

Allgemeine bauaufsichtliche Zulassung

Zulassungsstelle für Bauprodukte und Bauarten

Bautechnisches Prüfamt

Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des öffentlichen Rechts
Mitglied der EOTA, der UEAtc und der WFTAO

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Applicant:

fischerwerke GmbH & Co. KG

Klaus-Fischer-Straße 1

72178 Waldachtal

Subject of approval:

fischer remedial wall tie mechanical VBS-M

The subject of approval named above is herewith granted a national technical approval (*allgemeine bauaufsichtliche Zulassung*).

This national technical approval contains nine pages and six annexes.

This nation technical approval replaces national technical approval no. Z-21.2-1956 of 26 March 2012.

The subject of approval was granted the first national technical approval on 26 March 2012.

Translation authorised by DIBt

DIBt

I GENERAL PROVISIONS

- 1 With the national technical approval (*allgemeine bauaufsichtliche Zulassung*) the fitness for use and the applicability of the subject of approval in accordance with the Building Codes of the federal states (*Landesbauordnungen*) have been verified.
- 2 If in the national technical approval requirements are made concerning the special expertise and experience of persons entrusted with the manufacture of construction products and types of construction in accordance with the provisions of the relevant federal state following Section 17 Sub-section 5 of the Model Building Code (*Musterbauordnung*), it shall be noted that this expertise and experience can also be proven by equivalent verifications from other Member States of the European Union. If necessary, this also applies to equivalent 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 permits, approvals and certificates prescribed by law for carrying out building projects.
- 4 The national technical approval is granted without prejudice to the rights of third parties, in particular private property rights.
- 5 Notwithstanding further provisions in the 'Special Provisions', manufacturers and distributors of the subject of approval shall make copies of the national technical approval available to the user and point out that the national technical approval shall be available at the place of use. Upon request, copies of the national technical approval shall be placed at the disposal of the authorities involved.
- 6 The national technical approval shall be reproduced in full only. Partial publication requires the consent of Deutsches Institut für Bautechnik. Texts and drawings in promotional materials shall not contradict the national technical approval. In the event of a discrepancy between the German original of the national technical approval and this authorised translation, the German version shall prevail.
- 7 The national technical approval may be revoked. The provisions of the national technical approval can subsequently be supplemented and amended, in particular if this is required by new technical findings.

II SPECIAL PROVISIONS

1 Subject of approval and field of application

1.1 Subject of approval

The fisher remedial wall tie VBS-M (hereinafter called "anchor") consists of a polyamide anchor sleeve and a corresponding special screw made of galvanised or stainless steel. The anchor sleeve has two expansion zones which are slotted. With the first expansion zone the anchor expands in the base material (load-bearing inner leaf) and with the second expansion zone it expands in the outer masonry leaf when the screw is screwed into the anchor sleeve. The installed anchor is shown in Annex 1.

1.2 Field of application

The anchor may be used for subsequent anchoring of outer masonry leaves unless fire resistance requirements apply to the overall structure including the anchor.

The anchor may be used for anchoring in the following base materials for the load-bearing inner leaf:

- normal weight concrete \geq C12/15 and \leq C45/55 in accordance with DIN EN 206:2014-07 or \geq B 15 and \leq B55 in accordance with DIN 1045:1988-07.

The anchor may also be used for anchoring in masonry in accordance with DIN 1053-1:1996-11 or in accordance with DIN EN 1996-1-1. The following base materials shall be permitted:

- clay bricks \geq Mz 12 in accordance with DIN EN 771-1:2015-11 or DIN 105 100:2012 01
- solid calcium silicate bricks \geq KS 12 in accordance with DIN EN 771-2:2015-11 or DIN 106:2015-06
- lightweight concrete solid bricks \geq V 4 in accordance with DIN EN 771-3:2015-11 or DIN V 18152-100:2005-10
- lightweight concrete solid blocks \geq Vbl 4 in accordance with DIN EN 771-3:2015-11 or DIN V 18152-100:2005-10
- perforated clay bricks \geq Hlz 12 in accordance with DIN EN 771-1:2015-11 or DIN 105 100:2012-01
- perforated calcium silicate bricks \geq KSL 12 in accordance with DIN EN 771-2:2015-11 or DIN 106:2015-06
- lightweight concrete hollow blocks \geq Hbl 2 in accordance with DIN EN 771-3:2015-11 or DIN V 18151-100:2005-10.

The anchor may be used in the following base materials for the outer masonry leaf:

- facing bricks \geq KMz 12 in accordance with DIN EN 771-1:2015-11 or DIN 105 100:2012-01
- facing bricks \geq KHLz 12 in accordance with DIN EN 771-1:2015-11 or DIN 105 100:2012-01
- calcium silicate facing bricks \geq KSVb 20 in accordance with DIN EN 771-2:2015-11 or DIN 106:2015-06
- perforated clinker bricks \geq KHLz 28 in accordance with DIN EN 771-1:2015-11 or DIN 105-100:2012-01 (facing bricks for anchoring in masonry in accordance with DIN 18515).

