional loading capacity limits

This particular case with spacing 3m:

F_1 = 0.59 kN rec. loads



Maximal limit
F_{max} = 0.8 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**411500**	**MVA-LP 60 L-hanger**	2	
2	**216465**	**M8 nut**	6	
3	**282850**	**A 8,4/16 washer**	6	
4	**406471**	**S-MS 01Z 4.0x13 S-screw**	8	
5	**339793**	**AM8x1000 threaded rod**	-	1m = 2 x 0.5m
6	**416740**	**HUS-I 6x35 M8/M10 screw anchor**	2	

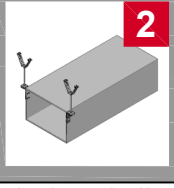
Application description

Ventilation - L-Hangers - Comfort - Light

General comments

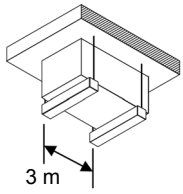
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application



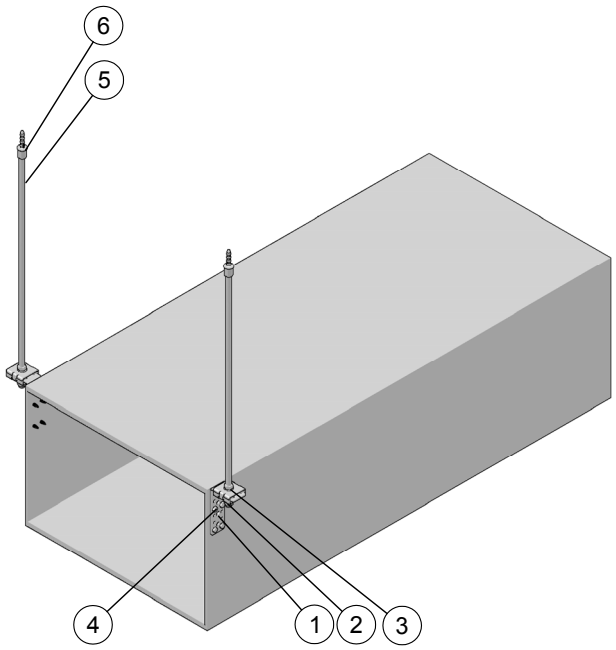
Base material	Concrete
Product line	L-Hangers
Capacity limit	0.8 kN

Ventilation Applications - L-Hangers - Comfort - Light



Type V-G-LH-3-C-L-GL

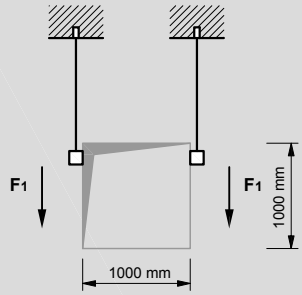
- Limited to square duct 1000 x 1000 mm
- Made of 1.0 mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated



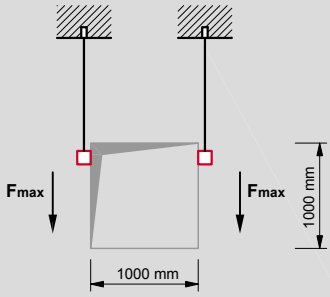
Additional loading capacity limits

This particular case with spacing 3m:

F_1 = 0.59 kN rec. loads



Maximal limit
F_{max} = 0.8 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**411501**	**MVA-LP 100 L-hanger**	2	
2	**216466**	**M10 nut**	6	
3	**282851**	**A 10.5/20 washer**	6	
4	**406471**	**S-MS 01Z 4.0x13 S-screw**	8	
5	**339795**	**AM10x1000 threaded rod**	-	2 x 0.5m
6	**416740**	**HUS-I 6x35 M8/M10 screw anchor**	2	

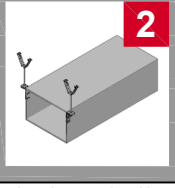
Application description

Ventilation - L-Hangers - Comfort - Light

General comments

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

Application



Base material	Concrete
Product line	L-Hangers
Capacity limit	0.8 kN

Ventilation - L-Hangers Connection to Concrete, PMS and Steel – M8 Options

1 V-Hanger with integrated sound insulation element through-bolted V

1x MVA-MS V-hanger	386545
3x M8 nut	216465
1x AM8x1000 fixed t-rod	339793
Through-bolt version 1-t-rod	
1x AM8x1000 fixed t-rod	339793
4x M8 nut	216465
Through-bolt ver. 2-long h-head screw	
1x M8x120 4.8	2063165
2x M8 nut	216465

2 V-Hanger with integrated hex nut through-bolted V

1x MVA-MS M8 V-hanger	386558
1x M8 nut	216465
1x AM8x1000 fixed th. rod	339793
Through-bolt version 1-t-rod	
1x AM8x1000 fixed t-rod	339793
4x M8 nut	216465
Through-bolt ver.2-long h-head screw	
1x M8x120 4.8	2063165
2x M8 nut	216465

3 V-Hanger with integrated sound insulation element fixed with self-tapping screws

1x MVA-MS V-hanger	386545
3x M8 nut	216465
1x AM8x1000 threaded rod	339793
6x S-MS 01Z 4.0x13 S-screw	406471

4 V-Hanger with integrated hex nut fixed with self-tapping screws

1x MVA-MS M8 V-hanger	386558
1x M8 nut	216465
1x AM8x1000 threaded rod	339793
6x S-MS 01Z 4.0x13 S-screw	406471

5 V-Hanger with welded hex-nut through-bolted V

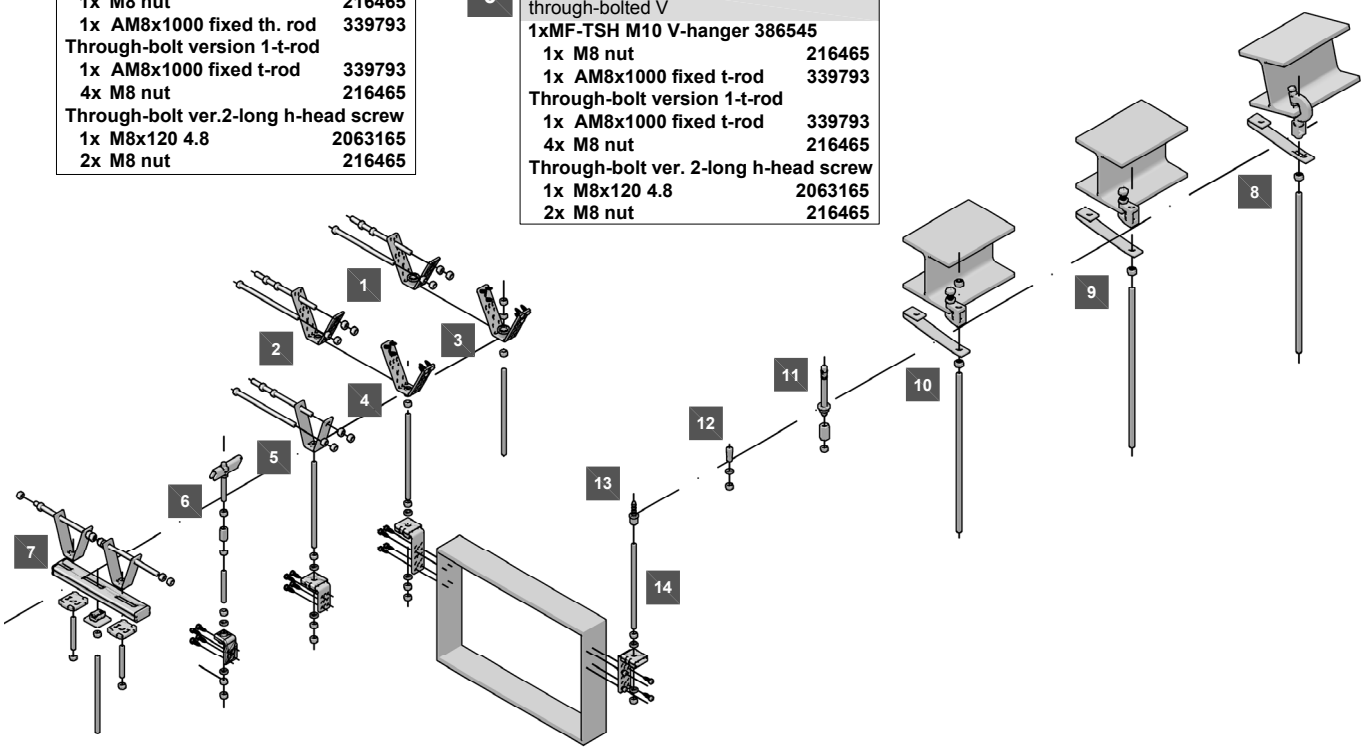
1xMF-TSH M10 V-hanger	386545
1x M8 nut	216465
1x AM8x1000 fixed t-rod	339793
Through-bolt version 1-t-rod	
1x AM8x1000 fixed t-rod	339793
4x M8 nut	216465
Through-bolt ver. 2-long h-head screw	
1x M8x120 4.8	2063165
2x M8 nut	216465

6 Toggle anchor

1x MF-SKD M8/100 togg. an.	230604
2x M8 nut	216465
1x M8x25 hex. coupler	216703

7 2x V-hangers fixed channel and dropped t-rod

2x MF-TSH M8 V-hanger	2290061
1x M8 nut	216465
5x AM8x1000…m thr. rod	339793
2x MQZ-L9 sq. washer	369678
1x MQ-21 3m channel	2148544
1x MQA-M8 saddle nut	369629



8 Swivel M8 beam clamp

1x MQT-G M8 clamp	284238
1x M8 nut	216465
Alternative with securing strap	
1x MQT-S secur. strap	284863

9 Threaded M8 beam clamp

1x MAB-M8 clamp	2006878
1x M8 nut	216465
Alternative with securing strap	
1x MAB-S 11/13 secur. strap	374409

10 Unthreaded M8 beam clamp

1x MAB-9 clamp	375956
2x M8 nut	216465
Alternative with securing strap	
1x MAB-S 11/13 secur. strap	374409

11 M8 stud anchor

1x HST3 M8x75 -/10	2105888
HST2 M8x75/10	2108161
1x M8x25 coupler	216703
1x M8 nut	216465

12 M8 drop in anchor

1x HKD M8x30 anchor	376959
1x A 8,4/16 washer	282850
1x M8 nut	216465

13 M8 screw anchor

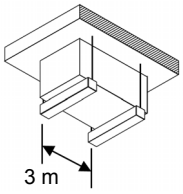
1x HUS-I 6x35 M8/M10	416740
1x M8 nut	216465

14 Threaded rods

M8	
AM8x1000 4.8 zinced	339793
AM8x2000 4.8 zinced	339794
AM8x3000 4.8 zinced	216415

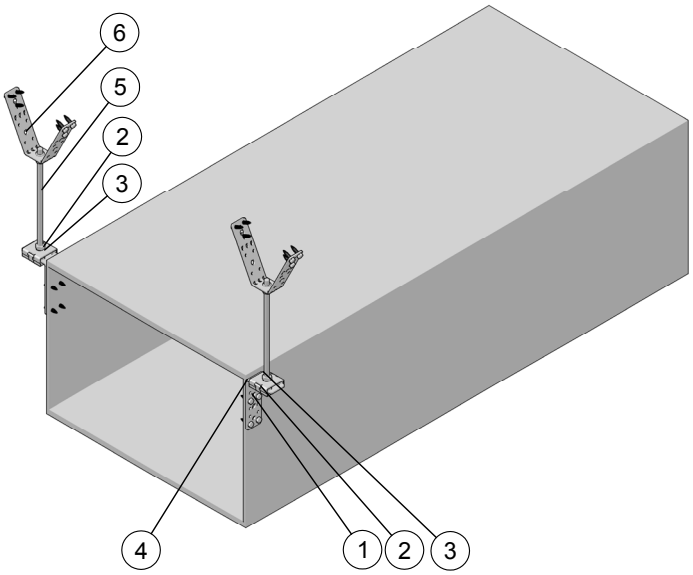
Application description	Application	Product lines	Base material
Ventilation - L-Hangers	2	Base material	Concrete
General comments		Threaded parts	Steel
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	PMS

Ventilation Applications - L-Hangers - Comfort - Light



Type V-G-LH-4-C-L-GL

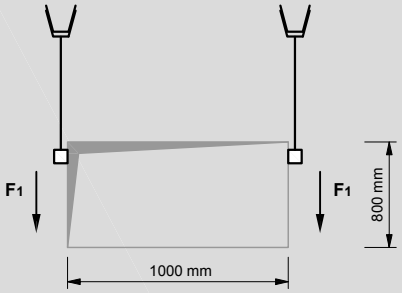
- Limited to square duct 1000 x 800 mm
- Made of 1.0 mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated



Additional loading capacity limits

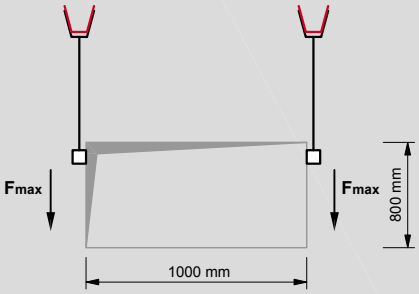
This particular case with spacing 3m:

F_1 = 0.53 kN rec. loads



Maximal limit

F_{max} = approx. 0.6 kN rec. loads assuming the average spot loading capacity of PMS is 0.6 kN



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**4110501**	**MVA-LP 100 L-hanger**	2	
2	**216466**	**M10 nut**	8	
3	**282851**	**A 10.5/20 washer**	4	
4	**406471**	**S-MS 01Z 4.0x13 S-screw**	20	
5	**339795**	**AM10x1000 threaded rod**	-	2 x 0.5m
6	**386559**	**MVA-MS M10 V-hanger**	2	

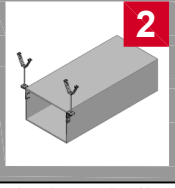
Application description

Ventilation - L-Hangers - Comfort - Light

General comments

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

Application



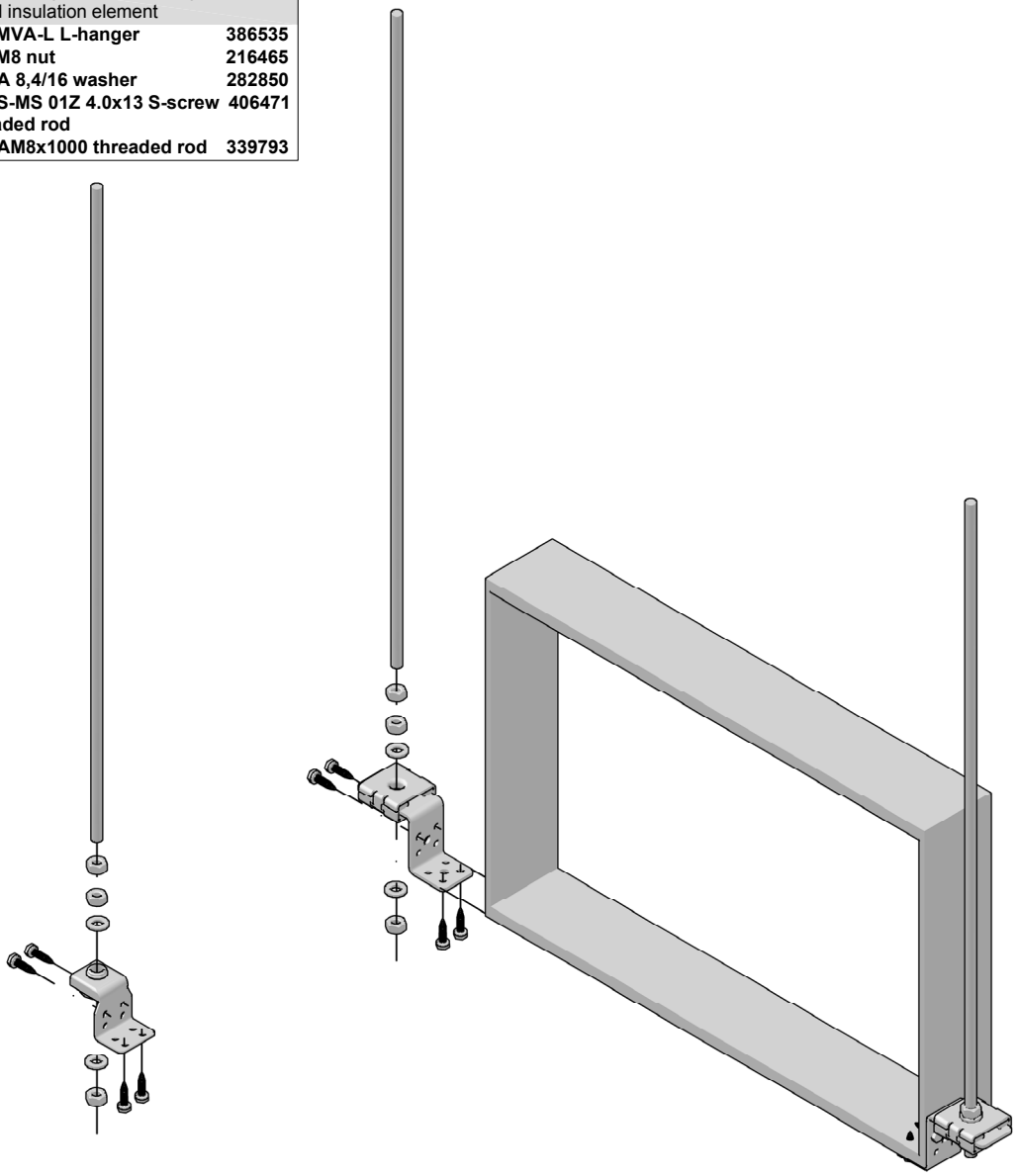
Base material	PMS
Product line	L-Hangers
Capacity limit	0.6 kN

Ventilation - Z-Hangers - M8 Options

Short L-hanger with integrated sound insulation element	
1x MVA-LP 60 L-hanger	411500
3x M8 nut	216465
2x A 8,4/16 washer	282850
4x S-MS 01Z 4.0x13 S-screw	406471
Threaded rod	
1x AM8x1000 threaded rod	339793

See connection to different base materials In application 1

Short L-hanger with non-integrated sound insulation element	
1x MVA-L L-hanger	386535
3x M8 nut	216465
2x A 8,4/16 washer	282850
4x S-MS 01Z 4.0x13 S-screw	406471
Threaded rod	
1x AM8x1000 threaded rod	339793

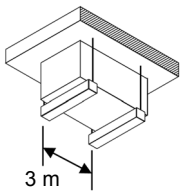


Application description	Application	Product lines	Base material
Ventilation - Z-Hangers	3	Base material	Concrete
		Threaded parts	Steel
		Anchors, Clamps	PMS

General comments

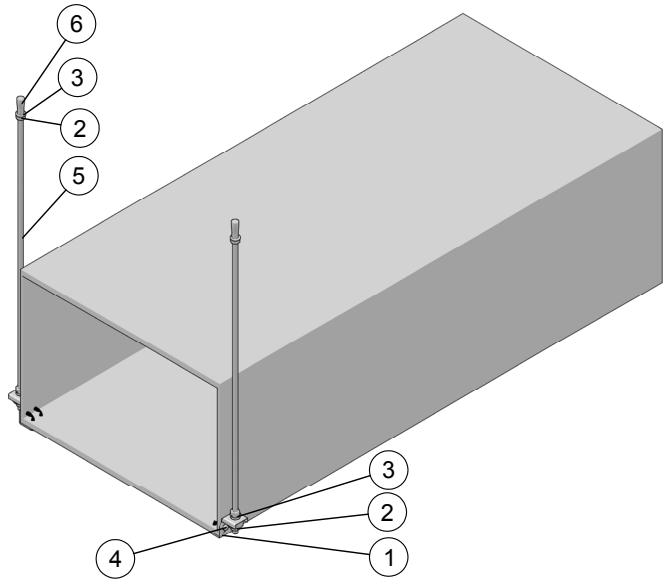
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Z-Hangers - Basic - Light



Type V-G-ZH-1-B-L-GL

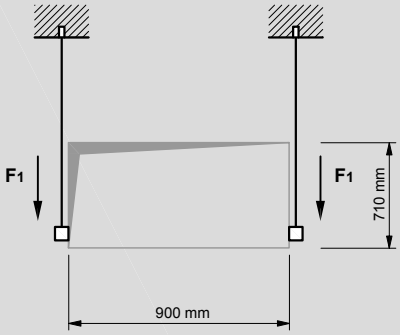
- Limited to square duct 900 x 710 mm
- Made of 1.0 mm thick metal sheet
- Spacing - support distance 3 m
- Non-insulated



Additional loading capacity limits

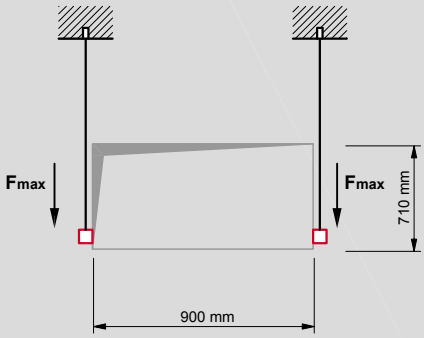
This particular case with spacing 3m:

F_1 = 0.47 kN rec. loads



Maximal limit

F_{max} = 0.50 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386532**	**MVA-Z Z-hanger**	2	
2	**216465**	**M8 nut**	8	
3	**282850**	**A 8,4/16 washer**	6	
4	**406471**	**S-MS 01Z 4.0x13 S-screw**	8	
5	**339793**	**AM8x1000 threaded rod**	2	2x0.5m
6	**376959**	**HKD M8x30 anchor**	2	

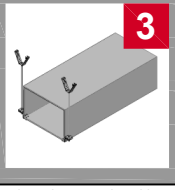
Application description

Ventilation - Z-Hangers - Basic - Light

General comments

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

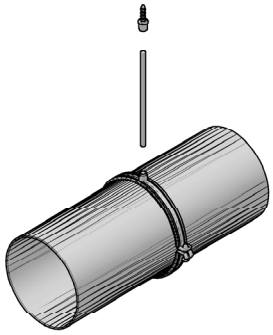
Application



Base material	Concrete
Product line	Z-Hangers
Capacity limit	0.5 kN

Ventilation - Single Fasteing Point - Piperings - Options M8, M10

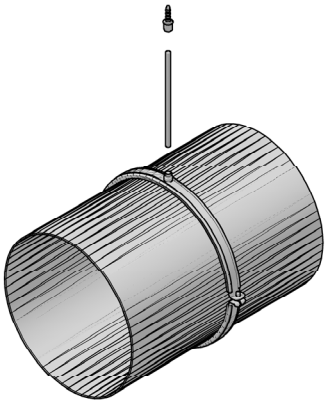
M8 option - For rounded ducts sizes 80 - 200mm



Threaded rods	
M8	
AM8x1000 4.8 zinced	**339793**
AM8x2000 4.8 zinced	**339794**
AM8x3000 4.8 zinced	**216415**

Ventilation pipe rings with M8 connection head	
MV-PI 80 M8	**386480**
MV-PI 100 M8	**386481**
MV-PI 125 M8	**386482**
MV-PI 140 M8	**386483**
MV-PI 150 M8	**386484**
MV-PI 160 M8	**386485**
MV-PI 180 M8	**386486**
MV-PI 200 M8	**386487**

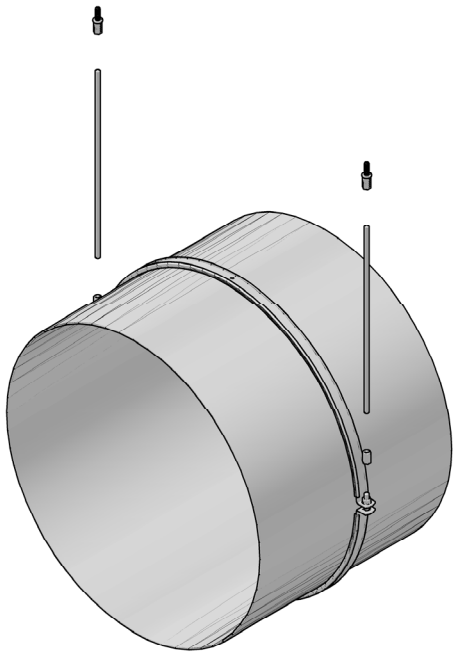
M8/M10 option - For rounded ducts sizes 200 - 630mm



Threaded rods	
M8	
AM8x1000 4.8 zinced	**339793**
AM8x2000 4.8 zinced	**339794**
AM8x3000 4.8 zinced	**216415**
M10	
AM10x1000 4.8 zinced	**339795**
AM10x2000 4.8 zinced	**339796**
AM10x3000 4.8 zinced	**216418**

Ventilation pipe rings with double connection head M8/M10	
MV-PI 224 M8/M10	**386488**
MV-PI 250 M8/M10	**386489**
MV-PI 280 M8/M10	**386490**
MV-PI 300 M8/M10	**386491**
MV-PI 315 M8/M10	**386492**
MV-PI 355 M8/M10	**386493**
MV-PI 400 M8/M10	**386494**
MV-PI 450 M8/M10	**386495**
MV-PI 500 M8/M10	**386496**
MV-PI 560 M8/M10	**386497**
MV-PI 600 M8/M10	**386498**
MV-PI 630 M8/M10	**386499**

M10 option - For rounded ducts sizes 710 - 1250mm

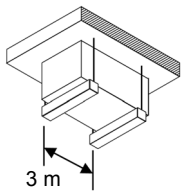


Threaded rods	
M10	
AM10x1000 4.8 zinced	**339795**
AM10x2000 4.8 zinced	**339796**
AM10x3000 4.8 zinced	**216418**

Ventilation pipe rings without connection head fixed by M10 through bolted ears of pipe ring	
MV-PI 710	**386500**
MV-PI 800	**386501**
MV-PI 900	**386502**
MV-PI 1000	**386503**
MV-PI 1120	**386504**
MV-PI 1250	**386505**

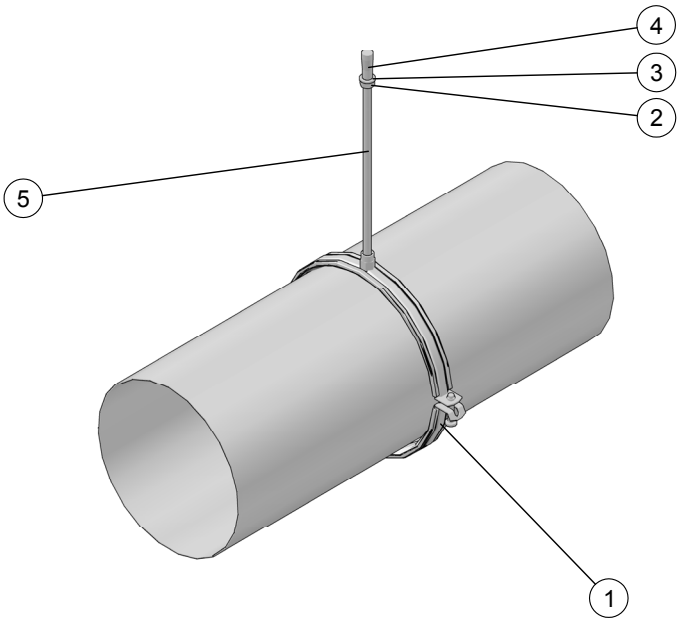
Application description	Application	Product lines	Base material
Ventilation - Pipe Rings	4	Ventilation piperings	Concrete
General comments		Threaded parts	Steel
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	PMS

Ventilation Applications - Single Fastening Point - Basic - Light



Type V-G-SFP-1-B-L-GL

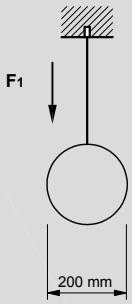
- Limited to square rounded duct DN 200mm O.D. (204.8 mm)
- Made of 0.6 mm thick metal sheet
- Spacing - support distance 3 m
- Non-insulated



Additional loading capacity limits

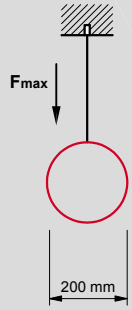
This particular case with spacing **3m:**

F_1 = 0.1 kN rec. loads



Maximal limit

F_{max} = 0.7 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2048125**	**MV-PI200 M8/M10 ventilation pipe ring**	1	
2	**216465**	**M8 nut**	1	
3	**282850**	**A 8,4/16 washer**	1	
4	**376959**	**HKD 8x30 anchor**	1	
5	**339793**	**AM 8x1000 4.8 theaded rod**	-	0.5m

Application description

Ventilation - Single Fastening Point - Basic - Light

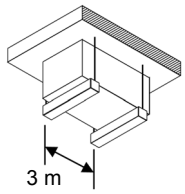
General comments

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

Application

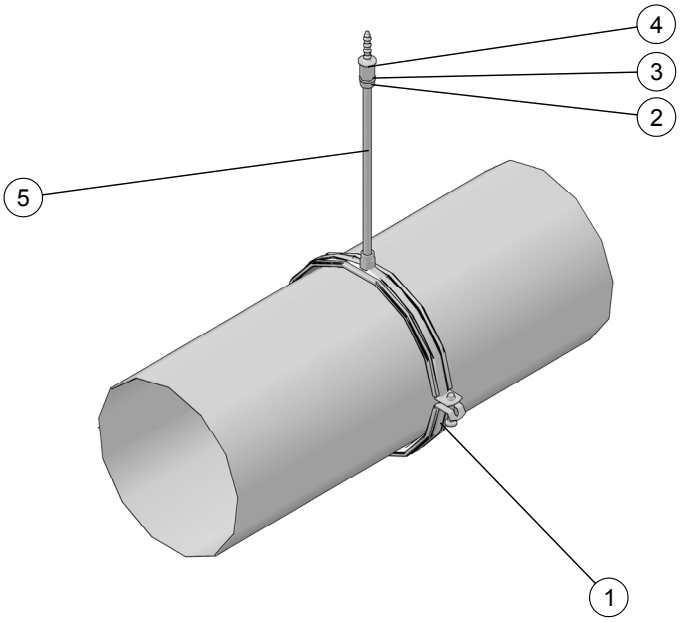
Base material	Concrete
Product line	Ventilation
Capacity limit	0.7 kN

Ventilation Applications - Single Fastening Point - Basic - Medium



Type V-G-SFP-2-B-M-GL

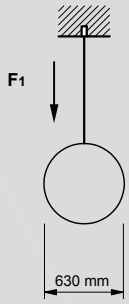
- Limited to rounded duct DN 630mm O.D. (638 mm)
- Made of 1.0 mm thick metal sheet
- Spacing - support distance 3 m
- Non-insulated



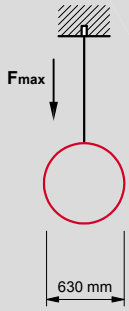
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.49 kN rec. loads



Maximal limit
F_{max} = 1.5 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386499**	**MV-PI 630 M8/M10**	1	
2	**216465**	**M8 nut**	1	
3	**282850**	**A 8,4/16 washer**	1	
4	**376959**	**HUS-I 6x35 M8/M10 anchor**	1	
5	**339793**	**AM 8x1000 4.8 theaded rod**	-	0.5m

Application description

Ventilation - Single Fastening Point - Basic - Medium

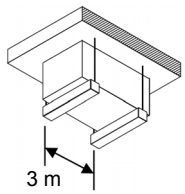
General comments

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

Application

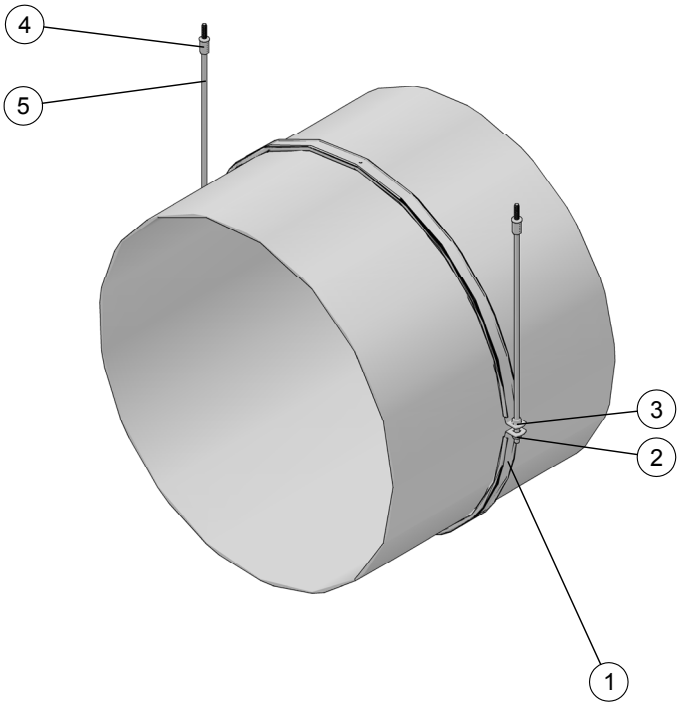
Base material	Concrete
Product line	Ventilation
Capacity limit	1.5 kN

Ventilation Applications - Single Fastening Point - Basic - Heavy



Type V-G-SFP-3-B-H-GL

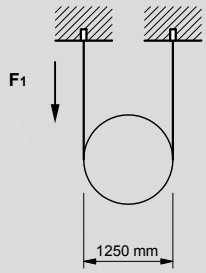
- Limited to rounded duct DN 1250 mm O.D. (1259.6 mm)
- Made of 1.2 mm thick metal sheet
- Spacing - support distance 3 m
- Non-insulated



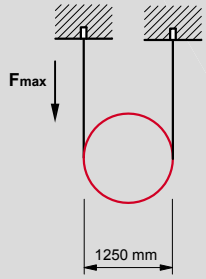
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 1.18 kN rec. loads



Maximal limit
F_{max} = 1.5 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386505**	**MV-PI 1250 ventilation pipe ring**	1	
2	**216466**	**M10 nut**	4	
3	**282851**	**A 10,5/16 washer**	4	
4	**423180**	**HUS-I 6x55 M8/M10 screw anchor**	2	
5	**339795**	**AM 10x1000 4.8 theaded rod**	-	0.8m

Application description

Ventilation - Single Fastening Point - Basic - Heavy

General comments

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

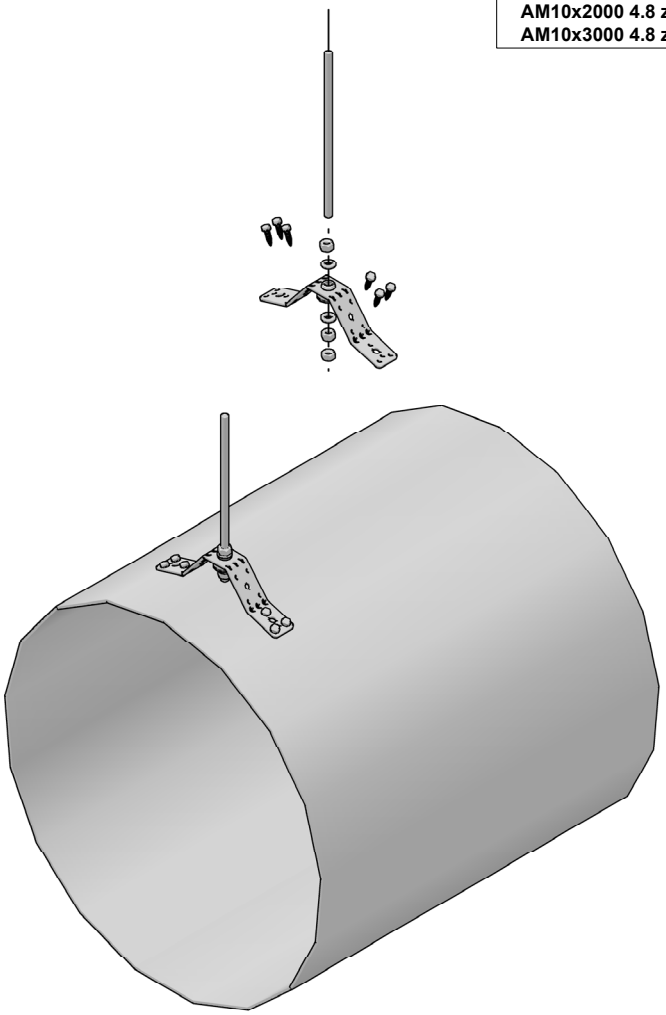
Application

Base material	Concrete
Product line	Ventilation
Capacity limit	1.5 kN

Ventilation - V-hangers - Options

M8/M10 option

See connection to different base materials In application 1

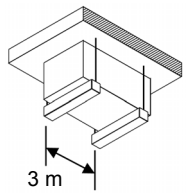


Threaded rods	
M8	
AM8x1000 4.8 zinced	**339793**
AM8x2000 4.8 zinced	**339794**
AM8x3000 4.8 zinced	**216415**
M10	
AM10x1000 4.8 zinced	**339795**
AM10x2000 4.8 zinced	**339796**
AM10x3000 4.8 zinced	**216418**

V-hanger with integrated sound insulation element - air duct connection	
1x MVA-S V-hanger	**386544**
3x M8 nut	**216465**
2x A 8,4/16 washer	**282850**
6x S-MS 01Z 4.0x13 S-screw	**406471**
Threaded rod	
1x AM8 threaded rod	**Various**

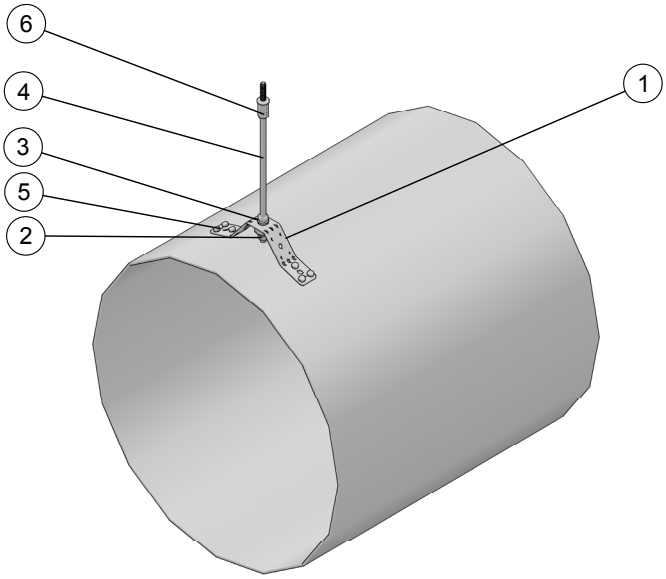
Application description	Application	Product lines	Base material
Ventilation - V-hangers	5	Ventilation piperings	Concrete, Steel, PMS
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors, Clamps	

Ventilation Applications - V - hangers - Basic - Light



Type V-G-VH-1-B-L-GL

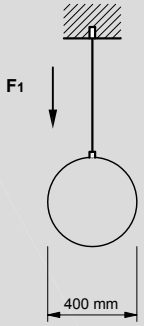
- Limited to rounded duct DN 400 mm O.D. (406.4 mm)
- Made of 0.8 mm thick metal sheet
- Spacing - support distance 3 m
- Non-insulated



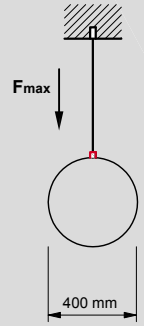
Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.25 kN rec. loads



Maximal limit
F_{max} = 0.6 kN rec. loads



The stated weights are approximate values. Note the specifications from the manufacturers.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386544**	**MVA-S V-hanger**	1	
2	**216465**	**M8 nut**	3	
3	**282850**	**A 8,4/16 washer**	2	
4	**339793**	**AM8x1000 threaded rod**	-	0.5m
5	**406471**	**S-MS 01Z 4.0x13 S-screw**	6	
6	**376959**	**HUS-I 6x35 M8/M10 screw anchor**	1	

Application description

Ventilation - V-hangers - Basic - Light

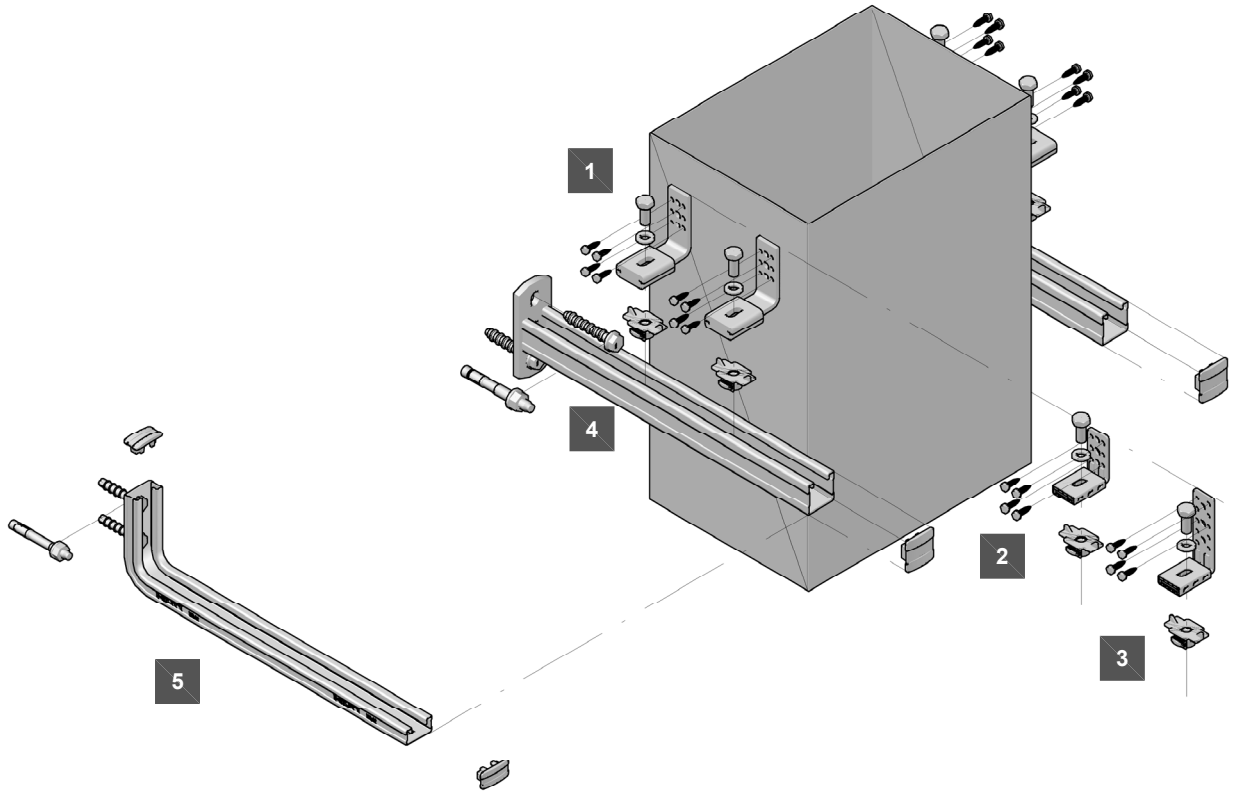
General comments

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

Application

Base material	Concrete
Product line	Ventilation
Capacity limit	0.6 kN

Ventilation - Rising Square Duct MQ Brackets - Options



1	Heavy duty adjustable MVA-LH angle BOM for one connection spot	
	1x MVA-LH angle	2047749
	4x S-MD01Z 4.2x16 screw	10405
	1x MQM-M10 wing nut	369626
	1x A 10.5/20 washer	282851
	1x M10x30 hex. head screw	47426

2	Comfort adjustable MVA-LC 60 angle BOM for one connection spot	
	1x MVA-LC 60 angle	386533
	4x S-MS 01Z 4.0x13 S-screw	406471
	1x MQM-M10 wing nut	369626
	1x M10x30 hex. head screw	47426

3	Comfort adjustable MVA-LC 100 angle BOM for one connection spot	
	1x MVA-LC 100 angle	386534
	4x S-MS 01Z 4.0x13 S-screw	406471
	1x MQM-M10 wing nut	369626
	1x A 10.5/20 washer	282851
	1x M10x30 hex. head screw	47426

4	MQ standard single bracket with anchor	
	1x MQ single bracket	
	MQK-21/300	369607
	MQK-21/450	369608
	MQK-41/300	369609
	MQK-41/450	369610
	MQK-41/600	369611
	MQK-41/1000	369612
	MQK-41/3/300	370595
	MQK-41/3/450	370596
	MQK-41/3/600	370597
	MQK-72/450	369615
	MQK-72/600	369616
	2x Anchor	
	HUS3-H 10x90 35/15/5	2079914
	or	
	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

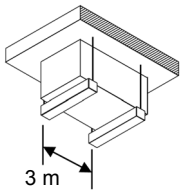
5	MQ light single bracket with anchor	
	1x MQ light single bracket	
	MQK-L-21/200	2141924
	MQK-L-21/300	2141925
	MQK-L-21/450	2141926
	2x MQZ-E21 plastic end cap	370598
	2x Anchor	
	HUS3-H 8x55 screw an.	2079794
	or	
	HST2 M10x90/10 stud an.	2107847

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ system brackets	Concrete
		Ventilation angles	Steel
		Anchors	PMS

