

FIRE RESISTANCE TYPICALS

Istallation Technical Manual Technical Challenges Fire Resistance





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Installation Technical Manual - Technical Challenges - Fire resistance typicals

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Installation Technical Manual - Technical Challenges - Fire resistance typicals

Introduction

Hilti offers a variety of fire-tested products in the areas of fire protection, fastening technology and installation technology, and therefore plays a major role in supporting structural and system fire protection to the effect that the people in the building can be evacuated, while ensuring safe access for the fire department and rescue teams. Protecting the escape and emergency routes is of paramount importance. For this reason, fire protection requirements are becoming increasingly important around the world.

Modern buildings house a variety of mechanical and electrical systems. Fire protectionrelated systems such as smoke extraction ducts, sprinkler piping and cable runs with functional integrity requirements (e.g. power supply for firestop shutters or ventilation and smoke extraction systems etc.) are crossed in many cases by pipes that are not related to fire protection, or the pipes are laid over a suspended fire protection ceiling due to lack of space. In the event of a fire, if the pipe supports fail or are severely deformed, this can seriously impact the required fire resistance time of the fire protection-related building components that are installed beneath. Therefore the installation positioned above the fire protection-related application (e.g. a suspended ceiling) must be guaranteed to have the same level of fire resistance as the structure below. This also applies in particular to escape and emergency routes where the suspended ceiling often is intended to protect the escape routes against flames and prevent the penetration of smoke and fumes.

A suspended ceiling with fire protection requirements must ensure the required fire resistance time in the event of fire exposure from both above and below. It must be noted that a fire can develop above the suspended ceiling due to the presence of flammable materials, e.g. as a result of retrofitting. Falling pipes and other installation components can damage a fire protection ceiling or cause it to collapse. Furthermore, severe deformations of the suspensions and support structures can result in partial damage to the suspended ceiling and thus impair the ceiling's fire-protection function.

In the event of a fire, if a suspended ceiling is damaged, the smoke that has collected in the ceiling cavity can spread into the areas within the building below. This can make it very difficult or even impossible for the people who are in the affected areas to orient themselves. Subsequently, for the people trying to escape there is a very high risk of fatality due to exposure to smoke and fumes. Therefore, it must be ensured that the function of escape and emergency routes is not affected above must under no circumstances affect the required fire resistance time of fire protection-related equipment or structures installed below, such as cable runs, ventilation, smoke extraction and electrical ducts as well as fire protection ceilings.



Hilti fire-resistance typicals during the fire test

Installation Technical Manual - Technical Challenges - Fire resistance typicals

How to read this manual

In this manual, you will find the Hilti fire resistant modular support systems typicals. The following pages contains typical applications for pipe and duct supports. These typicals contains axonometric view with description, loading capacity limits and bill of material. For pipe application typicals, pipe rings selection have to be done using pipe rings table that you will find at end of this manual.

All the information used in this manual came from the "Installation Technical Manual - Technical Challenges - Fire resistance". There you can find all details, norms and used annexes. For more information, please contact your local Hilti expert for support.



All item numbers and number of pieces of each item necessary to assemble this application.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Fire Resistance Applications - Headrail On Concrete

Channel MM-C-36 or MM-C-45

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Headrail - Loading capacity limits								
Channel:		MM-C-36	MM-C-36 or MM-C-45					
Fire resista		30 minutes						
Deformation of the channel: ≤ 50 mm								
Channel	Span width (mm)	Single load (kN)	Multiple load (kN)					
MM-C-36	400	0.15	4 x 0.113					
MM-C-45		0.10	4 X 0.110					

Extract of test report IBMB no.(3074/068/12)-CM, Table 2-1to 2-2

Single load scheme

S/2

S/2 S = span width





Bill of material

Part of typical		Ref.	ltem no.	Description	Quanti struc	Quantites for structure		Quantites for single load		tes for le load
					Piece	m	Piece	m	Piece	m
Structure Channel Fix. material	Channel	1	418751	MM-C-36 3m channel	_	0.45				
	onanner		2048104	MM-C-45 3m channel	-	0.45				
	Fix. material	2	416745	HUS3-P 6x40/5	2	-				
		3	418760	MM-S M8 pipering saddle			1	-	4	-
	M8	4	216465	M8 hexagon nut			1	-	4	-
Pipe		5	216382	AM8x60 threaded stud			1	-	4	-
connection		3	418761	MM-S M10 pipering saddle			1	-	4	-
	M10	4	216466	M10 hexagon nut			1	-	4	-
		5	216392	AM10x80 threaded stud			1	-	4	-
Pipering	M8/M10	6	-	Various*			1	-	4	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Fire Resistance Applications - Headrail On Concrete

Channel MQ-21 or MQ-41

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Headrail - Loading capacity limits								
Channel:	MQ-21	or MQ-41						
Fire resistance	3	0 minutes						
Deformation of the channel: ≤ 50 mm								
Pipering saddle	Span width (mm)	Single load (kN)	Multiple load (kN)					
	350	0.35	3 x 0.25					
≥ MQA-M8	500	0.30	3 x 0.20					
	700	0.25	3 x 0.15					
	350	0.45	3 x 0.30					
≥ MQA-M10B	500	0.40	3 x 0.25					
	700	0.35	3 x 0.20					

Extract of test report IBM B no.2100/580/15-CM, table 3-1

Single load scheme

Multiple load scheme



Bill of material

Part of typical		Ref.	ltem no.	Description	Quanti strue	Quantites for structure		tes for load	Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Channel	1	2148544	MQ-21 3m channel	_	Min.				
Structure Fi: ma	onanner		369591	MQ-41 3m channel		S + 0.05				
	-	2	2105714	HST3 M10x110 50/30 anchor *1	2	_				
	Fixation material	2	2105715	HST3 M10x130 70/50 anchor *2	2	-				
		3	369679	MQZ-L11 bored plate	2	-				
		4	369629	MQA-M8 pipering saddle			1	-	3	-
	M8	5	216465	M8 hexagon nut			1	-	3	-
		6	216382	AM8x60 threaded stud			1	-	3	-
		4	372471	MQA-M10-B pipering saddle			1	-	3	-
Pipe connection	M10	5	216466	M10 hexagon nut			1	-	3	-
		6	216392	AM10x80 threaded stud			1	-	3	-
		4	369631	MQA-M12 pipering saddle			1	-	3	-
	M12	5	216467	M12 hexagon nut			1	-	3	-
		6	216399	AM12x100 threaded stud			1	-	3	-
Pipering	M8/M10/M12	7	-	Various* ³			1	-	3	-

*1 Anchor for MQ-21 channel

*² Anchor for MQ-41 channel

 *3 Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Fire Resistance Applications - Headrail On Concrete

Channel MQ-41/3 or MQ-41/3 LL

Possible ultimate loads depending on the required fire resistance time.



