



MT SYSTEM STATIC FIRE CHANNELS

ETA-23/0105 (18.08.2023)



[English](#) 2-58

[French](#) 59-115



European Technical Assessment

ETA-23/0105 of 18/08/2023

English translation prepared by CSTB - Original version in French language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Centre Scientifique et Technique du Bâtiment (CSTB)

Trade name of the construction
product:

Hilti installation channels of MT System

Product family to which the
construction product belongs:

Products for installation systems for supporting technical building
equipment

Manufacturer:

Hilti AG Liechtenstein
Feldkircherstraße 100
9494 Schaan
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plants:

L 8321, L 1138282

This European Technical
Assessment contains:

57 pages including 54 pages of annexes which form an
integral part of this assessment

This European Technical
Assessment is issued in
accordance with Regulation (EU)
No 305/2011, on the basis of:

European Assessment Document (EAD)
280016-00-0602 version June 2020

This version replaces:

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Corrigendum

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Specific Part

1 Technical description of the product

This European Technical Assessment covers Hilti installation channels of MT System: MT-10, MT-15, MT-15 OC, MT-20, MT-20 OC, MT-30 S, MT-30, MT-30 S OC, MT-30 OC, MT-40 S, MT-40, MT-40 S OC, MT-40 T, MT-40 T OC, MT-40 OC, MT-40D S, MT-40D, MT-40D S OC, MT-40D OC, MT-50 S, MT-50, MT-50 S OC, MT-50 OC, MT-70 S OC, MT-70 OC, MT-80 S OC, MT-80 OC, MT-90 S OC, MT-90 OC, MT-100 S OC and MT-100 OC.

The Hilti installation channels MT-10, MT-15, MT-15 OC, MT-20, MT-20 OC, MT-40 T and MT-40 T OC are made of thin-walled steel in L- or C-shape. Recesses in the form of oblong and round holes allow the use of fasteners and fixtures.

The Hilti installation channels MT-30 S, MT-30, MT-30 S OC, MT-30 OC, MT-40 S, MT-40, MT-40 S OC, MT-40 OC, MT-50 S, MT-50, MT-50 S OC, MT-50 OC, MT-60, MT-60 S, MT-60 OC and MT-60 S OC are made of thin-walled steel with parallel flanges. The flanges are turned at the end which makes it possible to force-fit the channels to specific channel system fixtures. Recesses in the back and/or in the flanges of the channels in the form of oblong holes and round holes allow the use of fasteners and fixtures.

The HILTI installation channels MT-70 S OC, MT-70 OC, MT-80 S OC, MT-80 OC, MT-90 S OC, MT-90 OC, MT-100 S OC and MT-100 OC are made of thin-walled steel closed profiles in square or rectangular shape with recesses in the form of dome shape round holes on the inner sides to allow use of fasteners and fixtures.

The HILTI installation channels MT-40D S, MT-40D, MT-40D S OC and MT-40D OC consists of two profiles of similar types as MT-40 S, MT-40, MT-40 S OC and MT-40 OC which are connected in the area of the holes in the back of the channels in a shape-fitting and force-fitting way.

The MT installation open profile channels and closed profiles (girders) can be cut along the entire length following the manufacturers instructions without compromising the declared performances.

The drawings, dimensions and materials of the Hilti installation channels of MT System are given in Annex A.

2 Specification of the intended use

The performances given in clause 3 are only valid if HILTI installation channels of MT System are in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the HILTI installation channels of MT System of 50 years when installed in the works (provided that the installation systems products are subject to appropriate installation). The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

In accordance with the European Assessment Document EAD 280016-00-0602, the product is intended to be used in:

- a) installations for the support of sprinkler kits,
- b) installations for the support of pipes for the transport of gas/fuel intended for the supply of building heating/cooling systems.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

| No. | Essential characteristic | Performance |
|-----|---|-------------|
| 1 | Reaction to fire | Class A1 |
| 2 | Pull-through resistance of channel back holes under fire exposure | See Annex C |
| 3 | Bending characteristics under fire exposure | See Annex D |

3.2 Safety and accessibility in use (BWR 4)

| No. | Essential characteristic | Performance |
|-----|--|-------------------------|
| 4 | Shape | See Annex A |
| 5 | Dimensions | See Annex A |
| 6 | Material and cross-section characteristics | See Annex A and B |
| 7 | Characteristic pull-through resistance of channel back holes at ambient temperatures | No Performance Assessed |

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 280016-00-0602, the following legal bases apply:

- In case of intended use a) specified in Section 2:
Decision of the commission N° 1996/577/EC as amended by Commission Decision 2002/592/EC:
System 1 applies for the assessment and verification of constancy of performance (AVCP).
- In case of intended use b) specified in Section 2:
Decision of the commission N° 1999/472/EC as amended by Commission Decision 001/596/EC:
System 3 applies for the assessment and verification of constancy of performance (AVCP).

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

The technical details necessary for the implementation of the system for the assessment and verification of constancy of performance are laid down in the control plan (confidential part of this European Technical Assessment) deposited at Centre Scientifique et Technique du Bâtiment.

The manufacturer shall, on the basis of a contract, involve a notified body approved in the field of supporting systems for issuing the certificate of conformity CE based on the control plan.

The original French version is signed by

La cheffe de division, Anca CRONOPOL

Table A1: Dimensions and materials of Hilti MT-10, MT-15, MT-15 OC, MT-20, MT-20 OC, MT-30 S, MT-30, MT-30 S OC and MT-30 OC installation channels

| Illustration (Dimensions in mm and inch) | Item number | Designation | Length [m] | Materials and coatings |
|---|-------------|-------------|------------|--|
| | 2268492 | MT-10 | 2 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268493 | MT-15 | 2 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268494 | MT-15 OC | 2 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268495 | MT-20 | 2 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268496 | MT-20 OC | 2 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268497 | MT-30 S | 3 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268498 | MT-30 | 6 | |
| | 2268499 | MT-30 S OC | 3 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268500 | MT-30 OC | 6 | |

Hilti MT channels

Product description

Annexe A1

Table A2: Dimensions and materials of Hilti MT-40 S, MT-40, MT-40 S OC, MT-40 OC, MT-40 T, MT-40 T OC, MT-50 S, MT-50, MT-50 S OC, MT-50 OC, MT-60 S, MT-60, MT-60 S OC, and MT-60 OC, installation channels

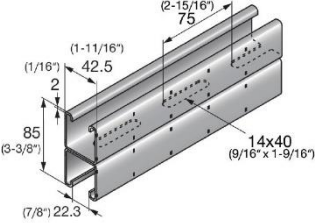
| Illustration (Dimensions in mm and inch) | Item number | Designation | Length [m] | Materials and coatings |
|---|-------------|-------------|------------|--|
| | 2268505 | MT-40 S | 3 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268506 | MT-40 | 6 | |
| | 2268507 | MT-40 S OC | 3 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268508 | MT-40 OC | 6 | |
| | 2268502 | MT-40 T | 6 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268504 | MT-40 T OC | 6 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268509 | MT-50 S | 3 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268510 | MT-50 | 6 | |
| | 2268511 | MT-50 S OC | 3 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268512 | MT-50 OC | 6 | |
| | 2268513 | MT-60 S | 3 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268514 | MT-60 | 6 | |
| | 2268515 | MT-60 S OC | 3 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268516 | MT-60 OC | 6 | |

Hilti MT channels

Product description

Annexe A2

Table A3: Dimensions and materials of Hilti, MT-40D S, MT-40D, MT-40D S OC and MT-40 D OC installation channels

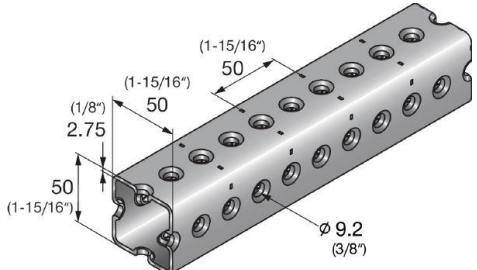
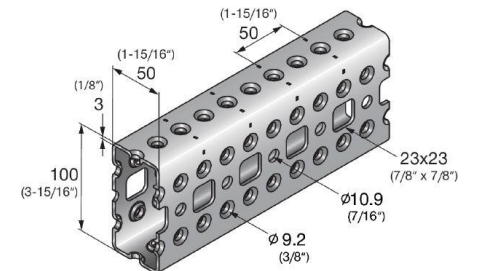
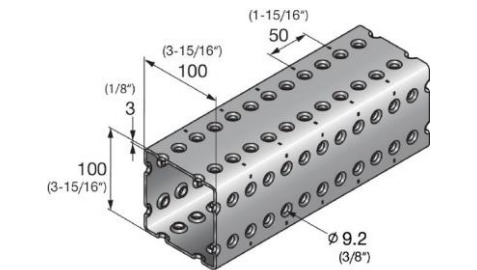
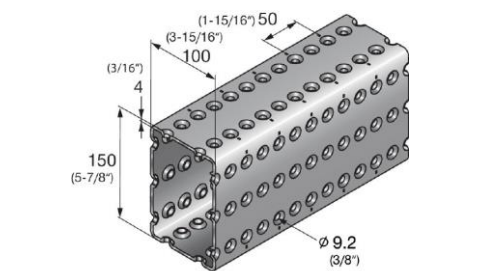
| Illustration (Dimensions in mm and inch) | Item number | Designation | Length [m] | Materials and coatings |
|---|-------------|-------------|------------|--|
|  <p>Two profiles of MT-40 channel are connected in the area of the holes in the back of the channels in a shape-fitting and force-fitting way as a kind of riveted connection.</p> | 2268517 | MT-40D S | 3 | S280GD or equivalent as defined in HN704 + Z275-M-A-C acc. to EN 10346 |
| | 2268518 | MT-40D | 6 | |
| | 2268519 | MT-40D S OC | 3 | S280GD or equivalent as defined in HN704 + ZM310-A-C acc. to EN 10346 |
| | 2268520 | MT-40D OC | 6 | |

Hilti MT channels

Product description

Annexe A3

Table A4: Dimensions and materials of Hilti MT-70 S OC, MT-70 OC, MT-80 S OC, MT-80 OC, MT-90 S OC, MT-90 OC, MT-100 S OC and MT-100 OC installation channels

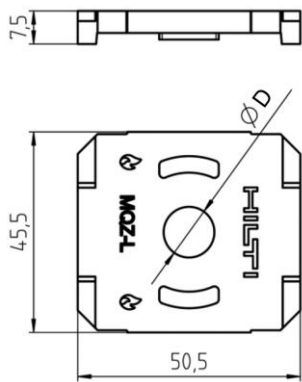
| Illustration (Dimensions in mm and inch) | Item number | Designation | Length [m] | Materials and coatings |
|---|-------------|-------------|------------|--|
|  | 2268364 | MT-70 S OC | 3 | S350GD+ ZM310-A-C acc. to EN 10346 |
| | 2268365 | MT-70 OC | 6 | |
|  | 2268366 | MT-80 S OC | 3 | S350GD+ ZM310-A-C acc. to EN 10346 |
| | 2268367 | MT-80 OC | 6 | |
|  | 2268368 | MT-90 S OC | 3 | S350GD+ ZM310-A-C acc. to EN 10346 |
| | 2268369 | MT-90 OC | 6 | |
|  | 2268490 | MT-100 S OC | 3 | S350GD+ ZM310-A-C acc. to EN 10346 |
| | 2268491 | MT-100 OC | 6 | |

Hilti MT channels

Product description

Annexe A4

Table B1: Dimensions and materials of Hilti MQZ-L11 and MQZ-L13 drilled plates

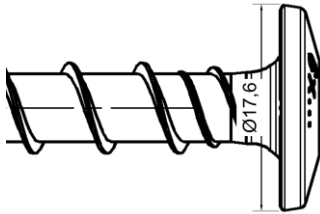
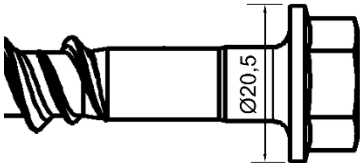
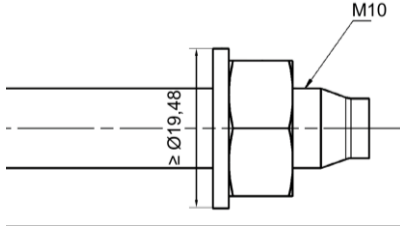
| Item number | Designation | D [mm] | Materials | Illustration (Dimensions in mm and inch) |
|-------------|-------------|--------|---|---|
| 2199455 | MQZ-L11 | 11,5 | S235JR in accordance with DIN EN 10025-2, zinc coated |  |
| 2199456 | MQZ-L13 | 13,5 | | |

Hilti MQZ-L drilled plates

Requirements for performance assessment

Annex B1

Table B2: Fasteners for channel fixation through round back holes

| Designation | Description | Dimensions of anchor head (in mm) |
|----------------------------|-----------------------------------|---|
| HUS3-P6 x L ¹⁾ | Screw anchor |  |
| HUS4-H8 x L ¹⁾ | Screw anchor |  |
| HST3-M10 x L ¹⁾ | Stud anchor with M10 thread |  |
| Bolt M10 + 10.5 washer | M10 threaded bolt ≥ 4.8 and A4-70 | Washer EN ISO 7089-10.5-200HV with M10 hexagonal nut strength class ≥ 8 ISO 4032 |

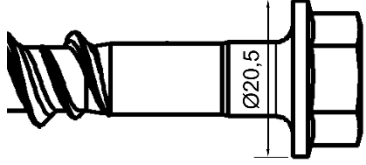
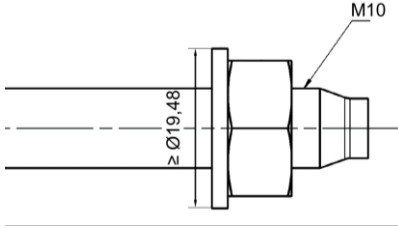
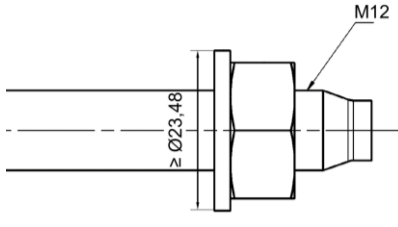
¹⁾ L = length of anchor, see manufacturers brochures

Hilti anchors for channel fastening

Requirements for performance assessment

Annex B2

Table B3: Fasteners for channel fixation through slotted back holes with MQZ-L 11 and MQZ-L 13 drilled plates

| Designation | Description | Dimensions of anchor head (in mm) | Drilled plate |
|----------------------------|--|---|---------------|
| HUS4-H10 x L ²⁾ | Screw anchor |  | MQZ-L13 |
| HST3-M10 x L ²⁾ | Stud anchor with M10 thread |  | MQZ-L11 |
| HST3-M12 x L ²⁾ | Stud anchor with M12 thread |  | MQZ-L13 |
| Bolt M10 | M10 threaded bolt ≥ 4.8 and A4-70 | Washer EN ISO 7089-10.5-200HV with M10 hexagonal nut strength class ≥ 8 ISO 4032 | MQZ-L11 |
| Bolt M12 | M12 threaded bolt ≥ 4.8 and A4-70 | Washer EN ISO 7089-13-200HV with M12 hexagonal nut strength class ≥ 8 ISO 4032 | MQZ-L13 |

²⁾ L = length of anchor, see manufacturers brochures

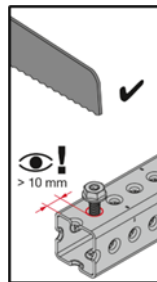
Hilti anchors for channel fastening

Requirements for performance assessment

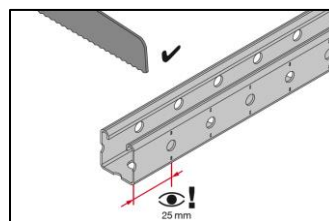
Annex B3

Specifications of intended use

- Hilti channels of MT System are used to transfer building services components loads such as ducts and equipment for water, heating, cooling, ventilation, electrical and other systems. Hilti MT channels are performing this loadbearing function under conditions described in Section 2 of this European Technical Assessment.
- Hilti MT-30, MT-40, MT-40D, MT-50, MT-70 and MT-80 installation channels (regardless of length and coating) in the scope of this European Technical Assessment are used for applications at ambient temperature and in case of fire.
- Hilti MT-10, MT-15, MT-20, MT-90 and MT-100 installation channels (regardless of length and coating) in the scope of this European Technical Assessment are used only for applications at ambient temperature.
- The resistance and deformation at ambient temperatures apply for static and centric loads.
- The resistance and deformation in case of fire are referring to the boundary conditions of the standard temperature / time curve (STTC) in accordance with EN 1363-1.
- MT channels used in headrail systems are installed with the channel profile opening facing away from the ceiling. In case of fire approved fire tested components are attached underneath using Hilti MQA-M10-B, MQA-M12-B or MQA-M16-B pipe ring saddles. The channels are mounted to the base material for use in case of fire using MQZ-L11 or MQZ-L13 drilled plates in conjunction with suitable approved fasteners. MT channels can be mounted on the base material for use at ambient temperatures with suitable fasteners through the longhole without using MQZ-L11 or MQZ-L13 drilled plates. MT-30, MT-40 and MT-50 channels can be mounted to the base material for use at ambient and in case of fire with suitable fasteners through the roundhole without using MQZ-L11 or MQZ-L13 drilled plates.
- The pull-through resistance of the round-holes in the back of the channels in case of fire results in combination with the fasteners specified in Table B2.
- In the case of suspended channel systems (e.g. rod-trapeze), the open side of the channel profile can be orientated upwards or downwards.
- The MT installation open profile channels and closed profiles (girders) can be cut along the entire length following the manufacturers instructions without compromising the declared performances.
- For girders the distance between the end of the girder and start of the dome shaped hole has to be minimum 10 mm.



- For channels the distance between the end of the channel and center of the first hole from channel end has to be minimum 25 mm.



- Threaded rods and other fixtures are only to be guided through the roundholes or longholes of the channel.

Hilti MT channels

**Intended use
 Specifications**

Annex B4

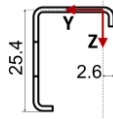
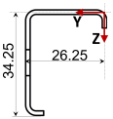
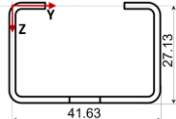
- The fastening of the base connector to the base material is made with appropriate anchors. The anchoring used with the base material must be suitable and have a fireproof certificate.
- Prior to installation, it must be ensured that the supported component, the anchoring of the threaded rod to the base material and the base material itself are suitable to withstand the resistance values of the installation system and that they have a fireproof certificate.
- The installation channels must be installed by appropriately qualified personnel and under the supervision of the site manager. The general installation instructions of the manufacturer apply

Hilti MT channels

Intended use
Specifications

Annex B5

Table B4: Properties of the cross section of Hilti channels MT-10, MT-15, MT-15 OC, MT-20, and MT-20 OC

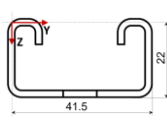
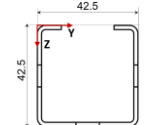
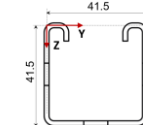
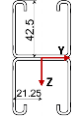
| Description | Symbol | Unit | MT-10 | MT-15 / MT-15 OC | MT-20 / MT-20 OC |
|---|---------------------|-----------------|---|---|---|
| Cross section (Dimensions in mm and inch) | - | - |  |  |  |
| Classification cross section in accordance with EN 1993-1-1 | - | - | 3 | 3 | 3 |
| Cross section areas | A | cm ² | 0.49 | 0.85 | 1.49 |
| | A _{tot} | cm ² | 0.49 | 0.85 | 1.49 |
| Shear areas | A _y | cm ² | NPA | NPA | NPA |
| | A _z | cm ² | NPA | NPA | NPA |
| Centroid position | y _{C,0} | cm | 1.22 | 1.93 | 2.02 |
| | z _{C,0} | cm | 0.92 | 1.19 | 1.64 |
| Moments of inertia | I _y | cm ⁴ | 0.41 | 1.27 | 1.86 |
| | I _z | cm ⁴ | 0.23 | 0.72 | 3.66 |
| Polar moments of inertia | I _p | cm ⁴ | 0.64 | 1.98 | 5.52 |
| | I _{p,M} | cm ⁴ | 1.26 | 3.80 | 14.71 |
| Radii of gyration | i _y | cm | 0.91 | 1.22 | 1.12 |
| | i _z | cm | 0.69 | 0.92 | 1.57 |
| Polar radii of gyration | i _p | cm | 1.14 | 1.53 | 1.92 |
| | i _{p,M} | cm | 1.61 | 2.11 | 3.14 |
| Warping radius of gyration | i _{w,M} | cm | NPA | NPA | NPA |
| Torsional constant | J | cm ⁴ | NPA | NPA | NPA |
| Secondary torsional constant | J _s | cm ⁴ | NPA | NPA | NPA |
| Location of the shear center | y _{M,0} | cm | NPA | NPA | NPA |
| | z _{M,0} | cm | NPA | NPA | NPA |
| | y _M | cm | NPA | NPA | NPA |
| | z _M | cm | NPA | NPA | NPA |
| Warping constant | I _{w,C} | cm ⁶ | NPA | NPA | NPA |
| | I _{w,M} | cm ⁶ | NPA | NPA | NPA |
| Section moduli | S _{y,max} | cm ³ | 0.25 | 0.57 | 1.78 |
| | S _{y,min} | cm ³ | -0.41 | -1.00 | -1.08 |
| | S _{z,max} | cm ³ | 0.45 | 1.03 | 1.73 |
| | S _{z,min} | cm ³ | -0.16 | -0.36 | -1.73 |
| Torsional section modulus | S _t | cm ³ | NPA | NPA | NPA |
| Max. plastic bending moment | M _{pl,y,k} | kNm | NPA | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA | NPA |
| Max. plastic section moduli | Z _y | cm ³ | NPA | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA | NPA |
| Plastic shear areas | A _{pl,y} | cm ² | NPA | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA | NPA |
| Area bisecting axis position | f _{y,0} | cm | NPA | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA | NPA |
| Plastic shear forces | V _{pl,y,k} | kN | NPA | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA | NPA |
| Plastic axial forces | N _{pl,k} | kN | NPA | NPA | NPA |
| Buckling curves | BC _y | - | c | c | c |
| | BC _z | - | c | c | c |

Hilti MT channels

Intended use
 Specifications

Annex B6

Table B5: Properties of the cross section of Hilti channels MT-30 S, MT-30, MT-30 S OC, MT-30 OC, MT-40 S, MT-40, MT-40 S OC, MT-40 OC, MT-40 T, MT-40 T OC, MT-40D S, MT-40D, MT-40D S OC and MT-40D OC

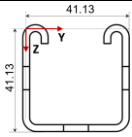
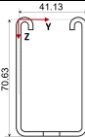
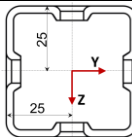
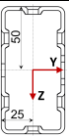
| Description | Symbol | Unit | MT-30 S / MT-30 / MT-30 S OC / MT-30 OC | MT-40 T / MT-40 T OC | MT-40 S / MT-40 / MT-40 S OC / MT-40 OC | MT-40D S / MT-40D / MT-40D S OC / MT-40D OC |
|---|---------------------|-----------------|---|--|---|---|
| Cross section (Dimensions in mm and inch) | - | - |  |  |  |  |
| Classification cross section in accordance with EN 1993-1-1 | - | - | 3 | 3 | 3 | 3 |
| Cross section areas | A | cm ² | 1.81 | 1.76 | 2.15 | 4.31 |
| | A _{tot} | cm ² | 1.81 | 1.76 | 2.15 | 4.31 |
| Shear areas | A _y | cm ² | NPA | NPA | NPA | NPA |
| | A _z | cm ² | NPA | NPA | NPA | NPA |
| Centroid position | y _{C,0} | cm | 2.02 | 2.13 | 2.02 | 0.00 |
| | z _{C,0} | cm | 1.10 | 2.30 | 2.07 | 0.00 |
| Moments of inertia | I _y | cm ⁴ | 1.22 | 4.85 | 5.80 | 30.13 |
| | I _z | cm ⁴ | 5.22 | 5.73 | 6.61 | 13.22 |
| Polar moments of inertia | I _p | cm ⁴ | 6.43 | 10.58 | 12.41 | 43.35 |
| | I _{p,M} | cm ⁴ | 16.42 | 40.93 | 55.83 | 43.35 |
| Radii of gyration | i _y | cm | 0.82 | 1.66 | 1.64 | 2.64 |
| | i _z | cm | 1.70 | 1.80 | 1.75 | 1.75 |
| Polar radii of gyration | i _p | cm | 1.89 | 2.45 | 2.40 | 3.17 |
| | i _{p,M} | cm | 3.01 | 4.82 | 5.10 | 3.17 |
| Warping radius of gyration | i _{w,M} | cm | NPA | NPA | NPA | NPA |
| Torsional constant | J | cm ⁴ | NPA | NPA | NPA | NPA |
| Secondary torsional constant | J _s | cm ⁴ | NPA | NPA | NPA | NPA |
| Location of the shear center | y _{M,0} | cm | NPA | NPA | NPA | NPA |
| | z _{M,0} | cm | NPA | NPA | NPA | NPA |
| | y _M | cm | NPA | NPA | NPA | NPA |
| | z _M | cm | NPA | NPA | NPA | NPA |
| Warping constant | I _{w,C} | cm ⁶ | NPA | NPA | NPA | NPA |
| | I _{w,M} | cm ⁶ | NPA | NPA | NPA | NPA |
| Section moduli | S _{y,max} | cm ³ | 1.11 | 2.49 | 2.79 | 7.09 |
| | S _{y,min} | cm ³ | -1.01 | -2.11 | -2.67 | -7.09 |
| | S _{z,max} | cm ³ | 2.45 | 2.69 | 3.11 | 6.22 |
| | S _{z,min} | cm ³ | -2.45 | -2.69 | -3.11 | -6.22 |
| Torsional section modulus | S _t | cm ³ | NPA | NPA | NPA | NPA |
| Max. plastic bending moment | M _{pl,y,k} | kNm | NPA | NPA | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA | NPA | NPA |
| Max. plastic section moduli | Z _y | cm ³ | NPA | NPA | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA | NPA | NPA |
| Plastic shear areas | A _{pl,y} | cm ² | NPA | NPA | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA | NPA | NPA |
| Area bisecting axis position | f _{y,0} | cm | NPA | NPA | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA | NPA | NPA |
| Plastic shear forces | V _{pl,y,k} | kN | NPA | NPA | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA | NPA | NPA |
| Plastic axial forces | N _{pl,k} | kN | NPA | NPA | NPA | NPA |
| Buckling curves | BC _y | - | c | c | c | c |
| | BC _z | - | c | c | c | c |

Hilti MT channels

Requirements for performance assessment

Annex B7

Table B6: Properties of the cross section of Hilti channels MT-50 S, MT-50 S OC, MT-50, MT-50 OC, MT-60 S, MT-60 S OC, MT-60, MT-60 OC, MT-70 S OC, MT-70 OC, MT-80 S OC and MT-80 OC


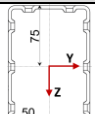
| Description | Symbol | Unit | MT-50 S / MT-50 / MT-50 S OC / MT-50 OC | MT-60 S / MT-60 S OC / MT-60 / MT-60 OC | MT-70 S OC / MT-70 OC | MT-80 S OC / MT-80 OC |
|---|---------------------|-----------------|---|--|---|---|
| Cross section (Dimensions in mm and inch) | - | - |  |  |  |  |
| Classification cross section in accordance with EN 1993-1-1 | - | - | 3 | 4 | 3 | 3 |
| Cross section areas | A | cm ² | 2.77 | 4.70 | 4.32 | 5.96 |
| | A _{tot} | cm ² | 2.77 | 4.70 | 4.32 | 5.96 |
| Shear areas | A _y | cm ² | NPA | NPA | NPA | NPA |
| | A _z | cm ² | NPA | NPA | NPA | NPA |
| Centroid position | y _{C,0} | cm | 1.99 | 1.99 | 0.00 | 0.00 |
| | z _{C,0} | cm | 2.07 | 3.66 | 0.00 | 0.00 |
| Moments of inertia | I _y | cm ⁴ | 7.07 | 26.81 | 15.96 | 88.39 |
| | I _z | cm ⁴ | 8.30 | 16.04 | 15.96 | 24.61 |
| Polar moments of inertia | I _p | cm ⁴ | 15.36 | 42.85 | 31.93 | 113.00 |
| | I _{p,M} | cm ⁴ | 66.91 | 267.95 | 31.93 | 113.00 |
| Radii of gyration | i _y | cm | 1.60 | 2.39 | 1.92 | 3.85 |
| | i _z | cm | 1.73 | 1.85 | 1.92 | 2.03 |
| Polar radii of gyration | i _p | cm | 2.35 | 3.02 | 2.72 | 4.36 |
| | i _{p,M} | cm | 4.91 | 7.55 | 2.72 | 4.36 |
| Warping radius of gyration | i _{ω,M} | cm | NPA | NPA | NPA | NPA |
| Torsional constant | J | cm ⁴ | NPA | NPA | NPA | NPA |
| Secondary torsional constant | J _s | cm ⁴ | NPA | NPA | NPA | NPA |
| Location of the shear center | y _{M,0} | cm | NPA | NPA | NPA | NPA |
| | z _{M,0} | cm | NPA | NPA | NPA | NPA |
| | y _M | cm | NPA | NPA | NPA | NPA |
| | z _M | cm | NPA | NPA | NPA | NPA |
| Warping constant | I _{ω,C} | cm ⁶ | NPA | NPA | NPA | NPA |
| | I _{ω,M} | cm ⁶ | NPA | NPA | NPA | NPA |
| Section moduli | S _{y,max} | cm ³ | 3.46 | 7.89 | 6.39 | 17.68 |
| | S _{y,min} | cm ³ | -3.21 | -7.09 | -6.39 | -17.68 |
| | S _{z,max} | cm ³ | 3.90 | 7.55 | 6.39 | 9.84 |
| | S _{z,min} | cm ³ | -3.90 | -7.55 | -6.39 | -9.84 |
| Torsional section modulus | S _t | cm ³ | | NPA | NPA | NPA |
| Max. plastic bending moment | M _{pl,y,k} | kNm | NPA | NPA | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA | NPA | NPA |
| Max. plastic section moduli | Z _y | cm ³ | NPA | NPA | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA | NPA | NPA |
| Plastic shear areas | A _{pl,y} | cm ² | NPA | NPA | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA | NPA | NPA |
| Area bisecting axis position | f _{y,0} | cm | NPA | NPA | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA | NPA | NPA |
| Plastic shear forces | V _{pl,y,k} | kN | NPA | NPA | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA | NPA | NPA |
| Plastic axial forces | N _{pl,k} | kN | NPA | NPA | NPA | NPA |
| Buckling curves | BC _y | - | c | c | c | c |
| | BC _z | - | c | c | c | c |

Hilti MT channels

Requirements for performance assessment

Annex B8

Table B7: Properties of the cross section of Hilti channels MT-90 S OC, MT-90 OC, MT-100 S OC, MT-100 OC

| Description | Symbol | Unit | MT-90 S OC / MT-90 OC | MT-100 S OC / MT-100 OC |
|---|---------------------|-----------------|--|---|
| Cross section (Dimensions in mm and inch) | - | - |  |  |
| Classification cross section in accordance with EN 1993-1-1 | - | - | 3 | 3 |
| Cross section areas | A | cm ² | 9.80 | 15.63 |
| | A _{tot} | cm ² | 9.80 | 15.63 |
| Shear areas | A _y | cm ² | NPA | NPA |
| | A _z | cm ² | NPA | NPA |
| Centroid position | Y _{C,0} | cm | 0.00 | 0.00 |
| | Z _{C,0} | cm | 0.00 | 0.00 |
| Moments of inertia | I _y | cm ⁴ | 151.49 | 490.02 |
| | I _z | cm ⁴ | 151.49 | 262.25 |
| Polar moments of inertia | I _p | cm ⁴ | 302.97 | 752.27 |
| | I _{p,M} | cm ⁴ | 302.97 | 752.27 |
| Radii of gyration | i _y | cm | 3.93 | 5.60 |
| | i _z | cm | 3.93 | 4.10 |
| Polar radii of gyration | i _p | cm | 5.56 | 6.94 |
| | i _{p,M} | cm | 5.56 | 6.94 |
| Warping radius of gyration | i _{ω,M} | cm | NPA | NPA |
| Torsional constant | J | cm ⁴ | NPA | NPA |
| Secondary torsional constant | J _s | cm ⁴ | NPA | NPA |
| Location of the shear center | Y _{M,0} | cm | NPA | NPA |
| | Z _{M,0} | cm | NPA | NPA |
| | y _M | cm | NPA | NPA |
| | z _M | cm | NPA | NPA |
| Warping constants | I _{ω,C} | cm ⁶ | NPA | NPA |
| | I _{ω,M} | cm ⁶ | NPA | NPA |
| Section moduli | S _{y,max} | cm ³ | 30.30 | 65.34 |
| | S _{y,min} | cm ³ | -30.30 | -65.34 |
| | S _{z,max} | cm ³ | 30.30 | 52.45 |
| | S _{z,min} | cm ³ | -30.30 | -52.45 |
| Torsional section modulus | S _t | cm ³ | NPA | NPA |
| Max. plastic bending moment | M _{pl,y,k} | kNm | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA |
| Max. plastic section moduli | Z _y | cm ³ | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA |
| Plastic shear areas | A _{pl,y} | cm ² | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA |
| Area bisecting axis position | f _{y,0} | cm | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA |
| Plastic shear forces | V _{pl,y,k} | kN | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA |
| Plastic axial forces | N _{pl,k} | kN | NPA | NPA |
| Buckling curves | BC _y | - | c | c |
| | BC _z | - | c | c |

Hilti MT channels

Requirements for performance assessment

Annex B9

Table C1: Pull-through resistance $F_{Rk,t}$ from the round holes in the back of the channels in case of fire

| Anchor | Installation channel | Parameter of regression curve | Pull through resistance $F_{Rk,t}$ in N | | | |
|---|--|---|---|-------------|-------------|--------------|
| | | $F_{Rk}(t) = c_3 (c_1 + c_2 / t)$ | $F_{Rk,30}$ | $F_{Rk,60}$ | $F_{Rk,90}$ | $F_{Rk,120}$ |
| HUS3-P6 x L ^{*)} HUS4-H8 x L ^{*)} HST4-M10 x L ^{*)} M10 threaded rod + 10.5 washer | MT-30 MT-30 S MT-30 OC MT-30 S OC MT-40 MT-40 S MT-40 OC MT-40 S OC MT-40D MT-40D S MT-40D OC MT-40D S OC MT-50 MT-50 S MT-50 OC MT-50 S OC | $c_1 = 971,5536$ $c_2 = 34991,5717$ $c_3 = 0,71824$ $22 \text{ min} \leq t \leq 130 \text{ min}$ | 1535,6 | 1116,7 | 997,1 | 907,2 |

^{*)} L = length of anchors, see manufacturers brochures.

Designation

$F_{Rk,t}$ Resistance after an exposure time t in case of fire [N]
 $F_{Rk}(t)$ Resistance time function in case of fire [N]

Hilti anchors for channel fixation

Characteristic pull-through resistance in case of fire

Annex C1

Table C2: Pull-through resistance $F_{Rk,t}$ of MQZ-L drilled plates through slotted holes in the back of the channels in case of fire

| Drilled plates | Installation channel | Parameter of regression curve | Pull through resistance $F_{Rk,t}$ in N | | | |
|--------------------|--|---|---|-------------|-------------|--------------|
| | | $F_{Rk}(t) = c_3 (c_1 + c_2 / t)$ | $F_{Rk,30}$ | $F_{Rk,60}$ | $F_{Rk,90}$ | $F_{Rk,120}$ |
| MQZ-L11 MQZ-L13 | MT-30 MT-30 S MT-30 OC MT-30 S OC MT-40 MT-40 S MT-40 OC MT-40 S OC MT-40D MT-40D S MT-40D OC MT-40D S OC MT-50 MT-50 S MT-50 OC MT-50 S OC | $c_1 = 427,2416$ $c_2 = 130158,0662$ $c_3 = 0,910073$ $33 \text{ min} \leq t \leq 130 \text{ min}$ | 2168,65 | 1181,5 | 852,5 | 687,95 |

Designation

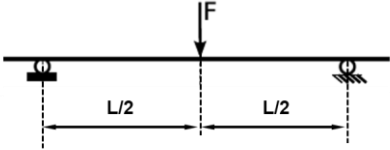
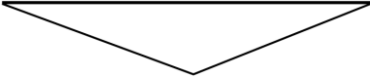
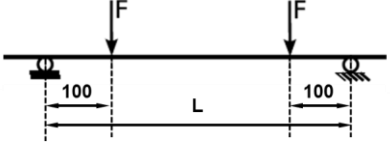
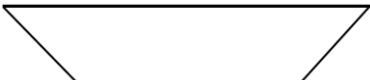
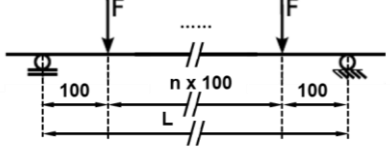

$F_{Rk,t}$ Resistance after an exposure time t in case of fire [N]
 $F_{Rk}(t)$ Resistance time function in case of fire [N]

Hilti MQZ-L drilled plates

Characteristic pull-through resistance in case of fire

Annex C2

Table D19: Loading characteristics of Hilti channels

| Loadcase | System | Resulting torque curve shape |
|----------|---|--|
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

Symbols and designation

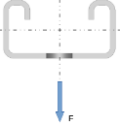
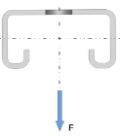

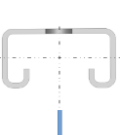
- L Distance between the supports in mm
- n number of 100 mm gaps between loads
- F Load

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D1

Table D20: Calculation-based deformation in case of fire for installation channels MT-30, MT-30 S, MT-30 OC and MT-30 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|---|--|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 300 | - |  | 5 | 0,50 | 65,69 | 12,03 | 120,00 | 12,03 | 12,03 | 12,03 | 12,03 |
| | | | | 10 | 0,50 | 133,47 | 22,23 | 120,00 | 13,21 | 14,03 | 16,61 | 22,23 |
| | | | | 15 | 0,50 | 201,24 | 43,04 | 120,00 | 14,75 | 19,22 | 29,00 | 43,04 |
| | | | | 20 | 0,50 | 269,02 | 68,57 | 120,00 | 16,30 | 25,55 | 44,79 | 68,57 |
| | | | | 25 | 0,50 | 336,80 | 90,40 | 120,00 | 17,92 | 33,17 | 62,02 | 90,40 |
| | | | | 30 | 0,50 | 404,58 | 104,49 | 120,00 | 19,77 | 42,43 | 79,77 | 104,49 |
| 1 | 300 | - |  | 5 | 0,50 | 65,69 | 12,15 | 120,00 | 12,15 | 12,15 | 12,15 | 12,15 |
| | | | | 10 | 0,50 | 133,47 | 26,38 | 120,00 | 13,54 | 14,98 | 18,84 | 26,38 |
| | | | | 15 | 0,50 | 201,24 | 56,39 | 120,00 | 15,24 | 20,89 | 34,63 | 56,39 |
| | | | | 20 | 0,50 | 269,02 | 76,00 | 100,00 | 17,00 | 28,40 | 57,33 | - |
| | | | | 25 | 0,50 | 336,80 | 45,84 | 66,67 | 18,88 | 38,20 | - | - |
| | | | | 30 | 0,50 | 404,58 | 52,03 | 60,00 | 21,05 | 52,03 | - | - |
| 2 / 3 | 300 | 1 |  | 5 | 0,67 | 49,27 | 12,30 | 120,00 | 12,30 | 12,30 | 12,30 | 12,30 |
| | | | | 10 | 0,67 | 100,10 | 40,58 | 120,00 | 14,03 | 16,98 | 24,66 | 40,58 |
| | | | | 15 | 0,67 | 150,93 | 88,84 | 120,00 | 16,06 | 25,21 | 53,29 | 88,84 |
| | | | | 20 | 0,67 | 201,77 | 108,13 | 120,00 | 18,13 | 37,20 | 91,35 | 108,13 |
| | | | | 25 | 0,67 | 252,60 | 111,26 | 120,00 | 20,67 | 58,86 | 100,51 | 111,26 |
| | | | | 30 | 0,67 | 303,43 | 113,86 | 120,00 | 24,11 | 80,63 | 105,77 | 113,86 |
| 2 / 3 | 300 | 1 |  | 5 | 0,67 | 49,27 | 12,38 | 120,00 | 12,38 | 12,38 | 12,38 | 12,38 |
| | | | | 10 | 0,67 | 100,10 | 38,30 | 120,00 | 14,23 | 17,44 | 25,20 | 38,30 |
| | | | | 15 | 0,67 | 150,93 | 71,97 | 120,00 | 16,36 | 25,77 | 48,27 | 71,97 |
| | | | | 20 | 0,67 | 201,77 | 104,92 | 120,00 | 18,55 | 37,17 | 71,75 | 104,92 |
| | | | | 25 | 0,67 | 252,60 | 116,31 | 120,00 | 21,22 | 52,59 | 94,32 | 116,31 |
| | | | | 30 | 0,67 | 303,43 | 120,47 | 120,00 | 24,70 | 70,86 | 106,36 | 120,47 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

Symbols and designation

- ϵ_{B,θ_a} Channel bending strain at elevated temperatures θ_a
- σ_B Channel bending stress
- V Momentum degree of fullness
- F Load
- $\delta_{t_{max};B}$ Deformation of the channel at the point in time of stability failure or of the plastic hinging
- $t_{max,B}$ Time in which loss of rigidity or plastic hinging of the channel occurs under bending stress
- δ_{30} Displacement after exposure time of 30 minutes to elevated temperatures
- δ_{60} Displacement after exposure time of 60 minutes to elevated temperatures
- δ_{90} Displacement after exposure time of 90 minutes to elevated temperatures
- δ_{120} Displacement after exposure time of 120 minutes to elevated temperatures

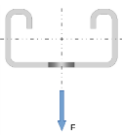
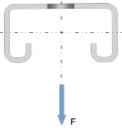
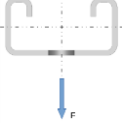
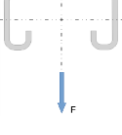
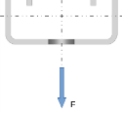
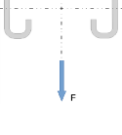
Thermal analyses as well as calculations are referring to the boundary conditions of STTC.

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D2

Table D21: Calculation-based deformation in case of fire for installation channels MT-30, MT-30 S, MT-30 OC and MT-30 S OC

| System | | | Load direction | σ_B MPa | $V^{1)}$ - | $F^{2)}$ N | $\delta_{t_{max},B}$ mm | $t_{max,B}$ min | δ_{30} mm | δ_{60} mm | δ_{90} mm | δ_{120} mm |
|----------|----------|---|---|-------------------|---------------|---------------|----------------------------|--------------------|---------------------|---------------------|---------------------|----------------------|
| Loadcase | $L^{3)}$ | n | | | | | | | | | | |
| 1 | 500 | - |  | 5 | 0,50 | 37,18 | 24,77 | 120,00 | 13,78 | 15,84 | 20,42 | 24,77 |
| | | | | 10 | 0,50 | 77,85 | 59,18 | 120,00 | 17,03 | 26,52 | 44,24 | 59,18 |
| | | | | 15 | 0,50 | 118,52 | 100,97 | 120,00 | 21,16 | 40,40 | 73,37 | 100,97 |
| | | | | 20 | 0,50 | 159,18 | 142,76 | 120,00 | 25,35 | 56,88 | 103,87 | 142,76 |
| | | | | 25 | 0,50 | 199,85 | 178,58 | 120,00 | 29,80 | 75,06 | 131,94 | 178,58 |
| | | | | 30 | 0,50 | 240,52 | 191,69 | 120,00 | 35,00 | 94,43 | 161,25 | 191,69 |
| 1 | 500 | - |  | 5 | 0,50 | 37,18 | 25,93 | 120,00 | 13,89 | 16,21 | 21,31 | 25,93 |
| | | | | 10 | 0,50 | 77,85 | 65,50 | 120,00 | 17,37 | 27,69 | 47,57 | 65,50 |
| | | | | 15 | 0,50 | 118,52 | 121,73 | 120,00 | 21,69 | 42,84 | 81,15 | 121,73 |
| | | | | 20 | 0,50 | 159,18 | 142,64 | 100,00 | 26,15 | 61,33 | 122,05 | - |
| | | | | 25 | 0,50 | 199,85 | 113,38 | 73,33 | 30,98 | 82,60 | - | - |
| | | | | 30 | 0,50 | 240,52 | 127,84 | 66,67 | 36,72 | 107,29 | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 46,48 | 35,05 | 120,00 | 14,87 | 19,48 | 28,74 | 35,05 |
| | | | | 10 | 0,80 | 97,31 | 106,99 | 120,00 | 20,42 | 38,33 | 70,22 | 106,99 |
| | | | | 15 | 0,80 | 148,15 | 162,42 | 120,00 | 26,75 | 61,80 | 122,64 | 162,42 |
| | | | | 20 | 0,80 | 198,98 | 181,97 | 120,00 | 33,16 | 88,40 | 157,42 | 181,97 |
| | | | | 25 | 0,80 | 249,81 | 186,83 | 120,00 | 41,37 | 127,50 | 172,98 | 186,83 |
| | | | | 30 | 0,80 | 300,65 | 191,24 | 120,00 | 52,07 | 153,03 | 180,82 | 191,24 |
| 2 | 500 | - |  | 5 | 0,80 | 46,48 | 35,03 | 120,00 | 14,89 | 19,52 | 28,74 | 35,03 |
| | | | | 10 | 0,80 | 97,31 | 90,19 | 120,00 | 20,49 | 38,12 | 67,44 | 90,19 |
| | | | | 15 | 0,80 | 148,15 | 131,24 | 120,00 | 26,81 | 60,77 | 106,95 | 131,24 |
| | | | | 20 | 0,80 | 198,98 | 177,45 | 120,00 | 33,19 | 84,42 | 156,77 | 177,45 |
| | | | | 25 | 0,80 | 249,81 | 186,95 | 120,00 | 41,10 | 107,18 | 170,60 | 186,95 |
| | | | | 30 | 0,80 | 300,65 | 193,19 | 120,00 | 51,13 | 143,98 | 180,14 | 193,19 |
| 3 | 500 | 3 |  | 5 | 0,67 | 15,49 | 31,73 | 120,00 | 14,52 | 18,30 | 26,03 | 31,73 |
| | | | | 10 | 0,67 | 32,44 | 84,32 | 120,00 | 19,18 | 33,93 | 60,56 | 84,32 |
| | | | | 15 | 0,67 | 49,38 | 161,52 | 120,00 | 24,69 | 54,17 | 101,12 | 161,52 |
| | | | | 20 | 0,67 | 66,33 | 187,22 | 120,00 | 30,24 | 77,47 | 157,22 | 187,22 |
| | | | | 25 | 0,67 | 83,27 | 199,19 | 120,00 | 36,84 | 103,26 | 179,64 | 199,19 |
| | | | | 30 | 0,67 | 100,22 | 207,27 | 120,00 | 45,36 | 140,95 | 192,44 | 207,27 |
| 3 | 500 | 3 |  | 5 | 0,67 | 15,49 | 31,74 | 120,00 | 14,53 | 18,33 | 26,07 | 31,74 |
| | | | | 10 | 0,67 | 32,44 | 82,25 | 120,00 | 19,26 | 34,07 | 60,36 | 82,25 |
| | | | | 15 | 0,67 | 49,38 | 124,65 | 120,00 | 24,84 | 54,12 | 96,57 | 124,65 |
| | | | | 20 | 0,67 | 66,33 | 166,73 | 120,00 | 30,42 | 76,51 | 130,16 | 166,73 |
| | | | | 25 | 0,67 | 83,27 | 185,55 | 120,00 | 36,97 | 99,56 | 155,21 | 185,55 |
| | | | | 30 | 0,67 | 100,22 | 197,65 | 120,00 | 45,31 | 120,08 | 174,81 | 197,65 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

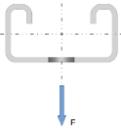
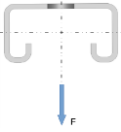
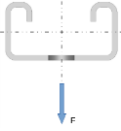
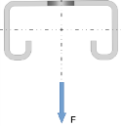
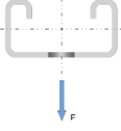
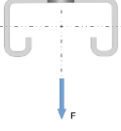
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D3

Table D22: Calculation-based deformation in case of fire for installation channels MT-30, MT-30 S, MT-30 OC and MT-30 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 700 | - |  | 5 | 0,50 | 24,17 | 48,85 | 120 | 16,54 | 24,78 | 40,11 | 48,85 |
| | | | | 10 | 0,50 | 53,22 | 107,18 | 120 | 22,95 | 45,47 | 83,06 | 107,18 |
| | | | | 15 | 0,50 | 82,27 | 167,86 | 120 | 31,01 | 71,47 | 128,69 | 167,86 |
| | | | | 20 | 0,50 | 111,32 | 232,67 | 120 | 39,13 | 99,74 | 171,01 | 232,67 |
| | | | | 25 | 0,50 | 140,36 | 261,63 | 120 | 47,67 | 128,05 | 213,55 | 261,63 |
| | | | | 30 | 0,50 | 169,41 | 276,65 | 120 | 57,65 | 155,32 | 245,41 | 276,65 |
| 1 | 700 | - |  | 5 | 0,50 | 24,17 | 49,88 | 120 | 16,61 | 25,02 | 40,86 | 49,88 |
| | | | | 10 | 0,50 | 53,22 | 113,53 | 120 | 23,20 | 46,60 | 86,49 | 113,53 |
| | | | | 15 | 0,50 | 82,27 | 178,05 | 120 | 31,49 | 73,99 | 135,88 | 178,05 |
| | | | | 20 | 0,50 | 111,32 | 211,04 | 106,67 | 39,87 | 104,32 | 181,63 | 0,00 |
| | | | | 25 | 0,50 | 140,36 | 219,3 | 86,67 | 48,84 | 135,31 | - | - |
| | | | | 30 | 0,50 | 169,41 | 207,99 | 73,33 | 59,44 | 165,64 | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 42,3 | 66,68 | 120 | 18,64 | 31,77 | 55,09 | 66,68 |
| | | | | 10 | 0,86 | 93,13 | 161,33 | 120 | 29,89 | 67,72 | 115,44 | 161,33 |
| | | | | 15 | 0,86 | 143,97 | 222,62 | 120 | 42,56 | 104,84 | 179,38 | 222,62 |
| | | | | 20 | 0,86 | 194,8 | 242,38 | 120 | 55,17 | 138,96 | 211,48 | 242,38 |
| | | | | 25 | 0,86 | 245,64 | 237,22 | 120 | 70,51 | 179,8 | 221,51 | 237,22 |
| | | | | 30 | 0,86 | 296,47 | 242,94 | 120 | 88,71 | 202,98 | 231,52 | 242,94 |
| 2 | 700 | - |  | 5 | 0,86 | 42,3 | 65,55 | 120 | 18,59 | 31,48 | 54,23 | 65,55 |
| | | | | 10 | 0,86 | 93,13 | 133,79 | 120 | 29,7 | 65,91 | 111,12 | 133,79 |
| | | | | 15 | 0,86 | 143,97 | 179,74 | 120 | 42,13 | 100,7 | 152,24 | 179,74 |
| | | | | 20 | 0,86 | 194,8 | 236,52 | 120 | 54,27 | 130,4 | 207,38 | 236,52 |
| | | | | 25 | 0,86 | 245,64 | 246,03 | 120 | 68,36 | 153,58 | 224,33 | 246,03 |
| | | | | 30 | 0,86 | 296,47 | 252,16 | 120 | 84,89 | 173,37 | 235,27 | 252,16 |
| 3 | 700 | 5 |  | 5 | 0,67 | 7,05 | 61,33 | 120 | 18,05 | 29,68 | 50,54 | 61,33 |
| | | | | 10 | 0,67 | 15,52 | 131,71 | 120 | 27,18 | 59 | 104,47 | 131,71 |
| | | | | 15 | 0,67 | 23,99 | 184,84 | 120 | 37,81 | 92,05 | 149,19 | 184,84 |
| | | | | 20 | 0,67 | 32,47 | 241,07 | 120 | 48,36 | 123,77 | 186,22 | 241,07 |
| | | | | 25 | 0,67 | 40,94 | 267,77 | 120 | 60,46 | 152,09 | 219,72 | 267,77 |
| | | | | 30 | 0,67 | 49,41 | 281,46 | 120 | 75,04 | 176,76 | 249,36 | 281,46 |
| 3 | 700 | 5 |  | 5 | 0,67 | 7,05 | 60,2 | 120 | 17,88 | 29,16 | 49,57 | 60,20 |
| | | | | 10 | 0,67 | 15,52 | 131,64 | 120 | 26,93 | 58,2 | 104,17 | 131,64 |
| | | | | 15 | 0,67 | 23,99 | 183,85 | 120 | 37,55 | 91,47 | 150,05 | 183,85 |
| | | | | 20 | 0,67 | 32,47 | 217,3 | 120 | 48,02 | 123,74 | 185,45 | 217,30 |
| | | | | 25 | 0,67 | 40,94 | 242,20 | 120 | 59,9 | 152,26 | 211,45 | 242,20 |
| | | | | 30 | 0,67 | 49,41 | 260,81 | 120 | 74,26 | 176,42 | 232,05 | 260,81 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D4

Table D23: Calculation-based deformation in case of fire for installation channels MT-30, MT-30 S, MT-30 OC and MT-30 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|---|----------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - | | 5 | 0,50 | 16,32 | 81,17 | 120,00 | 20,44 | 37,27 | 66,89 | 81,17 |
| | | | | 10 | 0,50 | 38,92 | 162,08 | 120,00 | 31,11 | 70,95 | 130,43 | 162,08 |
| | | | | 15 | 0,50 | 61,51 | 238,77 | 120,00 | 44,36 | 110,76 | 189,86 | 238,77 |
| | | | | 20 | 0,50 | 84,10 | 312,81 | 120,00 | 57,58 | 150,49 | 241,50 | 312,81 |
| | | | | 25 | 0,50 | 106,69 | 344,89 | 120,00 | 71,35 | 187,18 | 292,21 | 344,89 |
| | | | | 30 | 0,50 | 129,29 | 362,39 | 120,00 | 87,16 | 220,63 | 325,98 | 362,39 |
| 1 | 900 | - | | 5 | 0,50 | 16,32 | 82,19 | 120,00 | 20,45 | 37,44 | 67,63 | 82,19 |
| | | | | 10 | 0,50 | 38,92 | 168,04 | 120,00 | 31,33 | 72,25 | 133,98 | 168,04 |
| | | | | 15 | 0,50 | 61,51 | 244,11 | 120,00 | 44,88 | 113,56 | 196,03 | 244,11 |
| | | | | 20 | 0,50 | 84,10 | 304,09 | 120,00 | 58,43 | 155,18 | 247,98 | 304,09 |
| | | | | 25 | 0,50 | 106,69 | 310,91 | 100,00 | 72,75 | 193,84 | 288,41 | - |
| | | | | 30 | 0,50 | 129,29 | 319,97 | 86,67 | 89,33 | 228,91 | - | - |
| 2 | 900 | - | | 5 | 0,89 | 36,73 | 103,12 | 120,00 | 23,51 | 47,39 | 86,29 | 103,12 |
| | | | | 10 | 0,89 | 87,56 | 200,41 | 120,00 | 42,18 | 101,73 | 162,23 | 200,41 |
| | | | | 15 | 0,89 | 138,40 | 253,12 | 120,00 | 62,98 | 149,50 | 215,52 | 253,12 |
| | | | | 20 | 0,89 | 189,23 | 277,67 | 120,00 | 83,02 | 188,18 | 249,78 | 277,67 |
| | | | | 25 | 0,89 | 240,06 | 291,24 | 120,00 | 105,52 | 220,40 | 269,41 | 291,24 |
| | | | | 30 | 0,89 | 290,90 | 299,69 | 120,00 | 130,67 | 243,19 | 282,26 | 299,69 |
| 2 | 900 | - | | 5 | 0,89 | 36,73 | 101,33 | 120,00 | 23,39 | 46,80 | 84,90 | 101,33 |
| | | | | 10 | 0,89 | 87,56 | 179,16 | 120,00 | 41,69 | 98,58 | 156,53 | 179,16 |
| | | | | 15 | 0,89 | 138,40 | 225,03 | 120,00 | 61,96 | 143,30 | 200,91 | 225,03 |
| | | | | 20 | 0,89 | 189,23 | 259,46 | 120,00 | 81,08 | 177,17 | 228,72 | 259,46 |
| | | | | 25 | 0,89 | 240,06 | 299,64 | 120,00 | 101,57 | 201,98 | 248,09 | 299,64 |
| | | | | 30 | 0,89 | 290,90 | 309,09 | 120,00 | 124,26 | 220,60 | 262,32 | 309,09 |
| 3 | 900 | 9 | | 5 | 0,67 | 3,67 | 99,15 | 120,00 | 23,08 | 45,73 | 82,79 | 99,15 |
| | | | | 10 | 0,67 | 8,76 | 182,18 | 120,00 | 38,37 | 91,14 | 152,76 | 182,18 |
| | | | | 15 | 0,67 | 13,84 | 238,42 | 120,00 | 55,54 | 135,50 | 203,10 | 238,42 |
| | | | | 20 | 0,67 | 18,92 | 275,71 | 120,00 | 72,26 | 173,70 | 239,71 | 275,71 |
| | | | | 25 | 0,67 | 24,01 | 306,13 | 120,00 | 90,60 | 204,63 | 268,36 | 306,13 |
| | | | | 30 | 0,67 | 29,09 | 341,64 | 120,00 | 111,52 | 230,48 | 291,65 | 341,64 |
| 3 | 900 | 9 | | 5 | 0,67 | 3,67 | 97,14 | 120,00 | 22,59 | 44,25 | 80,76 | 97,14 |
| | | | | 10 | 0,67 | 8,76 | 185,15 | 120,00 | 37,60 | 89,77 | 154,22 | 185,15 |
| | | | | 15 | 0,67 | 13,84 | 245,04 | 120,00 | 54,79 | 135,97 | 207,98 | 245,04 |
| | | | | 20 | 0,67 | 18,92 | 281,80 | 120,00 | 71,49 | 176,24 | 246,51 | 281,80 |
| | | | | 25 | 0,67 | 24,01 | 306,87 | 120,00 | 89,79 | 208,80 | 275,26 | 306,87 |
| | | | | 30 | 0,67 | 29,09 | 326,28 | 120,00 | 110,88 | 235,72 | 296,86 | 326,28 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