General comments

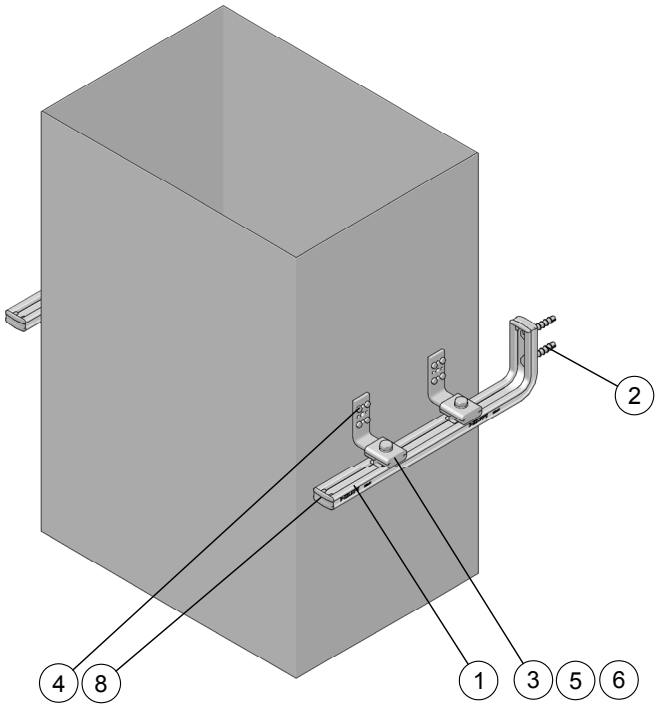
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Rising Square Duct Bracket - Basic - Light



Type V-G-RSDB-1-B-L-GL

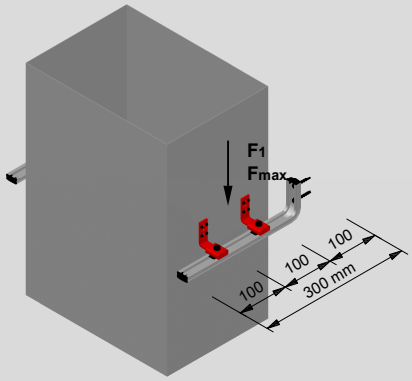
- Limited to square duct 280 x 280 mm
- Made of 0.75 mm thick metal sheet
- Spacing - support distance 3 m
- Insulated with 30mm aluminum laminated mineral wool



Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.07 kN rec. loads



Maximal limit
F_{max} = 0.27 kN rec. loads

The stated weights are approximate values. Note the specifications from the manufacturers.
Check the spot loading capacity of the air duct metal sheet to accomodate the loads.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2141925**	**MQK-L-21/300 bracket**	2	
2	**2079794**	**HUS3-H 8x55 screw anchor**	4	
3	**2047749**	**MVA-LH angle**	4	
4	**10405**	**S-MD01Z 4.2x16 screw**	16	
5	**369626**	**MQM-M10 wing nut**	4	
6	**282851**	**A 10,5/20 washer**	4	
7	**47426**	**M10x30 hexagon head screw**	4	
8	**370598**	**MQZ-E21 plastic end cap**	4	

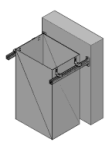
Application description

Ventilation - Rising Square Duct Bracket - Basic - Light

General comments

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

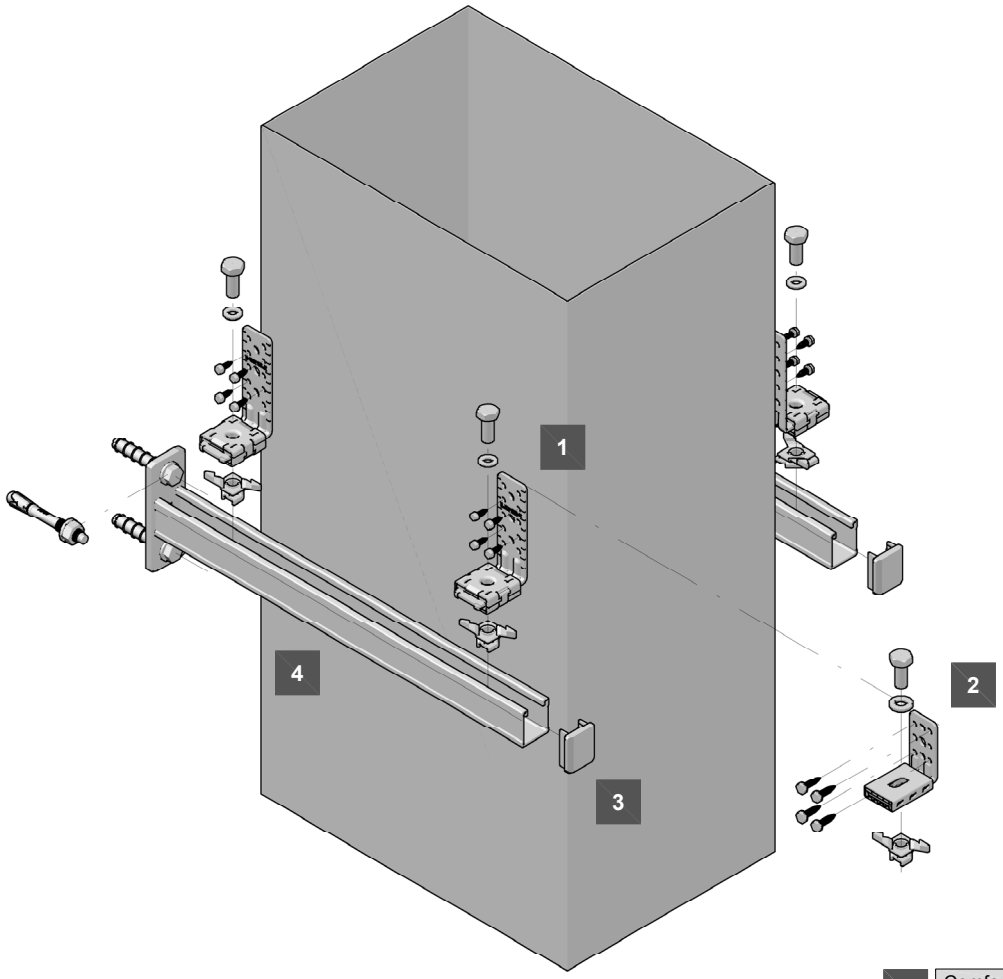
Application



6

Base material	Concrete
Product line	L-Hangers
Capacity limit	0.27 kN

Ventilation - Rising Square Duct MM Brackets - Options



1	Comfort adjustable MVA-LC 100 angle BOM for one connection spot	
	1x MVA-LC 100 angle	386534
	4x S-MS 01Z 4.0x13 S-screw	406471
	1x MM-WN M10 wing nut	418766
	1x A 10.5/20 washer	282851
	1x M10x30 hex. head screw	47426

2	Comfort adjustable MVA-LC 60 angle BOM for one connection spot	
	1x MVA-LC 60 angle	386533
	4x S-MS 01Z 4.0x13 S-screw	406471
	1x MM-WN M10 wing nut	418766
	1x A 10.5/20 washer	282851
	1x M10x30 hex. head screw	47426

4	MM bracket with anchor	
	1x MM bracket	
	MM-B-30/200	418752
	MM-B-30/300	418753
	MM-B-36/300	418754
	MM-B-36/450	418755
	MM-B-36/600	418756
	2x Anchor	
	HUS3-H 8x65 15/5/-	2079795
	or	
	HSA M10 5/-/-	2004127

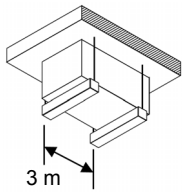
3	MM System plastic end cap	
	For MM-B-30 brackets	
	MM-E-30	418774
	For MM-B-36 brackets	
	MM-E-36	418775

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct MM Brackets	6	MM system brackets	Concrete
		Ventilation angles	
		Anchors	

General comments

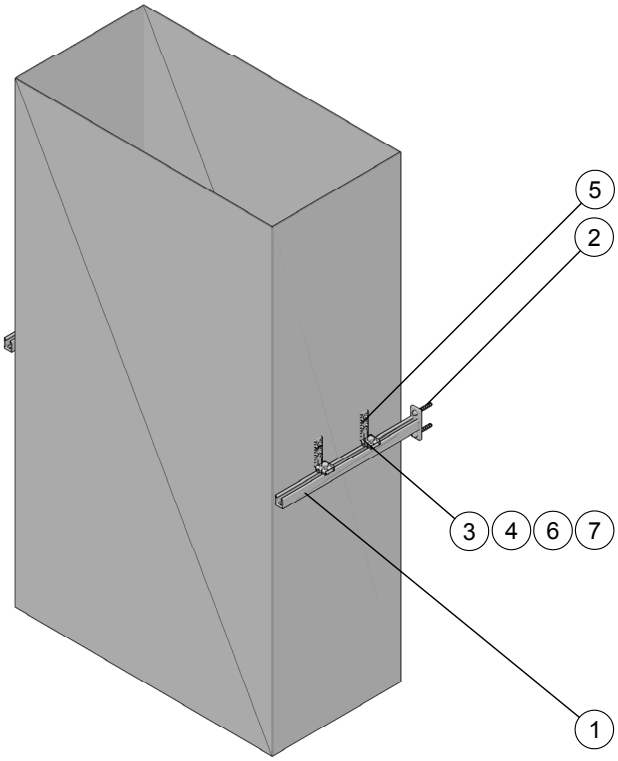
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Rising Square Duct Bracket - Basic - Light



Type V-G-RSDB-52-B-L-GL

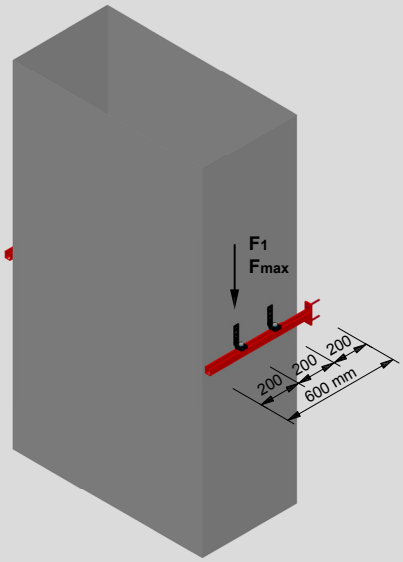
- Limited to air duct size 560 x 1120 mm
- Made of 1.0 mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.28 kN rec. loads



Maximal limit
F_{max} = 0.3 kN rec. loads

The stated weights are approximate values. Note the specifications from the manufacturers.
Check the spot loading capacity of the air duct metal sheet to accomodate the loads.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**418756**	**MM-B-36/600 bracket**	2	
2	**2079795**	**HUS3-H 8x65 15/5/- screw anchor**	6	
3	**418766**	**MM-WN M10 wing nut**	4	
4	**386534**	**MVA-LC 100 angle**	4	
5	**406471**	**S-MS 01Z 4.0x13 S-screw**	16	
6	**282850**	**A8.4/16 washer**	4	
7	**47426**	**M10x30 hexagon head screw**	4	

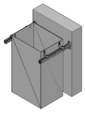
Application description

Ventilation - Rising Square Duct Bracket

General comments

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

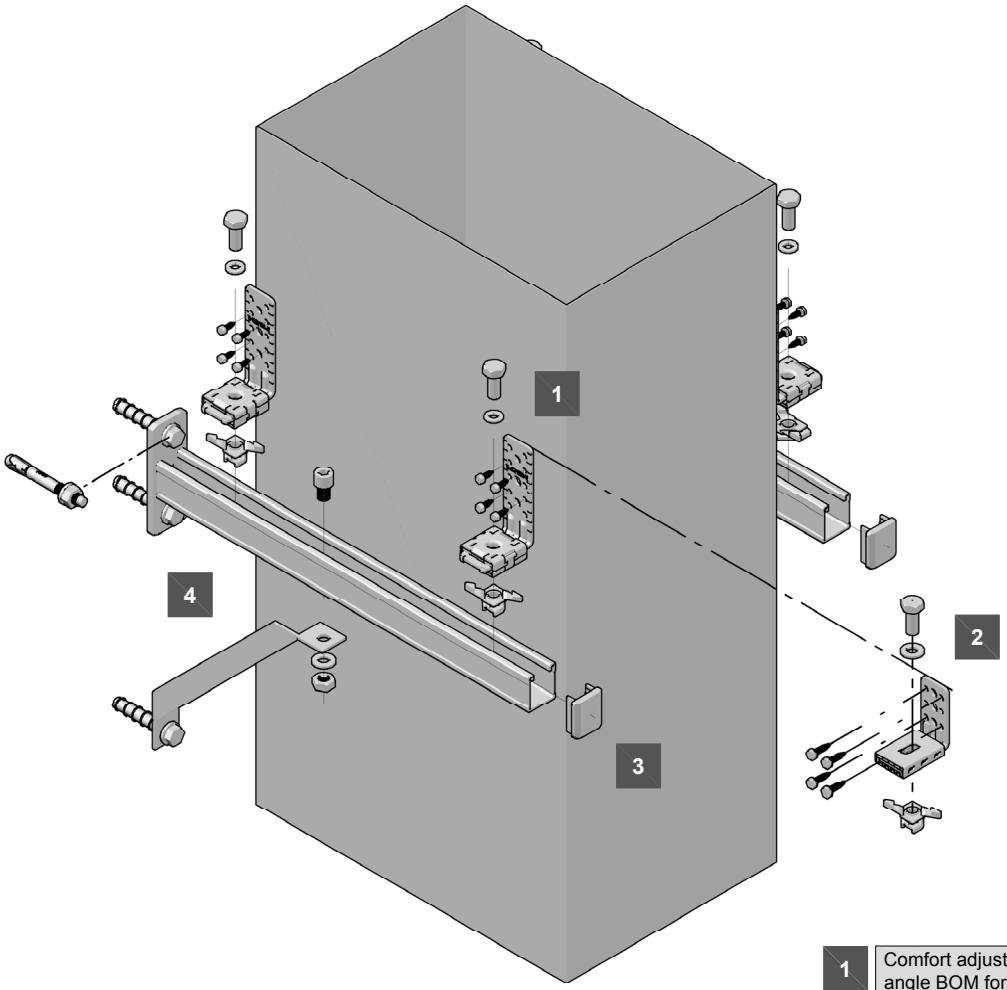
Application



6

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.560x1120mm

Ventilation - Rising Square Duct MM Braced Brackets - Options



1	Comfort adjustable MVA-LC 100 angle BOM for one connection spot	
	1x MVA-LC 100 angle	386534
	4x S-MS 01Z 4.0x13 S-screw	406471
	1x MM-WN M10 wing nut	418766
	1x A 10.5/20 washer	282851
	1x M10x30 hex. head screw	47426

2	Comfort adjustable MVA-LC 60 angle BOM for one connection spot	
	1x MVA-LC 60 angle	386533
	4x S-MS 01Z 4.0x13 S-screw	406471
	1x MM-WN M10 wing nut	418766
	1x A 10.5/20 washer	282851
	1x M10x30 hex. head screw	47426

3	MM System plastic end cap	
	For MM-B-30 brackets	
	MM-E-30	418774
	For MM-B-36 brackets	
	MM-E-36	418775

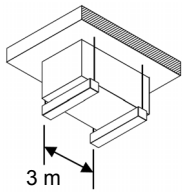
4	MM bracket with anchor	
	1x MM bracket	
	MM-B-30/200	418752
	MM-B-30/300	418753
	MM-B-36/300	418754
	MM-B-36/450	418755
	MM-B-36/600	418756
	Brace	
	1x MM-AB brace	418772
	1x M10x16 cyl. srew	216474
	1x A 10,5/20 washer	282851
	1x M10 nut216466	
	2x Anchor	
	HUS3-H 8x65 15/5/-	2079795
	or	
	HSA M10 5/-/-	2004127

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct MM Brackets	6	MM system brackets	Concrete
		Ventilation angles	
		Anchors	

General comments

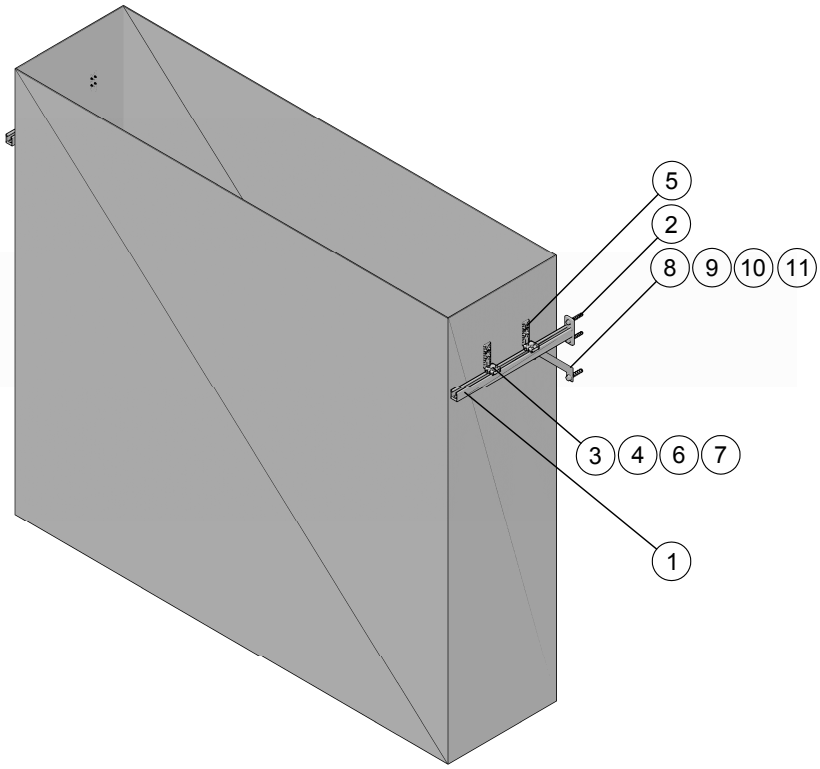
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Rising Square Duct Bracket - Basic - Heavy



Type V-G-RSDB-53-B-H-GL

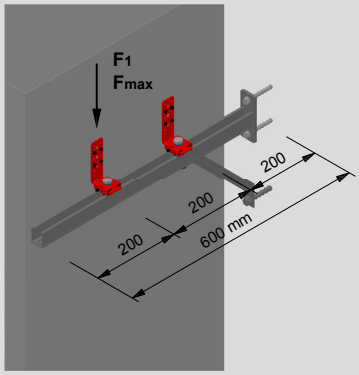
- Limited to air duct size 560 x 2240 mm
- Made of 1.25 mm thick metal sheet
- Spacing - support distance 3 m
- Without insulation



Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.6 kN rec. loads



Maximal limit
F_{max} = 0.6 kN rec. loads

The stated weights are approximate values. Note the specifications from the manufacturers.
Check the spot loading capacity of the air duct metal sheet to accomodate the loads.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**418756**	**MM-B-36/600 bracket**	2	
2	**2079795**	**HUS3-H 8x65 15/5/- screw anchor**	4	
3	**418766**	**MM-WN M10 wing nut**	4	
4	**386534**	**MVA-LC 100 angle**	4	
5	**406471**	**S-MS 01Z 4.0x13 S-screw**	16	
6	**282850**	**A8.4/16 washer**	4	
7	**47426**	**M10x30 hexagon head screw**	4	
8	**418772**	**MM-AB brace**	2	
9	**216466**	**M10 nut**	2	
10	**282851**	**A 10.5/20 washer**	2	
11	**216474**	**M10x16 cylindrical screw**	2	

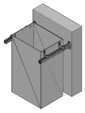
Application description

Ventilation - Rising Square Duct Bracket

General comments

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

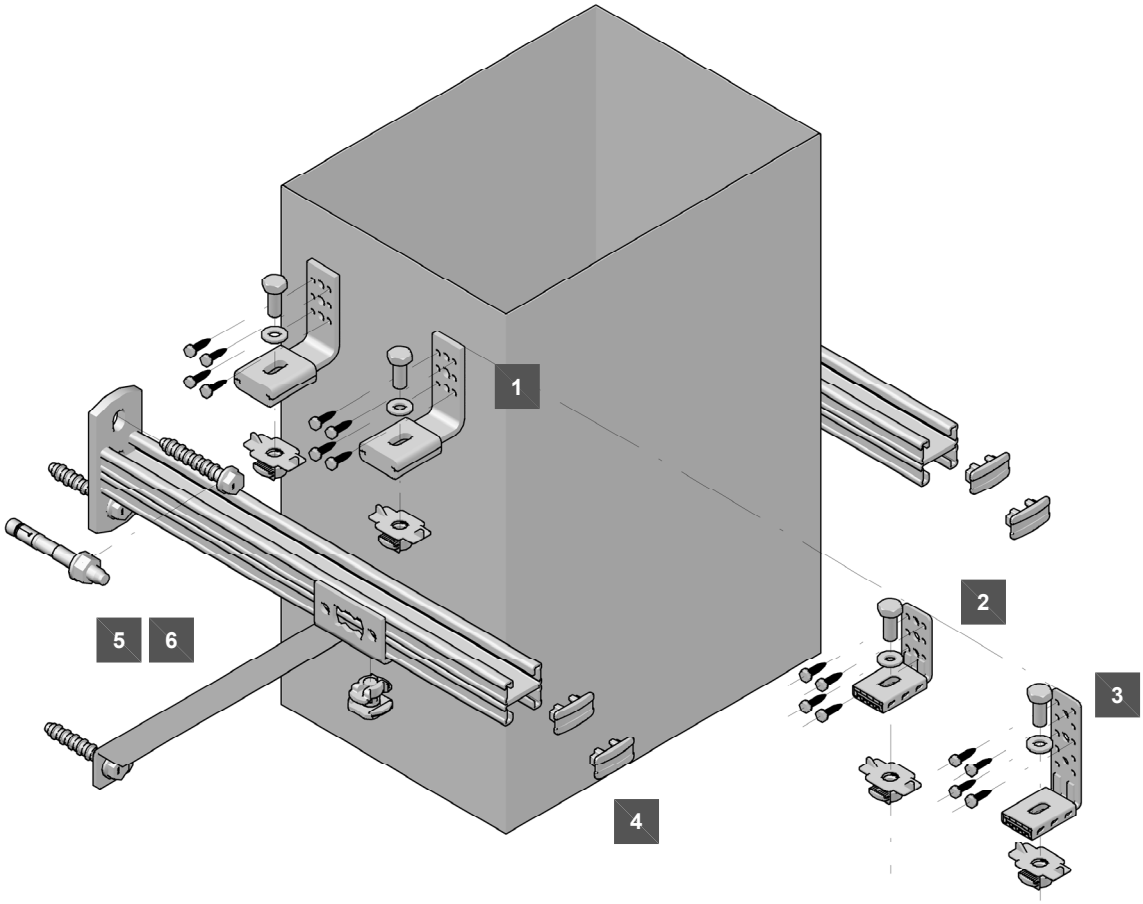
Application



6

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.560x2240mm

Ventilation - Rising Square Duct MQ Brackets - Options



1 Heavy duty adjustable MVA-LH angle
BOM for one connection spot

1x	MVA-LH angle	2047749
4x	S-MD01Z 4.2x16 screw	10405
1x	MQM-M10 wing nut	369626
1x	A 10.5/20 washer	282851
1x	M10x30 hex. head screw	47426

2 Comfort adjustable MVA-LC 60 angle
BOM for one connection spot

1x	MVA-LC 60 angle	386533
4x	S-MS 01Z 4.0x13 S-screw	406471
1x	MQM-M10 wing nut	369626
1x	A 10.5/20 washer	282851
1x	M10x30 hex. head screw	47426

3 Comfort adjustable MVA-LC 100 angle
BOM for one connection spot

1x	MVA-LC 100 angle	386534
4x	S-MS 01Z 4.0x13 S-screw	406471
1x	MQM-M10 wing nut	369626
1x	A 10.5/20 washer	282851
1x	M10x30 hex. head screw	47426

5 MQ braced bracket with short pre-fab brace and anchor

1x	MQ double bracket	
	MQK-21 D/600	369619
	MQK-41 D/1000	369620
1x	MQK-SL long pre-fab brace	369621
1x	MQN push button	369623
2x	Anchor	
	HUS3-H 10x90 35/15/5	2079914
	or	
	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

6 MQ braced bracket with short pre-fab brace and anchor

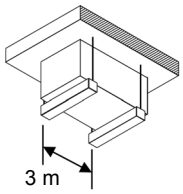
1x	MQ double bracket	
	MQK-21 D/450	369618
	MQK-21 D/600	369619
	MQK-41 D/1000	369620
1x	Brace	
	MQK-SK short pre-fab brace	369622
1x	MQN push button	369623
2x	Anchor	
	HUS3-H 10x90 35/15/5	2079914
	or	
	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ system brackets	Concrete
		Ventilation angles	Steel
		Anchors	PMS

General comments

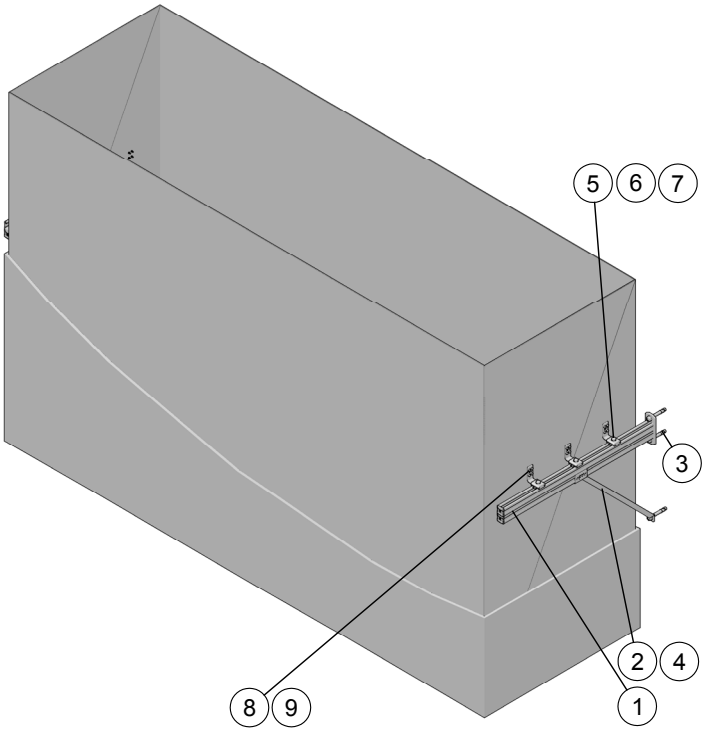
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Rising Square Duct Bracket - Comfort - Heavy



Type V-G-RSDB-2-C-H-GL

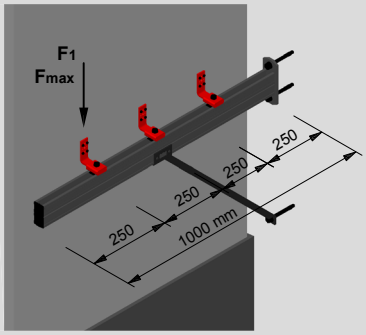
- Limited to square duct 1000 x 3150 mm
- Made of 1.25 mm thick metal sheet
- Spacing - support distance 3 m
- Insulated with 30mm aluminum laminated mineral wool



Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.67 kN rec. loads



Maximal limit
F_{max} = 0.8 kN rec. loads

The stated weights are approximate values. Note the specifications from the manufacturers.
Check the spot loading capacity of the air duct metal sheet to accomodate the loads.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369620**	**MQK-41 D/1000 bracket**	2	
2	**369621**	**MQK-SL long pre-fab brace**	2	
3	**2105718**	**HST3 M12x105 30/10 stud anchor**	6	
4	**369623**	**MQN push button**	2	
5	**369626**	**MQM-M10 wing nut**	6	
6	**282851**	**A 10.5/20 washer**	6	
7	**47426**	**M10x30 hexagon head screw**	6	
8	**10405**	**S-MD01Z 4.2x16 screw**	24	
9	**2047749**	**MVA-LH angle**	6	
10	**369685**	**MQZ-E41 plastic end cap**	4	

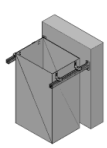
Application description

Ventilation - Rising Square Duct Bracket

General comments

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

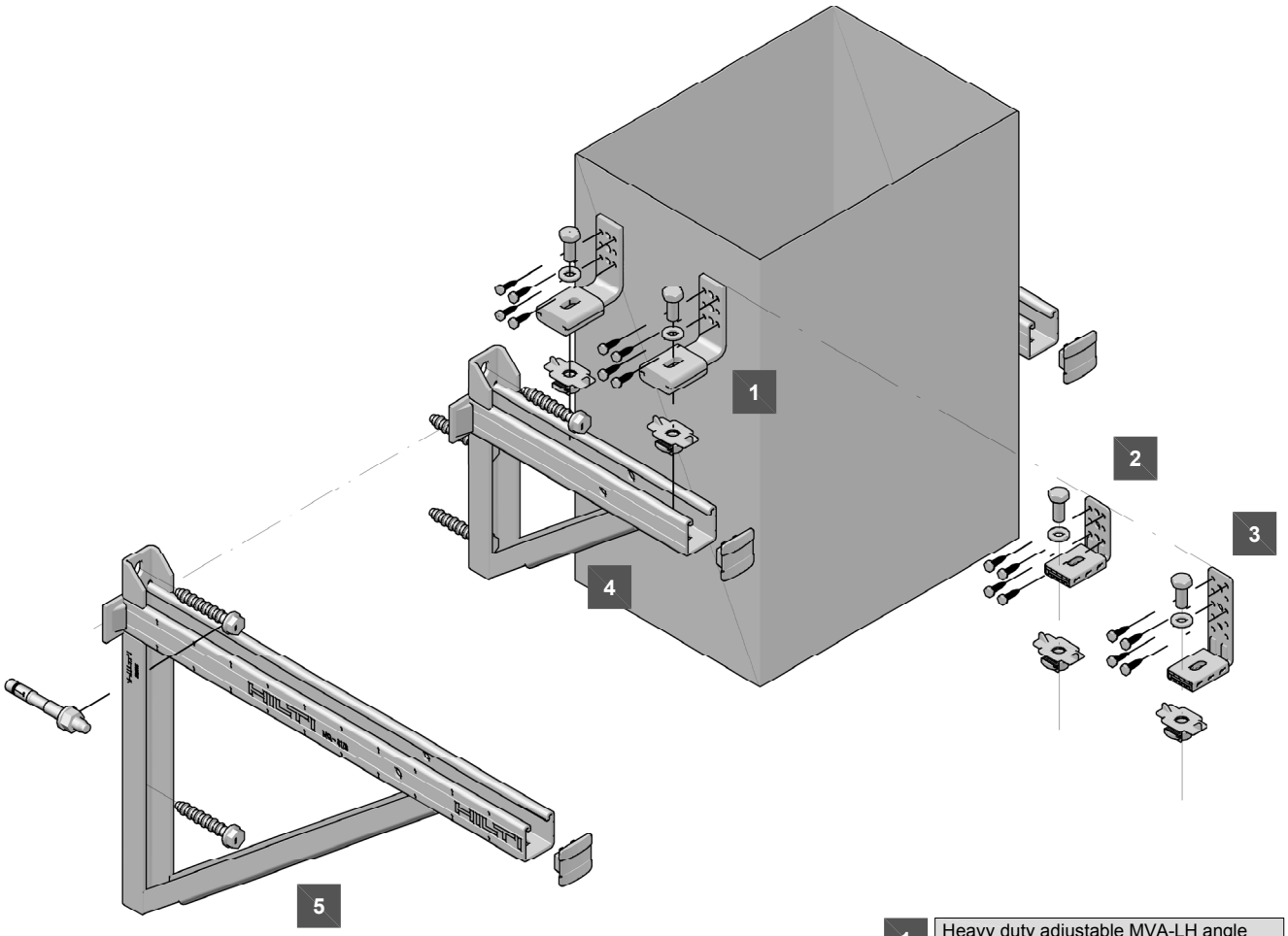
Application



6

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.1000x3150mm

Ventilation - Rising square duct MQ Heavy Brackets - Options



1 Heavy duty adjustable MVA-LH angle
BOM for one connection spot

1x	MVA-LH angle	2047749
4x	S-MD01Z 4.2x16 screw	10405
1x	MQM-M10 wing nut	369626
1x	A 10.5/20 washer	282851
1x	M10x30 hex. head screw	47426

2 Comfort adjustable MVA-LC 60 angle
BOM for one connection spot

1x	MVA-LC 60 angle	386533
4x	S-MS 01Z 4.0x13 S-screw	406471
1x	MQM-M10 wing nut	369626
1x	A 10.5/20 washer	282851
1x	M10x30 hex. head screw	47426

3 Comfort adjustable MVA-LC 100 angle
BOM for one connection spot

1x	MVA-LC 100 angle	386534
4x	S-MS 01Z 4.0x13 S-screw	406471
1x	MQM-M10 wing nut	369626
1x	A 10.5/20 washer	282851
1x	M10x30 hex. head screw	47426

4 MQK - H/300 heavy bracket with anchor

1x	MQ heavy bracket	
	MQK-H/300	2048096
1x	MQZ-E41 plastic end cap	369685
2x	Anchor	
	HUS3-H 10x90 35/15/5	2079914
	or	
	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

6 MQK-H/550 heavy bracket with anchor

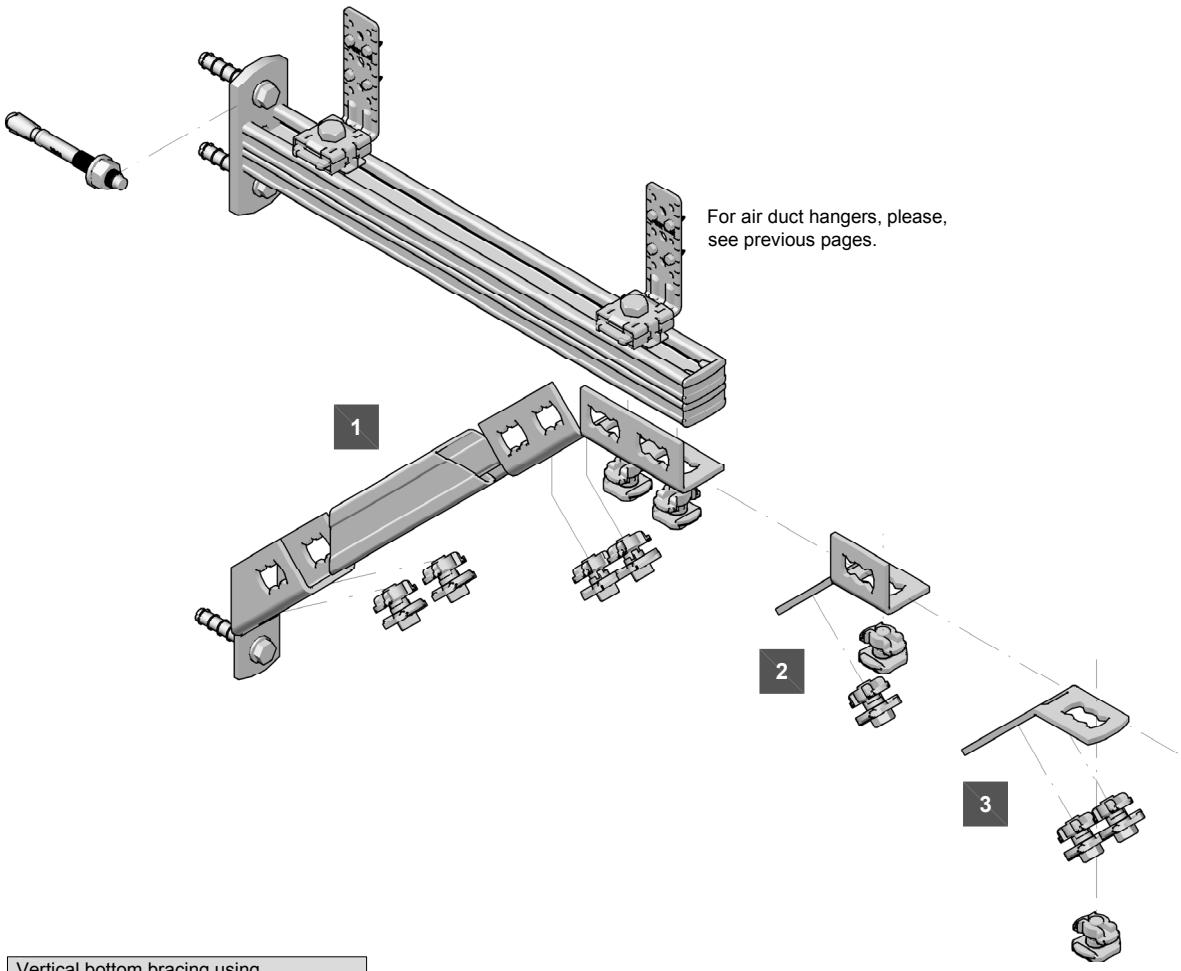
1x	MQ heavy bracket	
	MQK-H/5502048097	
1x	MQZ-E41 plastic end cap	369685
2x	Anchor	
	HUS3-H 10x90 35/15/5	2079914
	or	
	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ heavy brackets	Concrete
		Ventilation angles	
		Anchors	

General comments

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

Ventilation - Rising square duct MQ Braced Brackets With Bottom Assembled Brace - Options



1 Vertical bottom bracing using MQP-45 connector

Upper brace connection	
1x MQW-8/45 connector	**369660**
4x MQN push button	**369623**
Channel brace - 41mm format chann.	
MQ-41 3m	**369591**
Bottom brace connection	
1x MQP-45 channel base	**369649**
1x MQN push button	**369623**
1x Anchor	
HUS3-H 10x70/-/-	**2079912**
or	
HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

2 Vertical bottom bracing

Upper brace connection alternative	
1x MQW-3/135 connector	**369663**
2x MQN push button	**369623**

3 Vertical bottom bracing

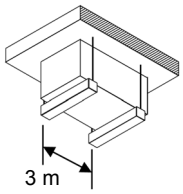
Upper brace connection alternative	
1x MQW-3/45 connector	**369657**
2x MQN push button	**369623**

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ brackets	Concrete
		Ventilation angles	
		Anchors	

General comments

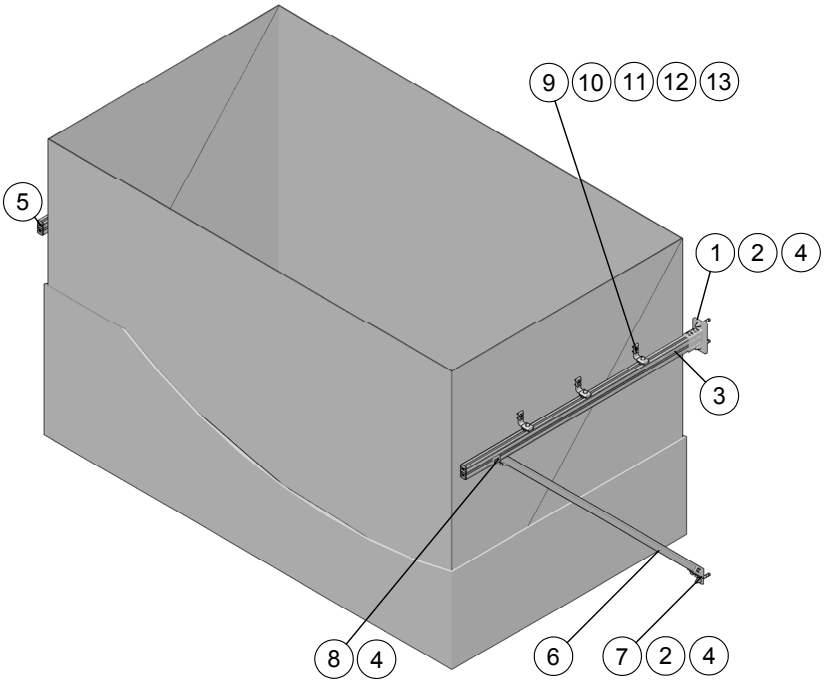
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Rising Square Duct Bracket - Comfort - Heavy



Type V-G-RSDB-3-C-H-GL

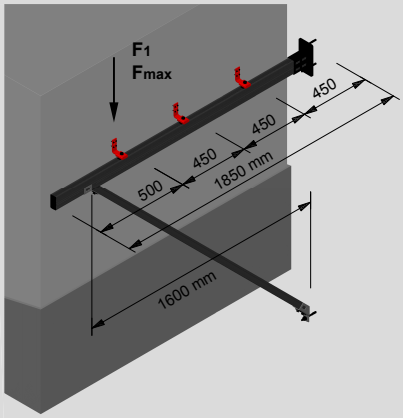
- Limited to square duct 1800 x 3150 mm
- Made of 1.25 mm thick metal sheet
- Spacing - support distance 3 m
- Insulated with 30mm aluminum laminated mineral wool



Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.79 kN rec. loads



Maximal limit
F_{max} = 0.8 kN rec. loads

The stated weights are approximate values. Note the specifications from the manufacturers.
Check the spot loading capacity of the air duct metal sheet to accomodate the loads.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369652**	**MQP-82 channel base**	2	
2	**2105718**	**HST3 M12x105 30/10 stud anchor**	6	
3	**369603**	**MQ-41 D 3m channel**	2	3.7m = 2x 1.85m
4	**369623**	**MQN push button**	16	
5	**369685**	**MQZ-E41 plastic end cap**	4	
6	**369591**	**MQ-41 3m channel**	2	4.48m = 2x 2.24m
7	**369649**	**MQP-45 channel base**	2	
8	**369663**	**MQW-3/135 connector**	2	
9	**369626**	**MQM-M10 wing nut**	6	
10	**282851**	**A 10.5/20 washer**	6	
11	**47426**	**M10x30 hexagon head screw**	6	
12	**10405**	**S-MD01Z 4.2x16 screw**	24	
13	**2047749**	**MVA-LH angle**	6	

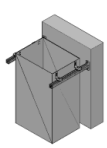
Application description

Ventilation - Rising Square Duct Bracket

General comments

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

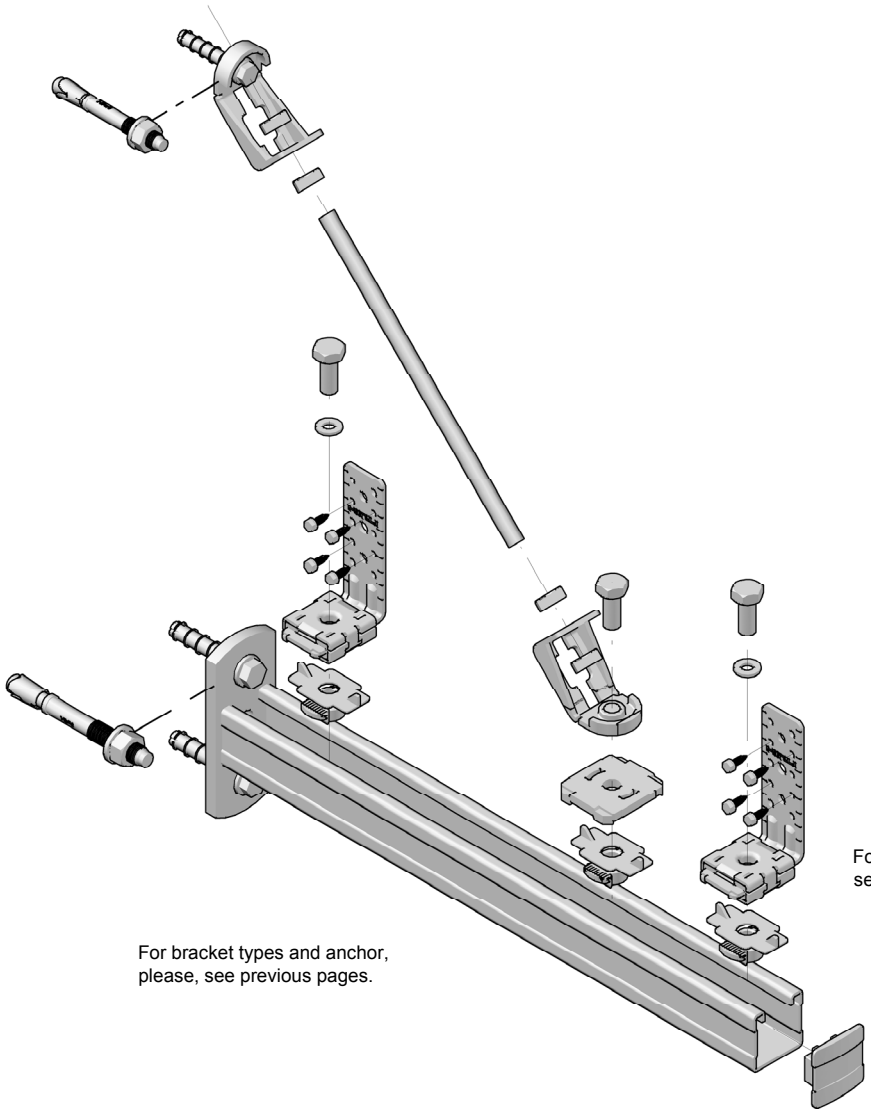
Application



6

Base material	Concrete
Product line	L-Hangers
Capacity limit	A.D.1800x3150mm

Ventilation - Rising square duct MQ Braced Brackets With Upper Threaded Rod Brace - Options



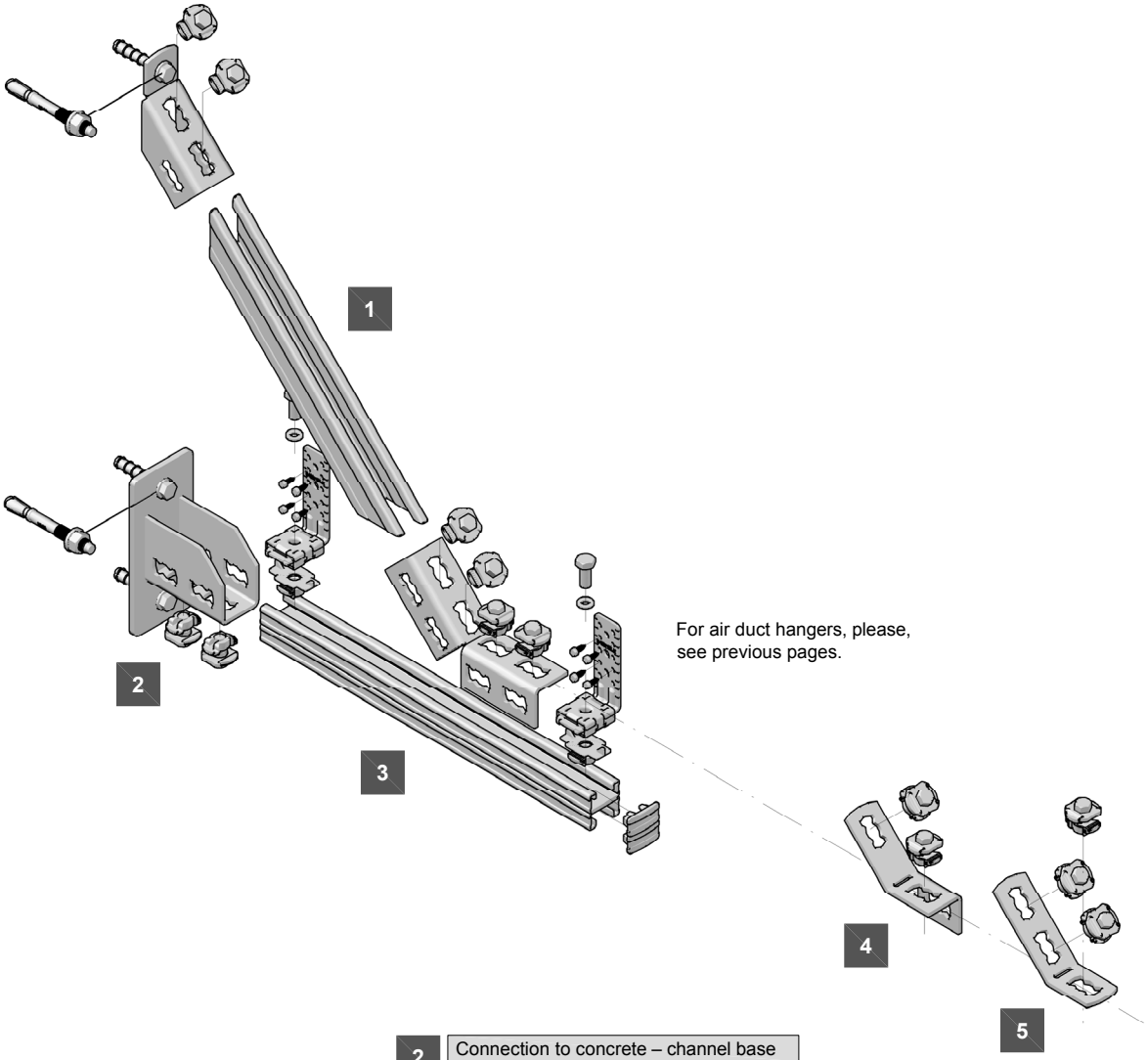
For bracket types and anchor, please, see previous pages.

