



MFWA Leipzig GmbH

Testing, Inspection and Certification Authority for
Construction Products and Construction Types

Leipzig Institute for Materials Research and Testing
Business Division III - Structural Fire Protection

Dipl.-Ing. Sebastian Hauswaldt

Work Group 3.2 - Fire Behaviour of Building Components and special
Constructions

Dipl.-Ing. S. Bauer

Tel.: +49 (0) 341-6582-194

s.bauer@mfwpa-leipzig.de

Notice of extension of the validity of the test report no. PB 3.2/13-333-1 dated 06/02/2014

29th August 2018

No. Copy 1

Subject matter: Fischer metal frame dowel F-M
Test according to Technical Report TR 020 „Evaluation of Anchorages in
Concrete concerning Resistance to Fire” (May 2004) to determine the
characteristic tensile stress vs. the fire resistance.

Client: fischerwerke GmbH & Co. KG
Weinhalde 14-18
72178 Waldachtal

Person in charge: Dipl.-Ing. S. Bauer

Validity: 06/02/2024

This notice extends the period of validity of the test report no. PB 3.2/13-333-1 dated 06/02/2014.

This notice is only valid in conjunction with the test report no. PB 3.2/13-333-1 dated 06/02/2014 and may
only be used in conjunction with it.

The results of the tests exclusively relate to the items tested. This document does not replace a certificate
of conformity or suitability according to national and European building codes.

Leipzig, 29th August 2018

Dipl.-Ing. S. Hauswaldt
Head of Business Division



Dipl.-Ing. S. Bauer
Testing Engineer

This document may only be reproduced in its unabbreviated form. All publication, even in excerpts, requires the prior written
permission of MFWA Leipzig GmbH. The legal binding form is the written German form with the original signatures and original stamp
of the authorized signatory / signatories. General terms and conditions of MFWA Leipzig GmbH are valid.

Gesellschaft für Materialforschung und Prüfungsanstalt für das
Bauwesen Leipzig mbH (MFWA Leipzig GmbH)

Head Office: Hans-Weigel-Str. 2b – 04319 Leipzig/Germany
Managing Director: Dr.-Ing. habil. Jörg Schmidt
Comm. Register: Local Court Leipzig HRB 17719
VAT-ID: DE 813200649
Tel.: +49 (0) 341-6582-0
Fax: +49 (0) 341-6582-135



Mfpa Leipzig GmbH

Testing, Inspection and Certification Authority for
Construction Products and Construction Types

Leipzig Institute for Materials Research and Testing
Business Division III - Structural Fire Protection
Dipl.-Ing. Sebastian Hauswaldt

Work Group 3.2 - Fire Behavior of Building Components and special Constructions

Dipl.-Math. U. Heide
Tel.: +49 (0) 341 - 6582-117
heide@mfpa-leipzig.de

Test Report No. PB 3.2/13-333-1

Translation of PB 3.2/13-333-1 K
06 February 2014
No. Copy 1

Object: Fischer metal frame dowel F-M
Test according to Technical Report TR 020 „Evaluation of Anchorages in Concrete concerning Resistance to Fire“ (May 2004) to determine the characteristic tensile stress vs. the fire resistance.

Client: fischerwerke GmbH & Co. KG
Weinhalde 14 - 18
72178 Waldachtal

Order date: 14/11/2013

Prepared by: Dipl.-Math. Uwe Heide

Sampling: fischerwerke GmbH & Co. KG

Sample identification: Embossing at dowel

Validity: 06/ 02/ 2019

This document consists of 6 sheets and 4 Enclosures

This document may only be reproduced in its unabbreviated form. All publication, even in excerpts, requires the prior written permission of Mfpa Leipzig GmbH. The legal binding form is the written form with the original signatures and original stamp of the authorized signatory / signatories.

General terms and conditions of MPFA Leipzig GmbH are valid.



Test laboratory accredited by DAkkS GmbH according to DIN EN ISO/IEC 17025. The accreditation only applies to the test methods listed in the certificate (in this document marked with *) which can be seen on www.mfpa-leipzig.de

Gesellschaft für Materialforschung und Prüfungsanstalt für das Bauwesen Leipzig mbH (Mfpa Leipzig GmbH)

Head Office: Hans-Weigel-Str. 2b – 04319 Leipzig/Germany
Managing Director: Prof. Dr.-Ing. Frank Dehn
Comm. Register: Local Court Leipzig HRB 17719
VAT-ID: DE 813200649
Tel.: +49 (0) 341 - 6582-0
Fax: +49 (0) 341 - 6582-135

1 Reason and order

MFPA Leipzig GmbH received the order from fischerwerke GmbH & Co. KG on 14/11/2013 to test the metal frame dowels F-M at one-side fire exposure and anchorage in a reinforced concrete surface in order to determine the characteristic parameters for stressing under tensile load.

