Designated according to The Construction Products (Amendment etc.) (EU Exit) Regulations 2020

UK Technical Assessment	UKTA-0836-22/6560 of 23/02/2023
Technical Assessment Body issuing the UK Technical Assessment:	British Board of Agrément
Trade name of the construction product:	Electrical cable fastener
Product family to which the construction product belongs:	Power-actuated fastener for multiple use in concrete for non-structural applications
Manufacturer:	Hilti AG Feldkircherstraße 100 9494 Schaan LIECHTENSTEIN
Manufacturing plant(s):	Hilti AG Manufacturing Plants
This UK Technical Assessment contains:	20 pages including 3 Annexes which form an integral part of this assessment
This UK Technical Assessment is issued in accordance with The Construction Products (Amendment etc.) (EU Exit) Regulations 2020 on the basis of:	UKAD 330083-02-0601 “Power-actuated fastener for multiple use in concrete for non-structural applications”

1. Technical description of the product

The electric cable fastener consists of the power-actuated fastener (Hilti X-P 20 B3 MX, Hilti X-P 24 B3 MX, Hilti X-P 20 G3 MX or Hilti X-P 24 G3 MX) made of galvanized steel and the fixture according to Annex A1 made of galvanized steel or polyamide. The power-actuated fasteners are driven in the concrete by using a mechanical fastening tool (Hilti BX3-ME) or a gas-actuated fastening tool (Hilti GX3-ME). They are anchored in the concrete by sintering and mechanical interlock.

The product description is given in Annex A.

2. Specification of the intended use(s) in accordance with the applicable UK Assessment Document (hereinafter UKAD)

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this UK Technical Assessment is based lead to the assumption of a working life of the fastener of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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.

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

3.1. Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Maximum service loads in non-cracked and cracked concrete	See Annex C1 to C4
Number of fixing points – n_1	$10 \leq n_1 \leq 100$
Uniform span between the fixing points	≤ 1.0 m
Acceptable gaps (number of failure next to each other) for local failure	See Annex C1 to C4
Acceptable gaps (number of failure next to each other) for serviceability limit state	See Annex C1 to C4

3.2. Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire of fasteners and fixtures made of metal	Class A1
Reaction to fire of fixtures made of polyamide	No performance assessed
Resistance to fire	No performance assessed

3.3. Health, hygiene and the environment (BWR 3)

Not relevant.

3.4. Safety and accessibility in use (BWR 4)

Not relevant.

3.5. Protection against noise (BWR 5)

Not relevant.

3.6. Energy economy and heat retention (BWR 6)

Not relevant.

3.7. Sustainable use of natural resources (BWR 7)

Essential characteristic	Performance
Durability	See Annex B1

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied

4.1. System of assessment and verification of constancy of performance

According to UKAD No. 330153-00-0602 and Annex V of the Construction Products Regulation (Regulation (EU) 305/2011) as brought into UK law and amended, the system of assessment and verification of constancy of performance (AVCP) 2+ applies.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the British Board of Agrément and made available to the UK Approved Bodies involved in the conformity attestation process.

5.1. UKCA marking for the product/ system must contain the following information:

- Identification number of the Approved Body
- Name/address of the manufacturer of the product/ system
- Marking with intention of clarification of intended use
- Date of marking
- Number of certificate of constancy of performance (where applicable)
- UKTA number.

On behalf of the British Board of Agrément 	
Date of Issue: 23 February 2023	**Hardy Giesler** Chief Executive Officer

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Hatters Lane,
Croxley Park
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ANNEX A1
Product description / Products

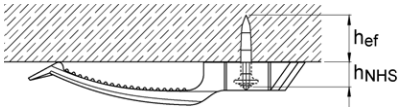
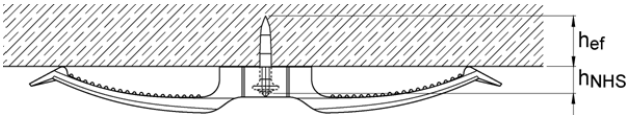
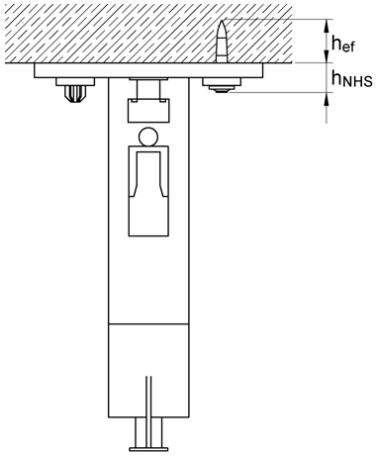
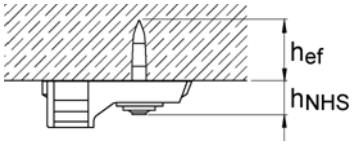
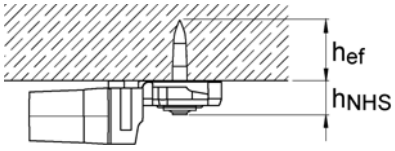
Electrical cable fastener consists of the fixture and a power-actuated fastener