The mortar compressive strength shall at least meet the requirements for normal mortar of mortar group IIa in accordance with DIN 1053-1:1996-11 or DIN EN 1996-1-1/NA:2015-05.

If the minimum strength class of the load-bearing inner masonry leaf stated and the minimum strength class of the outer masonry leaf cannot be adhered to or the mortar group IIa cannot be adhered to for anchoring in the horizontal joint, the load-bearing capacity of the anchor may be determined through job site tests. A suitable test kit from fischer shall be used for the job site tests in the outer masonry leaf.

The anchor with the galvanised steel screw with the additional head marking shall only be used if a facade system with thermal insulation (e.g. ETICS, ventilated curtain facade) is attached to the outer masonry leaf. The insulation shall have a thickness of at least 60 mm and there shall be no ventilation between the outer masonry leaf and this insulation.

The anchor with the stainless steel screw without head marking may be used for constructions with corrosion protection class III in accordance with national technical approval 'Products, fasteners and structural components made of stainless steels' approval no. Z-30.3-6.

2 Provisions for the construction product

2.1 Properties and composition

The anchor shall correspond to the specifications in the annexes in terms of its dimensions and material properties.

The material characteristics, dimensions and tolerances of the anchor which are not specified in this national technical approval shall comply with the specifications deposited with Deutsches Institut für Bautechnik, the certification body and the external surveillance body.

2.2 Packaging, storage and marking

The anchor shall only be supplied as a compiled unit.

The anchor sleeve shall be stored under normal climate conditions. It shall not be extremely dry or frozen prior to installation.

The packaging, instruction sheet or delivery note for the anchor shall be marked by the manufacturer with the national conformity mark (*Ü-Zeichen*) in accordance with the Conformity Marking Ordinances (*Übereinstimmungszeichen-Verordnungen*) of the federal states. The factory identifying mark, the approval number and the complete designation of the anchor shall also be stated on the packaging.

Application of the mark shall only be permitted if the requirements given in Section 2.3 are met.

The anchor is designated in accordance with the type and the anchor size, e.g. 'fischer VBS-M 8x125'.

Each anchor sleeve shall be marked with the factory identifying mark, the anchor type and the anchor length in accordance with Annex 2. The required minimum embedment depth shall be marked.

2.3 Attestation of conformity

2.3.1 General

The attestation of conformity of the anchor with the provisions of this national technical approval shall be issued for every manufacturing plant in the form of a certificate of conformity based on factory production control and regular external surveillance, including initial type-testing of the anchor, in accordance with the following provisions.

To issue the certificate of conformity and for external surveillance, including the associated product testing to be carried out in the process, the manufacturer of the anchor shall use an appropriately recognised certification body and an appropriately recognised inspection body.

The declaration that a certificate of conformity has been issued shall be submitted by the manufacturer through marking of the construction product with the national conformity mark (*Ü-Zeichen*) including statement of the intended use.

A copy of the certificate of conformity issued by the certification body shall be sent to Deutsches Institut für Bautechnik.

2.3.2 Factory production control

A factory production control system shall be set up and implemented in each manufacturing plant. Factory production control is understood to be continuous surveillance of production by the manufacturer to ensure that the manufactured construction products satisfy the provisions of this national technical approval.

The test plan deposited with Deutsches Institut für Bautechnik and the external surveillance body shall be decisive for the scope, type and frequency of factory production control.

The results of factory production control shall be recorded and evaluated. The records shall at least include the following information:

- designation of the construction product or the starting material and the components,
- type of check or test,
- date of manufacture and testing of the construction product or the starting material or the components,
- results of check and tests and, where applicable, comparison with requirements,
- signature of the person responsible for factory production control.

The records shall be kept for at least five years and submitted to the inspection body used for external surveillance. They shall be submitted to Deutsches Institut für Bautechnik and the competent supreme building authority upon request.

If the test result is unsatisfactory, the manufacturer shall immediately take the necessary measures to resolve the defect. Construction products which do not meet the requirements shall be handled in such a way that they cannot be confused with compliant products. After the defect has been remedied, the relevant test shall be repeated immediately, where technically feasible and necessary to show that the defect has been eliminated.

2.3.3 External surveillance

The factory production control system at each manufacturing plant shall be inspected regularly, i.e. at least once a year, by means of external surveillance.

Initial type-testing of the anchor shall be carried out within the scope of external surveillance. Samples for random testing shall also be taken. Sampling and testing shall be the responsibility of the recognised inspection body.

The test plan deposited with Deutsches Institut für Bautechnik and the external surveillance body shall be decisive for the scope, type and frequency of external surveillance.

The results of certification and external surveillance shall be kept for at least five years. They shall be presented by the certification or inspection body to Deutsches Institut für Bautechnik and the competent supreme building authority upon request.