Vertical upper bracing using MQ3D elements	
Upper brace connection	
1x MQ3D-A brace conn.	**369697**
2x M10 hex. nut	**216466**
1x AnchorHUS3-H 8x55/-/-	**2079794**
or	
HST3 M10x90 30/10	**2105712**
HST2 M10x90/10	**2107847**
Brace	
1x AM10 threaded rod	
AM10x1000 t. rod	**339795**
AM10x2000 t. rod	**339796**
AM10x3000 t. rod	**216418**
Bottom brace connection	
1x MQ3D-A brace conn.	**369697**
2x M10 hex. nut	**216466**
1x M10x25 hex. screw	**216454**
1x MQZ-L13 square washer	**369680**
1x MQM-M12 wing nut	**369627**

For air duct hangers, please, see previous pages.

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ heavy brackets	Concrete
General comments		Ventilation angles	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors	

Ventilation - Rising square duct MQ Braced Brackets With Upper Assembled Brace - Options



For air duct hangers, please, see previous pages.

1 Vertical bottom bracing using MQP-45 connector

Upper brace connection	
1x MQW-8/45 connector	**369660**
4x MQN push button	**369623**
Channel brace - 41mm format chann.	
MQ-41 3m	**369591**
Upper brace connection	
1x MQP-45 channel base	**369649**
1x MQN push button	**369623**
1x Anchor	
HUS3-H 10x70/-/-	**2079912**
or	
HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

2 Connection to concrete – channel base

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

3 Double channel

MQ-21 D 3m	**369601**
MQ-21 D 6m	**369602**
MQ-41 D 3m	**369603**
MQ-41 D 6m	**369604**
MQ-52-72 D 6m	**369605**
MQ-124X D 6m	**369606**

4 Vertical bottom bracing

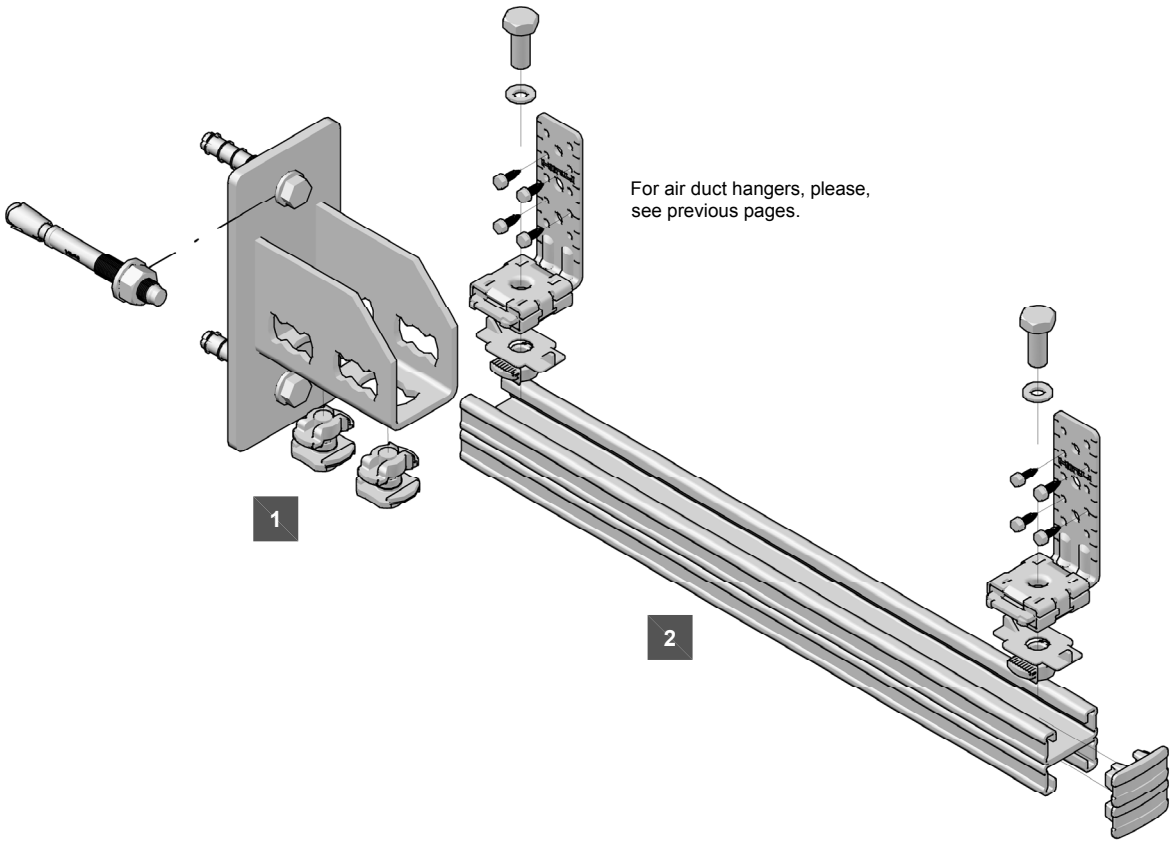
Upper brace connection alternative	
1x MQW-3/135 connector	**369663**
2x MQN push button	**369623**

5 Vertical bottom bracing

Upper brace connection alternative	
1x MQW-3/45 connector	**369657**
2x MQN push button	**369623**

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ heavy brackets	Concrete
General comments		Ventilation angles	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Anchors	

Ventilation - Rising square duct MQ System Assembled Brackets - Options



For air duct hangers, please, see previous pages.

1	Connection to concrete – channel base	
	1x MQP 21-72 channel base	369651
	2x MQN push button	369623
	2x Anchor	
	HUS3-H 10x70/-/-	2079912
	or	
	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848

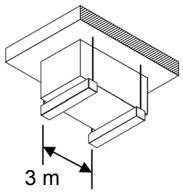
2	Double channel	
	MQ-21 D 3m	369601
	MQ-21 D 6m	369602
	MQ-41 D 3m	369603
	MQ-41 D 6m	369604
	MQ-52-72 D 6m	369605
	MQ-124X D 6m	369606

Application description	Application	Product lines	Base material
Ventilation - Rising Square Duct Brackets	6	MQ heavy brackets	Concrete
		Ventilation angles	
		Anchors	

General comments

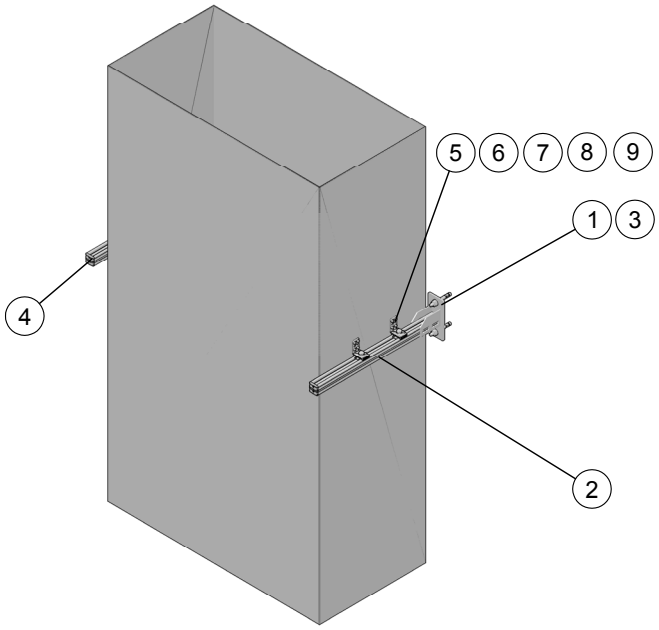
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Rising Square Duct Bracket - Comfort - Light



Type V-G-RSDB-4-C-L-GL

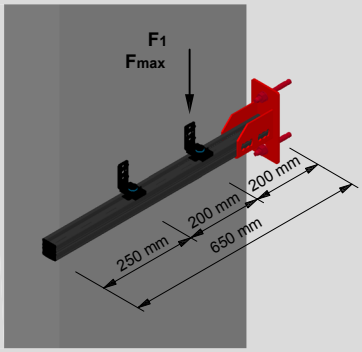
- Limited to square duct 560 x 1120 mm
- Made of 1.23 mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated



Additional loading capacity limits

This particular case with spacing **3m:**

F_1 = 0.28 kN rec. loads



Maximal limit
F_{max} = 0.3 kN rec. loads

The stated weights are approximate values. Note the specifications from the manufacturers.
Check the spot loading capacity of the air duct metal sheet to accomodate the loads.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369651**	**MQP-21-72 channel base**	2	
2	**369601**	**MQ-21 D channel**	2	1.29m = 2x 6.45m
3	**369623**	**MQN push button**	4	
4	**370598**	**MQZ-E21 plastic end cap**	4	
5	**386533**	**MVA-LC 60 angle**	4	
6	**369626**	**MQM-M10 wing nut**	4	
7	**282851**	**A 10.5/20 washer**	4	
8	**47426**	**M10x30 hexagon head screw**	4	
9	**406471**	**S-MS 01Z 4.0x13 S-screw**	16	

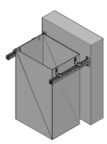
Application description

Ventilation - Rising Square Duct Bracket

General comments

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

Application



6

Base material	Concrete
Product line	MQ System
Capacity limit	A.D.560x1120mm

Ventilation - Wall Spot Fixture - Options

Distance keeping solution not carry any vertical loads

7 M10 MGL2 - M8 base plate

Base plate	
MGL 2-M10 base plate	246909
Screw anchor	
HUS-P 6x40/5	416745
HUS-P 6x40/5	428663
Stud anchor	
HSA M8x55 5/-/-	2004122
M10 threaded bolt	
AM10x40	216390
AM10x60	216391
AM10x80	216392
AM10x100	216393
AM10x120	216394
AM10x150	216395
AM10x180	216396

8 MGS 2-M10 base plate

Base plate	
MGS 2-M10 base plate	246913
Screw anchor	
HUS3-H 8x55/-/-	2079794
Stud anchor	
HSA M10 5/-/-	2004127
M10 threaded bolt	Various

6 Stud anchor and coupler

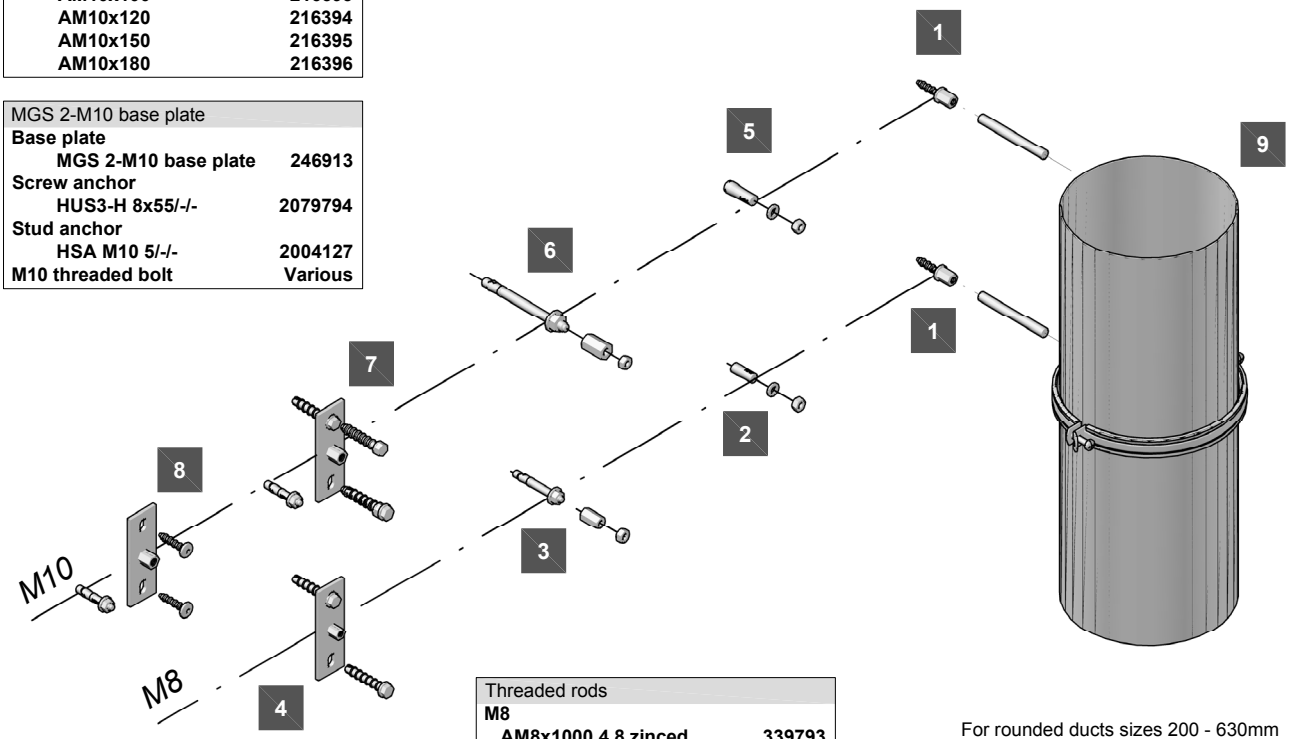
1x stud anchor	
HST3 M10x100 40/20	2105713
HST2 M10x100/20	2107840
1x M10x30 coupler	216704
1x M10 nut	216466

Threaded rods

M10	
AM10x1000 4.8 zinced	339795
AM10x2000 4.8 zinced	339796
AM10x3000 4.8 zinced	216418

5 Drop in anchor

1x drop in anchor	
M10	
HKD M10x40 anchor	378430
HKD M10x30 anchor	376965
HKD M10x25 anchor	2037453



Threaded rods

M8	
AM8x1000 4.8 zinced	339793
AM8x2000 4.8 zinced	339794
AM8x3000 4.8 zinced	216415

For rounded ducts sizes 200 - 630mm

9 Ventilation pipe rings with either M8 or double connection head M8/M10

MV-PI 80 M8	386480
MV-PI 100 M8	386481
MV-PI 125 M8	386482
MV-PI 140 M8	386483
MV-PI 150 M8	386484
MV-PI 160 M8	386485
MV-PI 180 M8	386486
MV-PI 200 M8	386487
MV-PI 224 M8/M10	386488
MV-PI 250 M8/M10	386489
MV-PI 280 M8/M10	386490
MV-PI 300 M8/M10	386491
MV-PI 315 M8/M10	386492
MV-PI 355 M8/M10	386493
MV-PI 400 M8/M10	386494
MV-PI 450 M8/M10	386495
MV-PI 500 M8/M10	386496
MV-PI 560 M8/M10	386497
MV-PI 600 M8/M10	386498
MV-PI 630 M8/M10	386499

4 M8 MGL2 - M8 base plate

Base plate	
MGL 2-M8 base plate	246908
Screw anchor	
HUS-P 6x40/5	416745
HUS-P 6x40/5 bulk	428663
Stud anchor	
HSA M8x55 5/-/-	2004122
M8 threaded bolt	
AM8x30	216379
AM8x40	216380
AM8x50	216381
AM8x60	216382
AM8x70	216383
AM8x80	216384
AM8x100	216385
AM8x120	216386
AM8x150	216387
AM8x180	216388

1 Internally threaded screw anchor

1x screw anchor	
HUS-I 6x35 M8/M10	376959
HUS-I 6x55 M8/M10	423180

2 Drop in anchor

1x drop in anchorM8	
HKD M8x25 anchor	376957
HKD M8x30 anchor	376959
HKD M8x40 anchor	376961

3 Stud anchor and coupler

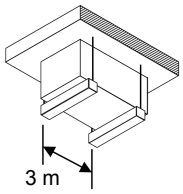
1x stud anchor	
HST3 M8x75 -/10	2105888
HST2 M8x75/10	2108161
1x M8x25 coupler	216703
1x M8 nut	216465

Application description	Application	Product lines	Base material
Ventilation - Wall Spot Fixture	7	Ventilation piperings	Concrete
		Anchors	
		Base plates	

General comments

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

Ventilation Applications - Wall Spot Fixture - Basic - Medium

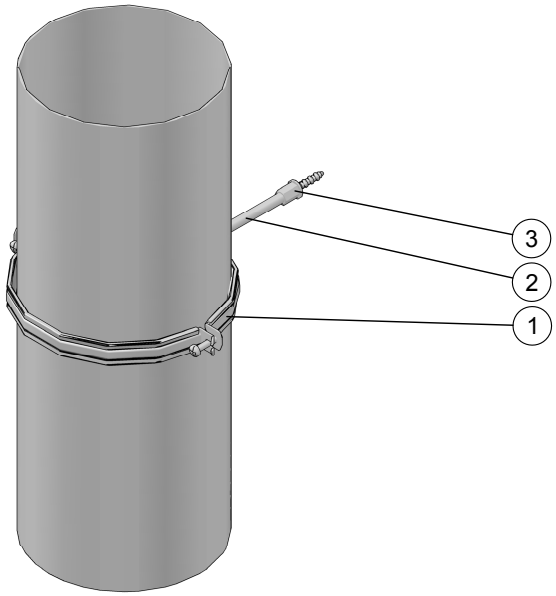


Type V-G-WSF-1-B-M-GL

- Limited to rounded duct DN 200 mm O.D. 204.8 mm
- Made of 0.6 mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated

Additional loading capacity limits

Application not subject to any loads as used as a spacer for offset solutions



Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386487**	**MV-PI 200 M8 ventilation pipe ring**	1	
2	**216384**	**AM8x80 threaded bolt**	1	
3	**376959**	**HUS-I 6x35 M8/M10 screw anchor**	1	

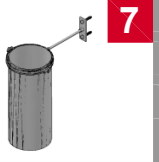
Application description

Ventilation - Wall Spot Fixture - Basic - Medium

General comments

- Application not subject to any forces as used as a spacer for offset solutions

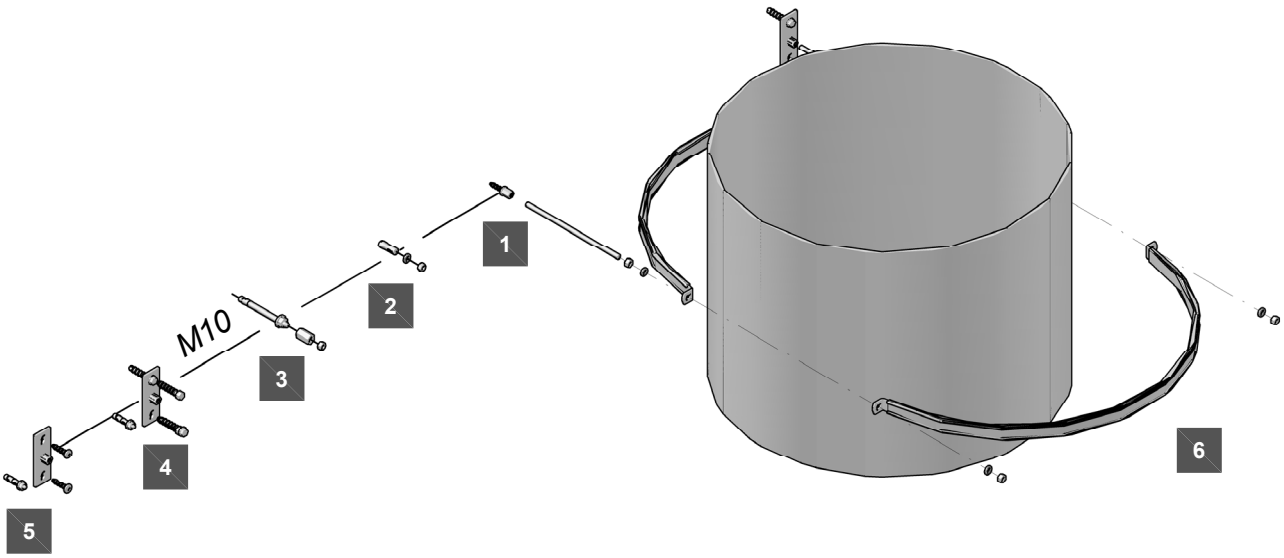
Application



Base material	Concrete
Product line	Ventilation
Capacity limit	Non

Ventilation - Wall Spot Fixture - Options

Distance keeping solution not carry any vertical loads



Threaded rods	
M10	
AM10x1000 4.8 zinced	**339795**
AM10x2000 4.8 zinced	**339796**
AM10x3000 4.8 zinced	**216418**

1

Internally threaded screw anchor	
1x screw anchor	
HUS-I 6x35 M8/M10	**376959**
HUS-I 6x55 M8/M10	**423180**

2

Drop in anchor	
1x drop in anchor M10	
HKD M10x25 anchor	**2037453**
HKD M10x30 anchor	**376965**
HKD M10x40 anchor	**378430**

3

Stud anchor and coupler	
1x stud anchor	
HSA M10x83 20/10/-	**2004128**
1x M10x30 coupler	**216704**
1x M10 nut	**216466**

4

M10 MGL2 - M8 base plate	
Base plate	
MGL 2-M10 base plate	**246909**
Screw anchor	
HUS-P 6x40/5	**416745**
HUS-P 6x40/5 bulk	**428663**
Stud anchor	
HSA M8x55 5/-/-2004122	
M10 threaded rod	**Various**

5

MGS 2-M10 base plate	
Base plate	
MGS 2-M10 base plate	**246913**
Screw anchor	
HUS3-H 8x55/-/-	**2079794**
Stud anchor	
HSA M10 5/-/-	**2004127**
M10 threaded bolt	**Various**

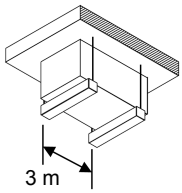
For rounded ducts sizes 710 - 1250mm

6

Ventilation pipe rings without connection head for through bolting the years of the pipe ring by M10 threaded rod	
1x Ventilation pipe ring	
MV-PI 710	**386500**
MV-PI 800	**386501**
MV-PI 900	**386502**
MV-PI 1000	**386503**
MV-PI 1120	**386504**
MV-PI 1250	**386505**
4x A10.5/20 washer	**282851**
4x M10 nut	**216466**

Application description	Application	Product lines	Base material
Ventilation - Wall Spot Fixture	 **7**	Ventilation piperings	Concrete
General comments		Anchors	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Base plates	

Ventilation Applications - Wall Spot Fixture - Basic - Medium

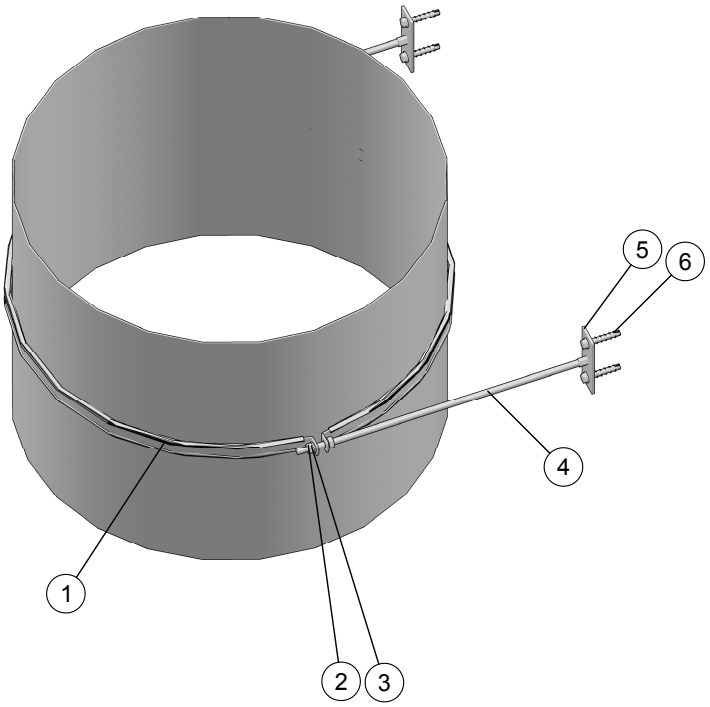


Type V-G-WSF-2-B-M-GL

- Limited to rounded duct DN 1250 mm O.D. 1259.6 mm
- Made of 1.2 mm thick metal sheet
- Spacing - support distance 3 m
- Non insulated

Additional loading capacity limits

Application not subject to any loads as used as a spacer for offset solutions



Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**386505**	**MV-PI 1250 ventilation pipe ring**	1	
2	**216466**	**M10 nut**	4	
3	**282851**	**A 10.5/20 washer**	4	
4	**339795**	**AM10x1000 4.8 threaded rod**	-	1m = 2x 0.5m
5	**246913**	**MGS 2-M10 base plate**	2	
6	**2079794**	**HUS3-H 8x55/-/-**	4	

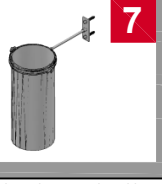
Application description

Ventilation - Wall Spot Fixture - Basic - Medium

General comments

- Application not subject to any forces as used as a spacerfor offset solutions

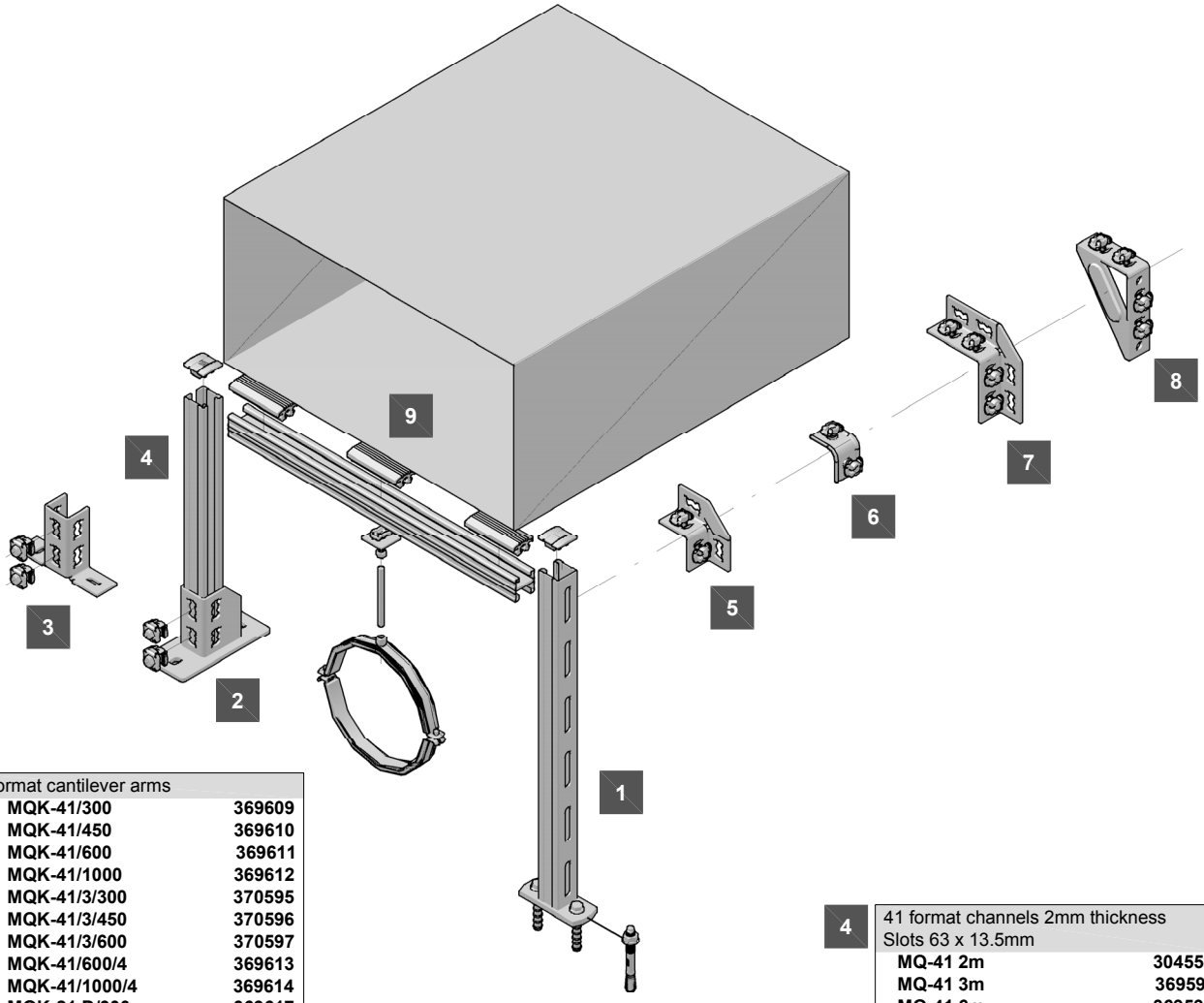
Application



7

Base material	Concrete
Product line	Ventilation
Capacity limit	Non

Ventilation - Goal Post On Concrete - Options



1 41 format cantilever arms

MQK-41/300	369609
MQK-41/450	369610
MQK-41/600	369611
MQK-41/1000	369612
MQK-41/3/300	370595
MQK-41/3/450	370596
MQK-41/3/600	370597
MQK-41/600/4	369613
MQK-41/1000/4	369614
MQK-21 D/300	369617
MQK-21 D/450	369618
MQK-21 D/600	369619
Anchor	
2x HUS3-H 10x70/-/-	2079912
or	
2x HST3 M12x105 30/10	2105718
HST2 M12x105/10	2107848

2 Connection to concrete – channel base

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

3 Connection to concrete – channel base

1x MQV -2/2 D-14 ch. base	369639
2x MQN push button	369623
Anchor	
2x HUS3-H 10x70/-/-	2079912
or	
2x HST3 M12x105 30/10	2105718
HST2 M12x105/10	2107848

5 Connector

1x MQW-4 connector	369658
2x MQN push button	369623

6 Connector

1x MQW-Q2 connector	369655

7 Connector

1x MQW-8 connector	369659
4x MQN push button	369623

8 Connector

1x MQW-S1 connector	369664
4x MQN push button	369623

9 Insulation inlays

10cm long strips	
3x MQZ-RI 10 cm ins. inlay	2047317
20m long	
MQZ-RI 20m ins. inlay	2047316

4 41 format channels 2mm thickness
Slots 63 x 13.5mm

MQ-41 2m	304559
MQ-41 3m	369591
MQ-41 6m	369592

41 format channels 2mm thickness
Slots 28 x 14mm

MQ-41 3m LL	2048100
MQ-41 6m LL	2048101

41 format channels 3mm thickness
Slots 63 x 13.5mm

MQ-41/3 3m	369596
MQ-41/3 6m	369597

41 format channels 3mm thickness
Slots 28 x 14mm

MQ-41/3 3m LL	2048102
MQ-41/3 6m LL	2048103

52 format channels 2.5mm thickness
Slots 63 x 13.5mm

MQ-52 3m	373795
MQ-52 6m	369598

72 format channels 2.75mm thickness
Slots 63 x 13.5mm

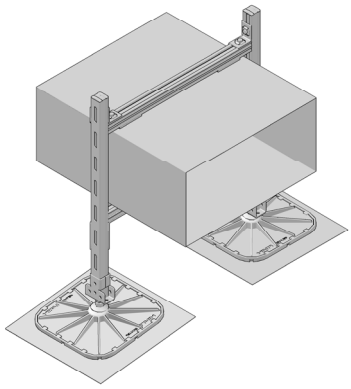
MQ-72 3m	373797
MQ-72 6m	369599

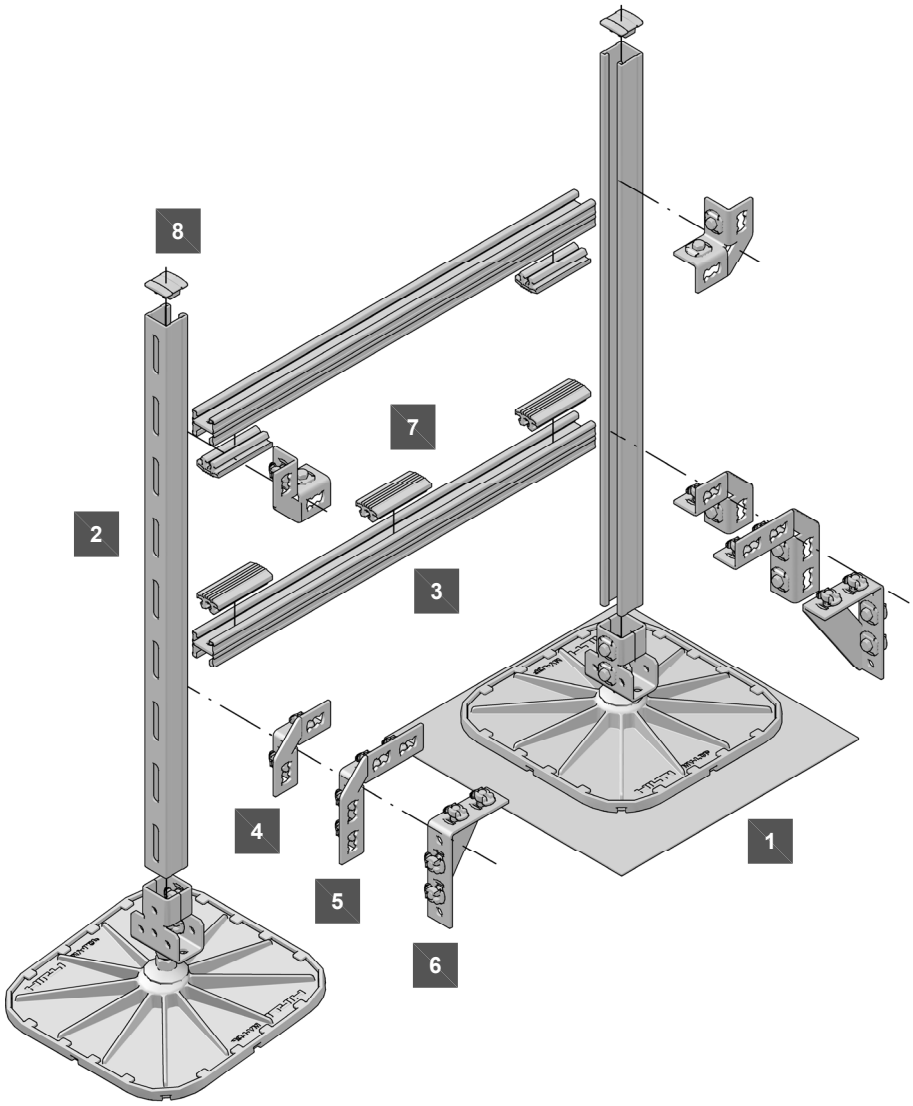
Application description	Application	Product lines	Base material
Ventilation - Goal Post	8	MQ System	Concrete
		Threaded parts	
		Anchors	

General comments

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

Ventilation - Roof top Goal Post - Options





1 Load distribution plate

1x	MV-LDP load dis. plate	2048106
Protective separation fleece		
1x	MV-PSF prot. sep. fleece	2050264
2x	MQN-HDG push button	387779

2 HDG 41 format channels 2mm thickness Slots 63 x 13.5mm

	MQ-41-F 3m	304099
	MQ-41-F 6m	304100
	MQ-41-HDG Plus 6m	304101

3 Double channel

	MQ-21D-F 3m	304107
	MQ-21D-F 6m	304108
	MQ-41D-F 3m	304109
	MQ-41D-F 6m	304110
	MQ-41D-HDG plus 6m	304111
	MQ-52-72D-F 6m	304112
	MQ-124XD-F 6m	370594

4 Connector

1x	MQW-4-F connector	304174
2x	MQN-HDG push button	387779

5 Connector

1x	MQW-8/90-F connector	304175
4x	MQN-HDG push button	387779

6 Connector

1x	MQW-S/1-F braced angle	304180
4x	MQN-HDG push button	387779

7 Insulation inlays

10cm long strips		
3x	MQZ-RI 10 cm ins. inlay	2047317
20m long		
	MQZ-RI 20m ins. inlay	2047316

8 Plastic end cap for MQ-41

1x	MQZ-E41	369685

Plastic end cap for MQ-52

1x	MQZ-E21	370598
1x	MQZ-E31	369686

Plastic end cap for MQ-72

1x	MQZ-E31	369686
1x	MQZ-E41	369685

Application description	Application	Product lines	Base material
Ventilation - Roof top Goal Post	8	MQ System	Concrete
		Threaded parts	
		Anchors	

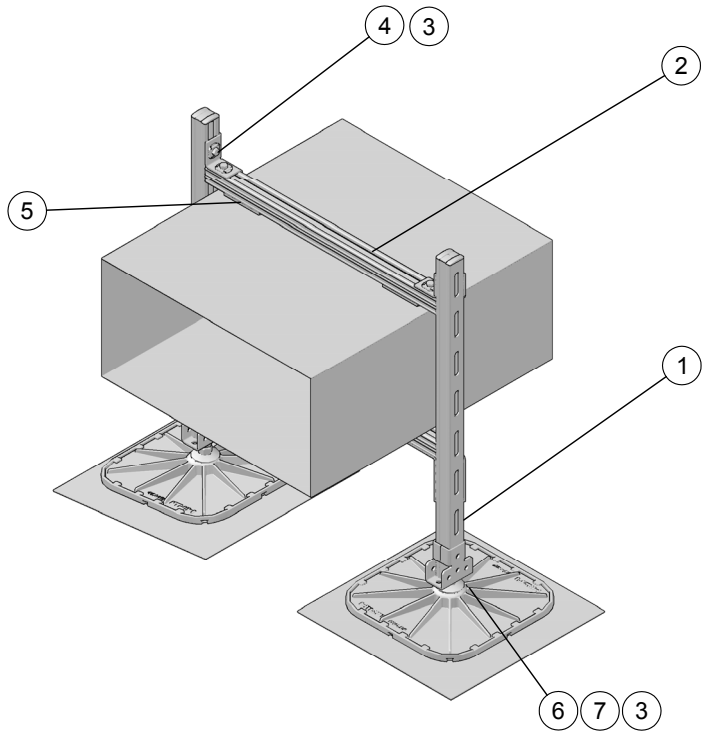
General comments

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

Ventilation Applications - Roof Top Goal Post - Comfort - Light

Type V-HDG-RTGP-2-C-L-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**304099**	**MQ-41-F 3m channel**	2	Depends on height
2	**304107**	**MQ-21D-F 3m channel**	2	Depends on width
3	**387779**	**MQN-HDG Plus push button**	12	
4	**304174**	**MQW-4-F connector**	4	
5	**2047317**	**MQZ-RI 10 cm rubber inlay**	4	
6	**2048106**	**MV-LDP load distribution plate**	2	
7	**2050264**	**MV-PSF protective separation fleece**	2	
8	**369685**	**MQZ-E41 plastic end cap**	2	

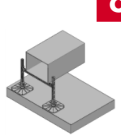
Application description

Ventilation - Roof Top Goal Post - Comfort - Light

General comments

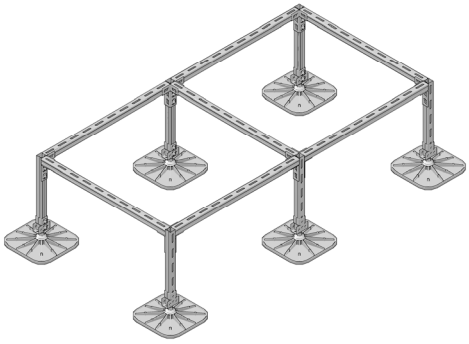
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

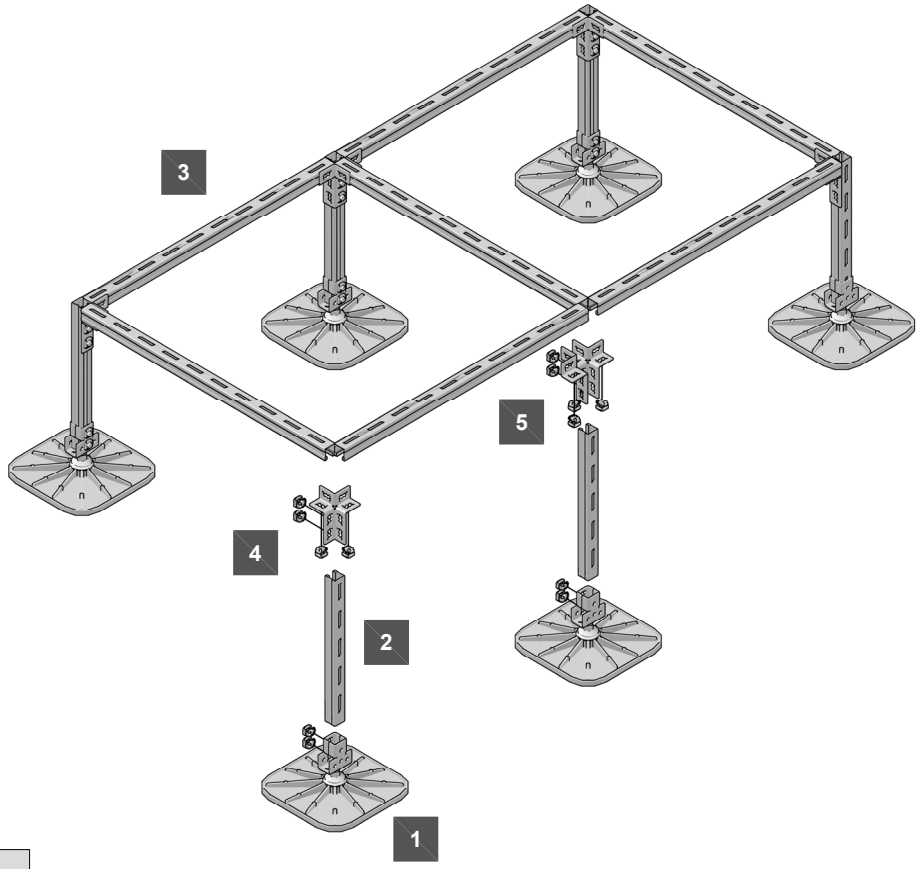
Application



Base material	Roof top
Product line	MQ System
Capacity limit	Individual

Ventilation - Roof Top Frame Light - Options





1	Load distribution plate		
	1x	**MV-LDP load dis. plate**	**2048106**
	Protective separation fleece		
	1x	**MV-PSF prot. sep. fleece**	**2050264**
	2x	**MQN-HDG push button**	**387779**