Fixture

X-EKB 4/8 MX	X-ECT MX	X-ECH MX
		 
X-EKB 16 MX 		
X-EKS MX	**X-EKSC MX**	**X-FB MX**
		
X-DFB MX	**X-ECC MX**	**X-EHS MX**
		

Power-actuated-fastener X-P 20 B3, X-P 24 B3 and X-P 20 G3, X-P 24 G3

ANNEX A2
Product description / Installed condition

<table>
<tr><td>X-EKB 4/8 MX</td><td colspan="3">X-EKB 16 MX</td></tr>
<tr><td> 
</td><td colspan="3"> 
</td></tr>
<tr><td>X-ECH MX</td><td>X-ECT MX</td><td colspan="2">X-EKS MX</td></tr>
<tr><td rowspan="2"> 
</td><td> 
</td><td colspan="2"> 
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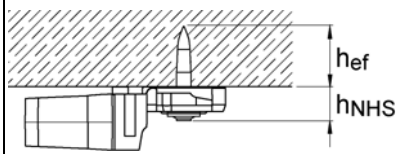
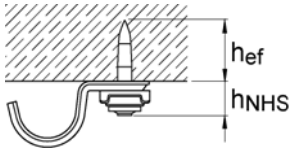
<tr><td>X-ECC MX</td><td> 
</td><td> 
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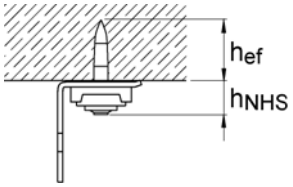
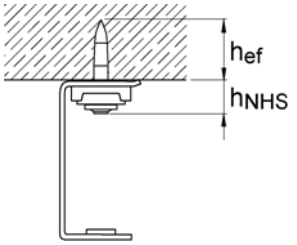
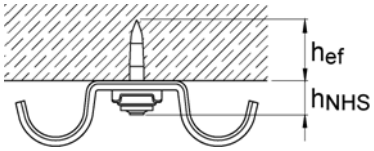
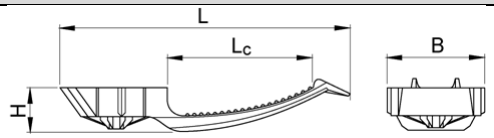
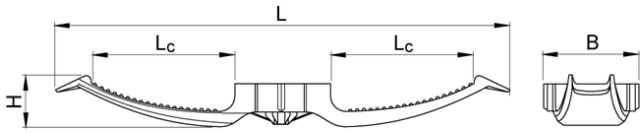
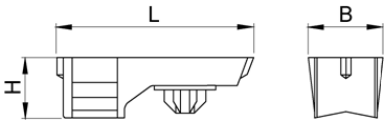
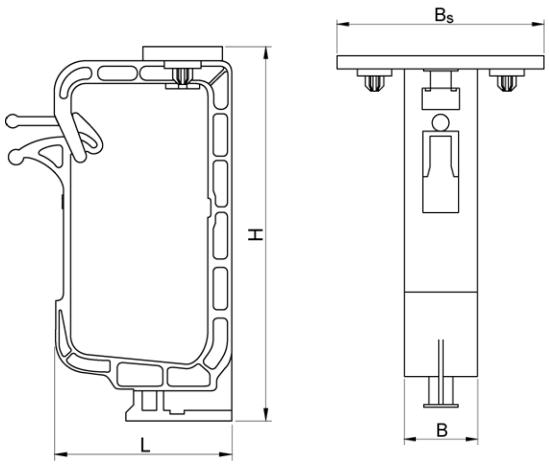
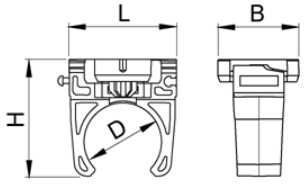
<tr><td> 
</td><td>X-EHS MX</td><td>X-DFB MX</td></tr>
<tr><td></td><td> 
</td><td> 
</td></tr>
</table>