Channel: MQ-41/3 and MQ-41/3 LL Fire resistant time Span width (mm) Single load (kN) Multiple load (kN) Min. distance (mm) 30 minutes 350 1.60 3 × 0.90 55 30 minutes 500 1.35 4 × 0.58 85 600 1.10 5 × 0.42 95 700 1.00 6 × 0.30 100 60 minutes 350 0.95 3 × 0.45 55 600 0.100 6 × 0.30 100 6 × 0.30 100 60 minutes 350 0.95 3 × 0.45 55 55 600 0.700 5 × 0.22 95 55	Headrail - Loading capacity limits										
Fire resistant time Span width (mm) Single load (kN) Multiple load (kN) Min. distance (kN) 30 minutes 350 1.60 3 × 0.90 55 500 1.35 4 × 0.58 85 600 1.10 5 × 0.42 95 700 1.00 6 × 0.30 100 850 0.95 3 × 0.45 55 60 minutes 500 0.80 4 × 0.31 85 600 0.70 5 × 0.22 95 95 700 0.60 6 × 0.16 100 90 90 minutes 350 0.65 3 × 0.30 55 600 0.45 5 × 0.14 80 700 0.60 3 × 0.30 55 500 0.50 4 × 0.19 75 600 0.45 5 × 0.14 80 700 0.40 6 × 0.11 80 700 0.45 4 × 0.17 75 600 0.45 5 × 0.12 80	Channel:		MQ-41/3 and MQ-41/3 LL								
Span time Single width (mm) Multiple load (kN) Min. distance (mm) 30 minutes 350 1.60 3 × 0.90 55 600 1.35 4 × 0.58 85 600 1.10 5 × 0.42 95 700 1.00 6 × 0.30 100 60 minutes 350 0.95 3 × 0.45 55 600 0.10 6 × 0.30 100 6 × 0.30 100 60 minutes 350 0.95 3 × 0.45 55 50 600 0.70 5 × 0.22 95 95 95 90 minutes 350 0.65 3 × 0.30 55 90 0.50 4 × 0.19 75 600 0.45 5 × 0.14 80 700 0.40 6 × 0.11 80 700 0.45 5 × 0.12 80 700 0.45 4 × 0.17 75 600 0.45 5 × 0.12 80 700 0.45	Fire resista	nce time:	30, 60, 90, 120 minutes								
350 1.60 3 x 0.90 55 30 minutes 500 1.35 4 x 0.58 85 600 1.10 5 x 0.42 95 700 1.00 6 x 0.30 100 60 minutes 350 0.95 3 x 0.45 55 60 minutes 500 0.80 4 x 0.31 85 600 0.70 5 x 0.22 95 700 0.60 6 x 0.16 100 350 0.65 3 x 0.30 55 90 minutes 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.60 3 x 0.28 55 90 minutes 350 0.60 3 x 0.28 55 600 0.45 5 x 0.14 80 700 0.40 5 x 0.12 80 700 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80	Fire resistant time	Span width (mm)	Single Ioad (kN)	Multiple load (kN)	Min. distance (mm)						
30 minutes 500 1.35 4 x 0.58 85 600 1.10 5 x 0.42 95 700 1.00 6 x 0.30 100 80 minutes 350 0.95 3 x 0.45 55 60 minutes 500 0.80 4 x 0.31 85 60 minutes 600 0.70 5 x 0.22 95 700 0.60 6 x 0.16 100 90 minutes 350 0.65 3 x 0.30 55 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 700 0.40 6 x 0.11 80 700 0.40 5 x 0.12 80 700 0.40 5 x 0.12 80		350	1.60	3 x 0.90	55						
50 minutes 600 1.10 5 x 0.42 95 700 1.00 6 x 0.30 100 350 0.95 3 x 0.45 55 60 minutes 500 0.80 4 x 0.31 85 600 0.70 5 x 0.22 95 700 0.60 6 x 0.16 100 90 minutes 350 0.65 3 x 0.30 55 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80	20 minutos	500	1.35	4 x 0.58	85						
700 1.00 6 × 0.30 100 350 0.95 3 × 0.45 55 500 0.80 4 × 0.31 85 60 minutes 600 0.70 5 × 0.22 95 700 0.60 6 × 0.16 100 90 minutes 350 0.65 3 × 0.30 55 500 0.50 4 × 0.19 75 600 0.45 5 × 0.14 80 700 0.40 6 × 0.11 80 350 0.60 3 × 0.28 55 500 0.45 4 × 0.17 75 600 0.40 5 × 0.12 80 700 0.40 5 × 0.12 80	50 minutes	600	1.10	5 x 0.42	95						
350 0.95 3 x 0.45 55 60 minutes 500 0.80 4 x 0.31 85 600 0.70 5 x 0.22 95 700 0.60 6 x 0.16 100 350 0.65 3 x 0.30 55 90 minutes 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 600 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80		700	1.00	6 x 0.30	100						
500 0.80 4 x 0.31 85 600 minutes 600 0.70 5 x 0.22 95 700 0.60 6 x 0.16 100 350 0.65 3 x 0.30 55 90 minutes 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 720 0.35 6 x 0.10 80		350	0.95	3 x 0.45	55						
600 0.70 5 x 0.22 95 700 0.60 6 x 0.16 100 350 0.65 3 x 0.30 55 90 minutes 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80	60 minutes	500	0.80	4 x 0.31	85						
700 0.60 6 x 0.16 100 90 minutes 350 0.65 3 x 0.30 55 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 120 minutes 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80	ou minutes	600	0.70	5 x 0.22	95						
350 0.65 3 x 0.30 55 90 minutes 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80		700	0.60	6 x 0.16	100						
90 minutes 500 0.50 4 x 0.19 75 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80		350	0.65	3 x 0.30	55						
30 minutes 600 0.45 5 x 0.14 80 700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80	90 minutos	500	0.50	4 x 0.19	75						
700 0.40 6 x 0.11 80 350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80	50 minutes	600	0.45	5 x 0.14	80						
350 0.60 3 x 0.28 55 500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80		700	0.40	6 x 0.11	80						
500 0.45 4 x 0.17 75 600 0.40 5 x 0.12 80 700 0.35 6 x 0.10 80		350	0.60	3 x 0.28	55						
600 0.40 5 x 0.12 80	120 minutos	500	0.45	4 x 0.17	75						
700 0.35 6 x 0.10 80	120 minutes	600	0.40	5 x 0.12	80						
700 0.00 0 0 0 00		700	0.35	6 x 0.10	80						

