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European Technical Assessment

**ETA-12/0056
of 2018-12-15**

General Part

**Technical Assessment Body issuing the ETA:
SINTEF Building and Infrastructure**

Trade name of the construction product

Milletech Fastening System

Product family to which the construction product belongs

Fasteners for mechanically fastened flexible roof waterproofing systems

Manufacturer

Milles Teknikplast AB
Bergsjödalen 55
S-415 23, Gothenburg
Sweden

Manufacturing plant(s)

Milles Teknikplast AB
Bergsjödalen 55
S-415 23, Gothenburg
Sweden

This European Technical Assessment contains

13 pages including 2 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

ETAG 006 used as EAD 2012, Systems of Mechanically Fastened Flexible Roof Waterproofing Membranes

This version replaces

ETA-12/0056 issued on 2012-04-12

Specific parts

1. Technical description of the product

Milletech Fastening System is used as mechanical fastening of insulation, bitumen based single/multi-layer or single ply waterproofing membranes, or polymeric single ply waterproofing membranes, for flat roofing. The supporting roof structure may consist of profiled steel sheets, concrete, light weight concrete, or a wood based construction as defined in ETA Guideline No. 006 edition March 2000, amended November 2012. For Systems of mechanically fastened flexible roof waterproofing membranes, paragraph 2.2 iii.

The range of fasteners consists of screws and washers as illustrated in Annex 1.

The fastener system is introduced to the market separately from the other components of roof waterproofing membrane kits, and this ETA covers only the performance characteristics of the Milletech Fastening System. A separate ETA according to ETAG 006 is necessary in order to cover an entire kit for mechanically fastened roof waterproofing membranes.

The fasteners may be used for all types of flexible membranes. The supporting roof structure may consist of profiled steel sheets, concrete, light weight concrete, or a wood based construction. Milletech Fastening System may be used with membranes installed on a thermal insulation material or directly to the supporting roof deck.

2. Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

General

The fasteners must be installed according to the manufacturer's instructions. It is the manufacturer's responsibility to provide correct information about the application of the products to the users.

Steel washers can be used on stiff substrates, i.e. on wood-based roof substrate, on concrete, or on non-compressible insulation. Plastic fasteners with integrated sleeve are recommended on thermal insulation.

If there is doubt about the suitability of the substrate, e.g. on a construction site, a pull-out test on site should be performed to verify the performance of the fastener (see ETAG 006 Annex C). Furthermore, care should be taken during design to ensure that galvanic corrosion between metal parts, especially between substrate and screw, does not occur. Likewise, use of insulation materials containing substances which can affect the performance of the fasteners must be avoided.

Fastening in wood

Minimum thickness for timber based substrate is 18 mm. For timber deck applications a site pull out test is recommended.

Fastening in concrete

When fixing Milletech Itech 6.1 T25 in concrete, the drill hole diameter must be normally 5 mm. The drill hole depth should be normally minimum 30 mm, unless special precautions are taken regarding installation control and inspection. Minimum anchorage depth shall be normally minimum 20 mm. Fixings in 40 mm thick concrete without penetration requires drilling with depth control. Concrete compression strength is minimum class C25/30 according to EN 206.

Fastening in light weight concrete

When fixing Milletech Itech 8,0 T25 in aerated concrete, the anchoring depth must be normally minimum 75 mm. Before use, pull-out tests have to be executed on site for each specific project according to ETAG 006 Annex D.

Fastening in steel sheets

Load bearing decks made of profiled steel sheets normally have a minimum thickness of 0.7 mm and quality S280. Using Milletech steel sheet fasteners in profiled steel sheets, the anchoring depth must be minimum 20 mm. In annex 2, Table 4, the axial load resistance of every steel sheet fastener is listed.

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

See Annex 2.

Mechanical resistance and stability

Not relevant.

Safety in case of fire

No performance determined. The reaction to fire of roof waterproofing kits is determined for the complete kits including the membrane.

Hygiene, health and environment

According to the manufacturer's declaration, the screws with corrosion protection contains no hazardous compounds. Consequently the products do not contain any dangerous substances according to the EU database.