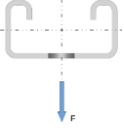
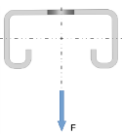

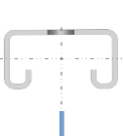

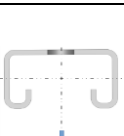
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D5

Table D24: Calculation-based deformation in case of fire for installation channels MT-30, MT-30 S, MT-30 OC and MT-30 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - |  | 5 | 0,50 | 10,82 | 121,25 | 120,00 | 25,61 | 53,72 | 100,77 | 121,25 |
| | | | | 10 | 0,50 | 29,31 | 221,36 | 120,00 | 41,65 | 102,64 | 183,83 | 221,36 |
| | | | | 15 | 0,50 | 47,79 | 310,11 | 120,00 | 61,33 | 156,61 | 254,91 | 310,11 |
| | | | | 20 | 0,50 | 66,28 | 392,70 | 120,00 | 80,74 | 206,59 | 312,74 | 392,70 |
| | | | | 25 | 0,50 | 84,76 | 429,13 | 120,00 | 100,63 | 250,17 | 369,51 | 429,13 |
| | | | | 30 | 0,50 | 103,25 | 448,96 | 120,00 | 122,89 | 288,51 | 407,48 | 448,96 |
| 1 | 1100 | - |  | 5 | 0,50 | 10,82 | 122,14 | 120,00 | 25,55 | 53,79 | 101,39 | 122,14 |
| | | | | 10 | 0,50 | 29,31 | 226,42 | 120,00 | 41,84 | 104,00 | 187,14 | 226,42 |
| | | | | 15 | 0,50 | 47,79 | 312,76 | 120,00 | 61,89 | 159,42 | 259,92 | 312,76 |
| | | | | 20 | 0,50 | 66,28 | 369,75 | 120,00 | 81,71 | 211,01 | 317,00 | 369,75 |
| | | | | 25 | 0,50 | 84,76 | 420,46 | 120,00 | 102,22 | 255,85 | 361,16 | 420,46 |
| | | | | 30 | 0,50 | 103,25 | 412,98 | 100,00 | 125,34 | 295,02 | 395,20 | - |
| 2 | 1100 | - |  | 5 | 0,91 | 29,76 | 142,03 | 120,00 | 29,32 | 65,56 | 120,27 | 142,03 |
| | | | | 10 | 0,91 | 80,60 | 248,82 | 120,00 | 56,88 | 138,17 | 209,95 | 248,82 |
| | | | | 15 | 0,91 | 131,43 | 306,44 | 120,00 | 87,24 | 195,00 | 265,98 | 306,44 |
| | | | | 20 | 0,91 | 182,26 | 334,88 | 120,00 | 115,45 | 237,58 | 302,52 | 334,88 |
| | | | | 25 | 0,91 | 233,10 | 351,66 | 120,00 | 144,95 | 270,21 | 325,56 | 351,66 |
| | | | | 30 | 0,91 | 283,93 | 363,14 | 120,00 | 176,36 | 294,06 | 341,48 | 363,14 |
| 2 | 1100 | - |  | 5 | 0,91 | 29,76 | 140,43 | 120,00 | 29,13 | 64,84 | 118,98 | 140,43 |
| | | | | 10 | 0,91 | 80,60 | 228,49 | 120,00 | 56,09 | 134,19 | 204,50 | 228,49 |
| | | | | 15 | 0,91 | 131,43 | 277,05 | 120,00 | 85,61 | 187,99 | 253,39 | 277,05 |
| | | | | 20 | 0,91 | 182,26 | 304,61 | 120,00 | 112,37 | 225,43 | 283,23 | 304,61 |
| | | | | 25 | 0,91 | 233,10 | 321,78 | 120,00 | 139,31 | 252,54 | 303,29 | 321,78 |
| | | | | 30 | 0,91 | 283,93 | 333,02 | 120,00 | 167,84 | 272,58 | 317,40 | 333,02 |
| 3 | 1100 | 9 |  | 5 | 0,67 | 1,98 | 143,55 | 120,00 | 29,95 | 67,04 | 121,73 | 143,55 |
| | | | | 10 | 0,67 | 5,37 | 234,36 | 120,00 | 53,00 | 128,74 | 203,56 | 234,36 |
| | | | | 15 | 0,67 | 8,76 | 295,00 | 120,00 | 77,92 | 182,24 | 259,21 | 295,00 |
| | | | | 20 | 0,67 | 12,15 | 334,67 | 120,00 | 101,65 | 225,26 | 297,80 | 334,67 |
| | | | | 25 | 0,67 | 15,54 | 363,40 | 120,00 | 126,48 | 259,09 | 327,42 | 363,40 |
| | | | | 30 | 0,67 | 18,93 | 385,92 | 120,00 | 153,50 | 286,36 | 350,97 | 385,92 |
| 3 | 1100 | 9 |  | 5 | 0,67 | 1,98 | 140,86 | 120,00 | 28,81 | 63,85 | 118,62 | 140,86 |
| | | | | 10 | 0,67 | 5,37 | 240,99 | 120,00 | 51,29 | 127,12 | 207,70 | 240,99 |
| | | | | 15 | 0,67 | 8,76 | 307,46 | 120,00 | 76,44 | 184,66 | 268,69 | 307,46 |
| | | | | 20 | 0,67 | 12,15 | 348,73 | 120,00 | 100,39 | 231,31 | 310,14 | 348,73 |
| | | | | 25 | 0,67 | 15,54 | 376,80 | 120,00 | 125,56 | 267,73 | 341,25 | 376,80 |
| | | | | 30 | 0,67 | 18,93 | 397,09 | 120,00 | 153,59 | 296,81 | 364,96 | 397,09 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D6

Table D25: Calculation-based deformation in case of fire for installation channels MT-30, MT-30 S, MT-30 OC and MT-30 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|----------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - | | 5 | 0,50 | 6,59 | 168,28 | 120,00 | 32,25 | 74,60 | 141,39 | 168,28 |
| | | | | 10 | 0,50 | 22,23 | 283,86 | 120,00 | 54,84 | 140,29 | 241,83 | 283,86 |
| | | | | 15 | 0,50 | 37,87 | 381,06 | 120,00 | 82,11 | 207,64 | 322,76 | 381,06 |
| | | | | 20 | 0,50 | 53,51 | 471,73 | 120,00 | 108,55 | 266,47 | 384,66 | 471,73 |
| | | | | 25 | 0,50 | 69,15 | 514,45 | 120,00 | 135,23 | 315,84 | 445,11 | 514,45 |
| | | | | 30 | 0,50 | 84,79 | 536,28 | 120,00 | 164,21 | 358,05 | 489,44 | 536,28 |
| 1 | 1300 | - | | 5 | 0,50 | 6,59 | 168,85 | 120,00 | 32,10 | 74,51 | 141,74 | 168,85 |
| | | | | 10 | 0,50 | 22,23 | 287,81 | 120,00 | 54,97 | 141,54 | 244,67 | 287,81 |
| | | | | 15 | 0,50 | 37,87 | 383,07 | 120,00 | 82,69 | 210,26 | 326,95 | 383,07 |
| | | | | 20 | 0,50 | 53,51 | 444,72 | 120,00 | 109,60 | 270,41 | 388,27 | 444,72 |
| | | | | 25 | 0,50 | 69,15 | 489,87 | 120,00 | 136,95 | 320,66 | 435,95 | 489,87 |
| | | | | 30 | 0,50 | 84,79 | 513,98 | 113,33 | 166,79 | 363,31 | 472,22 | - |
| 2 | 1300 | - | | 5 | 0,92 | 21,41 | 182,49 | 120,00 | 35,88 | 85,55 | 155,94 | 182,49 |
| | | | | 10 | 0,92 | 72,24 | 289,66 | 120,00 | 73,51 | 176,16 | 259,73 | 289,66 |
| | | | | 15 | 0,92 | 123,07 | 362,73 | 120,00 | 115,18 | 241,69 | 318,74 | 362,73 |
| | | | | 20 | 0,92 | 173,91 | 396,90 | 120,00 | 151,36 | 286,93 | 356,90 | 396,90 |
| | | | | 25 | 0,92 | 224,74 | 417,33 | 120,00 | 187,92 | 320,56 | 382,43 | 417,33 |
| | | | | 30 | 0,92 | 275,57 | 430,64 | 120,00 | 224,10 | 345,03 | 399,75 | 430,64 |
| 2 | 1300 | - | | 5 | 0,92 | 21,41 | 182,17 | 120,00 | 35,64 | 84,98 | 155,59 | 182,17 |
| | | | | 10 | 0,92 | 72,24 | 282,31 | 120,00 | 72,52 | 172,01 | 255,26 | 282,31 |
| | | | | 15 | 0,92 | 123,07 | 334,13 | 120,00 | 113,00 | 234,72 | 309,25 | 334,13 |
| | | | | 20 | 0,92 | 173,91 | 363,43 | 120,00 | 147,15 | 275,57 | 341,19 | 363,43 |
| | | | | 25 | 0,92 | 224,74 | 381,80 | 120,00 | 180,75 | 305,08 | 362,69 | 381,80 |
| | | | | 30 | 0,92 | 275,57 | 393,97 | 120,00 | 213,65 | 326,95 | 377,83 | 393,97 |
| 3 | 1300 | 11 | | 5 | 0,67 | 1,02 | 193,11 | 120,00 | 39,14 | 94,27 | 166,31 | 193,11 |
| | | | | 10 | 0,67 | 3,44 | 288,54 | 120,00 | 71,58 | 170,77 | 256,38 | 288,54 |
| | | | | 15 | 0,67 | 5,86 | 351,99 | 120,00 | 104,96 | 231,02 | 315,80 | 351,99 |
| | | | | 20 | 0,67 | 8,28 | 394,78 | 120,00 | 136,02 | 277,50 | 357,26 | 394,78 |
| | | | | 25 | 0,67 | 10,70 | 425,69 | 120,00 | 167,72 | 313,91 | 388,38 | 425,69 |
| | | | | 30 | 0,67 | 13,12 | 449,28 | 120,00 | 200,26 | 343,09 | 413,17 | 449,28 |
| 3 | 1300 | 11 | | 5 | 0,67 | 1,02 | 190,31 | 120,00 | 36,81 | 88,47 | 162,43 | 190,31 |
| | | | | 10 | 0,67 | 3,44 | 299,44 | 120,00 | 68,37 | 169,45 | 264,09 | 299,44 |
| | | | | 15 | 0,67 | 5,86 | 370,82 | 120,00 | 102,50 | 236,35 | 330,97 | 370,82 |
| | | | | 20 | 0,67 | 8,28 | 416,19 | 120,00 | 134,29 | 288,06 | 375,84 | 416,19 |
| | | | | 25 | 0,67 | 10,70 | 447,28 | 120,00 | 166,93 | 327,99 | 408,83 | 447,28 |
| | | | | 30 | 0,67 | 13,12 | 469,94 | 120,00 | 201,07 | 359,44 | 434,37 | 469,94 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

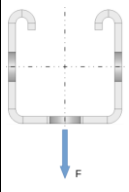
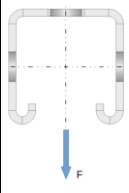
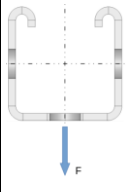
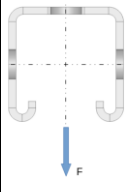
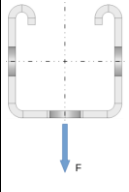
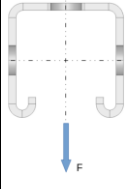
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D7

Table D26: Calculation-based deformation in case of fire for installation channels MT-40, MT-40 S, MT-40 OC and MT-40 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - |  | 5 | 0,50 | 102,77 | 14,27 | 120,00 | 5,98 | 11,19 | 14,27 | 14,27 |
| | | | | 10 | 0,50 | 209,68 | 22,33 | 120,00 | 8,44 | 17,10 | 22,33 | 22,33 |
| | | | | 15 | 0,50 | 316,59 | 35,91 | 120,00 | 11,05 | 24,32 | 35,73 | 35,91 |
| | | | | 20 | 0,50 | 423,50 | 115,16 | 120,00 | 14,48 | 34,17 | 75,97 | 115,16 |
| | | | | 25 | 0,50 | 530,42 | 141,80 | 120,00 | 20,41 | 96,85 | 132,55 | 141,80 |
| | | | | 30 | 0,50 | 637,33 | 159,48 | 120,00 | 49,13 | 122,99 | 151,91 | 159,48 |
| 1 | 500 | - |  | 5 | 0,50 | 102,77 | 14,46 | 120,00 | 6,07 | 11,36 | 14,46 | 14,46 |
| | | | | 10 | 0,50 | 209,68 | 22,92 | 120,00 | 8,61 | 17,52 | 22,92 | 22,92 |
| | | | | 15 | 0,50 | 316,59 | 36,03 | 120,00 | 11,37 | 24,92 | 36,03 | 36,03 |
| | | | | 20 | 0,50 | 423,50 | 58,42 | 86,67 | 14,99 | 34,01 | - | - |
| | | | | 25 | 0,50 | 530,42 | 45,10 | 46,67 | 21,02 | - | - | - |
| | | | | 30 | 0,50 | 637,33 | 18,88 | 26,67 | - | - | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 128,46 | 16,06 | 120,00 | 6,85 | 12,85 | 16,06 | 16,06 |
| | | | | 10 | 0,80 | 262,10 | 33,83 | 93,33 | 10,34 | 22,56 | 33,28 | - |
| | | | | 15 | 0,80 | 395,74 | 8,95 | 26,67 | - | - | - | - |
| | | | | 20 | 0,80 | 529,38 | 12,80 | 26,67 | - | - | - | - |
| | | | | 25 | 0,80 | 663,02 | 6,25 | 20,00 | - | - | - | - |
| | | | | 30 | 0,80 | 796,66 | 8,54 | 20,00 | - | - | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 0,67 | 128,46 | 16,17 | 120,00 | 6,91 | 12,96 | 16,17 |
| | | | | 10 | 0,80 | 0,67 | 262,10 | 31,39 | 120,00 | 10,49 | 22,86 | 31,39 |
| | | | | 15 | 0,80 | 0,67 | 395,74 | 57,07 | 113,33 | 14,57 | 32,85 | 51,38 |
| | | | | 20 | 0,80 | 0,67 | 529,38 | 50,83 | 60,00 | 21,32 | 50,83 | - |
| | | | | 25 | 0,80 | 0,67 | 663,02 | 51,74 | 33,33 | 36,48 | - | - |
| | | | | 30 | 0,80 | 0,67 | 796,66 | 39,49 | 26,67 | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 0,80 | 42,82 | 15,48 | 120,00 | 6,57 | 12,32 | 15,48 |
| | | | | 10 | 0,67 | 0,80 | 87,37 | 42,60 | 100,00 | 9,75 | 21,23 | 34,97 |
| | | | | 15 | 0,67 | 0,80 | 131,91 | 25,50 | 40,00 | 13,67 | - | - |
| | | | | 20 | 0,67 | 0,80 | 176,46 | 11,55 | 26,67 | - | - | - |
| | | | | 25 | 0,67 | 0,80 | 221,01 | 5,60 | 20,00 | - | - | - |
| | | | | 30 | 0,67 | 0,80 | 265,55 | 7,41 | 20,00 | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 0,80 | 42,82 | 15,55 | 120,00 | 6,61 | 12,38 | 15,55 |
| | | | | 10 | 0,67 | 0,80 | 87,37 | 28,06 | 120,00 | 9,80 | 20,83 | 28,06 |
| | | | | 15 | 0,67 | 0,80 | 131,91 | 50,30 | 106,67 | 13,32 | 29,96 | 46,55 |
| | | | | 20 | 0,67 | 0,80 | 176,46 | 47,12 | 60,00 | 18,73 | 47,12 | - |
| | | | | 25 | 0,67 | 0,80 | 221,01 | 17,32 | 26,67 | - | - | - |
| | | | | 30 | 0,67 | 0,80 | 265,55 | 32,10 | 26,67 | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

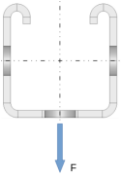
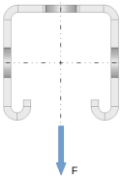
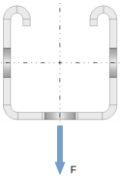
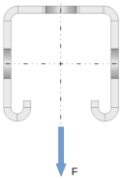
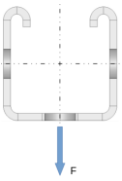
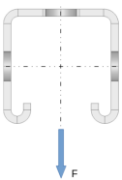
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D8

Table D27: Calculation-based deformation in case of fire for installation channels MT-40, MT-40 S, MT-40 OC and MT-40 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 700 | - |  | 5 | 0,50 | 70,56 | 18,73 | 120,00 | 8,22 | 15,38 | 18,73 | 18,73 |
| | | | | 10 | 0,50 | 146,93 | 34,64 | 120,00 | 12,92 | 26,90 | 34,64 | 34,64 |
| | | | | 15 | 0,50 | 223,29 | 109,06 | 120,00 | 17,96 | 40,64 | 61,44 | 109,06 |
| | | | | 20 | 0,50 | 299,66 | 165,36 | 120,00 | 24,61 | 77,92 | 149,10 | 165,36 |
| | | | | 25 | 0,50 | 376,03 | 197,18 | 120,00 | 57,97 | 131,91 | 183,96 | 197,18 |
| | | | | 30 | 0,50 | 452,39 | 229,01 | 120,00 | 91,33 | 185,90 | 218,83 | 229,01 |
| 1 | 700 | - |  | 5 | 0,50 | 70,56 | 18,85 | 120,00 | 8,28 | 15,49 | 18,85 | 18,85 |
| | | | | 10 | 0,50 | 146,93 | 34,83 | 120,00 | 13,03 | 27,12 | 34,83 | 34,83 |
| | | | | 15 | 0,50 | 223,29 | 63,97 | 120,00 | 18,12 | 40,75 | 58,79 | 63,97 |
| | | | | 20 | 0,50 | 299,66 | 89,80 | 86,67 | 24,72 | 56,91 | - | - |
| | | | | 25 | 0,50 | 376,03 | 82,96 | 53,33 | 35,59 | - | - | - |
| | | | | 30 | 0,50 | 452,39 | 32,71 | 26,67 | - | - | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 123,49 | 22,54 | 120,00 | 10,07 | 18,92 | 22,54 | 22,54 |
| | | | | 10 | 0,86 | 257,13 | 87,95 | 106,67 | 17,07 | 41,40 | 78,41 | - |
| | | | | 15 | 0,86 | 390,77 | 14,65 | 26,67 | - | - | - | - |
| | | | | 20 | 0,86 | 524,41 | 24,08 | 26,67 | - | - | - | - |
| | | | | 25 | 0,86 | 658,05 | 10,10 | 20,00 | - | - | - | - |
| | | | | 30 | 0,86 | 791,69 | 14,92 | 20,00 | - | - | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 123,49 | 22,53 | 120,00 | 10,09 | 18,93 | 22,53 | 22,53 |
| | | | | 10 | 0,86 | 257,13 | 51,78 | 120,00 | 17,13 | 38,33 | 51,78 | 51,78 |
| | | | | 15 | 0,86 | 390,77 | 90,78 | 120,00 | 24,97 | 56,47 | 83,20 | 90,78 |
| | | | | 20 | 0,86 | 524,41 | 111,88 | 86,67 | 37,21 | 79,01 | - | - |
| | | | | 25 | 0,86 | 658,05 | 102,42 | 53,33 | 56,57 | - | - | - |
| | | | | 30 | 0,86 | 791,69 | 108,72 | 40,00 | 82,15 | - | - | - |
| 3 | 700 | 5 |  | 5 | 0,67 | 20,58 | 21,18 | 120,00 | 9,38 | 17,62 | 21,18 | 21,18 |
| | | | | 10 | 0,67 | 42,85 | 65,63 | 106,67 | 15,50 | 35,22 | 54,63 | - |
| | | | | 15 | 0,67 | 65,13 | 58,24 | 46,67 | 23,20 | - | - | - |
| | | | | 20 | 0,67 | 87,40 | 19,68 | 26,67 | - | - | - | - |
| | | | | 25 | 0,67 | 109,67 | 8,61 | 20,00 | - | - | - | - |
| | | | | 30 | 0,67 | 131,95 | 12,36 | 20,00 | - | - | - | - |
| 3 | 700 | 5 |  | 5 | 0,67 | 20,58 | 21,00 | 120,00 | 9,34 | 17,50 | 21,00 | 21,00 |
| | | | | 10 | 0,67 | 42,85 | 44,78 | 120,00 | 15,37 | 33,56 | 44,78 | 44,78 |
| | | | | 15 | 0,67 | 65,13 | 92,43 | 113,33 | 21,98 | 50,66 | 78,18 | - |
| | | | | 20 | 0,67 | 87,40 | 93,01 | 66,67 | 31,98 | 78,07 | - | - |
| | | | | 25 | 0,67 | 109,67 | 29,65 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 131,95 | 55,37 | 26,67 | - | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

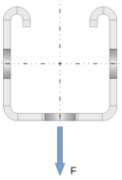
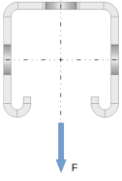
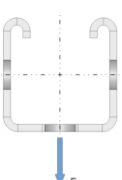
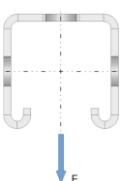
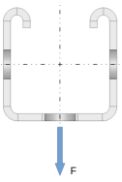
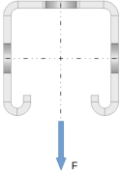
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D9

Table D28: Calculation-based deformation in case of fire for installation channels MT-40, MT-40 S, MT-40 OC and MT-40 S OC

| System | | | Load direction | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|------------------|---|---|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - |  | 5 | 0,50 | 51,94 | 24,99 | 120,00 | 11,35 | 21,25 | 24,99 | 24,99 |
| | | | | 10 | 0,50 | 111,33 | 51,35 | 120,00 | 19,05 | 40,19 | 51,35 | 51,35 |
| | | | | 15 | 0,50 | 170,73 | 175,90 | 120,00 | 27,28 | 62,37 | 140,45 | 175,90 |
| | | | | 20 | 0,50 | 230,12 | 202,00 | 120,00 | 47,70 | 100,20 | 170,82 | 202,00 |
| | | | | 25 | 0,50 | 289,52 | 241,15 | 120,00 | 78,33 | 156,93 | 216,37 | 241,15 |
| | | | | 30 | 0,50 | 348,91 | 306,39 | 120,00 | 129,38 | 251,49 | 292,29 | 306,39 |
| 1 | - | - |  | 5 | 0,50 | 51,94 | 24,99 | 120,00 | 11,36 | 21,27 | 24,99 | 24,99 |
| | | | | 10 | 0,50 | 111,33 | 51,07 | 120,00 | 19,08 | 40,18 | 51,07 | 51,07 |
| | | | | 15 | 0,50 | 170,73 | 98,86 | 120,00 | 27,26 | 61,73 | 87,85 | 98,86 |
| | | | | 20 | 0,50 | 230,12 | 149,48 | 100,00 | 37,73 | 85,61 | 130,73 | - |
| | | | | 25 | 0,50 | 289,52 | 125,25 | 60,00 | 54,24 | 125,25 | - | - |
| | | | | 30 | 0,50 | 348,91 | 51,14 | 26,67 | - | - | - | - |
| 2 | 900 | - |  | 5 | 0,89 | 116,85 | 31,18 | 120,00 | 14,33 | 26,95 | 31,18 | 31,18 |
| | | | | 10 | 0,89 | 250,49 | 128,51 | 120,00 | 35,45 | 84,17 | 118,98 | 128,51 |
| | | | | 15 | 0,89 | 384,13 | 22,23 | 26,67 | - | - | - | - |
| | | | | 20 | 0,89 | 517,77 | 10,48 | 20,00 | - | - | - | - |
| | | | | 25 | 0,89 | 651,41 | 15,32 | 20,00 | - | - | - | -- |
| | | | | 30 | 0,89 | 785,05 | 27,35 | 20,00 | - | - | - | - |
| 2 | 900 | - |  | 5 | 0,89 | 116,85 | 30,98 | 120,00 | 14,32 | 26,86 | 30,98 | 30,98 |
| | | | | 10 | 0,89 | 250,49 | 77,40 | 120,00 | 25,86 | 57,72 | 75,92 | 77,40 |
| | | | | 15 | 0,89 | 384,13 | 123,94 | 120,00 | 38,24 | 84,40 | 116,21 | 123,94 |
| | | | | 20 | 0,89 | 517,77 | 160,76 | 120,00 | 56,05 | 109,13 | 146,35 | 160,76 |
| | | | | 25 | 0,89 | 651,41 | 154,66 | 73,33 | 81,04 | 135,60 | - | - |
| | | | | 30 | 0,89 | 785,05 | 158,64 | 60,00 | 109,94 | 158,64 | - | - |
| 3 | 900 | 7 |  | 5 | 0,67 | 11,69 | 29,19 | 120,00 | 13,30 | 25,04 | 29,19 | 29,19 |
| | | | | 10 | 0,67 | 25,05 | 99,35 | 120,00 | 23,36 | 53,83 | 78,83 | 99,35 |
| | | | | 15 | 0,67 | 38,41 | 86,96 | 53,33 | 35,75 | - | - | - |
| | | | | 20 | 0,67 | 51,78 | 30,37 | 26,67 | - | - | - | - |
| | | | | 25 | 0,67 | 65,14 | 73,71 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 78,51 | 18,82 | 20,00 | - | - | - | - |
| 3 | 900 | 7 |  | 5 | 0,67 | 11,69 | 28,59 | 120,00 | 13,13 | 24,63 | 28,59 | 28,59 |
| | | | | 10 | 0,67 | 25,05 | 68,59 | 120,00 | 22,95 | 50,89 | 67,47 | 68,59 |
| | | | | 15 | 0,67 | 38,41 | 148,66 | 120,00 | 33,67 | 78,07 | 118,19 | 148,66 |
| | | | | 20 | 0,67 | 51,78 | 132,52 | 66,67 | 49,68 | 117,14 | - | - |
| | | | | 25 | 0,67 | 65,14 | 116,32 | 33,33 | 81,36 | - | - | - |
| | | | | 30 | 0,67 | 78,51 | 85,24 | 26,67 | - | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

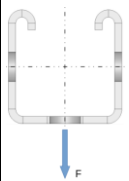
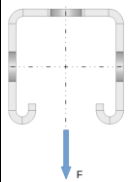
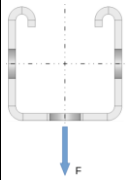
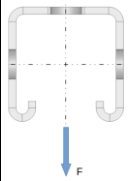
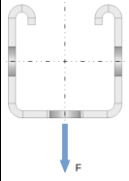
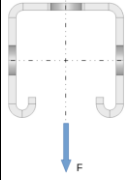
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D10

Table D29: Calculation-based deformation in case of fire for installation channels MT-40, MT-40 S, MT-40 OC and MT-40 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - |  | 5 | 0,50 | 39,48 | 33,22 | 120,00 | 15,47 | 28,98 | 33,22 | 33,22 |
| | | | | 10 | 0,50 | 88,07 | 74,41 | 120,00 | 26,88 | 57,05 | 72,87 | 74,41 |
| | | | | 15 | 0,50 | 136,67 | 239,23 | 120,00 | 38,96 | 90,33 | 206,21 | 239,23 |
| | | | | 20 | 0,50 | 185,27 | 258,30 | 120,00 | 56,43 | 119,83 | 226,92 | 258,30 |
| | | | | 25 | 0,50 | 233,86 | 296,43 | 120,00 | 91,39 | 178,84 | 268,33 | 296,43 |
| | | | | 30 | 0,50 | 282,46 | 366,34 | 120,00 | 155,48 | 287,01 | 344,25 | 366,34 |
| 1 | 1100 | - |  | 5 | 0,50 | 39,48 | 33,07 | 120,00 | 15,42 | 28,86 | 33,07 | 33,07 |
| | | | | 10 | 0,50 | 88,07 | 71,67 | 120,00 | 26,83 | 56,81 | 71,67 | 71,67 |
| | | | | 15 | 0,50 | 136,67 | 138,98 | 120,00 | 38,80 | 87,45 | 122,18 | 138,98 |
| | | | | 20 | 0,50 | 185,27 | 195,23 | 100,00 | 53,90 | 119,16 | 175,19 | - |
| | | | | 25 | 0,50 | 233,86 | 166,43 | 60,00 | 76,57 | 166,43 | - | - |
| | | | | 30 | 0,50 | 282,46 | 161,66 | 33,33 | 117,67 | - | - | - |
| 2 | 1100 | - |  | 5 | 0,91 | 108,56 | 64,85 | 120,00 | 19,67 | 37,51 | 47,17 | 64,85 |
| | | | | 10 | 0,91 | 242,20 | 167,07 | 120,00 | 53,82 | 128,22 | 159,56 | 167,07 |
| | | | | 15 | 0,91 | 375,84 | 32,88 | 26,67 | - | - | - | - |
| | | | | 20 | 0,91 | 509,48 | 14,53 | 20,00 | - | - | - | - |
| | | | | 25 | 0,91 | 643,12 | 22,71 | 20,00 | - | - | - | - |
| | | | | 30 | 0,91 | 776,76 | 10,70 | 13,33 | - | - | - | - |
| 2 | 1100 | - |  | 5 | 0,91 | 108,56 | 41,44 | 120,00 | 19,58 | 36,66 | 41,44 | 41,44 |
| | | | | 10 | 0,91 | 242,20 | 106,27 | 120,00 | 36,53 | 80,03 | 102,35 | 106,27 |
| | | | | 15 | 0,91 | 375,84 | 159,04 | 120,00 | 53,91 | 114,84 | 149,99 | 159,04 |
| | | | | 20 | 0,91 | 509,48 | 196,32 | 120,00 | 77,09 | 141,68 | 183,62 | 196,32 |
| | | | | 25 | 0,91 | 643,12 | 220,88 | 113,33 | 108,29 | 168,14 | 209,12 | - |
| | | | | 30 | 0,91 | 776,76 | 210,10 | 73,33 | 139,59 | 191,47 | - | - |
| 3 | 1100 | 9 |  | 5 | 0,67 | 7,24 | 39,94 | 120,00 | 18,46 | 34,90 | 39,94 | 39,94 |
| | | | | 10 | 0,67 | 16,15 | 123,54 | 120,00 | 33,46 | 77,16 | 109,11 | 123,54 |
| | | | | 15 | 0,67 | 25,06 | 125,50 | 60,00 | 51,36 | 125,50 | - | - |
| | | | | 20 | 0,67 | 33,97 | 43,79 | 26,67 | - | - | - | - |
| | | | | 25 | 0,67 | 42,87 | 94,23 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 51,78 | 26,93 | 20,00 | - | - | - | - |
| 3 | 1100 | 9 |  | 5 | 0,67 | 7,24 | 38,53 | 120,00 | 18,06 | 33,93 | 38,53 | 38,53 |
| | | | | 10 | 0,67 | 16,15 | 101,85 | 120,00 | 32,63 | 72,86 | 96,01 | 101,85 |
| | | | | 15 | 0,67 | 25,06 | 200,65 | 120,00 | 48,45 | 111,77 | 165,05 | 200,65 |
| | | | | 20 | 0,67 | 33,97 | 203,56 | 73,33 | 71,61 | 162,12 | - | - |
| | | | | 25 | 0,67 | 42,87 | 157,79 | 33,33 | 112,57 | - | - | - |
| | | | | 30 | 0,67 | 51,78 | 120,18 | 26,67 | - | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

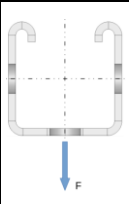
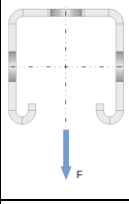
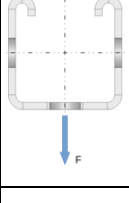
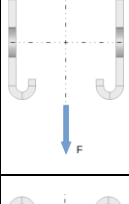
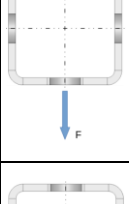
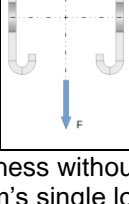
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D11

Table D30: Calculation-based deformation in case of fire for installation channels MT-40, MT-40 S, MT-40 OC and MT-40 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - |  | 5 | 0,50 | 30,34 | 43,60 | 120,00 | 20,70 | 38,71 | 43,60 | 43,60 |
| | | | | 10 | 0,50 | 71,46 | 112,78 | 120,00 | 36,48 | 77,59 | 99,91 | 112,78 |
| | | | | 15 | 0,50 | 112,58 | 302,96 | 120,00 | 53,02 | 131,77 | 265,87 | 302,96 |
| | | | | 20 | 0,50 | 153,70 | 327,10 | 120,00 | 77,44 | 175,90 | 292,86 | 327,10 |
| | | | | 25 | 0,50 | 194,82 | 375,39 | 120,00 | 126,29 | 264,16 | 346,84 | 375,39 |
| | | | | 30 | 0,50 | 235,94 | 463,92 | 120,00 | 215,85 | 400,97 | 445,81 | 463,92 |
| 1 | 1300 | - |  | 5 | 0,50 | 30,34 | 43,32 | 120,00 | 20,57 | 38,47 | 43,32 | 43,32 |
| | | | | 10 | 0,50 | 71,46 | 99,22 | 120,00 | 36,36 | 77,03 | 96,56 | 99,22 |
| | | | | 15 | 0,50 | 112,58 | 182,83 | 120,00 | 52,73 | 117,41 | 160,72 | 182,83 |
| | | | | 20 | 0,50 | 153,70 | 248,19 | 100,00 | 72,97 | 156,41 | 223,40 | - |
| | | | | 25 | 0,50 | 194,82 | 211,25 | 60,00 | 101,99 | 211,25 | - | - |
| | | | | 30 | 0,50 | 235,94 | 200,01 | 33,33 | 150,01 | - | - | - |
| 2 | 1300 | - |  | 5 | 0,92 | 98,62 | 97,40 | 120,00 | 26,24 | 63,24 | 93,40 | 97,40 |
| | | | | 10 | 0,92 | 232,26 | 193,18 | 120,00 | 70,38 | 154,26 | 185,57 | 193,18 |
| | | | | 15 | 0,92 | 365,90 | 239,93 | 120,00 | 125,32 | 194,98 | 229,14 | 239,93 |
| | | | | 20 | 0,92 | 499,54 | 269,84 | 120,00 | 165,60 | 223,13 | 257,30 | 269,84 |
| | | | | 25 | 0,92 | 633,18 | 294,54 | 120,00 | 196,07 | 248,44 | 281,67 | 294,54 |
| | | | | 30 | 0,92 | 766,82 | 308,59 | 120,00 | 217,20 | 265,80 | 296,93 | 308,59 |
| 2 | 1300 | - |  | 5 | 0,92 | 98,62 | 53,87 | 120,00 | 25,84 | 48,28 | 53,87 | 53,87 |
| | | | | 10 | 0,92 | 232,26 | 136,51 | 120,00 | 48,96 | 104,44 | 130,41 | 136,51 |
| | | | | 15 | 0,92 | 365,90 | 196,00 | 120,00 | 71,65 | 146,83 | 184,74 | 196,00 |
| | | | | 20 | 0,92 | 499,54 | 235,22 | 120,00 | 100,18 | 177,06 | 221,83 | 235,22 |
| | | | | 25 | 0,92 | 633,18 | 269,50 | 120,00 | 137,08 | 203,09 | 249,35 | 269,50 |
| | | | | 30 | 0,92 | 766,82 | 280,35 | 100,00 | 170,89 | 228,08 | 270,77 | - |
| 3 | 1300 | 11 |  | 5 | 0,67 | 4,70 | 53,87 | 120,00 | 25,06 | 47,65 | 53,87 | 53,87 |
| | | | | 10 | 0,67 | 11,06 | 201,67 | 120,00 | 45,88 | 105,13 | 145,10 | 201,67 |
| | | | | 15 | 0,67 | 17,42 | 216,61 | 73,33 | 70,01 | 173,48 | - | - |
| | | | | 20 | 0,67 | 23,79 | 162,54 | 33,33 | 111,09 | - | - | - |
| | | | | 25 | 0,67 | 30,15 | 121,52 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 36,52 | 36,81 | 20,00 | - | - | - | - |
| 3 | 1300 | 11 |  | 5 | 0,67 | 4,70 | 51,15 | 120,00 | 24,28 | 45,69 | 51,15 | 51,15 |
| | | | | 10 | 0,67 | 11,06 | 141,25 | 120,00 | 44,48 | 99,51 | 130,22 | 141,25 |
| | | | | 15 | 0,67 | 17,42 | 256,59 | 120,00 | 66,26 | 151,14 | 217,05 | 256,59 |
| | | | | 20 | 0,67 | 23,79 | 279,82 | 80,00 | 97,46 | 211,49 | - | - |
| | | | | 25 | 0,67 | 30,15 | 239,46 | 40,00 | 147,96 | - | - | - |
| | | | | 30 | 0,67 | 36,52 | 159,28 | 26,67 | - | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

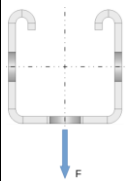
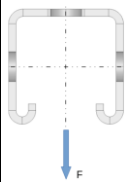
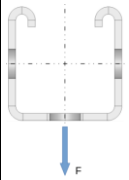
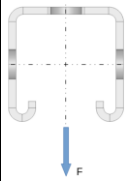
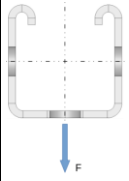
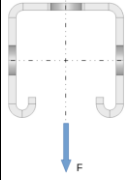
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D12

Table D31: Calculation-based deformation in case of fire for installation channels MT-40, MT-40 S, MT-40 OC and MT-40 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1500 | - |  | 5 | 0,50 | 23,20 | 56,41 | 120,00 | 27,14 | 50,70 | 56,41 | 56,41 |
| | | | | 10 | 0,50 | 58,84 | 214,05 | 120,00 | 47,91 | 101,60 | 140,22 | 214,05 |
| | | | | 15 | 0,50 | 94,48 | 346,77 | 120,00 | 69,39 | 223,90 | 310,06 | 346,77 |
| | | | | 20 | 0,50 | 130,12 | 374,41 | 120,00 | 101,89 | 292,56 | 341,71 | 374,41 |
| | | | | 25 | 0,50 | 165,75 | 429,68 | 120,00 | 166,90 | 344,86 | 405,02 | 429,68 |
| | | | | 30 | 0,50 | 201,39 | 531,02 | 120,00 | 286,09 | 480,93 | 518,58 | 531,02 |
| 1 | 1500 | - |  | 5 | 0,50 | 23,20 | 56,01 | 120,00 | 26,96 | 50,37 | 56,01 | 56,01 |
| | | | | 10 | 0,50 | 58,84 | 131,92 | 120,00 | 47,75 | 100,84 | 125,60 | 131,92 |
| | | | | 15 | 0,50 | 94,48 | 229,81 | 120,00 | 69,03 | 151,09 | 202,67 | 229,81 |
| | | | | 20 | 0,50 | 130,12 | 303,49 | 100,00 | 94,76 | 196,85 | 274,61 | - |
| | | | | 25 | 0,50 | 165,75 | 258,09 | 60,00 | 130,26 | 258,09 | - | - |
| | | | | 30 | 0,50 | 201,39 | 241,27 | 33,33 | 185,29 | - | - | - |
| 2 | 1500 | - |  | 5 | 0,93 | 87,01 | 120,23 | 120,00 | 35,67 | 94,50 | 118,16 | 120,23 |
| | | | | 10 | 0,93 | 220,65 | 223,72 | 120,00 | 86,15 | 180,58 | 214,32 | 223,72 |
| | | | | 15 | 0,93 | 354,29 | 271,31 | 120,00 | 147,41 | 224,17 | 260,30 | 271,31 |
| | | | | 20 | 0,93 | 487,93 | 304,59 | 120,00 | 191,90 | 257,55 | 293,32 | 304,59 |
| | | | | 25 | 0,93 | 621,57 | 326,22 | 120,00 | 222,90 | 281,83 | 315,54 | 326,22 |
| | | | | 30 | 0,93 | 755,21 | 341,37 | 120,00 | 245,92 | 300,21 | 331,67 | 341,37 |
| 2 | 1500 | - |  | 5 | 0,93 | 87,01 | 68,17 | 120,00 | 33,08 | 61,62 | 68,17 | 68,17 |
| | | | | 10 | 0,93 | 220,65 | 168,22 | 120,00 | 62,97 | 130,45 | 159,92 | 168,22 |
| | | | | 15 | 0,93 | 354,29 | 234,63 | 120,00 | 91,22 | 179,77 | 220,70 | 234,63 |
| | | | | 20 | 0,93 | 487,93 | 276,44 | 120,00 | 125,02 | 214,06 | 261,22 | 276,44 |
| | | | | 25 | 0,93 | 621,57 | 308,63 | 120,00 | 166,96 | 241,07 | 291,16 | 308,63 |
| | | | | 30 | 0,93 | 755,21 | 331,56 | 106,67 | 203,66 | 268,45 | 315,30 | - |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,11 | 71,56 | 120,00 | 33,30 | 63,70 | 71,56 | 71,56 |
| | | | | 10 | 0,67 | 7,88 | 231,73 | 120,00 | 60,74 | 137,88 | 186,56 | 231,73 |
| | | | | 15 | 0,67 | 12,65 | 318,10 | 80,00 | 91,82 | 212,84 | - | - |
| | | | | 20 | 0,67 | 17,43 | 206,39 | 33,33 | 142,75 | - | - | - |
| | | | | 25 | 0,67 | 22,20 | 152,49 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 26,97 | 48,56 | 20,00 | - | - | - | - |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,11 | 66,83 | 120,00 | 31,90 | 60,22 | 66,83 | 66,83 |
| | | | | 10 | 0,67 | 7,88 | 186,48 | 120,00 | 58,63 | 130,92 | 170,04 | 186,48 |
| | | | | 15 | 0,67 | 12,65 | 315,67 | 120,00 | 87,19 | 195,73 | 273,24 | 315,67 |
| | | | | 20 | 0,67 | 17,43 | 382,97 | 93,33 | 127,09 | 264,33 | 369,84 | - |
| | | | | 25 | 0,67 | 22,20 | 345,70 | 53,33 | 187,00 | - | - | - |
| | | | | 30 | 0,67 | 26,97 | 201,57 | 26,67 | - | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D13

Table D32: Calculation-based deformation in case of fire for installation channels MT-40D, MT-40D S, MT-40D OC and MT-40D S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----------|----------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | $n^{4)}$ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 600 | - | | 5 | 0,50 | 225,04 | 29,03 | 120,00 | 20,77 | 21,10 | 27,93 | 29,03 |
| | | | | 10 | 0,50 | 459,99 | 34,30 | 106,67 | 22,57 | 24,76 | 32,96 | - |
| | | | | 15 | 0,50 | 694,95 | 29,63 | 46,67 | 24,85 | - | - | - |
| | | | | 20 | 0,50 | 929,90 | 24,07 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 1164,86 | 16,09 | 20,00 | - | - | - | - |
| | | | | 30 | 0,50 | 1399,81 | 16,76 | 20,00 | - | - | - | - |
| 1 | 600 | - | | 5 | 0,50 | 225,04 | 29,76 | 120,00 | 21,01 | 21,55 | 28,54 | 29,76 |
| | | | | 10 | 0,50 | 459,99 | 37,13 | 120,00 | 23,13 | 25,86 | 34,48 | 37,13 |
| | | | | 15 | 0,50 | 694,95 | 51,07 | 93,33 | 25,89 | 32,55 | 48,92 | - |
| | | | | 20 | 0,50 | 929,90 | 45,48 | 53,33 | 29,67 | - | - | - |
| | | | | 25 | 0,50 | 1164,86 | 51,18 | 33,33 | 40,07 | - | - | - |
| | | | | 30 | 0,50 | 1399,81 | 38,07 | 26,67 | - | - | - | - |
| 2 | 600 | - | | 5 | 0,88 | 450,07 | 31,95 | 120,00 | 21,70 | 22,84 | 30,27 | 31,95 |
| | | | | 10 | 0,88 | 919,98 | 49,52 | 100,00 | 25,55 | 32,51 | 45,49 | - |
| | | | | 15 | 0,88 | 1389,89 | 41,81 | 40,00 | 31,78 | - | - | - |
| | | | | 20 | 0,88 | 1859,80 | 33,88 | 26,67 | - | - | - | - |
| | | | | 25 | 0,88 | 2329,71 | 19,03 | 20,00 | - | - | - | - |
| | | | | 30 | 0,88 | 2799,62 | 11,26 | 13,33 | - | - | - | - |
| 2 | 600 | - | | 5 | 0,88 | 450,07 | 31,23 | 120,00 | 21,54 | 22,50 | 29,74 | 31,23 |
| | | | | 10 | 0,88 | 919,98 | 70,61 | 120,00 | 24,83 | 30,22 | 42,27 | 70,61 |
| | | | | 15 | 0,88 | 1389,89 | 109,11 | 73,33 | 29,76 | 71,64 | - | - |
| | | | | 20 | 0,88 | 1859,80 | 102,70 | 33,33 | 66,52 | - | - | - |
| | | | | 25 | 0,88 | 2329,71 | 18,22 | 20,00 | - | - | - | - |
| | | | | 30 | 0,88 | 2799,62 | 20,29 | 20,00 | - | - | - | - |
| 3 | 600 | 6 | | 5 | 0,67 | 56,26 | 29,88 | 120,00 | 21,08 | 21,63 | 28,62 | 29,88 |
| | | | | 10 | 0,67 | 115,00 | 39,10 | 120,00 | 23,46 | 26,83 | 36,01 | 39,10 |
| | | | | 15 | 0,67 | 173,74 | 59,36 | 93,33 | 26,60 | 35,39 | 55,68 | - |
| | | | | 20 | 0,67 | 232,48 | 53,74 | 53,33 | 31,27 | - | - | - |
| | | | | 25 | 0,67 | 291,21 | 54,25 | 33,33 | 42,38 | - | - | - |
| | | | | 30 | 0,67 | 349,95 | 42,81 | 26,67 | - | - | - | - |
| 3 | 600 | 6 | | 5 | 0,67 | 56,26 | 30,13 | 120,00 | 21,18 | 21,80 | 28,83 | 30,13 |
| | | | | 10 | 0,67 | 115,00 | 39,64 | 120,00 | 23,67 | 27,13 | 36,30 | 39,64 |
| | | | | 15 | 0,67 | 173,74 | 88,93 | 73,33 | 26,88 | 37,36 | - | - |
| | | | | 20 | 0,67 | 232,48 | 39,56 | 33,33 | 32,91 | - | - | - |
| | | | | 25 | 0,67 | 291,21 | 31,49 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 349,95 | 17,92 | 20,00 | - | - | - | - |

1) Momentum degree of fullness without contribution from channel dead weight

2) Size of designated system's single load

3) Dimensions in mm and inch

4) distance between loads is 75 mm

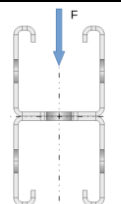
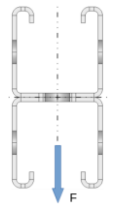
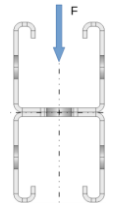
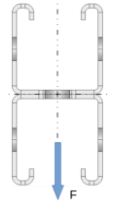
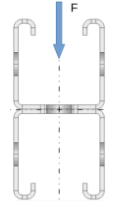
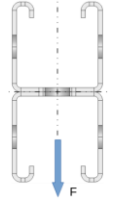
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D14

Table D33: Calculation-based deformation in case of fire for installation channels MT-40D, MT-40D S, MT-40D OC and MT-40D S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------------|-----------------|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - |  | 5 | 0,50 | 141,76 | 32,60 | 120,00 | 22,02 | 23,26 | 30,77 | 32,60 |
| | | | | 10 | 0,50 | 298,40 | 45,36 | 120,00 | 25,68 | 30,86 | 41,26 | 45,36 |
| | | | | 15 | 0,50 | 455,03 | 61,61 | 93,33 | 30,33 | 42,56 | 60,15 | - |
| | | | | 20 | 0,50 | 611,67 | 60,56 | 60,00 | 36,58 | 60,56 | - | - |
| | | | | 25 | 0,50 | 768,31 | 57,06 | 33,33 | 46,26 | - | - | - |
| | | | | 30 | 0,50 | 924,94 | 45,50 | 26,67 | - | - | - | - |
| 1 | 900 | - |  | 5 | 0,50 | 141,76 | 33,02 | 120,00 | 22,16 | 23,52 | 31,12 | 33,02 |
| | | | | 10 | 0,50 | 298,40 | 46,90 | 120,00 | 26,03 | 31,56 | 42,27 | 46,90 |
| | | | | 15 | 0,50 | 455,03 | 83,81 | 73,33 | 30,99 | 44,65 | - | - |
| | | | | 20 | 0,50 | 611,67 | 99,25 | 40,00 | 38,05 | - | - | - |
| | | | | 25 | 0,50 | 768,31 | 37,11 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 924,94 | 20,15 | 20,00 | - | - | - | - |
| 2 | 900 | - |  | 5 | 0,92 | 425,28 | 37,28 | 120,00 | 23,63 | 26,18 | 34,56 | 37,28 |
| | | | | 10 | 0,92 | 895,19 | 216,07 | 120,00 | 30,87 | 44,28 | 172,94 | 216,07 |
| | | | | 15 | 0,92 | 1365,10 | 352,83 | 120,00 | 42,55 | 224,71 | 322,16 | 352,83 |
| | | | | 20 | 0,92 | 1835,01 | 48,14 | 26,67 | - | - | - | - |
| | | | | 25 | 0,92 | 2304,92 | 22,94 | 20,00 | - | - | - | - |
| | | | | 30 | 0,92 | 2774,83 | 12,84 | 13,33 | - | - | - | - |
| 2 | 900 | - |  | 5 | 0,92 | 425,28 | 36,50 | 120,00 | 23,46 | 25,81 | 33,99 | 36,50 |
| | | | | 10 | 0,92 | 895,19 | 171,23 | 120,00 | 30,02 | 41,24 | 57,99 | 171,23 |
| | | | | 15 | 0,92 | 1365,10 | 269,20 | 120,00 | 39,22 | 124,11 | 227,73 | 269,20 |
| | | | | 20 | 0,92 | 1835,01 | 324,85 | 93,33 | 88,86 | 269,31 | 321,21 | - |
| | | | | 25 | 0,92 | 2304,92 | 22,07 | 20,00 | - | - | - | - |
| | | | | 30 | 0,92 | 2774,83 | 25,60 | 20,00 | - | - | - | - |
| 3 | 900 | 10 |  | 5 | 0,67 | 23,63 | 34,39 | 120,00 | 22,69 | 24,42 | 32,23 | 34,39 |
| | | | | 10 | 0,67 | 49,73 | 53,46 | 120,00 | 27,56 | 35,26 | 47,63 | 53,46 |
| | | | | 15 | 0,67 | 75,84 | 99,13 | 106,67 | 33,89 | 52,19 | 78,29 | - |
| | | | | 20 | 0,67 | 101,94 | 105,46 | 66,67 | 43,24 | 83,43 | - | - |
| | | | | 25 | 0,67 | 128,05 | 78,01 | 33,33 | 60,60 | - | - | - |
| | | | | 30 | 0,67 | 154,16 | 63,45 | 26,67 | 0,00 | - | - | - |
| 3 | 900 | 10 |  | 5 | 0,67 | 23,63 | 34,40 | 120,00 | 22,70 | 24,44 | 32,25 | 34,40 |
| | | | | 10 | 0,67 | 49,73 | 54,30 | 120,00 | 27,61 | 35,20 | 47,41 | 54,30 |
| | | | | 15 | 0,67 | 75,84 | 302,03 | 120,00 | 33,89 | 56,23 | 241,46 | 302,03 |
| | | | | 20 | 0,67 | 101,94 | 354,07 | 120,00 | 46,82 | 249,66 | 322,40 | 354,07 |
| | | | | 25 | 0,67 | 128,05 | 46,17 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 154,16 | 21,64 | 20,00 | - | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

⁴⁾ distance between loads is 75 mm

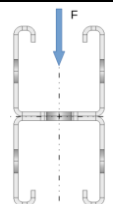
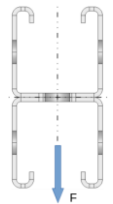
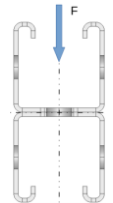
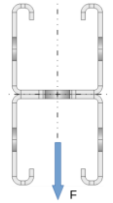
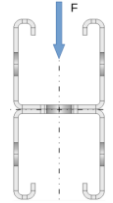
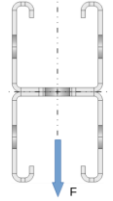
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D15

Table D34: Calculation-based deformation in case of fire for installation channels MT-40D, MT-40D S, MT-40D OC and MT-40D S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----------|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | $n^{4)}$ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1200 | - |  | 5 | 0,50 | 97,64 | 38,03 | 120,00 | 23,92 | 26,56 | 35,10 | 38,03 |
| | | | | 10 | 0,50 | 215,12 | 60,76 | 120,00 | 30,31 | 40,02 | 53,76 | 60,76 |
| | | | | 15 | 0,50 | 332,60 | 100,54 | 93,33 | 38,43 | 60,69 | 94,64 | - |
| | | | | 20 | 0,50 | 450,07 | 96,88 | 60,00 | 49,42 | 96,88 | - | - |
| | | | | 25 | 0,50 | 567,55 | 98,24 | 33,33 | 73,19 | - | - | - |
| | | | | 30 | 0,50 | 685,03 | 67,35 | 26,67 | - | - | - | - |
| 1 | 1200 | - |  | 5 | 0,50 | 97,64 | 38,33 | 120,00 | 24,03 | 26,75 | 35,35 | 38,33 |
| | | | | 10 | 0,50 | 215,12 | 63,62 | 120,00 | 30,58 | 40,57 | 54,82 | 63,62 |
| | | | | 15 | 0,50 | 332,60 | 124,16 | 66,67 | 38,98 | 77,89 | - | - |
| | | | | 20 | 0,50 | 450,07 | 82,47 | 33,33 | 60,51 | - | - | - |
| | | | | 25 | 0,50 | 567,55 | 50,68 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 685,03 | 24,23 | 20,00 | - | - | - | - |
| 2 | 1200 | - |  | 5 | 0,94 | 390,57 | 44,88 | 120,00 | 26,35 | 30,91 | 40,66 | 44,88 |
| | | | | 10 | 0,94 | 860,48 | 297,70 | 120,00 | 38,46 | 62,61 | 236,26 | 297,70 |
| | | | | 15 | 0,94 | 1330,39 | 451,21 | 120,00 | 89,14 | 266,52 | 361,85 | 451,21 |
| | | | | 20 | 0,94 | 450,07 | 82,47 | 33,33 | 60,51 | - | - | - |
| | | | | 25 | 0,94 | 567,55 | 50,68 | 26,67 | - | - | - | - |
| | | | | 30 | 0,94 | 685,03 | 24,23 | 20,00 | - | - | - | - |
| 2 | 1200 | - |  | 5 | 0,94 | 390,57 | 44,06 | 120,00 | 26,17 | 30,51 | 40,07 | 44,06 |
| | | | | 10 | 0,94 | 860,48 | 245,42 | 120,00 | 37,38 | 57,47 | 128,19 | 245,42 |
| | | | | 15 | 0,94 | 1330,39 | 337,90 | 120,00 | 56,50 | 215,81 | 296,46 | 337,90 |
| | | | | 20 | 0,94 | 1800,30 | 356,63 | 93,33 | 148,97 | 303,55 | 351,38 | - |
| | | | | 25 | 0,94 | 2270,21 | 27,52 | 20,00 | - | - | - | - |
| | | | | 30 | 0,94 | 2740,12 | 33,24 | 20,00 | - | - | - | - |
| 3 | 1200 | 14 |  | 5 | 0,67 | 12,21 | 41,25 | 120,00 | 25,15 | 28,69 | 37,76 | 41,25 |
| | | | | 10 | 0,67 | 26,89 | 74,91 | 120,00 | 33,66 | 47,82 | 64,97 | 74,91 |
| | | | | 15 | 0,67 | 41,57 | 215,97 | 120,00 | 44,62 | 76,85 | 119,32 | 215,97 |
| | | | | 20 | 0,67 | 56,26 | 404,68 | 120,00 | 60,71 | 135,49 | 330,01 | 404,68 |
| | | | | 25 | 0,67 | 70,94 | 417,72 | 120,00 | 92,26 | 299,78 | 378,43 | 417,72 |
| | | | | 30 | 0,67 | 85,63 | 435,77 | 120,00 | 183,39 | 334,63 | 396,70 | 435,77 |
| 3 | 1200 | 14 |  | 5 | 0,67 | 12,21 | 41,05 | 120,00 | 25,08 | 28,57 | 37,59 | 41,05 |
| | | | | 10 | 0,67 | 26,89 | 77,11 | 120,00 | 33,59 | 47,51 | 64,45 | 77,11 |
| | | | | 15 | 0,67 | 41,57 | 320,15 | 120,00 | 44,48 | 79,83 | 267,60 | 320,15 |
| | | | | 20 | 0,67 | 56,26 | 406,31 | 120,00 | 68,73 | 274,25 | 360,25 | 406,31 |
| | | | | 25 | 0,67 | 70,94 | 471,09 | 120,00 | 168,76 | 357,24 | 431,36 | 471,09 |
| | | | | 30 | 0,67 | 85,63 | 27,26 | 20,00 | - | - | - | - |