Single load scheme



Multiple load scheme



Extract of test report IBMB no.3054/048/12-CM, Table C-1to C-5

Part of typical		Ref.	ltem no.	Description	Quanti strue	Quantites for structure		tes for load	Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Channel	1	369596	MQ-41/3 3m channel	_	Min.				
Structure	onanner	'	2048102	MQ-41/3 LL 3m channel		S + 0.10				
Structure	Fixation	2	2105715	HST3 M10x130 70/50 anchor	2	-				
	material	3	369679	MQZ-L11 bored plate	2	-				
		4	372471	MQA-M10-B pipering saddle			1	-	1 x Y	-
	M10	5	216466	M10 hexagon nut			1	-	1 x Y	-
		6	216392	AM10x80 threaded stud			1	-	1 x Y	-
		4	369631	MQA-M12 pipering saddle			1	-	1 x Y	-
Pipe	M12	5	216467	M12 hexagon nut			1	-	1 x Y	-
		6	216399	AM12x100 threaded stud			1	-	1 x Y	-
		4	369632	MQA-M16-B pipering saddle			1	-	1 x Y	-
	M16	5	216468	M16 hexagon nut			1	-	1 x Y	-
		6	212635	AM16x100 threaded stud			1	-	1 x Y	-
Pipering	M10/ M12/M16	7	-	Various*			1	-	1 x Y	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MM-C-36 or MM-C-45

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Trapeze on rods - Loading capacity limits MM-C-36 or MM-C-45 Channel: Fire resistance time: 30 minutes Deformation of the channel: ≤ 50 mm Span Single load Multiple load Channel width (kN) (kN) (mm) MM-C-36 0.25 4 x 0.125 400 MM-C-45 0.35 4 x 0.175

Extract of test report IBMB no. 3074/068/12-CM , table 2-1to 2-2

Single I	oad	scheme
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Multiple load scheme



Bill of material										
Part of typical		Ref.	ltem no.	Description	Quanti strue	ites for cture	Quantites for single load		Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Channel	1	418751	MM-C-36 3m channel	_	0.45				
	onumer		2048104	MM-C-45 3m channel		0.40				
		2	418770	MM-CW M10 channel w asher	2	-				
Structure Fix. m		3	282862	A 10.5/28 flat w asher	2	-				
	Fix. material	4	216466	M10 hexagon nut	4	-				
		5	339795	AM10x1000 4.8 threaded rod	1	2 x 0.5				
		6	376967	HKD M10x40 drop-in anchor	2	-				
		7	418760	MM-S M8 pipering saddle			1	-	4	-
	M8	8	216465	M8 hexagon nut			1	-	4	-
Pipe		9	216382	AM8x60 threaded stud			1	-	4	-
connection		7	418761	MM-S M10 pipering saddle			1	-	4	-
	M10	8	216466	M10 hexagon nut			1	-	4	-
		9	216392	AM10x80 threaded stud			1	-	4	-
Pipering	M8/M10	10	-	Various*			1	-	4	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41 or MQ-41 LL

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Trapeze on rods - Loading capacity limits									
Channe	əl:	MQ-41 o	MQ-41 or MQ-41 LL						
Fire res	Fire resistance time:								
Deform	≤ 50 mm								
Pipering saddle	Span width (mm)	Single load (kN)	Multiple load (kN)						
M8	350	0.40	3 x 0.30						
IQA-	500	0.30	3 x 0.20						
~	700	0.20	3 x 0.12						
110B	350	0.50	3 x 0.35						
A-AG	500	0.40	3 x 0.25						
M≤	700	0.30	3 x 0.15						

Extract of test report IBMB no.2100/580/15-CM

Single load scheme

Multiple load scheme





Bill of material

Part of typical		Ref.	ltem no.	Description	Quanti strue	Quantites for structure		Quantites for single load		tes for e load
				Piece	m	Piece	m	Piece	m	
	Channel	1	369591	MQ-41 3m channel	_	Min.				
	Gliaimer	<u> </u>	2048100	MQ-41 LL 3m channel	_	S + 0.05				
Structure		2	369680	MQZ-L11 bored plate	4	-				
Fixation	Fixation	3	216466	M10 hegaxon nut	4	-				
	material	4	339795	AM10x1000 4.8 threaded rod	-	2 x 0.5				
		5	376967	HKD M10x40 drop-in anchor	2	-				
		6	369629	MQA-M8 pipering saddle			1	-	3	-
	M8	7	216465	M8 hexagon nut			1	-	3	-
		8	216382	AM8x60 threaded stud			1	-	3	-
		6	372471	MQA-M10-B pipering saddle			1	-	3	-
Pipe connection	M10	7	216466	M10 hexagon nut			1	-	3	-
		8	216392	AM10x80 threaded stud			1	-	3	-
		6	369631	MQA-M12 pipering saddle			1	-	3	-
	M12	7	216467	M12 hexagon nut			1	-	3	-
		8	216399	AM12x100 threaded stud			1	-	3	-
Pipering	M8/ M10/M12	9	-	Various*			1	-	3	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41/3 or MQ-41/3 LL

Possible ultimate loads depending on the required fire resistance time.



Bill of material





Note: Y = Quantity of loads

Trapeze o	n rods - L	oading ca	pacity lim	its	44011
Channel:			MQ-41/3	and MQ-	41/3 LL
Fire resist	ance time):	30, 60,	90, 120 n	ninutes
Fire	Span	Singl	e load	Multip	le load
resistant time	width (mm)	Load (kN)	Min. distance (mm)	Load (kN)	Min. distance (mm)
	350	1.70	185	3 x 1.06	55
30 minutes	700	1.70	380	6 x 0.48	240
	1000	1.45	440	9 x 0.27	425
	1250	1.20	495	11 x 0.21	625
	350	1.20	170	3 x 0.58	60
0 minutos	700	1.20	305	6 x 0.25	225
oo mmutes	1000	0.90	395	9 x 0.14	370
	1250	0.85	475	11 x 0.10	530
	350	0.80	155	3 x 0.40	70
00 minutes	700	0.80	295	6 x 0.17	200
somnutes	1000	0.70	390	9 x 0.10	345
	1250	0.70	465	11 x 0.07	495
	350	0.60	175	3 x 0.31	65
120	700	0.60	290	6 x 0.13	195
minutes	1000	0.60	395	9 x 0.07	330
	1250	0.60	475	11 x 0.05	485