Safety in use

The fasteners have been tested for wind uplift according to EN-16002:2010 / ETA Guideline No. 006 edition March 2000, amended November 2012. For Systems of mechanically fastened flexible roof waterproofing membranes, paragraph 2.2 iii. Axial pull out performance from substrates and resistance to unwinding are shown in Annex 2. The wind uplift performance of roof waterproofing kits is mainly determined by the roofing membranes. Several full scale wind load tests with bituminous and polymeric membranes have been executed. The membranes are fixed with washers, washers with integrated sleeves and barbed washers in combination with fixings to substrates of steel sheets. The complete test reports may be obtained from Milles Teknikplast AB.

Protection against noise

Not relevant

Energy consumption and heat retention

Not relevant

Aspects of durability

The plastic fasteners produced of polypropylene satisfy the aspects of durability according to ETAG 006 ch. 5.3.7, see Annex 2. The Quadro tubes are assessed to have an acceptable resistance to brittleness according to ETAG 006 ch. 5.3.4, see Annex 2.

The carbon steel screws and the steel washers have a corrosion-protection of Ruspert coating. The fasteners correspond to corrosion protection according to ETAG 006 ch.5.3.7, see Annex 2. Test procedure is 15 cycles in accordance with DIN:50018:1997.

Identification

The characteristic values of detailed product dimensions and respective tolerances are stated in the manufacturer's technical dossier and form a part of the control plan for the factory production control. The tube washers are marked with Milletech®. All packaging must be marked with product type and batch number, including CE marking.

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

According to Decision 98/143/EC by the European Commission, the system 2+ of assessment and verification of constancy of performance applies. See Annex V to Regulation (EU) No. 305/2011.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at SINETF prior to CE marking.

Issued in Trondheim on 2018-12-15

By

SINTEF Building and Infrastructure



Hans Boye Skogstad
Approval Manager

Description of Milletech Fastening System

Table 1

Fastener type	Fig. no.	Function	Material
Quadro T	1	Tube washer with studs	Polypropylene
Quadro	2	Tube washer without studs	Polypropylene
Milletech Itech 40	3	Steel washer	Coated carbon steel
Milletech Itech 40 countersunk	4	Steel washer	Coated carbon steel
Milletech Itech 40 countersunk	5	Steel washer for use together with wood screws	Coated carbon steel
Milletech Itech 40	6	Steel washer for use together with wood screws	Coated carbon steel
Milletech Itech 4.8 T25	7	Screw for fixing in steel sheets	Coated carbon steel
Milletech Itech 5.1 T25	8	Screw for fixing in steel sheets	Coated carbon steel
Milletech Itech 6.1 T25	9	Screw for fixing in steel sheets	Coated carbon steel
Milletech Itech 6.1 T25 concrete	10	Screw for fixing in concrete	Coated carbon steel
Milletech Itech 8,0 T25	11	Screw for fixing in light weight concrete	Coated carbon steel
Milletech Itech 5.2 T25	12	Screw for fixing in wood	Coated carbon steel
Milletech Itech 5.2 PH2	13	Screw for fixing in wood	Coated carbon steel