1) Momentum degree of fullness without contribution from channel dead weight

2) Size of designated system's single load

3) Dimensions in mm and inch

4) distance between loads is 75 mm

Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D16

Table D35: Calculation-based deformation in case of fire for installation channels MT-40D, MT-40D S, MT-40D OC and MT-40D S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----------|----------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | $n^{4)}$ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1500 | - | | 5 | 0,50 | 69,19 | 45,74 | 120,00 | 26,63 | 31,26 | 41,26 | 45,74 |
| | | | | 10 | 0,50 | 163,17 | 82,38 | 120,00 | 36,66 | 52,69 | 71,13 | 82,38 |
| | | | | 15 | 0,50 | 257,15 | 535,47 | 120,00 | 49,36 | 85,67 | 365,37 | 535,47 |
| | | | | 20 | 0,50 | 351,13 | 614,33 | 120,00 | 66,93 | 397,13 | 559,35 | 614,33 |
| | | | | 25 | 0,50 | 445,12 | 65,42 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 539,10 | 100,62 | 26,67 | - | - | - | - |
| 1 | 1500 | - | | 5 | 0,50 | 69,19 | 45,96 | 120,00 | 26,71 | 31,40 | 41,44 | 45,96 |
| | | | | 10 | 0,50 | 163,17 | 142,87 | 120,00 | 36,88 | 53,38 | 74,25 | 142,87 |
| | | | | 15 | 0,50 | 257,15 | 158,32 | 60,00 | 50,17 | 158,32 | - | - |
| | | | | 20 | 0,50 | 351,13 | 50,18 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 445,12 | 82,42 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 539,10 | 29,74 | 20,00 | - | - | - | - |
| 2 | 1500 | - | | 5 | 0,95 | 345,94 | 54,93 | 120,00 | 29,88 | 37,06 | 48,72 | 54,93 |
| | | | | 10 | 0,95 | 815,85 | 369,45 | 120,00 | 48,57 | 131,06 | 308,28 | 369,45 |
| | | | | 15 | 0,95 | 1285,76 | 459,22 | 120,00 | 138,22 | 337,06 | 414,37 | 459,22 |
| | | | | 20 | 0,95 | 1755,67 | 28,80 | 20,00 | - | - | - | - |
| | | | | 25 | 0,95 | 2225,58 | 35,81 | 20,00 | - | - | - | - |
| | | | | 30 | 0,95 | 2695,49 | 47,51 | 20,00 | - | - | - | - |
| 2 | 1500 | - | | 5 | 0,95 | 345,94 | 53,90 | 120,00 | 29,66 | 36,58 | 47,98 | 53,90 |
| | | | | 10 | 0,95 | 815,85 | 306,27 | 120,00 | 46,97 | 92,37 | 228,43 | 306,27 |
| | | | | 15 | 0,95 | 1285,76 | 399,57 | 120,00 | 96,73 | 281,78 | 358,66 | 399,57 |
| | | | | 20 | 0,95 | 1755,67 | 419,41 | 93,33 | 218,19 | 356,20 | 415,04 | - |
| | | | | 25 | 0,95 | 2225,58 | 34,54 | 20,00 | - | - | - | - |
| | | | | 30 | 0,95 | 2695,49 | 43,76 | 20,00 | - | - | - | - |
| 3 | 1500 | 18 | | 5 | 0,67 | 6,92 | 50,87 | 120,00 | 28,62 | 34,72 | 45,53 | 50,87 |
| | | | | 10 | 0,67 | 16,32 | 103,91 | 120,00 | 41,90 | 64,82 | 88,37 | 103,91 |
| | | | | 15 | 0,67 | 25,72 | 260,97 | 120,00 | 58,88 | 109,10 | 172,36 | 260,97 |
| | | | | 20 | 0,67 | 35,11 | 446,80 | 120,00 | 83,63 | 185,15 | 363,88 | 446,80 |
| | | | | 25 | 0,67 | 44,51 | 492,69 | 120,00 | 127,97 | 320,20 | 439,26 | 492,69 |
| | | | | 30 | 0,67 | 53,91 | 524,41 | 120,00 | 212,58 | 389,87 | 476,04 | 524,41 |
| 3 | 1500 | 18 | | 5 | 0,67 | 6,92 | 50,28 | 120,00 | 28,40 | 34,33 | 45,04 | 50,28 |
| | | | | 10 | 0,67 | 16,32 | 105,82 | 120,00 | 41,66 | 64,16 | 87,48 | 105,82 |
| | | | | 15 | 0,67 | 25,72 | 373,86 | 120,00 | 58,58 | 120,45 | 302,62 | 373,86 |
| | | | | 20 | 0,67 | 35,11 | 454,01 | 120,00 | 93,96 | 310,78 | 404,32 | 454,01 |
| | | | | 25 | 0,67 | 44,51 | 506,10 | 120,00 | 204,98 | 392,10 | 464,26 | 506,10 |
| | | | | 30 | 0,67 | 53,91 | 34,71 | 20,00 | - | - | - | - |

1) Momentum degree of fullness without contribution from channel dead weight

2) Size of designated system's single load

3) Dimensions in mm and inch

4) distance between loads is 75 mm

Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D17

Table D36: Calculation-based deformation in case of fire for installation channels MT-40D, MT-40D S, MT-40D OC and MT-40D S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----------|----------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | $n^{4)}$ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1800 | - | | 5 | 0,50 | 48,56 | 56,23 | 120,00 | 30,35 | 37,73 | 49,67 | 56,23 |
| | | | | 10 | 0,50 | 126,88 | 112,31 | 120,00 | 44,97 | 69,47 | 94,33 | 112,31 |
| | | | | 15 | 0,50 | 205,20 | 643,50 | 120,00 | 63,43 | 120,15 | 465,60 | 643,50 |
| | | | | 20 | 0,50 | 283,52 | 736,31 | 120,00 | 90,50 | 481,96 | 671,69 | 736,31 |
| | | | | 25 | 0,50 | 361,84 | 88,15 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 440,16 | 36,39 | 20,00 | - | - | - | - |
| 1 | 1800 | - | | 5 | 0,50 | 48,56 | 56,56 | 120,00 | 30,40 | 37,84 | 49,89 | 56,56 |
| | | | | 10 | 0,50 | 126,88 | 215,20 | 113,33 | 45,24 | 71,56 | 114,86 | 0,00 |
| | | | | 15 | 0,50 | 205,20 | 255,72 | 60,00 | 66,42 | 255,72 | - | - |
| | | | | 20 | 0,50 | 283,52 | 66,43 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 361,84 | 31,28 | 20,00 | - | - | - | - |
| | | | | 30 | 0,50 | 440,16 | 36,80 | 20,00 | - | - | - | - |
| 2 | 1800 | - | | 5 | 0,96 | 291,39 | 68,72 | 120,00 | 34,23 | 44,74 | 59,13 | 68,72 |
| | | | | 10 | 0,96 | 761,30 | 453,17 | 120,00 | 64,04 | 215,19 | 383,81 | 453,17 |
| | | | | 15 | 0,96 | 1231,21 | 555,84 | 120,00 | 187,63 | 414,88 | 503,93 | 555,84 |
| | | | | 20 | 0,96 | 1701,12 | 35,05 | 20,00 | - | - | - | - |
| | | | | 25 | 0,96 | 2171,03 | 45,16 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2640,94 | 84,77 | 20,00 | - | - | - | - |
| 2 | 1800 | - | | 5 | 0,96 | 291,39 | 67,40 | 120,00 | 33,98 | 44,17 | 58,23 | 67,40 |
| | | | | 10 | 0,96 | 761,30 | 382,16 | 120,00 | 60,71 | 155,72 | 306,30 | 382,16 |
| | | | | 15 | 0,96 | 1231,21 | 485,94 | 120,00 | 137,04 | 348,57 | 437,59 | 485,94 |
| | | | | 20 | 0,96 | 1701,12 | 531,10 | 106,67 | 283,26 | 434,52 | 503,20 | - |
| | | | | 25 | 0,96 | 2171,03 | 43,39 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2640,94 | 63,40 | 20,00 | - | - | - | - |
| 3 | 1800 | 22 | | 5 | 0,67 | 4,05 | 63,87 | 120,00 | 33,35 | 42,93 | 56,10 | 63,87 |
| | | | | 10 | 0,67 | 10,57 | 141,47 | 120,00 | 52,50 | 86,66 | 118,34 | 141,47 |
| | | | | 15 | 0,67 | 17,10 | 297,70 | 120,00 | 76,83 | 148,75 | 222,35 | 297,70 |
| | | | | 20 | 0,67 | 23,63 | 484,26 | 120,00 | 112,32 | 231,99 | 367,82 | 484,26 |
| | | | | 25 | 0,67 | 30,15 | 555,64 | 120,00 | 165,54 | 324,29 | 477,35 | 555,64 |
| | | | | 30 | 0,67 | 36,68 | 621,82 | 120,00 | 264,33 | 485,90 | 571,73 | 621,82 |
| 3 | 1800 | 22 | | 5 | 0,67 | 4,05 | 62,58 | 120,00 | 32,85 | 42,06 | 55,01 | 62,58 |
| | | | | 10 | 0,67 | 10,57 | 152,86 | 120,00 | 51,97 | 85,49 | 116,95 | 152,86 |
| | | | | 15 | 0,67 | 17,10 | 515,00 | 120,00 | 76,35 | 283,85 | 442,53 | 515,00 |
| | | | | 20 | 0,67 | 23,63 | 533,27 | 120,00 | 129,86 | 365,09 | 474,43 | 533,27 |
| | | | | 25 | 0,67 | 30,15 | 594,47 | 120,00 | 268,94 | 459,35 | 544,96 | 594,47 |
| | | | | 30 | 0,67 | 36,68 | 44,07 | 20,00 | - | - | - | - |

1) Momentum degree of fullness without contribution from channel dead weight

2) Size of designated system's single load

3) Dimensions in mm and inch

4) distance between loads is 75 mm

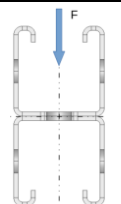
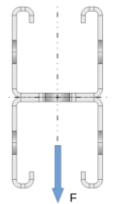
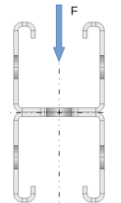
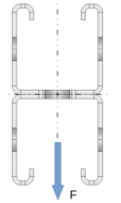
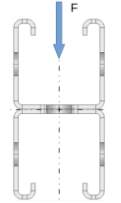
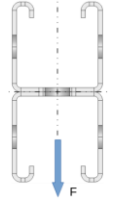
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D18

Table D37: Calculation-based deformation in case of fire for installation channels MT-40D, MT-40D S, MT-40D OC and MT-40D S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------------|-----------------|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2100 | - |  | 5 | 0,50 | 32,42 | 70,26 | 120,00 | 35,34 | 46,42 | 60,99 | 70,26 |
| | | | | 10 | 0,50 | 99,55 | 160,00 | 120,00 | 55,57 | 91,18 | 125,20 | 160,00 |
| | | | | 15 | 0,50 | 166,68 | 754,89 | 120,00 | 81,09 | 179,27 | 586,20 | 754,89 |
| | | | | 20 | 0,50 | 233,81 | 844,22 | 120,00 | 126,46 | 578,16 | 775,90 | 844,22 |
| | | | | 25 | 0,50 | 300,94 | 914,22 | 120,00 | 345,59 | 761,26 | 866,24 | 914,22 |
| | | | | 30 | 0,50 | 368,07 | 44,97 | 20,00 | - | - | - | - |
| 1 | 2100 | - |  | 5 | 0,50 | 32,42 | 71,58 | 120,00 | 35,38 | 46,62 | 61,65 | 71,58 |
| | | | | 10 | 0,50 | 99,55 | 306,50 | 106,67 | 56,18 | 99,29 | 193,76 | 0,00 |
| | | | | 15 | 0,50 | 166,68 | 320,74 | 53,33 | 92,19 | - | - | - |
| | | | | 20 | 0,50 | 233,81 | 91,87 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 300,94 | 37,93 | 20,00 | - | - | - | - |
| | | | | 30 | 0,50 | 368,07 | 45,68 | 20,00 | - | - | - | - |
| 2 | 2100 | - |  | 5 | 0,96 | 226,92 | 95,31 | 120,00 | 39,45 | 54,31 | 73,91 | 95,31 |
| | | | | 10 | 0,96 | 696,83 | 534,70 | 120,00 | 92,83 | 283,75 | 456,00 | 534,70 |
| | | | | 15 | 0,96 | 1166,74 | 655,13 | 120,00 | 240,96 | 490,69 | 594,40 | 655,13 |
| | | | | 20 | 0,96 | 1636,65 | 42,70 | 20,00 | - | - | - | - |
| | | | | 25 | 0,96 | 2106,56 | 59,09 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2576,47 | 157,74 | 20,00 | - | - | - | - |
| 2 | 2100 | - |  | 5 | 0,96 | 226,92 | 92,91 | 120,00 | 39,20 | 53,76 | 73,15 | 92,91 |
| | | | | 10 | 0,96 | 696,83 | 460,35 | 120,00 | 84,99 | 218,41 | 378,63 | 460,35 |
| | | | | 15 | 0,96 | 1166,74 | 575,80 | 120,00 | 184,46 | 415,51 | 519,45 | 575,80 |
| | | | | 20 | 0,96 | 1636,65 | 638,73 | 113,33 | 340,41 | 515,23 | 595,97 | - |
| | | | | 25 | 0,96 | 2106,56 | 55,93 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2576,47 | 107,34 | 20,00 | - | - | - | - |
| 3 | 2100 | 26 |  | 5 | 0,67 | 2,32 | 81,18 | 120,00 | 39,61 | 53,87 | 70,32 | 81,18 |
| | | | | 10 | 0,67 | 7,11 | 186,73 | 120,00 | 65,82 | 113,93 | 155,64 | 186,73 |
| | | | | 15 | 0,67 | 11,91 | 341,37 | 120,00 | 98,81 | 193,17 | 272,87 | 341,37 |
| | | | | 20 | 0,67 | 16,70 | 509,61 | 120,00 | 145,00 | 279,39 | 390,52 | 509,61 |
| | | | | 25 | 0,67 | 21,50 | 650,97 | 120,00 | 206,30 | 363,26 | 582,77 | 650,97 |
| | | | | 30 | 0,67 | 26,29 | 693,53 | 120,00 | 278,93 | 515,32 | 632,55 | 693,53 |
| 3 | 2100 | 26 |  | 5 | 0,67 | 2,32 | 78,70 | 120,00 | 38,65 | 52,19 | 68,17 | 78,70 |
| | | | | 10 | 0,67 | 7,11 | 220,87 | 120,00 | 64,84 | 112,07 | 153,58 | 220,87 |
| | | | | 15 | 0,67 | 11,91 | 581,64 | 120,00 | 98,03 | 308,03 | 499,02 | 581,64 |
| | | | | 20 | 0,67 | 16,70 | 608,72 | 120,00 | 166,38 | 416,71 | 540,47 | 608,72 |
| | | | | 25 | 0,67 | 21,50 | 679,83 | 120,00 | 319,85 | 522,61 | 622,08 | 679,83 |
| | | | | 30 | 0,67 | 26,29 | 55,43 | 20,00 | - | - | - | - |

1) Momentum degree of fullness without contribution from channel dead weight

2) Size of designated system's single load

3) Dimensions in mm and inch

4) distance between loads is 75 mm

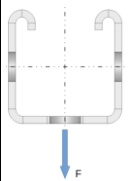
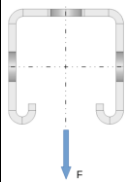
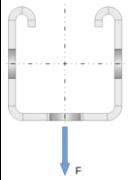
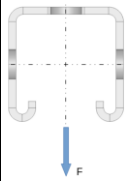
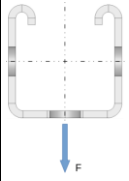
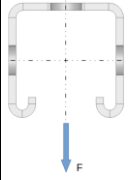
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D19

Table D38: Calculation-based deformation in case of fire for installation channels MT-50, MT-50 S, MT-50 OC and MT-50 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - |  | 5 | 0,50 | 122,79 | 9,93 | 120,00 | 7,50 | 7,50 | 9,93 | 9,93 |
| | | | | 10 | 0,50 | 250,89 | 17,22 | 120,00 | 10,28 | 13,00 | 17,22 | 17,22 |
| | | | | 15 | 0,50 | 379,00 | 36,62 | 120,00 | 13,10 | 19,74 | 28,87 | 36,62 |
| | | | | 20 | 0,50 | 507,11 | 121,28 | 120,00 | 15,97 | 27,73 | 75,78 | 121,28 |
| | | | | 25 | 0,50 | 635,22 | 140,57 | 120,00 | 18,95 | 39,35 | 115,74 | 140,57 |
| | | | | 30 | 0,50 | 763,33 | 160,60 | 120,00 | 22,61 | 89,52 | 141,98 | 160,60 |
| 1 | 500 | - |  | 5 | 0,50 | 122,79 | 10,02 | 120,00 | 7,54 | 7,55 | 10,02 | 10,02 |
| | | | | 10 | 0,50 | 250,89 | 17,36 | 120,00 | 10,36 | 13,16 | 17,36 | 17,36 |
| | | | | 15 | 0,50 | 379,00 | 31,72 | 120,00 | 13,21 | 19,80 | 27,84 | 31,72 |
| | | | | 20 | 0,50 | 507,11 | 59,92 | 106,67 | 16,08 | 27,08 | 45,86 | - |
| | | | | 25 | 0,50 | 635,22 | 48,63 | 73,33 | 19,04 | 35,76 | - | - |
| | | | | 30 | 0,50 | 763,33 | 49,46 | 60,00 | 22,31 | 49,46 | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 153,48 | 12,25 | 120,00 | 8,53 | 9,34 | 12,25 | 12,25 |
| | | | | 10 | 0,80 | 313,62 | 29,54 | 106,67 | 12,39 | 17,67 | 24,46 | - |
| | | | | 15 | 0,80 | 473,75 | 24,19 | 53,33 | 16,29 | - | - | - |
| | | | | 20 | 0,80 | 633,89 | 15,74 | 26,67 | - | - | - | - |
| | | | | 25 | 0,80 | 794,02 | 6,73 | 20,00 | - | - | - | - |
| | | | | 30 | 0,80 | 954,16 | 7,64 | 20,00 | - | - | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 153,48 | 12,40 | 120,00 | 8,58 | 9,46 | 12,40 | 12,40 |
| | | | | 10 | 0,80 | 313,62 | 24,65 | 120,00 | 12,53 | 17,95 | 23,70 | 24,65 |
| | | | | 15 | 0,80 | 473,75 | 54,72 | 120,00 | 16,53 | 27,87 | 43,02 | 54,72 |
| | | | | 20 | 0,80 | 633,89 | 57,89 | 80,00 | 20,56 | 38,74 | - | - |
| | | | | 25 | 0,80 | 794,02 | 52,52 | 60,00 | 24,82 | 52,52 | - | - |
| | | | | 30 | 0,80 | 954,16 | 51,68 | 46,67 | 30,86 | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 51,16 | 11,35 | 120,00 | 8,12 | 8,60 | 11,35 | 11,35 |
| | | | | 10 | 0,67 | 104,54 | 20,99 | 120,00 | 11,55 | 15,76 | 20,89 | 20,99 |
| | | | | 15 | 0,67 | 157,92 | 38,93 | 93,33 | 15,05 | 24,35 | 37,73 | - |
| | | | | 20 | 0,67 | 211,30 | 39,18 | 66,67 | 18,59 | 34,19 | - | - |
| | | | | 25 | 0,67 | 264,67 | 33,21 | 46,67 | 22,26 | - | - | - |
| | | | | 30 | 0,67 | 318,05 | 34,27 | 33,33 | 27,21 | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 51,16 | 11,46 | 120,00 | 8,17 | 8,70 | 11,46 | 11,46 |
| | | | | 10 | 0,67 | 104,54 | 21,15 | 120,00 | 11,66 | 15,98 | 21,11 | 21,15 |
| | | | | 15 | 0,67 | 157,92 | 46,92 | 120,00 | 15,19 | 24,60 | 36,86 | 46,92 |
| | | | | 20 | 0,67 | 211,30 | 68,02 | 93,33 | 18,76 | 34,11 | 64,24 | - |
| | | | | 25 | 0,67 | 264,67 | 55,44 | 66,67 | 22,46 | 46,32 | - | - |
| | | | | 30 | 0,67 | 318,05 | 57,75 | 53,33 | 27,30 | - | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

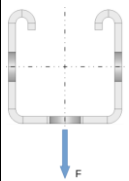
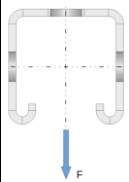
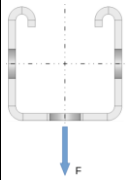
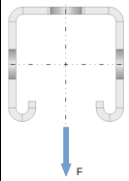
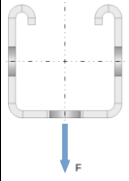
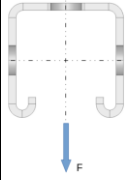
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D20

Table D39: Calculation-based deformation in case of fire for installation channels MT-50, MT-50 S, MT-50 OC and MT-50 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 700 | - |  | 5 | 0,50 | 84,06 | 15,96 | 120,00 | 10,15 | 12,34 | 15,96 | 15,96 |
| | | | | 10 | 0,50 | 175,56 | 31,24 | 120,00 | 15,46 | 23,06 | 30,07 | 31,24 |
| | | | | 15 | 0,50 | 267,07 | 110,67 | 120,00 | 20,88 | 35,87 | 52,26 | 110,67 |
| | | | | 20 | 0,50 | 358,57 | 171,86 | 120,00 | 26,37 | 50,61 | 141,00 | 171,86 |
| | | | | 25 | 0,50 | 450,08 | 203,36 | 120,00 | 32,00 | 114,31 | 178,10 | 203,36 |
| | | | | 30 | 0,50 | 541,58 | 229,95 | 120,00 | 38,73 | 153,52 | 207,78 | 229,95 |
| 1 | 700 | - |  | 5 | 0,50 | 84,06 | 16,00 | 120,00 | 10,18 | 12,38 | 16,00 | 16,00 |
| | | | | 10 | 0,50 | 175,56 | 30,84 | 120,00 | 15,51 | 23,02 | 29,88 | 30,84 |
| | | | | 15 | 0,50 | 267,07 | 59,05 | 120,00 | 20,90 | 35,50 | 49,33 | 59,05 |
| | | | | 20 | 0,50 | 358,57 | 95,65 | 106,67 | 26,31 | 48,86 | 79,15 | - |
| | | | | 25 | 0,50 | 450,08 | 99,89 | 80,00 | 31,79 | 63,88 | - | - |
| | | | | 30 | 0,50 | 541,58 | 96,53 | 60,00 | 40,22 | 96,53 | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 147,10 | 20,84 | 120,00 | 12,31 | 16,28 | 20,84 | 20,84 |
| | | | | 10 | 0,86 | 307,23 | 115,84 | 120,00 | 20,01 | 34,24 | 97,06 | 115,84 |
| | | | | 15 | 0,86 | 467,37 | 105,04 | 60,00 | 27,88 | 105,04 | - | - |
| | | | | 20 | 0,86 | 627,50 | 26,84 | 26,67 | - | - | - | - |
| | | | | 25 | 0,86 | 787,64 | 9,97 | 20,00 | - | - | - | - |
| | | | | 30 | 0,86 | 947,77 | 11,79 | 20,00 | - | - | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 147,10 | 20,93 | 120,00 | 12,34 | 16,36 | 20,93 | 20,93 |
| | | | | 10 | 0,86 | 307,23 | 47,57 | 120,00 | 20,12 | 32,93 | 42,72 | 47,57 |
| | | | | 15 | 0,86 | 467,37 | 86,89 | 120,00 | 27,91 | 51,31 | 73,61 | 86,89 |
| | | | | 20 | 0,86 | 627,50 | 120,84 | 113,33 | 35,66 | 69,31 | 105,06 | - |
| | | | | 25 | 0,86 | 787,64 | 117,95 | 80,00 | 43,53 | 87,39 | - | - |
| | | | | 30 | 0,86 | 947,77 | 119,64 | 66,67 | 53,39 | 106,26 | - | - |
| 3 | 700 | 5 |  | 5 | 0,67 | 24,52 | 18,74 | 120,00 | 11,38 | 14,57 | 18,74 | 18,74 |
| | | | | 10 | 0,67 | 51,21 | 40,15 | 120,00 | 17,97 | 28,24 | 36,84 | 40,15 |
| | | | | 15 | 0,67 | 77,89 | 68,81 | 93,33 | 24,62 | 44,09 | 66,48 | - |
| | | | | 20 | 0,67 | 104,58 | 69,64 | 66,67 | 31,30 | 61,24 | - | - |
| | | | | 25 | 0,67 | 131,27 | 58,57 | 46,67 | 38,14 | - | - | - |
| | | | | 30 | 0,67 | 157,96 | 59,47 | 33,33 | 46,96 | - | - | - |
| 3 | 700 | 5 |  | 5 | 0,67 | 24,52 | 18,81 | 120,00 | 11,41 | 14,65 | 18,81 | 18,81 |
| | | | | 10 | 0,67 | 51,21 | 40,15 | 120,00 | 18,06 | 28,46 | 36,99 | 40,15 |
| | | | | 15 | 0,67 | 77,89 | 78,46 | 120,00 | 24,76 | 44,37 | 63,93 | 78,46 |
| | | | | 20 | 0,67 | 104,58 | 131,24 | 120,00 | 31,46 | 60,84 | 98,26 | 131,24 |
| | | | | 25 | 0,67 | 131,27 | 131,04 | 86,67 | 38,27 | 78,89 | - | - |
| | | | | 30 | 0,67 | 157,96 | 119,58 | 66,67 | 46,49 | 101,36 | - | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

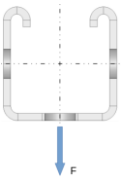
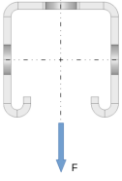
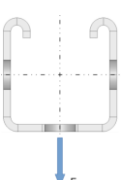
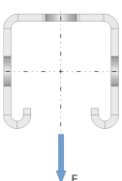
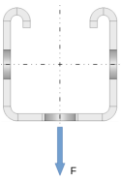
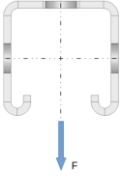
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D21

Table D40: Calculation-based deformation in case of fire for installation channels MT-50, MT-50 S, MT-50 OC and MT-50 S OC

| System | | | Load direction | σ_B MPa | $V^{(1)}$ - | $F^{(2)}$ N | $\delta_{t_{max},B}$ mm | $t_{max,B}$ min | δ_{30} mm | δ_{60} mm | δ_{90} mm | δ_{120} mm |
|----------|-----------|---|---|-------------------|----------------|----------------|----------------------------|--------------------|---------------------|---------------------|---------------------|----------------------|
| Loadcase | $L^{(3)}$ | n | | | | | | | | | | |
| 1 | 900 | - |  | 5 | 0,50 | 61,59 | 24,43 | 120,00 | 13,87 | 19,18 | 24,43 | 24,43 |
| | | | | 10 | 0,50 | 132,76 | 51,51 | 120,00 | 22,59 | 36,65 | 47,25 | 51,51 |
| | | | | 15 | 0,50 | 203,93 | 181,22 | 120,00 | 31,40 | 57,08 | 93,17 | 181,22 |
| | | | | 20 | 0,50 | 275,10 | 238,05 | 120,00 | 40,22 | 87,12 | 205,02 | 238,05 |
| | | | | 25 | 0,50 | 346,28 | 273,17 | 120,00 | 49,20 | 179,15 | 245,05 | 273,17 |
| | | | | 30 | 0,50 | 417,45 | 299,31 | 120,00 | 61,64 | 217,52 | 273,58 | 299,31 |
| 1 | 900 | - |  | 5 | 0,50 | 61,59 | 24,33 | 120,00 | 13,86 | 19,13 | 24,33 | 24,33 |
| | | | | 10 | 0,50 | 132,76 | 50,70 | 120,00 | 22,54 | 36,41 | 46,84 | 50,70 |
| | | | | 15 | 0,50 | 203,93 | 92,90 | 120,00 | 31,28 | 56,33 | 77,08 | 92,90 |
| | | | | 20 | 0,50 | 275,10 | 150,23 | 113,33 | 39,99 | 76,97 | 118,85 | - |
| | | | | 25 | 0,50 | 346,28 | 141,64 | 80,00 | 48,74 | 98,85 | - | - |
| | | | | 30 | 0,50 | 417,45 | 144,02 | 66,67 | 58,12 | 124,90 | - | - |
| 2 | 900 | - |  | 5 | 0,89 | 138,58 | 32,30 | 120,00 | 17,34 | 25,49 | 32,30 | 32,30 |
| | | | | 10 | 0,89 | 298,72 | 138,36 | 120,00 | 30,16 | 86,28 | 121,58 | 138,36 |
| | | | | 15 | 0,89 | 458,85 | 133,34 | 60,00 | 54,29 | 133,34 | - | - |
| | | | | 20 | 0,89 | 618,99 | 42,60 | 26,67 | - | - | - | - |
| | | | | 25 | 0,89 | 779,12 | 14,30 | 20,00 | - | - | - | - |
| | | | | 30 | 0,89 | 939,26 | 17,35 | 20,00 | - | - | - | - |
| 2 | 900 | - |  | 5 | 0,89 | 138,58 | 32,19 | 120,00 | 17,34 | 25,50 | 32,19 | 32,19 |
| | | | | 10 | 0,89 | 298,72 | 75,18 | 120,00 | 30,14 | 52,02 | 66,44 | 75,18 |
| | | | | 15 | 0,89 | 458,85 | 120,51 | 120,00 | 42,72 | 79,34 | 106,02 | 120,51 |
| | | | | 20 | 0,89 | 618,99 | 160,37 | 120,00 | 54,92 | 103,27 | 141,79 | 160,37 |
| | | | | 25 | 0,89 | 779,12 | 184,14 | 113,33 | 66,89 | 124,93 | 168,09 | - |
| | | | | 30 | 0,89 | 939,26 | 192,17 | 93,33 | 79,93 | 143,82 | 189,30 | - |
| 3 | 900 | 7 |  | 5 | 0,67 | 13,86 | 28,86 | 120,00 | 15,87 | 22,76 | 28,86 | 28,86 |
| | | | | 10 | 0,67 | 29,87 | 64,52 | 120,00 | 26,58 | 44,64 | 57,52 | 64,52 |
| | | | | 15 | 0,67 | 45,89 | 101,76 | 93,33 | 37,28 | 68,73 | 98,39 | - |
| | | | | 20 | 0,67 | 61,90 | 104,37 | 66,67 | 47,84 | 92,86 | - | - |
| | | | | 25 | 0,67 | 77,91 | 88,04 | 46,67 | 58,39 | - | - | - |
| | | | | 30 | 0,67 | 93,93 | 88,40 | 33,33 | 70,66 | - | - | - |
| 3 | 900 | 7 |  | 5 | 0,67 | 13,86 | 28,88 | 120,00 | 15,87 | 22,81 | 28,88 | 28,88 |
| | | | | 10 | 0,67 | 29,87 | 64,84 | 120,00 | 26,71 | 45,06 | 57,91 | 64,84 |
| | | | | 15 | 0,67 | 45,89 | 114,33 | 120,00 | 37,52 | 69,61 | 96,13 | 114,33 |
| | | | | 20 | 0,67 | 61,90 | 166,59 | 120,00 | 48,17 | 93,27 | 137,86 | 166,59 |
| | | | | 25 | 0,67 | 77,91 | 210,62 | 120,00 | 58,77 | 116,54 | 172,96 | 210,62 |
| | | | | 30 | 0,67 | 93,93 | 211,25 | 93,33 | 70,68 | 140,46 | 205,51 | - |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

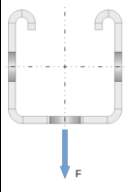
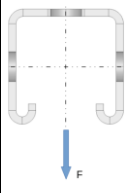
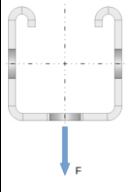
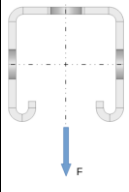
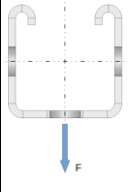
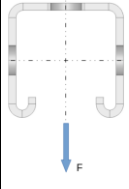
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D22

Table D41: Calculation-based deformation in case of fire for installation channels MT-50, MT-50 S, MT-50 OC and MT-50 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - |  | 5 | 0,50 | 46,52 | 35,51 | 120,00 | 18,79 | 28,18 | 35,51 | 35,51 |
| | | | | 10 | 0,50 | 104,75 | 77,38 | 120,00 | 31,69 | 53,79 | 68,91 | 77,38 |
| | | | | 15 | 0,50 | 162,98 | 232,92 | 120,00 | 44,59 | 83,58 | 186,12 | 232,92 |
| | | | | 20 | 0,50 | 221,22 | 102,01 | 53,33 | 57,42 | - | - | - |
| | | | | 25 | 0,50 | 279,45 | 98,91 | 40,00 | 70,55 | - | - | - |
| | | | | 30 | 0,50 | 337,68 | 62,35 | 26,67 | - | - | - | - |
| 1 | 1100 | - |  | 5 | 0,50 | 46,52 | 35,29 | 120,00 | 18,72 | 28,01 | 35,29 | 35,29 |
| | | | | 10 | 0,50 | 104,75 | 75,65 | 120,00 | 31,55 | 53,45 | 68,27 | 75,65 |
| | | | | 15 | 0,50 | 162,98 | 132,07 | 120,00 | 44,40 | 82,01 | 110,31 | 132,07 |
| | | | | 20 | 0,50 | 221,22 | 201,86 | 113,33 | 57,09 | 110,50 | 163,46 | - |
| | | | | 25 | 0,50 | 279,45 | 190,74 | 80,00 | 69,69 | 139,21 | - | - |
| | | | | 30 | 0,50 | 337,68 | 192,59 | 66,67 | 82,91 | 170,74 | - | - |
| 2 | 1100 | - |  | 5 | 0,91 | 127,94 | 69,64 | 120,00 | 23,63 | 37,28 | 51,26 | 69,64 |
| | | | | 10 | 0,91 | 288,07 | 166,94 | 120,00 | 45,83 | 118,04 | 151,28 | 166,94 |
| | | | | 15 | 0,91 | 448,21 | 208,96 | 120,00 | 82,64 | 161,63 | 194,51 | 208,96 |
| | | | | 20 | 0,91 | 608,34 | 66,45 | 26,67 | - | - | - | - |
| | | | | 25 | 0,91 | 768,48 | 19,72 | 20,00 | - | - | - | - |
| | | | | 30 | 0,91 | 928,61 | 24,44 | 20,00 | - | - | - | - |
| 2 | 1100 | - |  | 5 | 0,91 | 127,94 | 46,58 | 120,00 | 23,57 | 36,80 | 46,06 | 46,58 |
| | | | | 10 | 0,91 | 288,07 | 105,86 | 120,00 | 42,44 | 74,43 | 93,66 | 105,86 |
| | | | | 15 | 0,91 | 448,21 | 156,11 | 120,00 | 60,57 | 110,19 | 139,76 | 156,11 |
| | | | | 20 | 0,91 | 608,34 | 198,07 | 120,00 | 77,62 | 139,15 | 179,18 | 198,07 |
| | | | | 25 | 0,91 | 768,48 | 228,57 | 120,00 | 93,81 | 163,52 | 207,93 | 228,57 |
| | | | | 30 | 0,91 | 928,61 | 246,28 | 113,33 | 109,65 | 184,15 | 229,66 | - |
| 3 | 1100 | 9 |  | 5 | 0,67 | 8,53 | 42,16 | 120,00 | 21,72 | 33,36 | 41,93 | 42,16 |
| | | | | 10 | 0,67 | 19,20 | 93,20 | 120,00 | 37,46 | 64,70 | 82,35 | 93,20 |
| | | | | 15 | 0,67 | 29,88 | 169,49 | 100,00 | 52,91 | 97,12 | 141,99 | - |
| | | | | 20 | 0,67 | 40,56 | 154,49 | 73,33 | 68,64 | 127,81 | - | - |
| | | | | 25 | 0,67 | 51,23 | 121,70 | 46,67 | 82,41 | - | - | - |
| | | | | 30 | 0,67 | 61,91 | 121,60 | 33,33 | 98,42 | - | - | - |
| 3 | 1100 | 9 |  | 5 | 0,67 | 8,53 | 42,02 | 120,00 | 21,67 | 33,37 | 41,88 | 42,02 |
| | | | | 10 | 0,67 | 19,20 | 94,22 | 120,00 | 37,63 | 65,57 | 83,31 | 94,22 |
| | | | | 15 | 0,67 | 29,88 | 152,44 | 120,00 | 53,35 | 99,12 | 131,42 | 152,44 |
| | | | | 20 | 0,67 | 40,56 | 209,35 | 120,00 | 68,55 | 129,35 | 179,23 | 209,35 |
| | | | | 25 | 0,67 | 51,23 | 251,75 | 120,00 | 83,34 | 157,13 | 217,57 | 251,75 |
| | | | | 30 | 0,67 | 61,91 | 287,79 | 120,00 | 98,86 | 182,88 | 248,92 | 287,79 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

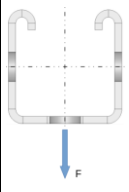
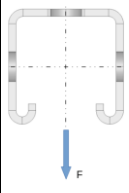
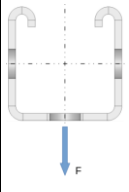
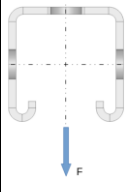
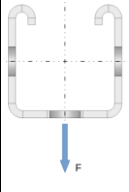
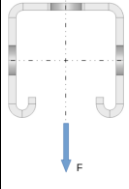
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D23

Table D42: Calculation-based deformation in case of fire for installation channels MT-50, MT-50 S, MT-50 OC and MT-50 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - |  | 5 | 0,50 | 35,44 | 50,34 | 120,00 | 25,05 | 39,53 | 49,47 | 50,34 |
| | | | | 10 | 0,50 | 84,71 | 110,76 | 120,00 | 42,85 | 74,60 | 95,11 | 110,76 |
| | | | | 15 | 0,50 | 133,98 | 299,78 | 120,00 | 60,52 | 117,38 | 254,76 | 299,78 |
| | | | | 20 | 0,50 | 183,25 | 115,26 | 46,67 | 77,98 | - | - | - |
| | | | | 25 | 0,50 | 232,52 | 119,54 | 33,33 | 95,25 | - | - | - |
| | | | | 30 | 0,50 | 281,80 | 84,75 | 26,67 | - | - | - | - |
| 1 | 1300 | - |  | 5 | 0,50 | 35,44 | 50,00 | 120,00 | 24,90 | 39,29 | 49,17 | 50,00 |
| | | | | 10 | 0,50 | 84,71 | 105,56 | 120,00 | 42,67 | 74,21 | 94,15 | 105,56 |
| | | | | 15 | 0,50 | 133,98 | 175,33 | 120,00 | 60,29 | 112,15 | 148,12 | 175,33 |
| | | | | 20 | 0,50 | 183,25 | 256,98 | 113,33 | 77,52 | 148,52 | 211,44 | - |
| | | | | 25 | 0,50 | 232,52 | 242,90 | 80,00 | 94,39 | 183,66 | - | - |
| | | | | 30 | 0,50 | 281,80 | 244,50 | 66,67 | 111,70 | 219,94 | - | - |
| 2 | 1300 | - |  | 5 | 0,92 | 115,16 | 102,17 | 120,00 | 31,30 | 56,59 | 87,55 | 102,17 |
| | | | | 10 | 0,92 | 275,30 | 197,57 | 120,00 | 68,95 | 145,84 | 179,80 | 197,57 |
| | | | | 15 | 0,92 | 435,43 | 241,56 | 120,00 | 110,98 | 190,82 | 224,88 | 241,56 |
| | | | | 20 | 0,92 | 595,57 | 262,49 | 120,00 | 152,69 | 216,30 | 248,21 | 262,49 |
| | | | | 25 | 0,92 | 755,70 | 281,76 | 120,00 | 181,47 | 238,04 | 268,71 | 281,76 |
| | | | | 30 | 0,92 | 915,84 | 301,03 | 120,00 | 210,25 | 259,79 | 289,21 | 301,03 |
| 2 | 1300 | - |  | 5 | 0,92 | 115,16 | 64,39 | 120,00 | 31,00 | 50,14 | 62,34 | 64,39 |
| | | | | 10 | 0,92 | 275,30 | 138,69 | 120,00 | 56,87 | 99,42 | 123,47 | 138,69 |
| | | | | 15 | 0,92 | 435,43 | 194,19 | 120,00 | 81,02 | 142,85 | 175,09 | 194,19 |
| | | | | 20 | 0,92 | 595,57 | 237,81 | 120,00 | 103,06 | 176,41 | 217,72 | 237,81 |
| | | | | 25 | 0,92 | 755,70 | 270,36 | 120,00 | 123,41 | 203,12 | 249,10 | 270,36 |
| | | | | 30 | 0,92 | 915,84 | 297,44 | 120,00 | 142,23 | 225,47 | 272,82 | 297,44 |
| 3 | 1300 | 11 |  | 5 | 0,67 | 5,48 | 59,91 | 120,00 | 29,08 | 46,52 | 58,07 | 59,91 |
| | | | | 10 | 0,67 | 13,11 | 125,36 | 120,00 | 50,63 | 87,98 | 110,62 | 125,36 |
| | | | | 15 | 0,67 | 20,73 | 292,41 | 120,00 | 71,27 | 128,12 | 205,04 | 292,41 |
| | | | | 20 | 0,67 | 28,36 | 348,80 | 120,00 | 90,79 | 184,70 | 310,77 | 348,80 |
| | | | | 25 | 0,67 | 35,99 | 384,34 | 120,00 | 109,53 | 262,82 | 350,60 | 384,34 |
| | | | | 30 | 0,67 | 43,61 | 186,45 | 40,00 | 127,94 | - | - | - |
| 3 | 1300 | 11 |  | 5 | 0,67 | 5,48 | 59,64 | 120,00 | 28,91 | 46,47 | 57,95 | 59,64 |
| | | | | 10 | 0,67 | 13,11 | 127,34 | 120,00 | 50,90 | 89,60 | 112,53 | 127,34 |
| | | | | 15 | 0,67 | 20,73 | 191,96 | 120,00 | 72,07 | 131,68 | 168,55 | 191,96 |
| | | | | 20 | 0,67 | 28,36 | 252,24 | 120,00 | 92,15 | 167,59 | 221,11 | 252,24 |
| | | | | 25 | 0,67 | 35,99 | 298,34 | 120,00 | 111,27 | 199,12 | 262,65 | 298,34 |
| | | | | 30 | 0,67 | 43,61 | 334,07 | 120,00 | 130,15 | 226,91 | 296,39 | 334,07 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

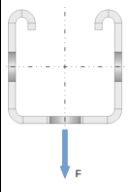
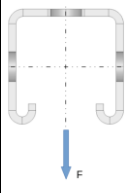
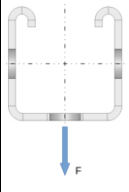
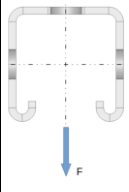
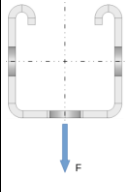
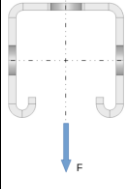
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D24

Table D43: Calculation-based deformation in case of fire for installation channels MT-50, MT-50 S, MT-50 OC and MT-50 S OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1500 | - |  | 5 | 0,50 | 26,74 | 69,18 | 120,00 | 32,82 | 53,55 | 66,66 | 69,18 |
| | | | | 10 | 0,50 | 69,44 | 156,55 | 120,00 | 56,23 | 99,36 | 128,32 | 156,55 |
| | | | | 15 | 0,50 | 112,14 | 367,21 | 120,00 | 79,27 | 211,60 | 319,11 | 367,21 |
| | | | | 20 | 0,50 | 154,84 | 138,88 | 40,00 | 102,11 | - | - | - |
| | | | | 25 | 0,50 | 197,55 | 92,90 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 240,25 | 110,95 | 26,67 | - | - | - | - |
| 1 | 1500 | - |  | 5 | 0,50 | 26,74 | 68,76 | 120,00 | 32,60 | 53,23 | 66,29 | 68,76 |
| | | | | 10 | 0,50 | 69,44 | 140,16 | 120,00 | 56,02 | 98,71 | 124,36 | 140,16 |
| | | | | 15 | 0,50 | 112,14 | 221,93 | 120,00 | 78,99 | 146,31 | 189,72 | 221,93 |
| | | | | 20 | 0,50 | 154,84 | 313,11 | 113,33 | 101,16 | 190,30 | 262,15 | - |
| | | | | 25 | 0,50 | 197,55 | 297,15 | 80,00 | 122,62 | 231,42 | - | - |
| | | | | 30 | 0,50 | 240,25 | 298,68 | 66,67 | 144,11 | 271,93 | - | - |
| 2 | 1500 | - |  | 5 | 0,93 | 100,26 | 127,09 | 120,00 | 40,94 | 85,50 | 114,48 | 127,09 |
| | | | | 10 | 0,93 | 260,40 | 236,47 | 120,00 | 90,37 | 173,01 | 214,01 | 236,47 |
| | | | | 15 | 0,93 | 420,53 | 282,98 | 120,00 | 138,78 | 223,88 | 263,32 | 282,98 |
| | | | | 20 | 0,93 | 580,67 | 294,93 | 120,00 | 175,48 | 244,97 | 279,04 | 294,93 |
| | | | | 25 | 0,93 | 740,80 | 314,56 | 120,00 | 205,20 | 268,02 | 300,53 | 314,56 |
| | | | | 30 | 0,93 | 900,94 | 337,27 | 120,00 | 236,15 | 293,12 | 324,57 | 337,27 |
| 2 | 1500 | - |  | 5 | 0,93 | 100,26 | 84,66 | 120,00 | 39,59 | 65,40 | 80,89 | 84,66 |
| | | | | 10 | 0,93 | 260,40 | 173,32 | 120,00 | 73,24 | 126,50 | 155,31 | 173,32 |
| | | | | 15 | 0,93 | 420,53 | 234,91 | 120,00 | 103,71 | 176,89 | 212,13 | 234,91 |
| | | | | 20 | 0,93 | 580,67 | 279,58 | 120,00 | 130,71 | 214,67 | 257,60 | 279,58 |
| | | | | 25 | 0,93 | 740,80 | 314,39 | 120,00 | 155,03 | 243,98 | 291,77 | 314,39 |
| | | | | 30 | 0,93 | 900,94 | 341,28 | 120,00 | 176,90 | 267,89 | 317,62 | 341,28 |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,58 | 81,20 | 120,00 | 38,13 | 62,43 | 77,46 | 81,20 |
| | | | | 10 | 0,67 | 9,30 | 161,03 | 120,00 | 66,02 | 113,81 | 141,50 | 161,03 |
| | | | | 15 | 0,67 | 15,02 | 302,22 | 120,00 | 92,10 | 161,24 | 225,03 | 302,22 |
| | | | | 20 | 0,67 | 20,74 | 386,93 | 120,00 | 116,20 | 215,37 | 334,92 | 386,93 |
| | | | | 25 | 0,67 | 26,46 | 429,91 | 120,00 | 139,35 | 282,47 | 389,36 | 429,91 |
| | | | | 30 | 0,67 | 32,18 | 461,08 | 120,00 | 170,29 | 351,56 | 423,66 | 461,08 |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,58 | 80,83 | 120,00 | 37,77 | 62,32 | 77,29 | 80,83 |
| | | | | 10 | 0,67 | 9,30 | 163,12 | 120,00 | 66,46 | 116,60 | 144,74 | 163,12 |
| | | | | 15 | 0,67 | 15,02 | 232,89 | 120,00 | 93,49 | 166,35 | 206,97 | 232,89 |
| | | | | 20 | 0,67 | 20,74 | 295,33 | 120,00 | 118,50 | 207,12 | 263,13 | 295,33 |
| | | | | 25 | 0,67 | 26,46 | 344,69 | 120,00 | 141,84 | 241,72 | 307,81 | 344,69 |
| | | | | 30 | 0,67 | 32,18 | 383,46 | 120,00 | 163,95 | 271,88 | 343,97 | 383,46 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

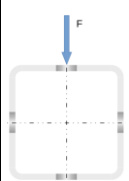

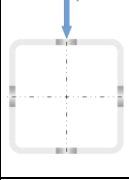
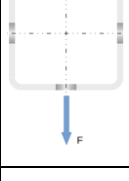
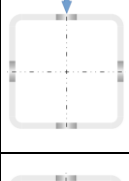
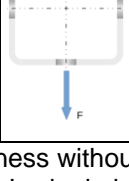
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D25

Table D44: Calculation-based deformation in case of fire for installation channels MT-70 S OC and MT-70 OC

| System | | | Load direction | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------|---|---|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{(3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - |  | 5 | 0,50 | 247,05 | 32,35 | 120,00 | 7,01 | 32,35 | 32,35 | 32,35 |
| | | | | 10 | 0,50 | 502,41 | 38,36 | 120,00 | 8,14 | 38,36 | 38,36 | 38,36 |
| | | | | 15 | 0,50 | 757,77 | 51,59 | 120,00 | 9,72 | 46,90 | 46,90 | 51,59 |
| | | | | 20 | 0,50 | 1013,13 | 156,46 | 120,00 | 12,34 | 62,06 | 80,63 | 156,46 |
| | | | | 25 | 0,50 | 1268,49 | 195,33 | 120,00 | 17,55 | 88,46 | 170,56 | 195,33 |
| | | | | 30 | 0,50 | 1523,85 | 210,65 | 120,00 | 27,60 | 155,54 | 199,01 | 210,65 |
| 1 | 500 | - |  | 5 | 0,50 | 247,05 | 33,21 | 120,00 | 7,35 | 33,21 | 33,21 | 33,21 |
| | | | | 10 | 0,50 | 502,41 | 40,17 | 120,00 | 9,05 | 40,17 | 40,17 | 40,17 |
| | | | | 15 | 0,50 | 757,77 | 48,64 | 120,00 | 11,37 | 48,64 | 48,64 | 48,64 |
| | | | | 20 | 0,50 | 1013,13 | 87,28 | 120,00 | 14,52 | 61,32 | 66,88 | 87,28 |
| | | | | 25 | 0,50 | 1268,49 | 152,03 | 120,00 | 19,08 | 80,44 | 107,53 | 152,03 |
| | | | | 30 | 0,50 | 1523,85 | 204,09 | 120,00 | 26,54 | 107,19 | 158,87 | 204,09 |
| 2 | 500 | - |  | 5 | 0,80 | 308,81 | 34,80 | 120,00 | 7,45 | 34,80 | 34,80 | 34,80 |
| | | | | 10 | 0,80 | 628,01 | 44,09 | 120,00 | 9,33 | 44,09 | 44,09 | 44,09 |
| | | | | 15 | 0,80 | 947,21 | 89,44 | 120,00 | 12,11 | 62,12 | 71,78 | 89,44 |
| | | | | 20 | 0,80 | 1266,41 | 126,51 | 120,00 | 17,81 | 92,92 | 111,00 | 126,51 |
| | | | | 25 | 0,80 | 1585,61 | 146,44 | 120,00 | 32,42 | 123,99 | 136,97 | 146,44 |
| | | | | 30 | 0,80 | 1904,81 | 151,99 | 90,91 | 58,28 | 146,85 | 151,37 | - |
| 2 | 500 | - |  | 5 | 0,80 | 308,81 | 34,60 | 120,00 | 7,44 | 34,60 | 34,60 | 34,60 |
| | | | | 10 | 0,80 | 628,01 | 42,86 | 120,00 | 9,23 | 42,86 | 42,86 | 42,86 |
| | | | | 15 | 0,80 | 947,21 | 64,64 | 120,00 | 11,58 | 55,84 | 55,84 | 64,64 |
| | | | | 20 | 0,80 | 1266,41 | 99,95 | 120,00 | 15,83 | 75,67 | 84,86 | 99,95 |
| | | | | 25 | 0,80 | 1585,61 | 124,97 | 117,77 | 25,13 | 100,20 | 111,00 | - |
| | | | | 30 | 0,80 | 1904,81 | 132,35 | 86,10 | 40,33 | 120,99 | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 102,94 | 33,77 | 120,00 | 7,27 | 33,77 | 33,77 | 33,77 |
| | | | | 10 | 0,67 | 209,34 | 41,46 | 120,00 | 8,80 | 41,46 | 41,46 | 41,46 |
| | | | | 15 | 0,67 | 315,74 | 76,61 | 120,00 | 10,82 | 53,94 | 57,32 | 76,61 |
| | | | | 20 | 0,67 | 422,14 | 138,95 | 120,00 | 14,43 | 78,29 | 107,97 | 138,95 |
| | | | | 25 | 0,67 | 528,54 | 184,65 | 120,00 | 22,94 | 115,77 | 155,14 | 184,65 |
| | | | | 30 | 0,67 | 634,94 | 206,49 | 120,00 | 40,89 | 155,52 | 188,56 | 206,49 |
| 3 | 500 | 3 |  | 5 | 0,67 | 102,94 | 33,74 | 120,00 | 7,28 | 33,74 | 33,74 | 33,74 |
| | | | | 10 | 0,67 | 209,34 | 41,12 | 120,00 | 8,81 | 41,12 | 41,12 | 41,12 |
| | | | | 15 | 0,67 | 315,74 | 58,64 | 120,00 | 10,77 | 51,80 | 51,80 | 58,64 |
| | | | | 20 | 0,67 | 422,14 | 101,04 | 120,00 | 14,07 | 69,47 | 81,67 | 101,04 |
| | | | | 25 | 0,67 | 528,54 | 138,89 | 120,00 | 20,88 | 94,70 | 117,43 | 138,89 |
| | | | | 30 | 0,67 | 634,94 | 167,03 | 120,00 | 33,06 | 122,34 | 145,78 | 167,03 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

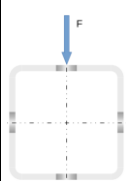

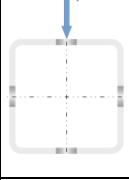
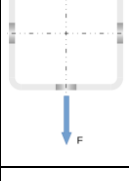
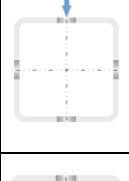
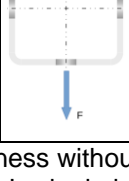
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D26

Table D45: Calculation-based deformation in case of fire for installation channels MT-70 S OC and MT-70 OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 800 | - |  | 5 | 0,50 | 146,30 | 37,15 | 120,00 | 8,03 | 37,15 | 37,15 | 37,15 |
| | | | | 10 | 0,50 | 305,90 | 51,36 | 120,00 | 10,79 | 51,36 | 51,36 | 51,36 |
| | | | | 15 | 0,50 | 465,50 | 104,98 | 120,00 | 14,35 | 70,27 | 83,77 | 104,98 |
| | | | | 20 | 0,50 | 625,10 | 188,53 | 120,00 | 19,81 | 101,73 | 143,75 | 188,53 |
| | | | | 25 | 0,50 | 784,70 | 287,59 | 120,00 | 30,42 | 146,59 | 216,85 | 287,59 |
| | | | | 30 | 0,50 | 944,30 | 328,95 | 120,00 | 50,99 | 199,96 | 291,64 | 328,95 |
| 1 | 800 | - |  | 5 | 0,50 | 146,30 | 37,59 | 120,00 | 8,21 | 37,59 | 37,59 | 37,59 |
| | | | | 10 | 0,50 | 305,90 | 52,26 | 120,00 | 11,24 | 52,26 | 52,26 | 52,26 |
| | | | | 15 | 0,50 | 465,50 | 97,60 | 120,00 | 15,13 | 70,67 | 81,20 | 97,60 |
| | | | | 20 | 0,50 | 625,10 | 166,31 | 120,00 | 20,78 | 99,10 | 132,52 | 166,31 |
| | | | | 25 | 0,50 | 784,70 | 230,37 | 120,00 | 30,49 | 138,44 | 189,70 | 230,37 |
| | | | | 30 | 0,50 | 944,30 | 288,75 | 120,00 | 47,64 | 181,46 | 240,91 | 288,75 |
| 2 | 800 | - |  | 5 | 0,88 | 292,60 | 43,33 | 120,00 | 9,08 | 43,33 | 43,33 | 43,33 |
| | | | | 10 | 0,88 | 611,80 | 90,19 | 120,00 | 13,76 | 67,02 | 75,78 | 90,19 |
| | | | | 15 | 0,88 | 931,00 | 160,84 | 120,00 | 20,48 | 110,06 | 140,50 | 160,84 |
| | | | | 20 | 0,88 | 1250,20 | 205,97 | 120,00 | 34,67 | 159,09 | 187,44 | 205,97 |
| | | | | 25 | 0,88 | 1569,40 | 228,43 | 120,00 | 71,07 | 198,04 | 215,41 | 228,43 |
| | | | | 30 | 0,88 | 1888,60 | 232,96 | 96,35 | 114,76 | 223,65 | 231,31 | - |
| 2 | 800 | - |  | 5 | 0,88 | 292,60 | 42,77 | 120,00 | 9,05 | 42,77 | 42,77 | 42,77 |
| | | | | 10 | 0,88 | 611,80 | 75,64 | 120,00 | 13,56 | 63,70 | 66,53 | 75,64 |
| | | | | 15 | 0,88 | 931,00 | 121,54 | 120,00 | 19,51 | 93,48 | 108,82 | 121,54 |
| | | | | 20 | 0,88 | 1250,20 | 161,78 | 120,00 | 30,49 | 128,95 | 148,58 | 161,78 |
| | | | | 25 | 0,88 | 1569,40 | 185,20 | 119,26 | 53,27 | 159,84 | 174,52 | - |
| | | | | 30 | 0,88 | 1888,60 | 192,40 | 86,74 | 82,82 | 183,55 | - | - |
| 3 | 800 | 6 |  | 5 | 0,67 | 36,57 | 39,96 | 120,00 | 8,52 | 39,96 | 39,96 | 39,96 |
| | | | | 10 | 0,67 | 76,47 | 66,72 | 120,00 | 12,13 | 58,08 | 58,37 | 66,72 |
| | | | | 15 | 0,67 | 116,37 | 135,21 | 120,00 | 16,79 | 84,91 | 109,54 | 135,21 |
| | | | | 20 | 0,67 | 156,27 | 206,64 | 120,00 | 24,72 | 127,76 | 171,73 | 206,64 |
| | | | | 25 | 0,67 | 196,17 | 258,44 | 120,00 | 42,19 | 178,22 | 226,12 | 258,44 |
| | | | | 30 | 0,67 | 236,07 | 301,74 | 120,00 | 74,97 | 221,82 | 266,99 | 301,74 |
| 3 | 800 | 6 |  | 5 | 0,67 | 36,57 | 39,97 | 120,00 | 8,56 | 39,97 | 39,97 | 39,97 |
| | | | | 10 | 0,67 | 76,47 | 63,97 | 120,00 | 12,21 | 57,74 | 57,74 | 63,97 |
| | | | | 15 | 0,67 | 116,37 | 119,67 | 120,00 | 16,86 | 82,23 | 100,40 | 119,67 |
| | | | | 20 | 0,67 | 156,27 | 182,25 | 120,00 | 24,53 | 118,83 | 153,63 | 182,25 |
| | | | | 25 | 0,67 | 196,17 | 225,13 | 120,00 | 40,12 | 161,71 | 198,90 | 225,13 |
| | | | | 30 | 0,67 | 236,07 | 257,18 | 120,00 | 67,32 | 198,63 | 234,53 | 257,18 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

