

MULTI-MONTI[®]-plus and MULTI-MONTI[®]

**German National Technical
Approval Z-21.8-2061**

Screw anchors MMS-plus and MMS for multiple use in temporary applications in young concrete



I GENERAL PROVISIONS

- 1 The granting of the National Technical Approval confirms that the object of certification is suitable for a specific use or application in accordance with regional building regulations.
- 2 Should the National Technical Approval include requirements with respect to the expertise and experience of persons entrusted with the manufacturing of construction products and types of construction according to § 17. Sect. 5 Musterbauordnung (Model Building Code) of the respective statutory regional guidelines, it must be noted that this expertise and experience can also be proved by equivalent verifications from other member states of the European Union. If necessary, this also applies to verifications presented within the framework of the Agreement on the European Economic Area (EEA) or other bilateral agreements.
- 3 The National Technical Approval does not replace the authorizations, approvals and confirmations for the execution of building projects prescribed by law.
- 4 The National Technical Approval is granted without prejudice to the rights of third parties, especially private property rights.
- 5 Notwithstanding further regulations of the “Special Provisions”, manufacturers and distributors of the subject of approval shall supply the user of the subject of approval with copies of the National Technical Approval and make users aware of the obligation to make the National Technical Approval available at the designated place of use. If requested, the authorities involved shall be supplied with copies of the National Technical Approval.
- 6 The National Technical Approval may only be duplicated in full. Publication of the approval in excerpts requires the prior consent of the Deutsches Institut für Bautechnik. Text and drawings of promotional material must be consistent with the National Technical Approval. Translations of the National Technical Approval must bear the note “Translation of the German original version not revised by the Deutsches Institut für Bautechnik”.
- 7 The National Technical Approval is granted until revoked. The provisions of this National Technical Approval may subsequently be supplemented and/or amended, in particular to permit the incorporation of technical advances.

II SPECIAL PROVISIONS

1 Subject of approval and field of application

1.1 Subject of approval

The National Technical Approval applies to the steel screw anchors MULTI-MONTI-plus and MULTI-MONTI (hereinafter called anchors) in sizes 10, 12 and 16 mm.

The anchors are set by screwing into a pre-drilled cylindrical drill hole, whereby the special thread of the anchor cuts an internal thread into the anchoring base while setting. The anchorage is characterised by the mechanical interlock of the special thread in the concrete.

Annex 1 shows the anchor in its installed state.

1.2 Intended use

The anchor is intended for use in reinforced or unreinforced normal weight concrete of strength classes C20/25 (minimum) and C50/60 (maximum), in accordance with OIN EN 206-1:2001-07 "Concrete – Part 1: Specification, performance, production and conformity". The anchor may be set before the concrete has reached its required characteristic compressive strength as long as the strength of the concrete is verified in accordance with Section 4.1.

The anchor is intended solely for the temporary fastening of site equipment, such as props, safety railings and scaffolding. On removal, the anchor may be reused in other drill holes. However, it may not be screwed into the same drill hole a second time. The reusability of the anchor must be checked, visually and with a gauge, prior to each application in accordance with Section 4.3. Installed anchors must be regularly checked for visual signs of damage (e.g. corrosion).

The anchor may be set in cracked and uncracked concrete.

The anchor may only be used if the overall construction, including the anchor, is not required to meet any specifications with regards to fire resistance classes.

The anchor may be used only for the temporary fastening applications for which it is intended, in indoor and outdoor environments.

2 Provisions for the construction product

2.1 Properties and composition

The anchor must correspond to the drawings and specifications provided in the Annexes of this approval and the European Technical Assessments ETA-15/0784 (sizes 10 and 12 mm) and ETA-05/0010 (size 16 mm).

The anchor is made of a Class A, non-flammable building material in accordance with DIN 4102-1:1998-05 "Fire behaviour of building materials and elements – Part 1: Classification of building materials – Requirements and testing".

3 Provisions for design and calculation

3.1 Design

The anchors must be designed according to sound engineering practice. Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored.

The design drawings must depict the precise location and size of the anchor.