Extract of test report IBMB no.3054/048/12-CM, table D-6 to D-25

Part of typical		Ref.	ltem no.	Description	Quanti struc	Quantites for structure		Quantites for single load		es for e load
					Piece	m	Piece	m	Piece	m
	Channel	1	369596	MQ-41/3 3m channel		Min.				
	Gliaimer	1	2048102	MQ-41/3 LL 3m channel	-	S + 0.10				
Structure	Fixation material	2	369680	MQZ-L13 bored plate	4	-				
		3	216467	M12 hegaxon nut	4					
		4	339797	AM12x1000 4.8 threaded rod	-	2 x 0.5				
		5	378544	HKD M12x50 drop-in anchor	2	-				
	M10	6	372471	MQA-M10-B pipering saddle			1	-	1 x Y	-
		7	216466	M10 hexagon nut			1	-	1 x Y	-
		8	216392	AM10x80 threaded stud			1	-	1 x Y	-
		6	369631	MQA-M12 pipering saddle			1	-	1 x Y	-
Pipe	M12	7	216467	M12 hexagon nut			1	-	1 x Y	-
		8	216399	AM12x100 threaded stud			1	-	1 x Y	-
		6	369632	MQA-M16-B pipering saddle			1	-	1 x Y	-
	M16	7	216468	M16 hexagon nut			1	-	1 x Y	-
		8	212635	AM16x100 threaded stud			1	-	1 x Y	-
Pipering	M10/ M12/M16	9	-	Various*			1	-	1 x Y	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41/3 or MQ-41/3 LL

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Trapeze o	Trapeze on rods - Loading capacity limits								
Channel:		MQ-41/3 and MQ-41/3 LL							
Fire resist	tance time:		30 minutes						
Deformation of the channel: $\leq 50 \text{ mm}$									
Fire resistant time	Span width (mm)	Single load (kN)	Multiple load (kN)	Min. distance (mm)					
	350	0.95	3 x 0.55	40					
20 minutos	500	0.55	4 x 0.24	40					
50 minutes	600	0.40	5 x 0.13	40					
	700	0.30	6 x 0.10	40					

Extract of test report IBM B no.3054/048/12-CM, table B-1to B-4

Sinale	load	scheme
Gingio	louu	001101110





Note: Y = Quantity of loads

Bill of material

Part of typical		Ref.	. Item no.	Description	Quanti strue	Quantites for structure		Quantites for single load		tes for e load
					Piece	m	Piece	m	Piece	m
	Channel	4	369596	MQ-41/3 3m channel	_	Min.				
	Gliailliei	· ·	2048102	MQ-41/3 LL 3m channel	-	S + 0.05				
Structure	Fixation material	2	369680	MQZ-L11 bored plate	4	-				
Structure		3	216466	M10 hegaxon nut	4					
		4	339795	AM10x1000 4.8 threaded rod	-	2 x 0.5				
		5	376967	HKD M10x40 drop-in anchor	2	-				
	M10	6	372471	MQA-M10-B pipering saddle			1	-	1 x Y	-
		7	216466	M10 hexagon nut			1	-	1 x Y	-
		8	216392	AM10x80 threaded stud			1	-	1 x Y	-
		6	369631	MQA-M12 pipering saddle			1	-	1 x Y	-
Pipe	M12	7	216467	M12 hexagon nut			1	-	1 x Y	-
		8	216399	AM12x100 threaded stud			1	-	1 x Y	-
		6	369632	MQA-M16-B pipering saddle			1	-	1 x Y	-
	M16	7	216468	M16 hexagon nut			1	-	1 x Y	-
		8	212635	AM16x100 threaded stud			1	-	1 x Y	-
Pipering	M10/ M12/M16	9	-	Various*			1	-	1 x Y	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Vertical channel MQ-41/3 and horizontal channel MQ-41 D

Possible ultimate loads depending on the required fire resistance time.



Single load scheme

Multiple load scheme

Note: Y = Quantity of loads





Trapeze on Frame - Loading capacity limits Channel: Horizontal MQ-41 D and vertical MQ-41/3 Fire resistance time: 30, 60, 90, 120 minutes Single load Multiple load Span Fire resistant width Min. Min. time (mm) Load Load distance distance (kN) (kN) (mm) (mm) 700 2.54 284 6 x 0.64 50 30 minutes 1000 2.46 424 9 x 0.32 124 1250 1.98 458 11 x 0.24 139 1.48 239 6 x 0.45 90 700 60 minutes 9 x 0.19 1000 1.17 234 103 470 1250 1.00 11 x 0.12 97 6 x 0.32 700 1.09 148 110 90 minutes 1000 0.76 266 9 x 0.14 116 1250 0.67 355 11 x 0.08 136 700 0.87 161 6 x 0.25 84 120 minutes 1000 0.56 127 9 x 0.11 122 1250 0.51 394 11 x 0.06 205

Extract of test report IBMB no .3022/9626-CM , table A-1 to A-4

Part of typical		Ref.	. Item no.	Description	Quantites for structure		Quantites for single load		Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Channel	1	369603	MQ-41 D 3m channel	-	S				
	onumer	2	369596	MQ-41/3 3m channel	-	2 x 0.6				
Structure	Fixation material	3	369665	MQW-S/2 angle	2	-				
		4	369651	MQP-21-72 base plate	2	-				
		5	369623	MQN pushbutton	12	-				
		6	2105718	HST3 M12x105 30/10 stud anchor	4	-				
	M10	7	372471	MQA-M10-B pipering saddle			1	-	1 x Y	-
		8	216466	M10 hexagon nut			1	-	1 x Y	-
		9	216392	AM10x80 threaded stud			1	-	1 x Y	-
		7	369631	MQA-M12 pipering saddle			1	-	1 x Y	-
Pipe	M12	8	216467	M12 hexagon nut			1	-	1 x Y	-
		9	216399	AM12x100 threaded stud			1	-	1 x Y	-
		7	369632	MQA-M16-B pipering saddle			1	-	1 x Y	-
	M16	8	216468	M16 hexagon nut			1	-	1 x Y	-
		9	212635	AM16x100 threaded stud			1	-	1 x Y	-
Pipering	M10/ M12/M16	10	-	Various*			1	-	1 x Y	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Vertical channel MQ-41/3 and horizontal channel MQ-41 D

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Trapeze on I	Trapeze on Frame - Loading capacity limits								
Channel:	Channel: Horizontal MQ-41 D and vertical MQ-41/3								
Fire resistar	Fire resistance time: 30 minutes								
Deformation of the channel: ≤ 50 mm									
Fire resistant time	Span width (mm)	Single load (kN)	Multiple load (kN)						
	700	1.20	6 x 0.64						
30 minutes	1000	0.60	9 x 0.15						
	1250	0.30	11 x 0.07						