2	HDG 41 format channels 2mm thickness Slots 63 x 13.5mm	
	MQ-41-F 3m	**304099**
	MQ-41-F 6m	**304100**
	MQ-41-HDG Plus 6m	**304101**

3	Double channel	
	MQ-21D-F 3m	**304107**
	MQ-21D-F 6m	**304108**
	MQ-41D-F 3m	**304109**
	MQ-41D-F 6m	**304110**
	MQ-41D-HDG plus 6m	**304111**
	MQ-52-72D-F 6m	**304112**
	MQ-124XD-F 6m	**370594**

4	Corner cconnector		
	1x	**MQV-3/3 D-F connector**	**304153**
	4x	**MQN-HDG push button**	**387779**

5	Node connector		
	1x	**MQV-4/3 D-F connector**	**304154**
	5x	**MQN-HDG push button**	**387779**

Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame Light	9	MQ System	Roof-top
		Threaded parts	
		Load distrib. plate	

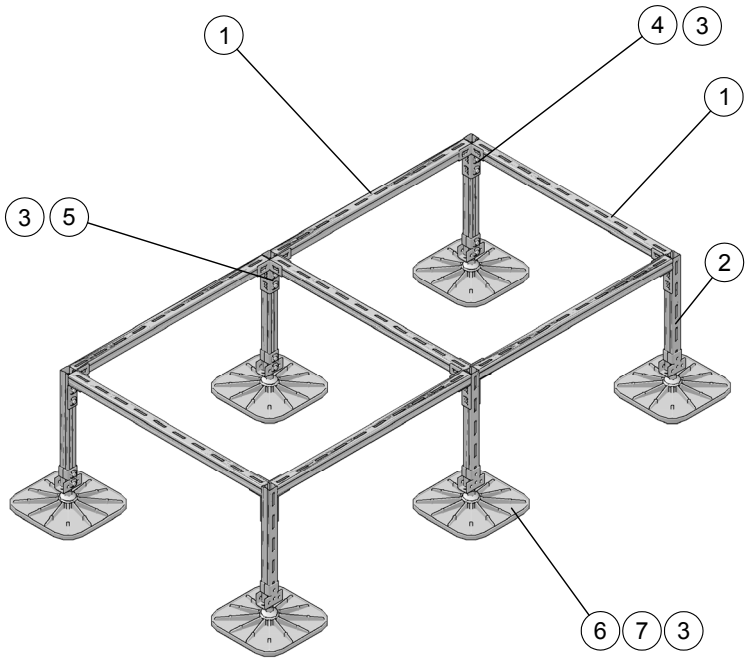
General comments

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

Ventilation Applications - Roof Top Frame - Basic - Light

Type V-HDG-RTF-1-B-L-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**304099**	**MQ-41-F 3m channel**	7	Depends on module size
2	**304099**	**MQ-41-F 3m channel**	6	Depends on height
3	**387779**	**MQN-HDG Plus push button**	38	
4	**304153**	**MQV-3/3 D-F connector**	4	
5	**30415**	**MQV-4/3 D-F connector**	2	
6	**2048106**	**MV-LDP load distribution plate**	6	
7	**2050264**	**MV-PSF protective separation fleece**	6	

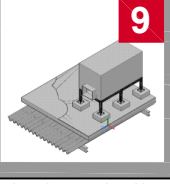
Application description

Ventilation - Roof Top Frame - Basic - Light

General comments

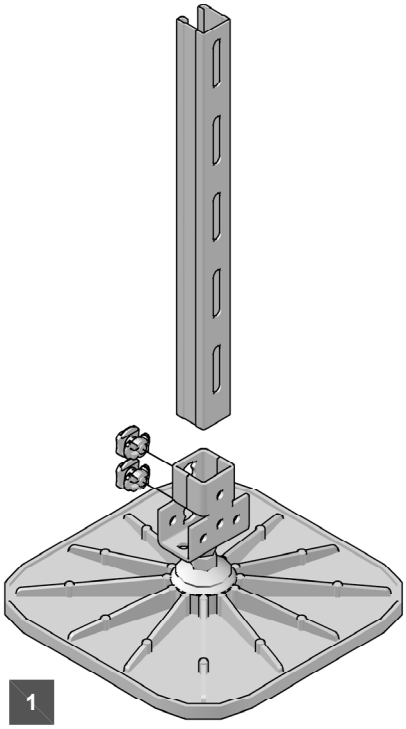
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application



Base material	Roof top
Product line	MQ System
Capacity limit	Individual

Ventilation - Roof-top Frame Light - LDP Connection - Options



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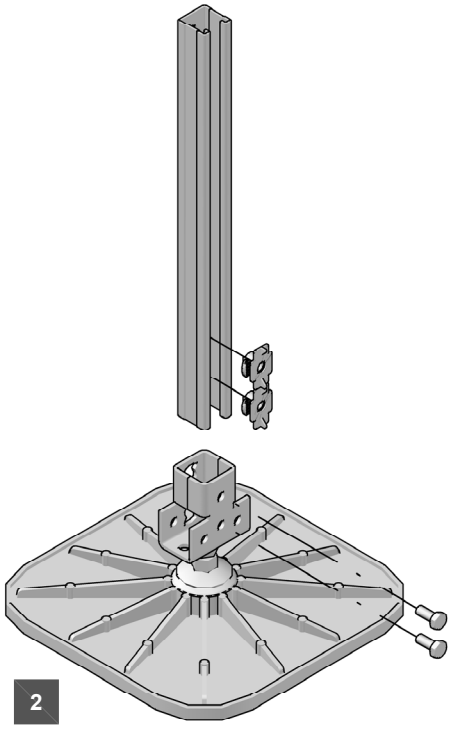


2

1 Load distribution plate fixed by push buttons

Load distribution plate
- 1x MV-LDP load distr. plate 2048106

Protective separation fleece
- 1x MV-PSF protec. sep. fl. 2050264
- 2x MQN-HDG push button 387779

2 Load distribution plate fixed through rounded holes

Load distribution plate
- 1x MV-LDP load distr. plate 2048106

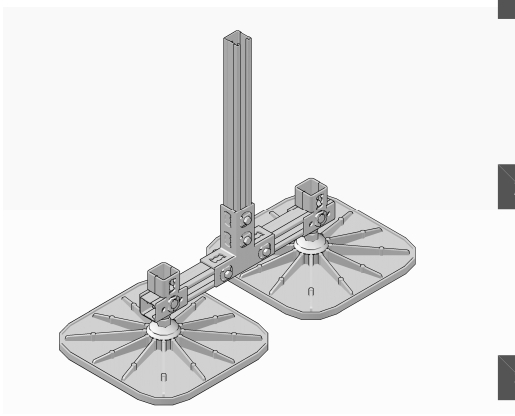
Protective separation fleece
- 1x MV-PSF protec. sep. fl. 2050264
- 2x MQA-M10-F wing nut 304139
- 2x M10x20-F hex. head scr. 2131565

Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MQ System	Roof-top
		Threaded parts	
		Load distrib. plate	

General comments

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

Ventilation - Roof-top Frame Light - 2x LDP Connection - Options



1 Double load distribution plate

Load distribution plate	
2x MV-LDP load distr. plate	2048106
1x MV-PSF protect. sep. fl.	2050264
1x MQ-41-F 3m channel	304099
4x MQZ-S-F conn. part	2063162
4x M12 nut	304766

2 Double load distribution plate

Load distribution plate	
2x MV-LDP load distr. plate	2048106
1x MV-PSF protect. sepa. fl.	2050264
1x MQ-21 D 3m channel	369601
2x MQA-M10-F wing nut	304139
2x M10x20-F hex. head scr.	2131565

3 Double load distribution plate

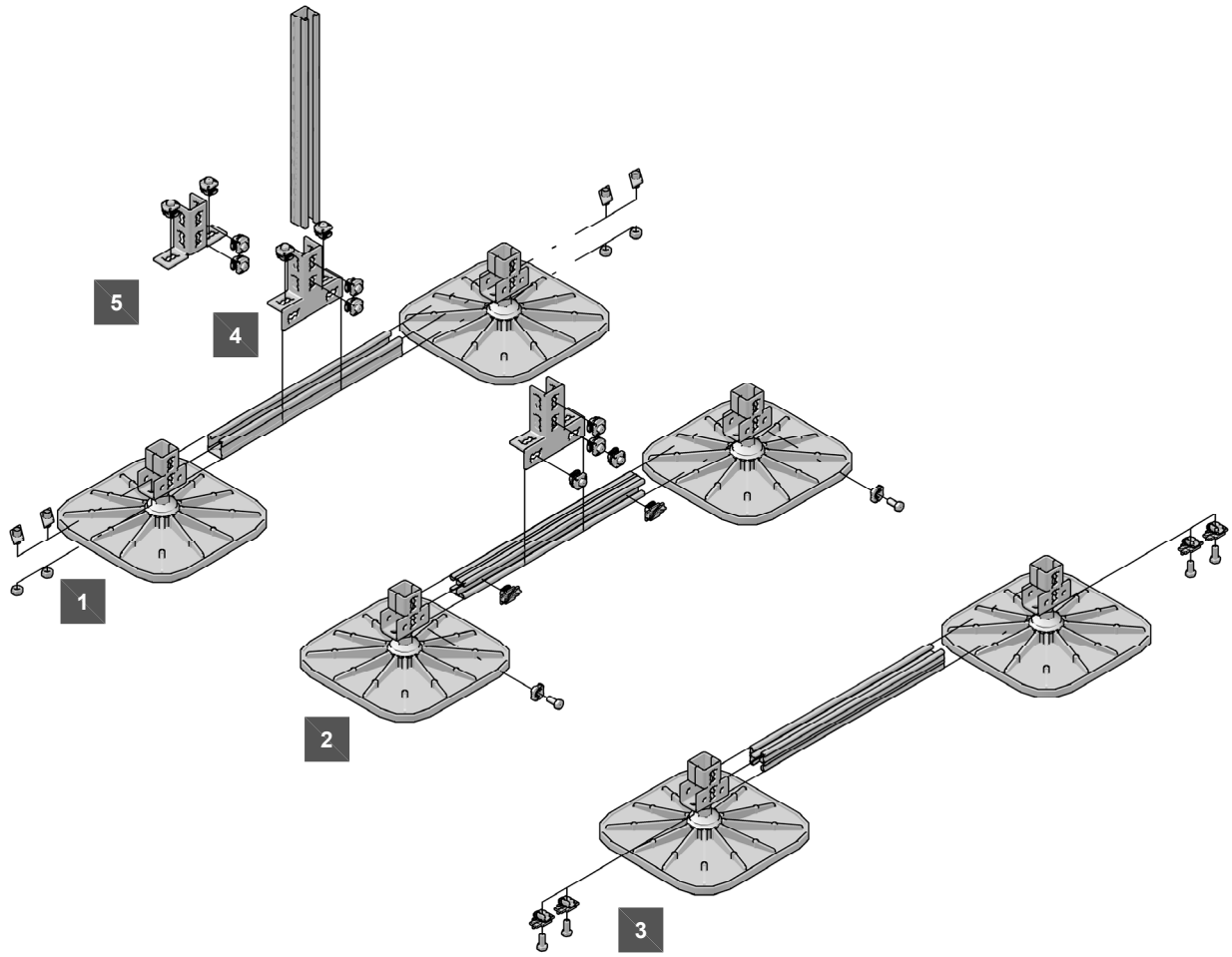
Load distribution plate	
2x MV-LDP load distr. plate	2048106
1x MV-PSF protect. sep. fl.	2050264
1x MQ-21 D 3m channel	369601
4x MQA-M10-F wing nut	304139
4x M12x20-F hex. head scr.	2131565

4 Node connector

1x MQV-3/2 D-F connector	304152
4x MQN-HDG push button	387779

5 Node connector

1x MQV-2/2 D-14-F connector	304151
4x MQN-HDG push button	387779

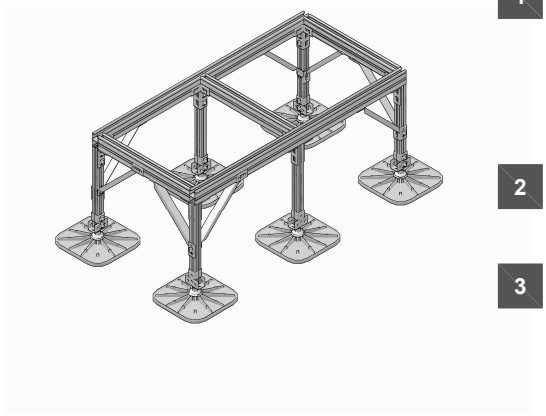


Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MQ System	Roof-top
		Threaded parts	
		Load distrib. plate	

General comments

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

Ventilation - Roof-top Frame Light - Pre-fab Space Bracing - Options



1 Load distribution plate fixed by push buttons

Load distribution plate		
1x	**MV-LDP load distr. plate**	**2048106**
Protective separation fleece		
1x	**MV-PSF protect. sep. fl.**	**2050264**
2x	**MQN-HDG push button**	**387779**

2 Double channel

	MQ-21D-F 3m	**304107**
	MQ-21D-F 6m	**304108**

3 Pre-fab channel brace incl. connection

Pre-fab channel brace		
	MQK-SL-F long	**304128**
	MQK-SK-F short	**304129**
1x	**MQN-HDG push button**	**387779**
1x	**MQM-M12-F wing nut**	**304134**
1x	**M10x20-F hex. head scr.**	**2131565**

4 Corner cconnector

1x	**MQV-3/3 D-F connector**	**304153**
4x	**MQN-HDG push button**	**387779**

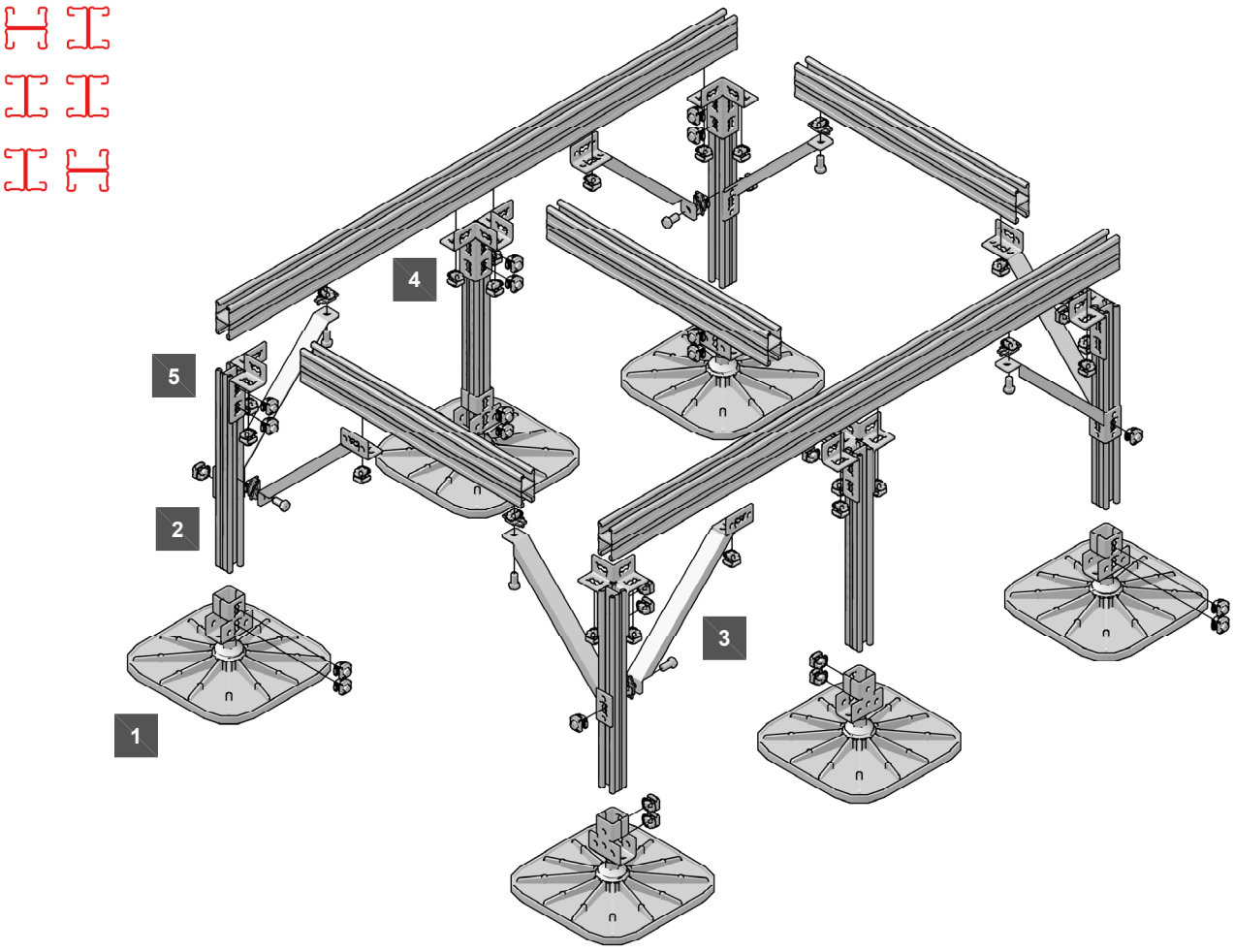
5 Node connector

1x	**MQV-4/3 D-F connector**	**304154**
4x	**MQN-HDG push button**	**387779**

6 Double channel

MQ-21D-F 3m	**304107**
MQ-21D-F 6m	**304108**
MQ-41D-F 3m	**304109**
MQ-41D-F 6m	**304110**
MQ-41D-HDG plus 6m	**304111**
MQ-52-72D-F 6m	**304112**
MQ-124XD-F 6m	**370594**

Important - rotations of the channels on columns



Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MQ System	Roof-top
		Threaded parts	
		Load distrib. plate	

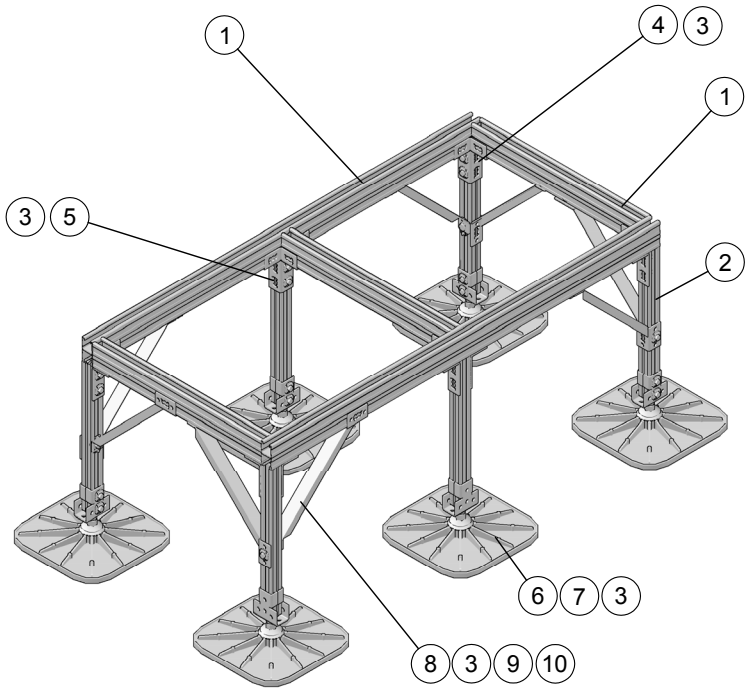
General comments

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

Ventilation Applications - Roof Top Frame - Comfort - Medium

Type V-HDG-RTF-2-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**304109**	**MQ-41D-F 3m channel**	7	Depends on module size
2	**304107**	**MQ-21D-F 3m channel**	6	Depends on height
3	**387779**	**MQN-HDG Plus push button**	46	
4	**304153**	**MQV-3/3 D-F connector**	4	
5	**30415**	**MQV-4/3 D-F connector**	2	
6	**2048106**	**MV-LDP load distribution plate**	6	
7	**2050264**	**MV-PSF protective separation fleece**	6	
8	**204129**	**MQK-SK-F short brace**	8	
9	**304134**	**MQM-M12-F wing nut**	8	
10	**2131565**	**M10x20-F hexagon screw**	8	

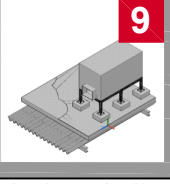
Application description

Ventilation - Roof Top Frame - Comfort - Medium

General comments

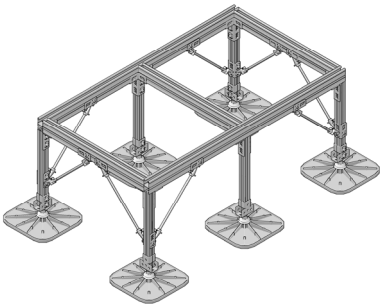
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

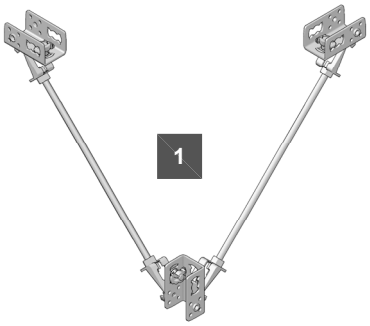
Application



Base material	Roof top
Product line	MQ System
Capacity limit	Individual

Ventilation - Roof-top Frame Light - Threaded Rod Space Bracing - Options

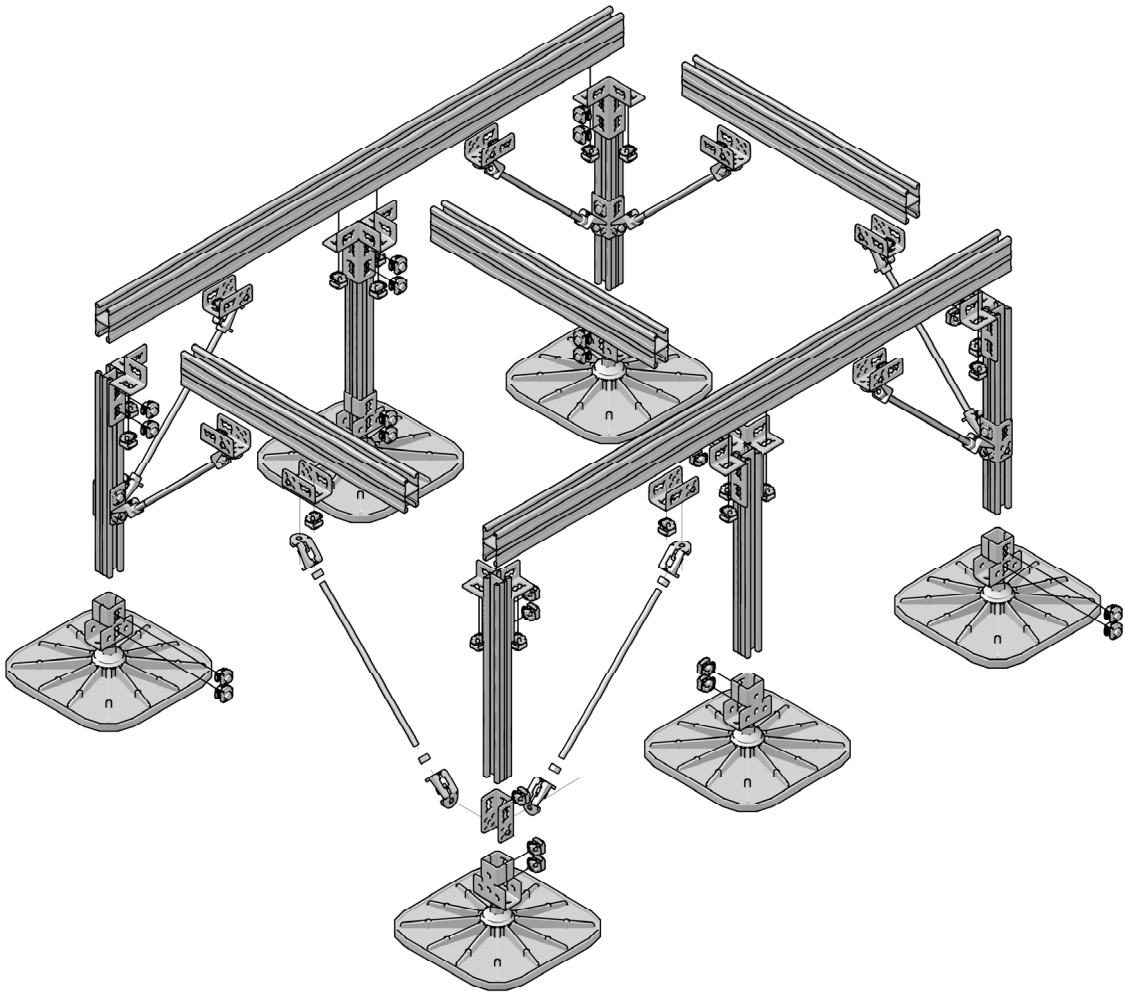


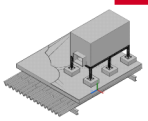


1 Space bracing set for one corner

Set of braces (2 braces)		
3x	**MQ3D-B 3D base**	**369694**
3x	**MQN push button**	**369623**
4x	**MQ3D-A brace connector**	**369697**
2x	**AM10 threaded rod**	
	AM10x1000 t. rod	**339795**
	AM10x2000 t. rod	**339796**
	AM10x3000 t. rod	**216418**
8x	**M10 hex. nut**	**216466**

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



Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9 	MQ System	Roof-top
		Threaded parts	
		Load distrib. plate	

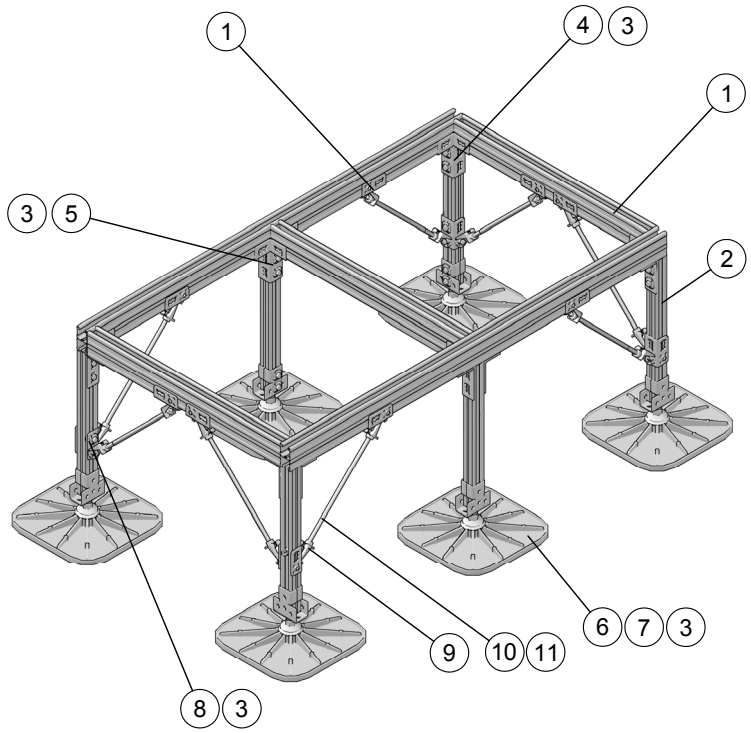
General comments

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

Ventilation Applications - Roof Top Frame - Comfort - Medium

Type V-HDG-RTF-3-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**304109**	**MQ-41D-F 3m channel**	7	Depends on module size
2	**304107**	**MQ-21D-F 3m channel**	6	Depends on height
3	**387779**	**MQN-HDG Plus push button**	50	
4	**304153**	**MQV-3/3 D-F connector**	4	
5	**30415**	**MQV-4/3 D-F connector**	2	
6	**2048106**	**MV-LDP load distribution plate**	6	
7	**2050264**	**MV-PSF protective separation fleece**	6	
8	**369694**	**MQ3D-B 3D base**	12	
9	**369697**	**MQ3D-A brace connector**	16	
10	**339795**	**AM10x1000 t. rod**	8	
11	**216466**	**M10 hex. Nut**	32	

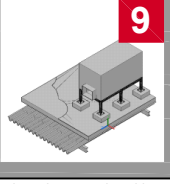
Application description

Ventilation - Roof Top Frame - Comfort - Medium

General comments

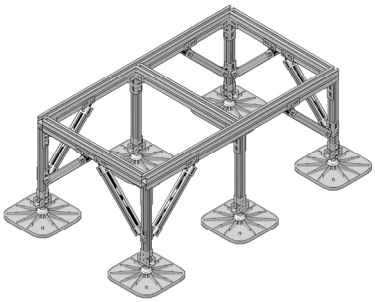
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

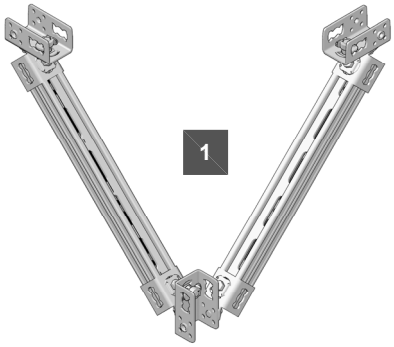
Application



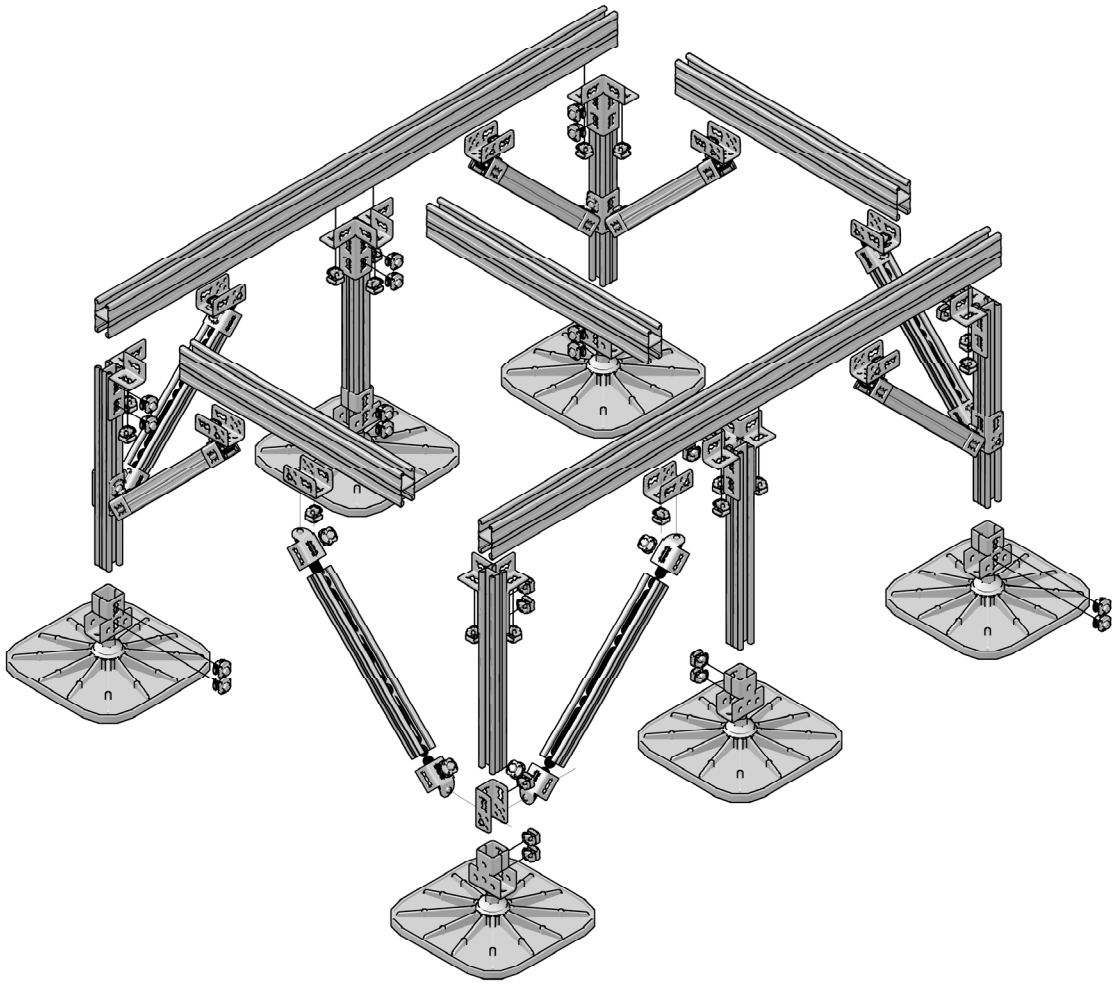
Base material	Roof top
Product line	MQ System
Capacity limit	Individual

Ventilation - Roof-top Frame Light - Channel Made Space Bracing - Options





1	Space bracing set for one corner	
	Set of braces (2 braces)	
	3x MQ3D-B 3D base	**369694**
	3x MQN push button	**369623**
	4x MQ3D-A brace connector	**369697**
	2x AM10 threaded rod	
	AM10x1000 t. rod	**339795**
	AM10x2000 t. rod	**339796**
	AM10x3000 t. rod	**216418**
	8x M10 hex. nut	**216466**
	Set of one cross has 1pc MQ3D-B 3D base and 1pc push button in addition to above bill of materials.	



Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MQ System	Roof-top
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Load distrib. plate	

Ventilation Applications - Roof Top Frame - Comfort - Medium

Type V-HDG-RTF-4-C-M-GL

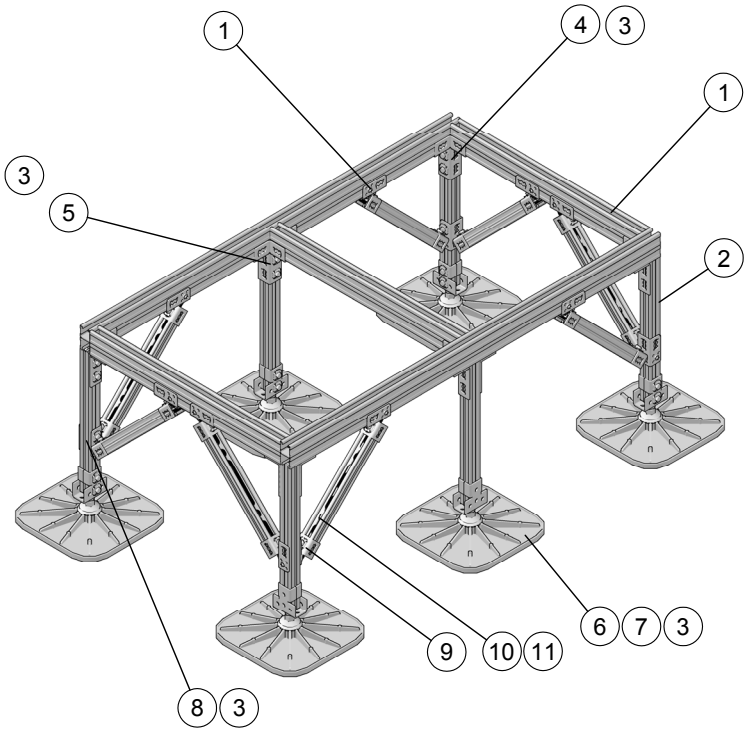
- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually

Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.



Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**304109**	**MQ-41D-F 3m channel**	7	Depends on module size
2	**304107**	**MQ-21D-F 3m channel**	6	Depends on height
3	**387779**	**MQN-HDG Plus push button**	66	
4	**304153**	**MQV-3/3 D-F connector**	4	
5	**30415**	**MQV-4/3 D-F connector**	2	
6	**2048106**	**MV-LDP load distribution plate**	6	
7	**2050264**	**MV-PSF protective separation fleece**	6	
8	**369694**	**MQ3D-B 3D base**	12	
9	**369696**	**MQ3D-W45 channel brace connector**	16	
10	**369601**	**MQ-21D 3m channel**	8	

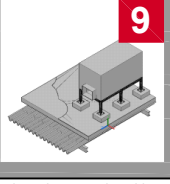
Application description

Ventilation - Roof Top Frame - Comfort - Medium

General comments

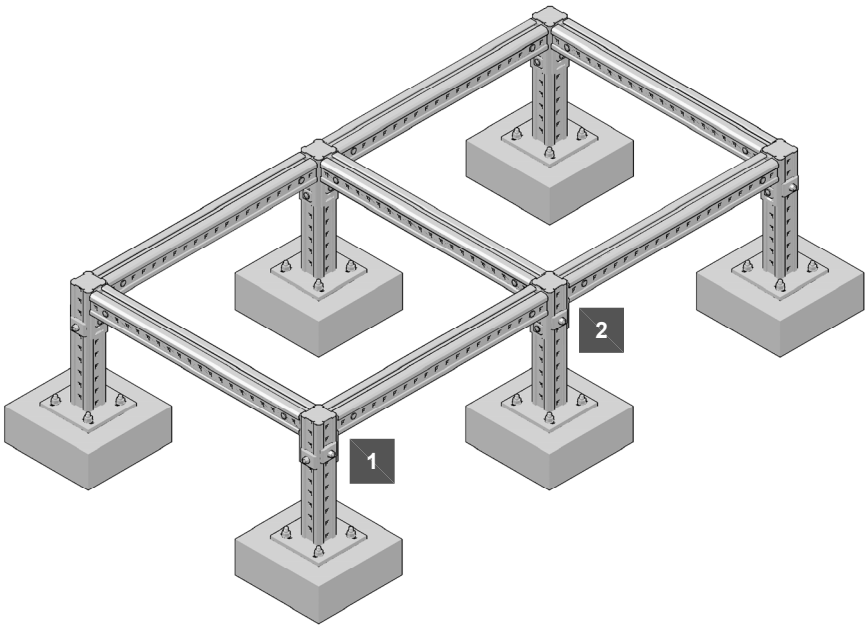
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application

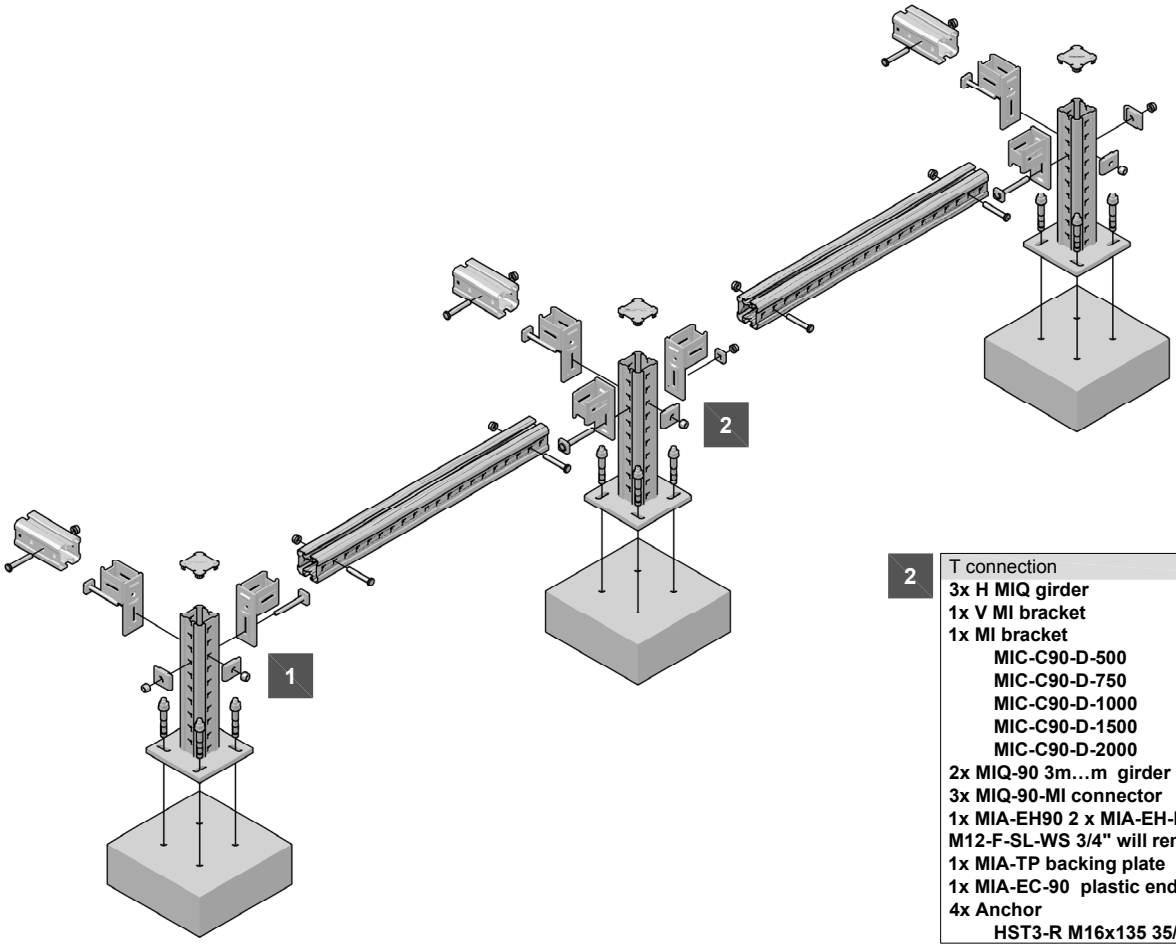


Base material	Roof top
Product line	MQ System
Capacity limit	Individual

Ventilation - Roof Top Frame Heavy - Options



1	Corner connection	
	2x H MIQ girder	
	1x V MI bracket	
	1x MIbracket	
	MIC-C90-D-500	**267789**
	MIC-C90-D-750	**267790**
	MIC-C90-D-1000	**267791**
	MIC-C90-D-1500	**267792**
	MIC-C90-D-2000	**267793**
	2x MIQ-90 3m…m girder	**2119866**
	2x MIQ-90-MI connector	**2140257**
	1x MIA-EC-90 plastic end cap	**304892**
	4x Anchor	
	HST3-R M16x135 35/15	**2105876**



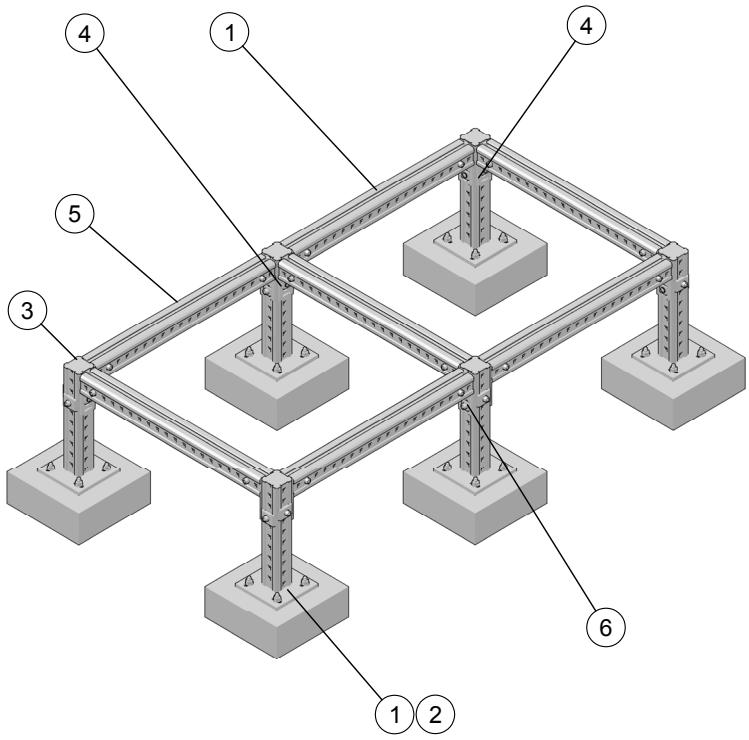
2	T connection	
	3x H MIQ girder	
	1x V MI bracket	
	1x MI bracket	
	MIC-C90-D-500	**267789**
	MIC-C90-D-750	**267790**
	MIC-C90-D-1000	**267791**
	MIC-C90-D-1500	**267792**
	MIC-C90-D-2000	**267793**
	2x MIQ-90 3m…m girder	**2119866**
	3x MIQ-90-MI connector	**2140257**
	1x MIA-EH90 2 x MIA-EH-P and 1 x M12-F-SL-WS 3/4" will remain unused	
	1x MIA-TP backing plate	**305707**
	1x MIA-EC-90 plastic end cap	**304892**
	4x Anchor	
	HST3-R M16x135 35/15	**2105876**

Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MQ System	Roof-top
General comments		Threaded parts	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Load distrib. plate	