3.2 Calculation

Verification of the immediate local force transfer to the concrete is provided. Verification must be provided of how the loads to be anchored are transferred by the component.

Additional stresses that may occur in the anchor, in the fixture or in the structural member in which the anchor is set due to restricted changes in shape or size (e.g. due to temperature changes) must be taken into account.

The minimum distances of the anchor (axis/edge distance) and minimum component thickness must comply with those specified in Annex 7.

It must be demonstrated that the design value for the action F_{Ed} does not exceed the design value for the resistance F_{Rd} : $F_{Ed} < F_{Rd}$

The design resistance values apply to all load directions (except shear loads in the direction c_2 , see Annex 7), irrespective of failure mode. The resistances depend on anchor size, setting depth and concrete strength $f_{c,cube}$ and are specified in Annex 7.

4. Provisions for installation

4.1 General

The anchor must be installed in accordance with the design drawings provided in Section 3.1.

The anchor is approved for use in concrete before it has reached its characteristic concrete compressive strength $f_{ck,cube}$. In this case, the concrete compressive strength $f_{c,cube}$ must have reached a value of at least 10 N/mm².

4.2 Drilling and cleaning the drill hole

The hole to be drilled must be positioned in such a way that it does not damage the reinforcement.

The hole must be drilled perpendicular to the surface of the concrete using a hammer drill, a hollow drill or a diamond drill. The nominal diameter of the drill and the cutting diameter must comply with the values specified in Annex 5.

Furthermore, the carbide-tipped masonry drill bit must comply with the requirements specified in the data sheet published by the DIBt "Specification, requirements and testing of carbide-tipped masonry drill bits used for drilling anchor holes" (dated January 2002).

Proof of adherence to the drill bit specification must be provided in the form of the acceptance test certificate 3.2 (DIN EN 10204) or the test mark (see data sheet) issued by the Prüfgemeinschaft Mauerbohrer e.V., Remscheid (PGM Masonry Drill Bit Certification Board).

The nominal drill hole depth must comply with the values specified in Annex 5. All drilling dust must be removed from the hole.

If a hole is drilled or positioned incorrectly, a new hole must be drilled at a distance equal to at least twice the depth of the incorrectly drilled hole.

4.3 Setting the anchor

The anchor is intended only for temporary use in a single drilled hole. After unscrewing and removal, the anchor may be reused in other drilled holes. However, it may not be screwed into the same hole a second time.

Before each reuse, thread wear must be checked using the corresponding gauge as specified in Annex 5. The anchor may only be reused if it does not project beyond the rear end of the sleeve when inserted into the gauge (see Annex 6). Anchors that show visible signs of damage, e.g. material loss due to corrosion, may not be reused under any circumstances.

The screw anchor may be driven into the hole using a tangential impact wrench.

In order to prevent the anchor spinning in the hole, wrenches with a high-power output should be equipped with an automatic cut-out, e.g. a depth-stop.

The anchor is set correctly when:

- the entire surface of the foot plate of the fixture is pulled flush against the surface of the concrete (no gap),
- the head of the anchor is in contact with the foot plate,
- the anchor cannot be easily tightened any further,
- the embedment depth h_{nom} is reached.

4.4 Checking the installation

When installing the anchors, the contractor responsible for the anchor installation work or the appointed site supervisor or a suitably qualified and experienced deputy site supervisor must be present on-site and must ensure that the work is performed properly.