2 Description of the tested structure

The metal frame dowel FM is suitable for push-through installation. The metal frame dowel F-M is anchored so that the cone is pulled into the dowel sleeve when tightening the screw; spreads the sleeve and is thus blocked in the drilling hole. The max. tightening torque is 5 Nm. The maximum recommended load at a F10M individual dowel in concrete C20/25 is 1.38 kN [2].

The dowel may be anchored in reinforced and plain normal concrete of the strength class of min. C20/25 and max. C50/60 according to DIN EN 206-1: 2001-07.

Two sizes of the metal frame dowels F-M were tested.

3 Test setup and testing

The tests were carried out according to the technical report TR 020 Evaluation of anchorages in concrete concerning resistance to fire: 2004-05 [1] to determine the fire resistance period under centric tension (type of failure: Steel failure) and/or ETAG 001 [3].

A total of seven metal frame dowels F8M with a length of 132 mm and eleven other metal frame dowels F10M with a length of 202 mm was embedded in a reinforced concrete surface, stressed for centric tension and tested and evaluated for the fire behavior in order to determine the fire resistance period.

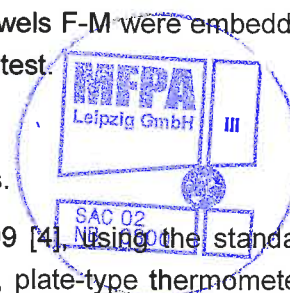
The metal frame dowels FM were installed according to the specific installation instructions of fischerwerke [2].

The reinforced concrete ceiling section into which the metal frame dowels F-M were embedded was the top horizontal room closure of the fire chamber during the fire test.

The anchoring depth for all dowels was 30 mm.

The metal frame dowels were loaded only by suspending deadweights.

The fire tests were carried out according to DIN EN 1363-1: 10-1999 [4]. Using the standard temperature/time curve. To verify the temperatures in the fire space, plate-type thermometers were installed according to DIN EN 1363-1, section 4.5.1.1 at a distance of 100 ± 50 mm to the reinforced concrete slab in the fire chamber and were used to control the temperature in the fire space.



All fire space temperature were measured and saved at 5 second intervals. The temperatures measured in the fire chamber during the fire test are shown in Enclosure 2.

4 Test results

The results of the fire tests – with the cause of failure are summarized in Table 1 for the dowels F8 with $l = 132$ mm and in Table 2 for the dowels F10 with $l = 202$ mm.

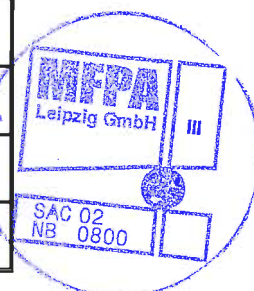
Table 1: Results of the test under centric tensile load with F8M132

Dowel No.	Tensile force N_{fire} [N]	Failure time in minutes	Cause of failure	Test date
2.4	150	*)		19/12/2013
2.1	200	163	Steel failure	19/12/2013
2.5	250	131	Steel failure	19/12/2013
2.2	300	88	Steel failure	19/12/2013
2.6	350	82	Steel failure	19/12/2013
2.3	400	85	Steel failure	19/12/2013
3.6	450	40	Steel failure	20/12/2013

*) No failure under the specified load during 180 test minutes

Table 2: Results of the test under centric tensile load with F10M202

Dowel No.	Tensile force N_{fire} [N]	Failure time in minutes	Cause of failure	Test date
1.1	100	*)		18/12/2013
1.2	150	*)		18/12/2013
1.3	200	*)		18/12/2013
1.4	250	*)		18/12/2013
1.5	300	165	Steel failure	18/12/2013
1.6	350	140	Steel failure	18/12/2013
3.4	400	96	Steel failure	20/12/2013



Dowel No.	Tensile force N_{fire} [N]	Failure time in minutes	Cause of failure	Test date
3.1	500	45	Steel failure	20/12/2013
3.5	600	38	Steel failure	20/12/2013
3.2	700	26	Steel failure	20/12/2013
3.3	800	22	Steel failure	20/12/2013