Ventilation Applications - Roof Top Frame - Comfort - Heavy

Type V-HDG-RTF-5-C-H-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**267791**	**MIC-C90-D-1000 bracket**	6	
2	**2105876**	**HST3-R M16x135 35/15 stud anchor**	24	
3	**304892**	**MIA-EC-90 plastic end cap**	6	
4	**2140257**	**MIQ-90-MI connector incl. all components**	14	
5	**2119866**	**MIQ-90 3m girder**	7	Depends on size of the module
6	**305707**	**MIA-TP backing plate**	2	

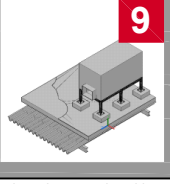
Application description

Ventilation - Roof Top Frame - Comfort - Heavy

General comments

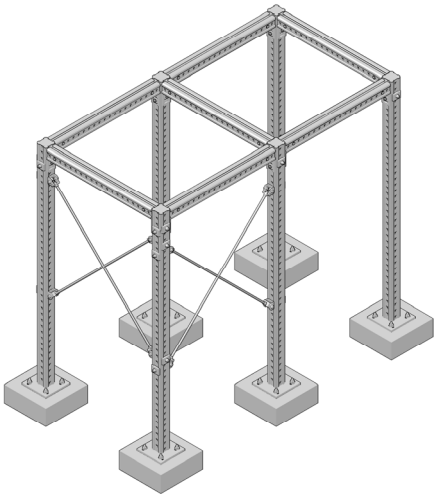
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

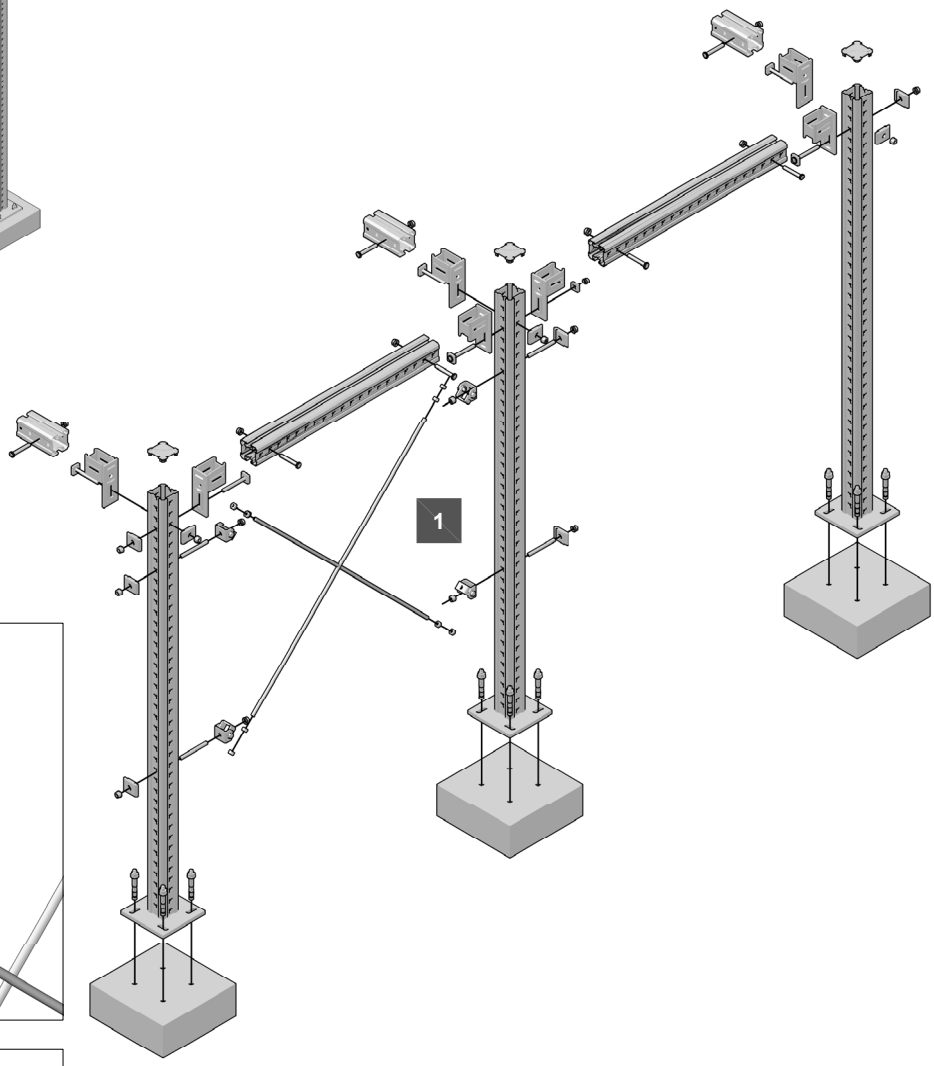
Application



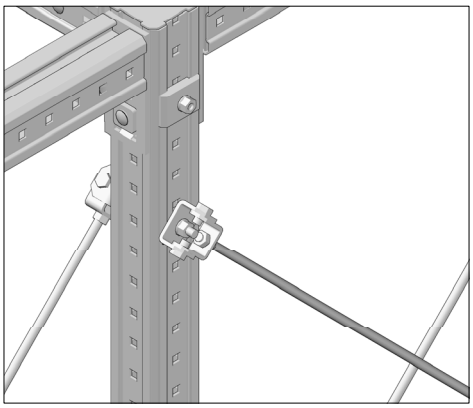
Base material	Roof top concrete
Product line	MI/MIQ System
Capacity limit	Individual

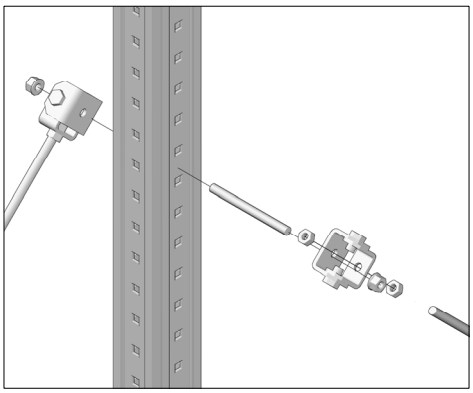
Ventilation - Roof Top Frame Heavy - Threaded Rod Space Bracing - Options





Alternative rod bracing

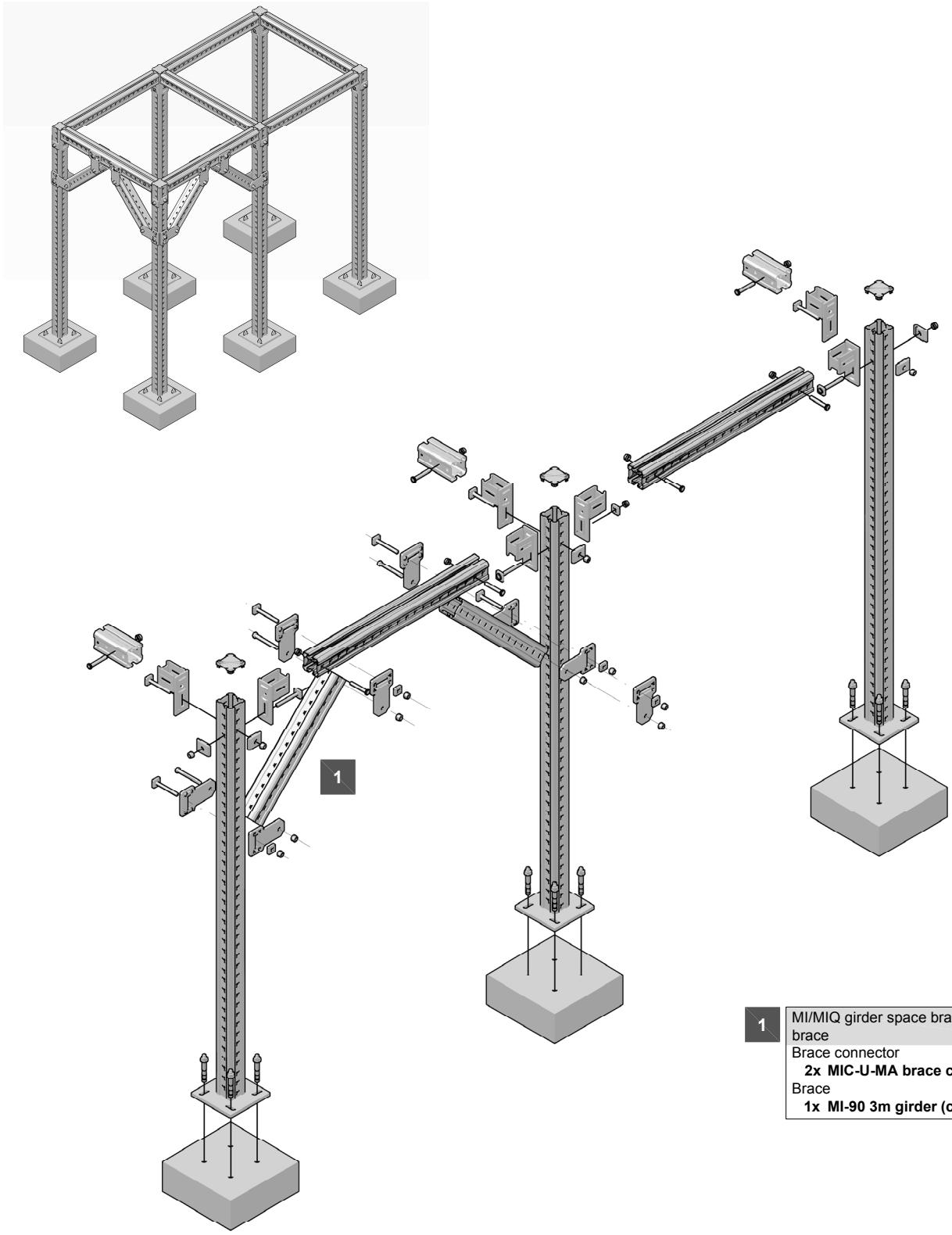




1	Threaded rod M12 space bracing BOM for 1 field cross	
	4x MQP-U M12-F pivot con.	388359
	2x AM12x2000-F 4.8 thr. rod	304775
	8x M12-F-SL-WS 3/4“ nut	382897
	4x AM12x1000-F 4.8 - 0.15m	304774
	8x M12-F hexagon head nut	304766

Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MI/MIQ System	Roof-top concrete blocks
General comments		Anchors	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads			

Ventilation - Roof Top Frame Heavy - Girder Space Bracing - Options



1	MI/MIQ girder space bracingBOM for 1 brace
	Brace connector
	2x MIC-U-MA brace conn. 304806
	Brace
	1x MI-90 3m girder (channel) 304798

Application description	Application	Product lines	Base material
Ventilation - Roof Top Frame	9	MI/MIQ System	Roof-top concrete blocks
		Anchors	

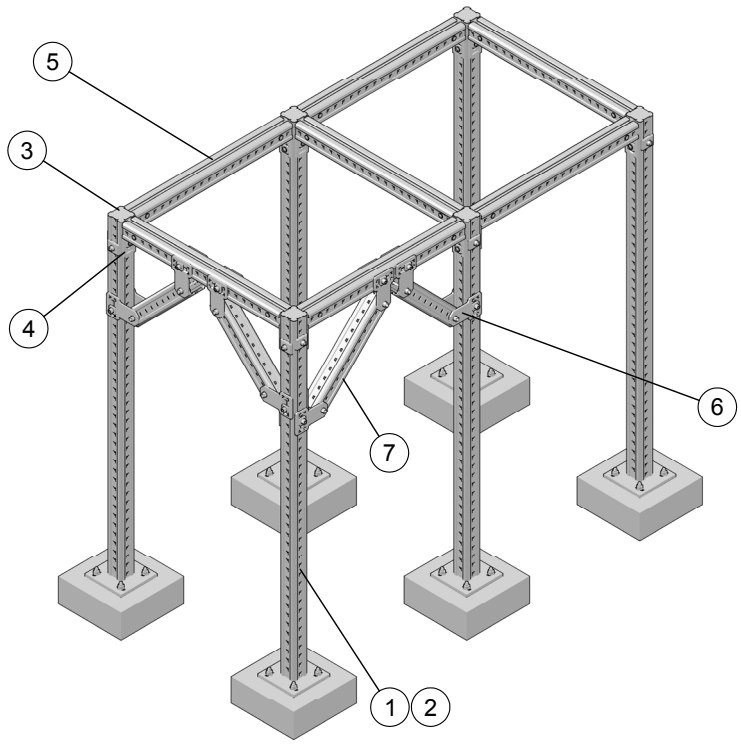
General comments

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

Ventilation Applications - Roof Top Frame - Comfort - Heavy

Type V-HDG-RTF-7-C-H-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**267793**	**MIC-C90-D-2000 bracket**	6	
2	**2105876**	**HST3-R M16x135 35/15 stud anchor**	24	
3	**304892**	**MIA-EC-90 plastic end cap**	6	
4	**2140257**	**MIQ-90-MI connector incl. all components**	14	
5	**2119866**	**MIQ-90 3m girder**	-	Depends on size of the module
6	**304806**	**MIC-U-MA brace connector**	4	
7	**304798**	**MI-90 3m girder**	-	Depends on the lenght of the brace

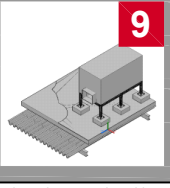
Application description

Ventilation - Roof Top Frame Comfort - Heavy

General comments

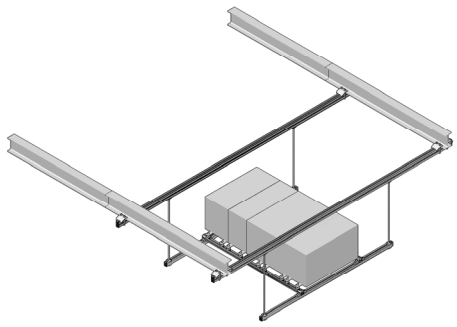
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

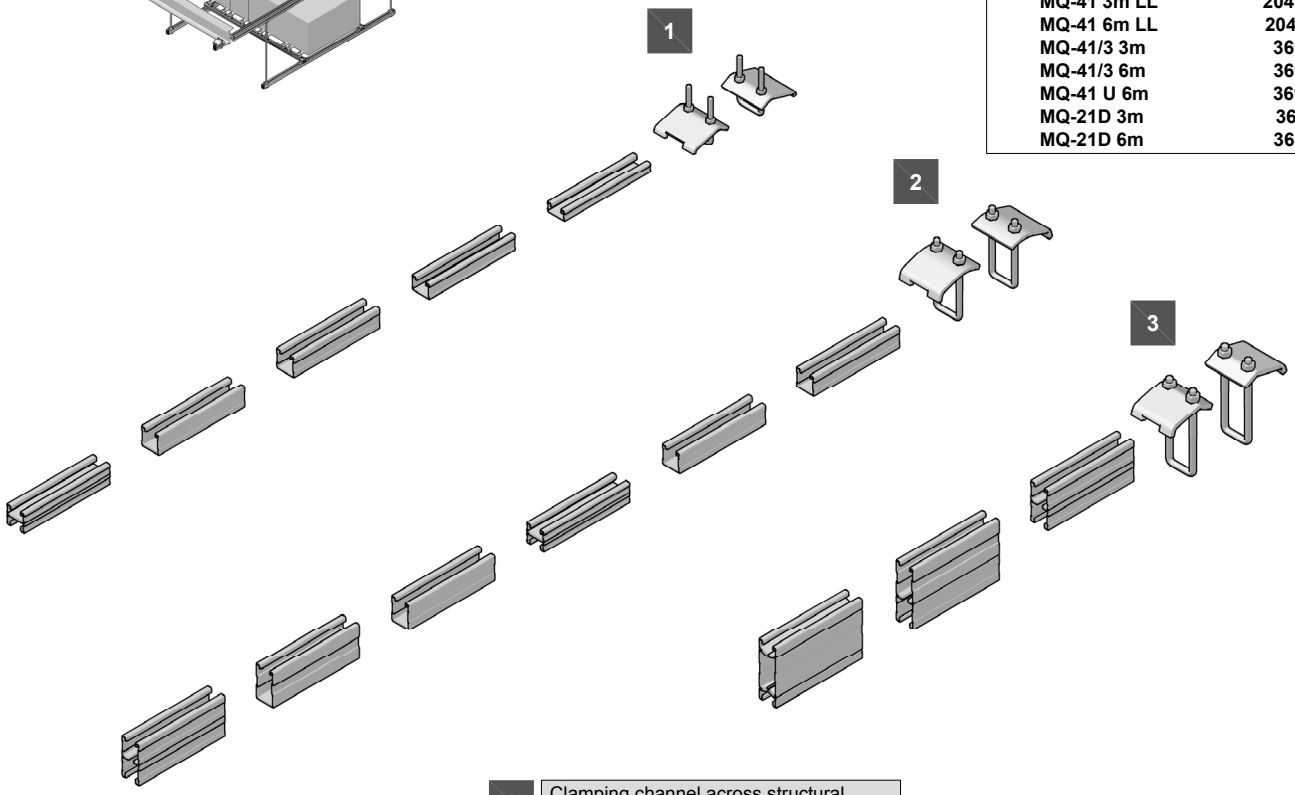
Application



Base material	Roof top concrete
Product line	MI/MIQ System
Capacity limit	Individual

Ventilation - Suspended Secondary Structure - MQ System - Upper Beam Clamping - Options

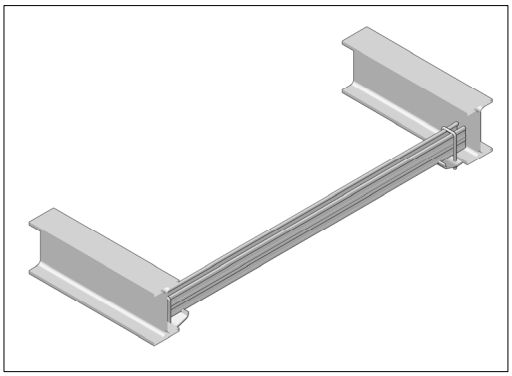




1 Clamping channel across structural I beamBOM for 1 connection

Beam clamp MQT-21-41 and associated channels		
2x	**MQT-21-41 beam clamp**	**369675**
	MQ-21 3m	**369584**
	MQ-21 6m	**369585**
	MQ-21 U 6m	**369588**
	MQ-41 2m	**304559**
	MQ-41 3m	**369591**
	MQ-41 6m	**369592**
	MQ-41 3m LL	**2048100**
	MQ-41 6m LL	**2048101**
	MQ-41/3 3m	**369596**
	MQ-41/3 6m	**369597**
	MQ-41 U 6m	**369595**
	MQ-21D 3m	**369601**
	MQ-21D 6m	**369602**

Alternative connection between the webs of the structural steel beam



2 Clamping channel across structural I beamBOM for 1 connection

Beam clamp MQT-41-82 and associated channel		
2x	**MQT-41-82**	**369676**
	MQ-41 2m	**304559**
	MQ-41 3m	**369591**
	MQ-41 6m	**369592**
	MQ-41 3m LL	**2048100**
	MQ-41 6m LL	**2048101**
	MQ-41/3 3m	**369596**
	MQ-41/3 6m	**369597**
	MQ-41 U 6m	**369595**
	MQ-21D 3m	**369601**
	MQ-21D 6m	**369602**
	MQ-52 3m	**373795**
	MQ-52 6m	**369598**
	MQ-72 3m	**373797**
	MQ-72 6m	**369599**
	MQ-72-U 6m3	**70593**
	MQ-41 D 3m	**369603**
	MQ-41 D 6m	**369604**

3 Clamping channel across structural I beamBOM for 1 connection

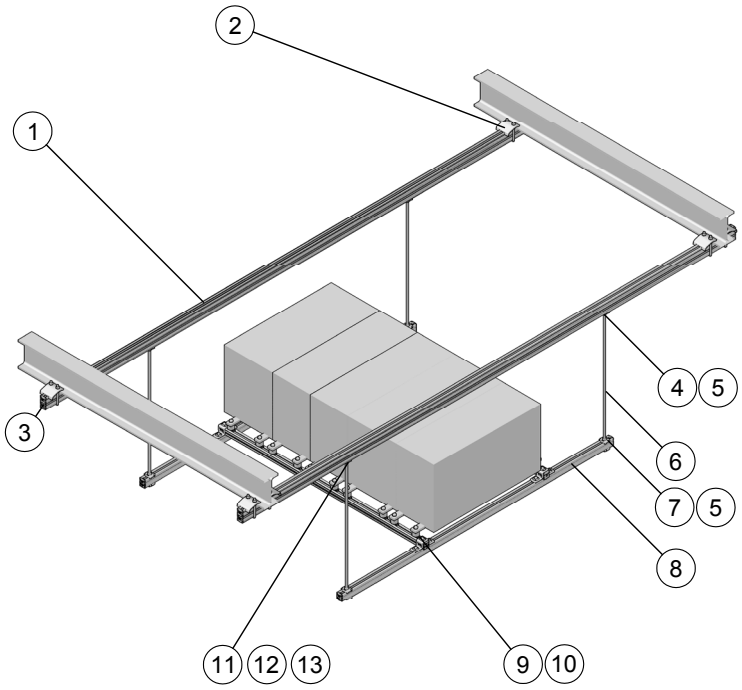
Beam clamp MQT-82-124 and associated channels		
2x	**MQT-82-124 beam clamp**	**369677**
	MQ-41 D 3m	**369603**
	MQ-41 D 6m	**369604**
	MQ-52-72 D 3m	**373799**
	MQ-52-72 D 6m	**369605**
	MQ-124X D 6m	**369606**

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MI/MIQ/MQ System	Steel
General comments		Beam clamps	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads			

Ventilation applications - Suspended Secondary Structure - Comfort - Medium

Type V-G-SSS-1-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369603**	**MQ-41 D 3m channel**	-	Depends on span
2	**369676**	**MQT-41-82 beam clamp**	8	
3	**369685**	**MQZ-E41 plastic end cap**	8	
4	**369631**	**MQA-M12-B saddle nut**	4	
5	**216467**	**M12 nut**	12	
6	**339797**	**AM12x1000 4.8 threaded rod**	-	Depends on distance
7	**369680**	**MQZ-L13 square washer**	8	
8	**369591**	**MQ-41 3m channel**	-	Depends on size of the unit
9	**369668**	**MQB-41 connector**	4	
10	**369623**	**MQN push button**	12	
11	**372471**	**MQA-M10-B saddle nut**	-	Depends on nr. of connection points
12	**386552**	**MVI-M10 T2 silencer**	-	Depends on nr. of connection points
13	**216466**	**M10 nut**	-	Depends on nr. of connection points

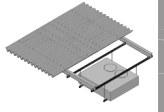
Application description

Ventilation - Suspended Secondary Structure - Comfort - Medium

General comments

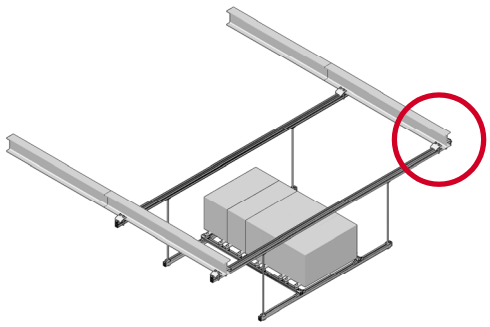
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

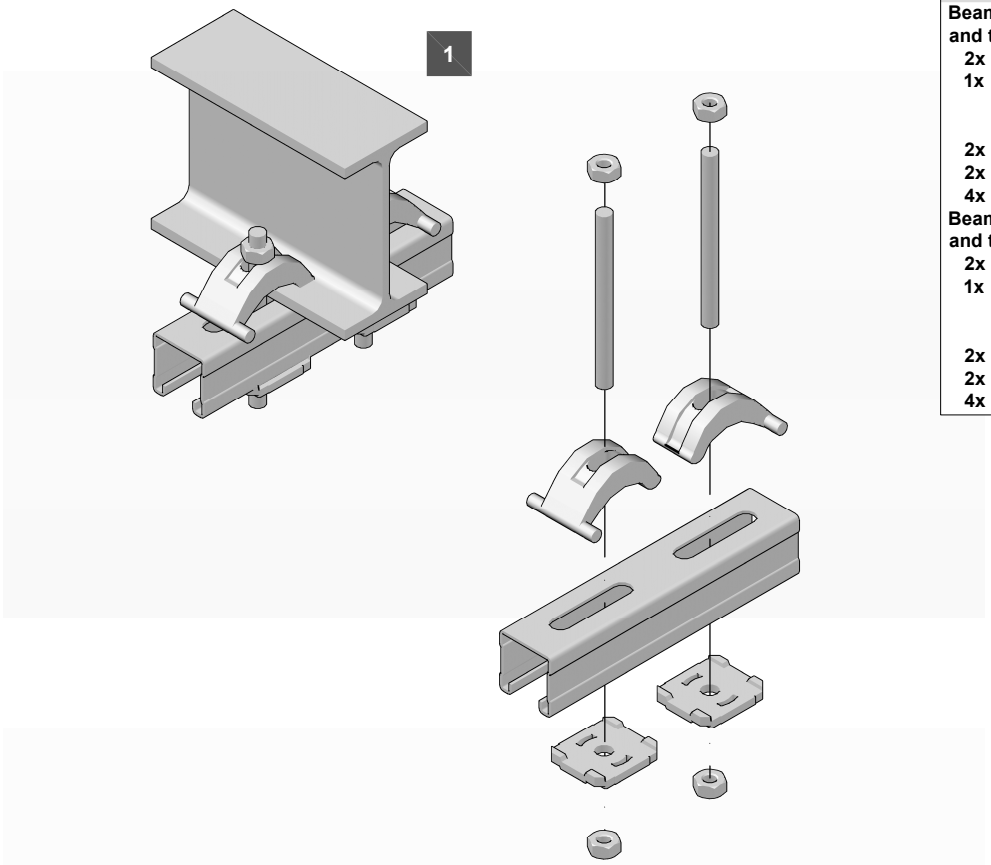
Application



Base material	Steel
Product line	MQ System
Capacity limit	Individual

Ventilation - Suspended Secondary Structure - MQ System - Upper Beam Clamping - Options





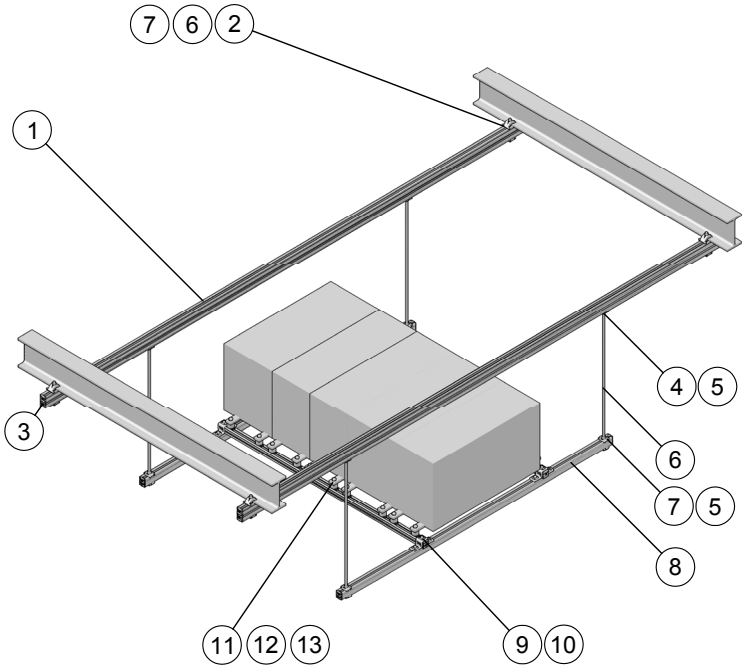
1	Clamping channel across structural I beamBOM for 1 connection	
	Beam clamp MQT-M10 and through bolting accessories	
	2x MQT-M10 beam clamp	**284242**
	1x Channel (see previous optional page - for all slotted channels)	
	2x MQZ-L11 square washer	**369679**
	2x AM10x1000 t. rod	**339795**
	4x M10 hex. nut216466	
	Beam clamp MQT-M12 and through bolting accessories	
	2x MQT-M12 beam clamp	**284243**
	1x Channel (see previous optional page - for all slotted channels)	
	2x MQZ-L13 square washer	**369680**
	2x AM12x1000 4.8 zinced	**339797**
	4x M12 nut	**216467**

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MI/MIQ/MQ System	Steel
General comments		Beam clamps	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads			

Ventilation applications - Suspended Secondary Structure - Comfort - Medium

Type V-G-SSS-2-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369603**	**MQ-41 D 3m channel**	-	Depends on span
2	**284243**	**MQT-M12 beam clamp**	8	
3	**369685**	**MQZ-E41 plastic end cap**	8	
4	**369631**	**MQA-M12-B saddle nut**	4	
5	**216467**	**M12 nut**	12	
6	**339797**	**AM12x1000 4.8 threaded rod**	-	12 x Depends on distance and I beam
7	**369680**	**MQZ-L13 square washer**	16	
8	**369591**	**MQ-41 3m channel**	-	Depends on size of the unit
9	**369668**	**MQB-41 connector**	4	
10	**369623**	**MQN push button**	12	
11	**372471**	**MQA-M10-B saddle nut**	-	Depends on nr. of connection points
12	**386552**	**MVI-M10 T2 silencer**	-	Depends on nr. of connection points
13	**216466**	**M10 nut**	-	Depends on nr. of connection points

Application description

Ventilation - Suspended Secondary Structure _ Comfort - Medium

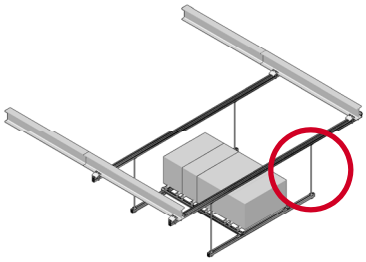
General comments

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

Application

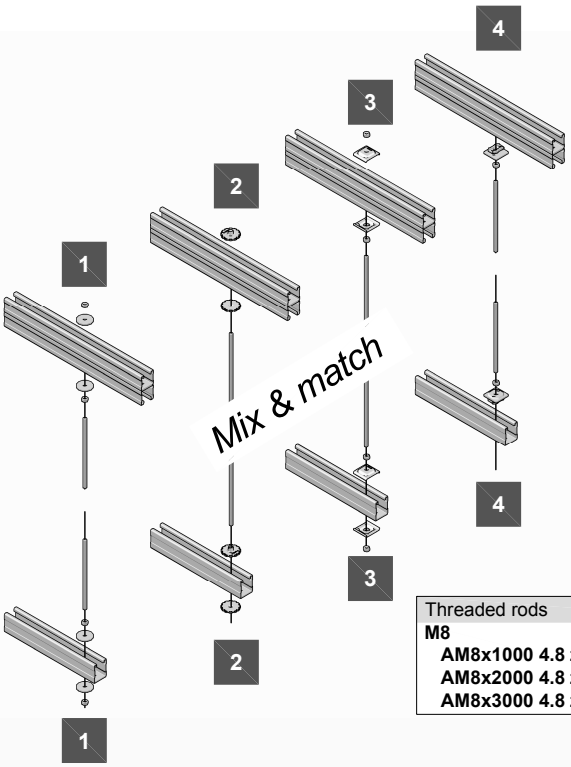
Base material	Steel
Product line	MQ System
Capacity limit	Individual

Ventilation - Suspended Secondary Structure - MQ System - Vertical M8, M10 Threaded Rod Connection - Options



M8 options

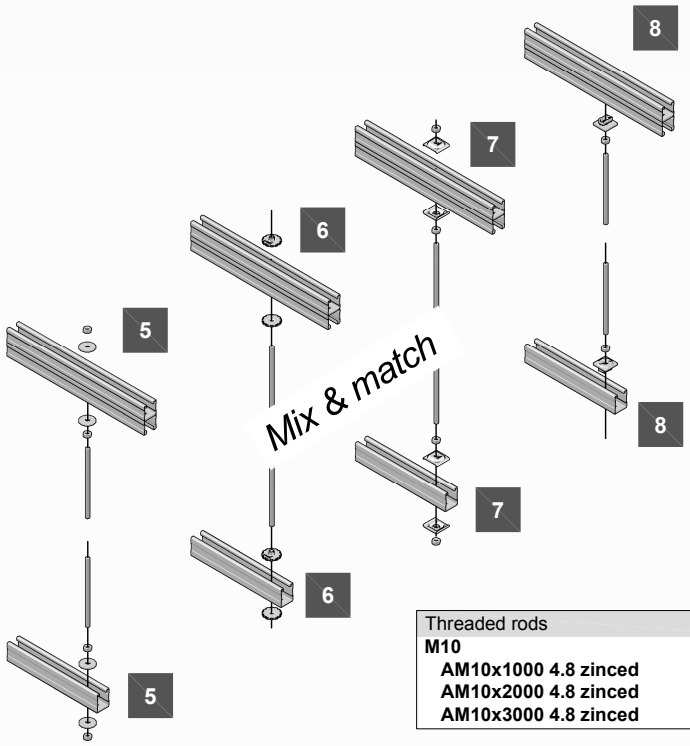
1	Connection of the vertical treaded rod		
	M8		
	2x	**A 8,4/40 washer**	**282856**
	2x	**M8 nut**	**216465**
	1x	**AM8 threaded rod**	**Various**
2	Connection of the vertical treaded rod		
	M8		
	2x	**MQZ-TW-M8 trap. wheel**	**2141930**
	1x	**AM8 threaded rod**	**Various**
3	Connection of the vertical treaded rod		
	M8		
	2x	**MQZ-P9 channel washer**	**2141908**
	2x	**M8 nut**	**216465**
	1x	**AM8 threaded rod**	**Various**
4	Connection of the vertical treaded rod		
	M8		
	1x	**MQA-M8 saddle nut**	**369629**
	1x	**M8 nut**	**216465**
	1x	**AM8 threaded rod**	**Various**



Threaded rods		
M8		
AM8x1000 4.8 zinced		**339793**
AM8x2000 4.8 zinced		**339794**
AM8x3000 4.8 zinced		**216415**

M10 options

5	Connection of the vertical treaded rod		
	M10		
	2x	**A 10,5/40 washer**	**282862**
	2x	**M10 nut**	**216462**
	1x	**AM10 threaded rod**	**Various**
6	Connection of the vertical treaded rod		
	M10		
	2x	**MQZ-TW-M10 trap. wheel**	**2141931**
	1x	**AM10 threaded rod**	**Various**
7	Connection of the vertical treaded rod		
	M10		
	2x	**MQZ-P11 chann. washer**	**2141909**
	2x	**M10 nut**	**216466**
	1x	**AM10 threaded rod**	**Various**
8	Connection of the vertical treaded rod		
	M10		
	1x	**MQA-M10 saddle nut**	**369630**
	1x	**M10 nut**	**216466**
	1x	**AM10 threaded rod**	**Various**



Threaded rods		
M10		
AM10x1000 4.8 zinced		**339795**
AM10x2000 4.8 zinced		**339796**
AM10x3000 4.8 zinced		**216418**

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MQ System	

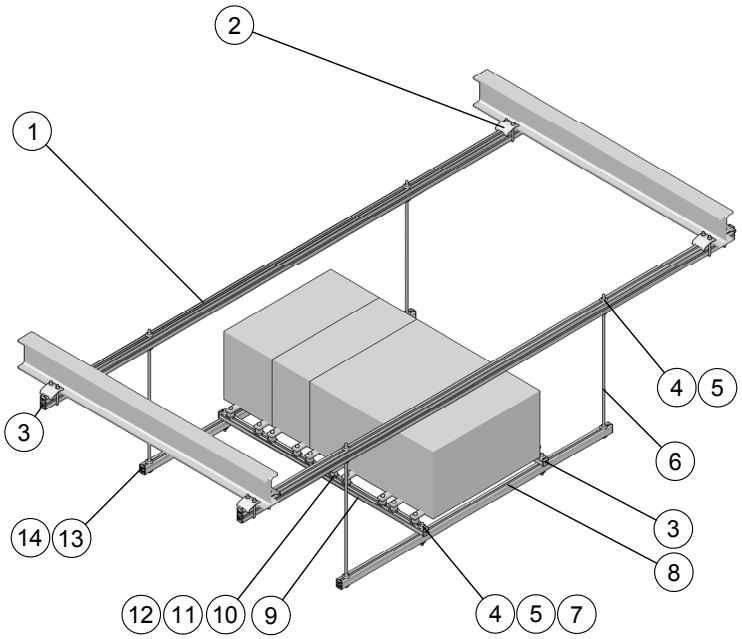
General comments

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

Ventilation applications - Suspended Secondary Structure - Basic - Medium

Type V-G-SSS-3-B-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369603**	**MQ-41 D 3m channel**	-	2 x depends on span
2	**369676**	**MQT-41-82 beam clamp**	8	
3	**369685**	**MQZ-E41 plastic end cap**	12	
4	**282862**	**A 10.5/40 washer**	24	
5	**216466**	**M10 nut**	24	
6	**339795**	**AM10x1000 4.8 threaded rod**	-	4 x depends onm hanging distance
7	**216395**	**AM 10x150 4.6 threaded bolt**	4	
8	**373795**	**MQ-52 3m channel**	-	2 x depends on unit size
9	**369591**	**MQ-41 3m channel**	-	2 x depends on unit size
10	**369630**	**MQA-M10 saddle nut**	-	Depends on nr. of connectionpoints
11	**386554**	**MVI-M10 T1 silencer**	-	Depends on nr. of connectionpoints
12	**216454**	**M10x25 hexagon head screw**	-	Depends on nr. of connectionpoints
13	**369686**	**MQZ-E31 plastic end cap**	4	
14	**370598**	**MQZ-E21 plastic end cap**	4	

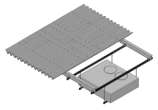
Application description

Ventilation - Suspended Secondary Structure - Basic - Medium

General comments

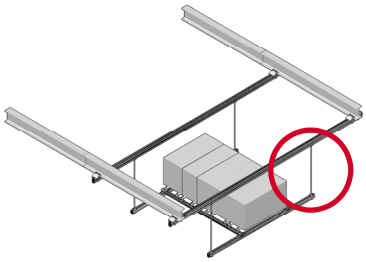
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application



10	
Base material	Steel
Product line	MQ System
Capacity limit	Individual

Ventilation - Suspended Secondary Structure - MQ System - Vertical M12, M16 Threaded Rod Connection - Options

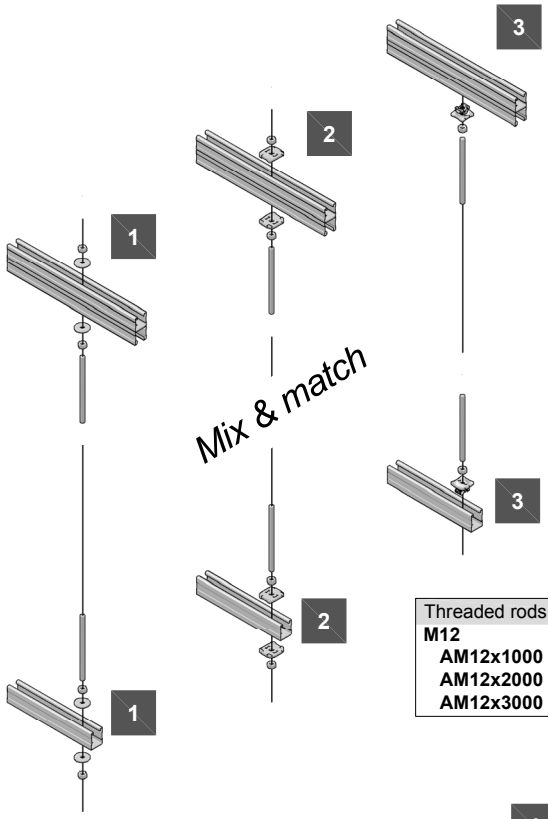


M12 options

1	Connection of the vertical treaded rod	
	M12	
	2x A 13/40 washer	**282858**
	2x M12 nut	**216467**
	1x AM12 threaded rod	**Various**

2	Connection of the vertical treaded rod	
	M12	
	2x MQZ-L13 square washer	**369680**
	2x M12 nut	**216467**
	1x AM12 threaded rod	**Various**

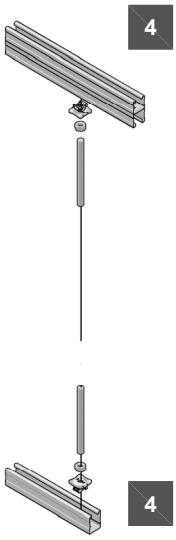
4	Connection of the vertical treaded rod	
	M12	
	1x MQA-M12 B saddle nut	**369631**
	1x M12 nut	**216467**
	1x AM8 threaded rod	**Various**



Threaded rods	
M12	
AM12x1000 4.8 zinced	**339797**
AM12x2000 4.8 zinced	**216420**
AM12x3000 4.8 zinced	**216421**

M16 options

4	**Connection of the vertical treaded rod**	
	M16	
	1x MQA-M16-B saddle nut	**369632**
	2x M16 nut	**216468**
	1x AM16 threaded rod	**Various**



Threaded rods	
M16	
AM16x1000 4.8 zinced	**216422**
AM16x2000 4.8 zinced	**216423**
AM16x3000 4.8 zinced	**216424**

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MQ System	

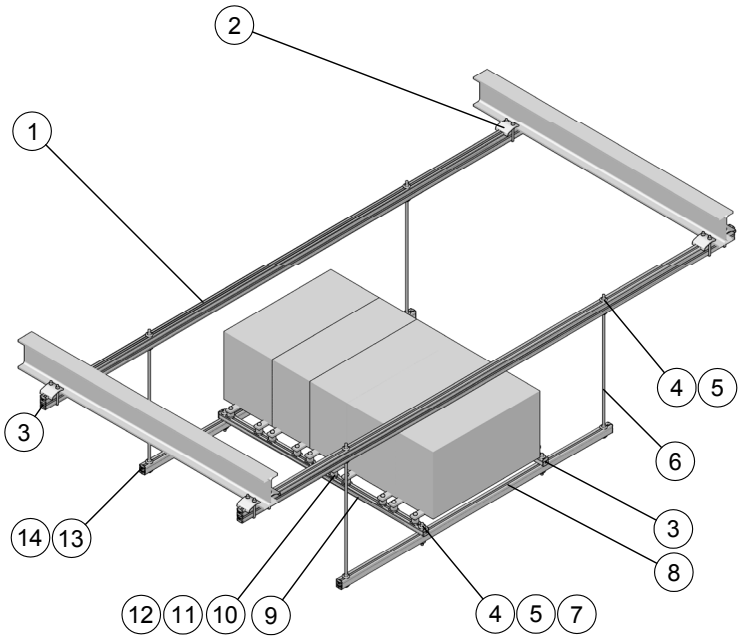
General comments

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

Ventilation applications - Suspended Secondary Structure - Basic - Medium

Type V-G-SSS-4-B-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369603**	**MQ-41 D 3m channel**	-	2 x depends on span
2	**369676**	**MQT-41-82 beam clamp**	8	
3	**369685**	**MQZ-E41 plastic end cap**	12	
4	**282858**	**A 13/40 washer**	24	
5	**216467**	**M12 nut**	24	
6	**339797**	**AM12x1000 4.8 threaded rod**	-	4 x depends onm hanging distance
7	**216401**	**AM 12x150 4.6 threaded bolt**	4	
8	**373795**	**MQ-52 3m channel**	-	2 x depends on unit size
9	**369591**	**MQ-41 3m channel**	-	2 x depends on unit size
10	**369630**	**MQA-M10 saddle nut**	-	Depends on nr. of connectionpoints
11	**386554**	**MVI-M10 T1 silencer**	-	Depends on nr. of connectionpoints
12	**216454**	**M10x25 hexagon head screw**	-	Depends on nr. of connectionpoints
13	**369686**	**MQZ-E31 plastic end cap**	4	
14	**370598**	**MQZ-E21 plastic end cap**	4	

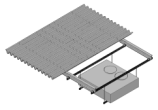
Application description

Ventilation - Suspended Secondary Structure - Basic - Medium

General comments

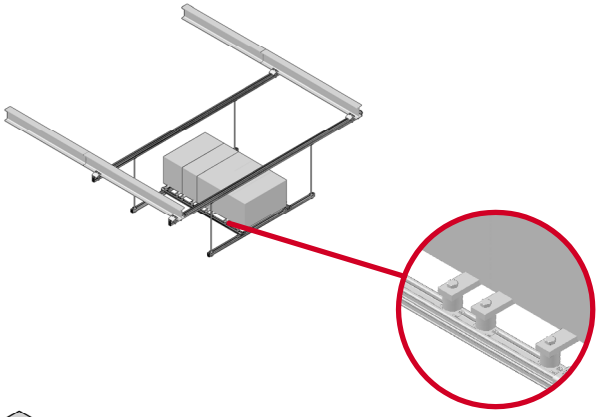
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