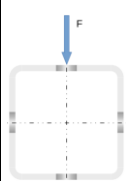

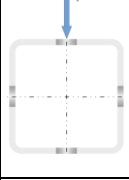
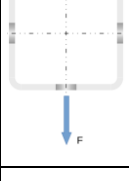
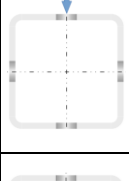
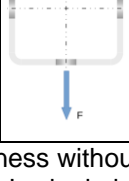
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D27

Table D46: Calculation-based deformation in case of fire for installation channels MT-70 S OC and MT-70 OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - |  | 5 | 0,50 | 97,78 | 44,47 | 120,00 | 9,57 | 44,47 | 44,47 | 44,47 |
| | | | | 10 | 0,50 | 213,85 | 90,08 | 120,00 | 14,71 | 70,67 | 79,48 | 90,08 |
| | | | | 15 | 0,50 | 329,93 | 170,78 | 120,00 | 21,23 | 103,99 | 140,03 | 170,78 |
| | | | | 20 | 0,50 | 446,00 | 265,95 | 120,00 | 31,02 | 154,31 | 218,39 | 265,95 |
| | | | | 25 | 0,50 | 562,07 | 357,23 | 120,00 | 49,47 | 216,07 | 294,52 | 357,23 |
| | | | | 30 | 0,50 | 678,15 | 429,03 | 120,00 | 83,56 | 277,03 | 366,09 | 429,03 |
| 1 | 1100 | - |  | 5 | 0,50 | 97,78 | 44,71 | 120,00 | 9,68 | 44,71 | 44,71 | 44,71 |
| | | | | 10 | 0,50 | 213,85 | 89,97 | 120,00 | 14,98 | 71,12 | 79,75 | 89,97 |
| | | | | 15 | 0,50 | 329,93 | 164,55 | 120,00 | 21,69 | 103,81 | 137,45 | 164,55 |
| | | | | 20 | 0,50 | 446,00 | 253,90 | 120,00 | 31,52 | 151,68 | 210,69 | 253,90 |
| | | | | 25 | 0,50 | 562,07 | 322,83 | 120,00 | 49,02 | 209,61 | 278,99 | 322,83 |
| | | | | 30 | 0,50 | 678,15 | 382,96 | 120,00 | 79,99 | 264,61 | 335,99 | 382,96 |
| 2 | 1100 | - |  | 5 | 0,91 | 268,90 | 55,51 | 120,00 | 11,38 | 55,51 | 55,51 | 55,51 |
| | | | | 10 | 0,91 | 588,10 | 155,74 | 120,00 | 20,19 | 100,15 | 131,71 | 155,74 |
| | | | | 15 | 0,91 | 907,30 | 236,04 | 120,00 | 32,82 | 169,15 | 213,11 | 236,04 |
| | | | | 20 | 0,91 | 1226,50 | 289,73 | 120,00 | 59,95 | 229,94 | 269,43 | 289,73 |
| | | | | 25 | 0,91 | 1545,70 | 316,31 | 120,00 | 118,75 | 272,79 | 301,35 | 316,31 |
| | | | | 30 | 0,91 | 1864,90 | 324,77 | 99,78 | 177,03 | 304,89 | 322,28 | - |
| 2 | 1100 | - |  | 5 | 0,91 | 268,90 | 54,19 | 120,00 | 11,32 | 54,19 | 54,19 | 54,19 |
| | | | | 10 | 0,91 | 588,10 | 128,59 | 120,00 | 19,76 | 92,55 | 112,91 | 128,59 |
| | | | | 15 | 0,91 | 907,30 | 183,94 | 120,00 | 30,85 | 139,04 | 166,72 | 183,94 |
| | | | | 20 | 0,91 | 1226,50 | 226,11 | 120,00 | 51,05 | 186,85 | 212,57 | 226,11 |
| | | | | 25 | 0,91 | 1545,70 | 249,89 | 120,00 | 88,10 | 221,42 | 241,50 | 249,89 |
| | | | | 30 | 0,91 | 1864,90 | 258,55 | 88,59 | 128,57 | 246,83 | - | - |
| 3 | 1100 | 9 |  | 5 | 0,67 | 17,93 | 49,62 | 120,00 | 10,47 | 49,62 | 49,62 | 49,62 |
| | | | | 10 | 0,67 | 39,21 | 119,82 | 120,00 | 17,31 | 83,49 | 102,56 | 119,82 |
| | | | | 15 | 0,67 | 60,49 | 210,61 | 120,00 | 26,21 | 131,06 | 178,51 | 210,61 |
| | | | | 20 | 0,67 | 81,77 | 295,09 | 120,00 | 41,55 | 194,51 | 255,54 | 295,09 |
| | | | | 25 | 0,67 | 103,05 | 350,43 | 120,00 | 74,72 | 257,63 | 313,76 | 350,43 |
| | | | | 30 | 0,67 | 124,33 | 389,04 | 120,00 | 128,76 | 307,45 | 359,45 | 389,04 |
| 3 | 1100 | 9 |  | 5 | 0,67 | 17,93 | 49,45 | 120,00 | 10,47 | 49,45 | 49,45 | 49,45 |
| | | | | 10 | 0,67 | 39,21 | 114,95 | 120,00 | 17,26 | 82,45 | 99,51 | 114,95 |
| | | | | 15 | 0,67 | 60,49 | 193,74 | 120,00 | 26,01 | 126,18 | 166,73 | 193,74 |
| | | | | 20 | 0,67 | 81,77 | 270,45 | 120,00 | 40,72 | 183,19 | 236,88 | 270,45 |
| | | | | 25 | 0,67 | 103,05 | 322,62 | 120,00 | 70,47 | 239,32 | 288,62 | 322,62 |
| | | | | 30 | 0,67 | 124,33 | 358,62 | 120,00 | 117,19 | 285,40 | 329,77 | 358,62 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

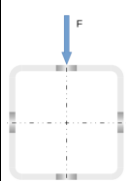

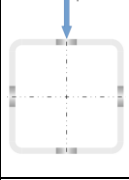
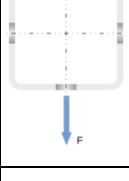
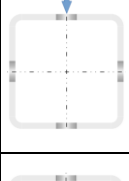
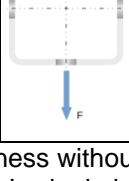
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D28

Table D47: Calculation-based deformation in case of fire for installation channels MT-70 S OC and MT-70 OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|----|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1400 | - |  | 5 | 0,50 | 67,92 | 54,74 | 120,00 | 11,73 | 54,74 | 54,74 | 54,74 |
| | | | | 10 | 0,50 | 159,12 | 142,09 | 120,00 | 20,02 | 96,57 | 123,77 | 142,09 |
| | | | | 15 | 0,50 | 250,32 | 245,97 | 120,00 | 30,50 | 147,49 | 207,15 | 245,97 |
| | | | | 20 | 0,50 | 341,52 | 355,17 | 120,00 | 46,11 | 217,35 | 301,21 | 355,17 |
| | | | | 25 | 0,50 | 432,72 | 441,62 | 120,00 | 74,90 | 293,35 | 384,18 | 441,62 |
| | | | | 30 | 0,50 | 523,92 | 518,66 | 120,00 | 125,26 | 361,86 | 453,77 | 518,66 |
| 1 | 1400 | - |  | 5 | 0,50 | 67,92 | 54,85 | 120,00 | 11,79 | 54,85 | 54,85 | 54,85 |
| | | | | 10 | 0,50 | 159,12 | 141,66 | 120,00 | 20,19 | 96,74 | 123,69 | 141,66 |
| | | | | 15 | 0,50 | 250,32 | 241,24 | 120,00 | 30,76 | 146,97 | 204,90 | 241,24 |
| | | | | 20 | 0,50 | 341,52 | 346,34 | 120,00 | 46,31 | 215,08 | 296,28 | 346,34 |
| | | | | 25 | 0,50 | 432,72 | 424,05 | 120,00 | 74,09 | 288,31 | 373,15 | 424,05 |
| | | | | 30 | 0,50 | 523,92 | 484,16 | 120,00 | 121,76 | 353,68 | 437,07 | 484,16 |
| 2 | 1400 | - |  | 5 | 0,93 | 237,72 | 78,46 | 120,00 | 14,30 | 70,84 | 78,29 | 78,46 |
| | | | | 10 | 0,93 | 556,92 | 227,82 | 120,00 | 28,54 | 141,73 | 196,03 | 227,82 |
| | | | | 15 | 0,93 | 876,12 | 314,93 | 120,00 | 49,05 | 233,09 | 288,77 | 314,93 |
| | | | | 20 | 0,93 | 1195,32 | 377,06 | 120,00 | 92,91 | 305,91 | 353,78 | 377,06 |
| | | | | 25 | 0,93 | 1514,52 | 410,55 | 120,00 | 177,30 | 354,16 | 392,80 | 410,55 |
| | | | | 30 | 0,93 | 1833,72 | 419,50 | 102,67 | 241,32 | 388,45 | 415,60 | - |
| 2 | 1400 | - |  | 5 | 0,93 | 237,72 | 71,32 | 120,00 | 14,20 | 68,54 | 71,32 | 71,32 |
| | | | | 10 | 0,93 | 556,92 | 187,55 | 120,00 | 27,75 | 128,14 | 166,28 | 187,55 |
| | | | | 15 | 0,93 | 876,12 | 255,33 | 120,00 | 45,48 | 189,49 | 229,68 | 255,33 |
| | | | | 20 | 0,93 | 1195,32 | 296,37 | 120,00 | 76,79 | 247,30 | 280,33 | 296,37 |
| | | | | 25 | 0,93 | 1514,52 | 320,84 | 120,00 | 127,33 | 287,74 | 312,36 | 320,84 |
| | | | | 30 | 0,93 | 1833,72 | 330,23 | 91,17 | 178,19 | 315,43 | 329,56 | - |
| 3 | 1400 | 12 |  | 5 | 0,67 | 9,70 | 61,83 | 120,00 | 12,96 | 61,83 | 61,83 | 61,83 |
| | | | | 10 | 0,67 | 22,73 | 180,34 | 120,00 | 23,85 | 114,95 | 154,70 | 180,34 |
| | | | | 15 | 0,67 | 35,76 | 285,87 | 120,00 | 38,00 | 182,92 | 249,05 | 285,87 |
| | | | | 20 | 0,67 | 48,79 | 381,63 | 120,00 | 62,04 | 263,59 | 339,37 | 381,63 |
| | | | | 25 | 0,67 | 61,82 | 446,39 | 120,00 | 111,17 | 335,73 | 403,85 | 446,39 |
| | | | | 30 | 0,67 | 74,85 | 490,85 | 120,00 | 183,11 | 393,90 | 453,15 | 490,85 |
| 3 | 1400 | 12 |  | 5 | 0,67 | 9,70 | 61,63 | 120,00 | 12,96 | 61,63 | 61,63 | 61,63 |
| | | | | 10 | 0,67 | 22,73 | 174,43 | 120,00 | 23,80 | 113,57 | 150,82 | 174,43 |
| | | | | 15 | 0,67 | 35,76 | 270,16 | 120,00 | 37,76 | 177,01 | 237,14 | 270,16 |
| | | | | 20 | 0,67 | 48,79 | 358,58 | 120,00 | 60,93 | 252,16 | 320,95 | 358,58 |
| | | | | 25 | 0,67 | 61,82 | 420,09 | 120,00 | 105,68 | 317,90 | 381,99 | 420,09 |
| | | | | 30 | 0,67 | 74,85 | 463,10 | 120,00 | 170,07 | 372,41 | 426,98 | 463,10 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

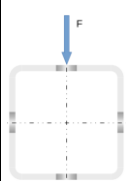

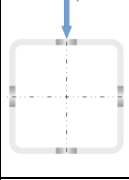
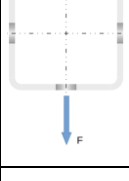
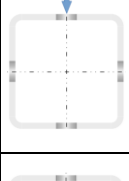
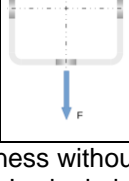
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D29

Table D48: Calculation-based deformation in case of fire for installation channels MT-70 S OC and MT-70 OC

| System | | | Load direction | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------|----|---|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{(3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1700 | - |  | 5 | 0,50 | 46,84 | 69,94 | 120,00 | 14,60 | 68,64 | 69,94 | 69,94 |
| | | | | 10 | 0,50 | 121,94 | 204,84 | 120,00 | 26,85 | 129,43 | 178,09 | 204,84 |
| | | | | 15 | 0,50 | 197,05 | 328,64 | 120,00 | 42,31 | 199,97 | 282,63 | 328,64 |
| | | | | 20 | 0,50 | 272,16 | 449,22 | 120,00 | 65,25 | 288,58 | 390,65 | 449,22 |
| | | | | 25 | 0,50 | 347,26 | 538,95 | 120,00 | 106,73 | 376,39 | 479,49 | 538,95 |
| | | | | 30 | 0,50 | 422,37 | 614,38 | 120,00 | 175,02 | 452,62 | 553,18 | 614,38 |
| 1 | 1700 | - |  | 5 | 0,50 | 46,84 | 69,89 | 120,00 | 14,64 | 68,66 | 69,89 | 69,89 |
| | | | | 10 | 0,50 | 121,94 | 204,21 | 120,00 | 26,94 | 129,39 | 177,78 | 204,21 |
| | | | | 15 | 0,50 | 197,05 | 325,06 | 120,00 | 42,44 | 199,21 | 280,66 | 325,06 |
| | | | | 20 | 0,50 | 272,16 | 442,39 | 120,00 | 65,22 | 286,64 | 386,88 | 442,39 |
| | | | | 25 | 0,50 | 347,26 | 529,51 | 120,00 | 105,59 | 372,33 | 471,65 | 529,51 |
| | | | | 30 | 0,50 | 422,37 | 592,73 | 120,00 | 171,58 | 447,06 | 541,47 | 592,73 |
| 2 | 1700 | - |  | 5 | 0,94 | 199,06 | 109,90 | 120,00 | 17,78 | 88,73 | 108,26 | 109,90 |
| | | | | 10 | 0,94 | 518,26 | 303,22 | 120,00 | 38,71 | 189,58 | 264,87 | 303,22 |
| | | | | 15 | 0,94 | 837,46 | 401,53 | 120,00 | 69,02 | 299,93 | 367,24 | 401,53 |
| | | | | 20 | 0,94 | 1156,66 | 466,63 | 120,00 | 132,09 | 384,16 | 440,74 | 466,63 |
| | | | | 25 | 0,94 | 1475,86 | 507,07 | 120,00 | 236,40 | 438,46 | 485,68 | 507,07 |
| | | | | 30 | 0,94 | 1795,06 | 518,54 | 105,72 | 307,91 | 474,73 | 511,91 | - |
| 2 | 1700 | - |  | 5 | 0,94 | 199,06 | 98,73 | 120,00 | 17,63 | 85,46 | 98,73 | 98,73 |
| | | | | 10 | 0,94 | 518,26 | 251,34 | 120,00 | 37,44 | 169,29 | 224,87 | 251,34 |
| | | | | 15 | 0,94 | 837,46 | 330,79 | 120,00 | 63,23 | 243,87 | 300,24 | 330,79 |
| | | | | 20 | 0,94 | 1156,66 | 376,42 | 120,00 | 107,01 | 311,08 | 351,88 | 376,42 |
| | | | | 25 | 0,94 | 1475,86 | 401,45 | 120,00 | 169,95 | 356,87 | 388,11 | 401,45 |
| | | | | 30 | 0,94 | 1795,06 | 408,28 | 94,69 | 230,59 | 388,17 | 407,08 | - |
| 3 | 1700 | 15 |  | 5 | 0,67 | 5,53 | 86,08 | 120,00 | 16,16 | 77,60 | 86,08 | 86,08 |
| | | | | 10 | 0,67 | 14,40 | 250,27 | 120,00 | 32,25 | 154,14 | 216,36 | 250,27 |
| | | | | 15 | 0,67 | 23,26 | 369,34 | 120,00 | 53,18 | 243,65 | 327,36 | 369,34 |
| | | | | 20 | 0,67 | 32,13 | 473,79 | 120,00 | 88,56 | 340,78 | 428,77 | 473,79 |
| | | | | 25 | 0,67 | 41,00 | 546,64 | 120,00 | 157,03 | 420,45 | 501,97 | 546,64 |
| | | | | 30 | 0,67 | 49,86 | 597,20 | 120,00 | 246,32 | 485,67 | 554,77 | 597,20 |
| 3 | 1700 | 15 |  | 5 | 0,67 | 5,53 | 85,23 | 120,00 | 16,15 | 77,31 | 85,23 | 85,23 |
| | | | | 10 | 0,67 | 14,40 | 243,38 | 120,00 | 32,14 | 152,23 | 211,60 | 243,38 |
| | | | | 15 | 0,67 | 23,26 | 354,74 | 120,00 | 52,77 | 236,62 | 315,20 | 354,74 |
| | | | | 20 | 0,67 | 32,13 | 451,39 | 120,00 | 86,89 | 328,37 | 410,16 | 451,39 |
| | | | | 25 | 0,67 | 41,00 | 520,79 | 120,00 | 149,86 | 402,53 | 479,92 | 520,79 |
| | | | | 30 | 0,67 | 49,86 | 569,71 | 120,00 | 231,67 | 464,05 | 530,59 | 569,71 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

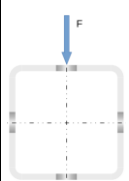

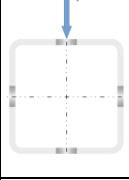
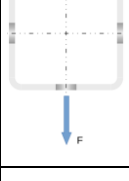
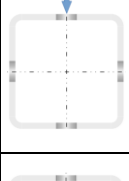
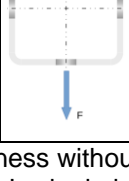
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D30

Table D49: Calculation-based deformation in case of fire for installation channels MT-70 S OC and MT-70 OC

| System | | | Load direction | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------|----|---|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{(3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2000 | - |  | 5 | 0,50 | 30,58 | 99,99 | 120,00 | 18,35 | 86,97 | 99,99 | 99,99 |
| | | | | 10 | 0,50 | 94,42 | 277,12 | 120,00 | 35,40 | 169,60 | 241,74 | 277,12 |
| | | | | 15 | 0,50 | 158,26 | 417,36 | 120,00 | 56,88 | 260,37 | 364,62 | 417,36 |
| | | | | 20 | 0,50 | 222,10 | 546,67 | 120,00 | 88,66 | 366,19 | 484,33 | 546,67 |
| | | | | 25 | 0,50 | 285,94 | 644,10 | 120,00 | 144,85 | 463,89 | 579,38 | 644,10 |
| | | | | 30 | 0,50 | 349,78 | 717,60 | 120,00 | 231,73 | 547,96 | 657,26 | 717,60 |
| 1 | 2000 | - |  | 5 | 0,50 | 30,58 | 99,86 | 120,00 | 18,36 | 86,93 | 99,86 | 99,86 |
| | | | | 10 | 0,50 | 94,42 | 276,38 | 120,00 | 35,43 | 169,40 | 241,26 | 276,38 |
| | | | | 15 | 0,50 | 158,26 | 414,68 | 120,00 | 56,89 | 259,45 | 362,91 | 414,68 |
| | | | | 20 | 0,50 | 222,10 | 541,40 | 120,00 | 88,43 | 364,44 | 481,24 | 541,40 |
| | | | | 25 | 0,50 | 285,94 | 636,96 | 120,00 | 143,42 | 460,56 | 574,24 | 636,96 |
| | | | | 30 | 0,50 | 349,78 | 706,05 | 120,00 | 228,32 | 543,49 | 648,44 | 706,05 |
| 2 | 2000 | - |  | 5 | 0,95 | 152,92 | 142,95 | 120,00 | 21,71 | 108,34 | 139,97 | 142,95 |
| | | | | 10 | 0,95 | 472,12 | 380,79 | 120,00 | 50,55 | 241,64 | 336,23 | 380,79 |
| | | | | 15 | 0,95 | 791,32 | 493,91 | 120,00 | 92,41 | 368,74 | 448,30 | 493,91 |
| | | | | 20 | 0,95 | 1110,52 | 559,08 | 120,00 | 175,95 | 464,18 | 530,48 | 559,08 |
| | | | | 25 | 0,95 | 1429,72 | 603,59 | 120,00 | 297,78 | 525,98 | 581,32 | 603,59 |
| | | | | 30 | 0,95 | 1748,92 | 621,31 | 110,18 | 377,74 | 566,21 | 611,58 | - |
| 2 | 2000 | - |  | 5 | 0,95 | 152,92 | 130,08 | 120,00 | 21,55 | 104,58 | 129,38 | 130,08 |
| | | | | 10 | 0,95 | 472,12 | 320,01 | 120,00 | 48,73 | 215,12 | 288,09 | 320,01 |
| | | | | 15 | 0,95 | 791,32 | 410,89 | 120,00 | 83,92 | 302,36 | 375,57 | 410,89 |
| | | | | 20 | 0,95 | 1110,52 | 461,69 | 120,00 | 141,12 | 378,54 | 429,59 | 461,69 |
| | | | | 25 | 0,95 | 1429,72 | 489,49 | 120,00 | 215,65 | 429,74 | 467,18 | 489,49 |
| | | | | 30 | 0,95 | 1748,92 | 492,54 | 99,12 | 285,81 | 464,59 | 489,30 | - |
| 3 | 2000 | 18 |  | 5 | 0,67 | 3,06 | 117,05 | 120,00 | 19,99 | 96,34 | 116,61 | 117,05 |
| | | | | 10 | 0,67 | 9,44 | 323,90 | 120,00 | 42,11 | 198,53 | 282,73 | 323,90 |
| | | | | 15 | 0,67 | 15,83 | 456,93 | 120,00 | 70,87 | 307,58 | 407,78 | 456,93 |
| | | | | 20 | 0,67 | 22,21 | 565,98 | 120,00 | 118,62 | 418,93 | 518,14 | 565,98 |
| | | | | 25 | 0,67 | 28,59 | 646,13 | 120,00 | 205,08 | 505,78 | 599,47 | 646,13 |
| | | | | 30 | 0,67 | 34,98 | 702,80 | 120,00 | 309,33 | 577,22 | 658,49 | 702,80 |
| 3 | 2000 | 18 |  | 5 | 0,67 | 3,06 | 116,03 | 120,00 | 19,98 | 96,04 | 115,76 | 116,03 |
| | | | | 10 | 0,67 | 9,44 | 316,78 | 120,00 | 41,99 | 196,33 | 277,64 | 316,78 |
| | | | | 15 | 0,67 | 15,83 | 444,49 | 120,00 | 70,38 | 300,16 | 396,15 | 444,49 |
| | | | | 20 | 0,67 | 22,21 | 545,12 | 120,00 | 116,55 | 406,31 | 500,28 | 545,12 |
| | | | | 25 | 0,67 | 28,59 | 621,64 | 120,00 | 196,92 | 489,01 | 578,10 | 621,64 |
| | | | | 30 | 0,67 | 34,98 | 676,52 | 120,00 | 294,36 | 556,41 | 635,14 | 676,52 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch


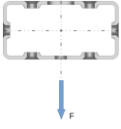

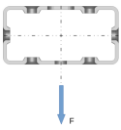

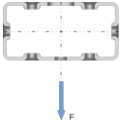
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D31

Table D50: Calculation-based deformation in case of fire for installation channels MT-80 S OC and MT-80 OC

| System | | | Load direction | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|-----------|---|---|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{(3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - |  | 5 | 0,50 | 695,64 | 33,01 | 120,00 | 3,91 | 30,49 | 30,49 | 33,01 |
| | | | | 10 | 0,50 | 1402,76 | 50,48 | 120,00 | 4,84 | 33,95 | 37,76 | 50,48 |
| | | | | 15 | 0,50 | 2109,88 | 45,66 | 70,00 | 6,15 | 39,48 | - | - |
| | | | | 20 | 0,50 | 2817,00 | 32,97 | 46,67 | 8,58 | - | - | - |
| | | | | 25 | 0,50 | 3524,12 | 12,65 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 4231,24 | 5,59 | 20,00 | - | - | - | - |
| 1 | 500 | - |  | 5 | 0,50 | 382,28 | 33,62 | 120,00 | 4,06 | 31,01 | 31,01 | 33,62 |
| | | | | 10 | 0,50 | 776,04 | 47,93 | 120,00 | 5,26 | 35,86 | 40,97 | 47,93 |
| | | | | 15 | 0,50 | 1169,80 | 83,59 | 120,00 | 6,89 | 42,92 | 58,57 | 83,59 |
| | | | | 20 | 0,50 | 1563,56 | 166,18 | 120,00 | 9,55 | 54,26 | 102,55 | 166,18 |
| | | | | 25 | 0,50 | 1957,32 | 196,80 | 120,00 | 14,50 | 74,38 | 162,61 | 196,80 |
| | | | | 30 | 0,50 | 2351,08 | 213,12 | 120,00 | 24,49 | 128,76 | 188,32 | 213,12 |
| 2 | 500 | - |  | 5 | 0,80 | 869,55 | 37,31 | 120,00 | 4,50 | 32,31 | 33,44 | 37,31 |
| | | | | 10 | 0,80 | 1753,45 | 47,60 | 80,00 | 6,22 | 38,77 | - | - |
| | | | | 15 | 0,80 | 2637,35 | 35,52 | 48,33 | 9,35 | - | - | - |
| | | | | 20 | 0,80 | 3521,25 | 22,29 | 30,00 | 22,29 | - | - | - |
| | | | | 25 | 0,80 | 4405,15 | 14,87 | 21,67 | - | - | - | - |
| | | | | 30 | 0,80 | 5289,05 | 7,96 | 18,33 | - | - | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 477,85 | 37,91 | 120,00 | 4,87 | 33,34 | 34,55 | 37,91 |
| | | | | 10 | 0,80 | 970,05 | 59,61 | 120,00 | 6,90 | 40,77 | 49,86 | 59,61 |
| | | | | 15 | 0,80 | 1462,25 | 92,47 | 120,00 | 10,00 | 51,18 | 71,92 | 92,47 |
| | | | | 20 | 0,80 | 1954,45 | 125,08 | 120,00 | 14,78 | 66,66 | 99,64 | 125,08 |
| | | | | 25 | 0,80 | 2446,65 | 145,57 | 120,00 | 22,73 | 85,89 | 122,61 | 145,57 |
| | | | | 30 | 0,80 | 2938,85 | 157,86 | 120,00 | 35,77 | 104,68 | 138,40 | 157,86 |
| 3 | 500 | 3 |  | 5 | 0,67 | 289,85 | 34,53 | 120,00 | 4,24 | 31,42 | 31,47 | 34,53 |
| | | | | 10 | 0,67 | 584,48 | 49,08 | 120,00 | 5,42 | 35,90 | 41,32 | 49,08 |
| | | | | 15 | 0,67 | 879,12 | 55,15 | 78,33 | 7,09 | 42,91 | - | - |
| | | | | 20 | 0,67 | 1173,75 | 48,14 | 55,00 | 9,69 | - | - | - |
| | | | | 25 | 0,67 | 1468,38 | 34,51 | 40,00 | 14,38 | - | - | - |
| | | | | 30 | 0,67 | 1763,02 | 23,40 | 28,33 | - | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 159,28 | 35,97 | 120,00 | 4,61 | 32,55 | 32,94 | 35,97 |
| | | | | 10 | 0,67 | 323,35 | 53,63 | 120,00 | 6,31 | 38,76 | 45,94 | 53,63 |
| | | | | 15 | 0,67 | 487,42 | 89,12 | 120,00 | 8,53 | 47,23 | 66,05 | 89,12 |
| | | | | 20 | 0,67 | 651,48 | 153,84 | 120,00 | 11,72 | 60,54 | 99,99 | 153,84 |
| | | | | 25 | 0,67 | 815,55 | 189,53 | 120,00 | 16,84 | 81,27 | 150,90 | 189,53 |
| | | | | 30 | 0,67 | 979,62 | 209,16 | 120,00 | 25,74 | 111,49 | 180,91 | 209,16 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch


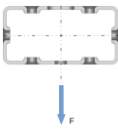

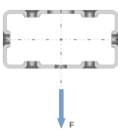
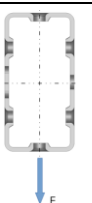
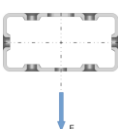
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D32

Table D51: Calculation-based deformation in case of fire for installation channels MT-80 S OC and MT-80 OC

| System | | | Load direction | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|----------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - |  | 5 | 0,50 | 372,18 | 38,41 | 120,00 | 5,01 | 34,19 | 35,16 | 38,41 |
| | | | | 10 | 0,50 | 765,03 | 62,99 | 120,00 | 7,48 | 43,31 | 53,95 | 62,99 |
| | | | | 15 | 0,50 | 1157,87 | 96,15 | 95,00 | 10,55 | 55,06 | 87,24 | - |
| | | | | 20 | 0,50 | 1550,72 | 100,05 | 68,33 | 14,79 | 74,99 | - | - |
| | | | | 25 | 0,50 | 1943,56 | 73,57 | 48,33 | 21,83 | - | - | - |
| | | | | 30 | 0,50 | 2336,41 | 43,88 | 30,00 | 43,88 | - | - | - |
| 1 | 900 | - |  | 5 | 0,50 | 198,10 | 41,58 | 120,00 | 5,97 | 36,76 | 38,35 | 41,58 |
| | | | | 10 | 0,50 | 416,85 | 72,90 | 120,00 | 9,71 | 49,38 | 63,00 | 72,90 |
| | | | | 15 | 0,50 | 635,61 | 133,11 | 120,00 | 14,01 | 64,46 | 98,39 | 133,11 |
| | | | | 20 | 0,50 | 854,36 | 267,87 | 120,00 | 19,39 | 87,31 | 158,89 | 267,87 |
| | | | | 25 | 0,50 | 1073,12 | 347,89 | 120,00 | 27,13 | 121,99 | 267,63 | 347,89 |
| | | | | 30 | 0,50 | 1291,87 | 380,84 | 120,00 | 40,86 | 184,85 | 336,11 | 380,84 |
| 2 | 900 | - |  | 5 | 0,89 | 837,42 | 48,42 | 120,00 | 6,39 | 38,70 | 44,35 | 48,42 |
| | | | | 10 | 0,89 | 1721,32 | 66,96 | 70,00 | 10,40 | 55,05 | - | - |
| | | | | 15 | 0,89 | 2605,22 | 45,18 | 41,67 | 17,10 | - | - | - |
| | | | | 20 | 0,89 | 3489,12 | 27,43 | 28,33 | - | - | - | - |
| | | | | 25 | 0,89 | 4373,02 | 19,41 | 21,67 | - | - | - | - |
| | | | | 30 | 0,89 | 5256,92 | 11,67 | 18,33 | - | - | - | - |
| 2 | 900 | - |  | 5 | 0,89 | 445,72 | 50,58 | 120,00 | 7,73 | 41,73 | 46,94 | 50,58 |
| | | | | 10 | 0,89 | 937,92 | 98,64 | 120,00 | 13,24 | 60,94 | 84,16 | 98,64 |
| | | | | 15 | 0,89 | 1430,12 | 146,26 | 120,00 | 20,95 | 82,99 | 121,73 | 146,26 |
| | | | | 20 | 0,89 | 1922,32 | 181,70 | 120,00 | 31,11 | 111,00 | 158,99 | 181,70 |
| | | | | 25 | 0,89 | 2414,52 | 207,74 | 120,00 | 44,91 | 138,12 | 187,90 | 207,74 |
| | | | | 30 | 0,89 | 2906,72 | 222,06 | 120,00 | 62,64 | 161,27 | 204,55 | 222,06 |
| 3 | 900 | 7 |  | 5 | 0,67 | 83,74 | 41,91 | 120,00 | 5,68 | 36,24 | 38,79 | 41,91 |
| | | | | 10 | 0,67 | 172,13 | 73,67 | 120,00 | 8,68 | 47,62 | 62,54 | 73,67 |
| | | | | 15 | 0,67 | 260,52 | 89,81 | 80,00 | 12,68 | 63,50 | - | - |
| | | | | 20 | 0,67 | 348,91 | 80,90 | 56,67 | 17,95 | - | - | - |
| | | | | 25 | 0,67 | 437,30 | 63,43 | 41,67 | 26,29 | - | - | - |
| | | | | 30 | 0,67 | 525,69 | 51,85 | 31,67 | 41,51 | - | - | - |
| 3 | 900 | 7 |  | 5 | 0,67 | 44,57 | 46,58 | 120,00 | 7,02 | 39,74 | 43,22 | 46,58 |
| | | | | 10 | 0,67 | 93,79 | 87,63 | 120,00 | 11,88 | 56,25 | 75,43 | 87,63 |
| | | | | 15 | 0,67 | 143,01 | 147,23 | 120,00 | 17,94 | 75,70 | 115,14 | 147,23 |
| | | | | 20 | 0,67 | 192,23 | 230,52 | 120,00 | 25,64 | 102,55 | 169,76 | 230,52 |
| | | | | 25 | 0,67 | 241,45 | 303,99 | 120,00 | 36,37 | 137,46 | 232,77 | 303,99 |
| | | | | 30 | 0,67 | 290,67 | 349,64 | 120,00 | 52,31 | 179,76 | 291,60 | 349,64 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch


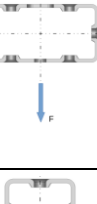
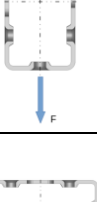


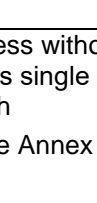
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D33

Table D52: Calculation-based deformation in case of fire for installation channels MT-80 S OC and MT-80 OC

| System | | | Load direction | σ_B | $V^1)$ | $F^2)$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|---|------------|--------|---------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - |  | 5 | 0,50 | 242,13 | 48,00 | 120,00 | 6,89 | 40,54 | 44,63 | 48,00 |
| | | | | 10 | 0,50 | 514,10 | 93,62 | 120,00 | 11,70 | 58,34 | 80,65 | 93,62 |
| | | | | 15 | 0,50 | 786,07 | 182,71 | 105,00 | 17,63 | 80,59 | 136,98 | - |
| | | | | 20 | 0,50 | 1058,03 | 170,61 | 71,67 | 25,37 | 115,22 | - | - |
| | | | | 25 | 0,50 | 1330,00 | 146,32 | 53,33 | 36,74 | - | - | - |
| | | | | 30 | 0,50 | 1601,97 | 116,13 | 38,33 | 57,23 | - | - | - |
| 1 | 1300 | - |  | 5 | 0,50 | 121,60 | 55,00 | 120,00 | 9,06 | 45,88 | 51,29 | 55,00 |
| | | | | 10 | 0,50 | 273,05 | 110,47 | 120,00 | 16,58 | 70,40 | 97,16 | 110,47 |
| | | | | 15 | 0,50 | 424,50 | 191,47 | 120,00 | 25,26 | 97,19 | 148,91 | 191,47 |
| | | | | 20 | 0,50 | 575,94 | 349,22 | 120,00 | 35,81 | 131,23 | 234,63 | 349,22 |
| | | | | 25 | 0,50 | 727,39 | 481,09 | 120,00 | 49,14 | 177,04 | 354,21 | 481,09 |
| | | | | 30 | 0,50 | 878,83 | 542,78 | 120,00 | 66,96 | 253,28 | 464,02 | 542,78 |
| 2 | 1300 | - |  | 5 | 0,92 | 786,91 | 66,81 | 120,00 | 9,38 | 48,96 | 62,36 | 66,81 |
| | | | | 10 | 0,92 | 1670,81 | 92,03 | 63,33 | 17,16 | 83,42 | - | - |
| | | | | 15 | 0,92 | 2554,71 | 57,77 | 36,67 | 29,96 | - | - | - |
| | | | | 20 | 0,92 | 3438,61 | 31,31 | 26,67 | - | - | - | - |
| | | | | 25 | 0,92 | 4322,51 | 16,66 | 20,00 | - | - | - | - |
| | | | | 30 | 0,92 | 5206,41 | 17,81 | 18,33 | - | - | - | - |
| 2 | 1300 | - |  | 5 | 0,92 | 395,21 | 68,02 | 120,00 | 11,77 | 53,30 | 63,88 | 68,02 |
| | | | | 10 | 0,92 | 887,41 | 150,59 | 120,00 | 22,44 | 89,05 | 130,10 | 150,59 |
| | | | | 15 | 0,92 | 1379,61 | 224,65 | 120,00 | 36,85 | 127,11 | 189,90 | 224,65 |
| | | | | 20 | 0,92 | 1871,81 | 277,82 | 120,00 | 54,93 | 169,19 | 241,90 | 277,82 |
| | | | | 25 | 0,92 | 2364,01 | 312,83 | 120,00 | 77,30 | 209,95 | 286,49 | 312,83 |
| | | | | 30 | 0,92 | 2856,21 | 336,03 | 120,00 | 103,18 | 244,03 | 317,92 | 336,03 |
| 3 | 1300 | 11 |  | 5 | 0,67 | 37,47 | 55,11 | 120,00 | 8,10 | 44,38 | 51,70 | 55,11 |
| | | | | 10 | 0,67 | 79,56 | 118,64 | 120,00 | 14,04 | 67,09 | 98,97 | 118,64 |
| | | | | 15 | 0,67 | 121,65 | 227,10 | 81,67 | 22,06 | 99,30 | - | - |
| | | | | 20 | 0,67 | 163,74 | 165,27 | 58,33 | 32,63 | - | - | - |
| | | | | 25 | 0,67 | 205,83 | 145,36 | 43,33 | 49,41 | - | - | - |
| | | | | 30 | 0,67 | 247,92 | 107,85 | 31,67 | 81,90 | - | - | - |
| 3 | 1300 | 11 |  | 5 | 0,67 | 18,82 | 63,47 | 120,00 | 10,91 | 50,93 | 59,51 | 63,47 |
| | | | | 10 | 0,67 | 42,26 | 137,34 | 120,00 | 20,46 | 82,23 | 118,36 | 137,34 |
| | | | | 15 | 0,67 | 65,70 | 225,20 | 120,00 | 32,26 | 117,06 | 182,86 | 225,20 |
| | | | | 20 | 0,67 | 89,13 | 327,58 | 120,00 | 46,92 | 161,79 | 258,81 | 327,58 |
| | | | | 25 | 0,67 | 112,57 | 414,57 | 120,00 | 66,30 | 213,35 | 333,03 | 414,57 |
| | | | | 30 | 0,67 | 136,01 | 479,56 | 120,00 | 93,02 | 267,96 | 401,27 | 479,56 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch


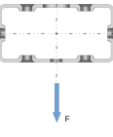

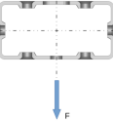
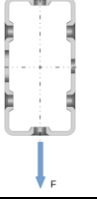
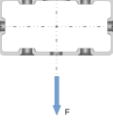
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D34

Table D53: Calculation-based deformation in case of fire for installation channels MT-80 S OC and MT-80 OC

| System | | | Load direction | σ_B | $V^1)$ | $F^2)$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|---|------------|--------|---------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1700 | - |  | 5 | 0,50 | 168,95 | 62,44 | 120,00 | 9,66 | 49,82 | 58,75 | 62,44 |
| | | | | 10 | 0,50 | 376,93 | 136,59 | 120,00 | 17,59 | 79,31 | 117,83 | 136,59 |
| | | | | 15 | 0,50 | 584,91 | 269,94 | 105,00 | 27,46 | 115,47 | 206,03 | - |
| | | | | 20 | 0,50 | 792,88 | 260,64 | 71,67 | 39,97 | 170,27 | - | - |
| | | | | 25 | 0,50 | 1000,86 | 250,27 | 55,00 | 57,92 | - | - | - |
| | | | | 30 | 0,50 | 1208,83 | 185,75 | 40,00 | 86,70 | - | - | - |
| 1 | 1700 | - |  | 5 | 0,50 | 76,79 | 74,67 | 120,00 | 13,61 | 58,99 | 70,21 | 74,67 |
| | | | | 10 | 0,50 | 192,60 | 163,74 | 120,00 | 26,10 | 98,74 | 143,60 | 163,74 |
| | | | | 15 | 0,50 | 308,41 | 268,90 | 120,00 | 40,58 | 141,54 | 221,80 | 268,90 |
| | | | | 20 | 0,50 | 424,22 | 400,99 | 120,00 | 58,11 | 193,51 | 313,55 | 400,99 |
| | | | | 25 | 0,50 | 540,03 | 552,73 | 120,00 | 80,02 | 254,05 | 412,05 | 552,73 |
| | | | | 30 | 0,50 | 655,85 | 639,97 | 120,00 | 108,54 | 320,86 | 535,96 | 639,97 |
| 2 | 1700 | - |  | 5 | 0,94 | 718,05 | 92,79 | 120,00 | 13,45 | 63,16 | 87,66 | 92,79 |
| | | | | 10 | 0,94 | 1601,95 | 131,09 | 60,00 | 26,60 | 131,09 | - | - |
| | | | | 15 | 0,94 | 2485,85 | 76,15 | 33,33 | 48,44 | - | - | - |
| | | | | 20 | 0,94 | 3369,75 | 35,67 | 25,00 | - | - | - | - |
| | | | | 25 | 0,94 | 4253,65 | 24,91 | 20,00 | - | - | - | - |
| | | | | 30 | 0,94 | 5137,55 | 26,85 | 18,33 | - | - | - | - |
| 2 | 1700 | - |  | 5 | 0,94 | 326,35 | 89,58 | 120,00 | 16,82 | 67,55 | 84,64 | 89,58 |
| | | | | 10 | 0,94 | 818,55 | 212,46 | 120,00 | 34,24 | 123,48 | 184,75 | 212,46 |
| | | | | 15 | 0,94 | 1310,75 | 317,02 | 120,00 | 57,17 | 180,56 | 270,07 | 317,02 |
| | | | | 20 | 0,94 | 1802,95 | 391,17 | 120,00 | 85,25 | 237,59 | 338,87 | 391,17 |
| | | | | 25 | 0,94 | 2295,15 | 441,73 | 120,00 | 118,23 | 293,09 | 397,10 | 441,73 |
| | | | | 30 | 0,94 | 2787,35 | 473,10 | 120,00 | 154,02 | 339,46 | 439,80 | 473,10 |
| 3 | 1700 | 15 |  | 5 | 0,67 | 19,95 | 73,56 | 120,00 | 11,49 | 55,67 | 69,72 | 73,56 |
| | | | | 10 | 0,67 | 44,50 | 176,48 | 120,00 | 21,36 | 93,42 | 147,01 | 176,48 |
| | | | | 15 | 0,67 | 69,05 | 744,33 | 120,00 | 34,81 | 145,87 | 436,38 | 744,33 |
| | | | | 20 | 0,67 | 93,60 | 802,13 | 120,00 | 52,43 | 282,52 | 764,75 | 802,13 |
| | | | | 25 | 0,67 | 118,16 | 392,10 | 46,67 | 80,08 | - | - | - |
| | | | | 30 | 0,67 | 142,71 | 169,01 | 31,67 | 130,63 | - | - | - |
| 3 | 1700 | 15 |  | 5 | 0,67 | 9,07 | 85,70 | 120,00 | 16,14 | 65,59 | 80,89 | 85,70 |
| | | | | 10 | 0,67 | 22,74 | 197,60 | 120,00 | 31,68 | 114,89 | 171,05 | 197,60 |
| | | | | 15 | 0,67 | 36,41 | 315,56 | 120,00 | 50,73 | 167,78 | 261,79 | 315,56 |
| | | | | 20 | 0,67 | 50,08 | 433,69 | 120,00 | 74,13 | 230,93 | 357,41 | 433,69 |
| | | | | 25 | 0,67 | 63,75 | 533,46 | 120,00 | 103,95 | 298,66 | 445,25 | 533,46 |
| | | | | 30 | 0,67 | 77,43 | 607,61 | 120,00 | 142,80 | 366,38 | 520,21 | 607,61 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch


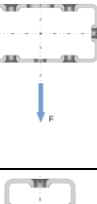
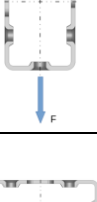


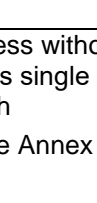
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D35

Table D54: Calculation-based deformation in case of fire for installation channels MT-80 S OC and MT-80 OC

| System | | | Load direction | σ_B | $V^1)$ | $F^2)$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|---|------------|--------|---------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2100 | - |  | 5 | 0,50 | 120,16 | 83,18 | 120,00 | 13,57 | 62,85 | 79,02 | 83,18 |
| | | | | 10 | 0,50 | 288,52 | 193,72 | 120,00 | 25,42 | 107,14 | 167,11 | 193,72 |
| | | | | 15 | 0,50 | 456,88 | 432,28 | 103,33 | 40,38 | 160,91 | 301,21 | - |
| | | | | 20 | 0,50 | 625,24 | 454,54 | 71,67 | 59,13 | 242,29 | - | - |
| | | | | 25 | 0,50 | 793,60 | 335,47 | 53,33 | 85,54 | - | - | - |
| | | | | 30 | 0,50 | 961,97 | 271,62 | 40,00 | 126,41 | - | - | - |
| 1 | 2100 | - |  | 5 | 0,50 | 45,55 | 101,80 | 120,00 | 19,93 | 76,75 | 96,25 | 101,80 |
| | | | | 10 | 0,50 | 139,30 | 229,82 | 120,00 | 38,54 | 134,63 | 201,42 | 229,82 |
| | | | | 15 | 0,50 | 233,05 | 368,17 | 120,00 | 60,14 | 195,86 | 307,61 | 368,17 |
| | | | | 20 | 0,50 | 326,80 | 519,87 | 120,00 | 86,18 | 267,21 | 421,96 | 519,87 |
| | | | | 25 | 0,50 | 420,56 | 660,20 | 120,00 | 118,30 | 345,93 | 534,50 | 660,20 |
| | | | | 30 | 0,50 | 514,31 | 785,76 | 120,00 | 159,04 | 428,46 | 643,89 | 785,76 |
| 2 | 2100 | - |  | 5 | 0,95 | 630,82 | 125,99 | 120,00 | 18,61 | 81,22 | 119,80 | 125,99 |
| | | | | 10 | 0,95 | 1514,72 | 165,38 | 56,67 | 38,79 | - | - | - |
| | | | | 15 | 0,95 | 2398,62 | 106,50 | 31,67 | 73,38 | - | - | - |
| | | | | 20 | 0,95 | 3282,52 | 54,07 | 25,00 | - | - | - | - |
| | | | | 25 | 0,95 | 4166,42 | 35,86 | 20,00 | - | - | - | - |
| | | | | 30 | 0,95 | 5050,32 | 24,72 | 16,67 | - | - | - | - |
| 2 | 2100 | - |  | 5 | 0,95 | 239,12 | 115,35 | 120,00 | 22,89 | 84,53 | 109,37 | 115,35 |
| | | | | 10 | 0,95 | 731,32 | 284,17 | 120,00 | 48,45 | 163,56 | 247,68 | 284,17 |
| | | | | 15 | 0,95 | 1223,52 | 421,52 | 120,00 | 81,50 | 242,04 | 360,67 | 421,52 |
| | | | | 20 | 0,95 | 1715,72 | 515,33 | 120,00 | 121,55 | 315,26 | 448,60 | 515,33 |
| | | | | 25 | 0,95 | 2207,92 | 577,86 | 120,00 | 166,77 | 386,33 | 517,77 | 577,86 |
| | | | | 30 | 0,95 | 2700,12 | 617,24 | 120,00 | 213,99 | 444,99 | 569,82 | 617,24 |
| 3 | 2100 | 19 |  | 5 | 0,67 | 11,47 | 98,15 | 120,00 | 16,00 | 70,61 | 93,75 | 98,15 |
| | | | | 10 | 0,67 | 27,54 | 248,72 | 120,00 | 30,85 | 127,22 | 207,64 | 248,72 |
| | | | | 15 | 0,67 | 43,61 | 783,34 | 120,00 | 51,22 | 204,64 | 527,36 | 783,34 |
| | | | | 20 | 0,67 | 59,68 | 949,12 | 120,00 | 77,86 | 400,37 | 857,93 | 949,12 |
| | | | | 25 | 0,67 | 75,75 | 993,65 | 120,00 | 119,18 | 799,47 | 960,24 | 993,65 |
| | | | | 30 | 0,67 | 91,82 | 258,19 | 31,67 | 193,61 | - | - | - |
| 3 | 2100 | 19 |  | 5 | 0,67 | 4,35 | 114,10 | 120,00 | 22,88 | 84,18 | 108,11 | 114,10 |
| | | | | 10 | 0,67 | 13,30 | 268,38 | 120,00 | 45,75 | 154,39 | 233,47 | 268,38 |
| | | | | 15 | 0,67 | 22,25 | 417,27 | 120,00 | 73,52 | 227,60 | 351,66 | 417,27 |
| | | | | 20 | 0,67 | 31,19 | 548,65 | 120,00 | 107,21 | 309,42 | 465,17 | 548,65 |
| | | | | 25 | 0,67 | 40,14 | 659,76 | 120,00 | 148,89 | 393,45 | 566,36 | 659,76 |
| | | | | 30 | 0,67 | 49,09 | 741,32 | 120,00 | 200,63 | 473,38 | 648,91 | 741,32 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch


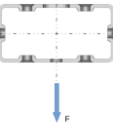

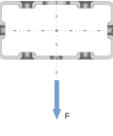
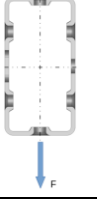
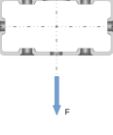
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D36

Table D55: Calculation-based deformation in case of fire for installation channels MT-80 S OC and MT-80 OC

| System | | | Load direction | σ_B | $V^1)$ | $F^2)$ | $\delta_{t_{max};B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|----------|--------|----|---|------------|--------|---------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Loadcase | $L^3)$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2500 | - |  | 5 | 0,50 | 84,04 | 111,94 | 120,00 | 18,91 | 80,51 | 107,14 | 111,94 |
| | | | | 10 | 0,50 | 225,46 | 266,28 | 120,00 | 35,47 | 142,67 | 229,51 | 266,28 |
| | | | | 15 | 0,50 | 366,88 | 802,33 | 110,00 | 56,71 | 217,73 | 444,31 | - |
| | | | | 20 | 0,50 | 508,31 | 773,69 | 75,00 | 83,20 | 335,07 | - | - |
| | | | | 25 | 0,50 | 649,73 | 553,35 | 53,33 | 120,18 | - | - | - |
| | | | | 30 | 0,50 | 791,16 | 357,60 | 38,33 | 176,40 | - | - | - |
| 1 | 2500 | - |  | 5 | 0,50 | 21,36 | 138,02 | 120,00 | 28,38 | 100,04 | 130,94 | 138,02 |
| | | | | 10 | 0,50 | 100,12 | 308,53 | 120,00 | 54,19 | 178,52 | 270,72 | 308,53 |
| | | | | 15 | 0,50 | 178,87 | 479,18 | 120,00 | 84,29 | 260,12 | 405,06 | 479,18 |
| | | | | 20 | 0,50 | 257,62 | 648,90 | 120,00 | 120,30 | 351,28 | 540,54 | 648,90 |
| | | | | 25 | 0,50 | 336,37 | 799,48 | 120,00 | 164,15 | 447,94 | 668,01 | 799,48 |
| | | | | 30 | 0,50 | 415,12 | 920,41 | 120,00 | 218,40 | 545,27 | 783,93 | 920,41 |
| 2 | 2500 | - |  | 5 | 0,96 | 525,22 | 167,24 | 120,00 | 25,23 | 104,23 | 159,69 | 167,24 |
| | | | | 10 | 0,96 | 1409,12 | 232,67 | 56,67 | 54,14 | - | - | - |
| | | | | 15 | 0,96 | 2293,02 | 104,86 | 30,00 | 104,86 | - | - | - |
| | | | | 20 | 0,96 | 3176,92 | 74,04 | 25,00 | - | - | - | - |
| | | | | 25 | 0,96 | 4060,82 | 49,16 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 4944,72 | 33,95 | 16,67 | - | - | - | - |
| 2 | 2500 | - |  | 5 | 0,96 | 133,52 | 145,36 | 120,00 | 30,03 | 104,44 | 138,15 | 145,36 |
| | | | | 10 | 0,96 | 625,72 | 364,93 | 120,00 | 64,95 | 208,49 | 318,19 | 364,93 |
| | | | | 15 | 0,96 | 1117,92 | 537,66 | 120,00 | 109,40 | 310,87 | 461,33 | 537,66 |
| | | | | 20 | 0,96 | 1610,12 | 651,27 | 120,00 | 163,48 | 401,99 | 569,29 | 651,27 |
| | | | | 25 | 0,96 | 2102,32 | 724,49 | 120,00 | 222,40 | 489,01 | 648,80 | 724,49 |
| | | | | 30 | 0,96 | 2594,52 | 770,14 | 120,00 | 282,41 | 560,63 | 708,64 | 770,14 |
| 3 | 2500 | 23 |  | 5 | 0,67 | 6,73 | 129,65 | 120,00 | 21,75 | 89,60 | 124,51 | 129,65 |
| | | | | 10 | 0,67 | 18,07 | 334,26 | 120,00 | 42,67 | 168,76 | 280,38 | 334,26 |
| | | | | 15 | 0,67 | 29,40 | 832,28 | 120,00 | 71,46 | 275,19 | 646,73 | 832,28 |
| | | | | 20 | 0,67 | 40,73 | 1062,42 | 120,00 | 109,03 | 529,85 | 903,31 | 1062,42 |
| | | | | 25 | 0,67 | 52,06 | 1146,38 | 120,00 | 166,63 | 807,77 | 1085,21 | 1146,38 |
| | | | | 30 | 0,67 | 63,39 | 1202,27 | 120,00 | 271,92 | 1102,39 | 1176,33 | 1202,27 |
| 3 | 2500 | 23 |  | 5 | 0,67 | 1,71 | 149,31 | 120,00 | 31,32 | 107,01 | 141,74 | 149,31 |
| | | | | 10 | 0,67 | 8,02 | 348,26 | 120,00 | 62,61 | 200,36 | 304,42 | 348,26 |
| | | | | 15 | 0,67 | 14,33 | 527,60 | 120,00 | 100,39 | 295,27 | 450,39 | 527,60 |
| | | | | 20 | 0,67 | 20,64 | 672,83 | 120,00 | 145,71 | 395,98 | 581,12 | 672,83 |
| | | | | 25 | 0,67 | 26,95 | 792,97 | 120,00 | 200,13 | 496,13 | 694,65 | 792,97 |
| | | | | 30 | 0,67 | 33,26 | 881,96 | 120,00 | 265,20 | 587,86 | 785,50 | 881,96 |

¹⁾ Momentum degree of fullness without contribution from channel dead weight

²⁾ Size of designated system's single load

³⁾ Dimensions in mm and inch

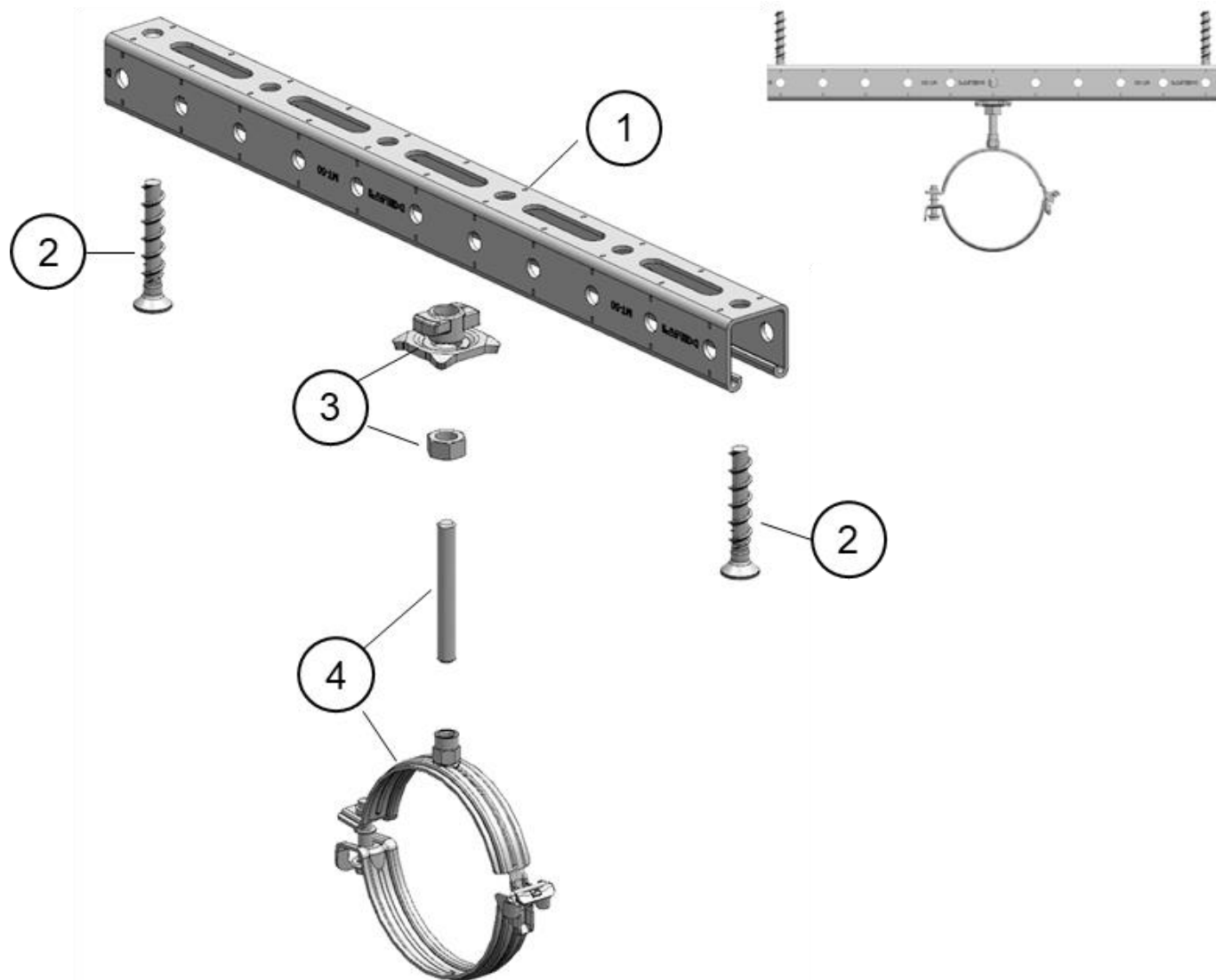
Symbols and designation see Annex D1

Hilti MT installation channels

Bending characteristics of the channel in case of fire

Annex D37

Figure E1: Example use case Hilti MT installation channel used as headrail



Legend

- 1 MT-30, MT-40, MT-40D or MT-50
- 2 Fastener to the substructure
- 3 MQA-B with hexagonal nut
- 4 Pipe ring with threaded rod

Annex

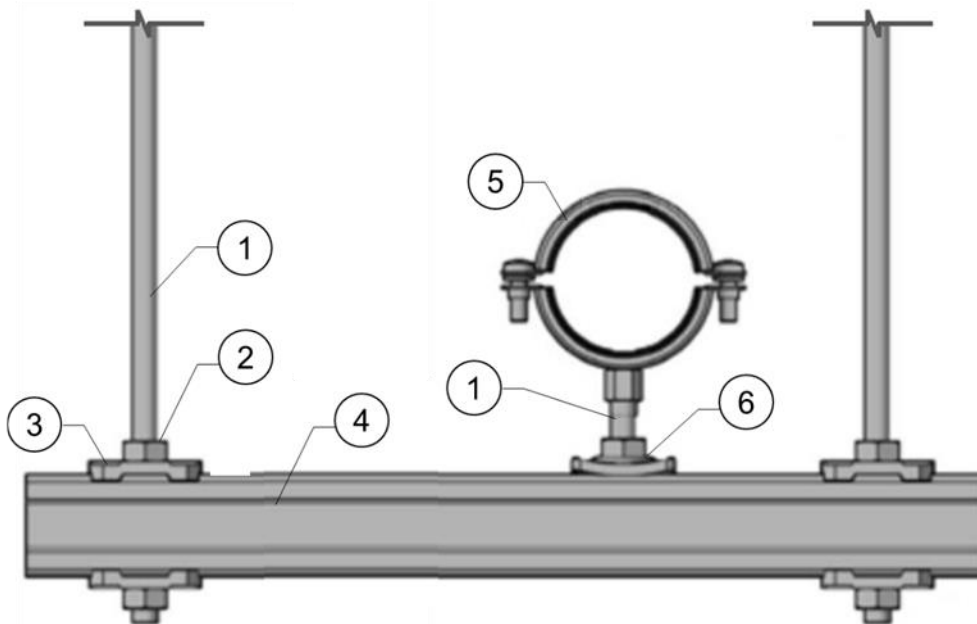
- A1
- Not an integral part of this ETA
- Not an integral part of this ETA
- Not an integral part of this ETA

Hilti MT installation channels

Example usage: Hilti MT installation channel used as headrail

Annex E1
 (informative)

Figure E2: Example use case Hilti MT installation channel used as rod trapeze



Legend

- 1 Threaded rod
- 2 Hexagonal nut
- 3 MQZ-L drilled plates
- 4 MT-30, MT-40, MT-40D or MT-50
- 5 Pipe ring
- 6 MQA-B saddle nut

Annex

- Not an integral part of this ETA
- Not an integral part of this ETA
- Not an integral part of this ETA
- Annex A
- Not an integral part of this ETA
- Not an integral part of this ETA

Hilti MT installation channels

Example usage: Hilti MT installation channel used as rod-trapeze

Annex E2
 (informative)



Evaluation Technique Européenne

ETE-23/0105 du 18/08/2023

(Version originale en langue française)

Partie Générale

Organisme d'Evaluation Technique (TAB) délivrant l'Evaluation Technique Européenne:

Centre Scientifique et Technique du Bâtiment (CSTB)

Nom commercial du produit de construction:

Rails d'installation Hilti du Système MT

Famille de produit à laquelle le produit de construction appartient:

Produits pour les systèmes d'installation pour le support des équipements techniques du bâtiment

Fabricant:

Hilti AG Liechtenstein
Feldkircherstraße 100
9494 Schaan
FÜRSTENTUM LIECHTENSTEIN

Usine(s) de fabrication:

L 8321, L 1138282

Cette Evaluation Technique Européenne contient:

57 pages incluant 54 pages d'annexes qui font partie intégrante de cette évaluation

Cette Evaluation Technique Européenne est délivrée en accord avec la réglementation (EU) No 305/2011, sur la base de:

European Assessment Document (EAD)
280016-00-0602 version June 2020

Cette Evaluation remplace:

-

Corrigendum

Les traductions de cette Evaluation Technique Européenne dans d'autres langues doivent correspondre pleinement au document original et doivent être identifiées comme telles. La communication de cette évaluation technique européenne, y compris la transmission par voie électronique, doit être complète. Cependant, une reproduction partielle peut être faite, avec le consentement écrit de l'organisme d'évaluation technique d'émission. Toute reproduction partielle doit être identifiée comme telle. La présente Evaluation Technique Européenne peut être retirée par l'Organisme d'Evaluation Technique émetteur, notamment sur information de la Commission conformément à l'article 25, paragraphe 3, du règlement (UE) n° 305/2011.