*) No failure under the specified load during 180 test minutes

4.1 Evaluation of test results

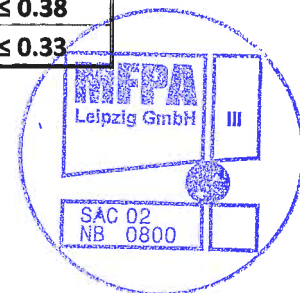
Based on the test results and evaluation according to TR 020 [1] for the fischer metal frame dowels F-M, installed in normal concrete at a minimum installation depth of 30 mm, the following fire resistance periods summarized in the tables can be indicated in dependence on the load utilization.

Table 3: Fire resistance period of fischer metal frame dowels F8M depending on the tensile load and an embedment depth of min. 30 mm.

Characteristic tension resistance		[kN]
30 min	NRk,s,fi(30)	≤ 0.56
60 min	NRk,s,fi(60)	≤ 0.42
90 min	NRk,s,fi(90)	≤ 0.29
120 min	NRk,s,fi(120)	≤ 0.22

Table 4: Fire resistance period of fischer metal frame dowels F10M depending on the tensile load and an embedment depth of min. 30 mm.

Characteristic tension resistance		[kN]
30 min	NRk,s,fi(30)	≤ 0.54
60 min	NRk,s,fi(60)	≤ 0.46
90 min	NRk,s,fi(90)	≤ 0.38
120 min	NRk,s,fi(120)	≤ 0.33





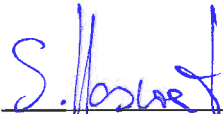
5 Specific notes

The evaluation for the fischer metal frame dowels F-M shall be applicable only in connection with reinforced concrete ceilings which can be classified at least in the fire resistance class of that of the dowels.


The validity of this test report expires on 06/02/2019.

The results of the tests exclusively refer to the described test objects but not to the main unit. This document does not replace a certificate of conformity or suitability according to national and European building codes.

Leipzig, 06 February 2014


Dipl.-Ing. S. Hauswaldt
Head of Business Division



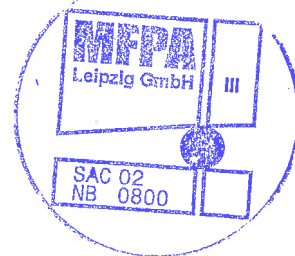

Dipl.-Math. U. Heide
Testing Engineer

References

- [1] Technical Report TR 020 *Evaluation of Anchorages in Concrete concerning Resistance to Fire*: 2004-05 der European Organization for Technical Approvals (EOTA)
- [2] Data sheet for metal frame dowels F-M of fischerwerke GmbH & Co. KG [*Download 1/2014*]
- [3] ETAG 001, Enclosure A: *Guidelines for the European technical approval for metal dowels for anchorage in concrete*, 1997 edition
- [4] *DIN EN 1363-1*: 1999-10 Fire resistance tests - Part 1: General requirements

List of Enclosures

- Enclosure 1: Installation parameters of the tested metal frame dowels F-M
- Enclosure 2: Fire space temperatures
- Enclosure 3: Failure patterns – photos of the specimens after steel failure
- Enclosure 4 Window frame dowels type F...M



Installation parameters



Fig. 1: Metal frame dowel F-M acc. to [2]

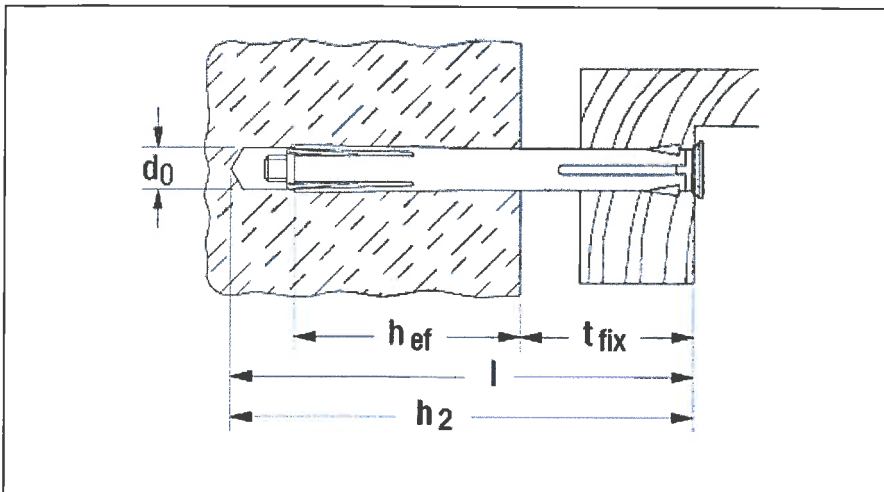
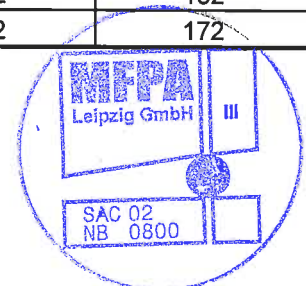