Extract of test report IBM B no .3022/9626-CM , table A-5

Sinala	heol	schomo
Single	ioau	scheme







Multiple load scheme

Bill of material

Part of typical		Ref. If	ltem no.	Description	Quantites for structure		Quantites for single load		Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Channel	1	369603	MQ-41 D 3m channel	-	S				
	onanner	2	369596	MQ-41/3 3m channel	-	2 x 0.6				
Structure	Fixation material	3	369665	MQW-S/2 angle	2	-				
		4	369651	MQP-21-72 base plate	2	-				
		5	369623	MQN pushbutton	12	-				
		6	2105718	HST3 M12x105 30/10 stud anchor	4	-				
	M10	7	372471	MQA-M10-B pipering saddle			1	-	1 x Y	-
		8	216466	M10 hexagon nut			1	-	1 x Y	-
		9	216392	AM10x80 threaded stud			1	-	1 x Y	-
		7	369631	MQA-M12 pipering saddle			1	-	1 x Y	-
Pipe	M12	8	216467	M12 hexagon nut			1	-	1 x Y	-
		9	216399	AM12x100 threaded stud			1	-	1 x Y	-
		7	369632	MQA-M16-B pipering saddle			1	-	1 x Y	-
	M16	8	216468	M16 hexagon nut			1	-	1 x Y	-
		9	212635	AM16x100 threaded stud			1	-	1 x Y	-
Pipering	M10/ M12/M16	10	-	Various*			1	-	1 x Y	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Fire Resistance Applications -Suspened Bracket On Concrete

Bracket MM-B-36

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Suspended Bracket - Loading capacity limits								
Bracket:	l	MM-B-36/450						
Fire resista		30 minutes						
Deformatio	el:	≤ 50 mm						
Channel	Span width	Single load	Multiple load					

(kN)

0.25

(k N)

4 x 0.125

Extract of test report IBM B no.(3074/068/12)-CM, Table 2-1to 2-2

(mm)

400

MM-B-36/450

S = spa	an width		E
S/2	S/2		L 00
-]	VI
		<u> </u>	Spacing ≥ 50mm

Single load scheme

Multiple load scheme



Bill of material										
Part of typical		Ref. Iter	ltem no.	Description	Quantites for structure		Quantites for single load		Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Bracket	1	418755	MM-B-36/450 bracket	1	-				
		2	418769	MM-CW M8 channel washer	1	-				
	Fixation material	3	282856	A 8.4/40 flat w asher	1	-				
Structure		4	216465	M8 hexagon nut	2	-				
		5	339793	AM8x1000 4.8 threaded rod	-	0.5				
		6	376959	HKD M8x30 drop-in anchor	1	-				
		7	2105712	HST3 M10x90 30/10 stud anchor	2	-				
		8	418760	MM-S M8 pipering saddle			1	-	4	-
	M 8	9	216465	M8 hexagon nut			1	-	4	-
Pipe		10	216382	AM8x60 threaded stud			1	-	4	-
connection		8	418761	MM-S M10 pipering saddle			1	-	4	-
	M10	9	216466	M10 hexagon nut			1	-	4	-
		10	216392	AM10x80 threaded stud			1	-	4	-
Pipering	M8/M10	11	-	Various*			1	-	4	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Fire Resistance Applications -Suspended Bracket On Concrete

Bracket MQK-41

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Suspended Bracket - Loading capacity limits								
Bracket: MQK-41								
Fire resistance time: 30 minutes								
Deformation of the channel: ≤ 50 mm								
Pipering saddle	Span width (mm)	Single load (kN)	Multiple load (kN)					
	350	0.40	3 x 0.30					
≥ MQA-M8	500	0.30	3 x 0.20					
	600	0.20	3 x 0.12					
	350	0.50	3 x 0.35					
≥ MQA-M10B	500	0.40	3 x 0.25					
	600	0.30	3 x 0.15					

Extract of test report IBMB no .2100/580/15-CM, table 3-1

Single load scheme





Bill of material

Part of typical		Ref.	ltem no.	Description	Quanti struc	Quantites for structure		Quantites for single load		tes for le load
					Piece	m	Piece	m	Piece	m
	Procket	1	369610	MQK-41/450 bracket	1					
	DidCkei	· ·	369611	MQK-41/600 bracket	I					
		2	369680	MQZ-L11 bored plate	2	-				
Structure		3	216466	M10 hegaxon nut	2	-				
	Fixation	4	339795	AM10x1000 4.8 threaded rod	-	1 x 0.5				
		5	376967	HKD M10x40 drop-in anchor	1	-				
		6	2105718	HST3 M12x105 30/10 stud anchor	2	-				
	M8	7	369629	MQA-M8 pipering saddle			1	-	3	-
		8	216465	M8 hexagon nut			1	-	3	-
		9	216382	AM8x60 threaded stud			1	-	3	-
		7	372471	MQA-M10-B pipering saddle			1	-	3	-
Pipe	M10	8	216466	M10 hexagon nut			1	-	3	-
		9	216392	AM10x80 threaded stud			1	-	3	-
		7	369631	MQA-M12 pipering saddle			1	-	3	-
	M12	8	216467	M12 hexagon nut			1	-	3	-
		9	216399	AM12x100 threaded stud			1	-	3	-
Pipering	M8/ M10/M12	10	-	Various*			1	-	3	-

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Fire Resistance Applications -Suspended Bracket On Concrete

Bracket MQK-41/3

Possible ultimate loads depending on the required fire resistance time.



Suspended Bracket - Loading capacity limits							
Bracket: MQK-41/3							
Fire resista	nce time:	30, 6	0, 90, 120	minutes			
Fire resistant time	Span width (mm)	Single Ioad (kN)	Multiple load (kN)	Min. distance (mm)			
	350	1.70	3 x 1.06	185			
30 minutes	500	1.70	4 x 0.76	270			
	600	1.70	5 x 0.59	325			
	350	1.20	3 x 0.58	170			
60 minutes	500	1.20	4 x 0.40	230			
	600	1.20	5 x 0.31	270			
	350	0.80	3 x 0.40	155			
90 minutes	500	0.80	4 x 0.28	270			
	600	0.80	5 x 0.21	260			
	350	0.60	3 x 0.31	175			
120 minutes	500	0.60	4 x 0.22	230			
	600	0.60	5 x 0.16	260			