3 Provisions for planning and design

3.1 General

The anchors shall be designed in line with good engineering practice. Verifiable calculations and design drawings shall be prepared in consideration of the loads to be anchored as well as the dimensions of the member and tolerances. The proof of the immediate local force transmission into the base material (load-bearing inner leaf and outer masonry leaf) has been provided.

The anchor shall be positioned in the outer masonry leaf in the horizontal joint or in the centre of the brick.

3.2 Planning

The anchor characteristic values, dimensions of the member and spacings specified in Annex 4, Table 4, shall be observed.

For determination of the anchor length l_d the thickness of the outer masonry leaf h_a as well as the thickness of the air space layer (leaf spacing a_z) shall be determined by means of drilled test holes. Annex 3, Table 3, shows the leaf spacings a_z for different outer masonry leaf thicknesses and different anchor lengths.

3.3 Design

The provisions of DIN EN 1996-1-1:2013-02 in conjunction with DIN EN 1996-1-1/NA:2012-05 shall apply to wire anchors in accordance with Figure NA.9 and DIN EN 1996-2:2010-12 in conjunction with DIN EN 1996-2/NA:2012-01, NCI Annex NA.D, to wire anchors in accordance with Figure NA.D.1. By way of deviation from these provisions, the remedial wall ties and leaf spacings in accordance with this approval shall be permitted.

These provisions shall also apply to the anchoring of outer masonry leaves in accordance with DIN 1053-1:1996-11.

The number of anchors per m^2 of wall area shall be determined in accordance with clause 6.5 of DIN EN 1996-1-1¹ using the following formula:

$$\text{Number of anchors } n_t = \frac{w_{Ed} [\text{kN/m}^2]}{N_{Rd} [\text{kN}]} \geq n_{tmin} \quad (3.1)$$

where

w_{Ed} = design value of the horizontal load to be transmitted per unit area

N_{Rd} = design value of tensile strength in accordance Annex 4, Table 5, and Annex 5, Table 6, with the smaller value being decisive.

n_{tmin} = minimum number of anchors in accordance with DIN EN 1996-1-1/NA:2012-05 Table NA.18 or DIN EN 1996-2/NA:2012-01 Table NA.D.1

If deviations from the base materials or joint qualities specified in Annexes 4 and 5 occur with respect to the strength class, the load-bearing capacity of the anchor in the load-bearing inner leaf and the outer masonry leaf may be determined through job site tests.

The load-bearing capacities given in Annex 4, Table 5, shall only apply if a rotary drill is used to produce the drilled hole in the masonry made of perforated clay bricks (Hlz). If the drilled holes are produced using impact or hammer action, the load-bearing capacity of the anchor shall be determined through job site tests in accordance with Section 3.4.

3.4 Verification of the anchor through job site tests

The job site tests can be carried out in accordance with method A (load criterion) or method B (deformation criterion).

For each base material at least fifteen pull-out tests for test method A and at least five pull-out tests for test method B shall be carried out with a centric load acting on the anchor.

Testing, test evaluation and test report preparation shall be carried out by testing bodies or under the supervision of the construction site supervisor.

Section 4 shall apply to the installation of the anchor.

¹ DIN EN 1996-1-1:2013-02 'Eurocode 6: Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures'

The test report shall contain all the information necessary for evaluating the load-bearing capacity of the base material. It shall be included in the building files. At least the following information is required:

- structure, building owner
- date and location of tests
- temperature
- company installing the anchors
- testing device
- results of tests
- testing carried out or supervised by ...
- signature.

3.4.1 Test method A (verification of characteristic load)

The pull-out device shall ensure a continuous and slow increase in load with calibrated force indication. The tensile load shall act perpendicular to the surface of the base material and be transmitted to the screw by means of a hinge.

The reaction forces shall be introduced into the base material at a distance of at least 15 cm from the anchor. The test load shall be increased continuously in such a way that the maximum load is reached after about a minute. The tensile load is read when the failure load N_1 is achieved.

The characteristic load-bearing capacity N_{Rk1} is determined as follows:

$$N_{Rk1} = 0.6 \times N_1 \quad \leq 1.5 \text{ kN} \quad (3.2)$$

$$\leq 2.0 \times N_{Rd}$$

where

N_1 = mean of the five lowest measurements at failure load

N_{Rd} = load-bearing capacity specified in Annex 4, Table 5, and Annex 5, Table 6, for the respective base material

The number of anchors per m² of wall area shall be determined using the following formula:

$$\text{Number of anchors } n_t = \frac{2.0 \cdot w_{Ed} \text{ [kN/m}^2\text{]}}{N_{Rk1} \text{ [kN]}} \geq n_{tmin} \quad (3.3)$$

where

w_{Ed} = design value of the horizontal load to be transmitted per unit area.

N_{Rk1} = characteristic load-bearing capacity from the tests in accordance with (3.2)

n_{tmin} = minimum number of wire anchors in accordance with DIN EN 1996-1-1/NA:2012-05 Table NA.18 or DIN EN 1996-2/NA:2012-01 Table NA.D.1

A check shall also be carried out to ensure the displacement of each anchor does not exceed the value of 1 mm at a test load of 1 kN.