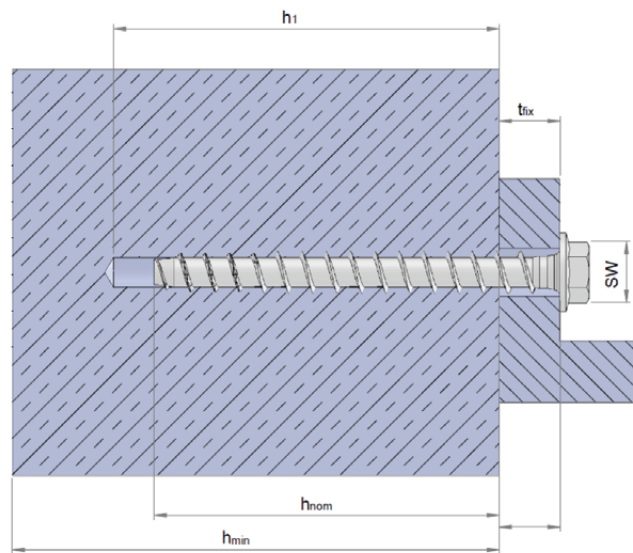
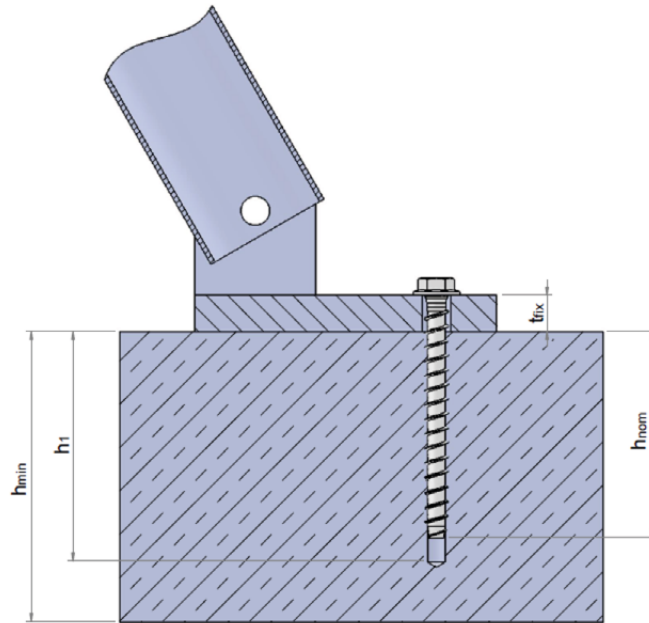
During installation of the anchors, the site supervisor or deputy site supervisor must keep a record of the concrete compressive strength, in accordance with Section 4.1, to verify that the anchors are correctly set.

During construction work, the relevant drawings must be available on-site and presented on request to persons authorised to check the respective records. On completion of the work, the contractor undertakes to retain all relevant documentation and suppliers' delivery notes for a minimum of 5 years.

Andreas Kummerow
Head of Division

Certified
Deutsches Institut
für Bautechnik (DIBt)

Installed condition



Example: MMS-plus SS size 10, 12 and MMS-SS 16 (hexagon head with washer)

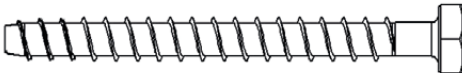

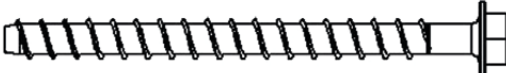

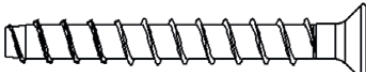

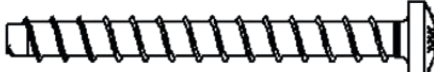

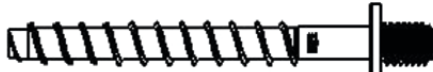

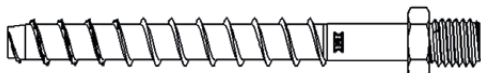



MULTI-MONTI-plus and MULTI-MONTI

Product description
Installed condition

Annex 1

Head forms and specifications

Table 1: Material and dimensions

Type	Marking / Material					
1, 2, 3, 4, 5, 6, 7,	screw anchor / steel ¹⁾					
	Size			MMS-plus 10	MMS-plus12	MMS 16
	Nominal value of the characteristic yield strength	$f_{yk} \geq$	[N/mm ²]	640	640	640
	Nominal value of the characteristic tensile strength	$f_{uk} \geq$	[N/mm ²]	800	800	800
1) steel according to EN 10263-4:2001						
		MMS+ S	1) Example: MULTI-MONTI-plus S, Hexagon head with or without a collar underneath the head, Size 10 and 12			
		MMS+ SS	2) Example: MULTI-MONTI-plus SS, Hexagon Head and washer, with or without a collar underneath the head, Size 10 and 12			
		MMS+ F	3) Example: MULTI-MONTI-plus F, Countersunk, Size 10 and 12			
		MMS+ P	4) Example: MULTI-MONTI-plus P, Pan Head, Size 10			
		MMS+ I	5) Example: MULTI-MONTI-plus I, anchor with internal thread, Size 10			
		MMS+ St	6) Example: MULTI-MONTI-plus ST, anchor with metric stud, Size 10			
		MMS+ V	7) Example: MULTI-MONTI-plus V, metric stud, Size 10 and 12			