Partie Spécifique

1 Description Technique du Produit

Cette Evaluation Technique Européenne couvre les rails d'installation Hilti du Système MT: MT-10, MT-15, MT-15 OC, MT-20, MT-20 OC, MT-30 S, MT-30, MT-30 S OC, MT-30 OC, MT-40 S, MT-40, MT-40 S OC, MT-40 T, MT-40 T OC, MT-40 OC, MT-40D S, MT-40D, MT-40D S OC, MT-40D OC, MT-50 S, MT-50, MT-50 S OC, MT-50 OC, MT-70 S OC, MT-70 OC, MT-80 S OC, MT-80 OC, MT-90 S OC, MT-90 OC, MT-100 S OC et MT-100 OC.

Les rails d'installation Hilti MT-10, MT-15, MT-15 OC, MT-20, MT-20 OC, MT-40 T et MT-40 T OC sont fabriqués en acier de faible épaisseur, en forme de L ou de C. Des trous de formes circulaire ou oblongue permettent l'utilisation de fixation ou de pièces à fixer.

Les rails d'installation Hilti MT-30 S, MT-30, MT-30 S OC, MT-30 OC, MT-40 S, MT-40, MT-40 S OC, MT-40 OC, MT-50 S, MT-50, MT-50 S OC, MT-50 OC, MT-60, MT-60 S, MT-60 OC et MT-60 S OC sont fabriqués en acier de faible épaisseur avec des cotés parallèles. Les côtés du rail sont recourbés à son extrémité ce qui rend possible de rentrer les rails en force dans des systèmes de fixation qui leurs sont spécifiques. Des trous de formes circulaire ou oblongue permettent l'utilisation de fixation ou de pièces à fixer.

Les rails d'installation Hilti MT-70 S OC, MT-70 OC, MT-80 S OC, MT-80 OC, MT-90 S OC, MT-90 OC, MT-100 S OC et MT-100 OC sont fabriqués en acier de faible épaisseur, les profils sont fermés et de section carrée ou rectangulaire. Des trous et des reliefs en forme de dôme sont réalisés du coté intérieur pour permettre l'utilisation de fixations ou d'éléments à fixer.

Les rails d'installation Hilti MT-40D S, MT-40D, MT-40D S OC et MT-40D OC consistent en deux profils de type similaires tels que MT-40 S, MT-40, MT-40 S OC et MT-40 OC. Ils sont connectés entre eux aux niveaux des trous présents au dos des rails par emboîtement et rivetage.

Les rails du Système MT à profils ouverts ou fermés (poutre) peuvent être coupés sur leur longueur selon les instructions du fabricant sans compromettre les performances déclarées.

Les dessins, dimensions et matériaux des rails d'installation du Système MT de Hilti sont donnés en Annexe A.

2 Définition de l'usage prévu

Les performances données dans la section 3 sont seulement valides si les rails d'installation du système MT Hilti répondent aux exigences des spécifications et conditions données en Annexe B.

Les essais et la méthode d'évaluation sur laquelle cette Evaluation Technique Européenne est basée mènent à supposer une durée de vie des rails Hilti du Système MT d'au moins 50 ans à température ambiante et en atmosphère intérieure. Les indications relatives à la durée de vie ne peuvent pas être interprétées comme une garantie donnée par le fabricant, mais ne doivent être considérées que comme un moyen pour choisir le produit qui convient à la durée de vie économiquement raisonnable attendue des ouvrages.

Selon le European Assessment Document EAD 280016-00-0602, le produit doit être utilisé pour :

- a) L'installations de systèmes de supportages pour des kits de sprinklers,
- b) L'installations de systèmes de support de conduites pour le transport de gaz/combustible destinées à l'alimentation des systèmes de chauffage/refroidissement des bâtiments.

3 Performances du produit et références aux méthodes utilisées pour leur évaluation

3.1 Sécurité en cas d'incendie (BWR 2)

| No. | Caractéristique essentielle | Performance |
|-----|---|---------------|
| 1 | Réaction au feu | Classe A1 |
| 2 | Résistance au poinçonnement des trous au dos des rails sous exposition au feu | Voir Annexe C |
| 3 | Caractéristiques à la flexion sous exposition au feu | Voir Annexe D |

3.2 Sécurité et accessibilité en cours d'utilisation (BWR 4)

| No. | Caractéristique essentielle | Performance |
|-----|---|-------------------------|
| 4 | Forme | Voir Annexe A |
| 5 | Dimensions | Voir Annexe A |
| 6 | Matériaux et caractéristiques de la section | Voir Annexe A et B |
| 7 | Résistance caractéristiques des trous au dos des rails à température ambiante | Performance non évaluée |

4 Système d'Evaluation et de Vérification de la Constance des Performances (AVCP) appliqué, avec référence à sa base juridique

Conformément au European Assessment Document EAD 280016-00-0602, la base juridique suivante s'applique:

- Dans le cas de l'emploi prévu a) spécifié en section 2:
Décision de la commission N°1996/577/EC telle qu'amendée par la décision de la Commission 2002/592/EC.:
Le Système 1 s'applique pour l'Evaluation et la Vérification de la Constance des Performances (AVCP).
- Dans le cas de l'emploi prévu b) spécifié en section 2:
Décision de la commission N°1999/472/EC telle qu'amendée par la décision de la Commission 2001/596/EC.:
Le Système 3 s'applique pour l'Evaluation et la Vérification de la Constance des Performances (AVCP).

5 Détails techniques nécessaires à l'implémentation du système AVCP, tel que proposé dans l'EAD concerné

Les données techniques nécessaires à la mise en œuvre du système d'Evaluation et de Vérification de la Constance des Performances (AVCP) sont définies dans le plan de contrôle (partie confidentielle de l'Evaluation Technique Européenne) déposé au Centre Scientifique et Technique du Bâtiment.

Le fabricant doit, sous la forme d'un contrat, impliquer un organisme notifié approuvé dans le domaine des systèmes de supportage pour la délivrance d'un certificat de conformité CE basé sur le plan de contrôle.

Délivrée à Marne La Vallée le 18/08/2023 par :

Anca CRONOPOL

Cheffe de la division Structure, Maçonnerie et Partition

Tableau A1: Dimensions et matériaux des rails d'installation Hilti MT-10, MT-15, MT-15 OC, MT-20, MT-20 OC, MT-30 S, MT-30, MT-30 S OC et MT-30 OC

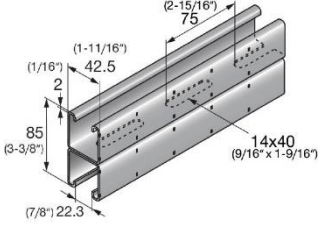
| Illustration (Dimensions en mm et pouces) | Numéro de l'élément | Référence | Longueur [m] | Matériaux et revêtements |
|--|---------------------|------------|--------------|--|
| | 2268492 | MT-10 | 2 | S280GD ou équivalent tel que défini dans HN704 + Z275-M-A-C selon l'EN 10346 |
| | 2268493 | MT-15 | 2 | S280GD ou équivalent tel que défini dans HN704 + Z275-M-A-C selon l'EN 10346 |
| | 2268494 | MT-15 OC | 2 | S280GD ou équivalent tel que défini dans HN704 + ZM310-A-C selon l'EN 10346 |
| | 2268495 | MT-20 | 2 | S280GD ou équivalent tel que défini dans HN704 + Z275-M-A-C selon EN 10346 |
| | 2268496 | MT-20 OC | 2 | S280GD ou équivalent tel que défini dans HN704 + ZM310-A-C selon l'EN 10346 |
| | 2268497 | MT-30 S | 3 | S280GD ou équivalent tel que défini dans HN704 + Z275-M-A-C selon l'EN 10346 |
| | 2268498 | MT-30 | 6 | |
| | 2268499 | MT-30 S OC | 3 | S280GD ou équivalent tel que défini dans HN704 + ZM310-A-C selon l'EN 10346 |
| | 2268500 | MT-30 OC | 6 | |

Rails d'installation Hilti MT

Description du produit

Annexe A1

Tableau A3: Dimensions et matériaux des rails d'installation Hilti, MT-40D S, MT-40D, MT-40D S OC et MT-40 D OC

| Illustration (Dimensions en mm et pouces) | Numéro de l'élément | Référence | Longueur [m] | Matériaux et revêtements |
|--|---------------------|-------------|--------------|--|
|  <p>Deux rails MT-40 sont connectés dans la zone des trous au dos du rail par emboîtement et rivetage</p> | 2268517 | MT-40D S | 3 | S280GD ou équivalent tel que défini dans HN704 + Z275-M-A-C selon l'EN 10346 |
| | 2268518 | MT-40D | 6 | |
| | 2268519 | MT-40D S OC | 3 | S280GD ou équivalent tel que défini dans HN704 + ZM310-A-C selon l'EN 10346 |
| | 2268520 | MT-40D OC | 6 | |

Rails d'installation Hilti MT

Description du produit

Annexe A3

Tableau A4: Dimensions et matériaux des rails d'installation Hilti MT-70 S OC, MT-70 OC, MT-280 S OC, MT-80 OC, MT-90 S OC, MT-90 OC, MT-100 S OC et MT-100 OC

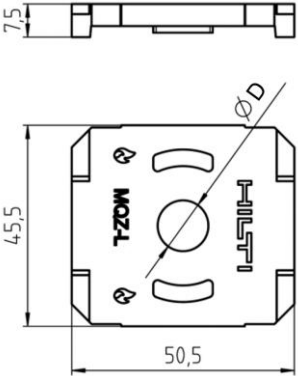
| Illustration (Dimensions en mm et pouces) | Numéro de l'élément | Référence | Longueur [m] | Matériaux et revêtements |
|--|---------------------|-------------|--------------|--|
| | 2268364 | MT-70 S OC | 3 | S350GD+ ZM310-A-C selon l'EN 10346 |
| | 2268365 | MT-70 OC | 6 | |
| | 2268366 | MT-80 S OC | 3 | S350GD+ ZM310-A-C selon l'EN 10346 |
| | 2268367 | MT-80 OC | 6 | |
| | 2268368 | MT-90 S OC | 3 | S350GD+ ZM310-A-C selon l'EN 10346 |
| | 2268369 | MT-90 OC | 6 | |
| | 2268490 | MT-100 S OC | 3 | S350GD+ ZM310-A-C selon l'EN 10346 |
| | 2268491 | MT-100 OC | 6 | |

Rails d'installation Hilti MT

Description du produit

Annexe A4

Tableau B1: Dimensions et matériaux des plaques percées Hilti MQZ-L11 et MQZ-L13

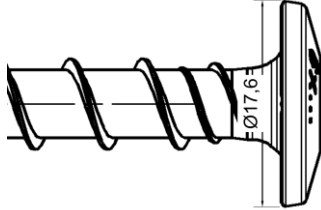
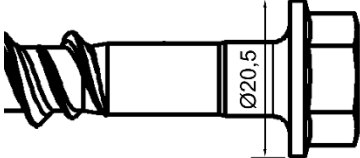
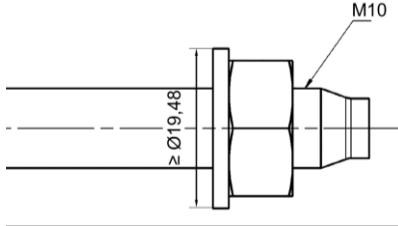
| Numéro de l'élément | Référence | D [mm] | Matériaux | Illustration (Dimensions en mm et pouces) |
|---------------------|-----------|--------|--|---|
| 2199455 | MQZ-L11 | 11,5 | S235JR selon DIN EN 10025-2, galvanisé |  |
| 2199456 | MQZ-L13 | 13,5 | | |

Plaques percées Hilti MQZ-L

Prérequis pour l'évaluation des performances

Annexe B1

Tableau B2: Ancrages pour la fixation des rails au travers des trous au dos des rails

| Référence | Description | Dimensions de la tête de l'ancrage (en mm) |
|----------------------------|--------------------------|--|
| HUS3-P6 x L ¹⁾ | Vis à béton |  |
| HUS4-H8 x L ¹⁾ | Vis à béton |  |
| HST3-M10 x L ¹⁾ | Goujon avec filetage M10 |  |
| Vis M10 + rondelle 10.5 | Vis M10 ≥ 4.8 et A4-70 | Rondelle EN ISO 7089-10.5-200HV avec un écrou hexagonal M10 de classe de résistance ≥ 8 ISO 4032 |

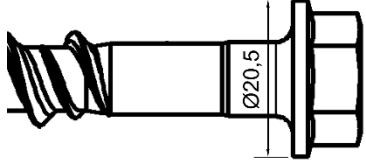
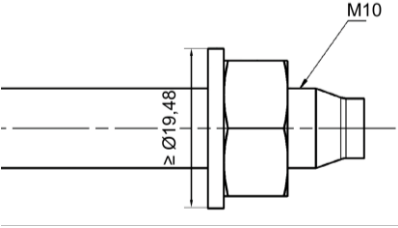
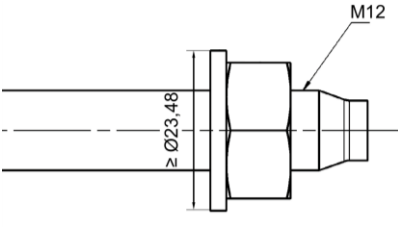
¹⁾ L = longueur de l'ancrage, voir la brochure du fabricant

Ancrages Hilti pour la fixation des rails

Prérequis pour l'évaluation des performances

Annexe B2

Tableau B3: Ancrages pour la fixation des rails au travers des trous au dos des rails avec des plaques percées MQZ-L 11 et MQZ-L 13

| Référence | Description | Dimensions de la tête de l'ancrage (in mm) | Plaque percée |
|----------------------------|--------------------------|--|---------------|
| HUS4-H10 x L ²⁾ | Vis à béton |  | MQZ-L13 |
| HST3-M10 x L ²⁾ | Goujon avec filetage M10 |  | MQZ-L11 |
| HST3-M12 x L ²⁾ | Goujon avec filetage M12 |  | MQZ-L13 |
| Vis M10 | Vis M10 ≥ 4.8 et A4-70 | Rondelle EN ISO 7089-10.5-200HV avec écrou hexagonal M10 classe de résistance ≥ 8 ISO 4032 | MQZ-L11 |
| Vis M12 | Vis M12 ≥ 4.8 et A4-70 | Rondelle EN ISO 7089-13-200HV avec écrou hexagonal M12 classe de résistance ≥ 8 ISO 4032 | MQZ-L13 |

²⁾ L = longueur de l'ancrage, voir la brochure du fabricant

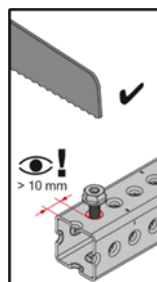
Ancrages Hilti pour la fixation des rails

Prérequis pour l'évaluation des performances

Annexe B3

Précisions sur le domaine d'emploi

- Les rails du Système MT de Hilti sont utilisés pour reprendre les charges des composants de service du bâtiment tel que les conduits et équipement pour les sprinklers, l'eau, le chauffage, le refroidissement, la ventilation, les systèmes électriques et autres à température ambiante et en cas d'incendie. Les rails du Système MT de Hilti remplissent cette fonction de reprise de charges dans les conditions décrites dans la section 2 de la présente Evaluation Technique Européenne.
- Les rails d'installation Hilti MT-30, MT-40, MT-40D, MT-50, MT-70 et MT-80 (sans considération de longueur ou de revêtement) faisant partie de cette Evaluation Technique Européenne sont utilisés pour des applications à température ambiante et en cas d'incendie.
- Les rails d'installation Hilti MT-10, MT-15, MT-20, MT-90 et MT-100 (sans considération de longueur ou de revêtement) faisant partie de cette Evaluation Technique Européenne sont utilisés pour des applications à température ambiante.
- Les résistances et déformations à température ambiante sont applicables pour des charges statiques et centrées.
- Les résistances et déformations en cas d'incendie se réfèrent aux conditions aux limites des courbes standards Température / Temps (STTC) selon l'EN 1363-1.
- Les rails MT utilisés en système headrail sont installés avec l'ouverture du profile face opposée au plafond. En cas d'incendie des composants validés par des essais au feu sont attachés en dessous en utilisant des écrous pour rails Hilti MQA-M10-B, MQA-M12-B ou MQA-M16-B. Les rails sont montés sur le matériau support en cas d'incendie en utilisant des plaques percées MQZ-L11 ou MQZ-L13 avec des fixations appropriées. Les rails MT peuvent être montés sur le matériau support pour une utilisation à température ambiante avec fixations à travers les trous oblongs sans utiliser les plaques percées MQZ-L11 ou MQZ-L13. Les rails MT-30, MT-40 et MT-50 peuvent être montés sur le matériau support à température ambiante et en cas d'incendie avec des fixations adaptées à travers les trous circulaires sans utiliser les plaques percées MQZ-L11 ou MQZ-L13.
- La résistance au poinçonnement des trous circulaires au dos des rails cas d'incendie résulte d'une combinaison avec les fixations spécifiées dans le Tableau B2.
- Dans le cas de systèmes de rails suspendus (e.g. trapèze et tiges), le coté ouvert du rail peut être orientée vers le bas ou vers le haut.
- Les rails d'installation à profils ouverts et fermés du système MT (poutres) peuvent être coupés sur leur longueur selon les instructions des fabricants sans compromettre les performances déclarées.
- Pour les poutres la distance entre la fin de la poutre et le début du trou en forme de dôme doit au moins être de 10 mm.

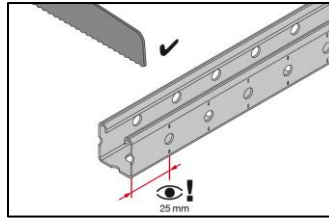


- Pour les rails la distance entre l'extrémité du rail et le centre du trou le plus proche doit au moins être de 25 mm.

Rails d'installation Hilti MT

Emploi prévu
Spécifications

Annexe B4



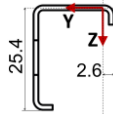
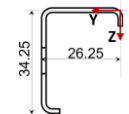

- Les tiges filetées et autres attaches doivent se positionner au niveau des trous circulaires ou oblongs des rails.
- La fixation du connecteur support dans le matériau support doit être réalisée avec un ancrage approprié et avoir un certificat pour une exposition au feu
- Avant installation, il doit être vérifié que le composant supporté, l'ancrage de la tige filetée dans le matériau support, et que le matériau support en lui-même sont adaptés et peuvent supporter les valeurs de résistance du système d'installation et qu'ils ont un certificat de résistance au feu.
- Les rails d'installation doivent être installés par du personnel approprié et sous la supervision du responsable du site. Les instructions générales du fabricant doivent être suivies.

Rails d'installation Hilti MT

Emploi prévu
Spécifications

Annexe B5

Tableau B4: Propriétés de la section des rails Hilti MT-10, MT-15, MT-15 OC, MT-20, et MT-20 OC

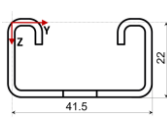
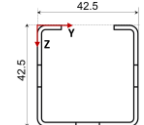
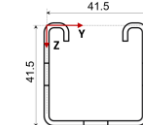
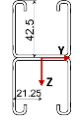
| Description | Symbole | Unité | MT-10 | MT-15 / MT-15 OC | MT-20 / MT-20 OC |
|--|---------------------|-----------------|---|--|---|
| Section (Dimensions en mm et pouces) | - | - |  |  |  |
| Classification de la section selon EN 1993-1-1 | - | - | 3 | 3 | 3 |
| Surface de la section | A | cm ² | 0.49 | 0.85 | 1.49 |
| | A _{tot} | cm ² | 0.49 | 0.85 | 1.49 |
| Surface cisailée | A _y | cm ² | NPA | NPA | NPA |
| | A _z | cm ² | NPA | NPA | NPA |
| Position du centroïde | y _{C,0} | cm | 1.22 | 1.93 | 2.02 |
| | z _{C,0} | cm | 0.92 | 1.19 | 1.64 |
| Moment d'inertie | I _y | cm ⁴ | 0.41 | 1.27 | 1.86 |
| | I _z | cm ⁴ | 0.23 | 0.72 | 3.66 |
| Moment polaire d'inertie | I _p | cm ⁴ | 0.64 | 1.98 | 5.52 |
| | I _{p,M} | cm ⁴ | 1.26 | 3.80 | 14.71 |
| Rayon de giration | i _y | cm | 0.91 | 1.22 | 1.12 |
| | i _z | cm | 0.69 | 0.92 | 1.57 |
| Rayon polaire de giration | i _p | cm | 1.14 | 1.53 | 1.92 |
| | i _{p,M} | cm | 1.61 | 2.11 | 3.14 |
| Rayon de giration de déformation | i _{w,M} | cm | NPA | NPA | NPA |
| Constante de torsion | J | cm ⁴ | NPA | NPA | NPA |
| Seconde constante de torsion | J _s | cm ⁴ | NPA | NPA | NPA |
| Position du centre de cisaillement | y _{M,0} | cm | NPA | NPA | NPA |
| | z _{M,0} | cm | NPA | NPA | NPA |
| | y _M | cm | NPA | NPA | NPA |
| | z _M | cm | NPA | NPA | NPA |
| Constantes de déformation | I _{w,C} | cm ⁶ | NPA | NPA | NPA |
| | I _{w,M} | cm ⁶ | NPA | NPA | NPA |
| Module de la section | S _{y,max} | cm ³ | 0.25 | 0.57 | 1.78 |
| | S _{y,min} | cm ³ | -0.41 | -1.00 | -1.08 |
| | S _{z,max} | cm ³ | 0.45 | 1.03 | 1.73 |
| | S _{z,min} | cm ³ | -0.16 | -0.36 | -1.73 |
| Module de torsion de la section | S _t | cm ³ | NPA | NPA | NPA |
| Moment plastique max. de flexion | M _{pl,y,k} | kNm | NPA | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA | NPA |
| Module plastique max. de la section | Z _y | cm ³ | NPA | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA | NPA |
| Surface de cisaillement plastique | A _{pl,y} | cm ² | NPA | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA | NPA |
| Position de l'axe bissecteur de la surface | f _{y,0} | cm | NPA | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA | NPA |
| Effort de cisaillement plastique | V _{pl,y,k} | kN | NPA | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA | NPA |
| Forces axiales plastiques | N _{pl,k} | kN | NPA | NPA | NPA |
| Courbes de flambement | BC _y | - | c | c | c |
| | BC _z | - | c | c | c |

Rails d'installation Hilti MT

Emploi prévu
Spécifications

Annexe B6

Tableau B5: Propriétés de la section des rails Hilti MT-30 S, MT-30, MT-30 S OC, MT-30 OC, MT-40 S, MT-40, MT-40 S OC, MT-40 OC, MT-40 T, MT-40 T OC, MT-40D S, MT-40D, MT-40D S OC et MT-40D OC

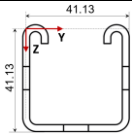
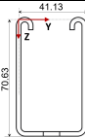
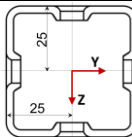
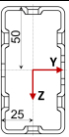
| Description | Symbole | Unité | MT-30 S / MT-30 / MT-30 S OC / MT-30 OC | MT-40 T / MT-40 T OC | MT-40 S / MT-40 / MT-40 S OC / MT-40 OC | MT-40D S / MT-40D / MT-40D S OC / MT-40D OC |
|--|---------------------|-----------------|---|--|---|---|
| Section (Dimensions en mm et pouces) | - | - |  |  |  |  |
| Classification de la section selon EN 1993-1-1 | - | - | 3 | 3 | 3 | 3 |
| Surface de la section | A | cm ² | 1.81 | 1.76 | 2.15 | 4.31 |
| | A _{tot} | cm ² | 1.81 | 1.76 | 2.15 | 4.31 |
| Surface cisailée | A _y | cm ² | NPA | NPA | NPA | NPA |
| | A _z | cm ² | NPA | NPA | NPA | NPA |
| Position du centroïde | y _{C,0} | cm | 2.02 | 2.13 | 2.02 | 0.00 |
| | z _{C,0} | cm | 1.10 | 2.30 | 2.07 | 0.00 |
| Moment d'inertie | I _y | cm ⁴ | 1.22 | 4.85 | 5.80 | 30.13 |
| | I _z | cm ⁴ | 5.22 | 5.73 | 6.61 | 13.22 |
| Moment polaire d'inertie | I _p | cm ⁴ | 6.43 | 10.58 | 12.41 | 43.35 |
| | I _{p,M} | cm ⁴ | 16.42 | 40.93 | 55.83 | 43.35 |
| Rayon de giration | i _y | cm | 0.82 | 1.66 | 1.64 | 2.64 |
| | i _z | cm | 1.70 | 1.80 | 1.75 | 1.75 |
| Rayon polaire de giration | i _p | cm | 1.89 | 2.45 | 2.40 | 3.17 |
| | i _{p,M} | cm | 3.01 | 4.82 | 5.10 | 3.17 |
| Rayon de giration de déformation | i _{w,M} | cm | NPA | NPA | NPA | NPA |
| Constante de torsion | J | cm ⁴ | NPA | NPA | NPA | NPA |
| Seconde constante de torsion | J _s | cm ⁴ | NPA | NPA | NPA | NPA |
| Position du centre de cisaillement | y _{M,0} | cm | NPA | NPA | NPA | NPA |
| | z _{M,0} | cm | NPA | NPA | NPA | NPA |
| | y _M | cm | NPA | NPA | NPA | NPA |
| | z _M | cm | NPA | NPA | NPA | NPA |
| Constantes de déformation | I _{w,C} | cm ⁶ | NPA | NPA | NPA | NPA |
| | I _{w,M} | cm ⁶ | NPA | NPA | NPA | NPA |
| Module de la section | S _{y,max} | cm ³ | 1.11 | 2.49 | 2.79 | 7.09 |
| | S _{y,min} | cm ³ | -1.01 | -2.11 | -2.67 | -7.09 |
| | S _{z,max} | cm ³ | 2.45 | 2.69 | 3.11 | 6.22 |
| | S _{z,min} | cm ³ | -2.45 | -2.69 | -3.11 | -6.22 |
| Module de torsion de la section | S _t | cm ³ | NPA | NPA | NPA | NPA |
| Moment plastique max. de flexion | M _{pl,y,k} | kNm | NPA | NPA | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA | NPA | NPA |
| Module plastique max. de la section | Z _y | cm ³ | NPA | NPA | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA | NPA | NPA |
| Surface de cisaillement plastique | A _{pl,y} | cm ² | NPA | NPA | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA | NPA | NPA |
| Position de l'axe bissecteur de la surface | f _{y,0} | cm | NPA | NPA | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA | NPA | NPA |
| Effort de cisaillement plastique | V _{pl,y,k} | kN | NPA | NPA | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA | NPA | NPA |
| Forces axiales plastiques | N _{pl,k} | kN | NPA | NPA | NPA | NPA |
| Courbes de flambement | BC _y | - | c | c | c | c |
| | BC _z | - | c | c | c | c |

Rails d'installation Hilti MT

Prérequis pour l'évaluation des performances

Annexe B7

Tableau B6: Propriétés de la section des rails Hilti MT-50 S, MT-50 S OC, MT-50, MT-50 OC, MT-60 S, MT-60 S OC, MT-60, MT-60 OC, MT-70 S OC, MT-70 OC, MT-80 S OC et MT-80 OC

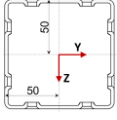
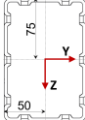
| Description | Symbole | Unité | MT-50 S / MT-50 / MT-50 S OC / MT-50 OC | MT-60 S / MT-60 S OC / MT-60 / MT-60 OC | MT-70 S OC / MT-70 OC | MT-80 S OC / MT-80 OC |
|--|---------------------|-----------------|---|--|---|---|
| Section (Dimensions en mm et pouces) | - | - |  |  |  |  |
| Classification de la section selon EN 1993-1-1 | - | - | 3 | 4 | 3 | 3 |
| Surface de la section | A | cm ² | 2.77 | 4.70 | 4.32 | 5.96 |
| | A _{tot} | cm ² | 2.77 | 4.70 | 4.32 | 5.96 |
| Surface cisailée | A _y | cm ² | NPA | NPA | NPA | NPA |
| | A _z | cm ² | NPA | NPA | NPA | NPA |
| Position du centroïde | y _{C,0} | cm | 1.99 | 1.99 | 0.00 | 0.00 |
| | z _{C,0} | cm | 2.07 | 3.66 | 0.00 | 0.00 |
| Moment d'inertie | I _y | cm ⁴ | 7.07 | 26.81 | 15.96 | 88.39 |
| | I _z | cm ⁴ | 8.30 | 16.04 | 15.96 | 24.61 |
| Moment polaire d'inertie | I _p | cm ⁴ | 15.36 | 42.85 | 31.93 | 113.00 |
| | I _{p,M} | cm ⁴ | 66.91 | 267.95 | 31.93 | 113.00 |
| Rayon de giration | i _y | cm | 1.60 | 2.39 | 1.92 | 3.85 |
| | i _z | cm | 1.73 | 1.85 | 1.92 | 2.03 |
| Rayon polaire de giration | i _p | cm | 2.35 | 3.02 | 2.72 | 4.36 |
| | i _{p,M} | cm | 4.91 | 7.55 | 2.72 | 4.36 |
| Rayon de giration de déformation | i _{ω,M} | cm | NPA | NPA | NPA | NPA |
| Constante de torsion | J | cm ⁴ | NPA | NPA | NPA | NPA |
| Seconde constante de torsion | J _s | cm ⁴ | NPA | NPA | NPA | NPA |
| Position du centre de cisaillement | y _{M,0} | cm | NPA | NPA | NPA | NPA |
| | z _{M,0} | cm | NPA | NPA | NPA | NPA |
| | y _M | cm | NPA | NPA | NPA | NPA |
| | z _M | cm | NPA | NPA | NPA | NPA |
| Constantes de déformation | I _{ω,C} | cm ⁶ | NPA | NPA | NPA | NPA |
| | I _{ω,M} | cm ⁶ | NPA | NPA | NPA | NPA |
| Module de la section | S _{y,max} | cm ³ | 3.46 | 7.89 | 6.39 | 17.68 |
| | S _{y,min} | cm ³ | -3.21 | -7.09 | -6.39 | -17.68 |
| | S _{z,max} | cm ³ | 3.90 | 7.55 | 6.39 | 9.84 |
| | S _{z,min} | cm ³ | -3.90 | -7.55 | -6.39 | -9.84 |
| Module de torsion de la section | S _t | cm ³ | NPA | NPA | NPA | NPA |
| Moment plastique max. de flexion | M _{pl,y,k} | kNm | NPA | NPA | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA | NPA | NPA |
| Module plastique max. de la section | Z _y | cm ³ | NPA | NPA | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA | NPA | NPA |
| Surface de cisaillement plastique | A _{pl,y} | cm ² | NPA | NPA | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA | NPA | NPA |
| Position de l'axe bissecteur de la surface | f _{y,0} | cm | NPA | NPA | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA | NPA | NPA |
| Effort de cisaillement plastique | V _{pl,y,k} | kN | NPA | NPA | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA | NPA | NPA |
| Forces axiales plastiques | N _{pl,k} | kN | NPA | NPA | NPA | NPA |
| Courbes de flambement | BC _y | - | c | c | c | c |
| | BC _z | - | c | c | c | c |

Hilti MT channels

Prérequis pour l'évaluation des performances

Annexe B8

Tableau B7: Propriétés de la section des rails Hilti MT-90 S OC, MT-90 OC, MT-100 S OC, MT-100 OC

| Description | Symbole | Unité | MT-90 S OC / MT-90 OC | MT-100 S OC / MT-100 OC |
|--|---------------------|-----------------|--|---|
| Section (Dimensions en mm et pouces) | - | - |  |  |
| Classification de la section selon EN 1993-1-1 | - | - | 3 | 3 |
| Surface de la section | A | cm ² | 9.80 | 15.63 |
| | A _{tot} | cm ² | 9.80 | 15.63 |
| Surface cisailée | A _y | cm ² | NPA | NPA |
| | A _z | cm ² | NPA | NPA |
| Position du centroïde | Y _{C,0} | cm | 0.00 | 0.00 |
| | Z _{C,0} | cm | 0.00 | 0.00 |
| Moment d'inertie | I _y | cm ⁴ | 151.49 | 490.02 |
| | I _z | cm ⁴ | 151.49 | 262.25 |
| Moment polaire d'inertie | I _p | cm ⁴ | 302.97 | 752.27 |
| | I _{p,M} | cm ⁴ | 302.97 | 752.27 |
| Rayon de giration | i _y | cm | 3.93 | 5.60 |
| | i _z | cm | 3.93 | 4.10 |
| Rayon polaire de giration | i _p | cm | 5.56 | 6.94 |
| | i _{p,M} | cm | 5.56 | 6.94 |
| Rayon de giration de déformation | i _{ω,M} | cm | NPA | NPA |
| Constante de torsion | J | cm ⁴ | NPA | NPA |
| Seconde constante de torsion | J _s | cm ⁴ | NPA | NPA |
| Position du centre de cisaillement | Y _{M,0} | cm | NPA | NPA |
| | Z _{M,0} | cm | NPA | NPA |
| | y _M | cm | NPA | NPA |
| | z _M | cm | NPA | NPA |
| Constantes de déformation | I _{ω,C} | cm ⁶ | NPA | NPA |
| | I _{ω,M} | cm ⁶ | NPA | NPA |
| Module de la section | S _{y,max} | cm ³ | 30.30 | 65.34 |
| | S _{y,min} | cm ³ | -30.30 | -65.34 |
| | S _{z,max} | cm ³ | 30.30 | 52.45 |
| | S _{z,min} | cm ³ | -30.30 | -52.45 |
| Module de torsion de la section | S _t | cm ³ | NPA | NPA |
| Moment plastique max. de flexion | M _{pl,y,k} | kNm | NPA | NPA |
| | M _{pl,z,k} | kNm | NPA | NPA |
| Module plastique max. de la section | Z _y | cm ³ | NPA | NPA |
| | Z _z | cm ³ | NPA | NPA |
| Surface de cisaillement plastique | A _{pl,y} | cm ² | NPA | NPA |
| | A _{pl,z} | cm ² | NPA | NPA |
| Position de l'axe bissecteur de la surface | f _{y,0} | cm | NPA | NPA |
| | f _{z,0} | cm | NPA | NPA |
| Effort de cisaillement plastique | V _{pl,y,k} | kN | NPA | NPA |
| | V _{pl,z,k} | kN | NPA | NPA |
| Forces axiales plastiques | N _{pl,k} | kN | NPA | NPA |
| Courbes de flambement | BC _y | - | c | c |
| | BC _z | - | c | c |

Hilti MT channels

Prérequis pour l'évaluation des performances

Annexe B9

Tableau C1: Résistance au poinçonnement $F_{Rk,t}$ des trous circulaires au dos des rails en cas d'incendie

| Ancrage | Rail d'installation | Paramètres de la courbe de régression | Résistance au poinçonnement $F_{Rk,t}$ en N | | | |
|--|--|---|---|-------------|-------------|--------------|
| | | $F_{Rk}(t) = c_3 (c_1 + c_2 / t)$ | $F_{Rk,30}$ | $F_{Rk,60}$ | $F_{Rk,90}$ | $F_{Rk,120}$ |
| HUS3-P6 x L ^{*)} HUS4-H8 x L ^{*)} HST4-M10 x L ^{*)} tige filetée M10 + rondelle 10.5 | MT-30 MT-30 S MT-30 OC MT-30 S OC MT-40 MT-40 S MT-40 OC MT-40 S OC MT-40D MT-40D S MT-40D OC MT-40D S OC MT-50 MT-50 S MT-50 OC MT-50 S OC | $c_1 = 971,5536$ $c_2 = 34991,5717$ $c_3 = 0,71824$ $22 \text{ min} \leq t \leq 130 \text{ min}$ | 1535,6 | 1116,7 | 997,1 | 907,2 |

^{*)} L = longueur de l'ancrage, voir les brochures des fabricants.

Référence

$F_{Rk,t}$ Résistance après une durée t en cas d'incendie [N]
 $F_{Rk}(t)$ Résistance en fonction du temps en cas d'incendie [N]

Ancrages Hilti pour la fixation des rails

Résistance caractéristique au poinçonnement en cas d'incendie

Annexe C1

Tableau C2: Résistance au poinçonnement des plaques percées $F_{Rk,t}$ of MQZ-L à travers les trous oblongs au dos des rails en cas d'incendie

| Plaques percées | Rail d'installation | Paramètres de la courbe de régression | Résistance au poinçonnement $F_{Rk,t}$ en N | | | |
|--------------------|--|---|---|-------------|-------------|--------------|
| | | $F_{Rk}(t) = c_3 (c_1 + c_2 / t)$ | $F_{Rk,30}$ | $F_{Rk,60}$ | $F_{Rk,90}$ | $F_{Rk,120}$ |
| MQZ-L11 MQZ-L13 | MT-30 MT-30 S MT-30 OC MT-30 S OC MT-40 MT-40 S MT-40 OC MT-40 S OC MT-40D MT-40D S MT-40D OC MT-40D S OC MT-50 MT-50 S MT-50 OC MT-50 S OC | $c_1 = 427,2416$ $c_2 = 130158,0662$ $c_3 = 0,910073$ $33 \text{ min} \leq t \leq 130 \text{ min}$ | 2168,65 | 1181,5 | 852,5 | 687,95 |

Référence

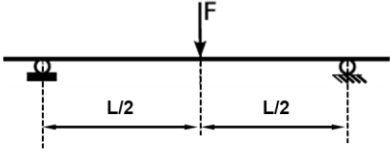
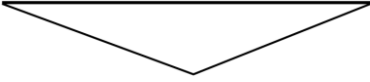
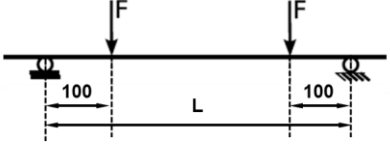

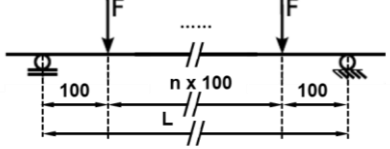

$F_{Rk,t}$ Résistance après une durée t en cas d'incendie [N]
 $F_{Rk}(t)$ Résistance en fonction du temps en cas d'incendie [N]

Plaques percées Hilti MQZ-L

Résistance caractéristique au poinçonnement en cas d'incendie

Annexe C2

Tableau D19: Caractéristiques de chargement des rails Hilti

| Cas de charge | Système | Forme de la courbe résultante du moment |
|---------------|---|--|
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

Symboles et référence

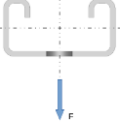
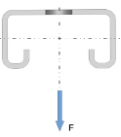

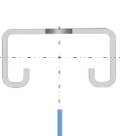
- L distance entre les appuis en mm
- n nombre d'espaces de 100 mm entre les points de chargement
- F chargement

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D1

Tableau D20: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-30, MT-30 S, MT-30 OC et MT-30 S OC

| System | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|----------|---|--|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | $L^{3)}$ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 300 | - |  | 5 | 0,50 | 65,69 | 12,03 | 120,00 | 12,03 | 12,03 | 12,03 | 12,03 |
| | | | | 10 | 0,50 | 133,47 | 22,23 | 120,00 | 13,21 | 14,03 | 16,61 | 22,23 |
| | | | | 15 | 0,50 | 201,24 | 43,04 | 120,00 | 14,75 | 19,22 | 29,00 | 43,04 |
| | | | | 20 | 0,50 | 269,02 | 68,57 | 120,00 | 16,30 | 25,55 | 44,79 | 68,57 |
| | | | | 25 | 0,50 | 336,80 | 90,40 | 120,00 | 17,92 | 33,17 | 62,02 | 90,40 |
| | | | | 30 | 0,50 | 404,58 | 104,49 | 120,00 | 19,77 | 42,43 | 79,77 | 104,49 |
| 1 | 300 | - |  | 5 | 0,50 | 65,69 | 12,15 | 120,00 | 12,15 | 12,15 | 12,15 | 12,15 |
| | | | | 10 | 0,50 | 133,47 | 26,38 | 120,00 | 13,54 | 14,98 | 18,84 | 26,38 |
| | | | | 15 | 0,50 | 201,24 | 56,39 | 120,00 | 15,24 | 20,89 | 34,63 | 56,39 |
| | | | | 20 | 0,50 | 269,02 | 76,00 | 100,00 | 17,00 | 28,40 | 57,33 | - |
| | | | | 25 | 0,50 | 336,80 | 45,84 | 66,67 | 18,88 | 38,20 | - | - |
| | | | | 30 | 0,50 | 404,58 | 52,03 | 60,00 | 21,05 | 52,03 | - | - |
| 2 / 3 | 300 | 1 |  | 5 | 0,67 | 49,27 | 12,30 | 120,00 | 12,30 | 12,30 | 12,30 | 12,30 |
| | | | | 10 | 0,67 | 100,10 | 40,58 | 120,00 | 14,03 | 16,98 | 24,66 | 40,58 |
| | | | | 15 | 0,67 | 150,93 | 88,84 | 120,00 | 16,06 | 25,21 | 53,29 | 88,84 |
| | | | | 20 | 0,67 | 201,77 | 108,13 | 120,00 | 18,13 | 37,20 | 91,35 | 108,13 |
| | | | | 25 | 0,67 | 252,60 | 111,26 | 120,00 | 20,67 | 58,86 | 100,51 | 111,26 |
| | | | | 30 | 0,67 | 303,43 | 113,86 | 120,00 | 24,11 | 80,63 | 105,77 | 113,86 |
| 2 / 3 | 300 | 1 |  | 5 | 0,67 | 49,27 | 12,38 | 120,00 | 12,38 | 12,38 | 12,38 | 12,38 |
| | | | | 10 | 0,67 | 100,10 | 38,30 | 120,00 | 14,23 | 17,44 | 25,20 | 38,30 |
| | | | | 15 | 0,67 | 150,93 | 71,97 | 120,00 | 16,36 | 25,77 | 48,27 | 71,97 |
| | | | | 20 | 0,67 | 201,77 | 104,92 | 120,00 | 18,55 | 37,17 | 71,75 | 104,92 |
| | | | | 25 | 0,67 | 252,60 | 116,31 | 120,00 | 21,22 | 52,59 | 94,32 | 116,31 |
| | | | | 30 | 0,67 | 303,43 | 120,47 | 120,00 | 24,70 | 70,86 | 106,36 | 120,47 |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

Symboles et référence

- σ_{B,θ_a} Contrainte de flexion du rail à température élevée θ_a
- σ_B Contrainte de flexion du rail
- V Facteur de correction pour la distribution du moment
- F chargement
- $\delta_{t_{max},B}$ Déformation du rail au moment d'une défaillance de la stabilité ou de la rotule plastique
- $t_{max,B}$ Durée à partir de laquelle une perte de rigidité ou une déformation plastique du rail se produit sous contrainte de flexion
- δ_{30} Déplacement après une durée d'exposition 30 minutes à des températures élevées
- δ_{60} Déplacement après une durée d'exposition 60 minutes à des températures élevées
- δ_{90} Déplacement après une durée d'exposition 90 minutes à des températures élevées
- δ_{120} Déplacement après une durée d'exposition 120 minutes à des températures élevées

Les analyses thermiques et les calculs se réfèrent aux conditions aux limites de la courbe STTC.

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D2

Tableau D21: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-30, MT-30 S, MT-30 OC et MT-30 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - | | 5 | 0,50 | 37,18 | 24,77 | 120,00 | 13,78 | 15,84 | 20,42 | 24,77 |
| | | | | 10 | 0,50 | 77,85 | 59,18 | 120,00 | 17,03 | 26,52 | 44,24 | 59,18 |
| | | | | 15 | 0,50 | 118,52 | 100,97 | 120,00 | 21,16 | 40,40 | 73,37 | 100,97 |
| | | | | 20 | 0,50 | 159,18 | 142,76 | 120,00 | 25,35 | 56,88 | 103,87 | 142,76 |
| | | | | 25 | 0,50 | 199,85 | 178,58 | 120,00 | 29,80 | 75,06 | 131,94 | 178,58 |
| | | | | 30 | 0,50 | 240,52 | 191,69 | 120,00 | 35,00 | 94,43 | 161,25 | 191,69 |
| 1 | 500 | - | | 5 | 0,50 | 37,18 | 25,93 | 120,00 | 13,89 | 16,21 | 21,31 | 25,93 |
| | | | | 10 | 0,50 | 77,85 | 65,50 | 120,00 | 17,37 | 27,69 | 47,57 | 65,50 |
| | | | | 15 | 0,50 | 118,52 | 121,73 | 120,00 | 21,69 | 42,84 | 81,15 | 121,73 |
| | | | | 20 | 0,50 | 159,18 | 142,64 | 100,00 | 26,15 | 61,33 | 122,05 | - |
| | | | | 25 | 0,50 | 199,85 | 113,38 | 73,33 | 30,98 | 82,60 | - | - |
| | | | | 30 | 0,50 | 240,52 | 127,84 | 66,67 | 36,72 | 107,29 | - | - |
| 2 | 500 | - | | 5 | 0,80 | 46,48 | 35,05 | 120,00 | 14,87 | 19,48 | 28,74 | 35,05 |
| | | | | 10 | 0,80 | 97,31 | 106,99 | 120,00 | 20,42 | 38,33 | 70,22 | 106,99 |
| | | | | 15 | 0,80 | 148,15 | 162,42 | 120,00 | 26,75 | 61,80 | 122,64 | 162,42 |
| | | | | 20 | 0,80 | 198,98 | 181,97 | 120,00 | 33,16 | 88,40 | 157,42 | 181,97 |
| | | | | 25 | 0,80 | 249,81 | 186,83 | 120,00 | 41,37 | 127,50 | 172,98 | 186,83 |
| | | | | 30 | 0,80 | 300,65 | 191,24 | 120,00 | 52,07 | 153,03 | 180,82 | 191,24 |
| 2 | 500 | - | | 5 | 0,80 | 46,48 | 35,03 | 120,00 | 14,89 | 19,52 | 28,74 | 35,03 |
| | | | | 10 | 0,80 | 97,31 | 90,19 | 120,00 | 20,49 | 38,12 | 67,44 | 90,19 |
| | | | | 15 | 0,80 | 148,15 | 131,24 | 120,00 | 26,81 | 60,77 | 106,95 | 131,24 |
| | | | | 20 | 0,80 | 198,98 | 177,45 | 120,00 | 33,19 | 84,42 | 156,77 | 177,45 |
| | | | | 25 | 0,80 | 249,81 | 186,95 | 120,00 | 41,10 | 107,18 | 170,60 | 186,95 |
| | | | | 30 | 0,80 | 300,65 | 193,19 | 120,00 | 51,13 | 143,98 | 180,14 | 193,19 |
| 3 | 500 | 3 | | 5 | 0,67 | 15,49 | 31,73 | 120,00 | 14,52 | 18,30 | 26,03 | 31,73 |
| | | | | 10 | 0,67 | 32,44 | 84,32 | 120,00 | 19,18 | 33,93 | 60,56 | 84,32 |
| | | | | 15 | 0,67 | 49,38 | 161,52 | 120,00 | 24,69 | 54,17 | 101,12 | 161,52 |
| | | | | 20 | 0,67 | 66,33 | 187,22 | 120,00 | 30,24 | 77,47 | 157,22 | 187,22 |
| | | | | 25 | 0,67 | 83,27 | 199,19 | 120,00 | 36,84 | 103,26 | 179,64 | 199,19 |
| | | | | 30 | 0,67 | 100,22 | 207,27 | 120,00 | 45,36 | 140,95 | 192,44 | 207,27 |
| 3 | 500 | 3 | | 5 | 0,67 | 15,49 | 31,74 | 120,00 | 14,53 | 18,33 | 26,07 | 31,74 |
| | | | | 10 | 0,67 | 32,44 | 82,25 | 120,00 | 19,26 | 34,07 | 60,36 | 82,25 |
| | | | | 15 | 0,67 | 49,38 | 124,65 | 120,00 | 24,84 | 54,12 | 96,57 | 124,65 |
| | | | | 20 | 0,67 | 66,33 | 166,73 | 120,00 | 30,42 | 76,51 | 130,16 | 166,73 |
| | | | | 25 | 0,67 | 83,27 | 185,55 | 120,00 | 36,97 | 99,56 | 155,21 | 185,55 |
| | | | | 30 | 0,67 | 100,22 | 197,65 | 120,00 | 45,31 | 120,08 | 174,81 | 197,65 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

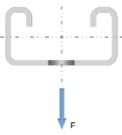
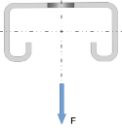
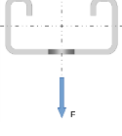
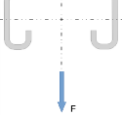
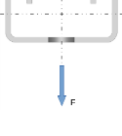
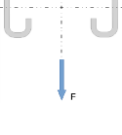
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D3

Tableau D22: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-30, MT-30 S, MT-30 OC et MT-30 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 700 | - |  | 5 | 0,50 | 24,17 | 48,85 | 120 | 16,54 | 24,78 | 40,11 | 48,85 |
| | | | | 10 | 0,50 | 53,22 | 107,18 | 120 | 22,95 | 45,47 | 83,06 | 107,18 |
| | | | | 15 | 0,50 | 82,27 | 167,86 | 120 | 31,01 | 71,47 | 128,69 | 167,86 |
| | | | | 20 | 0,50 | 111,32 | 232,67 | 120 | 39,13 | 99,74 | 171,01 | 232,67 |
| | | | | 25 | 0,50 | 140,36 | 261,63 | 120 | 47,67 | 128,05 | 213,55 | 261,63 |
| | | | | 30 | 0,50 | 169,41 | 276,65 | 120 | 57,65 | 155,32 | 245,41 | 276,65 |
| 1 | 700 | - |  | 5 | 0,50 | 24,17 | 49,88 | 120 | 16,61 | 25,02 | 40,86 | 49,88 |
| | | | | 10 | 0,50 | 53,22 | 113,53 | 120 | 23,20 | 46,60 | 86,49 | 113,53 |
| | | | | 15 | 0,50 | 82,27 | 178,05 | 120 | 31,49 | 73,99 | 135,88 | 178,05 |
| | | | | 20 | 0,50 | 111,32 | 211,04 | 106,67 | 39,87 | 104,32 | 181,63 | 0,00 |
| | | | | 25 | 0,50 | 140,36 | 219,3 | 86,67 | 48,84 | 135,31 | - | - |
| | | | | 30 | 0,50 | 169,41 | 207,99 | 73,33 | 59,44 | 165,64 | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 42,3 | 66,68 | 120 | 18,64 | 31,77 | 55,09 | 66,68 |
| | | | | 10 | 0,86 | 93,13 | 161,33 | 120 | 29,89 | 67,72 | 115,44 | 161,33 |
| | | | | 15 | 0,86 | 143,97 | 222,62 | 120 | 42,56 | 104,84 | 179,38 | 222,62 |
| | | | | 20 | 0,86 | 194,8 | 242,38 | 120 | 55,17 | 138,96 | 211,48 | 242,38 |
| | | | | 25 | 0,86 | 245,64 | 237,22 | 120 | 70,51 | 179,8 | 221,51 | 237,22 |
| | | | | 30 | 0,86 | 296,47 | 242,94 | 120 | 88,71 | 202,98 | 231,52 | 242,94 |
| 2 | 700 | - |  | 5 | 0,86 | 42,3 | 65,55 | 120 | 18,59 | 31,48 | 54,23 | 65,55 |
| | | | | 10 | 0,86 | 93,13 | 133,79 | 120 | 29,7 | 65,91 | 111,12 | 133,79 |
| | | | | 15 | 0,86 | 143,97 | 179,74 | 120 | 42,13 | 100,7 | 152,24 | 179,74 |
| | | | | 20 | 0,86 | 194,8 | 236,52 | 120 | 54,27 | 130,4 | 207,38 | 236,52 |
| | | | | 25 | 0,86 | 245,64 | 246,03 | 120 | 68,36 | 153,58 | 224,33 | 246,03 |
| | | | | 30 | 0,86 | 296,47 | 252,16 | 120 | 84,89 | 173,37 | 235,27 | 252,16 |
| 3 | 700 | 5 |  | 5 | 0,67 | 7,05 | 61,33 | 120 | 18,05 | 29,68 | 50,54 | 61,33 |
| | | | | 10 | 0,67 | 15,52 | 131,71 | 120 | 27,18 | 59 | 104,47 | 131,71 |
| | | | | 15 | 0,67 | 23,99 | 184,84 | 120 | 37,81 | 92,05 | 149,19 | 184,84 |
| | | | | 20 | 0,67 | 32,47 | 241,07 | 120 | 48,36 | 123,77 | 186,22 | 241,07 |
| | | | | 25 | 0,67 | 40,94 | 267,77 | 120 | 60,46 | 152,09 | 219,72 | 267,77 |
| | | | | 30 | 0,67 | 49,41 | 281,46 | 120 | 75,04 | 176,76 | 249,36 | 281,46 |
| 3 | 700 | 5 |  | 5 | 0,67 | 7,05 | 60,2 | 120 | 17,88 | 29,16 | 49,57 | 60,20 |
| | | | | 10 | 0,67 | 15,52 | 131,64 | 120 | 26,93 | 58,2 | 104,17 | 131,64 |
| | | | | 15 | 0,67 | 23,99 | 183,85 | 120 | 37,55 | 91,47 | 150,05 | 183,85 |
| | | | | 20 | 0,67 | 32,47 | 217,3 | 120 | 48,02 | 123,74 | 185,45 | 217,30 |
| | | | | 25 | 0,67 | 40,94 | 242,20 | 120 | 59,9 | 152,26 | 211,45 | 242,20 |
| | | | | 30 | 0,67 | 49,41 | 260,81 | 120 | 74,26 | 176,42 | 232,05 | 260,81 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

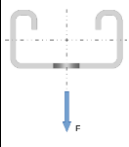
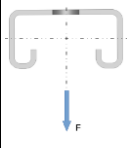
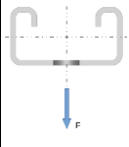
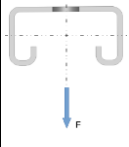
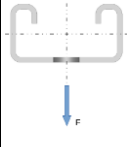
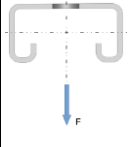
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D4