If this requirement cannot be met, the minimum number of anchors shall be increased in accordance with (3.4):

$$n_{t,increased} = n_t \cdot 1.0 \text{ kN} / \min N_{1mm} \quad (3.4)$$

where

$\min N_{1mm}$ = measured load in kN for a deformation of 1 mm, minimum value from all tests

n_t in accordance with (3.3)

3.4.2 Test method B (verification of deformation criterion)

For each base material at least five pull-out tests with a centric load acting on the anchor shall be carried out. At a test load of 1.5 kN slip shall not exceed 0.5 mm in at least five individual tests on each anchor or 1.0 mm in at least ten individual tests on each anchor.

The number of anchors per m² of wall area shall be determined in accordance with Section 3.3 for the corresponding base material.

4 Provisions for execution

4.1 General

The anchors shall only be delivered as a mass-produced compiled unit (pre-assembled or packaged together).

The anchor shall be installed in accordance with the design drawings prepared in accordance with Section 3.1 and the installation instructions of the applicant. Prior to installation of the anchor, the material and the strength class and, if necessary, the mortar group shall be determined by means of the building documents or strength testing.

4.2 Drilling of the holes

The hole shall be drilled in the horizontal joint or in the centre of the brick through the outer masonry leaf into the load-bearing base material. The hole shall be drilled at a rectangular angle to the surface of the base material with a hard metal hammer drill bit or a hard metal impact drill bit.

Holes in masonry made of perforated clay bricks (Hlz) may only be drilled with rotary drills (no impact or hammer drilling). Deviations from this provision shall only be permitted if the effect of impact or hammer drilling on the structural behaviour of the anchor in the masonry made of perforated clay bricks is evaluated through job site tests in accordance with Section 3.2.

The hard metal masonry drill bits shall meet the specifications given in the January 2002 version of the leaflet 'Characteristic values, requirements and tests for masonry drill bits with carbide cutting bodies which are used for the manufacture of drilled holes for anchoring' of DIBt and the Association of the German Tool Industry (*Fachverband Werkzeugindustrie e.V.*). Compliance of the drill bit characteristic values shall be verified in accordance with Section 5 of the leaflet.

The nominal drill bit diameter, cutting diameter of drill bit and hole depth shall correspond to the values given in Annex 4, Table 4.

The drill hole depth shall exceed the anchor length by at least 20 mm.

4.3 Installation of the anchor

The temperature of the base material shall not fall below -5 °C when the screw is being inserted.

In case of flush installation, the anchor sleeve shall be inserted into the drilled hole until the sleeve collar is flush with the brick surface. In case of recessed installation, the sleeve collar shall be positioned 20 mm at maximum below the brick surface.

The special screw shall be screwed in tightly to the collar of the anchor sleeve in such a way that the screw tip penetrates the anchor sleeve.

The anchor is properly installed when the screw has been completely screwed in (it may not protrude) so that neither the anchor sleeve nor the screw can rotate.

The anchor sleeve may only be installed once.