MULTI-MONTI-plus and MULTI-MONTI

Product description
Head forms and specifications

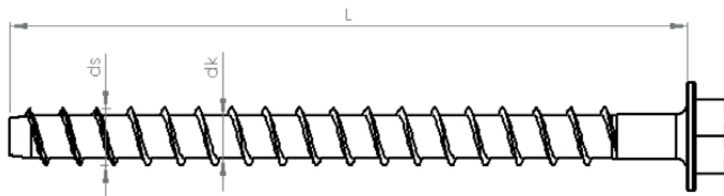
Annex 2

Dimensions and specifications for MMS-plus

Table 2: Dimensions and head markings

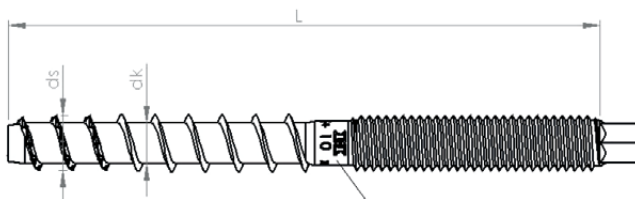
Size			MMS-plus 10	MMS-plus 12
Length	$L \geq$	[mm]	70	80
Length	$L \leq$	[mm]	200	400
Bolt diameter	d_k	[mm]	7,3	9,05
Thread diameter	d_s	[mm]	10,5	12,6
Material			steel according to EN 10263-4:2001	

Head marking for MMS-plus



Head marking
 Factory signs: H
 Anchor type: MMS+
 Anchor size: e.g. 10
 Anchor length: L

Bolt marking MMS-plus



Marking
 Factory signs: H
 Anchor type: MMS+
 Anchor size: e.g. 10
 Anchor length: L

MULTI-MONTI-plus and MULTI-MONTI

Product description
 Dimensions and specifications

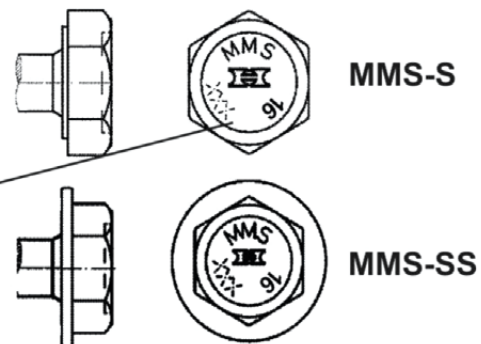
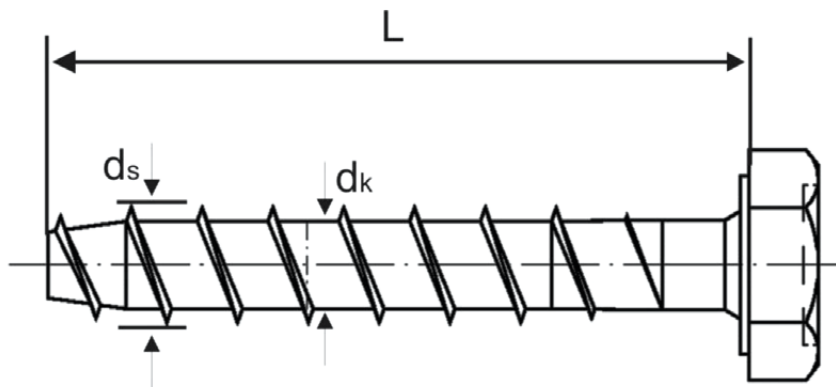
Annex 3