Fig. 2: Installation sketch acc. to [2]

		Nominal drilling diameter	Dowel length	max. thickness of attached part
		d_0	l	t_{fix}
Item designation	Item No.	[mm]	[mm]	[mm]
F 8 M 72	88660	8	72	42
F 8 M 92	88662	8	92	62
F 8 M 112	88664	8	112	82
F 8 M 132	88666	8	132	102
F 10 M 72	88670	10	72	42
F 10 M 92	88672	10	92	62
F 10 M 112	88674	10	112	82
F 10 M 132	88676	10	132	102
F 10 M 152	88678	10	152	122
F 10 M 182	88680	10	182	152
F 10 M 202	61064	10	202	172

Fig. 3: Installation dimensions acc. to [2]



Fire space temperatures

Comparison of fire space temperatures (relevant average value of measuring values at the thermocouples with the standard time curve (ETK))

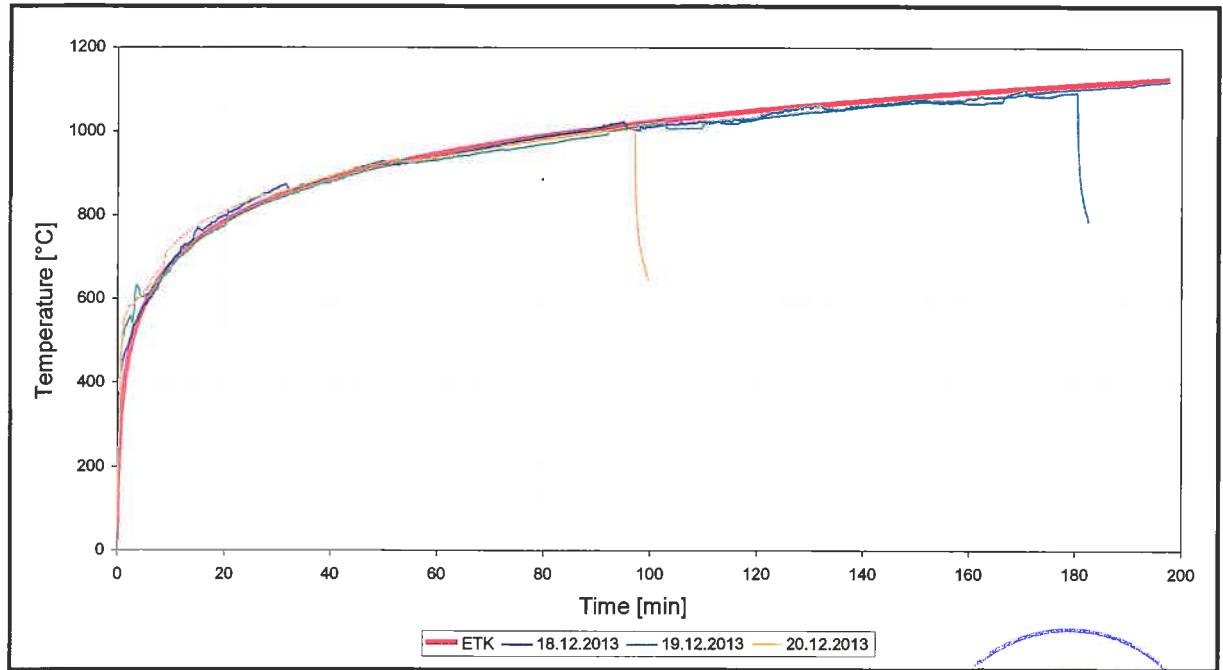


Fig. 1: Fire space temperatures



Failure patterns



Photo 1: F8M132; dowel 2.1
load: 200N ; failure time: 163 min



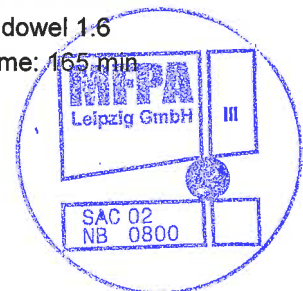
Photo 2: F8M132; dowel 2.6
load: 350N ; failure time: 82 min