Extract of test report IBMB no.3054/048/12-CM, Table C-1to C-5

Bill of material

Part of typical		Ref.	Ref. Item no. Description		Quantites for structure		Quantites for single load		Quantites for multiple load	
					Piece	m	Piece	m	Piece	m
	Procket	1	370596	MQK-41/3/450 bracket	1					
	Diacket	- ' - I	370597	MQK-41/3/600 bracket						
		2	369680	MQZ-L13 bored plate	2	-				
Structure	-	3	216467	M12 hegaxon nut	2	-				
	Fixation material	4	339797	AM12x1000 4.8 threaded rod	-	1 x 0.5				
		5	378544	HKD M12x50 drop-in anchor	1	-				
		6	2105718	HST3 M12x105 30/10 stud anchor	2	-				
	M10	7	372471	MQA-M10-B pipering saddle			1	-	1 x Y	-
		8	216466	M10 hexagon nut			1	-	1 x Y	-
		9	216392	AM10x80 threaded stud			1	-	1 x Y	-
Dime		7	369631	MQA-M12 pipering saddle			1	-	1 x Y	-
Pipe	M12	8	216467	M12 hexagon nut			1	-	1 x Y	-
		9	216399	AM12x100 threaded stud			1	-	1 x Y	-
		7	369632	MQA-M16-B pipering saddle			1	-	1 x Y	-
	M16	8	216468	M16 hexagon nut			1	-	1 x Y	-
		9	212635	AM16x100 threaded stud			1	-	1 x Y	-
Pipering	M10/ M12/M16	10	-	Various*			1	-	1 x Y	-

Note: Y = Quantity of loads

Minimum distance

* Selection of the pipering see tables on Page 29 or 30.

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MM-C-36 or MM-C-45

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Rigid duct - Loading capacity limits						
Channel:		MM-C-36 and MM-C-45				
Fire resista	ance time:	30 minutes				
Deformatio	on of the chann	el: ≤ 50 mm				
Fire	Span width	Equal load (∑ equally distributed load)				
time	(mm)	Load (kN)				
MM-C-36	400	0.50				
MM-0-00	700	0.35				
MM-C-45	400	1.00				
	700	0.50				

Extract of test report IBMB no. 3074/068/12-CM , table 2-1to 2-2

Equal load scheme



Bill of material Quantites for structure Part of typical Ref. Description Item no. Piece m 418751 MM-C-36 3m channel Channel 1 S + 0.05 _ 2048104 MM-C-45 3m channel 2 418769 MM-CW M8 channel washer 2 Structure 282861 A 8.4/28 flat washer 2 3 -Fixation 4 216465 M8 hexagon nut 4 material 5 339793 AM8x1000 4.8 threaded rod 2 x 0.5 _ 6 376959 HKD M8x30 drop-in anchor 2

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41 or MQ-41 LL

Possible ultimate loads depending on the required fire resistance time.



Rigid duct - Loading capacity limits						
Channel:		MQ-41 a	nd MQ-41 LL			
Fire resista	ince time:	30,60	, 90 minutes			
Fire	Span	Equa (∑equally dis	l load tributed load)			
resistant time	width (mm)	Load (kN)	Min. distance (mm)			
		2.4	100			
30 minutes		1.7	65			
	۶	1.3	50			
	Omr	1.7	105			
60 minutes	125	1.3	65			
	VI	1.0	50			
90 minutes		1.3	110			
30 millutes		1.0	80			

Extract of test report IBMB no. 3054/048/12-CM , table D-26 to D-27

Equal load scheme



Bill of mater	ial					
Part of typical Ref. Item no		ltem no.	Description	Quantites for structure		
				Piece	m	
	Channel	Channel 1	369591	MQ-41 3m channel		Min.
	Chaimer		2048100	MQ-41 LL 3m channel	-	S + 0.05
Structure		2	369680	MQZ-L11 bored plate	4	-
Structure	Fixation	3	216466	M10 hegaxon nut	4	-
	material	4	339795	AM10x1000 4.8 threaded rod	-	2 x 1
		5	376967	HKD M10x40 drop-in anchor	2	-

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41/3 or MQ-41/3 LL

Possible ultimate loads depending on the required fire resistance time.



Rigid duct - Loading capacity limits						
Channel:		MQ-41/3 ar	nd MQ-41/3 LL			
Fire resista	ince time:	30, 6	0,90 minutes			
Fire	Span	Equal load (∑ equally distributed load)				
resistant time	width (mm)	Load (kN)	Min. distance (mm)			
		3.2	100			
30 minutes		1.9	65			
	ε	1.4	50			
	Ē	1.9	105			
60 minutes	125(1.4	65			
	VI	1.1	50			
90 minutos		1.4	110			
90 minutes		1.1	80			

Extract of test report IBMB no.3054/048/12-CM , table D-26

Equal load scheme



Bill of mater	ial					
Part of	Part of typical Ref. Item no. Description		Quantites f	or structure		
					Piece	m
	Channel	1	369596	MQ-41/3 3m channel	_	Min.
	Chaimer		2048102	MQ-41/3 LL 3m channel		S + 0.05
Structure		2	369680	MQZ-L13 bored plate	4	-
Fixa	Fixation material	3	216467	M12 hegaxon nut	4	-
		4	339797	AM12x1000 4.8 threaded rod	-	2 x 1.0
		5	378544	HKD M12x50 drop-in anchor	2	-

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Bracket MM-B-36

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Rigid duct Bracket:	- Loading	capacity limits MM-B-36	
Fire resista	: 30 minutes		
Deformation of the channel: ≤ 50 mm			
Channali	Span	Equal load (∑ equally distributed load)	
Channel:	(mm)	Load (kN)	
MM-B-36	400	0.5	

Extract of test report IB M B no. 3074/068/12-CM , table 2-1to 2-2

Equal load scheme



Bill of mater	ial					
Part of typical		Ref.	ltem no.	Description	Quantites f	or structure
					Piece	m
Bracket	Bracket	1	418755	MM-B-36/450 bracket	1	-
		2	418769	MM-CW M8 channel washer	1	-
		3	282856	A 8.4/40 flat w asher	1	-
Structure	Fixation	4	216465	M8 hexagon nut	2	
	material	5	339793	AM8x1000 4.8 threaded rod	-	0.5
		6	376959	HKD M8x30 drop-in anchor	1	-
		7	2105712	HST3 M10x90 30/10 stud anchor	2	-

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Bracket MQK-41 or MQK-41/3

Possible ultimate loads depending on the required fire resistance time.