Dimensions and specifications for MMS

Table 3: Dimensions and head markings

Größe			MMS 16
Length	$L \geq$	[mm]	80
Length	$L \leq$	[mm]	400
Bolt diameter	d_k	[mm]	13,3
Thread diameter	d_s	[mm]	16,7
Material	Steel according to EN 10263-4:2001		

Head marking for MMS



Head marking
 Factory signs: H
 Anchor type: MMS
 Anchor size: e.g. 16
 Anchor length /
 $T_{fix \text{ max.}}$: e.g. 80/5

MULTI-MONTI-plus and MULTI-MONTI

Intended use
 Specifications and installation parameters

Annex 4

Dimensions and installation parameters

Table 4: Specifications for check gauges

Size			MMS-plus 10	MMS-plus 12	MMS 16
Gauge length	l_c	[mm]	24	32	36
Internal diameter of gauge	d_c	[mm]	9,5	11,5	15,5

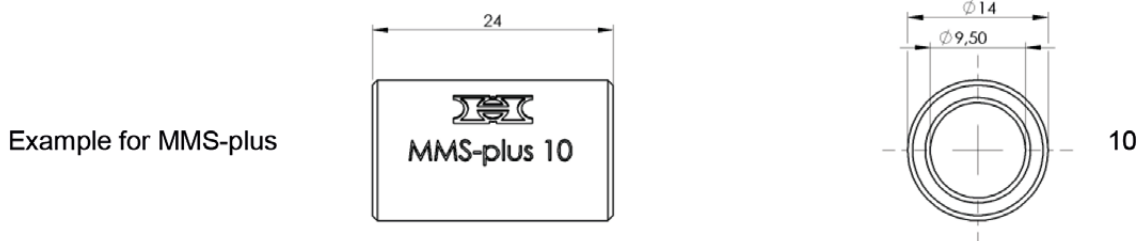
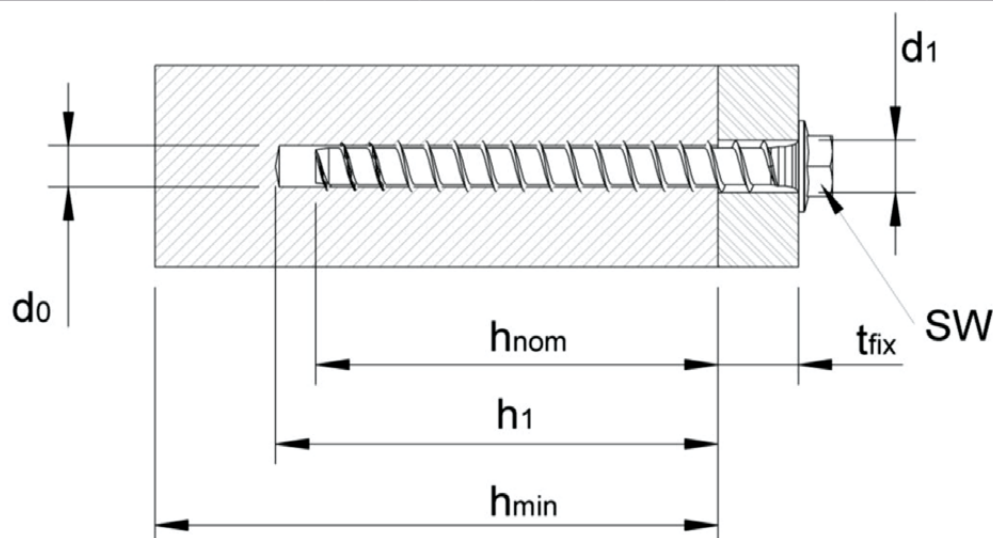


Table 5: Installation parameters

Size			MMS-plus 10	MMS-plus 12	MMS 16	
Embedment depth in concrete [mm]			h_{nom}	h_{nom}	h_{nom}	h_{nom}
			65	75	75	115
Nominal drill diameter	d_0	[mm]	8	10	14	14
Drill bit cutting diameter	$d_{cut} \leq$	[mm]	8,45	10,45	14,5	14,5
Depth of borehole	$h_1 \geq$	[mm]	75	85	85	125
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	12,0	14,0	18,0	18,0
Installation torque for connected thread (MMS-plus V)	$T_{inst} \leq$	[Nm]	25	30	-	-