Tableau D23: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-30, MT-30 S, MT-30 OC et MT-30 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - |  | 5 | 0,50 | 16,32 | 81,17 | 120,00 | 20,44 | 37,27 | 66,89 | 81,17 |
| | | | | 10 | 0,50 | 38,92 | 162,08 | 120,00 | 31,11 | 70,95 | 130,43 | 162,08 |
| | | | | 15 | 0,50 | 61,51 | 238,77 | 120,00 | 44,36 | 110,76 | 189,86 | 238,77 |
| | | | | 20 | 0,50 | 84,10 | 312,81 | 120,00 | 57,58 | 150,49 | 241,50 | 312,81 |
| | | | | 25 | 0,50 | 106,69 | 344,89 | 120,00 | 71,35 | 187,18 | 292,21 | 344,89 |
| | | | | 30 | 0,50 | 129,29 | 362,39 | 120,00 | 87,16 | 220,63 | 325,98 | 362,39 |
| 1 | 900 | - |  | 5 | 0,50 | 16,32 | 82,19 | 120,00 | 20,45 | 37,44 | 67,63 | 82,19 |
| | | | | 10 | 0,50 | 38,92 | 168,04 | 120,00 | 31,33 | 72,25 | 133,98 | 168,04 |
| | | | | 15 | 0,50 | 61,51 | 244,11 | 120,00 | 44,88 | 113,56 | 196,03 | 244,11 |
| | | | | 20 | 0,50 | 84,10 | 304,09 | 120,00 | 58,43 | 155,18 | 247,98 | 304,09 |
| | | | | 25 | 0,50 | 106,69 | 310,91 | 100,00 | 72,75 | 193,84 | 288,41 | - |
| | | | | 30 | 0,50 | 129,29 | 319,97 | 86,67 | 89,33 | 228,91 | - | - |
| 2 | 900 | - |  | 5 | 0,89 | 36,73 | 103,12 | 120,00 | 23,51 | 47,39 | 86,29 | 103,12 |
| | | | | 10 | 0,89 | 87,56 | 200,41 | 120,00 | 42,18 | 101,73 | 162,23 | 200,41 |
| | | | | 15 | 0,89 | 138,40 | 253,12 | 120,00 | 62,98 | 149,50 | 215,52 | 253,12 |
| | | | | 20 | 0,89 | 189,23 | 277,67 | 120,00 | 83,02 | 188,18 | 249,78 | 277,67 |
| | | | | 25 | 0,89 | 240,06 | 291,24 | 120,00 | 105,52 | 220,40 | 269,41 | 291,24 |
| | | | | 30 | 0,89 | 290,90 | 299,69 | 120,00 | 130,67 | 243,19 | 282,26 | 299,69 |
| 2 | 900 | - |  | 5 | 0,89 | 36,73 | 101,33 | 120,00 | 23,39 | 46,80 | 84,90 | 101,33 |
| | | | | 10 | 0,89 | 87,56 | 179,16 | 120,00 | 41,69 | 98,58 | 156,53 | 179,16 |
| | | | | 15 | 0,89 | 138,40 | 225,03 | 120,00 | 61,96 | 143,30 | 200,91 | 225,03 |
| | | | | 20 | 0,89 | 189,23 | 259,46 | 120,00 | 81,08 | 177,17 | 228,72 | 259,46 |
| | | | | 25 | 0,89 | 240,06 | 299,64 | 120,00 | 101,57 | 201,98 | 248,09 | 299,64 |
| | | | | 30 | 0,89 | 290,90 | 309,09 | 120,00 | 124,26 | 220,60 | 262,32 | 309,09 |
| 3 | 900 | 9 |  | 5 | 0,67 | 3,67 | 99,15 | 120,00 | 23,08 | 45,73 | 82,79 | 99,15 |
| | | | | 10 | 0,67 | 8,76 | 182,18 | 120,00 | 38,37 | 91,14 | 152,76 | 182,18 |
| | | | | 15 | 0,67 | 13,84 | 238,42 | 120,00 | 55,54 | 135,50 | 203,10 | 238,42 |
| | | | | 20 | 0,67 | 18,92 | 275,71 | 120,00 | 72,26 | 173,70 | 239,71 | 275,71 |
| | | | | 25 | 0,67 | 24,01 | 306,13 | 120,00 | 90,60 | 204,63 | 268,36 | 306,13 |
| | | | | 30 | 0,67 | 29,09 | 341,64 | 120,00 | 111,52 | 230,48 | 291,65 | 341,64 |
| 3 | 900 | 9 |  | 5 | 0,67 | 3,67 | 97,14 | 120,00 | 22,59 | 44,25 | 80,76 | 97,14 |
| | | | | 10 | 0,67 | 8,76 | 185,15 | 120,00 | 37,60 | 89,77 | 154,22 | 185,15 |
| | | | | 15 | 0,67 | 13,84 | 245,04 | 120,00 | 54,79 | 135,97 | 207,98 | 245,04 |
| | | | | 20 | 0,67 | 18,92 | 281,80 | 120,00 | 71,49 | 176,24 | 246,51 | 281,80 |
| | | | | 25 | 0,67 | 24,01 | 306,87 | 120,00 | 89,79 | 208,80 | 275,26 | 306,87 |
| | | | | 30 | 0,67 | 29,09 | 326,28 | 120,00 | 110,88 | 235,72 | 296,86 | 326,28 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

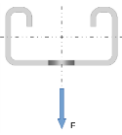
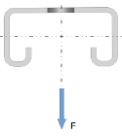
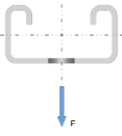
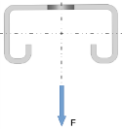
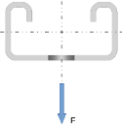
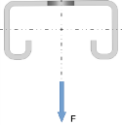
Symboles et références, voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D5

Tableau D24: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-30, MT-30 S, MT-30 OC et MT-30 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|---|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - |  | 5 | 0,50 | 10,82 | 121,25 | 120,00 | 25,61 | 53,72 | 100,77 | 121,25 |
| | | | | 10 | 0,50 | 29,31 | 221,36 | 120,00 | 41,65 | 102,64 | 183,83 | 221,36 |
| | | | | 15 | 0,50 | 47,79 | 310,11 | 120,00 | 61,33 | 156,61 | 254,91 | 310,11 |
| | | | | 20 | 0,50 | 66,28 | 392,70 | 120,00 | 80,74 | 206,59 | 312,74 | 392,70 |
| | | | | 25 | 0,50 | 84,76 | 429,13 | 120,00 | 100,63 | 250,17 | 369,51 | 429,13 |
| | | | | 30 | 0,50 | 103,25 | 448,96 | 120,00 | 122,89 | 288,51 | 407,48 | 448,96 |
| 1 | 1100 | - |  | 5 | 0,50 | 10,82 | 122,14 | 120,00 | 25,55 | 53,79 | 101,39 | 122,14 |
| | | | | 10 | 0,50 | 29,31 | 226,42 | 120,00 | 41,84 | 104,00 | 187,14 | 226,42 |
| | | | | 15 | 0,50 | 47,79 | 312,76 | 120,00 | 61,89 | 159,42 | 259,92 | 312,76 |
| | | | | 20 | 0,50 | 66,28 | 369,75 | 120,00 | 81,71 | 211,01 | 317,00 | 369,75 |
| | | | | 25 | 0,50 | 84,76 | 420,46 | 120,00 | 102,22 | 255,85 | 361,16 | 420,46 |
| | | | | 30 | 0,50 | 103,25 | 412,98 | 100,00 | 125,34 | 295,02 | 395,20 | - |
| 2 | 1100 | - |  | 5 | 0,91 | 29,76 | 142,03 | 120,00 | 29,32 | 65,56 | 120,27 | 142,03 |
| | | | | 10 | 0,91 | 80,60 | 248,82 | 120,00 | 56,88 | 138,17 | 209,95 | 248,82 |
| | | | | 15 | 0,91 | 131,43 | 306,44 | 120,00 | 87,24 | 195,00 | 265,98 | 306,44 |
| | | | | 20 | 0,91 | 182,26 | 334,88 | 120,00 | 115,45 | 237,58 | 302,52 | 334,88 |
| | | | | 25 | 0,91 | 233,10 | 351,66 | 120,00 | 144,95 | 270,21 | 325,56 | 351,66 |
| | | | | 30 | 0,91 | 283,93 | 363,14 | 120,00 | 176,36 | 294,06 | 341,48 | 363,14 |
| 2 | 1100 | - |  | 5 | 0,91 | 29,76 | 140,43 | 120,00 | 29,13 | 64,84 | 118,98 | 140,43 |
| | | | | 10 | 0,91 | 80,60 | 228,49 | 120,00 | 56,09 | 134,19 | 204,50 | 228,49 |
| | | | | 15 | 0,91 | 131,43 | 277,05 | 120,00 | 85,61 | 187,99 | 253,39 | 277,05 |
| | | | | 20 | 0,91 | 182,26 | 304,61 | 120,00 | 112,37 | 225,43 | 283,23 | 304,61 |
| | | | | 25 | 0,91 | 233,10 | 321,78 | 120,00 | 139,31 | 252,54 | 303,29 | 321,78 |
| | | | | 30 | 0,91 | 283,93 | 333,02 | 120,00 | 167,84 | 272,58 | 317,40 | 333,02 |
| 3 | 1100 | 9 |  | 5 | 0,67 | 1,98 | 143,55 | 120,00 | 29,95 | 67,04 | 121,73 | 143,55 |
| | | | | 10 | 0,67 | 5,37 | 234,36 | 120,00 | 53,00 | 128,74 | 203,56 | 234,36 |
| | | | | 15 | 0,67 | 8,76 | 295,00 | 120,00 | 77,92 | 182,24 | 259,21 | 295,00 |
| | | | | 20 | 0,67 | 12,15 | 334,67 | 120,00 | 101,65 | 225,26 | 297,80 | 334,67 |
| | | | | 25 | 0,67 | 15,54 | 363,40 | 120,00 | 126,48 | 259,09 | 327,42 | 363,40 |
| | | | | 30 | 0,67 | 18,93 | 385,92 | 120,00 | 153,50 | 286,36 | 350,97 | 385,92 |
| 3 | 1100 | 9 |  | 5 | 0,67 | 1,98 | 140,86 | 120,00 | 28,81 | 63,85 | 118,62 | 140,86 |
| | | | | 10 | 0,67 | 5,37 | 240,99 | 120,00 | 51,29 | 127,12 | 207,70 | 240,99 |
| | | | | 15 | 0,67 | 8,76 | 307,46 | 120,00 | 76,44 | 184,66 | 268,69 | 307,46 |
| | | | | 20 | 0,67 | 12,15 | 348,73 | 120,00 | 100,39 | 231,31 | 310,14 | 348,73 |
| | | | | 25 | 0,67 | 15,54 | 376,80 | 120,00 | 125,56 | 267,73 | 341,25 | 376,80 |
| | | | | 30 | 0,67 | 18,93 | 397,09 | 120,00 | 153,59 | 296,81 | 364,96 | 397,09 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

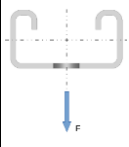
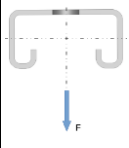
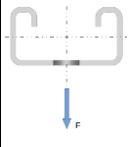
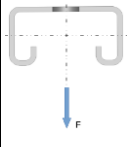
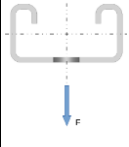
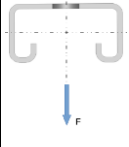
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D6

Tableau D25: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-30, MT-30 S, MT-30 OC et MT-30 S OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|----|---|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - |  | 5 | 0,50 | 6,59 | 168,28 | 120,00 | 32,25 | 74,60 | 141,39 | 168,28 |
| | | | | 10 | 0,50 | 22,23 | 283,86 | 120,00 | 54,84 | 140,29 | 241,83 | 283,86 |
| | | | | 15 | 0,50 | 37,87 | 381,06 | 120,00 | 82,11 | 207,64 | 322,76 | 381,06 |
| | | | | 20 | 0,50 | 53,51 | 471,73 | 120,00 | 108,55 | 266,47 | 384,66 | 471,73 |
| | | | | 25 | 0,50 | 69,15 | 514,45 | 120,00 | 135,23 | 315,84 | 445,11 | 514,45 |
| | | | | 30 | 0,50 | 84,79 | 536,28 | 120,00 | 164,21 | 358,05 | 489,44 | 536,28 |
| 1 | 1300 | - |  | 5 | 0,50 | 6,59 | 168,85 | 120,00 | 32,10 | 74,51 | 141,74 | 168,85 |
| | | | | 10 | 0,50 | 22,23 | 287,81 | 120,00 | 54,97 | 141,54 | 244,67 | 287,81 |
| | | | | 15 | 0,50 | 37,87 | 383,07 | 120,00 | 82,69 | 210,26 | 326,95 | 383,07 |
| | | | | 20 | 0,50 | 53,51 | 444,72 | 120,00 | 109,60 | 270,41 | 388,27 | 444,72 |
| | | | | 25 | 0,50 | 69,15 | 489,87 | 120,00 | 136,95 | 320,66 | 435,95 | 489,87 |
| | | | | 30 | 0,50 | 84,79 | 513,98 | 113,33 | 166,79 | 363,31 | 472,22 | - |
| 2 | 1300 | - |  | 5 | 0,92 | 21,41 | 182,49 | 120,00 | 35,88 | 85,55 | 155,94 | 182,49 |
| | | | | 10 | 0,92 | 72,24 | 289,66 | 120,00 | 73,51 | 176,16 | 259,73 | 289,66 |
| | | | | 15 | 0,92 | 123,07 | 362,73 | 120,00 | 115,18 | 241,69 | 318,74 | 362,73 |
| | | | | 20 | 0,92 | 173,91 | 396,90 | 120,00 | 151,36 | 286,93 | 356,90 | 396,90 |
| | | | | 25 | 0,92 | 224,74 | 417,33 | 120,00 | 187,92 | 320,56 | 382,43 | 417,33 |
| | | | | 30 | 0,92 | 275,57 | 430,64 | 120,00 | 224,10 | 345,03 | 399,75 | 430,64 |
| 2 | 1300 | - |  | 5 | 0,92 | 21,41 | 182,17 | 120,00 | 35,64 | 84,98 | 155,59 | 182,17 |
| | | | | 10 | 0,92 | 72,24 | 282,31 | 120,00 | 72,52 | 172,01 | 255,26 | 282,31 |
| | | | | 15 | 0,92 | 123,07 | 334,13 | 120,00 | 113,00 | 234,72 | 309,25 | 334,13 |
| | | | | 20 | 0,92 | 173,91 | 363,43 | 120,00 | 147,15 | 275,57 | 341,19 | 363,43 |
| | | | | 25 | 0,92 | 224,74 | 381,80 | 120,00 | 180,75 | 305,08 | 362,69 | 381,80 |
| | | | | 30 | 0,92 | 275,57 | 393,97 | 120,00 | 213,65 | 326,95 | 377,83 | 393,97 |
| 3 | 1300 | 11 |  | 5 | 0,67 | 1,02 | 193,11 | 120,00 | 39,14 | 94,27 | 166,31 | 193,11 |
| | | | | 10 | 0,67 | 3,44 | 288,54 | 120,00 | 71,58 | 170,77 | 256,38 | 288,54 |
| | | | | 15 | 0,67 | 5,86 | 351,99 | 120,00 | 104,96 | 231,02 | 315,80 | 351,99 |
| | | | | 20 | 0,67 | 8,28 | 394,78 | 120,00 | 136,02 | 277,50 | 357,26 | 394,78 |
| | | | | 25 | 0,67 | 10,70 | 425,69 | 120,00 | 167,72 | 313,91 | 388,38 | 425,69 |
| | | | | 30 | 0,67 | 13,12 | 449,28 | 120,00 | 200,26 | 343,09 | 413,17 | 449,28 |
| 3 | 1300 | 11 |  | 5 | 0,67 | 1,02 | 190,31 | 120,00 | 36,81 | 88,47 | 162,43 | 190,31 |
| | | | | 10 | 0,67 | 3,44 | 299,44 | 120,00 | 68,37 | 169,45 | 264,09 | 299,44 |
| | | | | 15 | 0,67 | 5,86 | 370,82 | 120,00 | 102,50 | 236,35 | 330,97 | 370,82 |
| | | | | 20 | 0,67 | 8,28 | 416,19 | 120,00 | 134,29 | 288,06 | 375,84 | 416,19 |
| | | | | 25 | 0,67 | 10,70 | 447,28 | 120,00 | 166,93 | 327,99 | 408,83 | 447,28 |
| | | | | 30 | 0,67 | 13,12 | 469,94 | 120,00 | 201,07 | 359,44 | 434,37 | 469,94 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D7

Tableau D26: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40, MT-40 S, MT-40 OC et MT-40 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - | | 5 | 0,50 | 102,77 | 14,27 | 120,00 | 5,98 | 11,19 | 14,27 | 14,27 |
| | | | | 10 | 0,50 | 209,68 | 22,33 | 120,00 | 8,44 | 17,10 | 22,33 | 22,33 |
| | | | | 15 | 0,50 | 316,59 | 35,91 | 120,00 | 11,05 | 24,32 | 35,73 | 35,91 |
| | | | | 20 | 0,50 | 423,50 | 115,16 | 120,00 | 14,48 | 34,17 | 75,97 | 115,16 |
| | | | | 25 | 0,50 | 530,42 | 141,80 | 120,00 | 20,41 | 96,85 | 132,55 | 141,80 |
| | | | | 30 | 0,50 | 637,33 | 159,48 | 120,00 | 49,13 | 122,99 | 151,91 | 159,48 |
| 1 | 500 | - | | 5 | 0,50 | 102,77 | 14,46 | 120,00 | 6,07 | 11,36 | 14,46 | 14,46 |
| | | | | 10 | 0,50 | 209,68 | 22,92 | 120,00 | 8,61 | 17,52 | 22,92 | 22,92 |
| | | | | 15 | 0,50 | 316,59 | 36,03 | 120,00 | 11,37 | 24,92 | 36,03 | 36,03 |
| | | | | 20 | 0,50 | 423,50 | 58,42 | 86,67 | 14,99 | 34,01 | - | - |
| | | | | 25 | 0,50 | 530,42 | 45,10 | 46,67 | 21,02 | - | - | - |
| | | | | 30 | 0,50 | 637,33 | 18,88 | 26,67 | - | - | - | - |
| 2 | 500 | - | | 5 | 0,80 | 128,46 | 16,06 | 120,00 | 6,85 | 12,85 | 16,06 | 16,06 |
| | | | | 10 | 0,80 | 262,10 | 33,83 | 93,33 | 10,34 | 22,56 | 33,28 | - |
| | | | | 15 | 0,80 | 395,74 | 8,95 | 26,67 | - | - | - | - |
| | | | | 20 | 0,80 | 529,38 | 12,80 | 26,67 | - | - | - | - |
| | | | | 25 | 0,80 | 663,02 | 6,25 | 20,00 | - | - | - | - |
| | | | | 30 | 0,80 | 796,66 | 8,54 | 20,00 | - | - | - | - |
| 2 | 500 | - | | 5 | 0,80 | 0,67 | 128,46 | 16,17 | 120,00 | 6,91 | 12,96 | 16,17 |
| | | | | 10 | 0,80 | 0,67 | 262,10 | 31,39 | 120,00 | 10,49 | 22,86 | 31,39 |
| | | | | 15 | 0,80 | 0,67 | 395,74 | 57,07 | 113,33 | 14,57 | 32,85 | 51,38 |
| | | | | 20 | 0,80 | 0,67 | 529,38 | 50,83 | 60,00 | 21,32 | 50,83 | - |
| | | | | 25 | 0,80 | 0,67 | 663,02 | 51,74 | 33,33 | 36,48 | - | - |
| | | | | 30 | 0,80 | 0,67 | 796,66 | 39,49 | 26,67 | - | - | - |
| 3 | 500 | 3 | | 5 | 0,67 | 0,80 | 42,82 | 15,48 | 120,00 | 6,57 | 12,32 | 15,48 |
| | | | | 10 | 0,67 | 0,80 | 87,37 | 42,60 | 100,00 | 9,75 | 21,23 | 34,97 |
| | | | | 15 | 0,67 | 0,80 | 131,91 | 25,50 | 40,00 | 13,67 | - | - |
| | | | | 20 | 0,67 | 0,80 | 176,46 | 11,55 | 26,67 | - | - | - |
| | | | | 25 | 0,67 | 0,80 | 221,01 | 5,60 | 20,00 | - | - | - |
| | | | | 30 | 0,67 | 0,80 | 265,55 | 7,41 | 20,00 | - | - | - |
| 3 | 500 | 3 | | 5 | 0,67 | 0,80 | 42,82 | 15,55 | 120,00 | 6,61 | 12,38 | 15,55 |
| | | | | 10 | 0,67 | 0,80 | 87,37 | 28,06 | 120,00 | 9,80 | 20,83 | 28,06 |
| | | | | 15 | 0,67 | 0,80 | 131,91 | 50,30 | 106,67 | 13,32 | 29,96 | 46,55 |
| | | | | 20 | 0,67 | 0,80 | 176,46 | 47,12 | 60,00 | 18,73 | 47,12 | - |
| | | | | 25 | 0,67 | 0,80 | 221,01 | 17,32 | 26,67 | - | - | - |
| | | | | 30 | 0,67 | 0,80 | 265,55 | 32,10 | 26,67 | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

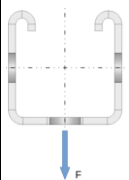
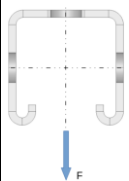
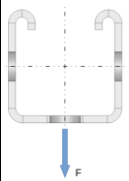
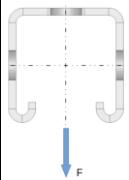
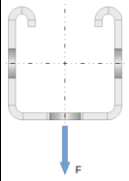
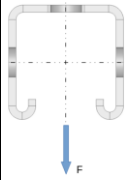
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D8

Tableau D27: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40, MT-40 S, MT-40 OC et MT-40 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|---|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 700 | - |  | 5 | 0,50 | 70,56 | 18,73 | 120,00 | 8,22 | 15,38 | 18,73 | 18,73 |
| | | | | 10 | 0,50 | 146,93 | 34,64 | 120,00 | 12,92 | 26,90 | 34,64 | 34,64 |
| | | | | 15 | 0,50 | 223,29 | 109,06 | 120,00 | 17,96 | 40,64 | 61,44 | 109,06 |
| | | | | 20 | 0,50 | 299,66 | 165,36 | 120,00 | 24,61 | 77,92 | 149,10 | 165,36 |
| | | | | 25 | 0,50 | 376,03 | 197,18 | 120,00 | 57,97 | 131,91 | 183,96 | 197,18 |
| | | | | 30 | 0,50 | 452,39 | 229,01 | 120,00 | 91,33 | 185,90 | 218,83 | 229,01 |
| 1 | 700 | - |  | 5 | 0,50 | 70,56 | 18,85 | 120,00 | 8,28 | 15,49 | 18,85 | 18,85 |
| | | | | 10 | 0,50 | 146,93 | 34,83 | 120,00 | 13,03 | 27,12 | 34,83 | 34,83 |
| | | | | 15 | 0,50 | 223,29 | 63,97 | 120,00 | 18,12 | 40,75 | 58,79 | 63,97 |
| | | | | 20 | 0,50 | 299,66 | 89,80 | 86,67 | 24,72 | 56,91 | - | - |
| | | | | 25 | 0,50 | 376,03 | 82,96 | 53,33 | 35,59 | - | - | - |
| | | | | 30 | 0,50 | 452,39 | 32,71 | 26,67 | - | - | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 123,49 | 22,54 | 120,00 | 10,07 | 18,92 | 22,54 | 22,54 |
| | | | | 10 | 0,86 | 257,13 | 87,95 | 106,67 | 17,07 | 41,40 | 78,41 | - |
| | | | | 15 | 0,86 | 390,77 | 14,65 | 26,67 | - | - | - | - |
| | | | | 20 | 0,86 | 524,41 | 24,08 | 26,67 | - | - | - | - |
| | | | | 25 | 0,86 | 658,05 | 10,10 | 20,00 | - | - | - | - |
| | | | | 30 | 0,86 | 791,69 | 14,92 | 20,00 | - | - | - | - |
| 2 | 700 | - |  | 5 | 0,86 | 123,49 | 22,53 | 120,00 | 10,09 | 18,93 | 22,53 | 22,53 |
| | | | | 10 | 0,86 | 257,13 | 51,78 | 120,00 | 17,13 | 38,33 | 51,78 | 51,78 |
| | | | | 15 | 0,86 | 390,77 | 90,78 | 120,00 | 24,97 | 56,47 | 83,20 | 90,78 |
| | | | | 20 | 0,86 | 524,41 | 111,88 | 86,67 | 37,21 | 79,01 | - | - |
| | | | | 25 | 0,86 | 658,05 | 102,42 | 53,33 | 56,57 | - | - | - |
| | | | | 30 | 0,86 | 791,69 | 108,72 | 40,00 | 82,15 | - | - | - |
| 3 | 700 | 5 |  | 5 | 0,67 | 20,58 | 21,18 | 120,00 | 9,38 | 17,62 | 21,18 | 21,18 |
| | | | | 10 | 0,67 | 42,85 | 65,63 | 106,67 | 15,50 | 35,22 | 54,63 | - |
| | | | | 15 | 0,67 | 65,13 | 58,24 | 46,67 | 23,20 | - | - | - |
| | | | | 20 | 0,67 | 87,40 | 19,68 | 26,67 | - | - | - | - |
| | | | | 25 | 0,67 | 109,67 | 8,61 | 20,00 | - | - | - | - |
| | | | | 30 | 0,67 | 131,95 | 12,36 | 20,00 | - | - | - | - |
| 3 | 700 | 5 |  | 5 | 0,67 | 20,58 | 21,00 | 120,00 | 9,34 | 17,50 | 21,00 | 21,00 |
| | | | | 10 | 0,67 | 42,85 | 44,78 | 120,00 | 15,37 | 33,56 | 44,78 | 44,78 |
| | | | | 15 | 0,67 | 65,13 | 92,43 | 113,33 | 21,98 | 50,66 | 78,18 | - |
| | | | | 20 | 0,67 | 87,40 | 93,01 | 66,67 | 31,98 | 78,07 | - | - |
| | | | | 25 | 0,67 | 109,67 | 29,65 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 131,95 | 55,37 | 26,67 | - | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D9

Tableau D28: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40, MT-40 S, MT-40 OC et MT-40 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - | | 5 | 0,50 | 51,94 | 24,99 | 120,00 | 11,35 | 21,25 | 24,99 | 24,99 |
| | | | | 10 | 0,50 | 111,33 | 51,35 | 120,00 | 19,05 | 40,19 | 51,35 | 51,35 |
| | | | | 15 | 0,50 | 170,73 | 175,90 | 120,00 | 27,28 | 62,37 | 140,45 | 175,90 |
| | | | | 20 | 0,50 | 230,12 | 202,00 | 120,00 | 47,70 | 100,20 | 170,82 | 202,00 |
| | | | | 25 | 0,50 | 289,52 | 241,15 | 120,00 | 78,33 | 156,93 | 216,37 | 241,15 |
| | | | | 30 | 0,50 | 348,91 | 306,39 | 120,00 | 129,38 | 251,49 | 292,29 | 306,39 |
| 1 | | - | | 5 | 0,50 | 51,94 | 24,99 | 120,00 | 11,36 | 21,27 | 24,99 | 24,99 |
| | | | | 10 | 0,50 | 111,33 | 51,07 | 120,00 | 19,08 | 40,18 | 51,07 | 51,07 |
| | | | | 15 | 0,50 | 170,73 | 98,86 | 120,00 | 27,26 | 61,73 | 87,85 | 98,86 |
| | | | | 20 | 0,50 | 230,12 | 149,48 | 100,00 | 37,73 | 85,61 | 130,73 | - |
| | | | | 25 | 0,50 | 289,52 | 125,25 | 60,00 | 54,24 | 125,25 | - | - |
| | | | | 30 | 0,50 | 348,91 | 51,14 | 26,67 | - | - | - | - |
| 2 | 900 | - | | 5 | 0,89 | 116,85 | 31,18 | 120,00 | 14,33 | 26,95 | 31,18 | 31,18 |
| | | | | 10 | 0,89 | 250,49 | 128,51 | 120,00 | 35,45 | 84,17 | 118,98 | 128,51 |
| | | | | 15 | 0,89 | 384,13 | 22,23 | 26,67 | - | - | - | - |
| | | | | 20 | 0,89 | 517,77 | 10,48 | 20,00 | - | - | - | - |
| | | | | 25 | 0,89 | 651,41 | 15,32 | 20,00 | - | - | - | - |
| | | | | 30 | 0,89 | 785,05 | 27,35 | 20,00 | - | - | - | - |
| 2 | 900 | - | | 5 | 0,89 | 116,85 | 30,98 | 120,00 | 14,32 | 26,86 | 30,98 | 30,98 |
| | | | | 10 | 0,89 | 250,49 | 77,40 | 120,00 | 25,86 | 57,72 | 75,92 | 77,40 |
| | | | | 15 | 0,89 | 384,13 | 123,94 | 120,00 | 38,24 | 84,40 | 116,21 | 123,94 |
| | | | | 20 | 0,89 | 517,77 | 160,76 | 120,00 | 56,05 | 109,13 | 146,35 | 160,76 |
| | | | | 25 | 0,89 | 651,41 | 154,66 | 73,33 | 81,04 | 135,60 | - | - |
| | | | | 30 | 0,89 | 785,05 | 158,64 | 60,00 | 109,94 | 158,64 | - | - |
| 3 | 900 | 7 | | 5 | 0,67 | 11,69 | 29,19 | 120,00 | 13,30 | 25,04 | 29,19 | 29,19 |
| | | | | 10 | 0,67 | 25,05 | 99,35 | 120,00 | 23,36 | 53,83 | 78,83 | 99,35 |
| | | | | 15 | 0,67 | 38,41 | 86,96 | 53,33 | 35,75 | - | - | - |
| | | | | 20 | 0,67 | 51,78 | 30,37 | 26,67 | - | - | - | - |
| | | | | 25 | 0,67 | 65,14 | 73,71 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 78,51 | 18,82 | 20,00 | - | - | - | - |
| 3 | 900 | 7 | | 5 | 0,67 | 11,69 | 28,59 | 120,00 | 13,13 | 24,63 | 28,59 | 28,59 |
| | | | | 10 | 0,67 | 25,05 | 68,59 | 120,00 | 22,95 | 50,89 | 67,47 | 68,59 |
| | | | | 15 | 0,67 | 38,41 | 148,66 | 120,00 | 33,67 | 78,07 | 118,19 | 148,66 |
| | | | | 20 | 0,67 | 51,78 | 132,52 | 66,67 | 49,68 | 117,14 | - | - |
| | | | | 25 | 0,67 | 65,14 | 116,32 | 33,33 | 81,36 | - | - | - |
| | | | | 30 | 0,67 | 78,51 | 85,24 | 26,67 | - | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D10

Tableau D29: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40, MT-40 S, MT-40 OC et MT-40 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - | | 5 | 0,50 | 39,48 | 33,22 | 120,00 | 15,47 | 28,98 | 33,22 | 33,22 |
| | | | | 10 | 0,50 | 88,07 | 74,41 | 120,00 | 26,88 | 57,05 | 72,87 | 74,41 |
| | | | | 15 | 0,50 | 136,67 | 239,23 | 120,00 | 38,96 | 90,33 | 206,21 | 239,23 |
| | | | | 20 | 0,50 | 185,27 | 258,30 | 120,00 | 56,43 | 119,83 | 226,92 | 258,30 |
| | | | | 25 | 0,50 | 233,86 | 296,43 | 120,00 | 91,39 | 178,84 | 268,33 | 296,43 |
| | | | | 30 | 0,50 | 282,46 | 366,34 | 120,00 | 155,48 | 287,01 | 344,25 | 366,34 |
| 1 | 1100 | - | | 5 | 0,50 | 39,48 | 33,07 | 120,00 | 15,42 | 28,86 | 33,07 | 33,07 |
| | | | | 10 | 0,50 | 88,07 | 71,67 | 120,00 | 26,83 | 56,81 | 71,67 | 71,67 |
| | | | | 15 | 0,50 | 136,67 | 138,98 | 120,00 | 38,80 | 87,45 | 122,18 | 138,98 |
| | | | | 20 | 0,50 | 185,27 | 195,23 | 100,00 | 53,90 | 119,16 | 175,19 | - |
| | | | | 25 | 0,50 | 233,86 | 166,43 | 60,00 | 76,57 | 166,43 | - | - |
| | | | | 30 | 0,50 | 282,46 | 161,66 | 33,33 | 117,67 | - | - | - |
| 2 | 1100 | - | | 5 | 0,91 | 108,56 | 64,85 | 120,00 | 19,67 | 37,51 | 47,17 | 64,85 |
| | | | | 10 | 0,91 | 242,20 | 167,07 | 120,00 | 53,82 | 128,22 | 159,56 | 167,07 |
| | | | | 15 | 0,91 | 375,84 | 32,88 | 26,67 | - | - | - | - |
| | | | | 20 | 0,91 | 509,48 | 14,53 | 20,00 | - | - | - | - |
| | | | | 25 | 0,91 | 643,12 | 22,71 | 20,00 | - | - | - | - |
| | | | | 30 | 0,91 | 776,76 | 10,70 | 13,33 | - | - | - | - |
| 2 | 1100 | - | | 5 | 0,91 | 108,56 | 41,44 | 120,00 | 19,58 | 36,66 | 41,44 | 41,44 |
| | | | | 10 | 0,91 | 242,20 | 106,27 | 120,00 | 36,53 | 80,03 | 102,35 | 106,27 |
| | | | | 15 | 0,91 | 375,84 | 159,04 | 120,00 | 53,91 | 114,84 | 149,99 | 159,04 |
| | | | | 20 | 0,91 | 509,48 | 196,32 | 120,00 | 77,09 | 141,68 | 183,62 | 196,32 |
| | | | | 25 | 0,91 | 643,12 | 220,88 | 113,33 | 108,29 | 168,14 | 209,12 | - |
| | | | | 30 | 0,91 | 776,76 | 210,10 | 73,33 | 139,59 | 191,47 | - | - |
| 3 | 1100 | 9 | | 5 | 0,67 | 7,24 | 39,94 | 120,00 | 18,46 | 34,90 | 39,94 | 39,94 |
| | | | | 10 | 0,67 | 16,15 | 123,54 | 120,00 | 33,46 | 77,16 | 109,11 | 123,54 |
| | | | | 15 | 0,67 | 25,06 | 125,50 | 60,00 | 51,36 | 125,50 | - | - |
| | | | | 20 | 0,67 | 33,97 | 43,79 | 26,67 | - | - | - | - |
| | | | | 25 | 0,67 | 42,87 | 94,23 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 51,78 | 26,93 | 20,00 | - | - | - | - |
| 3 | 1100 | 9 | | 5 | 0,67 | 7,24 | 38,53 | 120,00 | 18,06 | 33,93 | 38,53 | 38,53 |
| | | | | 10 | 0,67 | 16,15 | 101,85 | 120,00 | 32,63 | 72,86 | 96,01 | 101,85 |
| | | | | 15 | 0,67 | 25,06 | 200,65 | 120,00 | 48,45 | 111,77 | 165,05 | 200,65 |
| | | | | 20 | 0,67 | 33,97 | 203,56 | 73,33 | 71,61 | 162,12 | - | - |
| | | | | 25 | 0,67 | 42,87 | 157,79 | 33,33 | 112,57 | - | - | - |
| | | | | 30 | 0,67 | 51,78 | 120,18 | 26,67 | - | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D11

Tableau D30: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40, MT-40 S, MT-40 OC et MT-40 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - | | 5 | 0,50 | 30,34 | 43,60 | 120,00 | 20,70 | 38,71 | 43,60 | 43,60 |
| | | | | 10 | 0,50 | 71,46 | 112,78 | 120,00 | 36,48 | 77,59 | 99,91 | 112,78 |
| | | | | 15 | 0,50 | 112,58 | 302,96 | 120,00 | 53,02 | 131,77 | 265,87 | 302,96 |
| | | | | 20 | 0,50 | 153,70 | 327,10 | 120,00 | 77,44 | 175,90 | 292,86 | 327,10 |
| | | | | 25 | 0,50 | 194,82 | 375,39 | 120,00 | 126,29 | 264,16 | 346,84 | 375,39 |
| | | | | 30 | 0,50 | 235,94 | 463,92 | 120,00 | 215,85 | 400,97 | 445,81 | 463,92 |
| 1 | 1300 | - | | 5 | 0,50 | 30,34 | 43,32 | 120,00 | 20,57 | 38,47 | 43,32 | 43,32 |
| | | | | 10 | 0,50 | 71,46 | 99,22 | 120,00 | 36,36 | 77,03 | 96,56 | 99,22 |
| | | | | 15 | 0,50 | 112,58 | 182,83 | 120,00 | 52,73 | 117,41 | 160,72 | 182,83 |
| | | | | 20 | 0,50 | 153,70 | 248,19 | 100,00 | 72,97 | 156,41 | 223,40 | - |
| | | | | 25 | 0,50 | 194,82 | 211,25 | 60,00 | 101,99 | 211,25 | - | - |
| | | | | 30 | 0,50 | 235,94 | 200,01 | 33,33 | 150,01 | - | - | - |
| 2 | 1300 | - | | 5 | 0,92 | 98,62 | 97,40 | 120,00 | 26,24 | 63,24 | 93,40 | 97,40 |
| | | | | 10 | 0,92 | 232,26 | 193,18 | 120,00 | 70,38 | 154,26 | 185,57 | 193,18 |
| | | | | 15 | 0,92 | 365,90 | 239,93 | 120,00 | 125,32 | 194,98 | 229,14 | 239,93 |
| | | | | 20 | 0,92 | 499,54 | 269,84 | 120,00 | 165,60 | 223,13 | 257,30 | 269,84 |
| | | | | 25 | 0,92 | 633,18 | 294,54 | 120,00 | 196,07 | 248,44 | 281,67 | 294,54 |
| | | | | 30 | 0,92 | 766,82 | 308,59 | 120,00 | 217,20 | 265,80 | 296,93 | 308,59 |
| 2 | 1300 | - | | 5 | 0,92 | 98,62 | 53,87 | 120,00 | 25,84 | 48,28 | 53,87 | 53,87 |
| | | | | 10 | 0,92 | 232,26 | 136,51 | 120,00 | 48,96 | 104,44 | 130,41 | 136,51 |
| | | | | 15 | 0,92 | 365,90 | 196,00 | 120,00 | 71,65 | 146,83 | 184,74 | 196,00 |
| | | | | 20 | 0,92 | 499,54 | 235,22 | 120,00 | 100,18 | 177,06 | 221,83 | 235,22 |
| | | | | 25 | 0,92 | 633,18 | 269,50 | 120,00 | 137,08 | 203,09 | 249,35 | 269,50 |
| | | | | 30 | 0,92 | 766,82 | 280,35 | 100,00 | 170,89 | 228,08 | 270,77 | - |
| 3 | 1300 | 11 | | 5 | 0,67 | 4,70 | 53,87 | 120,00 | 25,06 | 47,65 | 53,87 | 53,87 |
| | | | | 10 | 0,67 | 11,06 | 201,67 | 120,00 | 45,88 | 105,13 | 145,10 | 201,67 |
| | | | | 15 | 0,67 | 17,42 | 216,61 | 73,33 | 70,01 | 173,48 | - | - |
| | | | | 20 | 0,67 | 23,79 | 162,54 | 33,33 | 111,09 | - | - | - |
| | | | | 25 | 0,67 | 30,15 | 121,52 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 36,52 | 36,81 | 20,00 | - | - | - | - |
| 3 | 1300 | 11 | | 5 | 0,67 | 4,70 | 51,15 | 120,00 | 24,28 | 45,69 | 51,15 | 51,15 |
| | | | | 10 | 0,67 | 11,06 | 141,25 | 120,00 | 44,48 | 99,51 | 130,22 | 141,25 |
| | | | | 15 | 0,67 | 17,42 | 256,59 | 120,00 | 66,26 | 151,14 | 217,05 | 256,59 |
| | | | | 20 | 0,67 | 23,79 | 279,82 | 80,00 | 97,46 | 211,49 | - | - |
| | | | | 25 | 0,67 | 30,15 | 239,46 | 40,00 | 147,96 | - | - | - |
| | | | | 30 | 0,67 | 36,52 | 159,28 | 26,67 | - | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

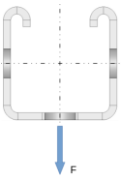
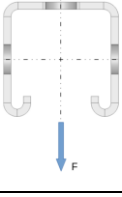
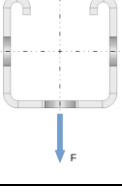
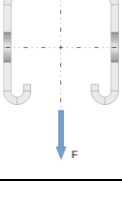
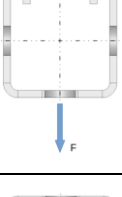
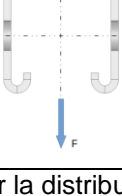
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D12

Tableau D31: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40, MT-40 S, MT-40 OC et MT-40 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|---|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1500 | - |  | 5 | 0,50 | 23,20 | 56,41 | 120,00 | 27,14 | 50,70 | 56,41 | 56,41 |
| | | | | 10 | 0,50 | 58,84 | 214,05 | 120,00 | 47,91 | 101,60 | 140,22 | 214,05 |
| | | | | 15 | 0,50 | 94,48 | 346,77 | 120,00 | 69,39 | 223,90 | 310,06 | 346,77 |
| | | | | 20 | 0,50 | 130,12 | 374,41 | 120,00 | 101,89 | 292,56 | 341,71 | 374,41 |
| | | | | 25 | 0,50 | 165,75 | 429,68 | 120,00 | 166,90 | 344,86 | 405,02 | 429,68 |
| | | | | 30 | 0,50 | 201,39 | 531,02 | 120,00 | 286,09 | 480,93 | 518,58 | 531,02 |
| 1 | 1500 | - |  | 5 | 0,50 | 23,20 | 56,01 | 120,00 | 26,96 | 50,37 | 56,01 | 56,01 |
| | | | | 10 | 0,50 | 58,84 | 131,92 | 120,00 | 47,75 | 100,84 | 125,60 | 131,92 |
| | | | | 15 | 0,50 | 94,48 | 229,81 | 120,00 | 69,03 | 151,09 | 202,67 | 229,81 |
| | | | | 20 | 0,50 | 130,12 | 303,49 | 100,00 | 94,76 | 196,85 | 274,61 | - |
| | | | | 25 | 0,50 | 165,75 | 258,09 | 60,00 | 130,26 | 258,09 | - | - |
| | | | | 30 | 0,50 | 201,39 | 241,27 | 33,33 | 185,29 | - | - | - |
| 2 | 1500 | - |  | 5 | 0,93 | 87,01 | 120,23 | 120,00 | 35,67 | 94,50 | 118,16 | 120,23 |
| | | | | 10 | 0,93 | 220,65 | 223,72 | 120,00 | 86,15 | 180,58 | 214,32 | 223,72 |
| | | | | 15 | 0,93 | 354,29 | 271,31 | 120,00 | 147,41 | 224,17 | 260,30 | 271,31 |
| | | | | 20 | 0,93 | 487,93 | 304,59 | 120,00 | 191,90 | 257,55 | 293,32 | 304,59 |
| | | | | 25 | 0,93 | 621,57 | 326,22 | 120,00 | 222,90 | 281,83 | 315,54 | 326,22 |
| | | | | 30 | 0,93 | 755,21 | 341,37 | 120,00 | 245,92 | 300,21 | 331,67 | 341,37 |
| 2 | 1500 | - |  | 5 | 0,93 | 87,01 | 68,17 | 120,00 | 33,08 | 61,62 | 68,17 | 68,17 |
| | | | | 10 | 0,93 | 220,65 | 168,22 | 120,00 | 62,97 | 130,45 | 159,92 | 168,22 |
| | | | | 15 | 0,93 | 354,29 | 234,63 | 120,00 | 91,22 | 179,77 | 220,70 | 234,63 |
| | | | | 20 | 0,93 | 487,93 | 276,44 | 120,00 | 125,02 | 214,06 | 261,22 | 276,44 |
| | | | | 25 | 0,93 | 621,57 | 308,63 | 120,00 | 166,96 | 241,07 | 291,16 | 308,63 |
| | | | | 30 | 0,93 | 755,21 | 331,56 | 106,67 | 203,66 | 268,45 | 315,30 | - |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,11 | 71,56 | 120,00 | 33,30 | 63,70 | 71,56 | 71,56 |
| | | | | 10 | 0,67 | 7,88 | 231,73 | 120,00 | 60,74 | 137,88 | 186,56 | 231,73 |
| | | | | 15 | 0,67 | 12,65 | 318,10 | 80,00 | 91,82 | 212,84 | - | - |
| | | | | 20 | 0,67 | 17,43 | 206,39 | 33,33 | 142,75 | - | - | - |
| | | | | 25 | 0,67 | 22,20 | 152,49 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 26,97 | 48,56 | 20,00 | - | - | - | - |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,11 | 66,83 | 120,00 | 31,90 | 60,22 | 66,83 | 66,83 |
| | | | | 10 | 0,67 | 7,88 | 186,48 | 120,00 | 58,63 | 130,92 | 170,04 | 186,48 |
| | | | | 15 | 0,67 | 12,65 | 315,67 | 120,00 | 87,19 | 195,73 | 273,24 | 315,67 |
| | | | | 20 | 0,67 | 17,43 | 382,97 | 93,33 | 127,09 | 264,33 | 369,84 | - |
| | | | | 25 | 0,67 | 22,20 | 345,70 | 53,33 | 187,00 | - | - | - |
| | | | | 30 | 0,67 | 26,97 | 201,57 | 26,67 | - | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D13

Tableau D32: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40D, MT-40D S, MT-40D OC et MT-40D S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|-----------------|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 600 | - | | 5 | 0,50 | 225,04 | 29,03 | 120,00 | 20,77 | 21,10 | 27,93 | 29,03 |
| | | | | 10 | 0,50 | 459,99 | 34,30 | 106,67 | 22,57 | 24,76 | 32,96 | - |
| | | | | 15 | 0,50 | 694,95 | 29,63 | 46,67 | 24,85 | - | - | - |
| | | | | 20 | 0,50 | 929,90 | 24,07 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 1164,86 | 16,09 | 20,00 | - | - | - | - |
| | | | | 30 | 0,50 | 1399,81 | 16,76 | 20,00 | - | - | - | - |
| 1 | 600 | - | | 5 | 0,50 | 225,04 | 29,76 | 120,00 | 21,01 | 21,55 | 28,54 | 29,76 |
| | | | | 10 | 0,50 | 459,99 | 37,13 | 120,00 | 23,13 | 25,86 | 34,48 | 37,13 |
| | | | | 15 | 0,50 | 694,95 | 51,07 | 93,33 | 25,89 | 32,55 | 48,92 | - |
| | | | | 20 | 0,50 | 929,90 | 45,48 | 53,33 | 29,67 | - | - | - |
| | | | | 25 | 0,50 | 1164,86 | 51,18 | 33,33 | 40,07 | - | - | - |
| | | | | 30 | 0,50 | 1399,81 | 38,07 | 26,67 | - | - | - | - |
| 2 | 600 | - | | 5 | 0,88 | 450,07 | 31,95 | 120,00 | 21,70 | 22,84 | 30,27 | 31,95 |
| | | | | 10 | 0,88 | 919,98 | 49,52 | 100,00 | 25,55 | 32,51 | 45,49 | - |
| | | | | 15 | 0,88 | 1389,89 | 41,81 | 40,00 | 31,78 | - | - | - |
| | | | | 20 | 0,88 | 1859,80 | 33,88 | 26,67 | - | - | - | - |
| | | | | 25 | 0,88 | 2329,71 | 19,03 | 20,00 | - | - | - | - |
| | | | | 30 | 0,88 | 2799,62 | 11,26 | 13,33 | - | - | - | - |
| 2 | 600 | - | | 5 | 0,88 | 450,07 | 31,23 | 120,00 | 21,54 | 22,50 | 29,74 | 31,23 |
| | | | | 10 | 0,88 | 919,98 | 70,61 | 120,00 | 24,83 | 30,22 | 42,27 | 70,61 |
| | | | | 15 | 0,88 | 1389,89 | 109,11 | 73,33 | 29,76 | 71,64 | - | - |
| | | | | 20 | 0,88 | 1859,80 | 102,70 | 33,33 | 66,52 | - | - | - |
| | | | | 25 | 0,88 | 2329,71 | 18,22 | 20,00 | - | - | - | - |
| | | | | 30 | 0,88 | 2799,62 | 20,29 | 20,00 | - | - | - | - |
| 3 | 600 | 6 | | 5 | 0,67 | 56,26 | 29,88 | 120,00 | 21,08 | 21,63 | 28,62 | 29,88 |
| | | | | 10 | 0,67 | 115,00 | 39,10 | 120,00 | 23,46 | 26,83 | 36,01 | 39,10 |
| | | | | 15 | 0,67 | 173,74 | 59,36 | 93,33 | 26,60 | 35,39 | 55,68 | - |
| | | | | 20 | 0,67 | 232,48 | 53,74 | 53,33 | 31,27 | - | - | - |
| | | | | 25 | 0,67 | 291,21 | 54,25 | 33,33 | 42,38 | - | - | - |
| | | | | 30 | 0,67 | 349,95 | 42,81 | 26,67 | - | - | - | - |
| 3 | 600 | 6 | | 5 | 0,67 | 56,26 | 30,13 | 120,00 | 21,18 | 21,80 | 28,83 | 30,13 |
| | | | | 10 | 0,67 | 115,00 | 39,64 | 120,00 | 23,67 | 27,13 | 36,30 | 39,64 |
| | | | | 15 | 0,67 | 173,74 | 88,93 | 73,33 | 26,88 | 37,36 | - | - |
| | | | | 20 | 0,67 | 232,48 | 39,56 | 33,33 | 32,91 | - | - | - |
| | | | | 25 | 0,67 | 291,21 | 31,49 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 349,95 | 17,92 | 20,00 | - | - | - | - |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

4) La distance entre les points de chargement est de 75 mm

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D14

Tableau D33: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40D, MT-40D S, MT-40D OC et MT-40D S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|-----------------|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - | | 5 | 0,50 | 141,76 | 32,60 | 120,00 | 22,02 | 23,26 | 30,77 | 32,60 |
| | | | | 10 | 0,50 | 298,40 | 45,36 | 120,00 | 25,68 | 30,86 | 41,26 | 45,36 |
| | | | | 15 | 0,50 | 455,03 | 61,61 | 93,33 | 30,33 | 42,56 | 60,15 | - |
| | | | | 20 | 0,50 | 611,67 | 60,56 | 60,00 | 36,58 | 60,56 | - | - |
| | | | | 25 | 0,50 | 768,31 | 57,06 | 33,33 | 46,26 | - | - | - |
| | | | | 30 | 0,50 | 924,94 | 45,50 | 26,67 | - | - | - | - |
| 1 | 900 | - | | 5 | 0,50 | 141,76 | 33,02 | 120,00 | 22,16 | 23,52 | 31,12 | 33,02 |
| | | | | 10 | 0,50 | 298,40 | 46,90 | 120,00 | 26,03 | 31,56 | 42,27 | 46,90 |
| | | | | 15 | 0,50 | 455,03 | 83,81 | 73,33 | 30,99 | 44,65 | - | - |
| | | | | 20 | 0,50 | 611,67 | 99,25 | 40,00 | 38,05 | - | - | - |
| | | | | 25 | 0,50 | 768,31 | 37,11 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 924,94 | 20,15 | 20,00 | - | - | - | - |
| 2 | 900 | - | | 5 | 0,92 | 425,28 | 37,28 | 120,00 | 23,63 | 26,18 | 34,56 | 37,28 |
| | | | | 10 | 0,92 | 895,19 | 216,07 | 120,00 | 30,87 | 44,28 | 172,94 | 216,07 |
| | | | | 15 | 0,92 | 1365,10 | 352,83 | 120,00 | 42,55 | 224,71 | 322,16 | 352,83 |
| | | | | 20 | 0,92 | 1835,01 | 48,14 | 26,67 | - | - | - | - |
| | | | | 25 | 0,92 | 2304,92 | 22,94 | 20,00 | - | - | - | - |
| | | | | 30 | 0,92 | 2774,83 | 12,84 | 13,33 | - | - | - | - |
| 2 | 900 | - | | 5 | 0,92 | 425,28 | 36,50 | 120,00 | 23,46 | 25,81 | 33,99 | 36,50 |
| | | | | 10 | 0,92 | 895,19 | 171,23 | 120,00 | 30,02 | 41,24 | 57,99 | 171,23 |
| | | | | 15 | 0,92 | 1365,10 | 269,20 | 120,00 | 39,22 | 124,11 | 227,73 | 269,20 |
| | | | | 20 | 0,92 | 1835,01 | 324,85 | 93,33 | 88,86 | 269,31 | 321,21 | - |
| | | | | 25 | 0,92 | 2304,92 | 22,07 | 20,00 | - | - | - | - |
| | | | | 30 | 0,92 | 2774,83 | 25,60 | 20,00 | - | - | - | - |
| 3 | 900 | 10 | | 5 | 0,67 | 23,63 | 34,39 | 120,00 | 22,69 | 24,42 | 32,23 | 34,39 |
| | | | | 10 | 0,67 | 49,73 | 53,46 | 120,00 | 27,56 | 35,26 | 47,63 | 53,46 |
| | | | | 15 | 0,67 | 75,84 | 99,13 | 106,67 | 33,89 | 52,19 | 78,29 | - |
| | | | | 20 | 0,67 | 101,94 | 105,46 | 66,67 | 43,24 | 83,43 | - | - |
| | | | | 25 | 0,67 | 128,05 | 78,01 | 33,33 | 60,60 | - | - | - |
| | | | | 30 | 0,67 | 154,16 | 63,45 | 26,67 | 0,00 | - | - | - |
| 3 | 900 | 10 | | 5 | 0,67 | 23,63 | 34,40 | 120,00 | 22,70 | 24,44 | 32,25 | 34,40 |
| | | | | 10 | 0,67 | 49,73 | 54,30 | 120,00 | 27,61 | 35,20 | 47,41 | 54,30 |
| | | | | 15 | 0,67 | 75,84 | 302,03 | 120,00 | 33,89 | 56,23 | 241,46 | 302,03 |
| | | | | 20 | 0,67 | 101,94 | 354,07 | 120,00 | 46,82 | 249,66 | 322,40 | 354,07 |
| | | | | 25 | 0,67 | 128,05 | 46,17 | 26,67 | - | - | - | - |
| | | | | 30 | 0,67 | 154,16 | 21,64 | 20,00 | - | - | - | - |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

4) La distance entre les points de chargement est de 75 mm

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D15

Tableau D34: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40D, MT-40D S, MT-40D OC et MT-40D S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|-----------------|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1200 | - | | 5 | 0,50 | 97,64 | 38,03 | 120,00 | 23,92 | 26,56 | 35,10 | 38,03 |
| | | | | 10 | 0,50 | 215,12 | 60,76 | 120,00 | 30,31 | 40,02 | 53,76 | 60,76 |
| | | | | 15 | 0,50 | 332,60 | 100,54 | 93,33 | 38,43 | 60,69 | 94,64 | - |
| | | | | 20 | 0,50 | 450,07 | 96,88 | 60,00 | 49,42 | 96,88 | - | - |
| | | | | 25 | 0,50 | 567,55 | 98,24 | 33,33 | 73,19 | - | - | - |
| | | | | 30 | 0,50 | 685,03 | 67,35 | 26,67 | - | - | - | - |
| 1 | 1200 | - | | 5 | 0,50 | 97,64 | 38,33 | 120,00 | 24,03 | 26,75 | 35,35 | 38,33 |
| | | | | 10 | 0,50 | 215,12 | 63,62 | 120,00 | 30,58 | 40,57 | 54,82 | 63,62 |
| | | | | 15 | 0,50 | 332,60 | 124,16 | 66,67 | 38,98 | 77,89 | - | - |
| | | | | 20 | 0,50 | 450,07 | 82,47 | 33,33 | 60,51 | - | - | - |
| | | | | 25 | 0,50 | 567,55 | 50,68 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 685,03 | 24,23 | 20,00 | - | - | - | - |
| 2 | 1200 | - | | 5 | 0,94 | 390,57 | 44,88 | 120,00 | 26,35 | 30,91 | 40,66 | 44,88 |
| | | | | 10 | 0,94 | 860,48 | 297,70 | 120,00 | 38,46 | 62,61 | 236,26 | 297,70 |
| | | | | 15 | 0,94 | 1330,39 | 451,21 | 120,00 | 89,14 | 266,52 | 361,85 | 451,21 |
| | | | | 20 | 0,94 | 450,07 | 82,47 | 33,33 | 60,51 | - | - | - |
| | | | | 25 | 0,94 | 567,55 | 50,68 | 26,67 | - | - | - | - |
| | | | | 30 | 0,94 | 685,03 | 24,23 | 20,00 | - | - | - | - |
| 2 | 1200 | - | | 5 | 0,94 | 390,57 | 44,06 | 120,00 | 26,17 | 30,51 | 40,07 | 44,06 |
| | | | | 10 | 0,94 | 860,48 | 245,42 | 120,00 | 37,38 | 57,47 | 128,19 | 245,42 |
| | | | | 15 | 0,94 | 1330,39 | 337,90 | 120,00 | 56,50 | 215,81 | 296,46 | 337,90 |
| | | | | 20 | 0,94 | 1800,30 | 356,63 | 93,33 | 148,97 | 303,55 | 351,38 | - |
| | | | | 25 | 0,94 | 2270,21 | 27,52 | 20,00 | - | - | - | - |
| | | | | 30 | 0,94 | 2740,12 | 33,24 | 20,00 | - | - | - | - |
| 3 | 1200 | 14 | | 5 | 0,67 | 12,21 | 41,25 | 120,00 | 25,15 | 28,69 | 37,76 | 41,25 |
| | | | | 10 | 0,67 | 26,89 | 74,91 | 120,00 | 33,66 | 47,82 | 64,97 | 74,91 |
| | | | | 15 | 0,67 | 41,57 | 215,97 | 120,00 | 44,62 | 76,85 | 119,32 | 215,97 |
| | | | | 20 | 0,67 | 56,26 | 404,68 | 120,00 | 60,71 | 135,49 | 330,01 | 404,68 |
| | | | | 25 | 0,67 | 70,94 | 417,72 | 120,00 | 92,26 | 299,78 | 378,43 | 417,72 |
| | | | | 30 | 0,67 | 85,63 | 435,77 | 120,00 | 183,39 | 334,63 | 396,70 | 435,77 |
| 3 | 1200 | 14 | | 5 | 0,67 | 12,21 | 41,05 | 120,00 | 25,08 | 28,57 | 37,59 | 41,05 |
| | | | | 10 | 0,67 | 26,89 | 77,11 | 120,00 | 33,59 | 47,51 | 64,45 | 77,11 |
| | | | | 15 | 0,67 | 41,57 | 320,15 | 120,00 | 44,48 | 79,83 | 267,60 | 320,15 |
| | | | | 20 | 0,67 | 56,26 | 406,31 | 120,00 | 68,73 | 274,25 | 360,25 | 406,31 |
| | | | | 25 | 0,67 | 70,94 | 471,09 | 120,00 | 168,76 | 357,24 | 431,36 | 471,09 |
| | | | | 30 | 0,67 | 85,63 | 27,26 | 20,00 | - | - | - | - |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