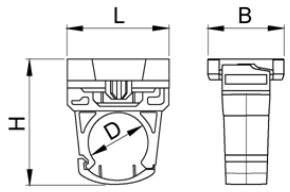
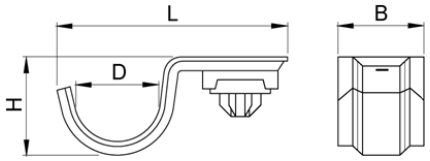
ANNEX A3
Product description / Dimensions and materials

Table 1: Fixture

	Designation	Dimensions [mm] / Material [-]			
X-EKB MX		L	L_c	B	H
	X-EKB 4 MX	96.4	48	21.3	13.5
	X-EKB 8 MX	139.6	96.6	21.3	17
	X-EKB 16 MX	237.6	96.6	21.3	17
	All sizes	Polyamide PA 6.6, light grey			
X-ECT MX		L	B	H	
	X-ECT MX	37.4	21.3	12.5	
	X-ECT 40 MX (with pre-mounted cable tie)	37.4	21.3	12.5	
		Polyamide PA 6.6, light grey			
X-ECH MX		L	B	B_S	H
	X-ECH 15 MX	48.5	27.5	78	93
	X-ECH 30 MX	59	27.5	78	128
	All sizes	Polyamide PA 6.6, light grey			
X-EKS MX		L	B	H	D
	X-EKS 16 MX	33	26	28	14.5
	X-EKS 19 MX	33	26	31.5	18.5
	X-EKS 20 MX	33	26	32.5	19.5
	X-EKS 25 MX	34	26	37	24.5
	X-EKS 32 MX	40.5	26	42.5	30.5
	X-EKS 40 MX	49.5	26	50.5	38.5
	All sizes	Polyamide PA 6.6, light grey			

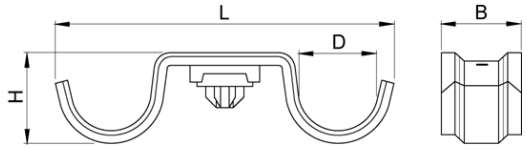
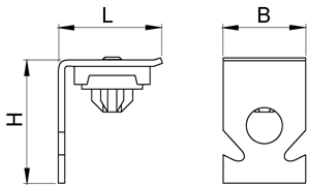
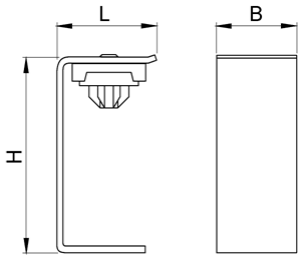
ANNEX A4
Product description / Dimensions and materials

Table 1: Fixture (continued)

	Designation	Dimensions [mm]			
		Material [-]			
X-EKSC MX		L	B	H	D
	X-EKSC 16 MX	33	26	31.5	15.7
	X-EKSC 20 MX	33	26	37	19.5
	X-EKSC 25 MX	34	26	42	24.5
	X-EKSC 32 MX	40.5	26	46.5	30.5
	X-EKSC 40 MX	49.5	26	54.5	38.5
	All sizes	Polyamide PA 6.6, light grey			
X-FB MX		L	B	H	D
	X-FB 5 MX	28	17.5	7	5
	X-FB 6 MX	29	17.5	8	6
	X-FB 7 MX	30	17.5	9	7
	X-FB 8 MX	31	17.5	9.5	8
	X-FB 9 MX	32	17.5	11	9
	X-FB 10 MX	33	17.5	11.5	10
	X-FB 11 MX	34	17.5	12.5	11
	X-FB 13 MX	36	17.5	14.5	13
	X-FB 16 MX	44	17.5	17.5	16
	X-FB 20 MX	48	17.5	21.5	20
	X-FB 22 MX	50	17.5	23.5	22
	X-FB 25 MX	53	17.5	28.5	25
	X-FB 28 MX	56	17.5	29.5	28
	X-FB 32 MX	58	17.5	33.5	32
	X-FB 40 MX	69	17.5	41.5	40
	All sizes	≥ 5 μm Galvanized steel			

ANNEX A5
Product description / Dimensions and materials

Table 1: Fixture (continued)