4.4 Inspection of execution

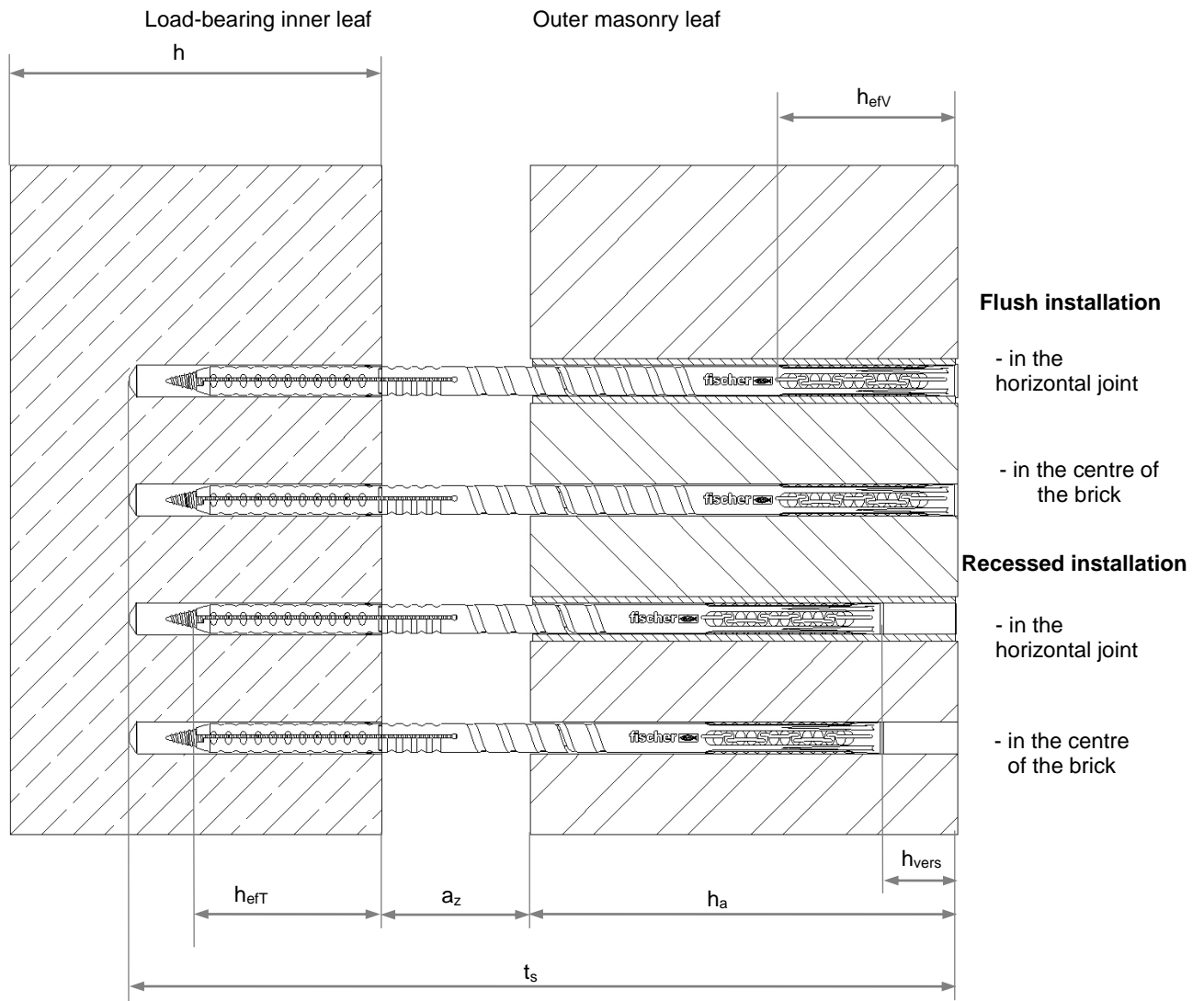
During the installation of the anchors the contractor commissioned with the anchoring of the anchors or the site manager assigned by him or her or a competent representative of the site manager shall be present at the construction site. He or she shall ensure that the work is carried out properly.

During the installation of the anchors records of the verification of the base material (concrete strength class or masonry type and masonry strength class) and the proper installation of the anchors shall be kept by the site manager or his or her representative. The records shall be available at the construction site during the construction period and shall be handed over to the construction site supervisor upon request. Like the delivery notes, they shall be kept by the contractor for a minimum of five years after completion of the project.

Andreas Kummerow
Head of Section

Drawn up by

VBS-M installed anchor



Legend:

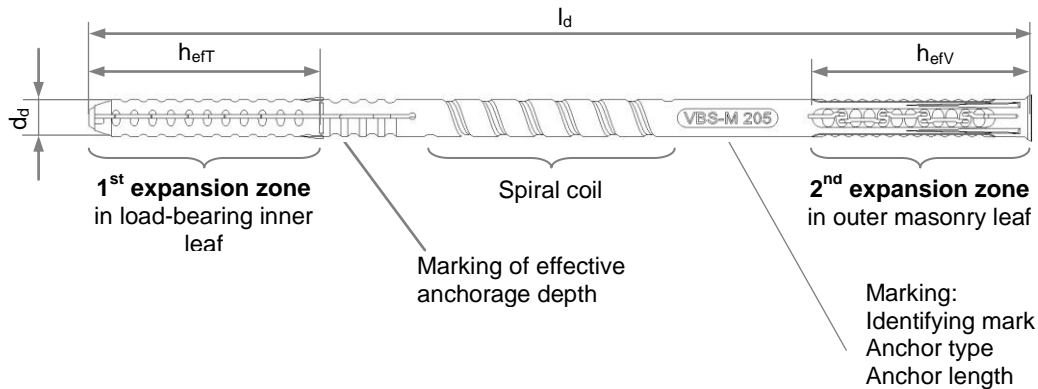
- h = Thickness of load-bearing inner leaf
- h_{efT} = Effective anchorage depth in load-bearing inner leaf
- h_{efV} = Effective anchorage depth in outer masonry leaf
- h_{ers} = Recessed depth
- h_a = Thickness of outer masonry leaf
- a_z = Leaf spacing
- t_s = Overall drill hole depth