Rigid duct - Loading capacity limits							
Bracket:			MQK-41	and MQ	K-41/3		
Fire resist	ance tin	ne:	30,	60, 90 m	inutes		
		Equal lo	ad (∑equa	equally distributed load)			
Fire resistant	Span width	Load (kN)		Min. distance (mm)			
time	(mm)	MQK- 41/600	MQK- 41/3/600	MQK- 41/600	MQK- 41/3/600		
		2.4	3.2	100			
30 minutes		1.7	1.9	6	5		
	_	1.3	1.4	50			
	E	1.7	1.9	1	05		
60 minutes	600	1.3	1.4	65			
		1.0	1.1	50			
90 minutes		1.3	1.4	1	10		
oo minutes		1.0	1.1	8	80		

Extract of test report IBMB no.3054/048/12-CM , table D-26 to D-27

Equal load scheme



Bill of mater	Bill of material								
Part of typical		Ref.	Ref. Item no. Description		Quantites for structure				
					Piece	m			
Brooket	Brackot	1	369611	MQK-41/600 bracket	1	_			
	Didcket		370597	MQK-41/3/600 bracket		-			
		2	369680	MQZ-L13 bored plate	2	-			
Structure	Firsting	3	216467	M12 hegaxon nut	2	-			
	material	4	339797	AM12x1000 4.8 threaded rod	-	1			
		5	378544	HKD M12x50 drop-in anchor	1	-			
		6	2105718	HST3 M12x105 30/10 stud anchor	2	-			

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MM-C-36 or MM-C-45

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Flexible duct - Loading capacity limits						
Channel:	Π	MM-C-36 and MM-C-45				
Fire resista	ance time:	30 minutes				
Deformatio	on of the chanı	nel: ≤ 50 mm				
Channel:	Span width	Equal load (∑ equally distributed load)				
	(mm)	Load (kN)				
MM C 26	400	0.50				
WIW-C-30	700	0.35				
MM C 45	400	1.00				
MM-C-45	700	0.50				

Extract of test report IBM B no. 3074/068/12-CM , table 2-1to 2-2

Equal load scheme



Bill of material							
Part of typical		Ref.	Item no. Description		Quantites for structure		
					Piece	m	
Channel	1	418751	MM-C-36 3m channel	_	S + 0.05		
	Gliaimer	ei i	2048104	MM-C-45 3m channel		0.00	
		2	418769	MM-CW M8 channel w asher	2	-	
Structure	Structure Fixation material	3	282861	A 8.4/28 flat washer	2	-	
		4	216465	M8 hexagon nut	4	-	
		5	339793	AM8x1000 4.8 threaded rod	-	2 x 0.5	
		6	376959	HKD M8x30 drop-in anchor	2	-	

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41 or MQ-41 LL

Possible ultimate loads depending on the required fire resistance time.



Flexible duct - Loading capacity limits						
Channel:	M	Q-41 and MQ-41 LL				
Fire resistan	ce time:	30, 60, 90 minutes				
Fire resistant	Span width	Equal load (∑equally distributed load)				
time	(mm)	Load (kN)				
		2.40				
30 minutes		1.70				
	=	1.30				
	Omr	1.70				
60 minutes	125	1.30				
	VI	1.00				
90 minutos		1.30				
oo millutes		1.00				

Extract of test report IBMB no. 3054/048/12-CM , table D-27

Equal load scheme



Bill of material

Part of typical		Ref.	Ref. Item no. Description		Quantites for structure			
			Piece	m				
	Channal 1	Channel	Channel	1	369591	MQ-41 3m channel	_	Min.
Chainer	onamer	2048100	MQ-41 LL 3m channel	S + 0.05	S + 0.05			
Structure	re Fixation 3	2	369680	MQZ-L11 bored plate	4	-		
Shuchare		3	216466	M10 hegaxon nut	4	-		
	material	4	339795	AM10x1000 4.8 threaded rod	-	2 x 1		
		5	376967	HKD M10x40 drop-in anchor	2	-		

Installation Technical Manual - Technical Challenges - Fire resistance typicals

Channel MQ-41/3 or MQ-41/3 LL

Possible ultimate loads depending on the required fire resistance time.



Channel: MQ-41/3 and MQ-41/3 Li Fire resistance time: 30, 60, 90, 120 minutes Fire resistant Span width (mm)	L
Fire resistance time: 30, 60, 90, 120 minutes Fire resistant Equal load Span width (mm) [Σ equally distributed]	
Fire resistant Span width /mm) [0ad]	s
time	ted
Load (kN)	
≤ 350 3.40	
30 minutos ≤ 700 3.00	
≤ 1000 2.65	
≤ 1250 2.50	
≤ 350 2.10	
≤ 700 1.60	
≤ 1000 1.35	
≤ 1250 1.25	
≤ 350 1.50	
≤ 700 1.10	
≤ 1000 0.95	
≤ 1250 0.85	
≤ 350 1.20	
120 minutes ≤ 700 0.85	
≤ 1000 0.70	
≤ 1250 0.65	

Equal load scheme



Extract of test report IBMB no. 3054/048/12-CM , table D-6 to D-9

Bill of material							
Part of typical		Ref.	ltem no.	Item no. Description		Quantites for structure	
					Piece	m	
	Channel	Channel 1	1	369596	MQ-41/3 3m channel		Min.
Chaimer	onanner	2048102	MQ-41/3 LL 3m channel	-	S + 0.05		
Structure	ire Fixation	2	369680	MQZ-L13 bored plate	4	-	
onuclure		3	216467	M12 hegaxon nut	4	-	
mate	material	4	339797	AM12x1000 4.8 threaded rod	-	2 x 1.0	
		5	378544	HKD M12x50 drop-in anchor	2	-	

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Bracket MM-B-36

Possible ultimate loads depending on the required fire resistance time 30 minutes and limited deformation of the channel \leq 50 mm.



Flexible duct - Loading capacity limits					
Bracket:			MM-B-36		
Fire resista	ince time:	:	30 minutes		
Deformation of the channel: \leq 50 mm					
Bracket:	Span width	Eq (∑equally o	ual load distributed load)		
	(mm)	Lo	ad (kN)		
MM-B-36	400		0.5		

Extract of test report IBMB no. 3074/068/12-CM , table 2-1to 2-2

Equal load scheme



Bill of material	Bill	of	ma	teria	1
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Part of typical Ref.		Ref.	ltem no.	Description	Quantites for structure		
			Piece	m			
	Bracket	1	418755	MM-B-36/450 bracket	1	-	
	2	418769	MM-CW M8 channel washer	1	-		
		3	282856	A 8.4/40 flat w asher	1	-	
Structure	ructure Fixation material	4	216465	M8 hexagon nut	2		
		5	339793	AM8x1000 4.8 threaded rod	-	0.5	
		6	376959	HKD M8x30 drop-in anchor	1	-	
		7	2105712	HST3 M10x90 30/10 stud anchor	2	-	

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Bracket MQK-41 or MQK-41/3

Possible ultimate loads depending on the required fire resistance time.