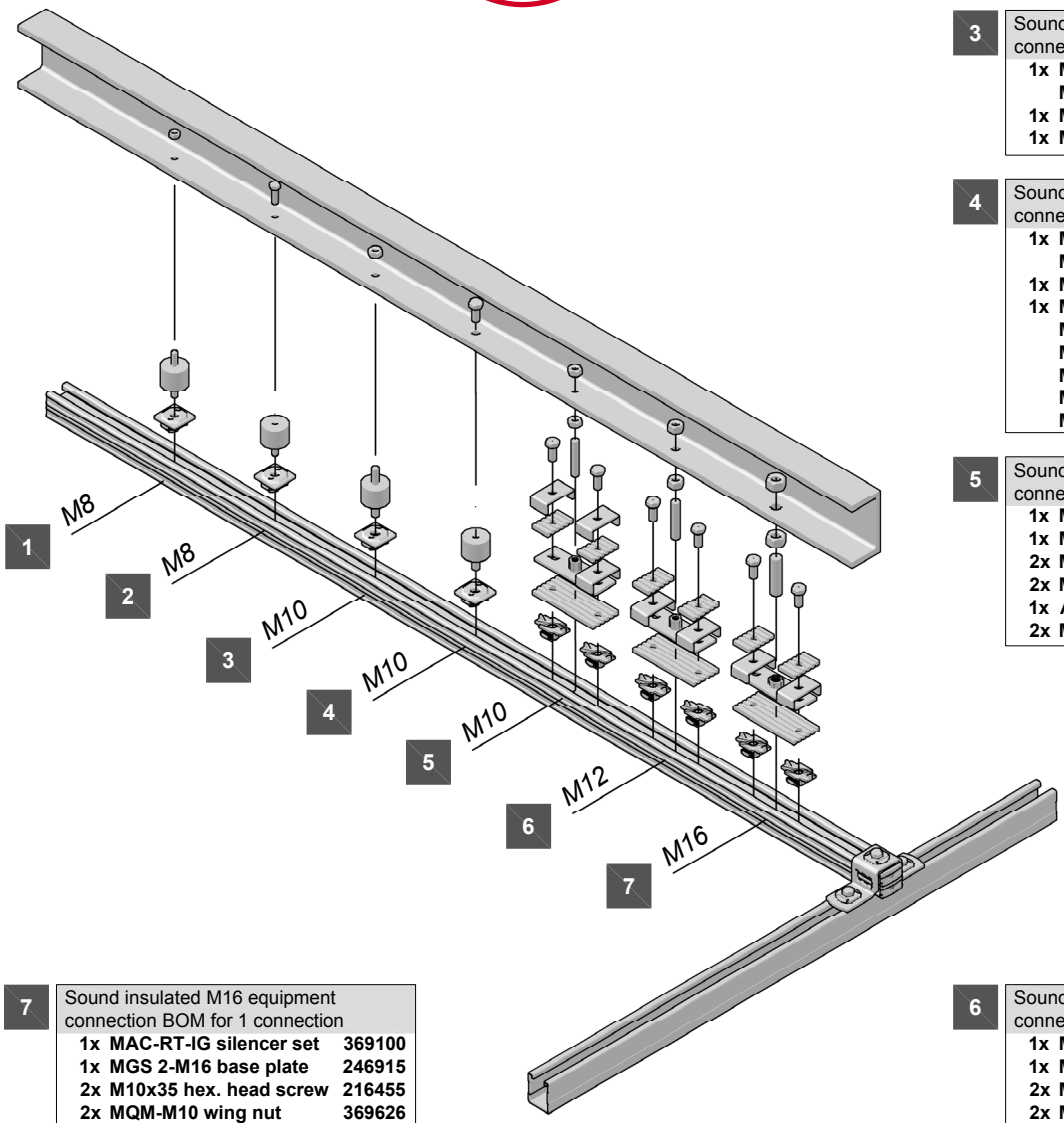
Application



10	
Base material	Steel
Product line	MQ System
Capacity limit	Individual

Ventilation - Suspended Secondary Structure - MQ System - Equipment Connections - Options





1 Sound insulated M8 equipment connection BOM for 1 connection

1x	MQA-M8 saddle nut	369629
1x	MVI-M8 T2 silencer	386551
1x	M8 hexagon head nut	216465

2 Sound insulated M8 equipment connection BOM for 1 connection

1x	MQA-M8 saddle nut	369629
1x	MVI-M8 T1 silencer	386553
1x	M8 hexagon head screw	
	M8x16	216446
	M8x20	216447
	M8x25	216448
	M8x35	216449
	M8x55	216450

3 Sound insulated M10 equipment connection BOM for 1 connection

1x	MQA-M10 saddle nut	369630
	MQA-M10-B saddle nut	372471
1x	MVI-M10 T2 silencer	386552
1x	M10 hexagon head nut	216466

4 Sound insulated M10 equipment connection BOM for 1 connection

1x	MQA-M10 saddle nut	369630
	MQA-M10-B saddle nut	372471
1x	MVI-M10 T1 silencer	386554
1x	M10 hexagon head screw	
	M10x16	216452
	M10x20	216453
	M10x25	216454
	M10x35	216455
	M10x55	216456

5 Sound insulated M10 equipment connection BOM for 1 connection

1x	MAC-RT-IG silencer set	369100
1x	MGS 2-M10 base plate	246913
2x	M10x35 hex. head screw	216455
2x	MQM-M10 wing nut	369626
1x	AM10x1000 threaded rod	339795
2x	M10 hex. head nut	216466

7 Sound insulated M16 equipment connection BOM for 1 connection

1x	MAC-RT-IG silencer set	369100
1x	MGS 2-M16 base plate	246915
2x	M10x35 hex. head screw	216455
2x	MQM-M10 wing nut	369626
1x	AM16x1000 threaded rod	216422
2x	M16 hex. head nut	216468

6 Sound insulated M12 equipment connection BOM for 1 connection

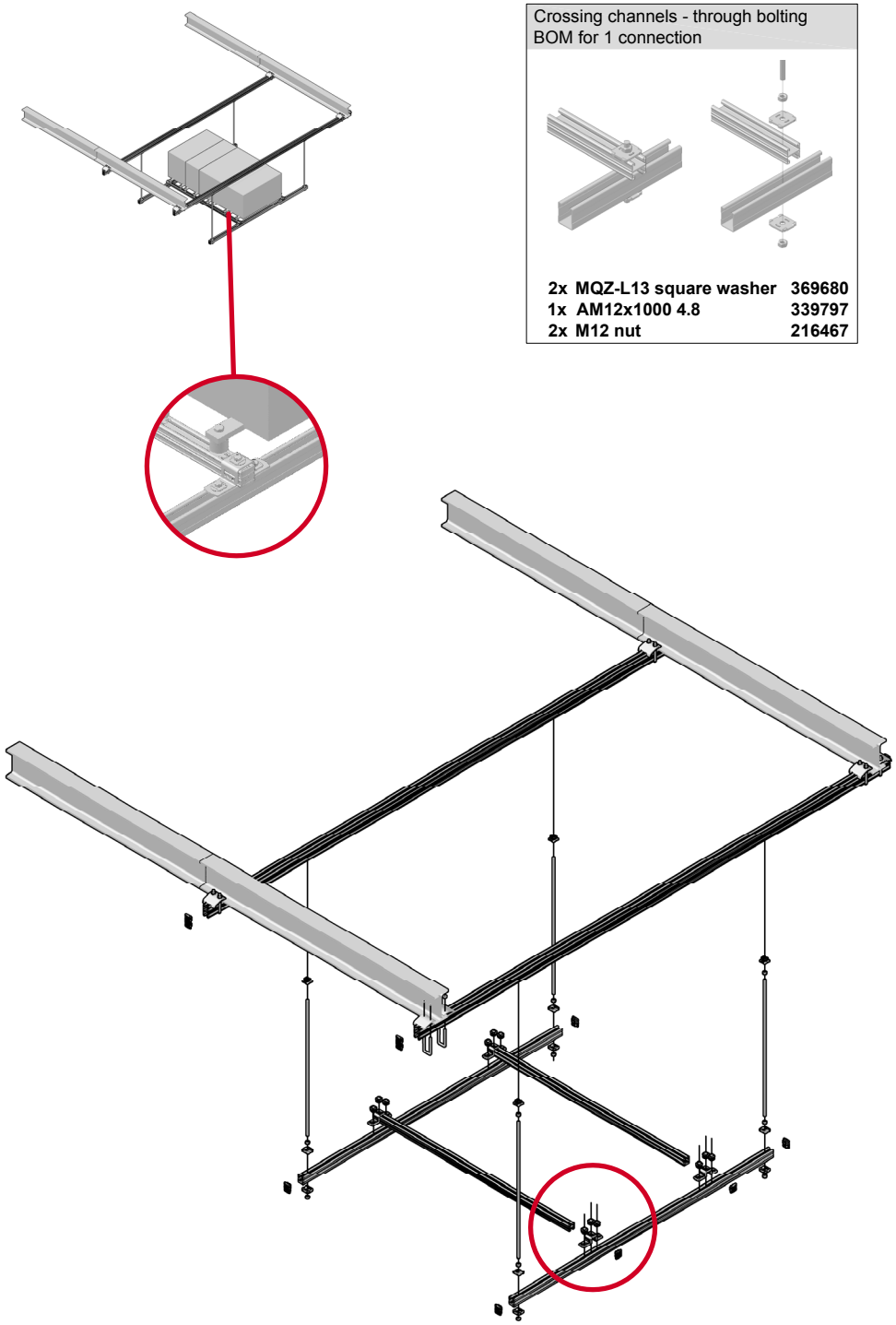
1x	MAC-RT-IG silencer set	369100
1x	MGS 2-M12 base plate	246914
2x	M10x35 hex. head screw	216455
2x	MQM-M10 wing nut	369626
1x	AM12x1000 threaded rod	339797
2x	M12 hex. head nut	216467

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MQ System	
		Ventilation	
		Base material connectors	

General comments

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

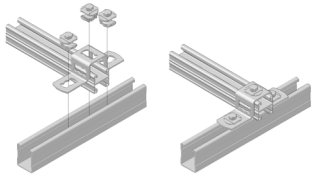
Ventilation - Suspended Secondary Structure - MQ System - Bottom Beam Cross Connection - Options



Crossing channels - through bolting
BOM for 1 connection

2x	MQZ-L13 square washer	369680
1x	AM12x1000 4.8	339797
2x	M12 nut	216467

Crossing channels - MQB connector
BOM for 1 connection



MQB-21 and associated channels		
1x	MQB-21 connector	369666
3x	MQN push button	369623
	MQ-21 3m	369584
	MQ-21 6m	369585
	MQ-21 U 6m	369588
MQB-41 and associated channels		
1x	MQB-41 connector	369668
3x	MQN push button	369623
	MQ-41 2m	304559
	MQ-41 3m	369591
	MQ-41 6m	369592
	MQ-41 3m LL	2048100
	MQ-41 6m LL	2048101
	MQ-41/3 3m	369596
	MQ-41/3 6m	369597
	MQ-41 U 6m	369595
	MQ-21D 3m	369601
	MQ-21D 6m	369602
MQB-52 and associated channels		
1x	MQB-52 connector	369669
3x	MQN push button	369623
	MQ-52 3m	373795
	MQ-52 6m	369598
MQB-72 and associated channels		
1x	MQB-72 connector	369670
3x	MQN push button	369623
	MQ-72 3m	373797
	MQ-72 6m	369599
	MQ-72-U 6m	370593
MQB-82 and associated channels		
1x	MQB-82 connector	369671
3x	MQN push button	369623
	MQ-41 D 3m	369603
	MQ-41 D 6m	369604
MQB-124 and associated channels		
1x	MQB-124 connector	369672
3x	MQN push button	369623
	MQ-52-72 D 3m	373799
	MQ-52-72 D 6m	369605
	MQ-124X D 6m	369606

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MQ System	
		Ventilation	

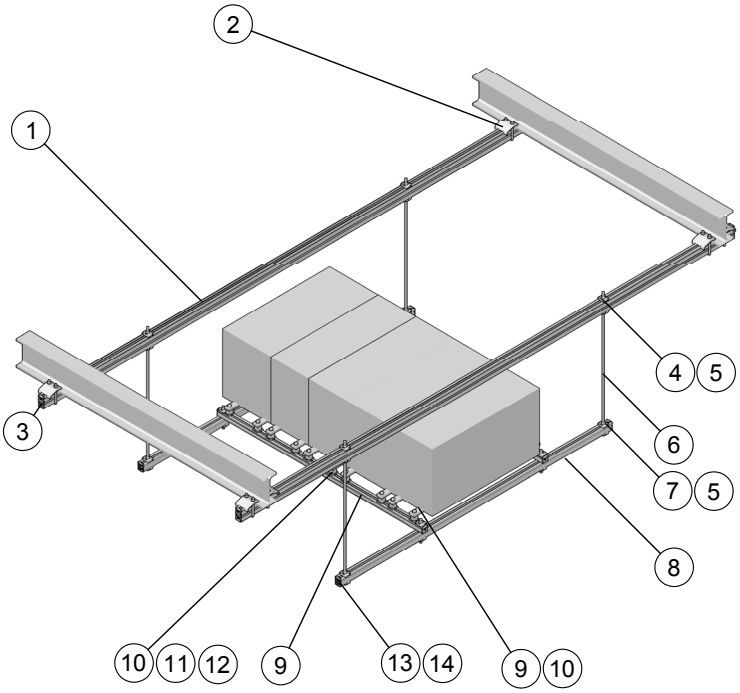
General comments

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

Ventilation applications - Suspended Secondary Structure - Comfort - Medium

Type V-G-SSS-5-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing roof top equipment.

Caution: This application is exposed to climatic loads and has to be design for worst case combination of these loads following local codes.

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369603**	**MQ-41 D 3m channel**	-	2 x depends on span
2	**369676**	**MQT-41-82 beam clamp**	8	
3	**369685**	**MQZ-E41 plastic end cap**	12	
4	**369680**	**MQZ-L13 square washer**	24	
5	**216467**	**M12 nut**	24	
6	**339797**	**AM12x1000 4.8 threaded rod**	-	4 x depends onm hanging distance
7	**216401**	**AM 12x150 4.6 threaded bolt**	4	
8	**373795**	**MQ-52 3m channel**	-	2 x depends on unit size
9	**369591**	**MQ-41 3m channel**	-	2 x depends on unit size
10	**369630**	**MQA-M10 saddle nut**	-	Depends on nr. of connectionpoints
11	**386554**	**MVI-M10 T1 silencer**	-	Depends on nr. of connectionpoints
12	**216454**	**M10x25 hexagon head screw**	-	Depends on nr. of connectionpoints
13	**369686**	**MQZ-E31 plastic end cap**	4	
14	**370598**	**MQZ-E21 plastic end cap**	4	

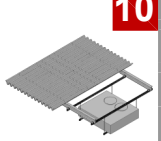
Application description

Ventilation - Suspended Secondary Structure - Comfort - Medium

General comments

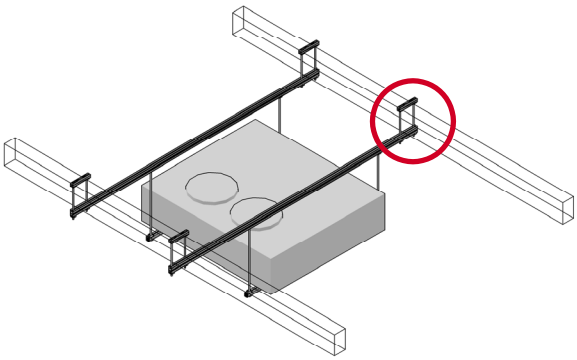
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application

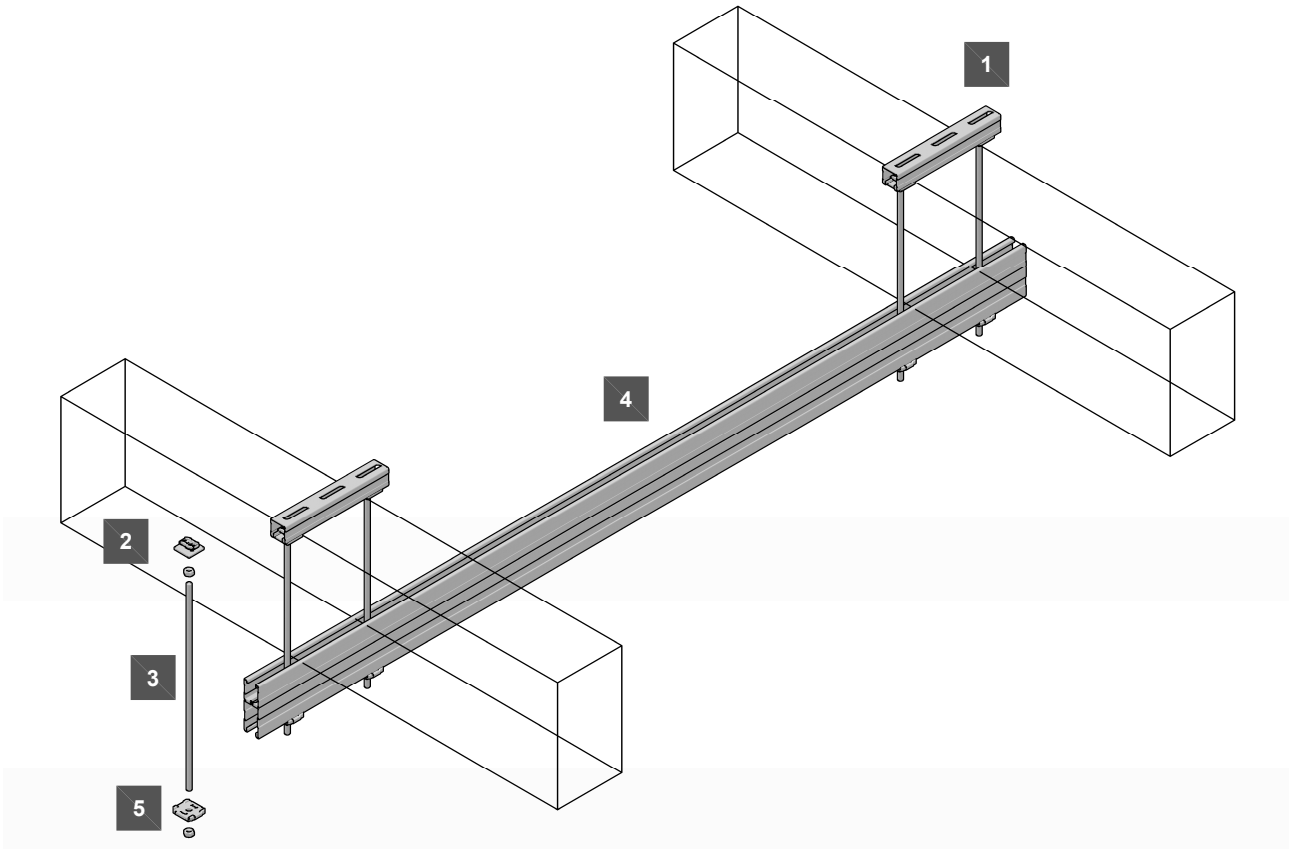


Base material	Steel
Product line	MQ System
Capacity limit	Individual

Ventilation - Suspended Secondary Structure - MQ System - Upper Concrete Beam connection - Options



1	Upper channel		
	1x	MQ-41 3m	369591
		MQ-41/3 3m	369596
2	Upper M12 threaded rod connections		
	2x	MQA-M12 B saddle nut	369631
	2x	M12 hexagon head nut	216467
3	M12 Threaded rods		
	2x	AM12x1000 4.8 th. rod	339797
4	Bottom beam (most probable sizes - must be strictly calculated under particular load exposure)		
	1x	MQ-41 D 6m	369604
		MQ-52-72 D 6m	369605
5	Bottom channel connection		
	2x	MQZ-L13 square washer	369680
	2x	M12 hexagon head nut	216467

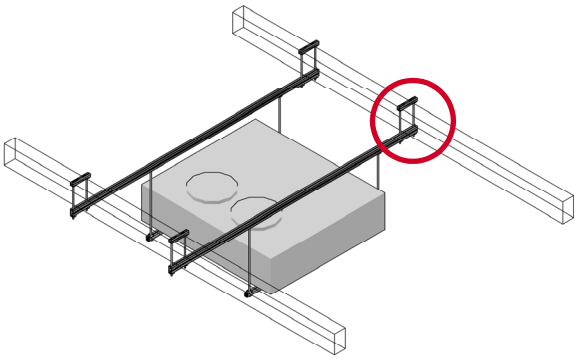


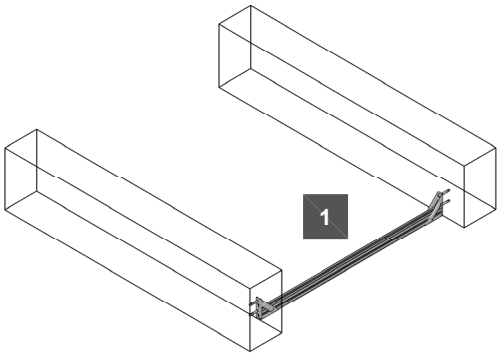
Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MQ System	Concrete
		Accessories	

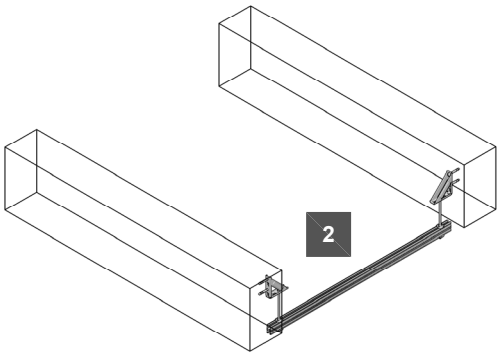
General comments

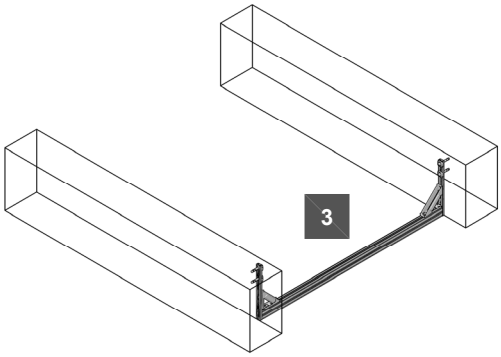
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

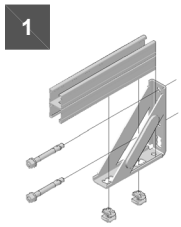
Ventilation - Suspended Secondary Structure - MQ System - Upper Concrete Beam connection - Options

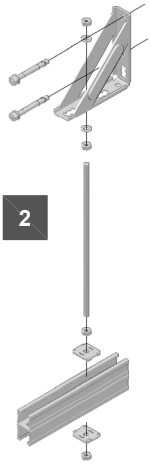


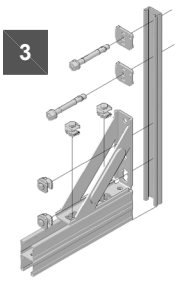












1 Side beam fixture with no limitation by tension zone
BOM for one side connection

Anchors		
2x	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848
Brace angle connector		
1x	MQW-S/2 angle conn.	369665
2x	MQN push button	369623
Spanning channel (most probable sizes - must be strictly calculated under particular load exposure)		
1x	MQ-41 D 6m	369604
	MQ-52-72 D 6m	369605
	MQ-124X D 6m	369606

2 Side beam fixture with no limitation by tension zone
BOM for one side connection

Anchors		
2x	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848
Brace angle connector		
1x	MQW-S/2 angle connector	369665
M12 Threaded rod hanged from the connector		
4x	M12 hexagon head nut	216467
2x	A13/24 washer	282852
1x	AM12x1000 4.8 th.rod	339797
2x	MQZ-L13 square washer	369680
Spanning channel (most probable sizes - must be strictly calculated under particular load exposure)		
1x	MQ-41 D 6m	369604
	MQ-52-72 D 6m	369605

3 Side beam fixture with limitation by tension zone
BOM for one side connection

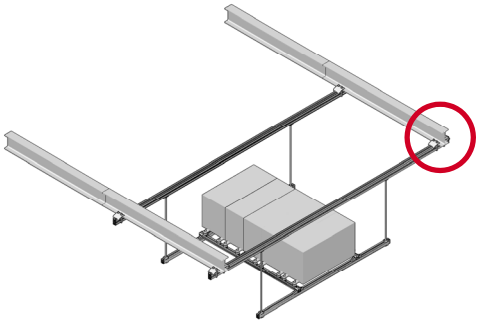
Anchors		
2x	HST3 M12x105 30/10	2105718
	HST2 M12x105/10	2107848
Side beam channel		
1x	MQ-21 3m channel…..m	369584
Brace angle connector		
1x	MQW-S/2 angle connector	369665
4x	MQN push button	369623
Spanning channel (most probable sizes - must be strictly calculated under particular load exposure)		
1x	MQ-41 D 6m	369604
	MQ-52-72 D 6m	369605
	MQ-124X D 6m	369606

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MQ System	Concrete
		Accessories	

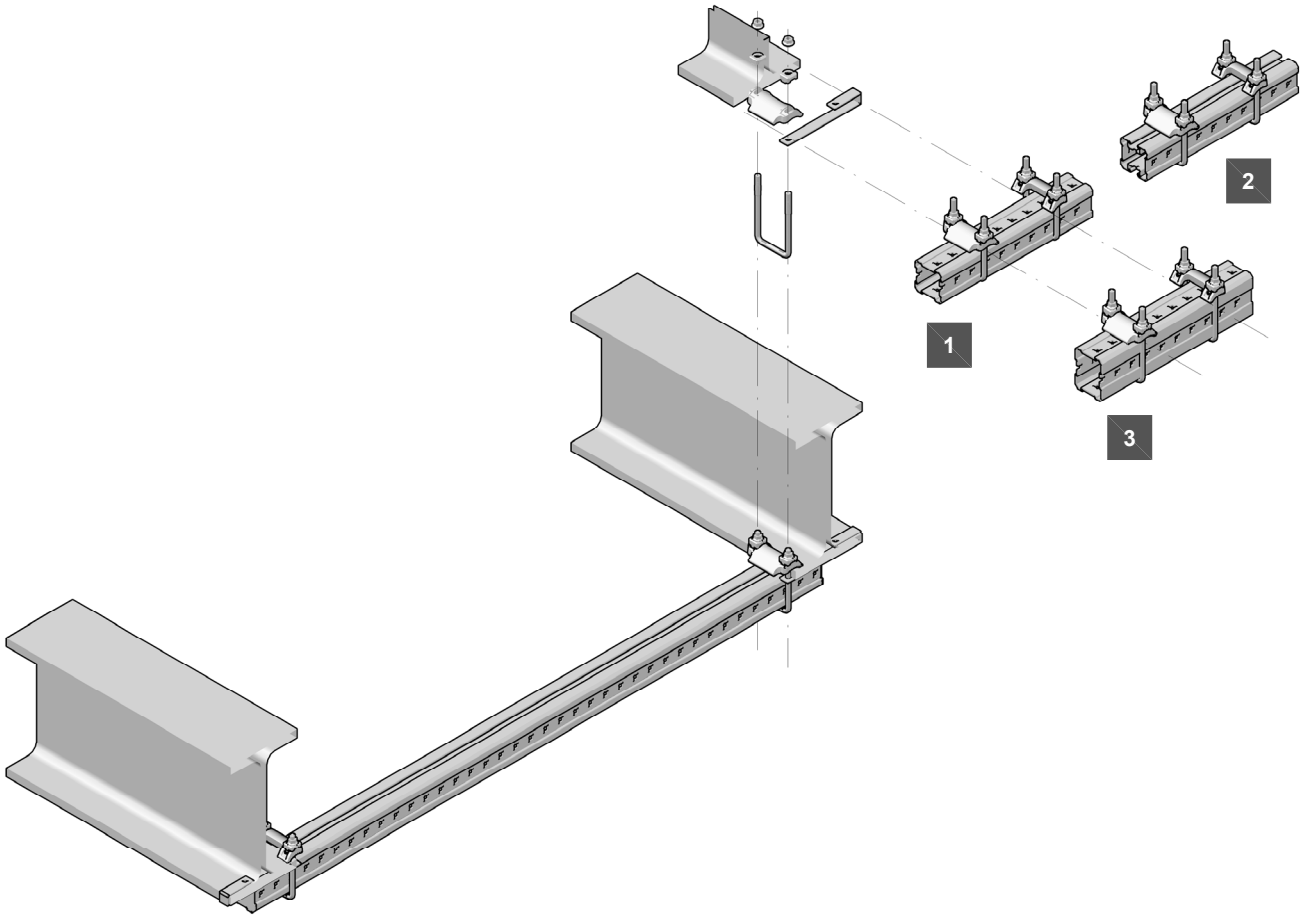
General comments

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

Ventilation - Suspended Secondary Structure - MI/MIQ System - Upper Beam Cross Connection - Options



Upper beam connection MI/MIQ girders BOM for 1 connection		
1	MI-90 connection	
	1x MI-90 3m girder	304798
	MI-90 6m girder	304799
	2x MI-DGC 90 beam clamp	233860
	1x MAB-S 11/13 secur. strap	374409
	Note: Available only in galvanized version	
2	MIQ-90 connection	
	1x MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867
	2x MI-DGC 90 beam clamp	233860
	1x MAB-S 11/13 secur. strap	374409
	Note: Available only in galvanized version	
3	MI-120 connection	
	1x MI-120 3m	304800
	MI-120 6m	304801
	2x MI-DGC 120 beam clamp	233861
	1x MAB-S 11/13 secur. strap	374409
	Note: Available only in galvanized version	

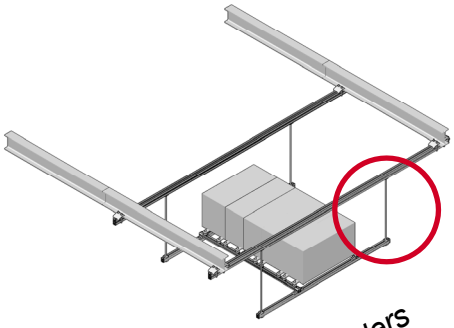


Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MI/MIQ/MQ System	Steel
		Beam clamps	

General comments

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

Ventilation - Suspended Secondary Structure - MI/MIQ/MQ System - Vertical Upright Connection - Options



1 Connection of vertical M12 threaded rod to MI System girders
BOM for one connection point

1x	M12-F-SL WS3/4 lock nut	382897
1x	MIA-EH-P back plate	304891
1x	MI System girder	
	MI-90 3m	304798
	MI-90 6m	304799
	MI-120 3m	304800
	MI-120 6m	304801
1x	A 13/40 washer	282858
2x	M12 nut	216467
1x	AM12 threaded rod	Various

2 Connection of vertical M12 threaded rod to MQ System channels
BOM for one connection point

2x	A 13/40 washer	282858
2x	M12 nut	216467
1x	AM12 threaded rod	Various

3 Connection of vertical M12 threaded rod to MQ System channels
BOM for one connection point

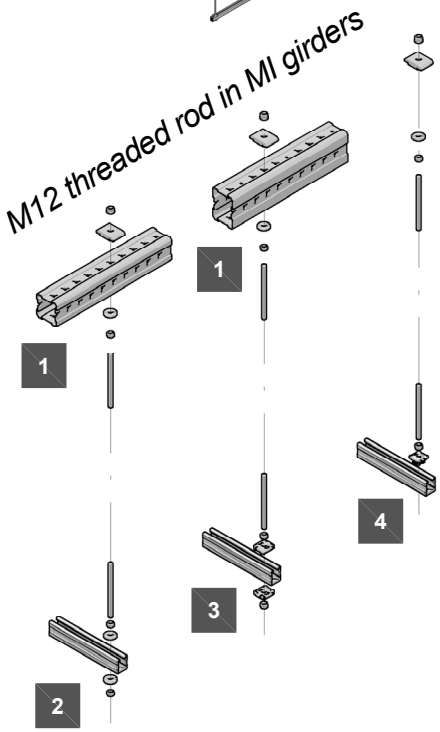
2x	MQZ-L13 square washer	369680
2x	M12 nut	216467
1x	AM12 threaded rod	Various

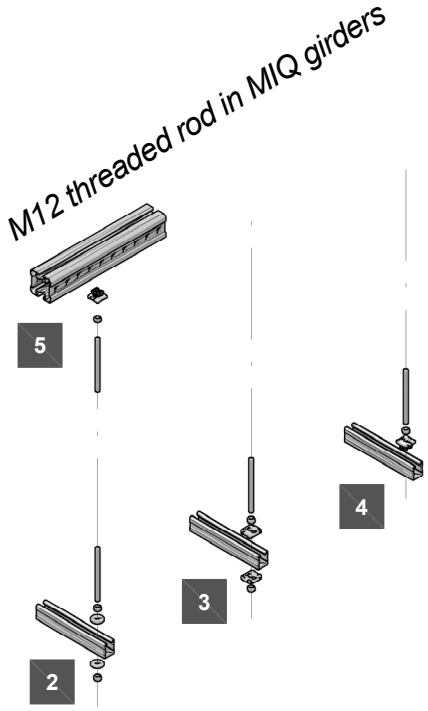
4 Connection of vertical M12 threaded rod to MQ System channels
BOM for one connection point

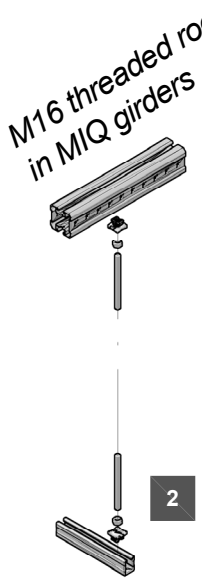
1x	MQA-M12-B saddle nut	369631
1x	M12 nut	216467
1x	AM12 threaded rod	Various

5 Connection of vertical M12 threaded rod to MIQ System girders
BOM for one connection point

1x	MQA-M12-B saddle nut	369631
1x	M12 nut	216467
1x	MIQ System girder	
	MIQ-90 3m girder	2119866
	MIQ-90 6m girder	2119867
1x	AM12 threaded rod	Various



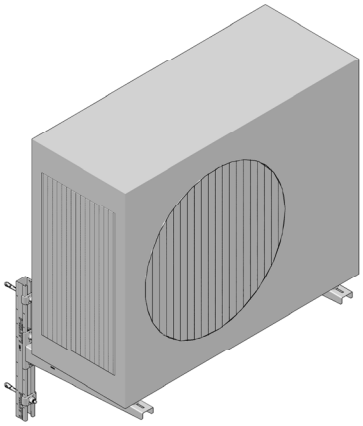


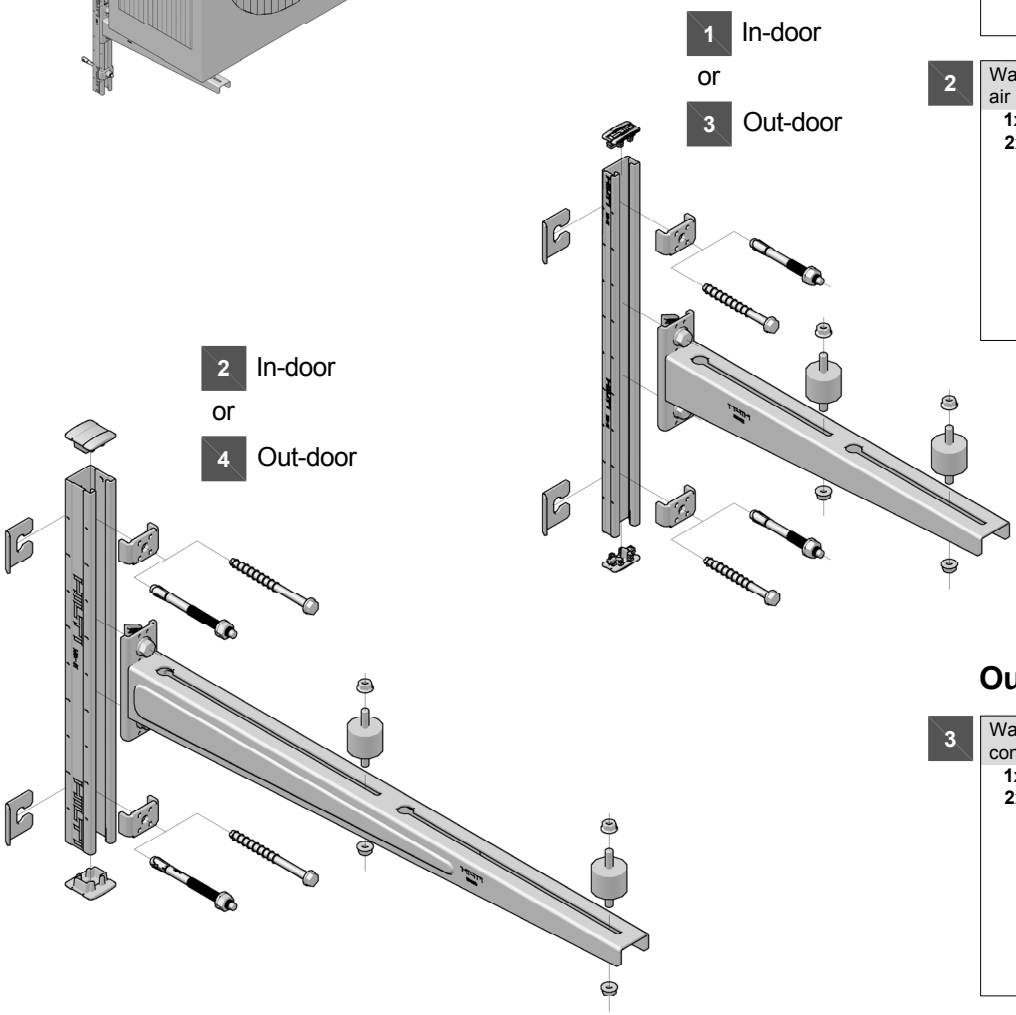


Threaded rods		
M12		
	AM12x1000 4.8 zinced	**339797**
	AM12x2000 4.8 zinced	**216420**
	AM12x3000 4.8 zinced	**216421**

Application description	Application	Product lines	Base material
Ventilation - Suspended Secondary Structure	10	MI/MIQ/MQ System	Steel
General comments		Beam clamps	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Base material connectors	

Ventilation - Wall bracket - Options





In-door options

1 Wall bracket set for ventilation / air conditioning unit max weight 100 kg

1x MV-ACS 500 air con. set 2018091
2x Anchors
Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can used for concrete C20/25 with no additional edge / distance influence.
HST3 M10x130 70/50 2105715
HUS3-H 8x120 70/60/50 2079799

2 Wall bracket set for ventilation / air conditioning unit max weight 150 kg

1x MV-ACS 780 air con. set 2048092
2x Anchors
Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.
HST3 M10x130 70/50 2105715
HUS3-H 8x120 70/60/50 2079799

Out-door options

3 Wall bracket set for ventilation / air conditioning unit max weight 100 kg

1x MV-ACS 500 HDG set 2048093
2x Anchors
Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.
HST3-R M10x130 70/50 2105867

4 Wall bracket set for ventilation / air conditioning unit max weight 150 kg

1x MV-ACS 780 HDG set 2048094
2x Anchors
Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.
HST3-R M10x130 70/50 2105867

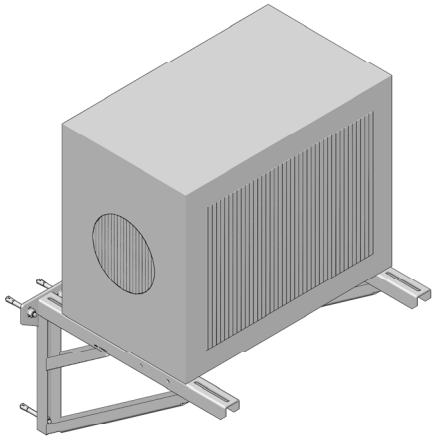
Set can be used on different base materials after consultation and selection of the proper anchor.