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Installed anchor

Annex 1

Anchor sleeve



Special screw

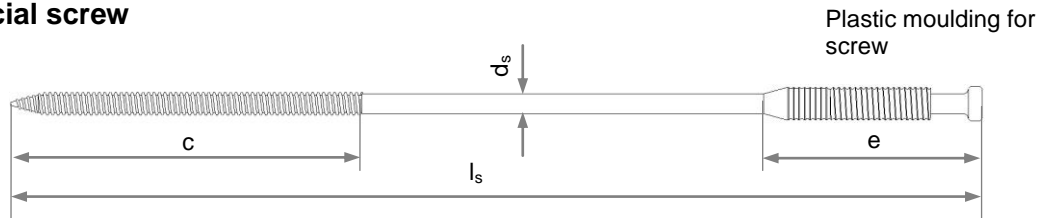
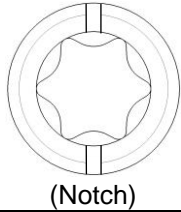
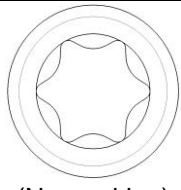


Table 1: Dimensions

Anchor size	Colour	Anchor sleeve				Corresponding special screw			
		d_d [mm]	h_{effT} [mm]	h_{effV} [mm]	l_d [mm]	d_s [mm]	c [mm]	e [mm]	l_s [mm]
VBS-M 8	grey	8	50	48	see Table 3	4.2	75	48	$l_d + 8$

Table 2: Material

Designation	Material	Head marking
Anchor sleeve	Polyamide PA6	-
Plastic moulding for screw	PA6 GF	-
Special screw	Steel ¹⁾ gal Zn A2G or A2F as per EN ISO 4042	 (Notch)
	Stainless steel of corrosion class III as per 'national technical approval' abZ-30.3-6	 (No marking)

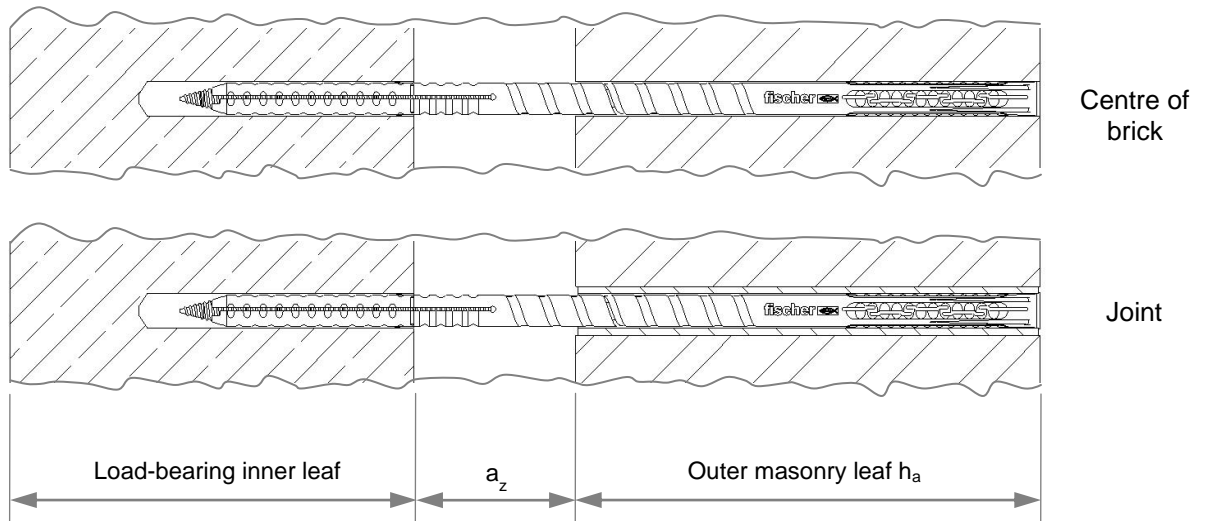
¹⁾ The anchor with the screw made of galvanised steel with the additional head marking may only be used if a facade system with an insulation product (e.g. ETICS or ventilated curtain facade) is attached to the outer masonry leaf. The insulation must have a thickness of at least 60 mm and there shall be no ventilation between the outer masonry leaf and this insulation..

fischer remedial wall tie mechanical VBS-M

Dimensions
 Material

Annex 2

Flush-installed anchor (brick and joint)



Recessed-installed anchor (brick and joint)