	Designation	Dimensions [mm]			
		Material [-]			
X-DFB MX		L	B	H	D
	X-DFB 5 MX	46	17.5	7	5
	X-DFB 6 MX	48.5	17.5	8	6
	X-DFB 7 MX	51	17.5	9	7
	X-DFB 8 MX	53.5	17.5	9.5	8
	X-DFB 9 MX	55.5	17.5	11	9
	X-DFB 10 MX	57.5	17.5	11.5	10
	X-DFB 11 MX	60	17.5	12.5	11
	X-DFB 13 MX	64	17.5	14.5	13
	X-DFB 16 MX	70.5	17.5	17.5	16
	X-DFB 20 MX	80	17.5	21.5	20
	X-DFB 22 MX	83.5	17.5	23.5	22
	X-DFB 25 MX	90	17.5	28.5	25
	X-DFB 28 MX	97	17.5	29.5	28
	All sizes	≥ 5 µm Galvanized steel			
X-ECC MX		L	B	H	
	X-ECC MX	21	18	25	
		≥ 5 µm Galvanized steel			
X-EHS MX		L	B	H	
	X-EHS M4 MX	20	18	38	
	X-EHS M6(W6) MX	20	18	38	
	X-EHS M8 MX	20	18	38	
	X-EHS W10 MX	20	18	38	
	All sizes	≥ 5 µm Galvanized steel			

ANNEX A6
Product description / Dimensions and materials

Table 2: Power-actuated fastener

Power-actuated fastener		**X-P 20 B3 MX** **X-P 20 G3 MX**	**X-P 24 B3 MX** **X-P 24 G3 MX**
Shank length	[mm]	20	24
Total length	[mm]	21.8	25.8
Shank diameter	[mm]	3	3
Head diameter	[mm]	6.8	6.8
Material of nail	[-]	Hardened carbon steel, Rockwell hardness 57.5 HRC	

ANNEX B1
Intended use / Specification of intended use

Anchorages subject to:

- Dead-loads of uniaxially spanned flexible cables or conduits as well as rigid cables or conduits. Cables up to an outer diameter of 12 mm are considered flexible (e.g. NYM 3x1.5 or NYM 5x1.5)

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C35/45 according to EN 206-1:2000.
- Cracked and non-cracked concrete.
- Two-dimensional load-bearing structures (slabs and walls).

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions
- Minimum temperature: -20 °C
- Maximum temperature:
  Fixtures made of steel: +80 °C,
  Fixtures made of plastic: long term temperature +24 °C, short term temperature +40 °C

Design:

- Conditions: Both ends of the chain are fixed supports (e.g. fixation in a cable-terminal box or where cables are led through interior rigid walls).
- Design: $F = g \cdot l \leq F_{s,max}$

with F = dead load of the cable or conduit acting on the fixture made of plastic or steel in N

g = dead load of the cable or conduit in N/m

l = spacing of the fasteners in m

$F_{s,max}$ = maximum service load (maximum possible loads) $N_{s,max}$ or $V_{s,max}$ in N according to Annex C1 to C4

Notes:

- A potential influence of an eccentric load introduction into the power-actuated nail is taken into consideration in corresponding published loads shown in Annexes C1 to C4.
- For fixtures made of plastic, the long-term effect due to creep is taken into consideration according to EN ISO 899-1.
- The loads given in Annexes C1 to C4 include the required safety against total failure of the global system according to EN 1990:2002 + A1:2005 + A1:2005/AC:2010 (Reliability class RC2, ultimate limit state, $\beta \geq 3.8$).
- The loads given in Annexes C1 to C4 include the required safety of the serviceability state according to EN 1990:2002 + A1:2005 + A1:2005/AC:2010 (Reliability class RC2, serviceability limit state, $\beta \geq 1.5$).
- The corresponding maximum service loads are valid for potential gaps due to single or maximum 2 fastener failures next to each other (see Annex C1 to C4). The fastener may be used if the cable sagging due to the given gaps have not bad appearance and the designer/user accepts these gaps.
- The loads given in Annexes C1 to C4 include the required safety against local failure according to EN 1990:2002 + A1:2005 + A1:2005/AC:2010 (Reliability class RC1, ultimate limit state, $\beta \geq 3.3$).
- The corresponding maximum service loads are valid for potential gaps due single or maximum 4 fastener failures next to each other (see Annex C1 to C4). The fastener may be used if the cable sagging due to the given gaps do not lead to a risk of use and the designer/user accepts these gaps.

Installation:

- Fastener installation carried out by appropriately qualified personnel
- Damages on the concrete surface, caused by setting defects, must be repaired according to technical rules, e.g. EN 1504-3 [13]. A new fastener is set at a minimum distance away of $\geq$ 150 mm and $\geq 3\ h_{ef}$ of the edge of the damaged surface.