Application description	Application	Product lines	Base material
Ventilation - Wall bracket	 11	Ventilation set	Concrete
		Anchors	

General comments

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

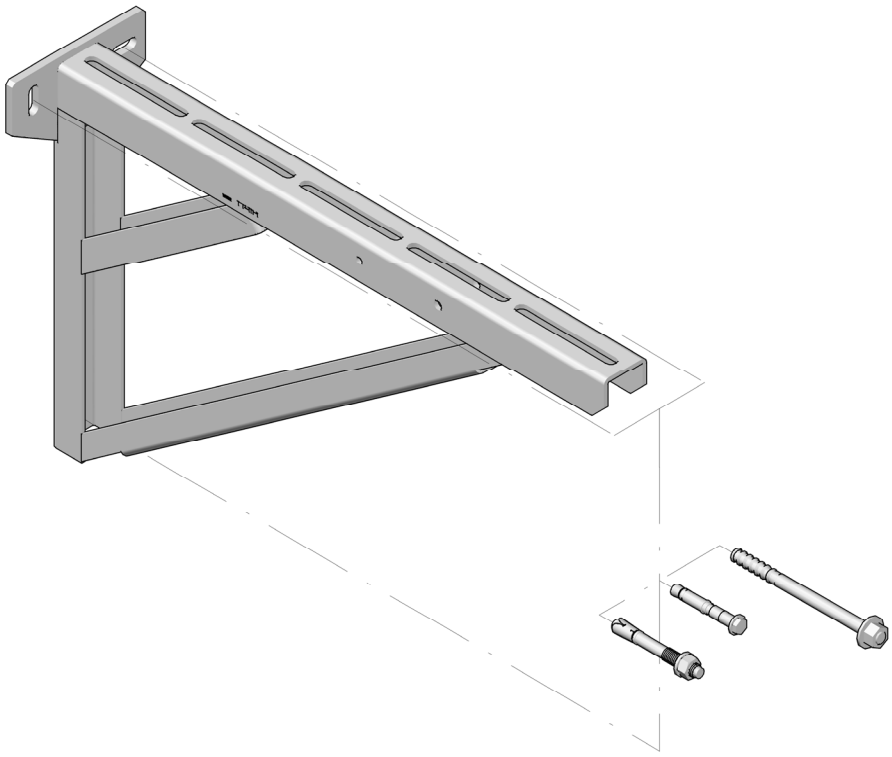
Ventilation - Wall bracket Heavy - Options



In-door options

MQ System heavy bracket		
1x	**MQK-H/750**	**2048098**
3x	**Anchors**	
	Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.	
	HST3 M16x135 35/15	**2105858**
	HST2 M16x140/25	**2108160**

MQ System heavy bracket		
1x	**MQK-H/750**	**2048099**
3x	**Anchors**	
	Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.	
	HST3 M16x135 35/15	**2105858**
	HST2 M16x140/25	**2108160**



Out-door options

MQ System heavy bracket		
1x	**MQK-H/750**	**2048098**
3x	**Anchors**	
	Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.	
	HST-R M16x130/10	**2105876**

MQ System heavy bracket		
1x	**MQK-H/750**	**2048099**
2x	**Anchors**	
	Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.	
	HST-R M16x130/10	**2105876**

Application description	Application	Product lines	Base material
Ventilation - Wall bracket	11	MQ System Heavy brackets	Concrete
		Anchors	

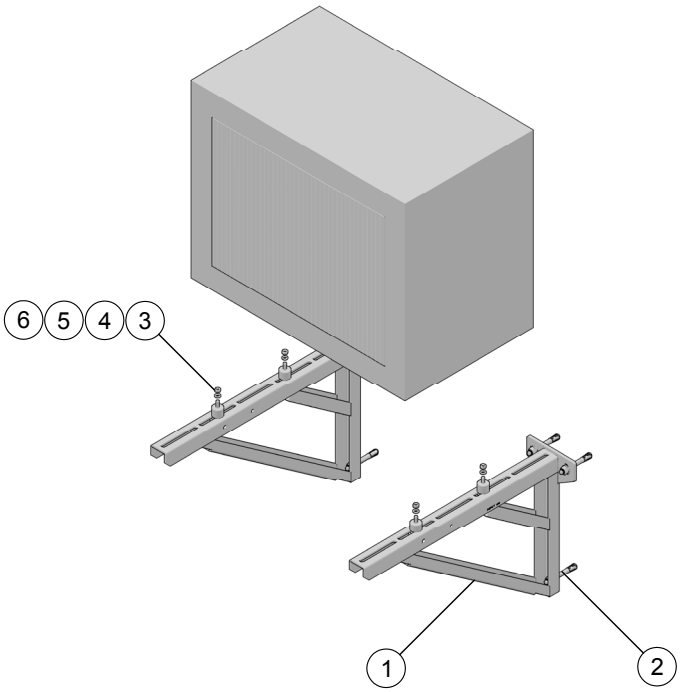
General comments

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

Ventilation applications - Wall Bracket - Comfort - Heavy

Type V-HDG-WB-2-C-H-GL

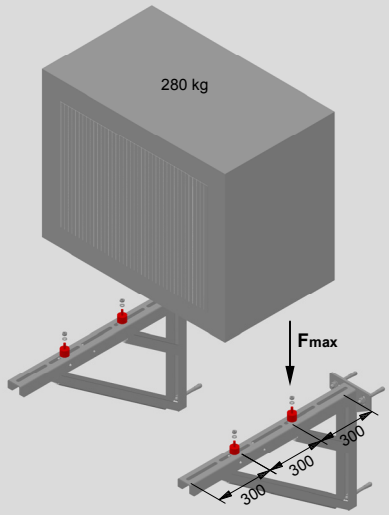
- Limited to 5x DN 80 (O.D. 88.9 mm) steel pipe
- Spacing - support distance 3 m
- Insulation 20 mm rubber



Additional loading capacity limits

This particular case with spacing 3m:

$F_{max,(silencer)}$ = 0.7 kN rec. loads limited by silencers
$F_{max,(bracket)}$ = 4.7 kN in 1/3rd's of the span



Conditions: C20/25, no edge, no distance influence

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2048099**	**MQK-H/900 bracket**	2	
2	**2105858**	**HST3 M16x135 35/15 stud anchor**	6	
3	**282857**	**A 10.5/40 waher**	4	
4	**282851**	**A 10.5/20 washer**	4	
5	**386552**	**MVI-M10 T2 silencer**	4	
6	**216466**	**M10 nut**	8	

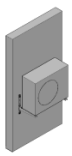
Application description

Ventilation - Wall Bracket - Comfort - Heavy

General comments

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

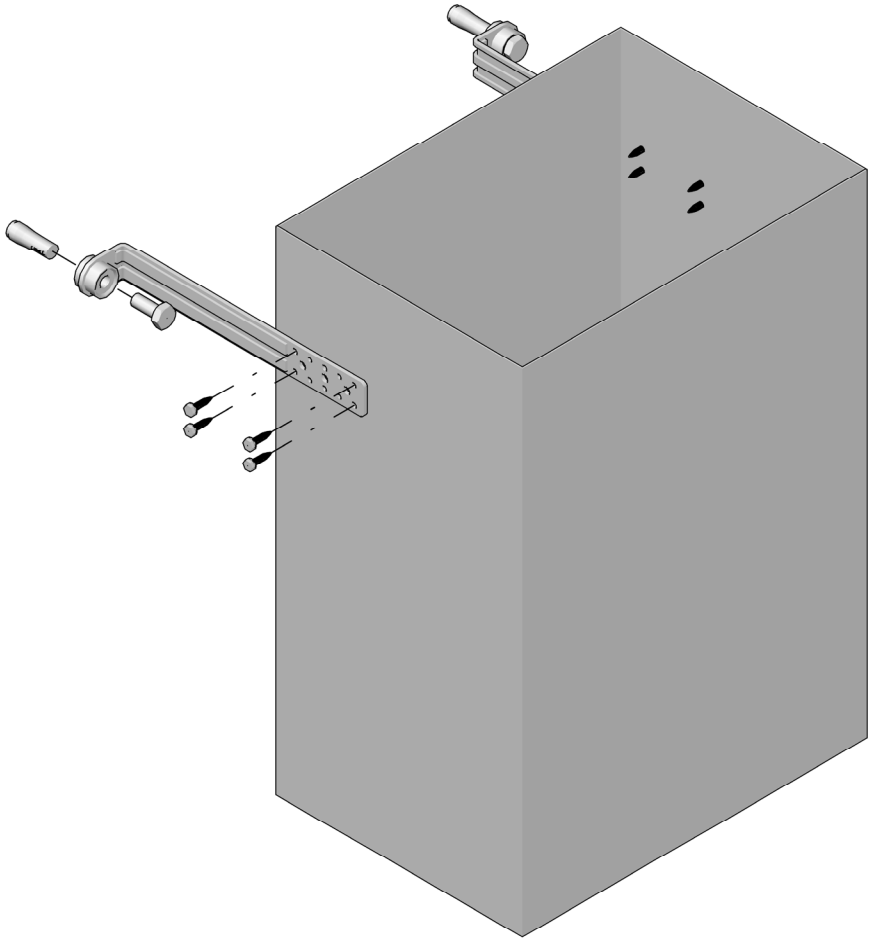
Application



11

Base material	Concrete
Product line	MQ System
Capacity limit	Unit weight 280kg

Ventilation - Wall mount - Options



Air duct bracket
BOM for one fixation point
(2x bracket angle)

- **2x Angle bracket**
  - **MVA-L 1002048080**
  - **MVA-L 1502048081**
  - **MVA-L 2002048082**
  - **MVA-L 2502048083**
  - **MVA-L 3002048084**
  - **MVA-L 3502048085**
  - **MVA-L 4502048086**
  - **MVA-L 5502048087**
- **8x S-MS 01Z 4.0x13 S-screw 406471**
- **2x M10x35 hex. head screw 216455**
- **3x Anchors**
  Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.
- **2x HKD M10x40 drop-in an. 376967**

Important notice:
This solution:

- respect existing market habit
- solution is just for distance keeping purpose
- can not carry any vertical loads

Application description	Application	Product lines	Base material
Ventilation - Wall mount	12	Ventilation brackets	Concrete
		Anchors	

General comments

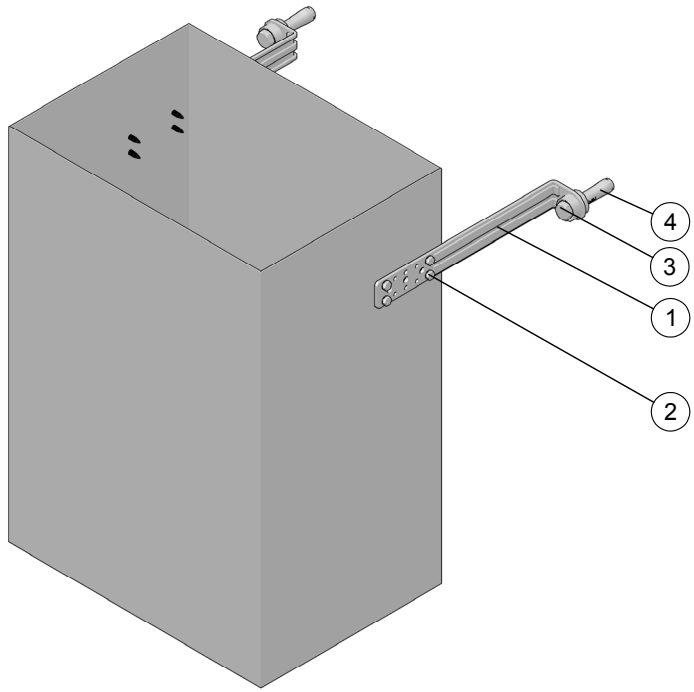
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Wall mount - Basic - Light

Type V-G-WM-1-B-L-GL

Limited use of this application:

- This solution respect existing market habit
- Solution is just for distance keeping purpose
- Can not carry any vertical loads



Additional loading capacity limits

Application not subject to any forces as used as a spacer for offset applications

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2048087**	**MVA-L 550 ventilation angle**	2	
2	**406471**	**S-MS 01Z 4.0x13 S-crew**	8	
3	**216455**	**M10x35 hexagon head screw**	2	
4	**376967**	**HKD M10x40 drop-in anchor**	2	

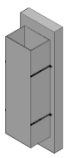
Application description

Ventilation - Wall Mount - Basic - Light

General comments

- Application not subject to any forces as used as a spacer for offset applications

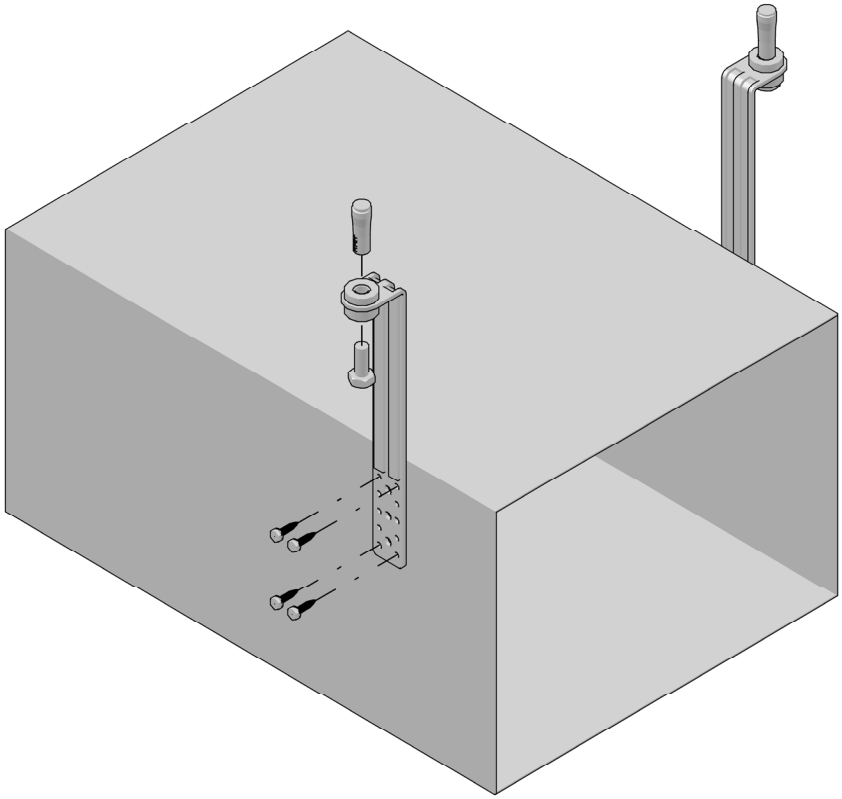
Application



12

Base material	Concrete
Product line	Ventilation
Capacity limit	Non

Ventilation - Ceiling mount - Options



Air duct bracketBOM for one fixation point (2x bracket angle)

- **2x Angle bracket**
  - **MVA-L 1002048080**
  - **MVA-L 1502048081**
  - **MVA-L 2002048082**
  - **MVA-L 2502048083**
  - **MVA-L 3002048084**
  - **MVA-L 3502048085**
  - **MVA-L 4502048086**
  - **MVA-L 5502048087**
- **8x S-MS 01Z 4.0x13 S-screw 406471**
- **2x M10x35 hex. head screw 216455**
- **2x Anchors**
  - Notice: selection of anchors must be based on particular type of base material and load exposure. Bellow mentioned anchor can be used for concrete C20/25 with no additional edge / distance influence.
  - **HKD M10x40 drop-in an. 376967**

Application description	Application	Product lines	Base material
Ventilation - Ceiling mount	13	Ventilation brackets	Concrete
		Anchors	

General comments

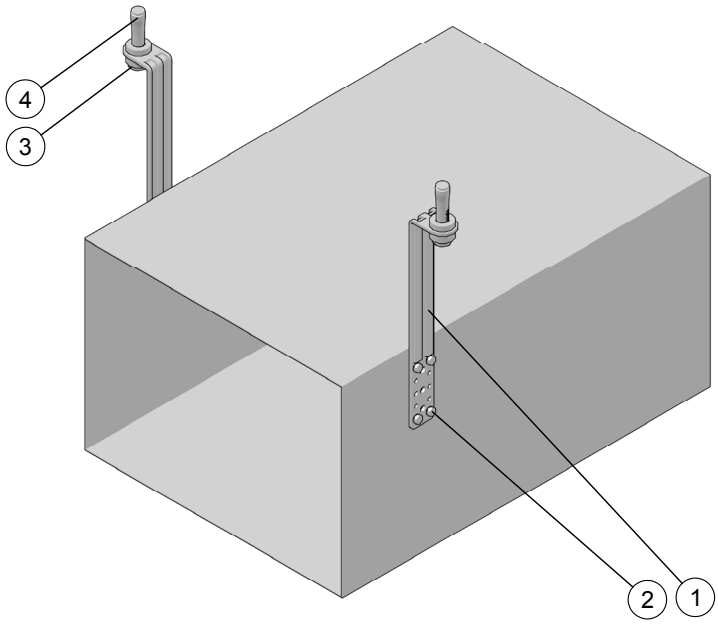
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Ventilation Applications - Ceiling mount - Basic - Light

Type V-G-CM-1-B-L-GL

Limited use of this application:

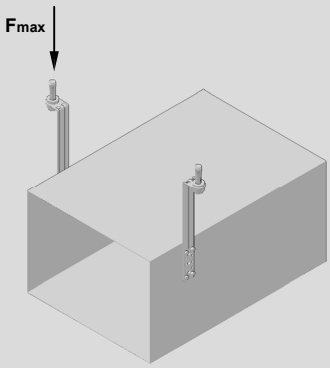
- Max spot load of 0.6 kN



Additional loading capacity limits

Each angle exposed to:

F_{max} = 0.6 kN rec. loads



Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**2048087**	**MVA-L 550 ventilation angle**	2	
2	**406471**	**S-MS 01Z 4.0x13 S-crew**	8	
3	**216455**	**M10x35 hexagon head screw**	2	
4	**376967**	**HKD M10x40 drop-in anchor**	2	

Application description

Ventilation - Ceiling Mount - Basic - Heavy

General comments

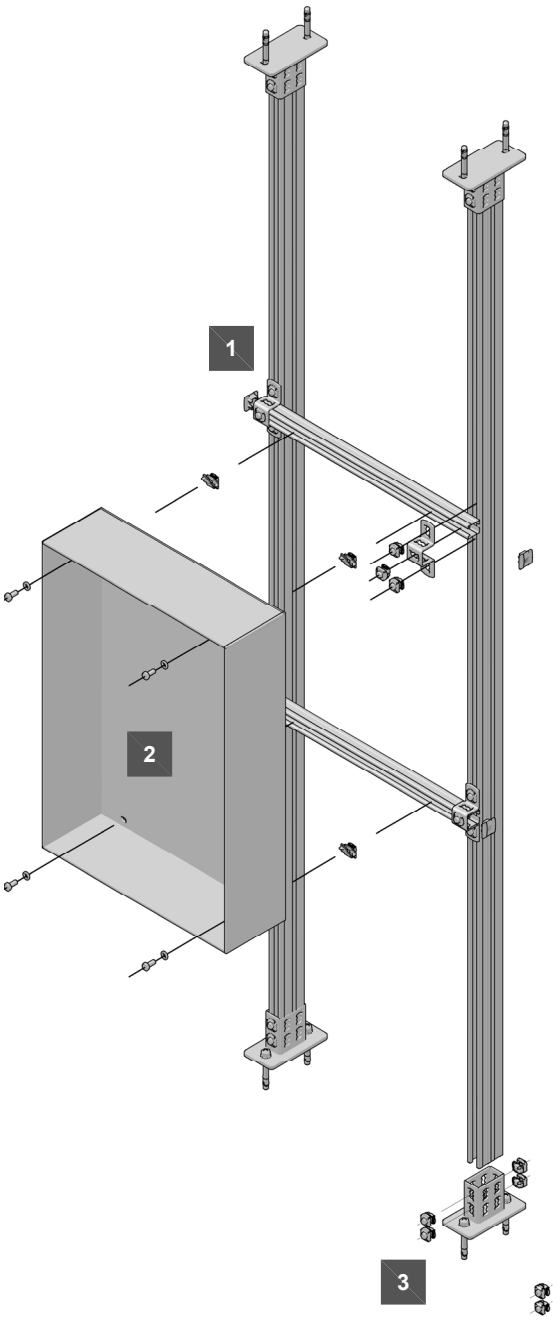
- Application subject to vertical loads caused by weight of the air ducts
- Application not subjects to any thermal expansion or any other 3D loads

Application

Base material	Concrete
Product line	Ventilation
Capacity limit	Non

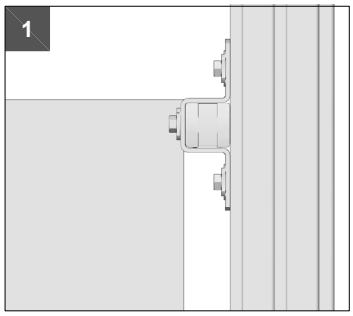
Ventilation - Plant Room Switch Box - Options

Switch box frame, floor to ceiling

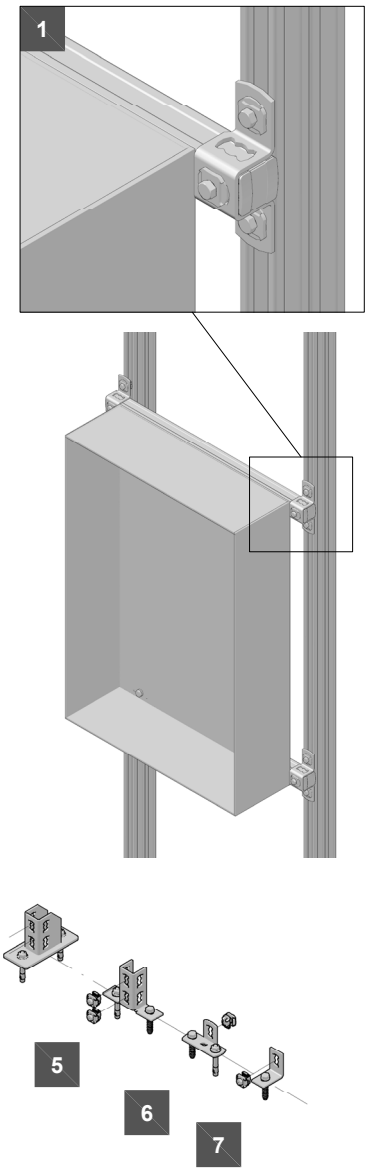


For cases where there is enough space

Side view



Isometric view



Relevant anchors for channel bases	
2-4x HUS3-H 10x70/-/-	**2079912**
or	
2-4x HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**
Notice:	
For MQP 1/1 only 1pc of anchor	

1 Cross connector for 1 fixing point

1x MQB-41 cross connector	**369668**
3x MQN push button	**369623**

2 Connection of the switch box to channel

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

3 MQP 82 channel base with associated channels

1x MQP-82 channel base	**369652**
4x MQN push button	**369623**
41D format channels	
MQ-41D 3m	**369603**
MQ-41D 6m	**369604**

4 Connection to concrete – channel base

1x MQP 21-72 channel base	**369651**
2x MQN push button	**369623**

5 Connection to concrete – channel base

1x MQV -2/2 D-14 chan. base	**369639**
2x MQN push button	**369623**

6 Connection to concrete – channel base

2x MQP 1/3 channel base	**369647**
2x MQN push button	**369623**

7 Connection to concrete – channel base

2x MQP 1/1 channel base	**369646**
2x MQN push button	**369623**

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

Application description	Application	Product lines	Base material
Ventilation - Switch box frame	14	MQ System	Concrete

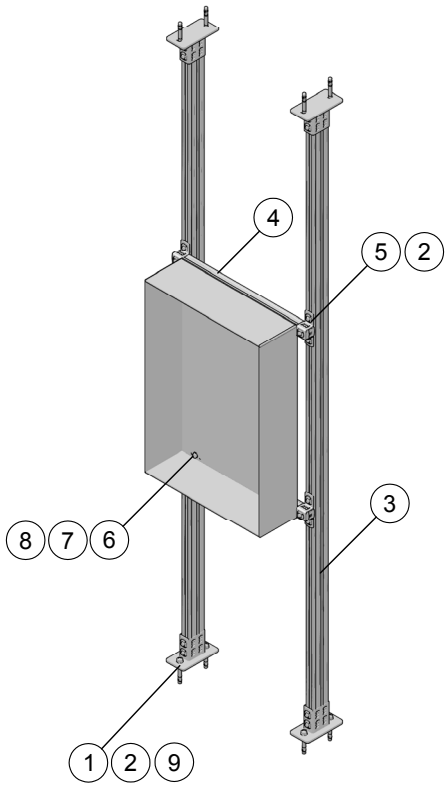
General comments

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

Ventilation Applications - Plant Room Switch Box Framing - Comfort - Medium

Type V-G-PRSB-1-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369652**	**MQP-82 channel base**	4	
2	**369623**	**MQN push button**	28	
3	**369603**	**MQ-41D 3m channel**	2	Depends on span
4	**369591**	**MQ-41 3m channel**	2	Depends on the with of the box
5	**369668**	**MQB-41 cross connector**	4	
6	**369627**	**MQM-M12 wing nut**	4	
7	**282852**	**A13/24 washer**	4	
8	**216458**	**M12x25 hex. screw**	4	
9	**2105718**	**HST3 M12x105 30/10 anchor**	8	

Application description

Ventilation - Plant Room Switch Box - Comfort - Medium

General comments

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

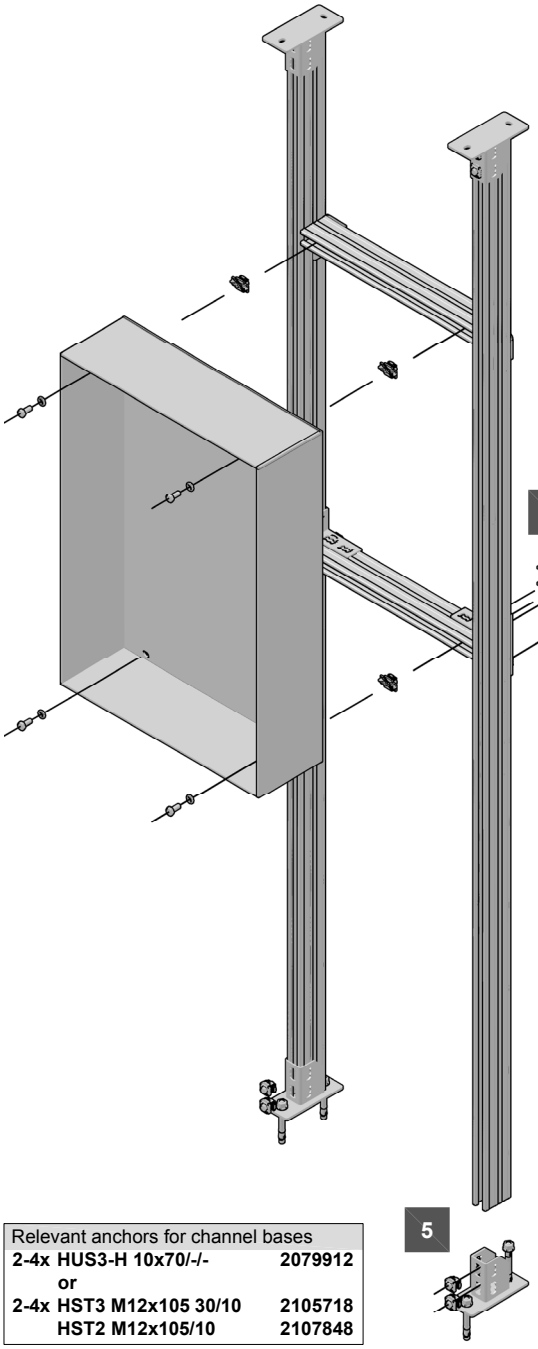
Application

14

Base material	Concrete
Product line	MQ System
Capacity limit	Various

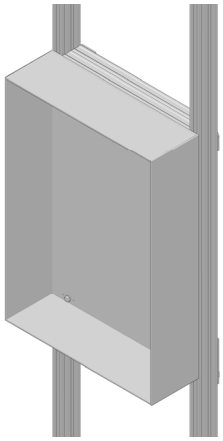
Ventilation - Plant Room Switch Box - Options

Switch box frame, floor to ceiling

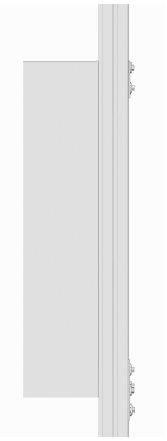


Space-saving solution

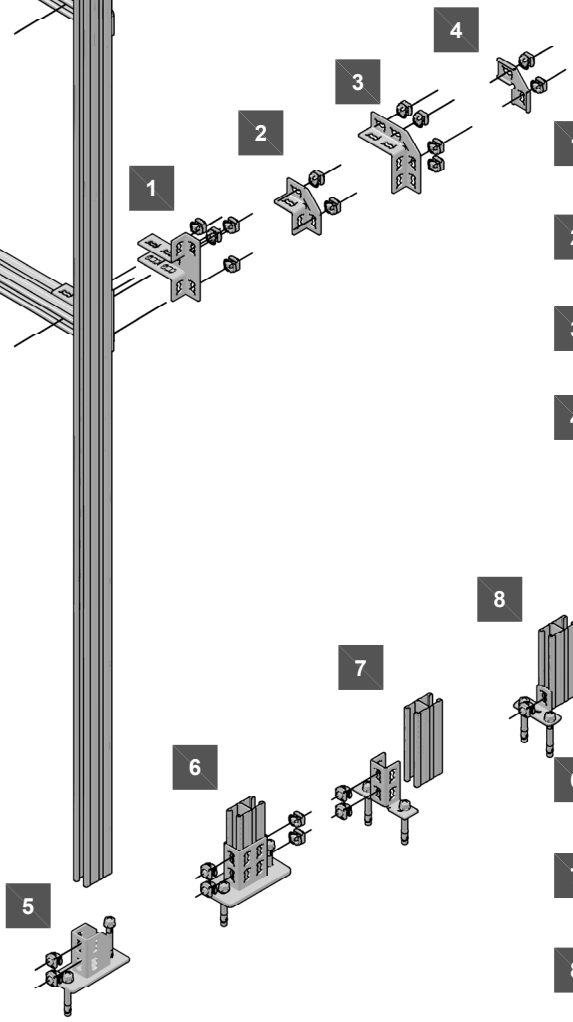
Isometric view



Side view



Front view



1	Connector		
	1x	MQV-3/2 D	369640
	4x	MQN push button	369623
2	Connector		
	1x	MQW-4 connector	369658
	2x	MQN push button	369623
3	Connector		
	1x	MQW-8 connector	369659
	4x	MQN push button	369623
4	Connector		
	1x	MQW - P2 connector	369661
	2x	MQN push button	369623
6	Connection to concrete – channel base		
	1x	MQP 82 channel base	369652
	4x	MQN push button	369623
7	Connection to concrete – channel base		
	1x	MQV -2/2 D-14 chan. base	369639
	2x	MQN push button	369623
8	Connection to concrete – channel base		
	2x	MQP 1/3 channel base	369647
	2x	MQN push button	369623
9	Connection to concrete – channel base		
	2x	MQP 1/1 channel base	369646
	2x	MQN push button	369623

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

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

5	Connection to concrete – channel base		
	1x	MQP 21-72 channel base	369651
	2x	MQN push button	369623

Application description	Application	Product lines	Base material
Ventilation - Switch box frame	14	MQ System	Concrete

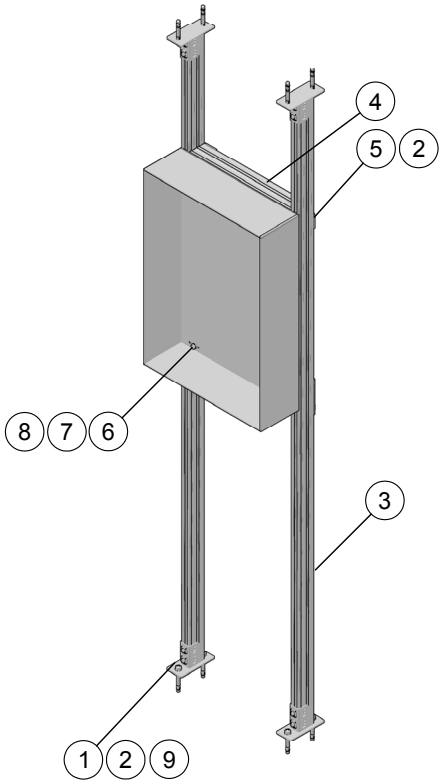
General comments

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

Ventilation Applications - Plant Room Switch Box Framing - Comfort - Medium

Type V-G-PRSB-2-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369652**	**MQP 21-72 channel base**	4	
2	**369623**	**MQN push button**	16	
3	**369603**	**MQ-41D 3m channel**	2	Depends on span
4	**369603**	**MQ-41D 3m channel**	2	Depends on the with of the box
5	**369658**	**MQW-4 connector**	4	
6	**369627**	**MQM-M12 wing nut**	4	
7	**282852**	**A13/24 washer**	4	
8	**216458**	**M12x25 hex. screw**	4	
9	**2105718**	**HST3 M12x105 30/10 anchor**	8	

Application description

Ventilation - Plant Room Switch Box - Comfort - Medium

General comments

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

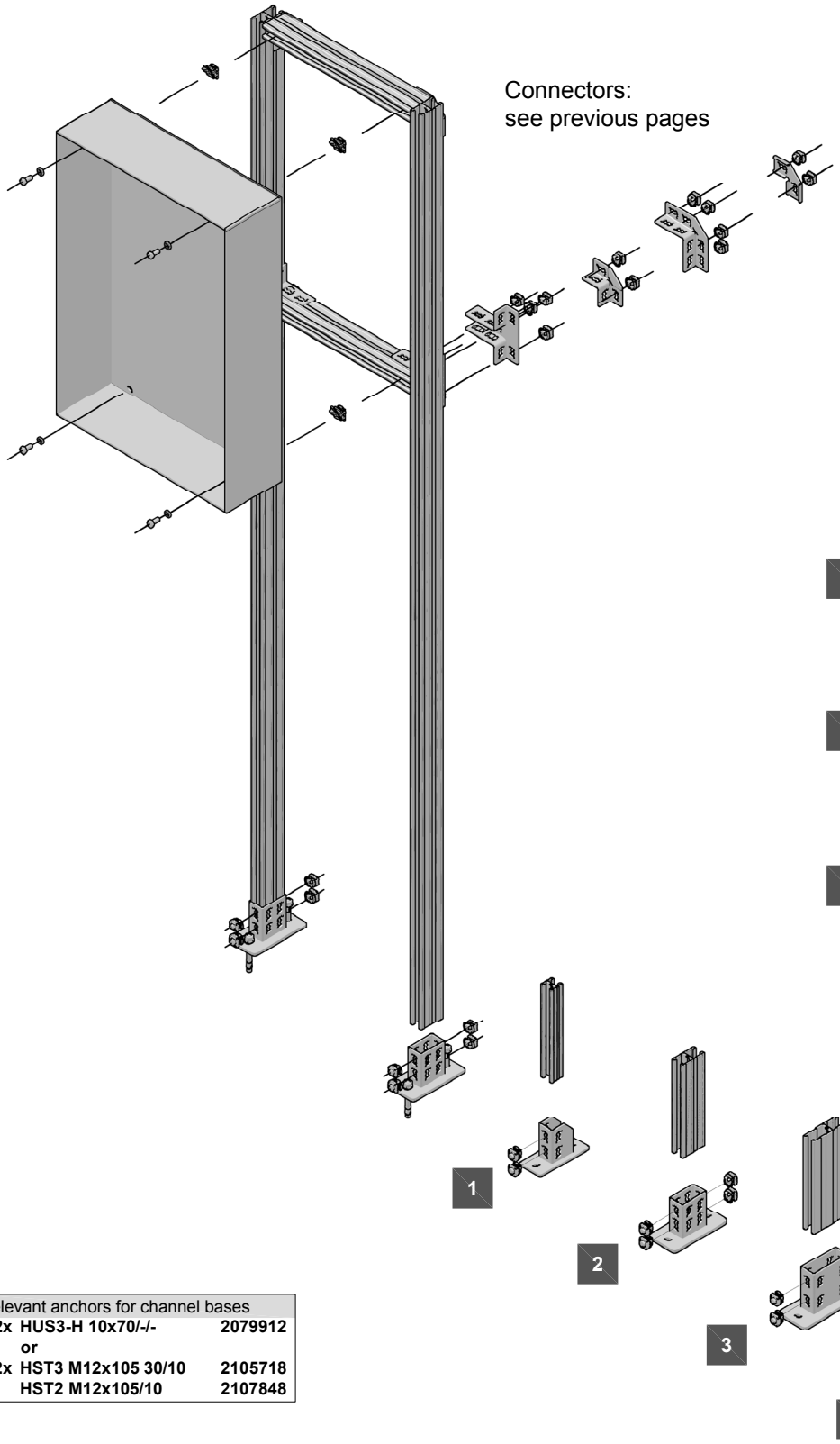
Application

14

Base material	Concrete
Product line	MQ System
Capacity limit	Various

Ventilation - Plant Room Switch Box - Options

Switch box frame, floor-mounted



1	MQP 21-72 channel base with MQ-21D	
	1x MQP 21-72 channel base	**369651**
	2x MQN push button	**369623**
	21D format channels	
	MQ-21D 3m	**369601**
	MQ-21D 6m	**369602**

2	MQP 82 channel base with MQ-41D	
	1x MQP 82 channel base	**369652**
	4x MQN push button	**369623**
	41D format channels	
	MQ-41D 3m	**369603**
	MQ-41D 6m	**369604**

3	MQP 124 channel base with associated channels	
	1x MQP 124 channel base	**369653**
	4x MQN push button	**369623**
	52-72D and 124X D format channels	
	MQ-52-72 D 3m	**373799**
	MQ-52-72 D 6m	**369605**
	MQ-124X D 6m	**369606**

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

Application description	Application	Product lines	Base material
Ventilation - Switch box frame	14	MQ System	Concrete

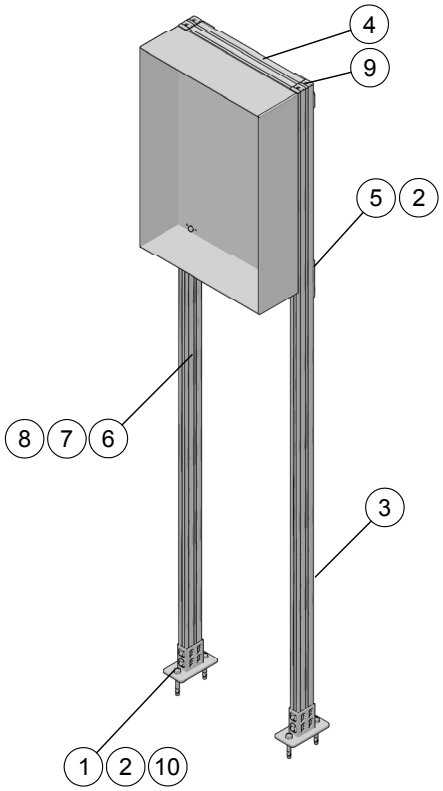
General comments

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

Ventilation Applications - Plant Room Switch Box Framing - Comfort - Medium

Type V-G-PRSB-3-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369652**	**MQP-82 channel base**	4	
2	**369623**	**MQN push button**	24	
3	**369603**	**MQ-41D 3m channel**	2	Depends on span
4	**369603**	**MQ-41D 3m channel**	2	Depends on the with of the box
5	**369658**	**MQW-4 connector**	4	
6	**369627**	**MQM-M12 wing nut**	4	
7	**282852**	**A13/24 washer**	4	
8	**216458**	**M12x25 hex. screw**	4	
9	**369685**	**MQZ-E41 plastic end cap**	4	
10	**2105718**	**HST3 M12x105 30/10 anchor**	8	

Application description

Ventilation - Plant Room Switch Box - Comfort - Medium

General comments

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

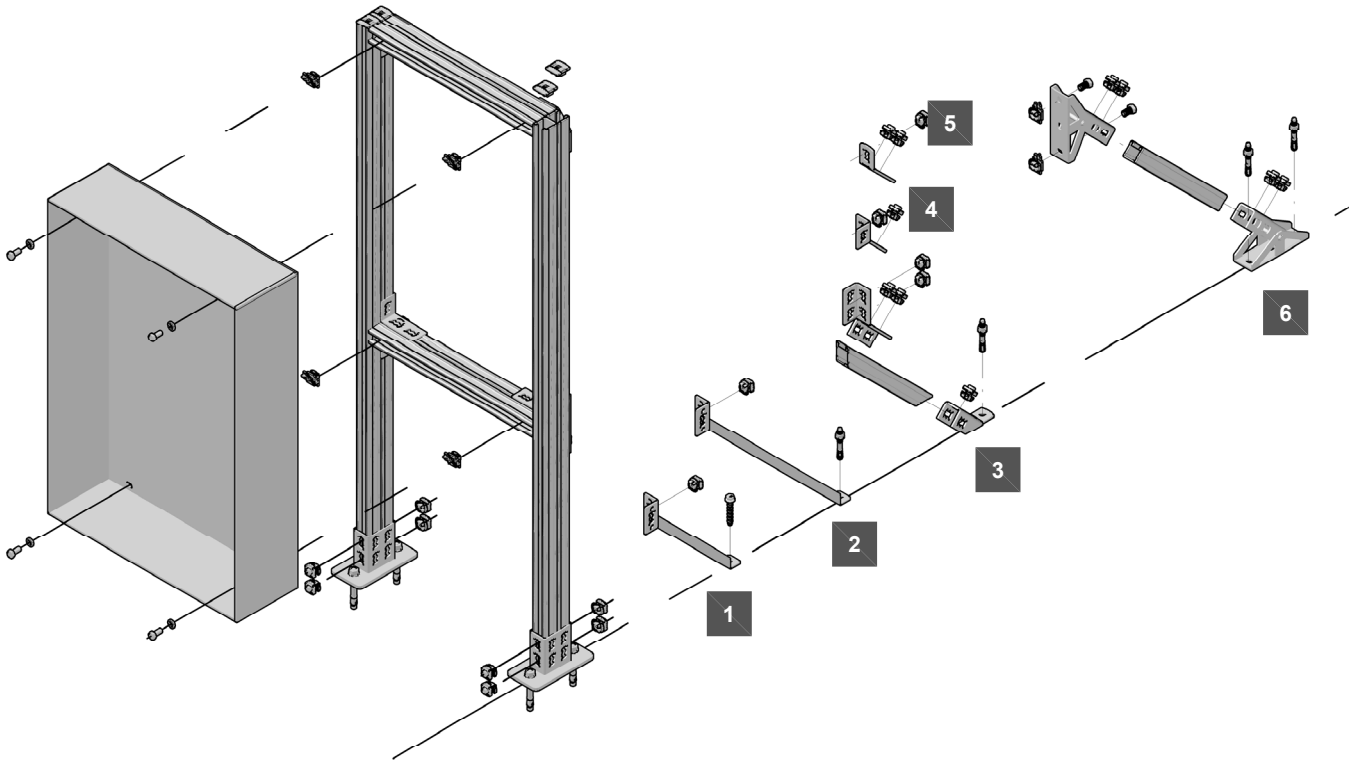
Application

14

Base material	Concrete
Product line	MQ System
Capacity limit	Various

Ventilation - Plant Room Switch Box - Options

Switch box frame, floor-mounted



1 Short pre-fab. bracePre-fab brace

1x MQK-SK pre-fab. brace	**369622**
1x MQN push button	**369623**
1x AnchorHUS3-H 10x70/-/-	**2079912**
or	
HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

2 Long pre-fab. bracePre-fab brace

1x MQK-SL pre-fab. brace	**369621**
1x MQN push button	**369623**
1x Anchor	
HUS3-H 10x70/-/-	**2079912**
or	
HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

3 Axial bracing using MQP-45 connector

Upper brace connection

1x MQW-8/45 connector	**369660**
4x MQN push button	**369623**

Channel brace - 41 mm format channels

MQ-41 3m	**369591**

Bottom brace connection

1x MQP-45 channel base	**369649**
1x MQN push button	**369623**
1x Anchor	
HUS3-H 10x70/-/-	**2079912**
or	
HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

4 Upper brace connector

Upper brace connection alternative

1x MQW-3/135 connector	**369663**
2x MQN push button	**369623**

5 Upper brace connector

Upper brace connection alternative

1x MQW-3/45 connector	**369657**
2x MQN push button	**369623**

6 Axial bracing using MQP-G pivot connector

Upper brace connection

1x MQP-G pivot connector	**369654**
2x MQN push button	**369623**
2x M12x25 hex. screw	**216458**
2x MQM-M12 wing nut	**369627**

Channel brace - 41 mm format channels

MQ-41 3m	**369591**

Bottom brace connection

1x MQP-G pivot connector	**369654**
2x MQN push button	**369623**
2x Anchor	
HUS3-H 10x70/-/-	**2079912**
or	
HST3 M12x105 30/10	**2105718**
HST2 M12x105/10	**2107848**

Application description	Application	Product lines	Base material
Ventilation - Switch box frame	14	MQ System	Concrete

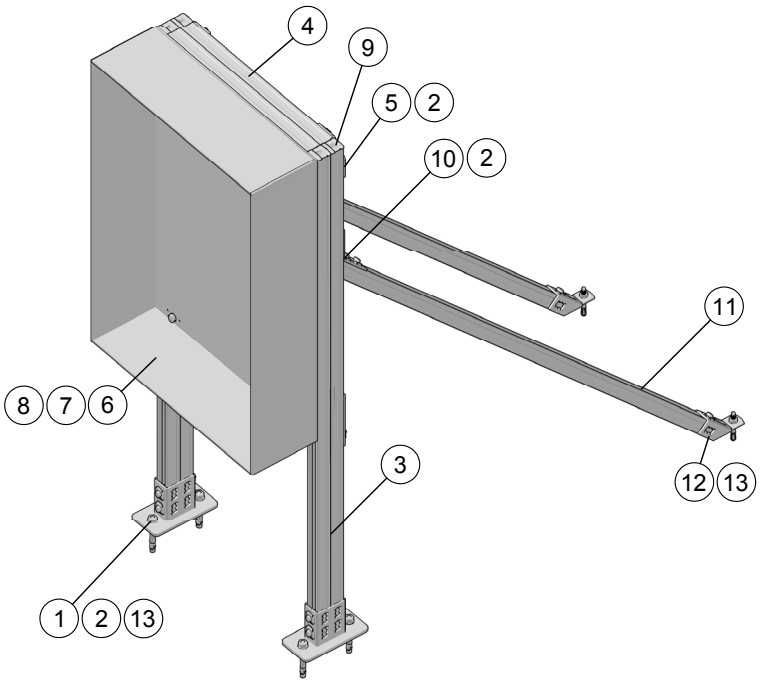
General comments

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

Ventilation Applications - Plant Room Switch Box Framing - Comfort - Medium

Type V-G-PRSB-4-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369652**	**MQP-82 channel base**	4	
2	**369623**	**MQN push button**	26	
3	**369603**	**MQ-41D 3m channel**	2	Depends on height
4	**369603**	**MQ-41D 3m channel**	2	Depends on the with of the box
5	**369658**	**MQW-4 connector**	4	
6	**369627**	**MQM-M12 wing nut**	4	
7	**282852**	**A13/24 washer**	4	
8	**216458**	**M12x25 hex. screw**	4	
9	**369685**	**MQZ-E41 plastic end cap**	4	
10	**369660**	**MQW-8/45 connector**	2	
11	**369591**	**MQ-41 3m channel**	2	Depends on the length of the brace
12	**369649**	**MQP-45 channel base**	2	
13	**2105718**	**HST3 M12x105 30/10 anchor**	6	

Application description

Ventilation - Plant Room Switch Box - Comfort - Medium

General comments

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

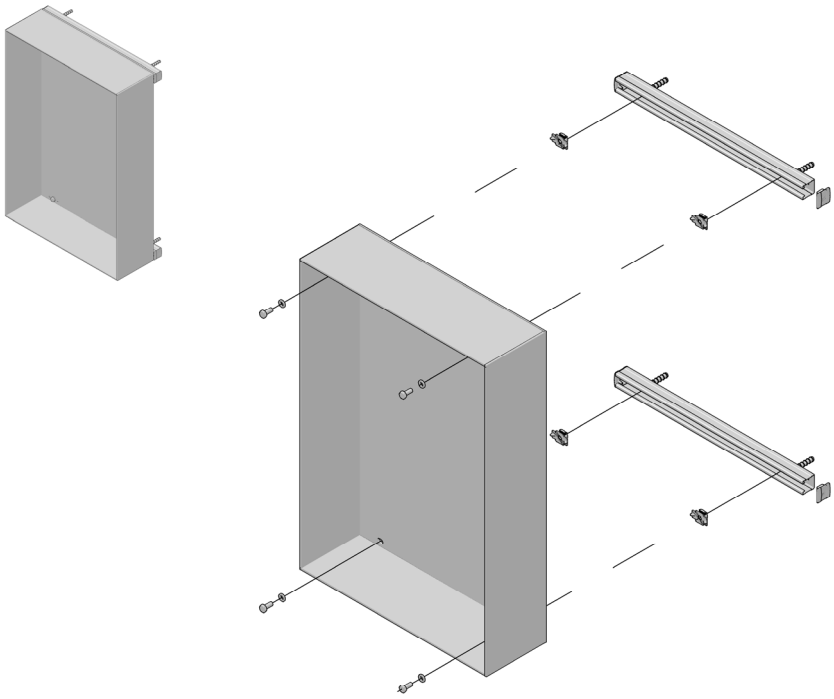
Application

14

Base material	Concrete
Product line	MQ System
Capacity limit	Various

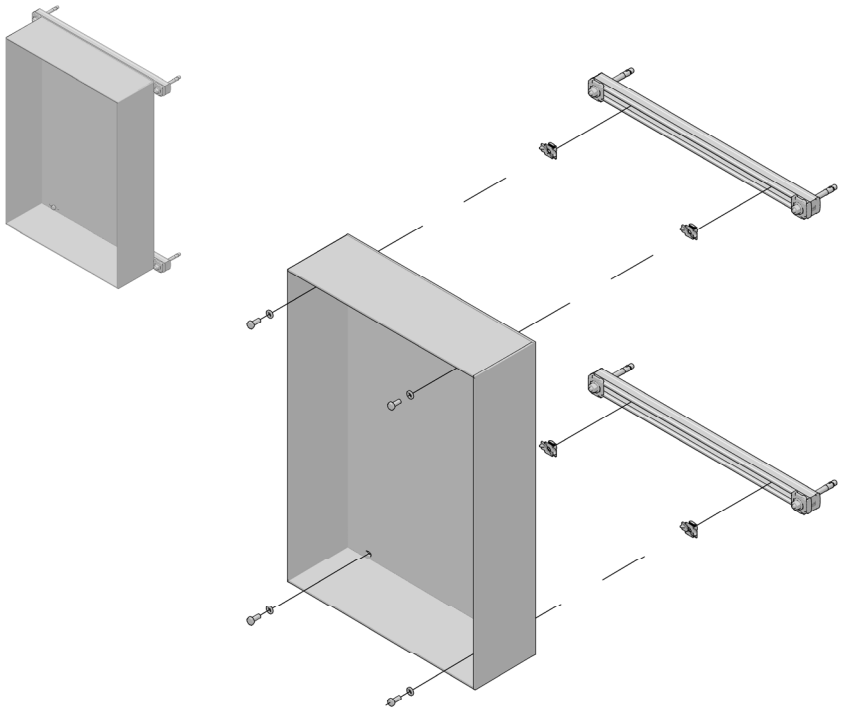
Ventilation - Plant Room Switch Box - Options