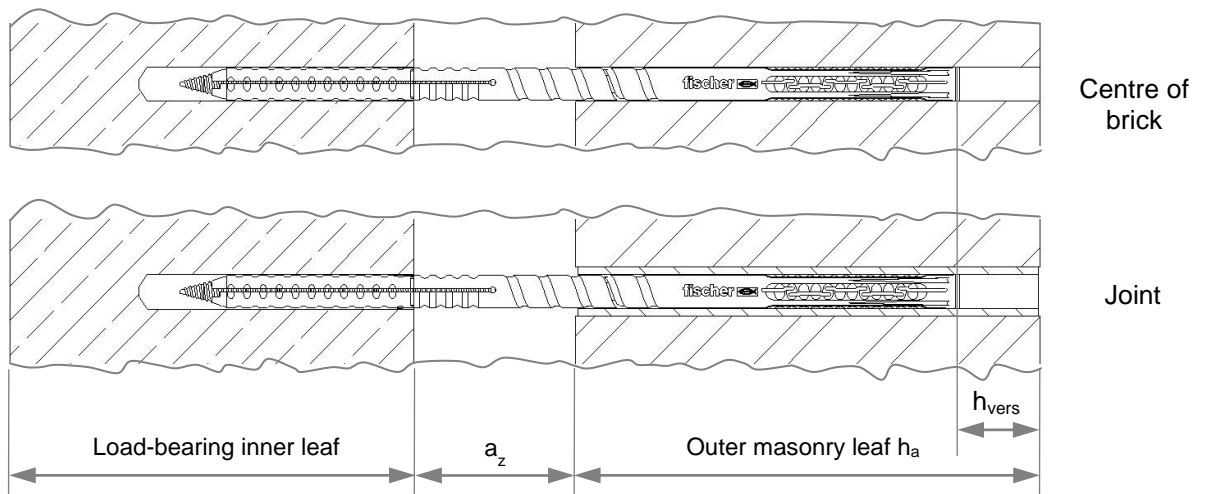


Table 3: Anchor length and leaf spacing

Anchor type VBS-M	l_d	Leaf spacing a_z for $h_a = 50 \text{ mm}^{1)}$ outer masonry leaf		Leaf spacing a_z for $h_a = 70 \text{ mm}^{2)}$ outer masonry leaf		Leaf spacing a_z for $h_a = 100 \text{ mm}^{2)}$ outer masonry leaf		Leaf spacing a_z for $h_a = 115 \text{ mm}^{2)}$ outer masonry leaf	
		Flush	Recessed	Flush	Recessed	Flush	Recessed	Flush	Recessed
8x120	120	≤ 20	-	-	-	-	-	-	-
8x185	185	-	≤ 65	≤ 85	≤ 35	≤ 55	≤ 20	≤ 40	
8x205	205	-	≤ 85	≤ 105	≤ 55	≤ 75	≤ 40	≤ 60	
8x225	225	-	≤ 105	≤ 125	≤ 75	≤ 95	≤ 60	≤ 80	
8x245	245	-	≤ 125	≤ 145	≤ 95	≤ 115	≤ 80	≤ 100	
8x265	265	-	≤ 145	≤ 165	≤ 115	≤ 135	≤ 100	≤ 120	
8x285	285	-	≤ 165	≤ 185	≤ 135	≤ 155	≤ 120	≤ 140	

¹⁾ Recessed installation is not permissible for facing bricks.

²⁾ Interpolation shall be carried out for other leaf spacings and recessed lengths below 20 mm.

Sizes in mm

fischer remedial wall tie mechanical VBS-M

Leaf spacing

Annex 3

Table 4: Installation and anchor parameters¹⁾

Anchor type		VBS-M Installation condition	
		Flush	Recessed 0 – 20 mm
Nominal drill bit diameter	d_0 [mm]	8	
Drill bit cutting diameter	$d_{cut} \leq$ [mm]	8.45	
Effective anchorage depth in the load-bearing inner leaf	$h_{effT} \geq$ [mm]	50	
Effective anchorage depth in the outer masonry leaf	$h_{effV} =$ [mm]	50	
Overall drill hole depth	$t_s \geq$ [mm]	$l_d + 20$	$l_d + 20 + h_{vers}$
Thickness of outer masonry leaf	$h_a \geq$ [mm]	50	$50 + h_{vers}$
Base material		Concrete	Masonry
Spacing	$a \geq$ [mm]	100	$100 (250)^{2)}$
Edge distance with superimposed load	$c \geq$ [mm]	100	
Edge distance without superimposed load	$c \geq$ [mm]	250	
Thickness of load-bearing inner leaf	$h \geq$ [mm]	100	100

¹⁾ The hole shall always be drilled through the outer masonry leaf in the centre of the brick / joint into the load-bearing inner leaf (see Annex 1)

²⁾ For anchoring in a load-bearing inner leaf made of Hlz, KSL ($h > 113$ mm, perforation content > 15 %) and lightweight hollow concrete blocks Hbl, the spacing shall be ≥ 250 mm.

Table 5: Design value of load-bearing capacity N_{Rd} in [kN] per anchor in the load-bearing inner leaf – 1st expansion zone for use categories A, B and C

Base material	Bulk density class ρ [kg/dm ³]	Min. compressive strength f_b [N/mm ²]	Dimension \geq	Drilling method ¹⁾	Load-bearing capacity N_{Rd} [kN]
Concrete \geq C12/15 (B15) as per DIN EN 206:2014-07 / DIN 1045:1988-07	-	-		H	0.75
Clay brick Mz as per DIN 105-100:2012-01 / DIN EN 771-1:2015-11	≥ 1.8	20	NF	H	0.75
		12			0.45
Solid calcium silicate bricks KS as per DIN 106:2015-06 / DIN EN 771-2:2015-11	≥ 1.8	12	2 DF	H	0.75
Lightweight concrete solid bricks V as per DIN V 18152-100:2005-10 / DIN EN 771-3:2015-11	≥ 1.2	6	2 DF	H	0.4
		4			0.3
Lightweight concrete solid blocks Vbl as per DIN V 18152-100:2005-10 / DIN EN 771-3:2015-11	≥ 1.4	8	8 DF	H	0.75
		6			0.6
		4			0.4
Perforated clay bricks HLz as per DIN 105-100:2012-01 / DIN EN 771-1:2015-11	≥ 1.0	12	2 DF	D	0.5
Perforated calcium silicated bricks KSL as per DIN 106:2015-06 / DIN EN 771-2:2015-11	≥ 1.4	12	3 DF	H	0.5
Lightweight concrete hollow blocks Hbl ²⁾ as per DIN V 18151-100:2005-10 / DIN EN 771-3:2015-11	≥ 0.7	4	16 DF	H	0.4
		2			0.2