4) La distance entre les points de chargement est de 75 mm

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D16

Tableau D35: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40D, MT-40D S, MT-40D OC et MT-40D S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|-----------------|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1500 | - | | 5 | 0,50 | 69,19 | 45,74 | 120,00 | 26,63 | 31,26 | 41,26 | 45,74 |
| | | | | 10 | 0,50 | 163,17 | 82,38 | 120,00 | 36,66 | 52,69 | 71,13 | 82,38 |
| | | | | 15 | 0,50 | 257,15 | 535,47 | 120,00 | 49,36 | 85,67 | 365,37 | 535,47 |
| | | | | 20 | 0,50 | 351,13 | 614,33 | 120,00 | 66,93 | 397,13 | 559,35 | 614,33 |
| | | | | 25 | 0,50 | 445,12 | 65,42 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 539,10 | 100,62 | 26,67 | - | - | - | - |
| 1 | 1500 | - | | 5 | 0,50 | 69,19 | 45,96 | 120,00 | 26,71 | 31,40 | 41,44 | 45,96 |
| | | | | 10 | 0,50 | 163,17 | 142,87 | 120,00 | 36,88 | 53,38 | 74,25 | 142,87 |
| | | | | 15 | 0,50 | 257,15 | 158,32 | 60,00 | 50,17 | 158,32 | - | - |
| | | | | 20 | 0,50 | 351,13 | 50,18 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 445,12 | 82,42 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 539,10 | 29,74 | 20,00 | - | - | - | - |
| 2 | 1500 | - | | 5 | 0,95 | 345,94 | 54,93 | 120,00 | 29,88 | 37,06 | 48,72 | 54,93 |
| | | | | 10 | 0,95 | 815,85 | 369,45 | 120,00 | 48,57 | 131,06 | 308,28 | 369,45 |
| | | | | 15 | 0,95 | 1285,76 | 459,22 | 120,00 | 138,22 | 337,06 | 414,37 | 459,22 |
| | | | | 20 | 0,95 | 1755,67 | 28,80 | 20,00 | - | - | - | - |
| | | | | 25 | 0,95 | 2225,58 | 35,81 | 20,00 | - | - | - | - |
| | | | | 30 | 0,95 | 2695,49 | 47,51 | 20,00 | - | - | - | - |
| 2 | 1500 | - | | 5 | 0,95 | 345,94 | 53,90 | 120,00 | 29,66 | 36,58 | 47,98 | 53,90 |
| | | | | 10 | 0,95 | 815,85 | 306,27 | 120,00 | 46,97 | 92,37 | 228,43 | 306,27 |
| | | | | 15 | 0,95 | 1285,76 | 399,57 | 120,00 | 96,73 | 281,78 | 358,66 | 399,57 |
| | | | | 20 | 0,95 | 1755,67 | 419,41 | 93,33 | 218,19 | 356,20 | 415,04 | - |
| | | | | 25 | 0,95 | 2225,58 | 34,54 | 20,00 | - | - | - | - |
| | | | | 30 | 0,95 | 2695,49 | 43,76 | 20,00 | - | - | - | - |
| 3 | 1500 | 18 | | 5 | 0,67 | 6,92 | 50,87 | 120,00 | 28,62 | 34,72 | 45,53 | 50,87 |
| | | | | 10 | 0,67 | 16,32 | 103,91 | 120,00 | 41,90 | 64,82 | 88,37 | 103,91 |
| | | | | 15 | 0,67 | 25,72 | 260,97 | 120,00 | 58,88 | 109,10 | 172,36 | 260,97 |
| | | | | 20 | 0,67 | 35,11 | 446,80 | 120,00 | 83,63 | 185,15 | 363,88 | 446,80 |
| | | | | 25 | 0,67 | 44,51 | 492,69 | 120,00 | 127,97 | 320,20 | 439,26 | 492,69 |
| | | | | 30 | 0,67 | 53,91 | 524,41 | 120,00 | 212,58 | 389,87 | 476,04 | 524,41 |
| 3 | 1500 | 18 | | 5 | 0,67 | 6,92 | 50,28 | 120,00 | 28,40 | 34,33 | 45,04 | 50,28 |
| | | | | 10 | 0,67 | 16,32 | 105,82 | 120,00 | 41,66 | 64,16 | 87,48 | 105,82 |
| | | | | 15 | 0,67 | 25,72 | 373,86 | 120,00 | 58,58 | 120,45 | 302,62 | 373,86 |
| | | | | 20 | 0,67 | 35,11 | 454,01 | 120,00 | 93,96 | 310,78 | 404,32 | 454,01 |
| | | | | 25 | 0,67 | 44,51 | 506,10 | 120,00 | 204,98 | 392,10 | 464,26 | 506,10 |
| | | | | 30 | 0,67 | 53,91 | 34,71 | 20,00 | - | - | - | - |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

4) La distance entre les points de chargement est de 75 mm

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D17

Tableau D36: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40D, MT-40D S, MT-40D OC et MT-40D S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|-----------------|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1800 | - | | 5 | 0,50 | 48,56 | 56,23 | 120,00 | 30,35 | 37,73 | 49,67 | 56,23 |
| | | | | 10 | 0,50 | 126,88 | 112,31 | 120,00 | 44,97 | 69,47 | 94,33 | 112,31 |
| | | | | 15 | 0,50 | 205,20 | 643,50 | 120,00 | 63,43 | 120,15 | 465,60 | 643,50 |
| | | | | 20 | 0,50 | 283,52 | 736,31 | 120,00 | 90,50 | 481,96 | 671,69 | 736,31 |
| | | | | 25 | 0,50 | 361,84 | 88,15 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 440,16 | 36,39 | 20,00 | - | - | - | - |
| 1 | 1800 | - | | 5 | 0,50 | 48,56 | 56,56 | 120,00 | 30,40 | 37,84 | 49,89 | 56,56 |
| | | | | 10 | 0,50 | 126,88 | 215,20 | 113,33 | 45,24 | 71,56 | 114,86 | 0,00 |
| | | | | 15 | 0,50 | 205,20 | 255,72 | 60,00 | 66,42 | 255,72 | - | - |
| | | | | 20 | 0,50 | 283,52 | 66,43 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 361,84 | 31,28 | 20,00 | - | - | - | - |
| | | | | 30 | 0,50 | 440,16 | 36,80 | 20,00 | - | - | - | - |
| 2 | 1800 | - | | 5 | 0,96 | 291,39 | 68,72 | 120,00 | 34,23 | 44,74 | 59,13 | 68,72 |
| | | | | 10 | 0,96 | 761,30 | 453,17 | 120,00 | 64,04 | 215,19 | 383,81 | 453,17 |
| | | | | 15 | 0,96 | 1231,21 | 555,84 | 120,00 | 187,63 | 414,88 | 503,93 | 555,84 |
| | | | | 20 | 0,96 | 1701,12 | 35,05 | 20,00 | - | - | - | - |
| | | | | 25 | 0,96 | 2171,03 | 45,16 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2640,94 | 84,77 | 20,00 | - | - | - | - |
| 2 | 1800 | - | | 5 | 0,96 | 291,39 | 67,40 | 120,00 | 33,98 | 44,17 | 58,23 | 67,40 |
| | | | | 10 | 0,96 | 761,30 | 382,16 | 120,00 | 60,71 | 155,72 | 306,30 | 382,16 |
| | | | | 15 | 0,96 | 1231,21 | 485,94 | 120,00 | 137,04 | 348,57 | 437,59 | 485,94 |
| | | | | 20 | 0,96 | 1701,12 | 531,10 | 106,67 | 283,26 | 434,52 | 503,20 | - |
| | | | | 25 | 0,96 | 2171,03 | 43,39 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2640,94 | 63,40 | 20,00 | - | - | - | - |
| 3 | 1800 | 22 | | 5 | 0,67 | 4,05 | 63,87 | 120,00 | 33,35 | 42,93 | 56,10 | 63,87 |
| | | | | 10 | 0,67 | 10,57 | 141,47 | 120,00 | 52,50 | 86,66 | 118,34 | 141,47 |
| | | | | 15 | 0,67 | 17,10 | 297,70 | 120,00 | 76,83 | 148,75 | 222,35 | 297,70 |
| | | | | 20 | 0,67 | 23,63 | 484,26 | 120,00 | 112,32 | 231,99 | 367,82 | 484,26 |
| | | | | 25 | 0,67 | 30,15 | 555,64 | 120,00 | 165,54 | 324,29 | 477,35 | 555,64 |
| | | | | 30 | 0,67 | 36,68 | 621,82 | 120,00 | 264,33 | 485,90 | 571,73 | 621,82 |
| 3 | 1800 | 22 | | 5 | 0,67 | 4,05 | 62,58 | 120,00 | 32,85 | 42,06 | 55,01 | 62,58 |
| | | | | 10 | 0,67 | 10,57 | 152,86 | 120,00 | 51,97 | 85,49 | 116,95 | 152,86 |
| | | | | 15 | 0,67 | 17,10 | 515,00 | 120,00 | 76,35 | 283,85 | 442,53 | 515,00 |
| | | | | 20 | 0,67 | 23,63 | 533,27 | 120,00 | 129,86 | 365,09 | 474,43 | 533,27 |
| | | | | 25 | 0,67 | 30,15 | 594,47 | 120,00 | 268,94 | 459,35 | 544,96 | 594,47 |
| | | | | 30 | 0,67 | 36,68 | 44,07 | 20,00 | - | - | - | - |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

4) La distance entre les points de chargement est de 75 mm

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D18

Tableau D37: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-40D, MT-40D S, MT-40D OC et MT-40D S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|-----------------|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n ⁴⁾ | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2100 | - | | 5 | 0,50 | 32,42 | 70,26 | 120,00 | 35,34 | 46,42 | 60,99 | 70,26 |
| | | | | 10 | 0,50 | 99,55 | 160,00 | 120,00 | 55,57 | 91,18 | 125,20 | 160,00 |
| | | | | 15 | 0,50 | 166,68 | 754,89 | 120,00 | 81,09 | 179,27 | 586,20 | 754,89 |
| | | | | 20 | 0,50 | 233,81 | 844,22 | 120,00 | 126,46 | 578,16 | 775,90 | 844,22 |
| | | | | 25 | 0,50 | 300,94 | 914,22 | 120,00 | 345,59 | 761,26 | 866,24 | 914,22 |
| | | | | 30 | 0,50 | 368,07 | 44,97 | 20,00 | - | - | - | - |
| 1 | 2100 | - | | 5 | 0,50 | 32,42 | 71,58 | 120,00 | 35,38 | 46,62 | 61,65 | 71,58 |
| | | | | 10 | 0,50 | 99,55 | 306,50 | 106,67 | 56,18 | 99,29 | 193,76 | 0,00 |
| | | | | 15 | 0,50 | 166,68 | 320,74 | 53,33 | 92,19 | - | - | - |
| | | | | 20 | 0,50 | 233,81 | 91,87 | 26,67 | - | - | - | - |
| | | | | 25 | 0,50 | 300,94 | 37,93 | 20,00 | - | - | - | - |
| | | | | 30 | 0,50 | 368,07 | 45,68 | 20,00 | - | - | - | - |
| 2 | 2100 | - | | 5 | 0,96 | 226,92 | 95,31 | 120,00 | 39,45 | 54,31 | 73,91 | 95,31 |
| | | | | 10 | 0,96 | 696,83 | 534,70 | 120,00 | 92,83 | 283,75 | 456,00 | 534,70 |
| | | | | 15 | 0,96 | 1166,74 | 655,13 | 120,00 | 240,96 | 490,69 | 594,40 | 655,13 |
| | | | | 20 | 0,96 | 1636,65 | 42,70 | 20,00 | - | - | - | - |
| | | | | 25 | 0,96 | 2106,56 | 59,09 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2576,47 | 157,74 | 20,00 | - | - | - | - |
| 2 | 2100 | - | | 5 | 0,96 | 226,92 | 92,91 | 120,00 | 39,20 | 53,76 | 73,15 | 92,91 |
| | | | | 10 | 0,96 | 696,83 | 460,35 | 120,00 | 84,99 | 218,41 | 378,63 | 460,35 |
| | | | | 15 | 0,96 | 1166,74 | 575,80 | 120,00 | 184,46 | 415,51 | 519,45 | 575,80 |
| | | | | 20 | 0,96 | 1636,65 | 638,73 | 113,33 | 340,41 | 515,23 | 595,97 | - |
| | | | | 25 | 0,96 | 2106,56 | 55,93 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 2576,47 | 107,34 | 20,00 | - | - | - | - |
| 3 | 2100 | 26 | | 5 | 0,67 | 2,32 | 81,18 | 120,00 | 39,61 | 53,87 | 70,32 | 81,18 |
| | | | | 10 | 0,67 | 7,11 | 186,73 | 120,00 | 65,82 | 113,93 | 155,64 | 186,73 |
| | | | | 15 | 0,67 | 11,91 | 341,37 | 120,00 | 98,81 | 193,17 | 272,87 | 341,37 |
| | | | | 20 | 0,67 | 16,70 | 509,61 | 120,00 | 145,00 | 279,39 | 390,52 | 509,61 |
| | | | | 25 | 0,67 | 21,50 | 650,97 | 120,00 | 206,30 | 363,26 | 582,77 | 650,97 |
| | | | | 30 | 0,67 | 26,29 | 693,53 | 120,00 | 278,93 | 515,32 | 632,55 | 693,53 |
| 3 | 2100 | 26 | | 5 | 0,67 | 2,32 | 78,70 | 120,00 | 38,65 | 52,19 | 68,17 | 78,70 |
| | | | | 10 | 0,67 | 7,11 | 220,87 | 120,00 | 64,84 | 112,07 | 153,58 | 220,87 |
| | | | | 15 | 0,67 | 11,91 | 581,64 | 120,00 | 98,03 | 308,03 | 499,02 | 581,64 |
| | | | | 20 | 0,67 | 16,70 | 608,72 | 120,00 | 166,38 | 416,71 | 540,47 | 608,72 |
| | | | | 25 | 0,67 | 21,50 | 679,83 | 120,00 | 319,85 | 522,61 | 622,08 | 679,83 |
| | | | | 30 | 0,67 | 26,29 | 55,43 | 20,00 | - | - | - | - |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

4) La distance entre les points de chargement est de 75 mm

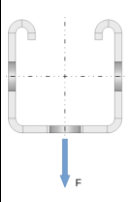
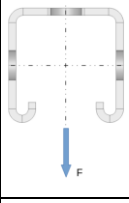
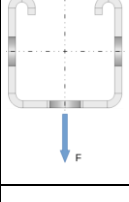
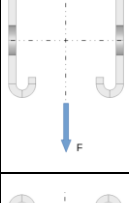
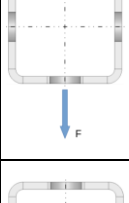
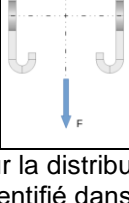
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D19

Tableau D38: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-50, MT-50 S, MT-50 OC et MT-50 S OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|---|---|------------|-----------|-----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - |  | 5 | 0,50 | 122,79 | 9,93 | 120,00 | 7,50 | 7,50 | 9,93 | 9,93 |
| | | | | 10 | 0,50 | 250,89 | 17,22 | 120,00 | 10,28 | 13,00 | 17,22 | 17,22 |
| | | | | 15 | 0,50 | 379,00 | 36,62 | 120,00 | 13,10 | 19,74 | 28,87 | 36,62 |
| | | | | 20 | 0,50 | 507,11 | 121,28 | 120,00 | 15,97 | 27,73 | 75,78 | 121,28 |
| | | | | 25 | 0,50 | 635,22 | 140,57 | 120,00 | 18,95 | 39,35 | 115,74 | 140,57 |
| | | | | 30 | 0,50 | 763,33 | 160,60 | 120,00 | 22,61 | 89,52 | 141,98 | 160,60 |
| 1 | 500 | - |  | 5 | 0,50 | 122,79 | 10,02 | 120,00 | 7,54 | 7,55 | 10,02 | 10,02 |
| | | | | 10 | 0,50 | 250,89 | 17,36 | 120,00 | 10,36 | 13,16 | 17,36 | 17,36 |
| | | | | 15 | 0,50 | 379,00 | 31,72 | 120,00 | 13,21 | 19,80 | 27,84 | 31,72 |
| | | | | 20 | 0,50 | 507,11 | 59,92 | 106,67 | 16,08 | 27,08 | 45,86 | - |
| | | | | 25 | 0,50 | 635,22 | 48,63 | 73,33 | 19,04 | 35,76 | - | - |
| | | | | 30 | 0,50 | 763,33 | 49,46 | 60,00 | 22,31 | 49,46 | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 153,48 | 12,25 | 120,00 | 8,53 | 9,34 | 12,25 | 12,25 |
| | | | | 10 | 0,80 | 313,62 | 29,54 | 106,67 | 12,39 | 17,67 | 24,46 | - |
| | | | | 15 | 0,80 | 473,75 | 24,19 | 53,33 | 16,29 | - | - | - |
| | | | | 20 | 0,80 | 633,89 | 15,74 | 26,67 | - | - | - | - |
| | | | | 25 | 0,80 | 794,02 | 6,73 | 20,00 | - | - | - | - |
| | | | | 30 | 0,80 | 954,16 | 7,64 | 20,00 | - | - | - | - |
| 2 | 500 | - |  | 5 | 0,80 | 153,48 | 12,40 | 120,00 | 8,58 | 9,46 | 12,40 | 12,40 |
| | | | | 10 | 0,80 | 313,62 | 24,65 | 120,00 | 12,53 | 17,95 | 23,70 | 24,65 |
| | | | | 15 | 0,80 | 473,75 | 54,72 | 120,00 | 16,53 | 27,87 | 43,02 | 54,72 |
| | | | | 20 | 0,80 | 633,89 | 57,89 | 80,00 | 20,56 | 38,74 | - | - |
| | | | | 25 | 0,80 | 794,02 | 52,52 | 60,00 | 24,82 | 52,52 | - | - |
| | | | | 30 | 0,80 | 954,16 | 51,68 | 46,67 | 30,86 | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 51,16 | 11,35 | 120,00 | 8,12 | 8,60 | 11,35 | 11,35 |
| | | | | 10 | 0,67 | 104,54 | 20,99 | 120,00 | 11,55 | 15,76 | 20,89 | 20,99 |
| | | | | 15 | 0,67 | 157,92 | 38,93 | 93,33 | 15,05 | 24,35 | 37,73 | - |
| | | | | 20 | 0,67 | 211,30 | 39,18 | 66,67 | 18,59 | 34,19 | - | - |
| | | | | 25 | 0,67 | 264,67 | 33,21 | 46,67 | 22,26 | - | - | - |
| | | | | 30 | 0,67 | 318,05 | 34,27 | 33,33 | 27,21 | - | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 51,16 | 11,46 | 120,00 | 8,17 | 8,70 | 11,46 | 11,46 |
| | | | | 10 | 0,67 | 104,54 | 21,15 | 120,00 | 11,66 | 15,98 | 21,11 | 21,15 |
| | | | | 15 | 0,67 | 157,92 | 46,92 | 120,00 | 15,19 | 24,60 | 36,86 | 46,92 |
| | | | | 20 | 0,67 | 211,30 | 68,02 | 93,33 | 18,76 | 34,11 | 64,24 | - |
| | | | | 25 | 0,67 | 264,67 | 55,44 | 66,67 | 22,46 | 46,32 | - | - |
| | | | | 30 | 0,67 | 318,05 | 57,75 | 53,33 | 27,30 | - | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D20

Tableau D39: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-50, MT-50 S, MT-50 OC et MT-50 S OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|---|------------------------|------------|-----------|-----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 700 | - | | 5 | 0,50 | 84,06 | 15,96 | 120,00 | 10,15 | 12,34 | 15,96 | 15,96 |
| | | | | 10 | 0,50 | 175,56 | 31,24 | 120,00 | 15,46 | 23,06 | 30,07 | 31,24 |
| | | | | 15 | 0,50 | 267,07 | 110,67 | 120,00 | 20,88 | 35,87 | 52,26 | 110,67 |
| | | | | 20 | 0,50 | 358,57 | 171,86 | 120,00 | 26,37 | 50,61 | 141,00 | 171,86 |
| | | | | 25 | 0,50 | 450,08 | 203,36 | 120,00 | 32,00 | 114,31 | 178,10 | 203,36 |
| | | | | 30 | 0,50 | 541,58 | 229,95 | 120,00 | 38,73 | 153,52 | 207,78 | 229,95 |
| 1 | 700 | - | | 5 | 0,50 | 84,06 | 16,00 | 120,00 | 10,18 | 12,38 | 16,00 | 16,00 |
| | | | | 10 | 0,50 | 175,56 | 30,84 | 120,00 | 15,51 | 23,02 | 29,88 | 30,84 |
| | | | | 15 | 0,50 | 267,07 | 59,05 | 120,00 | 20,90 | 35,50 | 49,33 | 59,05 |
| | | | | 20 | 0,50 | 358,57 | 95,65 | 106,67 | 26,31 | 48,86 | 79,15 | - |
| | | | | 25 | 0,50 | 450,08 | 99,89 | 80,00 | 31,79 | 63,88 | - | - |
| | | | | 30 | 0,50 | 541,58 | 96,53 | 60,00 | 40,22 | 96,53 | - | - |
| 2 | 700 | - | | 5 | 0,86 | 147,10 | 20,84 | 120,00 | 12,31 | 16,28 | 20,84 | 20,84 |
| | | | | 10 | 0,86 | 307,23 | 115,84 | 120,00 | 20,01 | 34,24 | 97,06 | 115,84 |
| | | | | 15 | 0,86 | 467,37 | 105,04 | 60,00 | 27,88 | 105,04 | - | - |
| | | | | 20 | 0,86 | 627,50 | 26,84 | 26,67 | - | - | - | - |
| | | | | 25 | 0,86 | 787,64 | 9,97 | 20,00 | - | - | - | - |
| | | | | 30 | 0,86 | 947,77 | 11,79 | 20,00 | - | - | - | - |
| 2 | 700 | - | | 5 | 0,86 | 147,10 | 20,93 | 120,00 | 12,34 | 16,36 | 20,93 | 20,93 |
| | | | | 10 | 0,86 | 307,23 | 47,57 | 120,00 | 20,12 | 32,93 | 42,72 | 47,57 |
| | | | | 15 | 0,86 | 467,37 | 86,89 | 120,00 | 27,91 | 51,31 | 73,61 | 86,89 |
| | | | | 20 | 0,86 | 627,50 | 120,84 | 113,33 | 35,66 | 69,31 | 105,06 | - |
| | | | | 25 | 0,86 | 787,64 | 117,95 | 80,00 | 43,53 | 87,39 | - | - |
| | | | | 30 | 0,86 | 947,77 | 119,64 | 66,67 | 53,39 | 106,26 | - | - |
| 3 | 700 | 5 | | 5 | 0,67 | 24,52 | 18,74 | 120,00 | 11,38 | 14,57 | 18,74 | 18,74 |
| | | | | 10 | 0,67 | 51,21 | 40,15 | 120,00 | 17,97 | 28,24 | 36,84 | 40,15 |
| | | | | 15 | 0,67 | 77,89 | 68,81 | 93,33 | 24,62 | 44,09 | 66,48 | - |
| | | | | 20 | 0,67 | 104,58 | 69,64 | 66,67 | 31,30 | 61,24 | - | - |
| | | | | 25 | 0,67 | 131,27 | 58,57 | 46,67 | 38,14 | - | - | - |
| | | | | 30 | 0,67 | 157,96 | 59,47 | 33,33 | 46,96 | - | - | - |
| 3 | 700 | 5 | | 5 | 0,67 | 24,52 | 18,81 | 120,00 | 11,41 | 14,65 | 18,81 | 18,81 |
| | | | | 10 | 0,67 | 51,21 | 40,15 | 120,00 | 18,06 | 28,46 | 36,99 | 40,15 |
| | | | | 15 | 0,67 | 77,89 | 78,46 | 120,00 | 24,76 | 44,37 | 63,93 | 78,46 |
| | | | | 20 | 0,67 | 104,58 | 131,24 | 120,00 | 31,46 | 60,84 | 98,26 | 131,24 |
| | | | | 25 | 0,67 | 131,27 | 131,04 | 86,67 | 38,27 | 78,89 | - | - |
| | | | | 30 | 0,67 | 157,96 | 119,58 | 66,67 | 46,49 | 101,36 | - | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D21

Tableau D40: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-50, MT-50 S, MT-50 OC et MT-50 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - | | 5 | 0,50 | 61,59 | 24,43 | 120,00 | 13,87 | 19,18 | 24,43 | 24,43 |
| | | | | 10 | 0,50 | 132,76 | 51,51 | 120,00 | 22,59 | 36,65 | 47,25 | 51,51 |
| | | | | 15 | 0,50 | 203,93 | 181,22 | 120,00 | 31,40 | 57,08 | 93,17 | 181,22 |
| | | | | 20 | 0,50 | 275,10 | 238,05 | 120,00 | 40,22 | 87,12 | 205,02 | 238,05 |
| | | | | 25 | 0,50 | 346,28 | 273,17 | 120,00 | 49,20 | 179,15 | 245,05 | 273,17 |
| | | | | 30 | 0,50 | 417,45 | 299,31 | 120,00 | 61,64 | 217,52 | 273,58 | 299,31 |
| 1 | 900 | - | | 5 | 0,50 | 61,59 | 24,33 | 120,00 | 13,86 | 19,13 | 24,33 | 24,33 |
| | | | | 10 | 0,50 | 132,76 | 50,70 | 120,00 | 22,54 | 36,41 | 46,84 | 50,70 |
| | | | | 15 | 0,50 | 203,93 | 92,90 | 120,00 | 31,28 | 56,33 | 77,08 | 92,90 |
| | | | | 20 | 0,50 | 275,10 | 150,23 | 113,33 | 39,99 | 76,97 | 118,85 | - |
| | | | | 25 | 0,50 | 346,28 | 141,64 | 80,00 | 48,74 | 98,85 | - | - |
| | | | | 30 | 0,50 | 417,45 | 144,02 | 66,67 | 58,12 | 124,90 | - | - |
| 2 | 900 | - | | 5 | 0,89 | 138,58 | 32,30 | 120,00 | 17,34 | 25,49 | 32,30 | 32,30 |
| | | | | 10 | 0,89 | 298,72 | 138,36 | 120,00 | 30,16 | 86,28 | 121,58 | 138,36 |
| | | | | 15 | 0,89 | 458,85 | 133,34 | 60,00 | 54,29 | 133,34 | - | - |
| | | | | 20 | 0,89 | 618,99 | 42,60 | 26,67 | - | - | - | - |
| | | | | 25 | 0,89 | 779,12 | 14,30 | 20,00 | - | - | - | - |
| | | | | 30 | 0,89 | 939,26 | 17,35 | 20,00 | - | - | - | - |
| 2 | 900 | - | | 5 | 0,89 | 138,58 | 32,19 | 120,00 | 17,34 | 25,50 | 32,19 | 32,19 |
| | | | | 10 | 0,89 | 298,72 | 75,18 | 120,00 | 30,14 | 52,02 | 66,44 | 75,18 |
| | | | | 15 | 0,89 | 458,85 | 120,51 | 120,00 | 42,72 | 79,34 | 106,02 | 120,51 |
| | | | | 20 | 0,89 | 618,99 | 160,37 | 120,00 | 54,92 | 103,27 | 141,79 | 160,37 |
| | | | | 25 | 0,89 | 779,12 | 184,14 | 113,33 | 66,89 | 124,93 | 168,09 | - |
| | | | | 30 | 0,89 | 939,26 | 192,17 | 93,33 | 79,93 | 143,82 | 189,30 | - |
| 3 | 900 | 7 | | 5 | 0,67 | 13,86 | 28,86 | 120,00 | 15,87 | 22,76 | 28,86 | 28,86 |
| | | | | 10 | 0,67 | 29,87 | 64,52 | 120,00 | 26,58 | 44,64 | 57,52 | 64,52 |
| | | | | 15 | 0,67 | 45,89 | 101,76 | 93,33 | 37,28 | 68,73 | 98,39 | - |
| | | | | 20 | 0,67 | 61,90 | 104,37 | 66,67 | 47,84 | 92,86 | - | - |
| | | | | 25 | 0,67 | 77,91 | 88,04 | 46,67 | 58,39 | - | - | - |
| | | | | 30 | 0,67 | 93,93 | 88,40 | 33,33 | 70,66 | - | - | - |
| 3 | 900 | 7 | | 5 | 0,67 | 13,86 | 28,88 | 120,00 | 15,87 | 22,81 | 28,88 | 28,88 |
| | | | | 10 | 0,67 | 29,87 | 64,84 | 120,00 | 26,71 | 45,06 | 57,91 | 64,84 |
| | | | | 15 | 0,67 | 45,89 | 114,33 | 120,00 | 37,52 | 69,61 | 96,13 | 114,33 |
| | | | | 20 | 0,67 | 61,90 | 166,59 | 120,00 | 48,17 | 93,27 | 137,86 | 166,59 |
| | | | | 25 | 0,67 | 77,91 | 210,62 | 120,00 | 58,77 | 116,54 | 172,96 | 210,62 |
| | | | | 30 | 0,67 | 93,93 | 211,25 | 93,33 | 70,68 | 140,46 | 205,51 | - |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D22

Tableau D41: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-50, MT-50 S, MT-50 OC et MT-50 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - | | 5 | 0,50 | 46,52 | 35,51 | 120,00 | 18,79 | 28,18 | 35,51 | 35,51 |
| | | | | 10 | 0,50 | 104,75 | 77,38 | 120,00 | 31,69 | 53,79 | 68,91 | 77,38 |
| | | | | 15 | 0,50 | 162,98 | 232,92 | 120,00 | 44,59 | 83,58 | 186,12 | 232,92 |
| | | | | 20 | 0,50 | 221,22 | 102,01 | 53,33 | 57,42 | - | - | - |
| | | | | 25 | 0,50 | 279,45 | 98,91 | 40,00 | 70,55 | - | - | - |
| | | | | 30 | 0,50 | 337,68 | 62,35 | 26,67 | - | - | - | - |
| 1 | 1100 | - | | 5 | 0,50 | 46,52 | 35,29 | 120,00 | 18,72 | 28,01 | 35,29 | 35,29 |
| | | | | 10 | 0,50 | 104,75 | 75,65 | 120,00 | 31,55 | 53,45 | 68,27 | 75,65 |
| | | | | 15 | 0,50 | 162,98 | 132,07 | 120,00 | 44,40 | 82,01 | 110,31 | 132,07 |
| | | | | 20 | 0,50 | 221,22 | 201,86 | 113,33 | 57,09 | 110,50 | 163,46 | - |
| | | | | 25 | 0,50 | 279,45 | 190,74 | 80,00 | 69,69 | 139,21 | - | - |
| | | | | 30 | 0,50 | 337,68 | 192,59 | 66,67 | 82,91 | 170,74 | - | - |
| 2 | 1100 | - | | 5 | 0,91 | 127,94 | 69,64 | 120,00 | 23,63 | 37,28 | 51,26 | 69,64 |
| | | | | 10 | 0,91 | 288,07 | 166,94 | 120,00 | 45,83 | 118,04 | 151,28 | 166,94 |
| | | | | 15 | 0,91 | 448,21 | 208,96 | 120,00 | 82,64 | 161,63 | 194,51 | 208,96 |
| | | | | 20 | 0,91 | 608,34 | 66,45 | 26,67 | - | - | - | - |
| | | | | 25 | 0,91 | 768,48 | 19,72 | 20,00 | - | - | - | - |
| | | | | 30 | 0,91 | 928,61 | 24,44 | 20,00 | - | - | - | - |
| 2 | 1100 | - | | 5 | 0,91 | 127,94 | 46,58 | 120,00 | 23,57 | 36,80 | 46,06 | 46,58 |
| | | | | 10 | 0,91 | 288,07 | 105,86 | 120,00 | 42,44 | 74,43 | 93,66 | 105,86 |
| | | | | 15 | 0,91 | 448,21 | 156,11 | 120,00 | 60,57 | 110,19 | 139,76 | 156,11 |
| | | | | 20 | 0,91 | 608,34 | 198,07 | 120,00 | 77,62 | 139,15 | 179,18 | 198,07 |
| | | | | 25 | 0,91 | 768,48 | 228,57 | 120,00 | 93,81 | 163,52 | 207,93 | 228,57 |
| | | | | 30 | 0,91 | 928,61 | 246,28 | 113,33 | 109,65 | 184,15 | 229,66 | - |
| 3 | 1100 | 9 | | 5 | 0,67 | 8,53 | 42,16 | 120,00 | 21,72 | 33,36 | 41,93 | 42,16 |
| | | | | 10 | 0,67 | 19,20 | 93,20 | 120,00 | 37,46 | 64,70 | 82,35 | 93,20 |
| | | | | 15 | 0,67 | 29,88 | 169,49 | 100,00 | 52,91 | 97,12 | 141,99 | - |
| | | | | 20 | 0,67 | 40,56 | 154,49 | 73,33 | 68,64 | 127,81 | - | - |
| | | | | 25 | 0,67 | 51,23 | 121,70 | 46,67 | 82,41 | - | - | - |
| | | | | 30 | 0,67 | 61,91 | 121,60 | 33,33 | 98,42 | - | - | - |
| 3 | 1100 | 9 | | 5 | 0,67 | 8,53 | 42,02 | 120,00 | 21,67 | 33,37 | 41,88 | 42,02 |
| | | | | 10 | 0,67 | 19,20 | 94,22 | 120,00 | 37,63 | 65,57 | 83,31 | 94,22 |
| | | | | 15 | 0,67 | 29,88 | 152,44 | 120,00 | 53,35 | 99,12 | 131,42 | 152,44 |
| | | | | 20 | 0,67 | 40,56 | 209,35 | 120,00 | 68,55 | 129,35 | 179,23 | 209,35 |
| | | | | 25 | 0,67 | 51,23 | 251,75 | 120,00 | 83,34 | 157,13 | 217,57 | 251,75 |
| | | | | 30 | 0,67 | 61,91 | 287,79 | 120,00 | 98,86 | 182,88 | 248,92 | 287,79 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D23

Tableau D42: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-50, MT-50 S, MT-50 OC et MT-50 S OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - | | 5 | 0,50 | 35,44 | 50,34 | 120,00 | 25,05 | 39,53 | 49,47 | 50,34 |
| | | | | 10 | 0,50 | 84,71 | 110,76 | 120,00 | 42,85 | 74,60 | 95,11 | 110,76 |
| | | | | 15 | 0,50 | 133,98 | 299,78 | 120,00 | 60,52 | 117,38 | 254,76 | 299,78 |
| | | | | 20 | 0,50 | 183,25 | 115,26 | 46,67 | 77,98 | - | - | - |
| | | | | 25 | 0,50 | 232,52 | 119,54 | 33,33 | 95,25 | - | - | - |
| | | | | 30 | 0,50 | 281,80 | 84,75 | 26,67 | - | - | - | - |
| 1 | 1300 | - | | 5 | 0,50 | 35,44 | 50,00 | 120,00 | 24,90 | 39,29 | 49,17 | 50,00 |
| | | | | 10 | 0,50 | 84,71 | 105,56 | 120,00 | 42,67 | 74,21 | 94,15 | 105,56 |
| | | | | 15 | 0,50 | 133,98 | 175,33 | 120,00 | 60,29 | 112,15 | 148,12 | 175,33 |
| | | | | 20 | 0,50 | 183,25 | 256,98 | 113,33 | 77,52 | 148,52 | 211,44 | - |
| | | | | 25 | 0,50 | 232,52 | 242,90 | 80,00 | 94,39 | 183,66 | - | - |
| | | | | 30 | 0,50 | 281,80 | 244,50 | 66,67 | 111,70 | 219,94 | - | - |
| 2 | 1300 | - | | 5 | 0,92 | 115,16 | 102,17 | 120,00 | 31,30 | 56,59 | 87,55 | 102,17 |
| | | | | 10 | 0,92 | 275,30 | 197,57 | 120,00 | 68,95 | 145,84 | 179,80 | 197,57 |
| | | | | 15 | 0,92 | 435,43 | 241,56 | 120,00 | 110,98 | 190,82 | 224,88 | 241,56 |
| | | | | 20 | 0,92 | 595,57 | 262,49 | 120,00 | 152,69 | 216,30 | 248,21 | 262,49 |
| | | | | 25 | 0,92 | 755,70 | 281,76 | 120,00 | 181,47 | 238,04 | 268,71 | 281,76 |
| | | | | 30 | 0,92 | 915,84 | 301,03 | 120,00 | 210,25 | 259,79 | 289,21 | 301,03 |
| 2 | 1300 | - | | 5 | 0,92 | 115,16 | 64,39 | 120,00 | 31,00 | 50,14 | 62,34 | 64,39 |
| | | | | 10 | 0,92 | 275,30 | 138,69 | 120,00 | 56,87 | 99,42 | 123,47 | 138,69 |
| | | | | 15 | 0,92 | 435,43 | 194,19 | 120,00 | 81,02 | 142,85 | 175,09 | 194,19 |
| | | | | 20 | 0,92 | 595,57 | 237,81 | 120,00 | 103,06 | 176,41 | 217,72 | 237,81 |
| | | | | 25 | 0,92 | 755,70 | 270,36 | 120,00 | 123,41 | 203,12 | 249,10 | 270,36 |
| | | | | 30 | 0,92 | 915,84 | 297,44 | 120,00 | 142,23 | 225,47 | 272,82 | 297,44 |
| 3 | 1300 | 11 | | 5 | 0,67 | 5,48 | 59,91 | 120,00 | 29,08 | 46,52 | 58,07 | 59,91 |
| | | | | 10 | 0,67 | 13,11 | 125,36 | 120,00 | 50,63 | 87,98 | 110,62 | 125,36 |
| | | | | 15 | 0,67 | 20,73 | 292,41 | 120,00 | 71,27 | 128,12 | 205,04 | 292,41 |
| | | | | 20 | 0,67 | 28,36 | 348,80 | 120,00 | 90,79 | 184,70 | 310,77 | 348,80 |
| | | | | 25 | 0,67 | 35,99 | 384,34 | 120,00 | 109,53 | 262,82 | 350,60 | 384,34 |
| | | | | 30 | 0,67 | 43,61 | 186,45 | 40,00 | 127,94 | - | - | - |
| 3 | 1300 | 11 | | 5 | 0,67 | 5,48 | 59,64 | 120,00 | 28,91 | 46,47 | 57,95 | 59,64 |
| | | | | 10 | 0,67 | 13,11 | 127,34 | 120,00 | 50,90 | 89,60 | 112,53 | 127,34 |
| | | | | 15 | 0,67 | 20,73 | 191,96 | 120,00 | 72,07 | 131,68 | 168,55 | 191,96 |
| | | | | 20 | 0,67 | 28,36 | 252,24 | 120,00 | 92,15 | 167,59 | 221,11 | 252,24 |
| | | | | 25 | 0,67 | 35,99 | 298,34 | 120,00 | 111,27 | 199,12 | 262,65 | 298,34 |
| | | | | 30 | 0,67 | 43,61 | 334,07 | 120,00 | 130,15 | 226,91 | 296,39 | 334,07 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

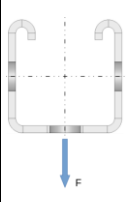
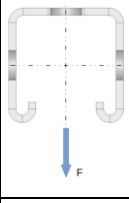
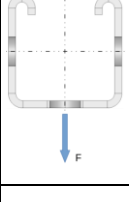
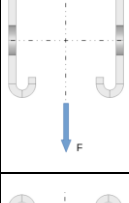
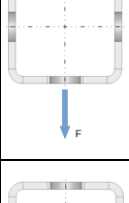
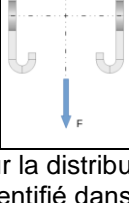
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D24

Tableau D43: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-50, MT-50 S, MT-50 OC et MT-50 S OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|----|---|------------|-----------|-----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1500 | - |  | 5 | 0,50 | 26,74 | 69,18 | 120,00 | 32,82 | 53,55 | 66,66 | 69,18 |
| | | | | 10 | 0,50 | 69,44 | 156,55 | 120,00 | 56,23 | 99,36 | 128,32 | 156,55 |
| | | | | 15 | 0,50 | 112,14 | 367,21 | 120,00 | 79,27 | 211,60 | 319,11 | 367,21 |
| | | | | 20 | 0,50 | 154,84 | 138,88 | 40,00 | 102,11 | - | - | - |
| | | | | 25 | 0,50 | 197,55 | 92,90 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 240,25 | 110,95 | 26,67 | - | - | - | - |
| 1 | 1500 | - |  | 5 | 0,50 | 26,74 | 68,76 | 120,00 | 32,60 | 53,23 | 66,29 | 68,76 |
| | | | | 10 | 0,50 | 69,44 | 140,16 | 120,00 | 56,02 | 98,71 | 124,36 | 140,16 |
| | | | | 15 | 0,50 | 112,14 | 221,93 | 120,00 | 78,99 | 146,31 | 189,72 | 221,93 |
| | | | | 20 | 0,50 | 154,84 | 313,11 | 113,33 | 101,16 | 190,30 | 262,15 | - |
| | | | | 25 | 0,50 | 197,55 | 297,15 | 80,00 | 122,62 | 231,42 | - | - |
| | | | | 30 | 0,50 | 240,25 | 298,68 | 66,67 | 144,11 | 271,93 | - | - |
| 2 | 1500 | - |  | 5 | 0,93 | 100,26 | 127,09 | 120,00 | 40,94 | 85,50 | 114,48 | 127,09 |
| | | | | 10 | 0,93 | 260,40 | 236,47 | 120,00 | 90,37 | 173,01 | 214,01 | 236,47 |
| | | | | 15 | 0,93 | 420,53 | 282,98 | 120,00 | 138,78 | 223,88 | 263,32 | 282,98 |
| | | | | 20 | 0,93 | 580,67 | 294,93 | 120,00 | 175,48 | 244,97 | 279,04 | 294,93 |
| | | | | 25 | 0,93 | 740,80 | 314,56 | 120,00 | 205,20 | 268,02 | 300,53 | 314,56 |
| | | | | 30 | 0,93 | 900,94 | 337,27 | 120,00 | 236,15 | 293,12 | 324,57 | 337,27 |
| 2 | 1500 | - |  | 5 | 0,93 | 100,26 | 84,66 | 120,00 | 39,59 | 65,40 | 80,89 | 84,66 |
| | | | | 10 | 0,93 | 260,40 | 173,32 | 120,00 | 73,24 | 126,50 | 155,31 | 173,32 |
| | | | | 15 | 0,93 | 420,53 | 234,91 | 120,00 | 103,71 | 176,89 | 212,13 | 234,91 |
| | | | | 20 | 0,93 | 580,67 | 279,58 | 120,00 | 130,71 | 214,67 | 257,60 | 279,58 |
| | | | | 25 | 0,93 | 740,80 | 314,39 | 120,00 | 155,03 | 243,98 | 291,77 | 314,39 |
| | | | | 30 | 0,93 | 900,94 | 341,28 | 120,00 | 176,90 | 267,89 | 317,62 | 341,28 |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,58 | 81,20 | 120,00 | 38,13 | 62,43 | 77,46 | 81,20 |
| | | | | 10 | 0,67 | 9,30 | 161,03 | 120,00 | 66,02 | 113,81 | 141,50 | 161,03 |
| | | | | 15 | 0,67 | 15,02 | 302,22 | 120,00 | 92,10 | 161,24 | 225,03 | 302,22 |
| | | | | 20 | 0,67 | 20,74 | 386,93 | 120,00 | 116,20 | 215,37 | 334,92 | 386,93 |
| | | | | 25 | 0,67 | 26,46 | 429,91 | 120,00 | 139,35 | 282,47 | 389,36 | 429,91 |
| | | | | 30 | 0,67 | 32,18 | 461,08 | 120,00 | 170,29 | 351,56 | 423,66 | 461,08 |
| 3 | 1500 | 13 |  | 5 | 0,67 | 3,58 | 80,83 | 120,00 | 37,77 | 62,32 | 77,29 | 80,83 |
| | | | | 10 | 0,67 | 9,30 | 163,12 | 120,00 | 66,46 | 116,60 | 144,74 | 163,12 |
| | | | | 15 | 0,67 | 15,02 | 232,89 | 120,00 | 93,49 | 166,35 | 206,97 | 232,89 |
| | | | | 20 | 0,67 | 20,74 | 295,33 | 120,00 | 118,50 | 207,12 | 263,13 | 295,33 |
| | | | | 25 | 0,67 | 26,46 | 344,69 | 120,00 | 141,84 | 241,72 | 307,81 | 344,69 |
| | | | | 30 | 0,67 | 32,18 | 383,46 | 120,00 | 163,95 | 271,88 | 343,97 | 383,46 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

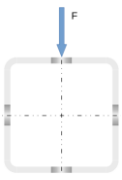

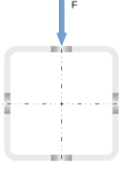
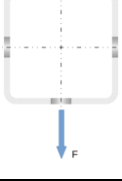
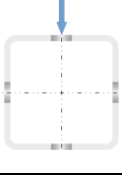
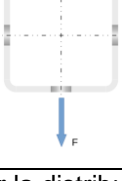
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D25

Tableau D44: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-70 S OC et MT-70 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|---|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - |  | 5 | 0,50 | 247,05 | 32,35 | 120,00 | 7,01 | 32,35 | 32,35 | 32,35 |
| | | | | 10 | 0,50 | 502,41 | 38,36 | 120,00 | 8,14 | 38,36 | 38,36 | 38,36 |
| | | | | 15 | 0,50 | 757,77 | 51,59 | 120,00 | 9,72 | 46,90 | 46,90 | 51,59 |
| | | | | 20 | 0,50 | 1013,13 | 156,46 | 120,00 | 12,34 | 62,06 | 80,63 | 156,46 |
| | | | | 25 | 0,50 | 1268,49 | 195,33 | 120,00 | 17,55 | 88,46 | 170,56 | 195,33 |
| | | | | 30 | 0,50 | 1523,85 | 210,65 | 120,00 | 27,60 | 155,54 | 199,01 | 210,65 |
| 1 | 500 | - |  | 5 | 0,50 | 247,05 | 33,21 | 120,00 | 7,35 | 33,21 | 33,21 | 33,21 |
| | | | | 10 | 0,50 | 502,41 | 40,17 | 120,00 | 9,05 | 40,17 | 40,17 | 40,17 |
| | | | | 15 | 0,50 | 757,77 | 48,64 | 120,00 | 11,37 | 48,64 | 48,64 | 48,64 |
| | | | | 20 | 0,50 | 1013,13 | 87,28 | 120,00 | 14,52 | 61,32 | 66,88 | 87,28 |
| | | | | 25 | 0,50 | 1268,49 | 152,03 | 120,00 | 19,08 | 80,44 | 107,53 | 152,03 |
| | | | | 30 | 0,50 | 1523,85 | 204,09 | 120,00 | 26,54 | 107,19 | 158,87 | 204,09 |
| 2 | 500 | - |  | 5 | 0,80 | 308,81 | 34,80 | 120,00 | 7,45 | 34,80 | 34,80 | 34,80 |
| | | | | 10 | 0,80 | 628,01 | 44,09 | 120,00 | 9,33 | 44,09 | 44,09 | 44,09 |
| | | | | 15 | 0,80 | 947,21 | 89,44 | 120,00 | 12,11 | 62,12 | 71,78 | 89,44 |
| | | | | 20 | 0,80 | 1266,41 | 126,51 | 120,00 | 17,81 | 92,92 | 111,00 | 126,51 |
| | | | | 25 | 0,80 | 1585,61 | 146,44 | 120,00 | 32,42 | 123,99 | 136,97 | 146,44 |
| | | | | 30 | 0,80 | 1904,81 | 151,99 | 90,91 | 58,28 | 146,85 | 151,37 | - |
| 2 | 500 | - |  | 5 | 0,80 | 308,81 | 34,60 | 120,00 | 7,44 | 34,60 | 34,60 | 34,60 |
| | | | | 10 | 0,80 | 628,01 | 42,86 | 120,00 | 9,23 | 42,86 | 42,86 | 42,86 |
| | | | | 15 | 0,80 | 947,21 | 64,64 | 120,00 | 11,58 | 55,84 | 55,84 | 64,64 |
| | | | | 20 | 0,80 | 1266,41 | 99,95 | 120,00 | 15,83 | 75,67 | 84,86 | 99,95 |
| | | | | 25 | 0,80 | 1585,61 | 124,97 | 117,77 | 25,13 | 100,20 | 111,00 | - |
| | | | | 30 | 0,80 | 1904,81 | 132,35 | 86,10 | 40,33 | 120,99 | - | - |
| 3 | 500 | 3 |  | 5 | 0,67 | 102,94 | 33,77 | 120,00 | 7,27 | 33,77 | 33,77 | 33,77 |
| | | | | 10 | 0,67 | 209,34 | 41,46 | 120,00 | 8,80 | 41,46 | 41,46 | 41,46 |
| | | | | 15 | 0,67 | 315,74 | 76,61 | 120,00 | 10,82 | 53,94 | 57,32 | 76,61 |
| | | | | 20 | 0,67 | 422,14 | 138,95 | 120,00 | 14,43 | 78,29 | 107,97 | 138,95 |
| | | | | 25 | 0,67 | 528,54 | 184,65 | 120,00 | 22,94 | 115,77 | 155,14 | 184,65 |
| | | | | 30 | 0,67 | 634,94 | 206,49 | 120,00 | 40,89 | 155,52 | 188,56 | 206,49 |
| 3 | 500 | 3 |  | 5 | 0,67 | 102,94 | 33,74 | 120,00 | 7,28 | 33,74 | 33,74 | 33,74 |
| | | | | 10 | 0,67 | 209,34 | 41,12 | 120,00 | 8,81 | 41,12 | 41,12 | 41,12 |
| | | | | 15 | 0,67 | 315,74 | 58,64 | 120,00 | 10,77 | 51,80 | 51,80 | 58,64 |
| | | | | 20 | 0,67 | 422,14 | 101,04 | 120,00 | 14,07 | 69,47 | 81,67 | 101,04 |
| | | | | 25 | 0,67 | 528,54 | 138,89 | 120,00 | 20,88 | 94,70 | 117,43 | 138,89 |
| | | | | 30 | 0,67 | 634,94 | 167,03 | 120,00 | 33,06 | 122,34 | 145,78 | 167,03 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

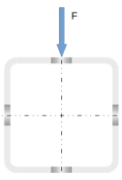

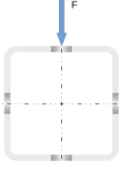
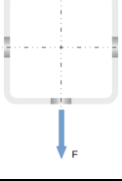
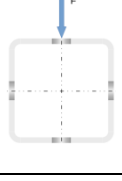
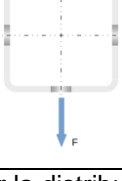
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D26

Tableau D45: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-70 S OC et MT-70 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 800 | - |  | 5 | 0,50 | 146,30 | 37,15 | 120,00 | 8,03 | 37,15 | 37,15 | 37,15 |
| | | | | 10 | 0,50 | 305,90 | 51,36 | 120,00 | 10,79 | 51,36 | 51,36 | 51,36 |
| | | | | 15 | 0,50 | 465,50 | 104,98 | 120,00 | 14,35 | 70,27 | 83,77 | 104,98 |
| | | | | 20 | 0,50 | 625,10 | 188,53 | 120,00 | 19,81 | 101,73 | 143,75 | 188,53 |
| | | | | 25 | 0,50 | 784,70 | 287,59 | 120,00 | 30,42 | 146,59 | 216,85 | 287,59 |
| | | | | 30 | 0,50 | 944,30 | 328,95 | 120,00 | 50,99 | 199,96 | 291,64 | 328,95 |
| 1 | 800 | - |  | 5 | 0,50 | 146,30 | 37,59 | 120,00 | 8,21 | 37,59 | 37,59 | 37,59 |
| | | | | 10 | 0,50 | 305,90 | 52,26 | 120,00 | 11,24 | 52,26 | 52,26 | 52,26 |
| | | | | 15 | 0,50 | 465,50 | 97,60 | 120,00 | 15,13 | 70,67 | 81,20 | 97,60 |
| | | | | 20 | 0,50 | 625,10 | 166,31 | 120,00 | 20,78 | 99,10 | 132,52 | 166,31 |
| | | | | 25 | 0,50 | 784,70 | 230,37 | 120,00 | 30,49 | 138,44 | 189,70 | 230,37 |
| | | | | 30 | 0,50 | 944,30 | 288,75 | 120,00 | 47,64 | 181,46 | 240,91 | 288,75 |
| 2 | 800 | - |  | 5 | 0,88 | 292,60 | 43,33 | 120,00 | 9,08 | 43,33 | 43,33 | 43,33 |
| | | | | 10 | 0,88 | 611,80 | 90,19 | 120,00 | 13,76 | 67,02 | 75,78 | 90,19 |
| | | | | 15 | 0,88 | 931,00 | 160,84 | 120,00 | 20,48 | 110,06 | 140,50 | 160,84 |
| | | | | 20 | 0,88 | 1250,20 | 205,97 | 120,00 | 34,67 | 159,09 | 187,44 | 205,97 |
| | | | | 25 | 0,88 | 1569,40 | 228,43 | 120,00 | 71,07 | 198,04 | 215,41 | 228,43 |
| | | | | 30 | 0,88 | 1888,60 | 232,96 | 96,35 | 114,76 | 223,65 | 231,31 | - |
| 2 | 800 | - |  | 5 | 0,88 | 292,60 | 42,77 | 120,00 | 9,05 | 42,77 | 42,77 | 42,77 |
| | | | | 10 | 0,88 | 611,80 | 75,64 | 120,00 | 13,56 | 63,70 | 66,53 | 75,64 |
| | | | | 15 | 0,88 | 931,00 | 121,54 | 120,00 | 19,51 | 93,48 | 108,82 | 121,54 |
| | | | | 20 | 0,88 | 1250,20 | 161,78 | 120,00 | 30,49 | 128,95 | 148,58 | 161,78 |
| | | | | 25 | 0,88 | 1569,40 | 185,20 | 119,26 | 53,27 | 159,84 | 174,52 | - |
| | | | | 30 | 0,88 | 1888,60 | 192,40 | 86,74 | 82,82 | 183,55 | - | - |
| 3 | 800 | 6 |  | 5 | 0,67 | 36,57 | 39,96 | 120,00 | 8,52 | 39,96 | 39,96 | 39,96 |
| | | | | 10 | 0,67 | 76,47 | 66,72 | 120,00 | 12,13 | 58,08 | 58,37 | 66,72 |
| | | | | 15 | 0,67 | 116,37 | 135,21 | 120,00 | 16,79 | 84,91 | 109,54 | 135,21 |
| | | | | 20 | 0,67 | 156,27 | 206,64 | 120,00 | 24,72 | 127,76 | 171,73 | 206,64 |
| | | | | 25 | 0,67 | 196,17 | 258,44 | 120,00 | 42,19 | 178,22 | 226,12 | 258,44 |
| | | | | 30 | 0,67 | 236,07 | 301,74 | 120,00 | 74,97 | 221,82 | 266,99 | 301,74 |
| 3 | 800 | 6 |  | 5 | 0,67 | 36,57 | 39,97 | 120,00 | 8,56 | 39,97 | 39,97 | 39,97 |
| | | | | 10 | 0,67 | 76,47 | 63,97 | 120,00 | 12,21 | 57,74 | 57,74 | 63,97 |
| | | | | 15 | 0,67 | 116,37 | 119,67 | 120,00 | 16,86 | 82,23 | 100,40 | 119,67 |
| | | | | 20 | 0,67 | 156,27 | 182,25 | 120,00 | 24,53 | 118,83 | 153,63 | 182,25 |
| | | | | 25 | 0,67 | 196,17 | 225,13 | 120,00 | 40,12 | 161,71 | 198,90 | 225,13 |
| | | | | 30 | 0,67 | 236,07 | 257,18 | 120,00 | 67,32 | 198,63 | 234,53 | 257,18 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

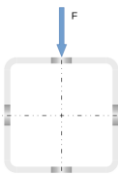

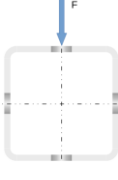
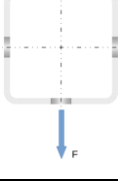

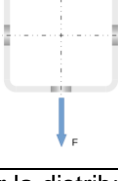
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D27