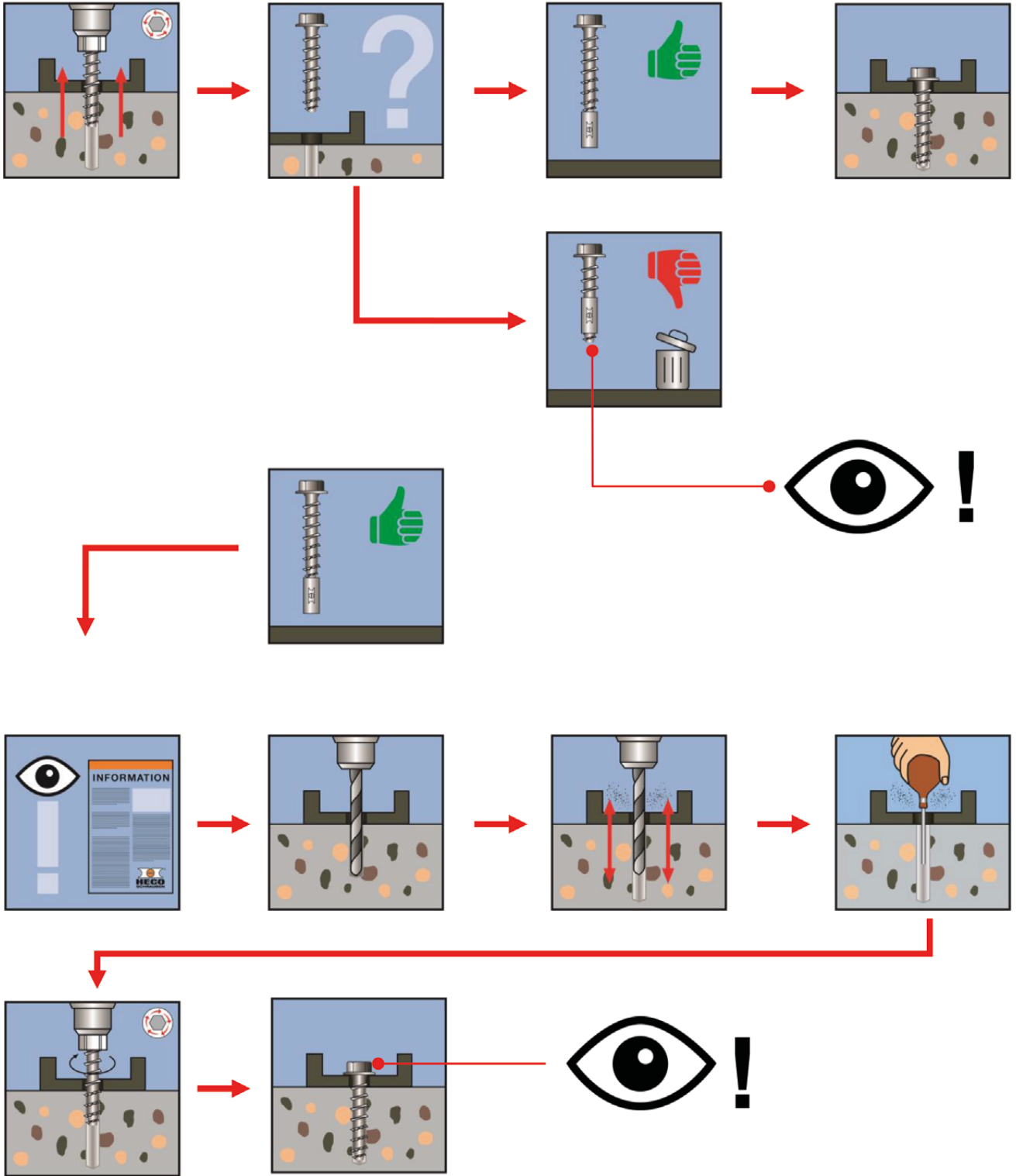


MULTI-MONTI-plus and MULTI-MONTI

Intended use
Specifications and installation parameters

Annex 5

Installation instructions



MULTI-MONTI-plus and MULTI-MONTI

Intended use
 Installation instruction for multiple use of temporary fixations

Annex 6

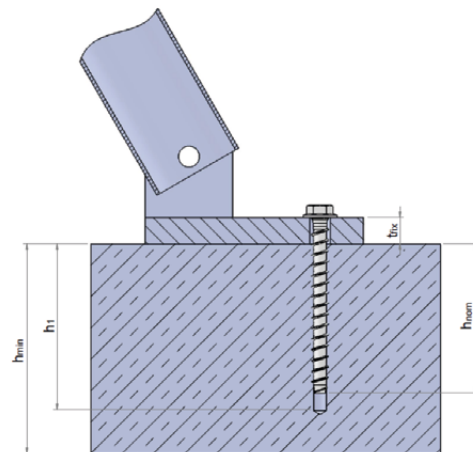
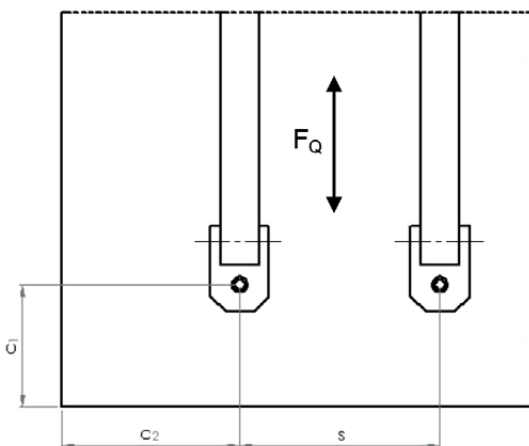
Table 6: Min. thickness of the concrete member and min. spacing and distance in cracked and uncracked concrete

Size			10	12	16	
	h_{nom}	[mm]	h_{nom}	h_{nom}	h_{nom}	h_{nom}
Embedment depth in concrete	h_{nom}	[mm]	65	75	75	115
Min. thickness of the concrete member	h_{min}	[mm]	115	125	150	200
Min. spacing	s	[mm]	265	305	375	645
Min. distance	c_1	[mm]	88	105	125	215
Min. distance	c_2	[mm]	135	155	188	325

Table 7: Design resistance for all load directions in cracked and uncracked concrete

Size			10	12	16	
	h_{nom}	[mm]	h_{nom}	h_{nom}	h_{nom}	h_{nom}
Embedment depth in concrete	h_{nom}	[mm]	65	75	75	115