ANNEX B3
Intended use / Concrete strength class and installation parameters

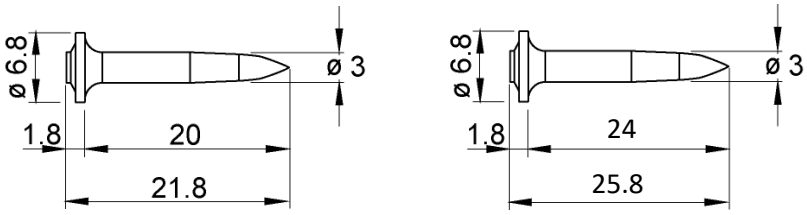
Table 3: Concrete parameters

Power-actuated fastener		**X-P 20 B3 MX** **X-P 20 G3 MX**	**X-P 24 B3 MX** **X-P 24 G3 MX**
Minimum concrete strength class	[-]	C20/25	
Maximum concrete strength class	[-]	C35/45	
Minimum thickness of concrete member h_{min}	[mm]	80	

Table 4: Installation parameters

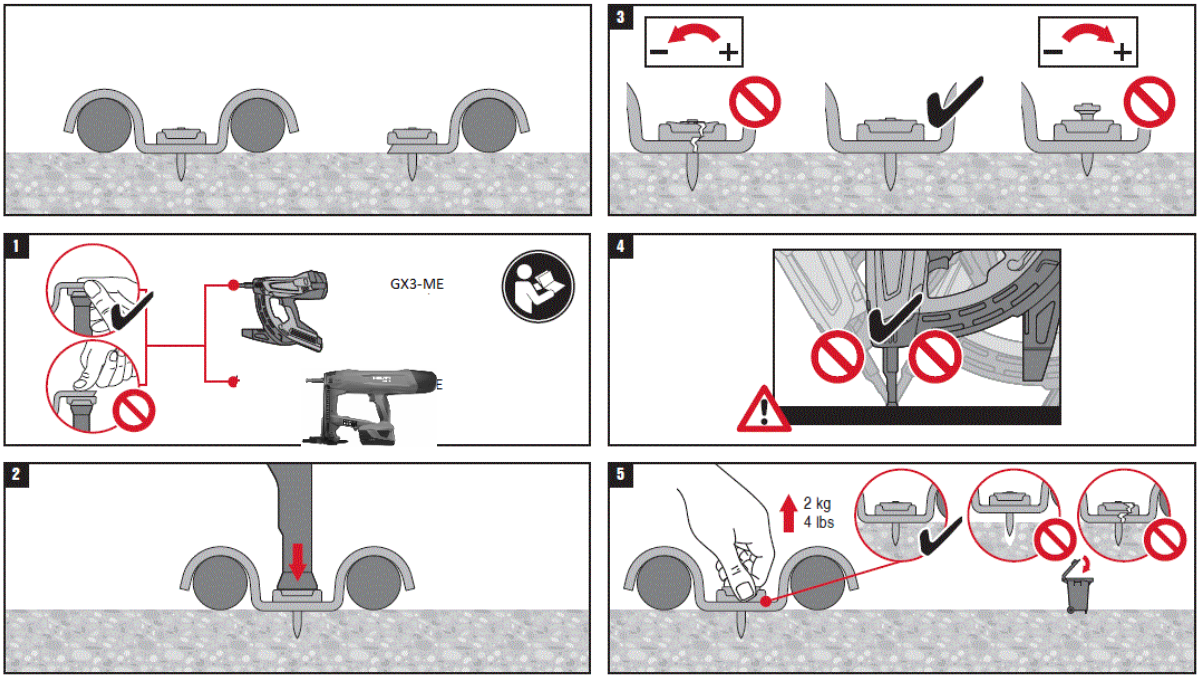
Power-actuated fastener	**Fixture**	**Embedment depth h_{ef} [mm]** (see Annex A2)	**Total thickness of the fixture t_{fix} [mm]**	**Fastener standoff h_{NHS}** (see Annex A2)
X-P 20 B3 MX X-P 20 G3 MX	X-EKB MX	11-16mm	4	6-11 mm
	X-ECT MX	11-16 mm	4	6-11 mm
	X-ECH MX	11-16 mm	4	6-11 mm
	X-EKS MX	11-16 mm	4	6-11 mm
	X-EKSC MX	11-16 mm	4	6-11 mm
	X-FB MX	11-15 mm	5	7-11 mm
	X-DFB MX	11-15 mm	5	7-11 mm
	X-ECC MX	11-15 mm	4,5	7-11 mm
	X-EHS MX	11-15 mm	4,5	7-11 mm