¹⁾ H = impact or hammer drilling, D = rotary drilling

²⁾ The 1st expansion zone must extend into the outer web

fischer remedial wall tie mechanical VBS-M

Installation and anchor parameters
Design values of tensile strength – 1st expansion zone

Annex 4

Table 6: Design value of load-bearing capacity N_{Rd} in [kN] per anchor in the outer masonry inner leaf – 2nd expansion zone

Base material	Bulk density class ρ [kg/dm ³]	Min. compressive strength f_b [N/mm ²]	Dimension \geq	Drilling method ¹⁾	Load-bearing capacity N_{Rd} [kN]
Facing bricks KMz as per DIN 105-100:2012-01 / DIN EN 771-1:2015-11	≥ 2.2	28	NF	H	0.6
		20			0.4
		12			0.25
Facing bricks KHLz as per DIN 105-100:2012-01 / DIN EN 771-1:2015-11	≥ 1.8	28	NF: cross section reduced by more than 15 % through perforations vertical to horizontal surface	H	0.6
		20			0.4
		12			0.25
Calcium silicate facing bricks KSVb as per DIN 106:2015-06 / DIN EN 771-2:2015-11	≥ 1.8	20	NF	H	0.6
Perforated clinker bricks KHLz as per DIN 105-100:2012-01 / DIN EN 771-1:2015-11 'Sparverblender'	≥ 2.0	28	240x52x71	H	0.2

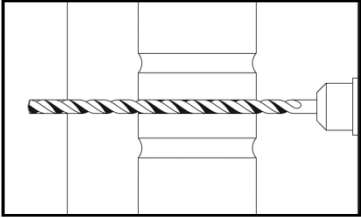
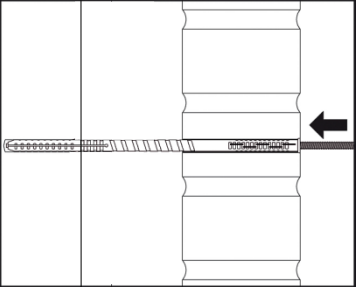
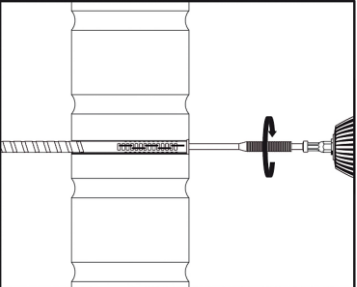
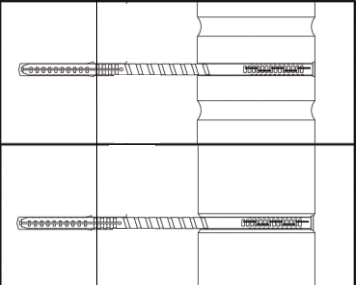
¹⁾ H = impact or hammer drilling, D = rotary drilling

fischer remedial wall tie mechanical VBS-M

Design values of tensile strength – 2nd expansion zone

Annex 5

Table 7: Installation instructions fischer VBS-M

	<p>Drilling of through hole and anchoring hole</p> <ul style="list-style-type: none"> Hole diameter and hole depth: see Table 4 'Installation and anchor parameters' Drilling method: In load-bearing inner leaf und in outer masonry leaf: - Impact or hammer drilling <p>Exception: Hz in the load-bearing inner leaf may only be drilled by rotary drilling.</p> <ul style="list-style-type: none"> Drilling perpendicuar to surface. <p>Installation in centre of the brick as shown here.</p>
	<p>Inserting the assembled anchor</p> <ul style="list-style-type: none"> Push in the remedial anchor until the sleeve collar is flush with the brick surface. The anchor can also be recessed by a max. of 20 mm (except if facing bricks are used).
	<p>Inserting the special screw</p> <ul style="list-style-type: none"> Insert the special screw using rotary drilling until the screw is flush with the sleeve collar.
	<p>Installation position I: centre of the brick</p> <ul style="list-style-type: none"> Anchor flush-installed in the middle of the brick. <p>Installation position II: horizontal joint</p> <ul style="list-style-type: none"> Anchor flush-installed in the horizontal joint.

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Installtion instructions

Annex 6