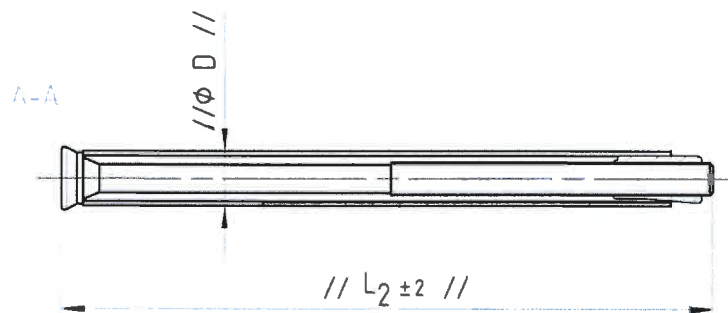
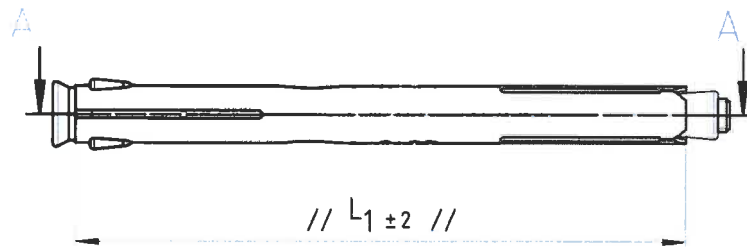
Photo 3: F10M202; dowel 1.3
load: 350N ; failure time: 140min



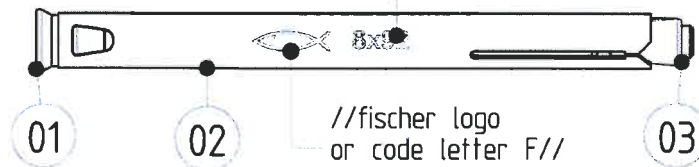
Photo 4: F10M202; dowel 1.6
load: 300N ; failure time: 165 min