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



Switch box on wall rail – concealed channel	
Channel - 21 mm format channels	
2x MQ-21 2m	**304558**
MQ-21 3m	**369584**
MQ-21 6m	**369585**
Channel -41 mm format channels	
2x MQ-41 2m	**304559**
MQ-41 3m	**369591**
MQ-41 6m	**369592**
MQ-41 3m LL	**2048100**
MQ-41 6m LL	**2048101**
MQ-41/3 3m	**369596**
MQ-41/3 6m	**369597**
Plastic end cap	
4x MQZ-E21 end cap	**370598**
4x MQZ-E41 end cap	**369685**
Anchor	
4x HUS3-H 10x70/-/-	**2079912**
Switch box fastening	
M8	
4x M8x20 hex. screw	**216447**
4x A8,4/16 washer	**282850**
4x MQM-M8 wing nut	**369698**
M10	
4x M10x20 hex. screw	**216453**
4x A10,5/20 washer	**282851**
4x MQM-M10 wing nut	**369626**
M12	
4x M12x20 hex. screw	**216457**
4x A13/24 washer	**282852**
4x MQM-M12 wing nut	**369627**

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



Switch box on wall rail – projecting channel	
Channel - 21 mm format channels	
2x MQ-21 2m	**304558**
MQ-21 3m	**369584**
MQ-21 6m	**369585**
Channel -41 mm format channels	
2x MQ-41 2m	**304559**
MQ-41 3m	**369591**
MQ-41 6m	**369592**
MQ-41 3m LL	**2048100**
MQ-41 6m LL	**2048101**
MQ-41/3 3m	**369596**
MQ-41/3 6m	**369597**
Plastic end cap	
4x MQZ-E21 end cap	**370598**
4x MQZ-E41 end cap	**369685**
Connection to the wall	
4x MQZ-L13 square washer	**369680**
4x HST3 M12x145 70/50	**2105851**
Switch box fastening	
See above	

Application description	Application	Product lines	Base material
Ventilation - Switch box frame	14	MQ System	Concrete

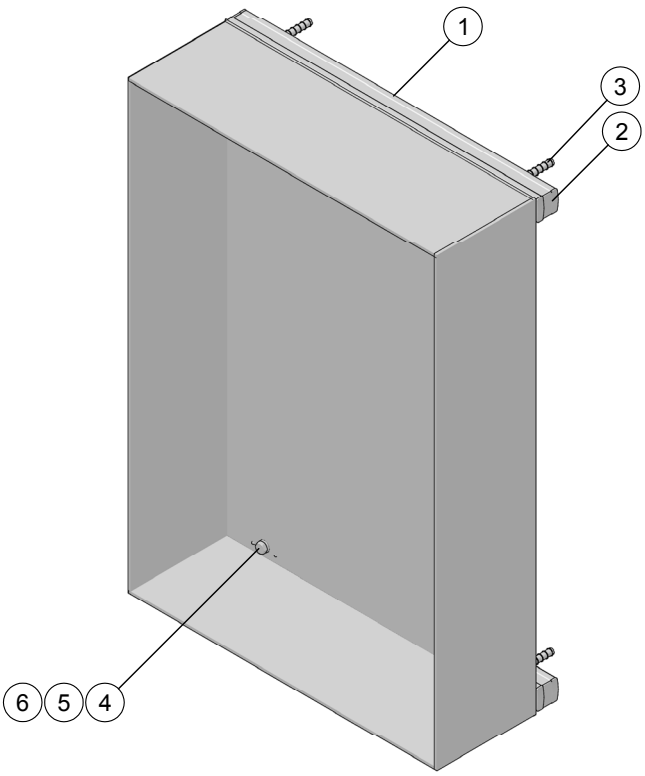
General comments

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

Ventilation Applications - Plant Room Switch Box Framing - Basic - Light

Type V-G-PRSB-5-B-L-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369591**	**MQ-41 3m channel**	2	Depends on the width of the box
2	**370598**	**MQZ-E41 plastic end cap**	4	
3	**2079912**	**HUS3-H 10x70/-/- screw anchor**	3	
4	**369627**	**MQM-M12 wing nut**	4	
5	**282852**	**A13/24 washer**	4	
6	**216458**	**M12x25 hex. screw**	4	

Application description

Ventilation - Plant Room Switch Box - Basic - Light

General comments

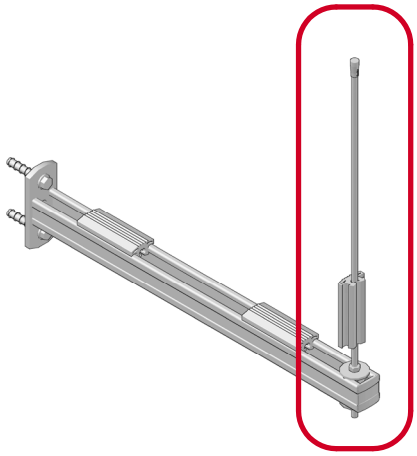
- Application subject to vertical loads caused by weight of the pipes
- Application not subjects to any thermal expansion or any other 3D loads

Application

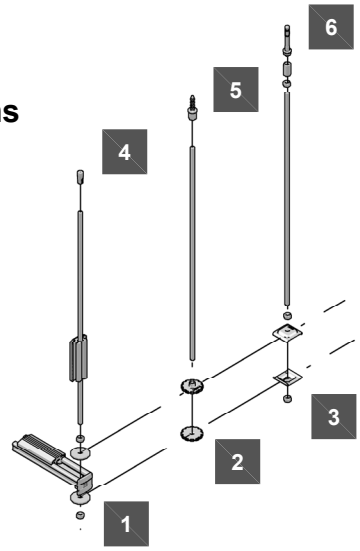
14

Base material	Concrete
Product line	MQ System
Capacity limit	Various

Ventilation - Wall-Ceiling Trapeze - Options

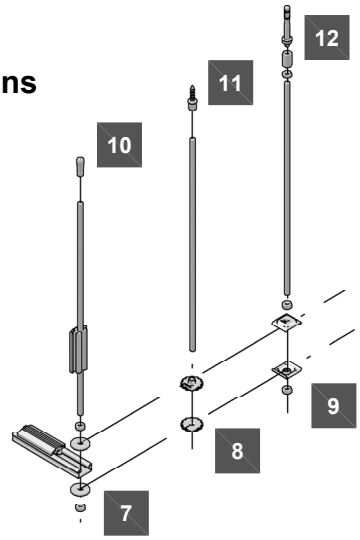


M8 options



Threaded rods	
M8	
AM8x1000 4.8 zinced	339793
AM8x2000 4.8 zinced	339794
AM8x3000 4.8 zinced	216415

M10 options



Threaded rods	
M10	
AM10x1000 4.8 zinced	339795
AM10x2000 4.8 zinced	339796
AM10x3000 4.8 zinced	216418

1 Connection of the vertical treaded rod

M8		
2x	A 8,4/40 washer	282856
2x	M8 nut	216465
1x	AM8 threaded rod	Various

2 Connection of the vertical treaded rod

M8		
2x	MQZ-TW-M8 trap.wheel	2141930
1x	AM8 threaded rod	Various

3 Connection of the vertical treaded rod

M8		
2x	MQZ-P9 channel washer	2141908
2x	M8 nut	216465
1x	AM8 threaded rod	Various

4 Drop in anchor

1x drop in anchor		
M8		
	HKD M8x25 anchor	376957
	HKD M8x30 anchor	376959
	HKD M8x40 anchor	376961

5 Internally threaded screw anchor

1x screw anchor		
	HUS-I 6x35 M8/M10	376959
	HUS-I 6x55 M8/M10	423180

6 Stud anchor and coupler

1x	stud anchor	
	HST3 M8x75 -/10	2105888
	HST2 M8x75/10	2108161
1x	M8x25 coupler	216703
1x	M8 nut	216465

7 Connection of the vertical treaded rod

M10		
2x	A 10.5/40 washer	282862
2x	M10 nut	216466
1x	AM8 threaded rod	Various

8 Connection of the vertical treaded rod

M10		
2x	MQZ-TW-M10 trap. wheel	2141931
1x	AM10 threaded rod	Various

9 Connection of the vertical treaded rod

M10		
2x	MQZ-P11 chan. washer	2141909
2x	M10 nut	216466
1x	AM8 threaded rod	Various

10 Drop in anchor1x drop in anchor

M10		
	HKD M10x40 anchor	378430
	HKD M10x30 anchor	376965
	HKD M10x25 anchor	2037453

11 Internally threaded screw anchor

1x screw anchor		
	HUS-I 6x35 M8/M10	376959
	HUS-I 6x55 M8/M10	423180

12 Stud anchor and coupler

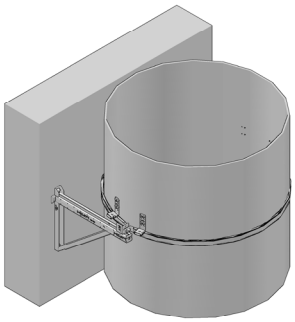
1x	stud anchor	
	HST3 M10x100 40/20	2105713
	HST2 M10x100/20	2107840
1x	M10x30 coupler	216704
1x	M10 nut	216466

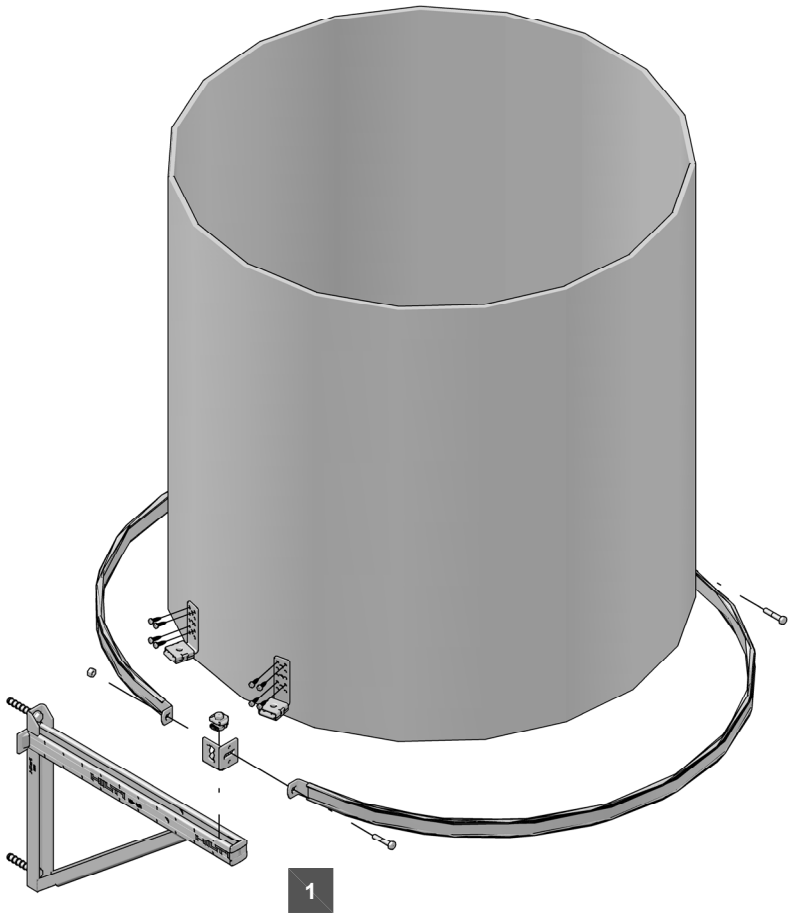
Application description	Application	Product lines	Base material
Ventilation - Wall-Ceiling trapeze	15	MQ System	Concrete

General comments

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

Ventilation - Heavy Rounded Duct Riser - Options





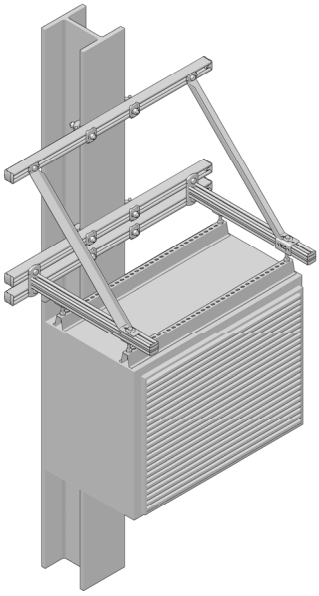
1	Heavy rounded duct riser bracket		
	2x	Bracket	
		MQK-H/300 HDG	2048096
		MQK-H/550 HDG	2048097
	4x	Anchor	
		HUS3-H 10x70/-/-	2079912
		or	
		HST3 M12x105 30/10	2105718
		HST2 M12x105/10	2107848
	2x	MQZ-E41 end cap	369685
	2x	MQP-2/1 angle	377731
	2x	MQN push button	369623
	1x	Ventilation pipe ring	
		MV-PI 710	386500
		MV-PI 800	386501
		MV-PI 900	386502
		MV-PI 1000	386503
		MV-PI 1120	386504
		MV-PI 1250	386505
	4x	MVA-LH angle	20477491
	6x	S-MS 01Z 4.0x13 S-screw	406471

Application description	Application	Product lines	Base material
Ventilation - Heavy Rounded Duct Riser	16	MQ System	Concrete

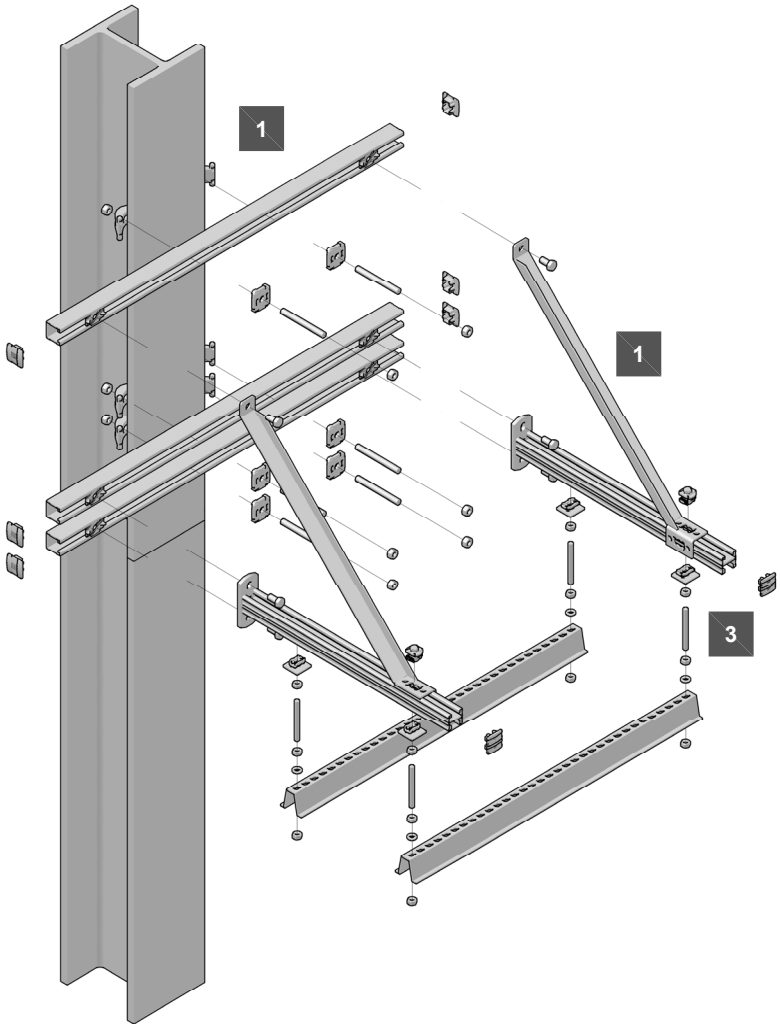
General comments

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

Ventilation - Radiation Unit Bearing Secondary Structure - Options



	Ventilation unit fixed on the structural steel column BOM for the entire solution	
1	Beam clamps and base channels	
	6x MQT-M12 beam clamps	284243
	6x M12x120 threaded bolt	216400
	6x MQZ-L13 square washer	369680
	12x M12 hexagon nut	216467
	3x MQ-41/3 3m…1m channel	369596
	6x MQZ-E41 plastic end cap	369685
2	Brackets and braces	
	2x MQK-21 D/600 bracket	369619
	6x MQM-M12 wing nut	369627
	6x M10x25 hex. head screw	216454
	2x MQK-SL brace	369621
	2x MQN push button	369623
	4x MQZ-E21 plastic end cap	370598
3	Connection of the unit	
	4x MQA-M10 saddle nut	369630
	12x M10 hexagon nut	216466
	4x A 10,5/20 washer	282851
	4x AM10x1000 threaded rod	339795



Application description	Application	Product lines	Base material
Ventilation - Radiation Unit Bearing Secondary Structure	17	MQ System	Steel

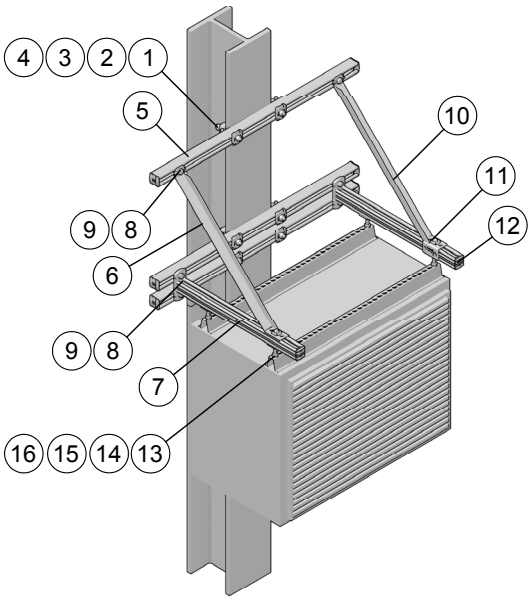
General comments

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

Ventilation Applications - Radiation Unit Bearing Secondary Structure - Comfort - Medium

Type V-G-RUBSS-1-C-M-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**284243**	**MQT-M12 beam clamp**	6	
2	**216400**	**M12x120 threaded bolt**	6	
3	**369680**	**MQZ-L13 square washer**	6	
4	**216467**	**M12 hexagon nut**	12	
5	**369596**	**MQ-41/3 3m channel**	3	Depends on width of the unit
6	**369685**	**MQZ-E41 plastic end cap**	6	
7	**369619**	**MQK-21 D/600 bracket**	2	
8	**369627**	**MQM-M12 wing nut**	6	
9	**216454**	**M10x25 hexagon head screw**	6	
10	**369621**	**MQK-SL brace**	2	
11	**369623**	**MQN push button**	2	
12	**370598**	**MQZ-E21 plastic end cap**	4	
13	**369630**	**MQA-M10 saddle nut**	4	
14	**216466**	**M10 nut**	12	
15	**282851**	**A 10,5/20 washer**	4	
16	**339795**	**AM10x1000 threaded rod**	4	

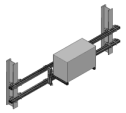
Application description

Ventilation - Radiation Unit Bearing Secondary Structure - Comfort - Medium

General comments

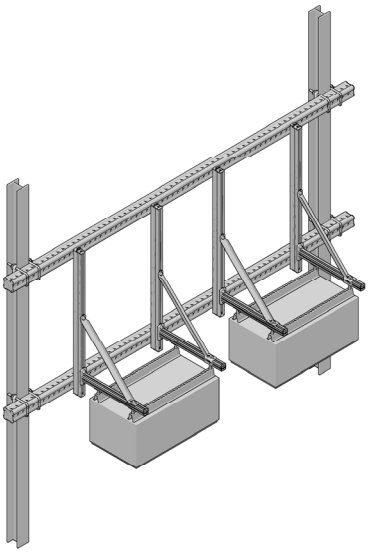
- Application subject to vertical loads caused by weight of the pipes
- Application not subjects to any thermal expansion or any other 3D loads

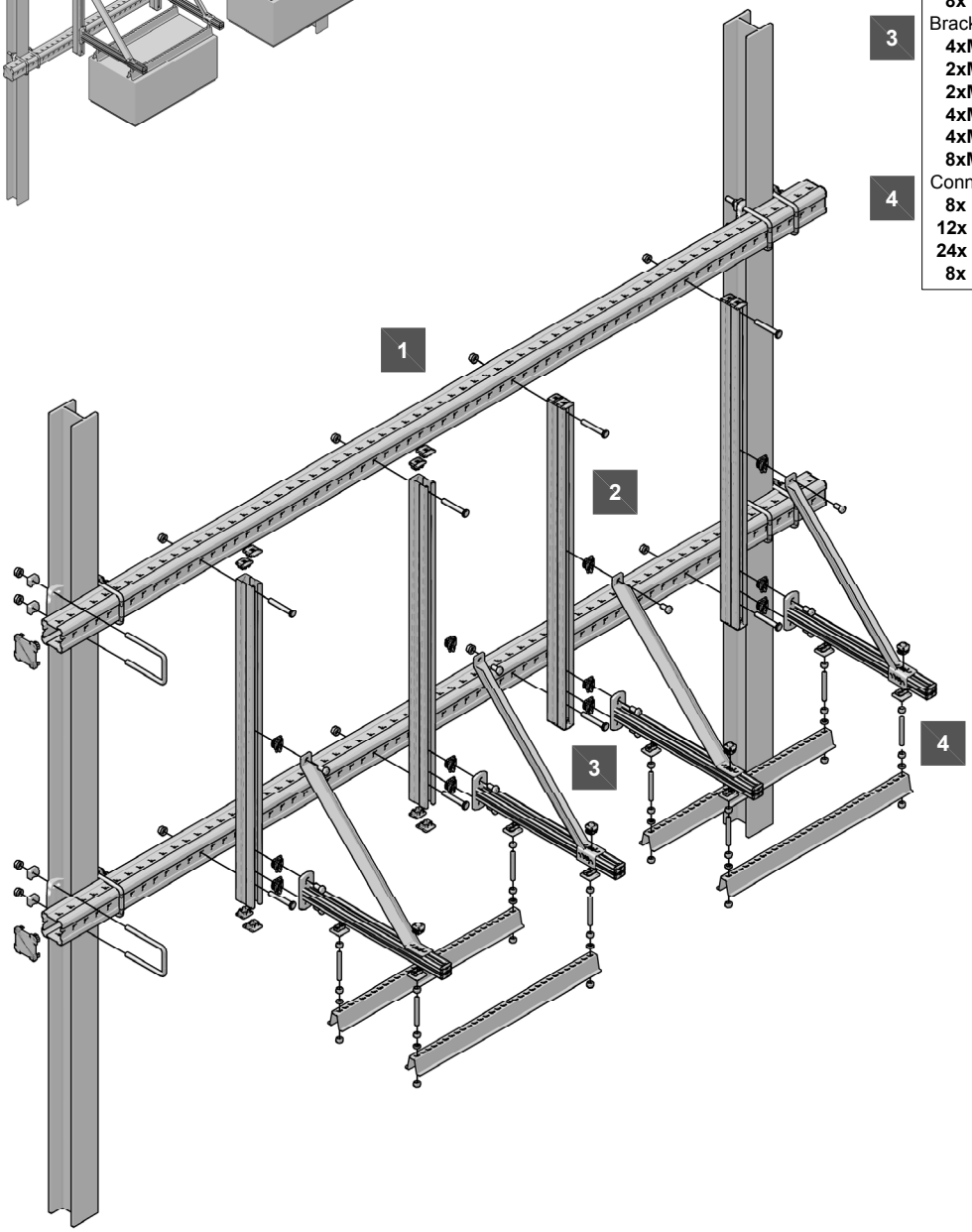
Application



Base material	Steel
Product line	MQ System
Capacity limit	Various

Ventilation - Radiation Unit Bearing Secondary Structure - Options





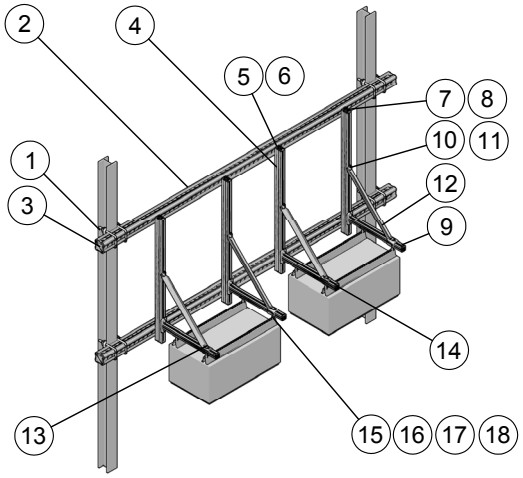
	2x Ventilation unit fixed on the structural steel column BOM for the entire solution	
1	Beam clamps and base MI System girders	
	8x MI-DGC 90 beam clamp	**233860**
	2x MI-90 3m…m girder	**304798**
	4x MIA-EC-90 plastic end cap	**432077**
2	Vertical channels and their fixation	
	4x MQ-72 3m….m channel	**373797**
	8x MIA-OH90 one hand screw	**304889**
	8x M12-F-SL-WS 3/4“ lock nut	**382897**
	8x MQZ-E31 plastic end cap	**369686**
	8x MQZ-E41plastic end cap	**369685**
3	Brackets and braces	
	4xMQK-21 D/600 bracket	**3696191**
	2xMQM-M12 wing nut	**3696271**
	2xM10x25 hex. head screw	**216454**
	4xMQK-SL brace	**369621**
	4xMQN push button	**369623**
	8xMQZ-E21 plastic end cap	**370598**
4	Connection of the unit	
	8x MQA-M10 saddle nut	**369630**
	12x M10 hexagon nut	**216466**
	24x A 10,5/20 washer	**282851**
	8x AM10x1000 threaded rod	**339795**

Application description	Application	Product lines	Base material
Ventilation - Radiation Unit Bearing Secondary Structure	17	MI System	Steel
General comments		MQ System	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads		Accessories	

Ventilation Applications - Radiation Unit Bearing Secondray Structure - Comfort - Heavy

Type V-G-RUBSS-2-C-H-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**233860**	**MI-DGC 90 beam clamp**	8	
2	**304798**	**MI-90 3m girder**	2	Depends on span
3	**432077**	**MIA-EC-90 plastic end cap**	6	
4	**373797**	**MQ-72 3m channel**	4	Depends on height
5	**304889**	**MIA-OH90 one hand screw**	8	
6	**382897**	**M12-F-SL-WS 3/4“ lock nut**	8	
7	**369686**	**MQZ-E31 plastic end cap**	8	
8	**369685**	**MQZ-E41plastic end cap**	8	
9	**369619**	**MQK-21 D/600 bracket**	4	
10	**369627**	**MQM-M12 wing nut**	12	
11	**216454**	**M10x25 hexagon head screw**	12	
12	**369621**	**MQK-SL brace**	4	
13	**369623**	**MQN push button**	4	
14	**370598**	**MQZ-E21 plastic end cap**	8	
15	**369630**	**MQA-M10 saddle nut**	8	
16	**216466**	**M10 hexagon nut**	12	
17	**282851**	**A 10,5/20 washer**	24	
18	**339795**	**AM10x1000 threaded rod**	8	Depends on the hanging distance

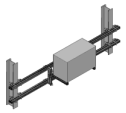
Application description

Ventilation - Radiation Unit Bearing Secondary Structure - Comfort - Heavy

General comments

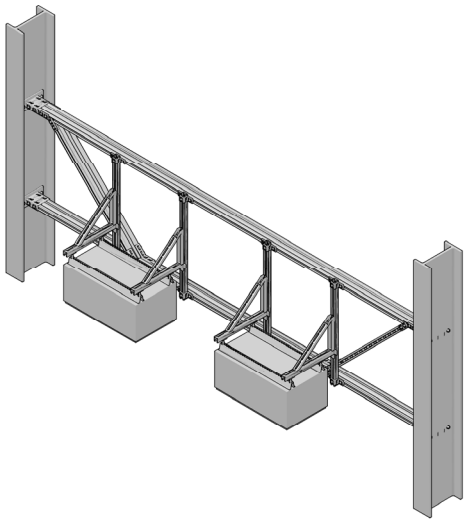
- Application subject to vertical loads caused by weight of the pipes
- Application not subjects to any thermal expansion or any other 3D loads

Application

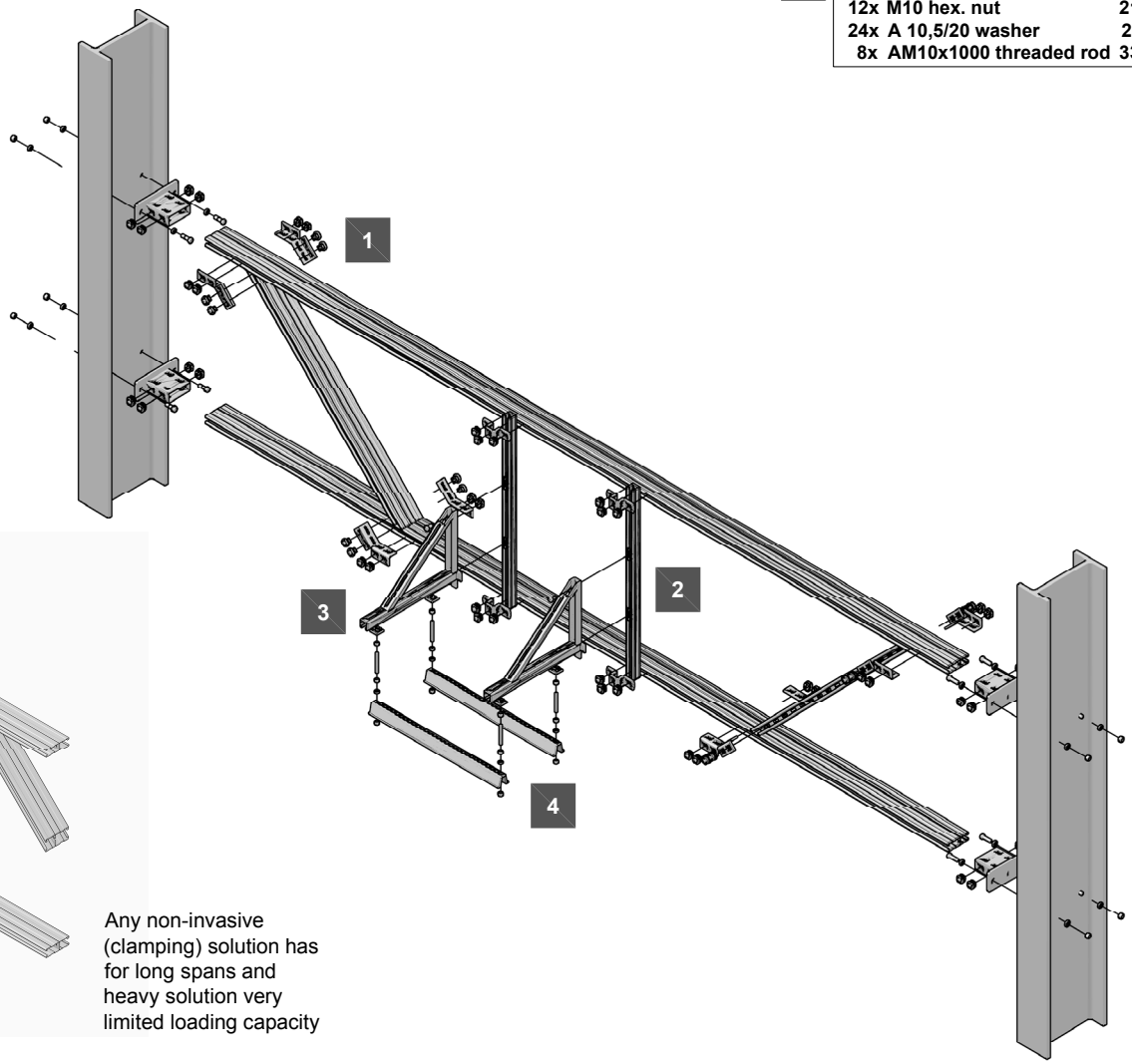


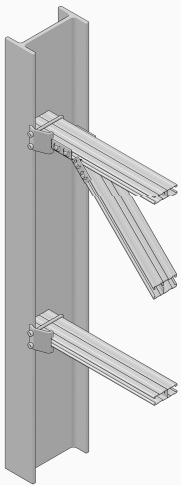
Base material	Steel
Product line	MQ System
Capacity limit	Various

Ventilation - Radiation Unit Bearing Secondary Structure - Options



	2x Ventilation unit fixed on the structural steel columns in the distance of 6m BOM for the entire solution		
1	Main Beam (channel) sub-structure		
	2x	MQ-52-72 D 6m channel	369605
	4x	MQP-124 channel base	369653
	48x	MQN push button	369623
	8x	M12x60 hex. head screw	216460
	8x	A 13/24 washer	282852
	8x	M12 hexagon nut	216467
	8x	MQW-8/45° brace con.	369660
2	Vertical channels and their fixation		
	4x	MQ-41/3 3m…..m channel	369596
	8x	MQB-41 cross chan. con.	369668
	24x	MQN push button	369623
	8x	MQZ-E41plastic end cap	369685
3	Brackets and their fixations		
	4x	MQK-H/550 HDG bracket	2048097
	8x	MQM-M12 wing nut	369627
	8x	A 13/24 washer	282852
	8x	M10x25 hex. head screw	216454
4	Connection of the unit		
	8x	MQA-M10 saddle nut	369630
	12x	M10 hex. nut	216466
	24x	A 10,5/20 washer	282851
	8x	AM10x1000 threaded rod	339795





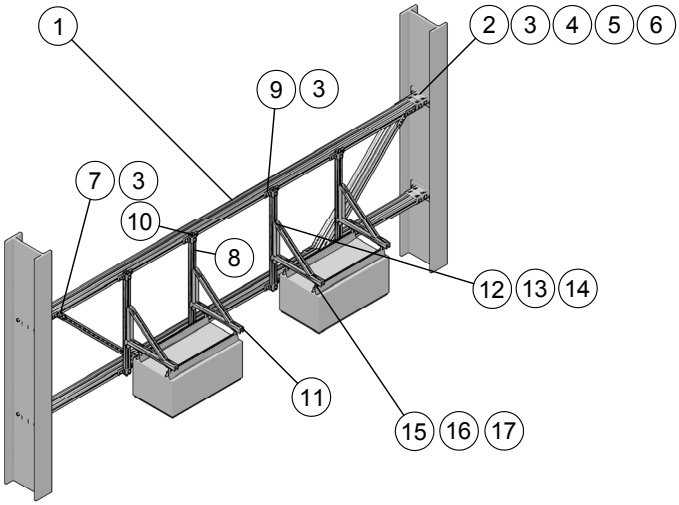
Any non-invasive (clamping) solution has for long spans and heavy solution very limited loading capacity

Application description	Application	Product lines	Base material
Ventilation - Radiation Unit Bearing Secondary Structure	17	MQ System	Steel
General comments		Accessories	
• Application subject to vertical loads caused by weight of the air ducts • Application not subjects to any thermal expansion or any other 3D loads			

Ventilation Applications - Radiation Unit Bearing Secondary Structure - Comfort - Heavy

Type V-G-RUBSS-3-C-H-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369605**	**MQ-52-72 D 6m channel**	4	Depends on span and height
2	**369653**	**MQP-124 channel base**	4	
3	**369623**	**MQN push button**	60	
4	**216460**	**M12x60 hexagon head screw**	8	
5	**282852**	**A 13/24 washer**	8	
6	**216467**	**M12 hexagon nut**	8	
7	**369660**	**MQW-8/45° brace connector**	8	
8	**369596**	**MQ-41/3 3m channel**	4	Depends on height
9	**369668**	**MQB-41 cross channel connector**	8	
10	**369685**	**MQZ-E41plastic end cap**	8	
11	**2048097**	**MQK-H/550 HDG bracket**	4	
12	**369627**	**MQM-M12 wing nut**	8	
13	**282852**	**A 13/24 washer**	8	
14	**216454**	**M10x25 hexagon head screw**	8	
15	**369630**	**MQA-M10 saddle nut**	8	
16	**216466**	**A 10,5/20 washer**	24	
17	**339795**	**AM10x1000 threaded rod**	8	Depends on hanging distance

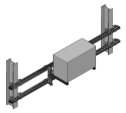
Application description

Ventilation - Radiation Unit Bearing Secondary Structure - Comfort - Heavy

General comments

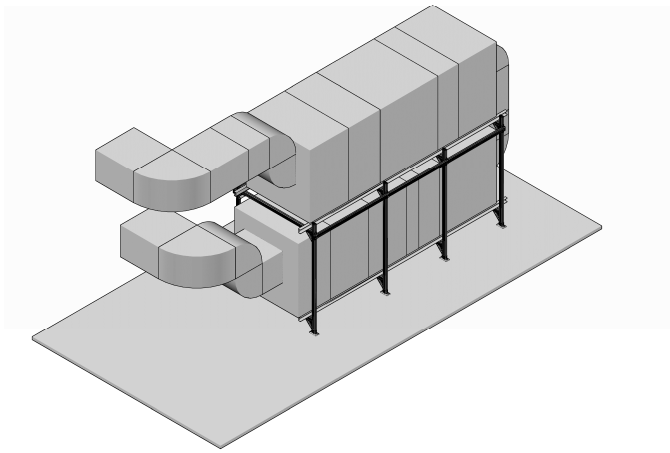
- Application subject to vertical loads caused by weight of the pipes
- Application not subjects to any thermal expansion or any other 3D loads

Application



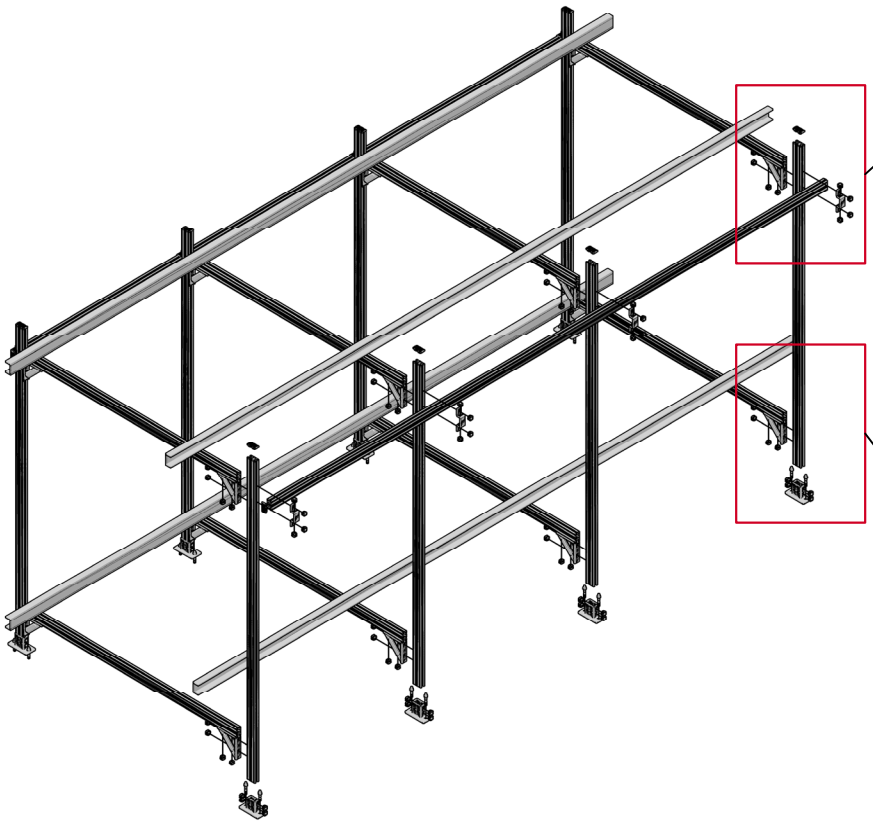
Base material	Steel
Product line	MQ System
Capacity limit	Various

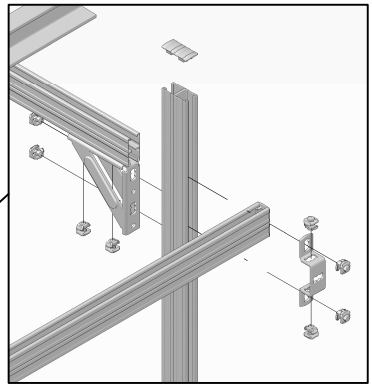
Ventilation - Plant Room Multi Frame - Options

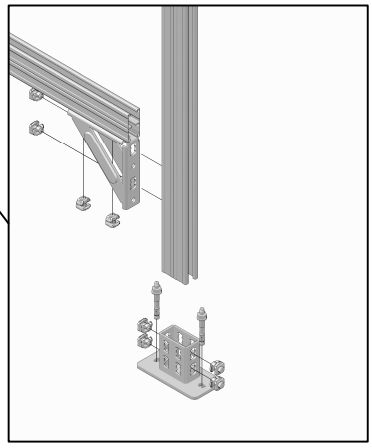


2 level set of ventilation units fixed on 3D multi frame		
BOM for the entire solution		
Main frame		
8x	MQ-41 D 3m channel	369603
8x	MQ-41 D 3m..2.4m	369603
8x	MQP-82 channel base	369652
16x	MQW-S/2 braced angle	369665
96x	MQN push button	369623
16x	MQZ-E41 plastic end caps	369685
8x	HSA M12x100 20/5/-	2004155
Connecting longitudinal channels		
2x	MQ-41 D 6m channel	369604
8x	MQB-4x2 cr. chan. con.	3696733
2x	MQN push button	369623
8x	MQZ-E41 plastic end cap	369685

Important notice:
supporting 3D frame has to allow maintenance of individual blocks from the side







Application description	Application	Product lines	Base material
Ventilation - 3D Plant Room Multi Frame	18	MQ System	Concrete
		Accessories	

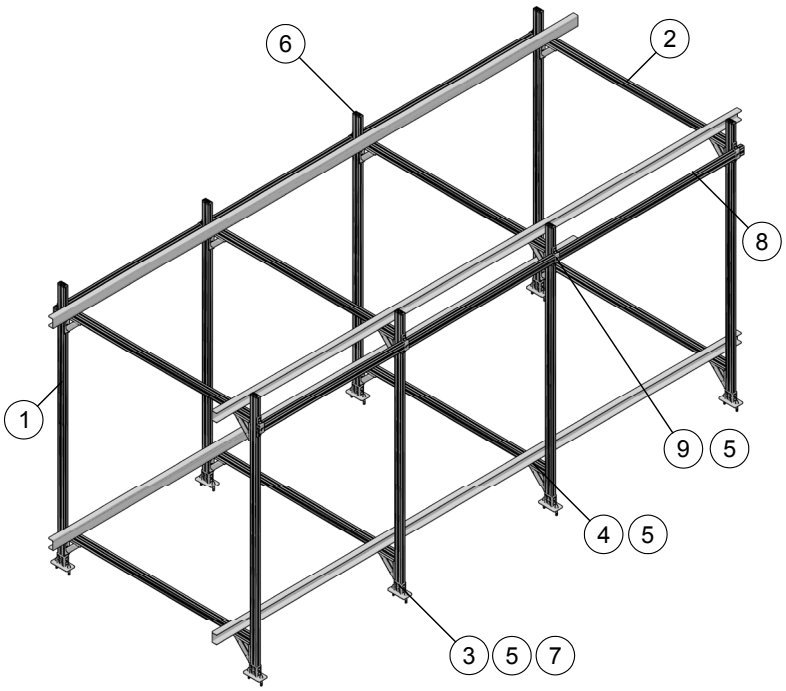
General comments

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

Ventilation Applications - Plant Room Multi Frame - Comfort - Heavy

Type V-G-PRMF-1-C-H-GL

- No particular loading capacity limits for this case since every case must be modeled, calculated and verified individually



Additional loading capacity limits

Every case must be modeled, calculated and verified individually.

Strength, rigidity and convenience are more important than finding the most cost-efficient solution when installing plant room equipment

Bill of material

Ref.	Item no.	Description	Piece	Length [m]
1	**369603**	**MQ-41 D 3m channel**	-	24m = 8x 3m
2	**369603**	**MQ-41 D 3m channel**	-	19.2m = 8x 2.4m
3	**369652**	**MQP-82 channel base**	8	
4	**369665**	**MQW-S/2 braced angle**	16	
5	**369623**	**MQN push button**	128	
6	**369685**	**MQZ-E41 plastic end caps**	24	
7	**2004155**	**HSA M12x100 20/5/- anchor**	8	
8	**369604**	**MQ-41 D 6m channel**	2	
9	**369673**	**MQB-4x2 cross channel connector**	8	

Application description

Ventilation - Plant Room Multi Frame - Comfort - Heavy

General comments

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

Application

18

Base material	Concrete
Product line	MQ System
Capacity limit	Various

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