ANNEX B4
Intended use / Power-actuated fastening tools

Fastening tool BX3-ME with nails X-P20 B3 MX and X-P24 B3 MX	Fastening tool GX3-ME with nails X-P20 G3 MX and X-P24 G3 MX
 Fastening tool BX3-ME: fully automatic, mechanical driven	 Fastening tool GX3-ME: fully automatic, gas driven
 collated nails X-P20 B3 MX and X-P24 B3 MX	 *collated nails* *X-P20 G3 MX and X-P24 G3 MX*
 X-P20 X-P24 Nails X-P20 and X-P24	

ANNEX B5
Intended use / instructions for use

Example X-(D)FB MX



Fastener inspection – fastener stand-off

For the fastener inspection a measurement of the fastener standoff h_{NHS}, as shown in Table 4 in Annex B2 must be done.

ANNEX C1
Performance / Service loads /Maximum service loads $F_{S,max}$

The acceptable gap corresponds to the number of failures next to each other.

X-EKB 4 MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	9.0
Acceptable gap for local failure β ≥ 3.3	1	6.2
	2	9.0

X-EKB 8 MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	14.0
Acceptable gap for local failure β ≥ 3.3	2	12.5
	3	14.0

X-EKB 16 MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Flexible cables - symmetric loading
Acceptable gap for serviceability limit state β ≥ 1.5	0	12.0
	1	18.0
Acceptable gap for local failure β ≥ 3.3	1	18.0

X-EKB 16 MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Flexible cables - asymmetric loading
Acceptable gap for serviceability limit state β ≥ 1.5	1	14.0
Acceptable gap for local failure β ≥ 3.3	2	12.5
	3	14.0

ANNEX C2
Performance / Service loads / Maximum service loads $F_{S,max}$ (continued)

The acceptable gap corresponds to the number of failures next to each other.

X-ECT MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]
		Flexible cables or conduits
Acceptable gap for serviceability limit state β ≥ 1.5	1	40
	2	55
Acceptable gap for local failure β ≥ 3.3	3	40
	4	55

X-EKS MX with X-P 20 B3 MX or X-P 20 G3 MX nail			
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]	
		Flexible cables	Rigid cables or conduits
Acceptable gap for serviceability limit state β ≥ 1.5	0	10.5	6.5
Acceptable gap for local failure β ≥ 3.3	1	10.5	6.5

X-EKSC MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	55
Acceptable gap for local failure β ≥ 3.3	2	45
	3	55

X-EKSC MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]
		Rigid cables or conduits
Acceptable gap for serviceability limit state β ≥ 1.5	1	32
Acceptable gap for local failure β ≥ 3.3	2	32

ANNEX C3
Performance / Service loads / Maximum service loads $F_{S,max}$ (continued)

The acceptable gap corresponds to the number of failures next to each other.

X-ECH MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	40
	2	55
Acceptable gap for local failure β ≥ 3.3	3	40
	4	55

X-ECC MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	35
	2	50
Acceptable gap for local failure β ≥ 3.3	3	35
	4	50

X-ECC MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Rigid cables or conduits
Acceptable gap for serviceability limit state β ≥ 1.5	1	15
	2	30
Acceptable gap for local failure β ≥ 3.3	2	15
	4	30

ANNEX C4
Performance / Service loads / Maximum service loads $F_{S,max}$ (continued)

The acceptable gap corresponds to the number of failures next to each other.

X-EHS MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	60
	2	80
Acceptable gap for local failure β ≥ 3.3	3	60
	4	80

X-EHS MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension service load $N_{S,max}$ [N]
		Rigid cables or conduits
Acceptable gap for serviceability limit state β ≥ 1.5	1	45
Acceptable gap for local failure β ≥ 3.3	3	40
	4	45

X-FB MX and X-DFB MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]
		Flexible cables
Acceptable gap for serviceability limit state β ≥ 1.5	1	30
Acceptable gap for local failure β ≥ 3.3	2	20
	3	30

X-FB MX and X-DFB MX with X-P 20 B3 MX or X-P 20 G3 MX nail		
Number of fixing points n_1 = 100		Maximum tension and shear service load $N_{S,max} = V_{S,max}$ [N]
		Rigid cables or conduits
Acceptable gap for serviceability limit state β ≥ 1.5	1	20
Acceptable gap for local failure β ≥ 3.3	2	20

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