Design resistance for concrete with a compressive strength $f_{c,cube} \geq 10 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	3,0	5,0	6,0	12,5
Design resistance for concrete with a compressive strength $f_{c,cube} \geq 15 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	3,7	5,7	7,4	15,3
Design resistance for concrete with a compressive strength $f_{c,cube} \geq 20 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	4,3	6,2	8,5	17,7
Design resistance for concrete with a compressive strength $f_{c,cube} \geq 25 \text{ N/mm}^2$	$F_{Rd}^{1)}$	[kN]	4,9	6,7	9,5	19,8

1) Design resistance including partial safety factor

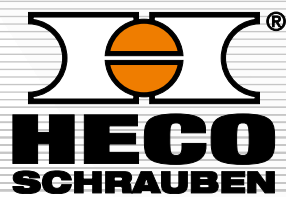


MULTI-MONTI-plus and MULTI-MONTI

Performance

Min. thickness of the concrete member, minimum spacings and design resistance

Annex 7



HECO-Schrauben GmbH & Co.KG

Dr.-Kurt-Stein-Straße 28 · D-78713 Schramberg

Tel.: +49 (0) 74 22 / 9 89-0 · Fax: +49 (0) 74 22 / 9 89-200

Mail: info@heco-schrauben.de · www.heco-schrauben.de