Flexible duct - Loading capacity limits					
Bracket:	MC	K-41 and MQK-41/3			
Fire resista	ance time:	30, 60, 90 minutes			
Fire	Span width	Equal load (∑ equally distributed load)			
resistant time	(mm)	Load (kN)			
		MQK-41 or MQK-41/3			
30 minutes	350	3.40			
	500	3.30			
	600	3.15			
	350	2.10			
60 minutes	500	1.80			
	600	1.70			
	350	2.10			
90 minutes	500	1.80			
	600	1.70			
	350	1.50			
120 minutes	500	1.30			
	600	1.15			

Extract of test report IBM B no.3054/048/12-CM

Equal load scheme



Bill of material

Part of typical		Ref.	Ref. Item no. Description		Quantites for structure	
				Piece	m	
			369610	MQK-41/450 bracket		
Structure Fixation material	Procket	1	369611	MQK-41/600 bracket	1	-
	Didcket	· ·	370596	MQK-41/3/450 bracket		
			370597	MQK-41/3/600 bracket		
	2	369680	MQZ-L13 bored plate	2	-	
	Fination	3	216467	M12 hegaxon nut	2	
	material	4	339797	AM12x1000 4.8 threaded rod	-	1
		5	378544	HKD M12x50 drop-in anchor	1	-
		6	2105718	HST3 M12x105 30/10 stud anchor	2	-

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Overview of fire-tested piperings

Hilti has tested various types of pipe ring over the last few years in accordance with the RAL quality guideline GZ-656 [6]. Furthermore, in the past other rings were fire-tested and evaluated by IBMB in Braunschweig. The corresponding RAL and IBMB test reports are summarized in annex 3.

Critical areas of suspended pipe rings when exposed to fire:

- Connection boss
- Welded seam
- Thread failure, internal thread on connection boss or threaded rod
- Closing mechanism
- Joint
- Screw
- Quick-lock closure

Overview:



Pipering selection

Hilti fire-tested galvanized pipe rings

The following conditions must be clarified before a suitable pipe ring can be determined based upon the table:

- 1. The applicable pipe diameter.
- 2. Calculation of pipe weight per meter, taking the filling and possible insulation into account.
- 3. Definition of the available space between the pipe ring and relevant fire protection applications that are positioned below.
- 4. Clarification of the required fire resistance time.

The following table is used to clarify whether the pipe weight is lower than the maximum load capacity of the pipe ring with the specified spacing of the suspensions. Furthermore, it is possible to read whether the spacing is sufficient between the pipe ring and a classified building component or system that is installed below.



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Pipering selection

Hilti fire-tested stainless steel pipe rings

The following conditions must be clarified before a suitable pipe ring can be determined based upon the table:

- 1. The applicable pipe diameter.
- 2. Calculation of pipe weight per meter, taking the filling and possible insulation into account.
- 3. Definition of the available space between the pipe ring and relevant fire protection applications that are positioned below.
- 4. Clarification of the required fire resistance time.

The following table is used to clarify whether the pipe weight is lower than the maximum load capacity of the pipe ring with the specified spacing of the suspensions. Furthermore, it is possible to read whether the spacing is sufficient between the pipe ring and a classified building component or system that is installed below.



Note: Use fire-tested Hilti anchors (annex 7)

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Restriction of the threaded rod lenght for upright installation

To avoid sudden failure of the upright pipe rings due to lack of rigidity, it is recommended that the threaded rod lengths specified in the following tables are not exceeded. Max. threaded rod length for upright installation of pipe rings.

Recommended maximum threaded rod length for upright installation of pipe rings :

Threaded rod M8 (4.8)							
Vertical	30 m in	60 min	90 m in	120 m in			
load [N]	Length of rod [mm]						
100		80	80	80			
150	80		40	40			
200	00		-10	40			
250							
300							
400	40						
450	40						
500							

Threaded rod M10 (4.8)							
Vertical load [N]	30 m in	60 m in	90 m in	120 m in			
	Length of rod [mm]						
100	140	140	140	140			
150			80	80			
200		80					
250			40	40			
300	80						
400		40					
450							
500							
600	40						
700							
750							

Threaded rod M16 (4.8)								
Vertical	30 m in	60 m in	90 m in	120 m in				
load [N]	Length of rod [mm]							
400	160	160	160	160				
450				140				
500								
600				120				
700			140	100				
750			120	80				
800		140						
900			100	60				
1000		120	80	40				
1050	140	120	60					
1100		100						
1200								
1250		80	40					
1300			10					
1350	120							
1400	120	60						
1500								
1600	100	40						
1700								
2000								
2100	80							
2250	00							
2300	60							
2500								
2600	40							
2900								

Threaded rod M12 (4.8)							
Vertical	30 min	60 m in	90 min	120 m in			
load [N]	Length of rod [mm]						
100	160	160	160	160			
150				120			
200							
250			120	80			
300			120	00			
400		120	80	60			
450			60	40			
500		80	00	10			
600	120	00	40				
700		60					
750							
800	80	40					
900							
1000							
1050	60						
1250							
1300	40						
1500							

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Cutting and distance of the cut from the oblong hole edge for head rail and trapeze on rods applications

Cutting

To guarantee the loads recommended in this manual, there is an important cutting rule that has to be followed. The oblong holes must not be cut. It does not apply for round holes.



Distance of the cut from the oblong hole edge

There must be a minimum distance between the cut and oblong holes, see details below.



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Annexes

There is a list of used annexes:

- Annex 1: Calculation of the deformation of installation channels exposed to fire MFPA Leipzig GmbH
- Annex 2: Fire protection design of installation systems Process steps

Annex 3: IBMB and RAL test reports – Pipe rings

Annex 3a: IBMB test report – MPN-QRC

Annex 3b: IBMB test report - MPN-RC

Annex 3c: IBMB test report - MP-MX/MXI

Annex 3d: RAL test report - MPN-LI

Annex 3e: RAL test report – MP-HI

Annex 3f: RAL test report - MP-MI

Annex 3g: RAL test report – MP-SRN

Annex 3h: IBMB test report - MP-SRNI

Annex 4: IBMB test report – Roller connector

Annex 5: IBMB test reports – Installation channel systems

Annex 5a: IBMB test report - MM installation channel system

Annex 5b: IBMB test report – MQ-21 & MQ-41 installation channel system

Annex 5b: IBMB test report – MQ-41/3 installation channel system

Annex 5d: IBMB test report – U-support

Annex 6: Assessment - IBB, Germany Page

Anlage 7: Fire-tested Hilti anchors Page

Annex 7: Fastening Technology Manual for Building Construction and Engineering Construction, issue 08/2015

All these annexes are available in german in the "Installation Technical Manual - Technical Challenges - Fire **Resistance**" and the english version are available on request. For support please contact your local Hilti expert.