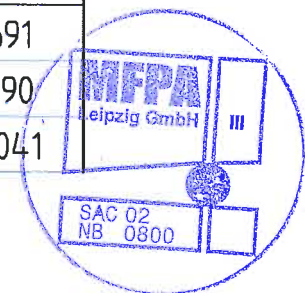
Window frame dowel type F...M

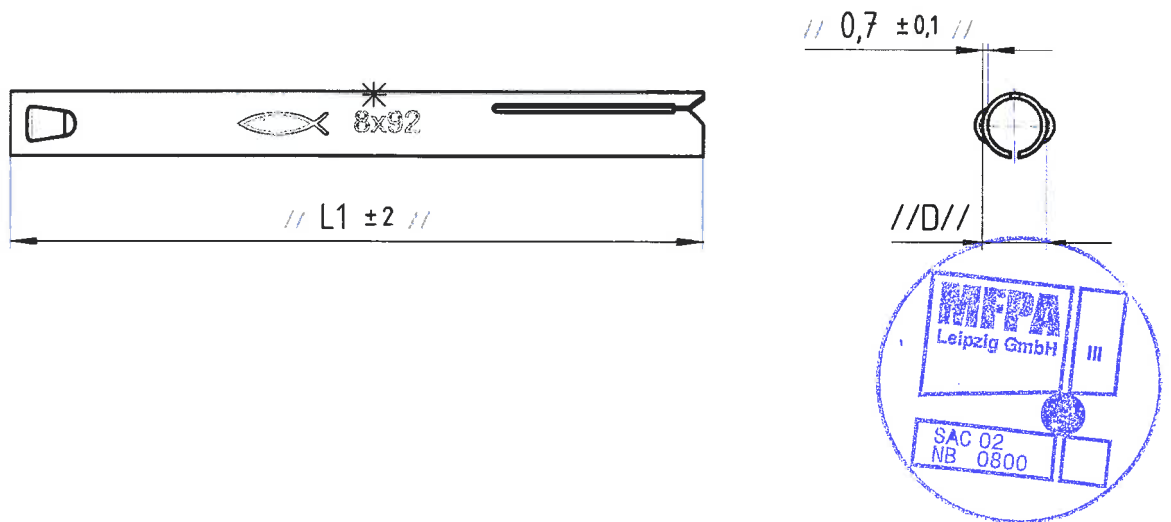
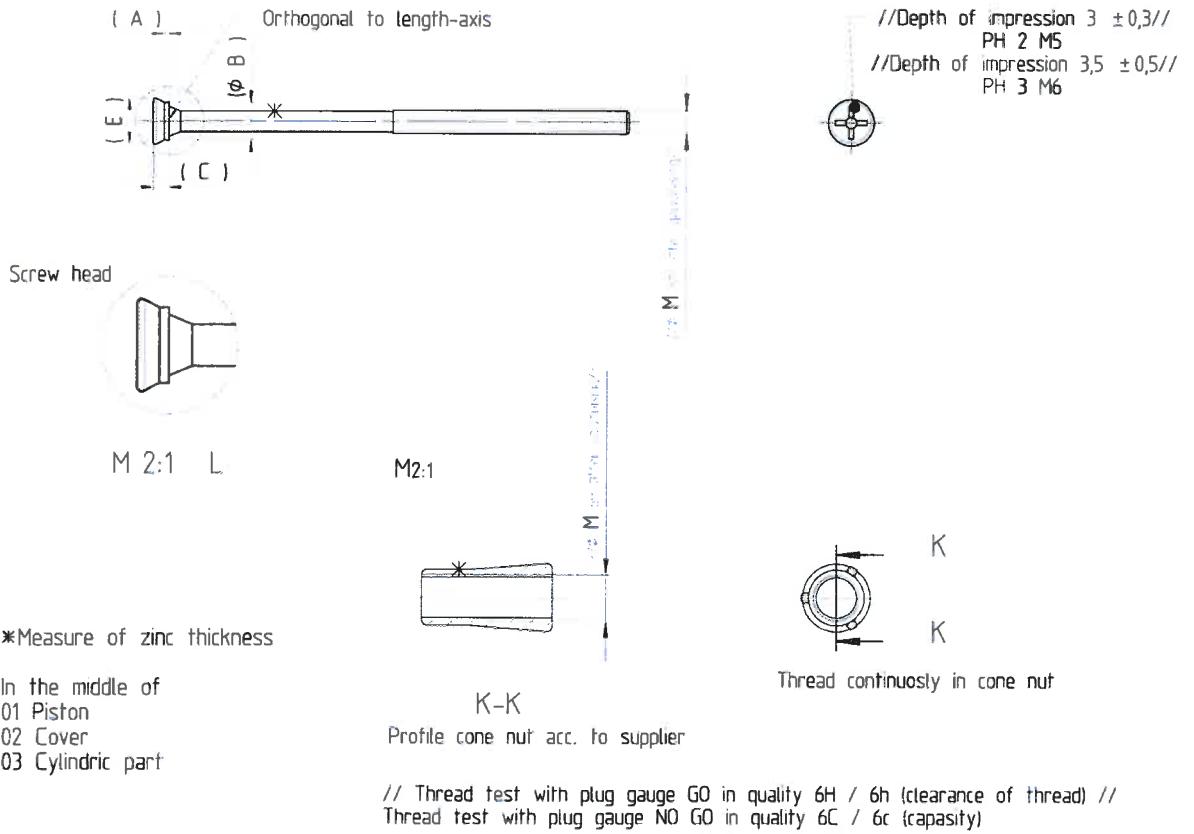


//Stamping font size 3
font 0,1...0,2 recessed//
Placement are facultative



ID-No	Description	Model No
01	Flat-head screw	1001691
02	Cover	1001690
03	Cone nut	11002041







Description	Art No	// L1 //	// L2 //	// M. //	// D //	(A)	(B)	(C)	(E)
F8M 72	88660	72	83	M5	8,5 ± 0,3	ref. 1,2	ref. 8	ref. 3,5	ref. 10,5
F8M 92	88662	92	103						
F8M 112	88664	112	123						
F8M 132	88666	132	143						
F10M 72	88670	72	83	M6	10 ± 0,4	ref. 1,5	ref. 10	ref. 4,5	ref. 13
F10M 92	88672	92	103						
F10M 112	88674 108604	112	123						
F10M 132	88676 108605	132	143						
F10M 152	88678 108606	152	163						
F10M 182	88680 121666	182	193						
F10M 202	61064 121667	202	213						