Tableau D46: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-70 S OC et MT-70 OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|---|---|------------|-----------|-----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1100 | - |  | 5 | 0,50 | 97,78 | 44,47 | 120,00 | 9,57 | 44,47 | 44,47 | 44,47 |
| | | | | 10 | 0,50 | 213,85 | 90,08 | 120,00 | 14,71 | 70,67 | 79,48 | 90,08 |
| | | | | 15 | 0,50 | 329,93 | 170,78 | 120,00 | 21,23 | 103,99 | 140,03 | 170,78 |
| | | | | 20 | 0,50 | 446,00 | 265,95 | 120,00 | 31,02 | 154,31 | 218,39 | 265,95 |
| | | | | 25 | 0,50 | 562,07 | 357,23 | 120,00 | 49,47 | 216,07 | 294,52 | 357,23 |
| | | | | 30 | 0,50 | 678,15 | 429,03 | 120,00 | 83,56 | 277,03 | 366,09 | 429,03 |
| 1 | 1100 | - |  | 5 | 0,50 | 97,78 | 44,71 | 120,00 | 9,68 | 44,71 | 44,71 | 44,71 |
| | | | | 10 | 0,50 | 213,85 | 89,97 | 120,00 | 14,98 | 71,12 | 79,75 | 89,97 |
| | | | | 15 | 0,50 | 329,93 | 164,55 | 120,00 | 21,69 | 103,81 | 137,45 | 164,55 |
| | | | | 20 | 0,50 | 446,00 | 253,90 | 120,00 | 31,52 | 151,68 | 210,69 | 253,90 |
| | | | | 25 | 0,50 | 562,07 | 322,83 | 120,00 | 49,02 | 209,61 | 278,99 | 322,83 |
| | | | | 30 | 0,50 | 678,15 | 382,96 | 120,00 | 79,99 | 264,61 | 335,99 | 382,96 |
| 2 | 1100 | - |  | 5 | 0,91 | 268,90 | 55,51 | 120,00 | 11,38 | 55,51 | 55,51 | 55,51 |
| | | | | 10 | 0,91 | 588,10 | 155,74 | 120,00 | 20,19 | 100,15 | 131,71 | 155,74 |
| | | | | 15 | 0,91 | 907,30 | 236,04 | 120,00 | 32,82 | 169,15 | 213,11 | 236,04 |
| | | | | 20 | 0,91 | 1226,50 | 289,73 | 120,00 | 59,95 | 229,94 | 269,43 | 289,73 |
| | | | | 25 | 0,91 | 1545,70 | 316,31 | 120,00 | 118,75 | 272,79 | 301,35 | 316,31 |
| | | | | 30 | 0,91 | 1864,90 | 324,77 | 99,78 | 177,03 | 304,89 | 322,28 | - |
| 2 | 1100 | - |  | 5 | 0,91 | 268,90 | 54,19 | 120,00 | 11,32 | 54,19 | 54,19 | 54,19 |
| | | | | 10 | 0,91 | 588,10 | 128,59 | 120,00 | 19,76 | 92,55 | 112,91 | 128,59 |
| | | | | 15 | 0,91 | 907,30 | 183,94 | 120,00 | 30,85 | 139,04 | 166,72 | 183,94 |
| | | | | 20 | 0,91 | 1226,50 | 226,11 | 120,00 | 51,05 | 186,85 | 212,57 | 226,11 |
| | | | | 25 | 0,91 | 1545,70 | 249,89 | 120,00 | 88,10 | 221,42 | 241,50 | 249,89 |
| | | | | 30 | 0,91 | 1864,90 | 258,55 | 88,59 | 128,57 | 246,83 | - | - |
| 3 | 1100 | 9 |  | 5 | 0,67 | 17,93 | 49,62 | 120,00 | 10,47 | 49,62 | 49,62 | 49,62 |
| | | | | 10 | 0,67 | 39,21 | 119,82 | 120,00 | 17,31 | 83,49 | 102,56 | 119,82 |
| | | | | 15 | 0,67 | 60,49 | 210,61 | 120,00 | 26,21 | 131,06 | 178,51 | 210,61 |
| | | | | 20 | 0,67 | 81,77 | 295,09 | 120,00 | 41,55 | 194,51 | 255,54 | 295,09 |
| | | | | 25 | 0,67 | 103,05 | 350,43 | 120,00 | 74,72 | 257,63 | 313,76 | 350,43 |
| | | | | 30 | 0,67 | 124,33 | 389,04 | 120,00 | 128,76 | 307,45 | 359,45 | 389,04 |
| 3 | 1100 | 9 |  | 5 | 0,67 | 17,93 | 49,45 | 120,00 | 10,47 | 49,45 | 49,45 | 49,45 |
| | | | | 10 | 0,67 | 39,21 | 114,95 | 120,00 | 17,26 | 82,45 | 99,51 | 114,95 |
| | | | | 15 | 0,67 | 60,49 | 193,74 | 120,00 | 26,01 | 126,18 | 166,73 | 193,74 |
| | | | | 20 | 0,67 | 81,77 | 270,45 | 120,00 | 40,72 | 183,19 | 236,88 | 270,45 |
| | | | | 25 | 0,67 | 103,05 | 322,62 | 120,00 | 70,47 | 239,32 | 288,62 | 322,62 |
| | | | | 30 | 0,67 | 124,33 | 358,62 | 120,00 | 117,19 | 285,40 | 329,77 | 358,62 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

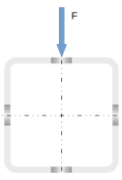

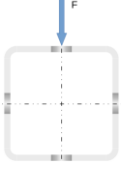
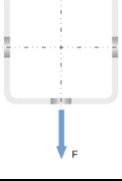
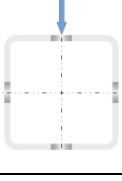
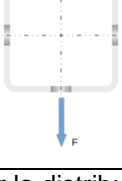
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D28

Tableau D47: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-70 S OC et MT-70 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|---|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1400 | - |  | 5 | 0,50 | 67,92 | 54,74 | 120,00 | 11,73 | 54,74 | 54,74 | 54,74 |
| | | | | 10 | 0,50 | 159,12 | 142,09 | 120,00 | 20,02 | 96,57 | 123,77 | 142,09 |
| | | | | 15 | 0,50 | 250,32 | 245,97 | 120,00 | 30,50 | 147,49 | 207,15 | 245,97 |
| | | | | 20 | 0,50 | 341,52 | 355,17 | 120,00 | 46,11 | 217,35 | 301,21 | 355,17 |
| | | | | 25 | 0,50 | 432,72 | 441,62 | 120,00 | 74,90 | 293,35 | 384,18 | 441,62 |
| | | | | 30 | 0,50 | 523,92 | 518,66 | 120,00 | 125,26 | 361,86 | 453,77 | 518,66 |
| 1 | 1400 | - |  | 5 | 0,50 | 67,92 | 54,85 | 120,00 | 11,79 | 54,85 | 54,85 | 54,85 |
| | | | | 10 | 0,50 | 159,12 | 141,66 | 120,00 | 20,19 | 96,74 | 123,69 | 141,66 |
| | | | | 15 | 0,50 | 250,32 | 241,24 | 120,00 | 30,76 | 146,97 | 204,90 | 241,24 |
| | | | | 20 | 0,50 | 341,52 | 346,34 | 120,00 | 46,31 | 215,08 | 296,28 | 346,34 |
| | | | | 25 | 0,50 | 432,72 | 424,05 | 120,00 | 74,09 | 288,31 | 373,15 | 424,05 |
| | | | | 30 | 0,50 | 523,92 | 484,16 | 120,00 | 121,76 | 353,68 | 437,07 | 484,16 |
| 2 | 1400 | - |  | 5 | 0,93 | 237,72 | 78,46 | 120,00 | 14,30 | 70,84 | 78,29 | 78,46 |
| | | | | 10 | 0,93 | 556,92 | 227,82 | 120,00 | 28,54 | 141,73 | 196,03 | 227,82 |
| | | | | 15 | 0,93 | 876,12 | 314,93 | 120,00 | 49,05 | 233,09 | 288,77 | 314,93 |
| | | | | 20 | 0,93 | 1195,32 | 377,06 | 120,00 | 92,91 | 305,91 | 353,78 | 377,06 |
| | | | | 25 | 0,93 | 1514,52 | 410,55 | 120,00 | 177,30 | 354,16 | 392,80 | 410,55 |
| | | | | 30 | 0,93 | 1833,72 | 419,50 | 102,67 | 241,32 | 388,45 | 415,60 | - |
| 2 | 1400 | - |  | 5 | 0,93 | 237,72 | 71,32 | 120,00 | 14,20 | 68,54 | 71,32 | 71,32 |
| | | | | 10 | 0,93 | 556,92 | 187,55 | 120,00 | 27,75 | 128,14 | 166,28 | 187,55 |
| | | | | 15 | 0,93 | 876,12 | 255,33 | 120,00 | 45,48 | 189,49 | 229,68 | 255,33 |
| | | | | 20 | 0,93 | 1195,32 | 296,37 | 120,00 | 76,79 | 247,30 | 280,33 | 296,37 |
| | | | | 25 | 0,93 | 1514,52 | 320,84 | 120,00 | 127,33 | 287,74 | 312,36 | 320,84 |
| | | | | 30 | 0,93 | 1833,72 | 330,23 | 91,17 | 178,19 | 315,43 | 329,56 | - |
| 3 | 1400 | 12 |  | 5 | 0,67 | 9,70 | 61,83 | 120,00 | 12,96 | 61,83 | 61,83 | 61,83 |
| | | | | 10 | 0,67 | 22,73 | 180,34 | 120,00 | 23,85 | 114,95 | 154,70 | 180,34 |
| | | | | 15 | 0,67 | 35,76 | 285,87 | 120,00 | 38,00 | 182,92 | 249,05 | 285,87 |
| | | | | 20 | 0,67 | 48,79 | 381,63 | 120,00 | 62,04 | 263,59 | 339,37 | 381,63 |
| | | | | 25 | 0,67 | 61,82 | 446,39 | 120,00 | 111,17 | 335,73 | 403,85 | 446,39 |
| | | | | 30 | 0,67 | 74,85 | 490,85 | 120,00 | 183,11 | 393,90 | 453,15 | 490,85 |
| 3 | 1400 | 12 |  | 5 | 0,67 | 9,70 | 61,63 | 120,00 | 12,96 | 61,63 | 61,63 | 61,63 |
| | | | | 10 | 0,67 | 22,73 | 174,43 | 120,00 | 23,80 | 113,57 | 150,82 | 174,43 |
| | | | | 15 | 0,67 | 35,76 | 270,16 | 120,00 | 37,76 | 177,01 | 237,14 | 270,16 |
| | | | | 20 | 0,67 | 48,79 | 358,58 | 120,00 | 60,93 | 252,16 | 320,95 | 358,58 |
| | | | | 25 | 0,67 | 61,82 | 420,09 | 120,00 | 105,68 | 317,90 | 381,99 | 420,09 |
| | | | | 30 | 0,67 | 74,85 | 463,10 | 120,00 | 170,07 | 372,41 | 426,98 | 463,10 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

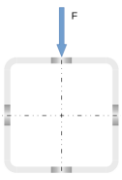

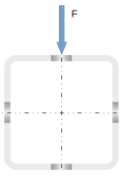

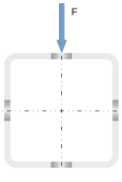
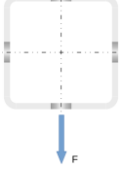
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D29

Tableau D48: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-70 S OC et MT-70 OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|----|---|------------|-----------|-----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1700 | - |  | 5 | 0,50 | 46,84 | 69,94 | 120,00 | 14,60 | 68,64 | 69,94 | 69,94 |
| | | | | 10 | 0,50 | 121,94 | 204,84 | 120,00 | 26,85 | 129,43 | 178,09 | 204,84 |
| | | | | 15 | 0,50 | 197,05 | 328,64 | 120,00 | 42,31 | 199,97 | 282,63 | 328,64 |
| | | | | 20 | 0,50 | 272,16 | 449,22 | 120,00 | 65,25 | 288,58 | 390,65 | 449,22 |
| | | | | 25 | 0,50 | 347,26 | 538,95 | 120,00 | 106,73 | 376,39 | 479,49 | 538,95 |
| | | | | 30 | 0,50 | 422,37 | 614,38 | 120,00 | 175,02 | 452,62 | 553,18 | 614,38 |
| 1 | 1700 | - |  | 5 | 0,50 | 46,84 | 69,89 | 120,00 | 14,64 | 68,66 | 69,89 | 69,89 |
| | | | | 10 | 0,50 | 121,94 | 204,21 | 120,00 | 26,94 | 129,39 | 177,78 | 204,21 |
| | | | | 15 | 0,50 | 197,05 | 325,06 | 120,00 | 42,44 | 199,21 | 280,66 | 325,06 |
| | | | | 20 | 0,50 | 272,16 | 442,39 | 120,00 | 65,22 | 286,64 | 386,88 | 442,39 |
| | | | | 25 | 0,50 | 347,26 | 529,51 | 120,00 | 105,59 | 372,33 | 471,65 | 529,51 |
| | | | | 30 | 0,50 | 422,37 | 592,73 | 120,00 | 171,58 | 447,06 | 541,47 | 592,73 |
| 2 | 1700 | - |  | 5 | 0,94 | 199,06 | 109,90 | 120,00 | 17,78 | 88,73 | 108,26 | 109,90 |
| | | | | 10 | 0,94 | 518,26 | 303,22 | 120,00 | 38,71 | 189,58 | 264,87 | 303,22 |
| | | | | 15 | 0,94 | 837,46 | 401,53 | 120,00 | 69,02 | 299,93 | 367,24 | 401,53 |
| | | | | 20 | 0,94 | 1156,66 | 466,63 | 120,00 | 132,09 | 384,16 | 440,74 | 466,63 |
| | | | | 25 | 0,94 | 1475,86 | 507,07 | 120,00 | 236,40 | 438,46 | 485,68 | 507,07 |
| | | | | 30 | 0,94 | 1795,06 | 518,54 | 105,72 | 307,91 | 474,73 | 511,91 | - |
| 2 | 1700 | - |  | 5 | 0,94 | 199,06 | 98,73 | 120,00 | 17,63 | 85,46 | 98,73 | 98,73 |
| | | | | 10 | 0,94 | 518,26 | 251,34 | 120,00 | 37,44 | 169,29 | 224,87 | 251,34 |
| | | | | 15 | 0,94 | 837,46 | 330,79 | 120,00 | 63,23 | 243,87 | 300,24 | 330,79 |
| | | | | 20 | 0,94 | 1156,66 | 376,42 | 120,00 | 107,01 | 311,08 | 351,88 | 376,42 |
| | | | | 25 | 0,94 | 1475,86 | 401,45 | 120,00 | 169,95 | 356,87 | 388,11 | 401,45 |
| | | | | 30 | 0,94 | 1795,06 | 408,28 | 94,69 | 230,59 | 388,17 | 407,08 | - |
| 3 | 1700 | 15 |  | 5 | 0,67 | 5,53 | 86,08 | 120,00 | 16,16 | 77,60 | 86,08 | 86,08 |
| | | | | 10 | 0,67 | 14,40 | 250,27 | 120,00 | 32,25 | 154,14 | 216,36 | 250,27 |
| | | | | 15 | 0,67 | 23,26 | 369,34 | 120,00 | 53,18 | 243,65 | 327,36 | 369,34 |
| | | | | 20 | 0,67 | 32,13 | 473,79 | 120,00 | 88,56 | 340,78 | 428,77 | 473,79 |
| | | | | 25 | 0,67 | 41,00 | 546,64 | 120,00 | 157,03 | 420,45 | 501,97 | 546,64 |
| | | | | 30 | 0,67 | 49,86 | 597,20 | 120,00 | 246,32 | 485,67 | 554,77 | 597,20 |
| 3 | 1700 | 15 |  | 5 | 0,67 | 5,53 | 85,23 | 120,00 | 16,15 | 77,31 | 85,23 | 85,23 |
| | | | | 10 | 0,67 | 14,40 | 243,38 | 120,00 | 32,14 | 152,23 | 211,60 | 243,38 |
| | | | | 15 | 0,67 | 23,26 | 354,74 | 120,00 | 52,77 | 236,62 | 315,20 | 354,74 |
| | | | | 20 | 0,67 | 32,13 | 451,39 | 120,00 | 86,89 | 328,37 | 410,16 | 451,39 |
| | | | | 25 | 0,67 | 41,00 | 520,79 | 120,00 | 149,86 | 402,53 | 479,92 | 520,79 |
| | | | | 30 | 0,67 | 49,86 | 569,71 | 120,00 | 231,67 | 464,05 | 530,59 | 569,71 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

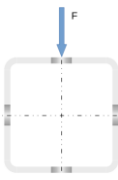

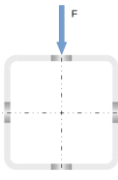
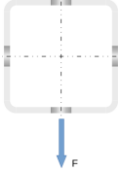
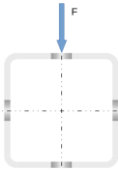

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D30

Tableau D49: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-70 S OC et MT-70 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|---|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2000 | - |  | 5 | 0,50 | 30,58 | 99,99 | 120,00 | 18,35 | 86,97 | 99,99 | 99,99 |
| | | | | 10 | 0,50 | 94,42 | 277,12 | 120,00 | 35,40 | 169,60 | 241,74 | 277,12 |
| | | | | 15 | 0,50 | 158,26 | 417,36 | 120,00 | 56,88 | 260,37 | 364,62 | 417,36 |
| | | | | 20 | 0,50 | 222,10 | 546,67 | 120,00 | 88,66 | 366,19 | 484,33 | 546,67 |
| | | | | 25 | 0,50 | 285,94 | 644,10 | 120,00 | 144,85 | 463,89 | 579,38 | 644,10 |
| | | | | 30 | 0,50 | 349,78 | 717,60 | 120,00 | 231,73 | 547,96 | 657,26 | 717,60 |
| 1 | 2000 | - |  | 5 | 0,50 | 30,58 | 99,86 | 120,00 | 18,36 | 86,93 | 99,86 | 99,86 |
| | | | | 10 | 0,50 | 94,42 | 276,38 | 120,00 | 35,43 | 169,40 | 241,26 | 276,38 |
| | | | | 15 | 0,50 | 158,26 | 414,68 | 120,00 | 56,89 | 259,45 | 362,91 | 414,68 |
| | | | | 20 | 0,50 | 222,10 | 541,40 | 120,00 | 88,43 | 364,44 | 481,24 | 541,40 |
| | | | | 25 | 0,50 | 285,94 | 636,96 | 120,00 | 143,42 | 460,56 | 574,24 | 636,96 |
| | | | | 30 | 0,50 | 349,78 | 706,05 | 120,00 | 228,32 | 543,49 | 648,44 | 706,05 |
| 2 | 2000 | - |  | 5 | 0,95 | 152,92 | 142,95 | 120,00 | 21,71 | 108,34 | 139,97 | 142,95 |
| | | | | 10 | 0,95 | 472,12 | 380,79 | 120,00 | 50,55 | 241,64 | 336,23 | 380,79 |
| | | | | 15 | 0,95 | 791,32 | 493,91 | 120,00 | 92,41 | 368,74 | 448,30 | 493,91 |
| | | | | 20 | 0,95 | 1110,52 | 559,08 | 120,00 | 175,95 | 464,18 | 530,48 | 559,08 |
| | | | | 25 | 0,95 | 1429,72 | 603,59 | 120,00 | 297,78 | 525,98 | 581,32 | 603,59 |
| | | | | 30 | 0,95 | 1748,92 | 621,31 | 110,18 | 377,74 | 566,21 | 611,58 | - |
| 2 | 2000 | - |  | 5 | 0,95 | 152,92 | 130,08 | 120,00 | 21,55 | 104,58 | 129,38 | 130,08 |
| | | | | 10 | 0,95 | 472,12 | 320,01 | 120,00 | 48,73 | 215,12 | 288,09 | 320,01 |
| | | | | 15 | 0,95 | 791,32 | 410,89 | 120,00 | 83,92 | 302,36 | 375,57 | 410,89 |
| | | | | 20 | 0,95 | 1110,52 | 461,69 | 120,00 | 141,12 | 378,54 | 429,59 | 461,69 |
| | | | | 25 | 0,95 | 1429,72 | 489,49 | 120,00 | 215,65 | 429,74 | 467,18 | 489,49 |
| | | | | 30 | 0,95 | 1748,92 | 492,54 | 99,12 | 285,81 | 464,59 | 489,30 | - |
| 3 | 2000 | 18 |  | 5 | 0,67 | 3,06 | 117,05 | 120,00 | 19,99 | 96,34 | 116,61 | 117,05 |
| | | | | 10 | 0,67 | 9,44 | 323,90 | 120,00 | 42,11 | 198,53 | 282,73 | 323,90 |
| | | | | 15 | 0,67 | 15,83 | 456,93 | 120,00 | 70,87 | 307,58 | 407,78 | 456,93 |
| | | | | 20 | 0,67 | 22,21 | 565,98 | 120,00 | 118,62 | 418,93 | 518,14 | 565,98 |
| | | | | 25 | 0,67 | 28,59 | 646,13 | 120,00 | 205,08 | 505,78 | 599,47 | 646,13 |
| | | | | 30 | 0,67 | 34,98 | 702,80 | 120,00 | 309,33 | 577,22 | 658,49 | 702,80 |
| 3 | 2000 | 18 |  | 5 | 0,67 | 3,06 | 116,03 | 120,00 | 19,98 | 96,04 | 115,76 | 116,03 |
| | | | | 10 | 0,67 | 9,44 | 316,78 | 120,00 | 41,99 | 196,33 | 277,64 | 316,78 |
| | | | | 15 | 0,67 | 15,83 | 444,49 | 120,00 | 70,38 | 300,16 | 396,15 | 444,49 |
| | | | | 20 | 0,67 | 22,21 | 545,12 | 120,00 | 116,55 | 406,31 | 500,28 | 545,12 |
| | | | | 25 | 0,67 | 28,59 | 621,64 | 120,00 | 196,92 | 489,01 | 578,10 | 621,64 |
| | | | | 30 | 0,67 | 34,98 | 676,52 | 120,00 | 294,36 | 556,41 | 635,14 | 676,52 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D31

Tableau D50: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-80 S OC et MT-80 OC

| Système | | | Direction de la charge | σ_B | $V^{(1)}$ | $F^{(2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|------------------|---|------------------------|------------|-----------|-----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ⁽³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 500 | - | | 5 | 0,50 | 695,64 | 33,01 | 120,00 | 3,91 | 30,49 | 30,49 | 33,01 |
| | | | | 10 | 0,50 | 1402,76 | 50,48 | 120,00 | 4,84 | 33,95 | 37,76 | 50,48 |
| | | | | 15 | 0,50 | 2109,88 | 45,66 | 70,00 | 6,15 | 39,48 | - | - |
| | | | | 20 | 0,50 | 2817,00 | 32,97 | 46,67 | 8,58 | - | - | - |
| | | | | 25 | 0,50 | 3524,12 | 12,65 | 26,67 | - | - | - | - |
| | | | | 30 | 0,50 | 4231,24 | 5,59 | 20,00 | - | - | - | - |
| 1 | 500 | - | | 5 | 0,50 | 382,28 | 33,62 | 120,00 | 4,06 | 31,01 | 31,01 | 33,62 |
| | | | | 10 | 0,50 | 776,04 | 47,93 | 120,00 | 5,26 | 35,86 | 40,97 | 47,93 |
| | | | | 15 | 0,50 | 1169,80 | 83,59 | 120,00 | 6,89 | 42,92 | 58,57 | 83,59 |
| | | | | 20 | 0,50 | 1563,56 | 166,18 | 120,00 | 9,55 | 54,26 | 102,55 | 166,18 |
| | | | | 25 | 0,50 | 1957,32 | 196,80 | 120,00 | 14,50 | 74,38 | 162,61 | 196,80 |
| | | | | 30 | 0,50 | 2351,08 | 213,12 | 120,00 | 24,49 | 128,76 | 188,32 | 213,12 |
| 2 | 500 | - | | 5 | 0,80 | 869,55 | 37,31 | 120,00 | 4,50 | 32,31 | 33,44 | 37,31 |
| | | | | 10 | 0,80 | 1753,45 | 47,60 | 80,00 | 6,22 | 38,77 | - | - |
| | | | | 15 | 0,80 | 2637,35 | 35,52 | 48,33 | 9,35 | - | - | - |
| | | | | 20 | 0,80 | 3521,25 | 22,29 | 30,00 | 22,29 | - | - | - |
| | | | | 25 | 0,80 | 4405,15 | 14,87 | 21,67 | - | - | - | - |
| | | | | 30 | 0,80 | 5289,05 | 7,96 | 18,33 | - | - | - | - |
| 2 | 500 | - | | 5 | 0,80 | 477,85 | 37,91 | 120,00 | 4,87 | 33,34 | 34,55 | 37,91 |
| | | | | 10 | 0,80 | 970,05 | 59,61 | 120,00 | 6,90 | 40,77 | 49,86 | 59,61 |
| | | | | 15 | 0,80 | 1462,25 | 92,47 | 120,00 | 10,00 | 51,18 | 71,92 | 92,47 |
| | | | | 20 | 0,80 | 1954,45 | 125,08 | 120,00 | 14,78 | 66,66 | 99,64 | 125,08 |
| | | | | 25 | 0,80 | 2446,65 | 145,57 | 120,00 | 22,73 | 85,89 | 122,61 | 145,57 |
| | | | | 30 | 0,80 | 2938,85 | 157,86 | 120,00 | 35,77 | 104,68 | 138,40 | 157,86 |
| 3 | 500 | 3 | | 5 | 0,67 | 289,85 | 34,53 | 120,00 | 4,24 | 31,42 | 31,47 | 34,53 |
| | | | | 10 | 0,67 | 584,48 | 49,08 | 120,00 | 5,42 | 35,90 | 41,32 | 49,08 |
| | | | | 15 | 0,67 | 879,12 | 55,15 | 78,33 | 7,09 | 42,91 | - | - |
| | | | | 20 | 0,67 | 1173,75 | 48,14 | 55,00 | 9,69 | - | - | - |
| | | | | 25 | 0,67 | 1468,38 | 34,51 | 40,00 | 14,38 | - | - | - |
| | | | | 30 | 0,67 | 1763,02 | 23,40 | 28,33 | - | - | - | - |
| 3 | 500 | 3 | | 5 | 0,67 | 159,28 | 35,97 | 120,00 | 4,61 | 32,55 | 32,94 | 35,97 |
| | | | | 10 | 0,67 | 323,35 | 53,63 | 120,00 | 6,31 | 38,76 | 45,94 | 53,63 |
| | | | | 15 | 0,67 | 487,42 | 89,12 | 120,00 | 8,53 | 47,23 | 66,05 | 89,12 |
| | | | | 20 | 0,67 | 651,48 | 153,84 | 120,00 | 11,72 | 60,54 | 99,99 | 153,84 |
| | | | | 25 | 0,67 | 815,55 | 189,53 | 120,00 | 16,84 | 81,27 | 150,90 | 189,53 |
| | | | | 30 | 0,67 | 979,62 | 209,16 | 120,00 | 25,74 | 111,49 | 180,91 | 209,16 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D32

Tableau D51: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-80 S OC et MT-80 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{t_{max},B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|---|------------------------|------------|----------|----------|----------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 900 | - | | 5 | 0,50 | 372,18 | 38,41 | 120,00 | 5,01 | 34,19 | 35,16 | 38,41 |
| | | | | 10 | 0,50 | 765,03 | 62,99 | 120,00 | 7,48 | 43,31 | 53,95 | 62,99 |
| | | | | 15 | 0,50 | 1157,87 | 96,15 | 95,00 | 10,55 | 55,06 | 87,24 | - |
| | | | | 20 | 0,50 | 1550,72 | 100,05 | 68,33 | 14,79 | 74,99 | - | - |
| | | | | 25 | 0,50 | 1943,56 | 73,57 | 48,33 | 21,83 | - | - | - |
| | | | | 30 | 0,50 | 2336,41 | 43,88 | 30,00 | 43,88 | - | - | - |
| 1 | 900 | - | | 5 | 0,50 | 198,10 | 41,58 | 120,00 | 5,97 | 36,76 | 38,35 | 41,58 |
| | | | | 10 | 0,50 | 416,85 | 72,90 | 120,00 | 9,71 | 49,38 | 63,00 | 72,90 |
| | | | | 15 | 0,50 | 635,61 | 133,11 | 120,00 | 14,01 | 64,46 | 98,39 | 133,11 |
| | | | | 20 | 0,50 | 854,36 | 267,87 | 120,00 | 19,39 | 87,31 | 158,89 | 267,87 |
| | | | | 25 | 0,50 | 1073,12 | 347,89 | 120,00 | 27,13 | 121,99 | 267,63 | 347,89 |
| | | | | 30 | 0,50 | 1291,87 | 380,84 | 120,00 | 40,86 | 184,85 | 336,11 | 380,84 |
| 2 | 900 | - | | 5 | 0,89 | 837,42 | 48,42 | 120,00 | 6,39 | 38,70 | 44,35 | 48,42 |
| | | | | 10 | 0,89 | 1721,32 | 66,96 | 70,00 | 10,40 | 55,05 | - | - |
| | | | | 15 | 0,89 | 2605,22 | 45,18 | 41,67 | 17,10 | - | - | - |
| | | | | 20 | 0,89 | 3489,12 | 27,43 | 28,33 | - | - | - | - |
| | | | | 25 | 0,89 | 4373,02 | 19,41 | 21,67 | - | - | - | - |
| | | | | 30 | 0,89 | 5256,92 | 11,67 | 18,33 | - | - | - | - |
| 2 | 900 | - | | 5 | 0,89 | 445,72 | 50,58 | 120,00 | 7,73 | 41,73 | 46,94 | 50,58 |
| | | | | 10 | 0,89 | 937,92 | 98,64 | 120,00 | 13,24 | 60,94 | 84,16 | 98,64 |
| | | | | 15 | 0,89 | 1430,12 | 146,26 | 120,00 | 20,95 | 82,99 | 121,73 | 146,26 |
| | | | | 20 | 0,89 | 1922,32 | 181,70 | 120,00 | 31,11 | 111,00 | 158,99 | 181,70 |
| | | | | 25 | 0,89 | 2414,52 | 207,74 | 120,00 | 44,91 | 138,12 | 187,90 | 207,74 |
| | | | | 30 | 0,89 | 2906,72 | 222,06 | 120,00 | 62,64 | 161,27 | 204,55 | 222,06 |
| 3 | 900 | 7 | | 5 | 0,67 | 83,74 | 41,91 | 120,00 | 5,68 | 36,24 | 38,79 | 41,91 |
| | | | | 10 | 0,67 | 172,13 | 73,67 | 120,00 | 8,68 | 47,62 | 62,54 | 73,67 |
| | | | | 15 | 0,67 | 260,52 | 89,81 | 80,00 | 12,68 | 63,50 | - | - |
| | | | | 20 | 0,67 | 348,91 | 80,90 | 56,67 | 17,95 | - | - | - |
| | | | | 25 | 0,67 | 437,30 | 63,43 | 41,67 | 26,29 | - | - | - |
| | | | | 30 | 0,67 | 525,69 | 51,85 | 31,67 | 41,51 | - | - | - |
| 3 | 900 | 7 | | 5 | 0,67 | 44,57 | 46,58 | 120,00 | 7,02 | 39,74 | 43,22 | 46,58 |
| | | | | 10 | 0,67 | 93,79 | 87,63 | 120,00 | 11,88 | 56,25 | 75,43 | 87,63 |
| | | | | 15 | 0,67 | 143,01 | 147,23 | 120,00 | 17,94 | 75,70 | 115,14 | 147,23 |
| | | | | 20 | 0,67 | 192,23 | 230,52 | 120,00 | 25,64 | 102,55 | 169,76 | 230,52 |
| | | | | 25 | 0,67 | 241,45 | 303,99 | 120,00 | 36,37 | 137,46 | 232,77 | 303,99 |
| | | | | 30 | 0,67 | 290,67 | 349,64 | 120,00 | 52,31 | 179,76 | 291,60 | 349,64 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D33

Tableau D52: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-80 S OC et MT-80 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax;B}$ | $t_{max;B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1300 | - | | 5 | 0,50 | 242,13 | 48,00 | 120,00 | 6,89 | 40,54 | 44,63 | 48,00 |
| | | | | 10 | 0,50 | 514,10 | 93,62 | 120,00 | 11,70 | 58,34 | 80,65 | 93,62 |
| | | | | 15 | 0,50 | 786,07 | 182,71 | 105,00 | 17,63 | 80,59 | 136,98 | - |
| | | | | 20 | 0,50 | 1058,03 | 170,61 | 71,67 | 25,37 | 115,22 | - | - |
| | | | | 25 | 0,50 | 1330,00 | 146,32 | 53,33 | 36,74 | - | - | - |
| | | | | 30 | 0,50 | 1601,97 | 116,13 | 38,33 | 57,23 | - | - | - |
| 1 | 1300 | - | | 5 | 0,50 | 121,60 | 55,00 | 120,00 | 9,06 | 45,88 | 51,29 | 55,00 |
| | | | | 10 | 0,50 | 273,05 | 110,47 | 120,00 | 16,58 | 70,40 | 97,16 | 110,47 |
| | | | | 15 | 0,50 | 424,50 | 191,47 | 120,00 | 25,26 | 97,19 | 148,91 | 191,47 |
| | | | | 20 | 0,50 | 575,94 | 349,22 | 120,00 | 35,81 | 131,23 | 234,63 | 349,22 |
| | | | | 25 | 0,50 | 727,39 | 481,09 | 120,00 | 49,14 | 177,04 | 354,21 | 481,09 |
| | | | | 30 | 0,50 | 878,83 | 542,78 | 120,00 | 66,96 | 253,28 | 464,02 | 542,78 |
| 2 | 1300 | - | | 5 | 0,92 | 786,91 | 66,81 | 120,00 | 9,38 | 48,96 | 62,36 | 66,81 |
| | | | | 10 | 0,92 | 1670,81 | 92,03 | 63,33 | 17,16 | 83,42 | - | - |
| | | | | 15 | 0,92 | 2554,71 | 57,77 | 36,67 | 29,96 | - | - | - |
| | | | | 20 | 0,92 | 3438,61 | 31,31 | 26,67 | - | - | - | - |
| | | | | 25 | 0,92 | 4322,51 | 16,66 | 20,00 | - | - | - | - |
| | | | | 30 | 0,92 | 5206,41 | 17,81 | 18,33 | - | - | - | - |
| 2 | 1300 | - | | 5 | 0,92 | 395,21 | 68,02 | 120,00 | 11,77 | 53,30 | 63,88 | 68,02 |
| | | | | 10 | 0,92 | 887,41 | 150,59 | 120,00 | 22,44 | 89,05 | 130,10 | 150,59 |
| | | | | 15 | 0,92 | 1379,61 | 224,65 | 120,00 | 36,85 | 127,11 | 189,90 | 224,65 |
| | | | | 20 | 0,92 | 1871,81 | 277,82 | 120,00 | 54,93 | 169,19 | 241,90 | 277,82 |
| | | | | 25 | 0,92 | 2364,01 | 312,83 | 120,00 | 77,30 | 209,95 | 286,49 | 312,83 |
| | | | | 30 | 0,92 | 2856,21 | 336,03 | 120,00 | 103,18 | 244,03 | 317,92 | 336,03 |
| 3 | 1300 | 11 | | 5 | 0,67 | 37,47 | 55,11 | 120,00 | 8,10 | 44,38 | 51,70 | 55,11 |
| | | | | 10 | 0,67 | 79,56 | 118,64 | 120,00 | 14,04 | 67,09 | 98,97 | 118,64 |
| | | | | 15 | 0,67 | 121,65 | 227,10 | 81,67 | 22,06 | 99,30 | - | - |
| | | | | 20 | 0,67 | 163,74 | 165,27 | 58,33 | 32,63 | - | - | - |
| | | | | 25 | 0,67 | 205,83 | 145,36 | 43,33 | 49,41 | - | - | - |
| | | | | 30 | 0,67 | 247,92 | 107,85 | 31,67 | 81,90 | - | - | - |
| 3 | 1300 | 11 | | 5 | 0,67 | 18,82 | 63,47 | 120,00 | 10,91 | 50,93 | 59,51 | 63,47 |
| | | | | 10 | 0,67 | 42,26 | 137,34 | 120,00 | 20,46 | 82,23 | 118,36 | 137,34 |
| | | | | 15 | 0,67 | 65,70 | 225,20 | 120,00 | 32,26 | 117,06 | 182,86 | 225,20 |
| | | | | 20 | 0,67 | 89,13 | 327,58 | 120,00 | 46,92 | 161,79 | 258,81 | 327,58 |
| | | | | 25 | 0,67 | 112,57 | 414,57 | 120,00 | 66,30 | 213,35 | 333,03 | 414,57 |
| | | | | 30 | 0,67 | 136,01 | 479,56 | 120,00 | 93,02 | 267,96 | 401,27 | 479,56 |

1) Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

2) Dimension du système identifié dans le cas d'un chargement simple

3) Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D34

Tableau D53: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-80 S OC et MT-80 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax;B}$ | $t_{max;B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 1700 | - | | 5 | 0,50 | 168,95 | 62,44 | 120,00 | 9,66 | 49,82 | 58,75 | 62,44 |
| | | | | 10 | 0,50 | 376,93 | 136,59 | 120,00 | 17,59 | 79,31 | 117,83 | 136,59 |
| | | | | 15 | 0,50 | 584,91 | 269,94 | 105,00 | 27,46 | 115,47 | 206,03 | - |
| | | | | 20 | 0,50 | 792,88 | 260,64 | 71,67 | 39,97 | 170,27 | - | - |
| | | | | 25 | 0,50 | 1000,86 | 250,27 | 55,00 | 57,92 | - | - | - |
| | | | | 30 | 0,50 | 1208,83 | 185,75 | 40,00 | 86,70 | - | - | - |
| 1 | 1700 | - | | 5 | 0,50 | 76,79 | 74,67 | 120,00 | 13,61 | 58,99 | 70,21 | 74,67 |
| | | | | 10 | 0,50 | 192,60 | 163,74 | 120,00 | 26,10 | 98,74 | 143,60 | 163,74 |
| | | | | 15 | 0,50 | 308,41 | 268,90 | 120,00 | 40,58 | 141,54 | 221,80 | 268,90 |
| | | | | 20 | 0,50 | 424,22 | 400,99 | 120,00 | 58,11 | 193,51 | 313,55 | 400,99 |
| | | | | 25 | 0,50 | 540,03 | 552,73 | 120,00 | 80,02 | 254,05 | 412,05 | 552,73 |
| | | | | 30 | 0,50 | 655,85 | 639,97 | 120,00 | 108,54 | 320,86 | 535,96 | 639,97 |
| 2 | 1700 | - | | 5 | 0,94 | 718,05 | 92,79 | 120,00 | 13,45 | 63,16 | 87,66 | 92,79 |
| | | | | 10 | 0,94 | 1601,95 | 131,09 | 60,00 | 26,60 | 131,09 | - | - |
| | | | | 15 | 0,94 | 2485,85 | 76,15 | 33,33 | 48,44 | - | - | - |
| | | | | 20 | 0,94 | 3369,75 | 35,67 | 25,00 | - | - | - | - |
| | | | | 25 | 0,94 | 4253,65 | 24,91 | 20,00 | - | - | - | - |
| | | | | 30 | 0,94 | 5137,55 | 26,85 | 18,33 | - | - | - | - |
| 2 | 1700 | - | | 5 | 0,94 | 326,35 | 89,58 | 120,00 | 16,82 | 67,55 | 84,64 | 89,58 |
| | | | | 10 | 0,94 | 818,55 | 212,46 | 120,00 | 34,24 | 123,48 | 184,75 | 212,46 |
| | | | | 15 | 0,94 | 1310,75 | 317,02 | 120,00 | 57,17 | 180,56 | 270,07 | 317,02 |
| | | | | 20 | 0,94 | 1802,95 | 391,17 | 120,00 | 85,25 | 237,59 | 338,87 | 391,17 |
| | | | | 25 | 0,94 | 2295,15 | 441,73 | 120,00 | 118,23 | 293,09 | 397,10 | 441,73 |
| | | | | 30 | 0,94 | 2787,35 | 473,10 | 120,00 | 154,02 | 339,46 | 439,80 | 473,10 |
| 3 | 1700 | 15 | | 5 | 0,67 | 19,95 | 73,56 | 120,00 | 11,49 | 55,67 | 69,72 | 73,56 |
| | | | | 10 | 0,67 | 44,50 | 176,48 | 120,00 | 21,36 | 93,42 | 147,01 | 176,48 |
| | | | | 15 | 0,67 | 69,05 | 744,33 | 120,00 | 34,81 | 145,87 | 436,38 | 744,33 |
| | | | | 20 | 0,67 | 93,60 | 802,13 | 120,00 | 52,43 | 282,52 | 764,75 | 802,13 |
| | | | | 25 | 0,67 | 118,16 | 392,10 | 46,67 | 80,08 | - | - | - |
| | | | | 30 | 0,67 | 142,71 | 169,01 | 31,67 | 130,63 | - | - | - |
| 3 | 1700 | 15 | | 5 | 0,67 | 9,07 | 85,70 | 120,00 | 16,14 | 65,59 | 80,89 | 85,70 |
| | | | | 10 | 0,67 | 22,74 | 197,60 | 120,00 | 31,68 | 114,89 | 171,05 | 197,60 |
| | | | | 15 | 0,67 | 36,41 | 315,56 | 120,00 | 50,73 | 167,78 | 261,79 | 315,56 |
| | | | | 20 | 0,67 | 50,08 | 433,69 | 120,00 | 74,13 | 230,93 | 357,41 | 433,69 |
| | | | | 25 | 0,67 | 63,75 | 533,46 | 120,00 | 103,95 | 298,66 | 445,25 | 533,46 |
| | | | | 30 | 0,67 | 77,43 | 607,61 | 120,00 | 142,80 | 366,38 | 520,21 | 607,61 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D35

Tableau D54: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-80 S OC et MT-80 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax,B}$ | $t_{max,B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2100 | - | | 5 | 0,50 | 120,16 | 83,18 | 120,00 | 13,57 | 62,85 | 79,02 | 83,18 |
| | | | | 10 | 0,50 | 288,52 | 193,72 | 120,00 | 25,42 | 107,14 | 167,11 | 193,72 |
| | | | | 15 | 0,50 | 456,88 | 432,28 | 103,33 | 40,38 | 160,91 | 301,21 | - |
| | | | | 20 | 0,50 | 625,24 | 454,54 | 71,67 | 59,13 | 242,29 | - | - |
| | | | | 25 | 0,50 | 793,60 | 335,47 | 53,33 | 85,54 | - | - | - |
| | | | | 30 | 0,50 | 961,97 | 271,62 | 40,00 | 126,41 | - | - | - |
| 1 | 2100 | - | | 5 | 0,50 | 45,55 | 101,80 | 120,00 | 19,93 | 76,75 | 96,25 | 101,80 |
| | | | | 10 | 0,50 | 139,30 | 229,82 | 120,00 | 38,54 | 134,63 | 201,42 | 229,82 |
| | | | | 15 | 0,50 | 233,05 | 368,17 | 120,00 | 60,14 | 195,86 | 307,61 | 368,17 |
| | | | | 20 | 0,50 | 326,80 | 519,87 | 120,00 | 86,18 | 267,21 | 421,96 | 519,87 |
| | | | | 25 | 0,50 | 420,56 | 660,20 | 120,00 | 118,30 | 345,93 | 534,50 | 660,20 |
| | | | | 30 | 0,50 | 514,31 | 785,76 | 120,00 | 159,04 | 428,46 | 643,89 | 785,76 |
| 2 | 2100 | - | | 5 | 0,95 | 630,82 | 125,99 | 120,00 | 18,61 | 81,22 | 119,80 | 125,99 |
| | | | | 10 | 0,95 | 1514,72 | 165,38 | 56,67 | 38,79 | - | - | - |
| | | | | 15 | 0,95 | 2398,62 | 106,50 | 31,67 | 73,38 | - | - | - |
| | | | | 20 | 0,95 | 3282,52 | 54,07 | 25,00 | - | - | - | - |
| | | | | 25 | 0,95 | 4166,42 | 35,86 | 20,00 | - | - | - | - |
| | | | | 30 | 0,95 | 5050,32 | 24,72 | 16,67 | - | - | - | - |
| 2 | 2100 | - | | 5 | 0,95 | 239,12 | 115,35 | 120,00 | 22,89 | 84,53 | 109,37 | 115,35 |
| | | | | 10 | 0,95 | 731,32 | 284,17 | 120,00 | 48,45 | 163,56 | 247,68 | 284,17 |
| | | | | 15 | 0,95 | 1223,52 | 421,52 | 120,00 | 81,50 | 242,04 | 360,67 | 421,52 |
| | | | | 20 | 0,95 | 1715,72 | 515,33 | 120,00 | 121,55 | 315,26 | 448,60 | 515,33 |
| | | | | 25 | 0,95 | 2207,92 | 577,86 | 120,00 | 166,77 | 386,33 | 517,77 | 577,86 |
| | | | | 30 | 0,95 | 2700,12 | 617,24 | 120,00 | 213,99 | 444,99 | 569,82 | 617,24 |
| 3 | 2100 | 19 | | 5 | 0,67 | 11,47 | 98,15 | 120,00 | 16,00 | 70,61 | 93,75 | 98,15 |
| | | | | 10 | 0,67 | 27,54 | 248,72 | 120,00 | 30,85 | 127,22 | 207,64 | 248,72 |
| | | | | 15 | 0,67 | 43,61 | 783,34 | 120,00 | 51,22 | 204,64 | 527,36 | 783,34 |
| | | | | 20 | 0,67 | 59,68 | 949,12 | 120,00 | 77,86 | 400,37 | 857,93 | 949,12 |
| | | | | 25 | 0,67 | 75,75 | 993,65 | 120,00 | 119,18 | 799,47 | 960,24 | 993,65 |
| | | | | 30 | 0,67 | 91,82 | 258,19 | 31,67 | 193,61 | - | - | - |
| 3 | 2100 | 19 | | 5 | 0,67 | 4,35 | 114,10 | 120,00 | 22,88 | 84,18 | 108,11 | 114,10 |
| | | | | 10 | 0,67 | 13,30 | 268,38 | 120,00 | 45,75 | 154,39 | 233,47 | 268,38 |
| | | | | 15 | 0,67 | 22,25 | 417,27 | 120,00 | 73,52 | 227,60 | 351,66 | 417,27 |
| | | | | 20 | 0,67 | 31,19 | 548,65 | 120,00 | 107,21 | 309,42 | 465,17 | 548,65 |
| | | | | 25 | 0,67 | 40,14 | 659,76 | 120,00 | 148,89 | 393,45 | 566,36 | 659,76 |
| | | | | 30 | 0,67 | 49,09 | 741,32 | 120,00 | 200,63 | 473,38 | 648,91 | 741,32 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D36

Tableau D55: Déformations basées sur le calcul en cas d'incendie des rails d'installation MT-80 S OC et MT-80 OC

| Système | | | Direction de la charge | σ_B | $V^{1)}$ | $F^{2)}$ | $\delta_{tmax;B}$ | $t_{max;B}$ | δ_{30} | δ_{60} | δ_{90} | δ_{120} |
|---------------|-----------------|----|------------------------|------------|----------|----------|-------------------|-------------|---------------|---------------|---------------|----------------|
| Cas de charge | L ³⁾ | n | | MPa | - | N | mm | min | mm | mm | mm | mm |
| 1 | 2500 | - | | 5 | 0,50 | 84,04 | 111,94 | 120,00 | 18,91 | 80,51 | 107,14 | 111,94 |
| | | | | 10 | 0,50 | 225,46 | 266,28 | 120,00 | 35,47 | 142,67 | 229,51 | 266,28 |
| | | | | 15 | 0,50 | 366,88 | 802,33 | 110,00 | 56,71 | 217,73 | 444,31 | - |
| | | | | 20 | 0,50 | 508,31 | 773,69 | 75,00 | 83,20 | 335,07 | - | - |
| | | | | 25 | 0,50 | 649,73 | 553,35 | 53,33 | 120,18 | - | - | - |
| | | | | 30 | 0,50 | 791,16 | 357,60 | 38,33 | 176,40 | - | - | - |
| 1 | 2500 | - | | 5 | 0,50 | 21,36 | 138,02 | 120,00 | 28,38 | 100,04 | 130,94 | 138,02 |
| | | | | 10 | 0,50 | 100,12 | 308,53 | 120,00 | 54,19 | 178,52 | 270,72 | 308,53 |
| | | | | 15 | 0,50 | 178,87 | 479,18 | 120,00 | 84,29 | 260,12 | 405,06 | 479,18 |
| | | | | 20 | 0,50 | 257,62 | 648,90 | 120,00 | 120,30 | 351,28 | 540,54 | 648,90 |
| | | | | 25 | 0,50 | 336,37 | 799,48 | 120,00 | 164,15 | 447,94 | 668,01 | 799,48 |
| | | | | 30 | 0,50 | 415,12 | 920,41 | 120,00 | 218,40 | 545,27 | 783,93 | 920,41 |
| 2 | 2500 | - | | 5 | 0,96 | 525,22 | 167,24 | 120,00 | 25,23 | 104,23 | 159,69 | 167,24 |
| | | | | 10 | 0,96 | 1409,12 | 232,67 | 56,67 | 54,14 | - | - | - |
| | | | | 15 | 0,96 | 2293,02 | 104,86 | 30,00 | 104,86 | - | - | - |
| | | | | 20 | 0,96 | 3176,92 | 74,04 | 25,00 | - | - | - | - |
| | | | | 25 | 0,96 | 4060,82 | 49,16 | 20,00 | - | - | - | - |
| | | | | 30 | 0,96 | 4944,72 | 33,95 | 16,67 | - | - | - | - |
| 2 | 2500 | - | | 5 | 0,96 | 133,52 | 145,36 | 120,00 | 30,03 | 104,44 | 138,15 | 145,36 |
| | | | | 10 | 0,96 | 625,72 | 364,93 | 120,00 | 64,95 | 208,49 | 318,19 | 364,93 |
| | | | | 15 | 0,96 | 1117,92 | 537,66 | 120,00 | 109,40 | 310,87 | 461,33 | 537,66 |
| | | | | 20 | 0,96 | 1610,12 | 651,27 | 120,00 | 163,48 | 401,99 | 569,29 | 651,27 |
| | | | | 25 | 0,96 | 2102,32 | 724,49 | 120,00 | 222,40 | 489,01 | 648,80 | 724,49 |
| | | | | 30 | 0,96 | 2594,52 | 770,14 | 120,00 | 282,41 | 560,63 | 708,64 | 770,14 |
| 3 | 2500 | 23 | | 5 | 0,67 | 6,73 | 129,65 | 120,00 | 21,75 | 89,60 | 124,51 | 129,65 |
| | | | | 10 | 0,67 | 18,07 | 334,26 | 120,00 | 42,67 | 168,76 | 280,38 | 334,26 |
| | | | | 15 | 0,67 | 29,40 | 832,28 | 120,00 | 71,46 | 275,19 | 466,73 | 832,28 |
| | | | | 20 | 0,67 | 40,73 | 1062,42 | 120,00 | 109,03 | 529,85 | 903,31 | 1062,42 |
| | | | | 25 | 0,67 | 52,06 | 1146,38 | 120,00 | 166,63 | 807,77 | 1085,21 | 1146,38 |
| | | | | 30 | 0,67 | 63,39 | 1202,27 | 120,00 | 271,92 | 1102,39 | 1176,33 | 1202,27 |
| 3 | 2500 | 23 | | 5 | 0,67 | 1,71 | 149,31 | 120,00 | 31,32 | 107,01 | 141,74 | 149,31 |
| | | | | 10 | 0,67 | 8,02 | 348,26 | 120,00 | 62,61 | 200,36 | 304,42 | 348,26 |
| | | | | 15 | 0,67 | 14,33 | 527,60 | 120,00 | 100,39 | 295,27 | 450,39 | 527,60 |
| | | | | 20 | 0,67 | 20,64 | 672,83 | 120,00 | 145,71 | 395,98 | 581,12 | 672,83 |
| | | | | 25 | 0,67 | 26,95 | 792,97 | 120,00 | 200,13 | 496,13 | 694,65 | 792,97 |
| | | | | 30 | 0,67 | 33,26 | 881,96 | 120,00 | 265,20 | 587,86 | 785,50 | 881,96 |

¹⁾ Facteur de correction pour la distribution du moment sans la contribution du poids propre du rail

²⁾ Dimension du système identifié dans le cas d'un chargement simple

³⁾ Dimensions en mm et pouces

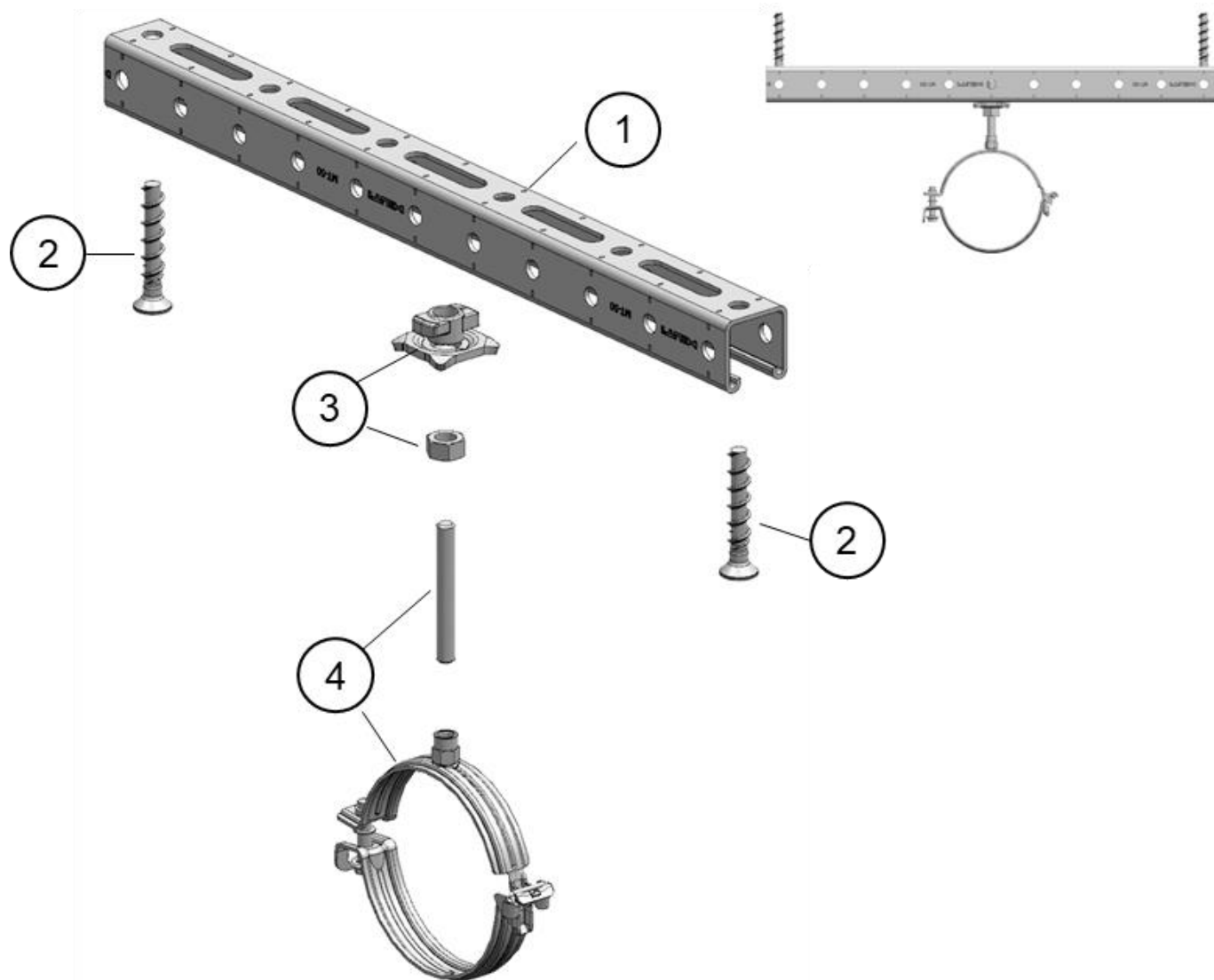
Symboles et références voir Annexe D1

Rails d'installation Hilti MT

Caractéristiques du rail à la flexion en cas d'incendie

Annexe D37

Figure E1: Exemple de cas d'utilisation de rail d'installation Hilti MT utilisés en tant que support



Légende

- 1 MT-30, MT-40, MT-40D or MT-50
- 2 Fixation à la structure porteuse
- 3 MQA-B avec écrou hexagonal
- 4 Collier avec tige filetée

Annexe

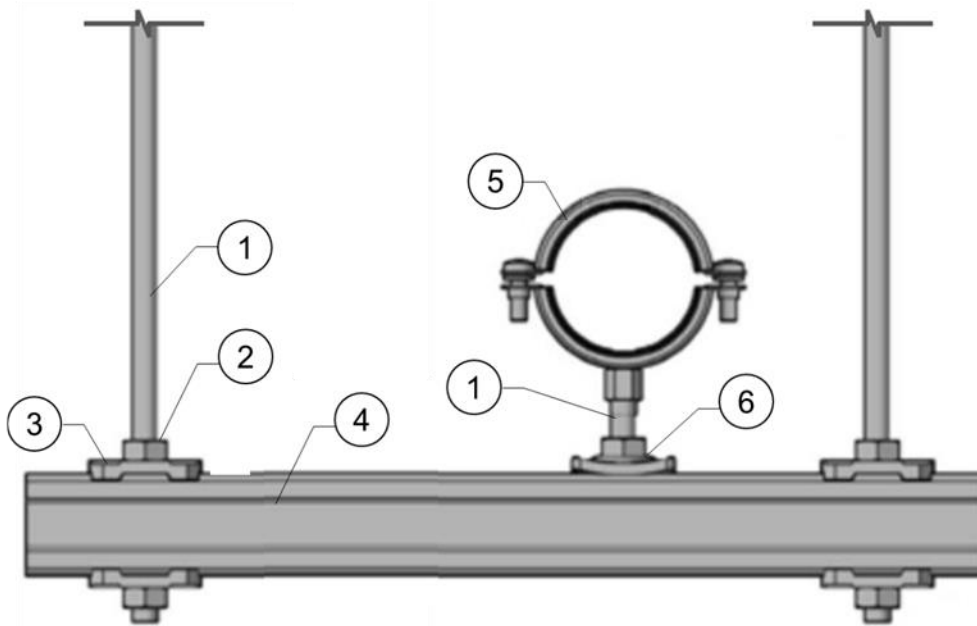
- A1 N'est pas compris dans cette ETA
- N'est pas compris dans cette ETA
- N'est pas compris dans cette ETA

Rails d'installation Hilti MT

Exemple d'utilisation: rail d'installation Hilti MT utilisé comme support

**Annexe E1
 (informative)**

Figure E2: Exemple de cas d'utilisation de rail d'installation Hilti MT utilisé avec une structure trapézoïdale en tiges



Légende

- 1 Tige filetée
- 2 Écrou hexagonal
- 3 Plaques percées MQZ-L
- 4 MT-30, MT-40, MT-40D or MT-50
- 5 Collier
- 6 Ecrou pour rail MQA-B

Annexe

- N'est pas compris dans cette ETA
- N'est pas compris dans cette ETA
- N'est pas compris dans cette ETA
- Annexe A
- N'est pas compris dans cette ETA
- N'est pas compris dans cette ETA

Rails d'installation Hilti MT

Exemple d'utilisation: rail d'installation Hilti MT utilisé comme structure trapézoïdale avec des tiges

**Annexe E2
(informative)**