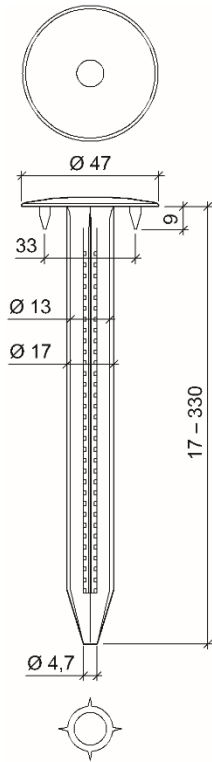


Fig. 1
Quadro – T fastening plug with studs

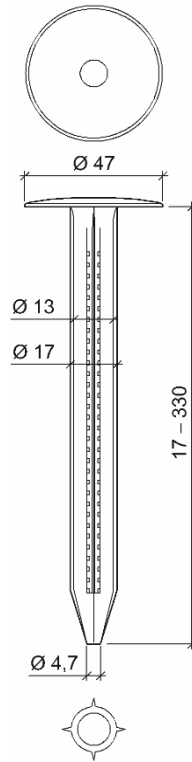


Fig. 2
Quadro fastening plug without studs

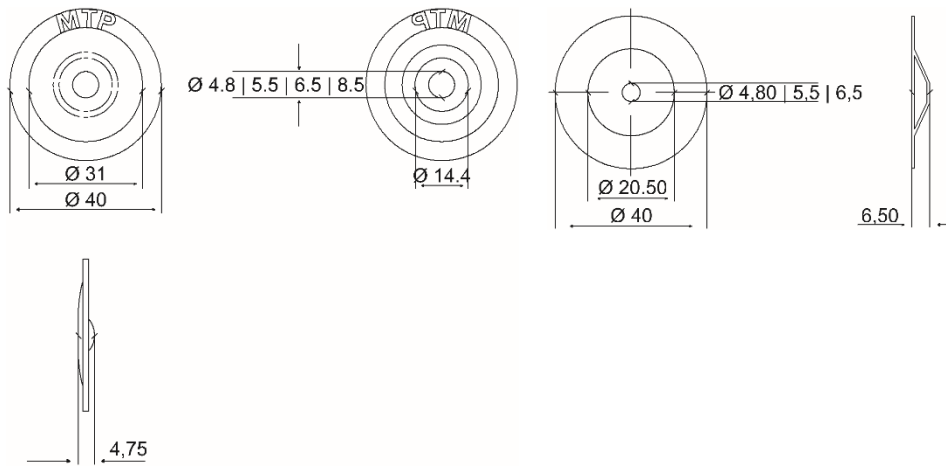


Fig. 3
Milletech Itech 40 steel washer

Fig. 4
Milletech Itech 40 countersunk steel washer

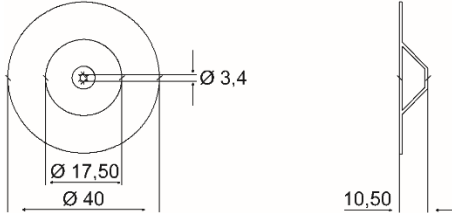
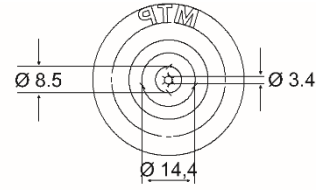
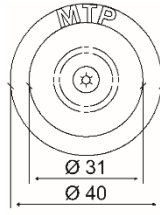


Fig. 5
Milletech Itech 40 countersunk steel washer for use together with wood screws

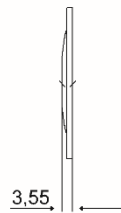


Fig. 6
Milletech Itech 40 steel washer for use together with wood screws

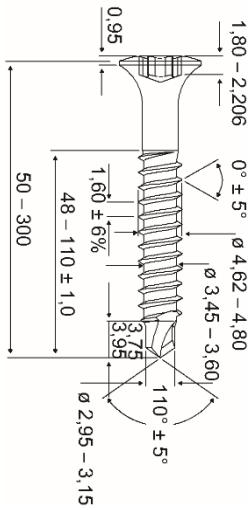
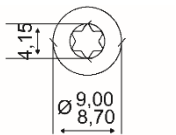


Fig. 7
Milletech Itech 4,8 T25 for fixing in steel sheets

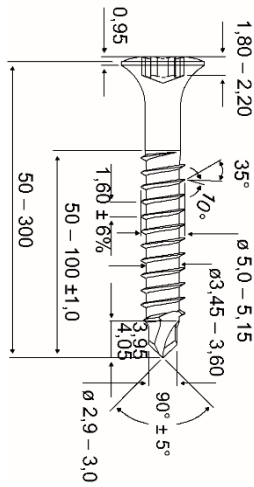
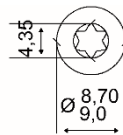


Fig. 8
Milletech Itech 5,1 T25 for fixing in steel sheets

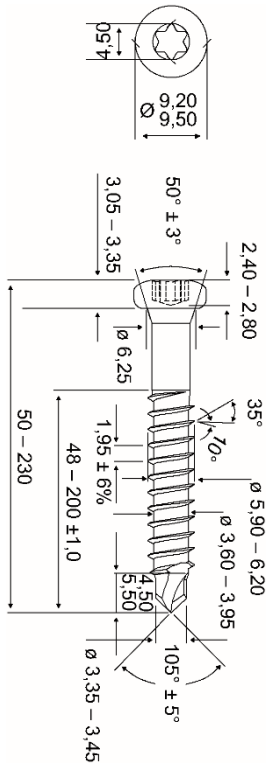


Fig. 9
Milletech Itech 6,1 T25 for fixing in steel sheets

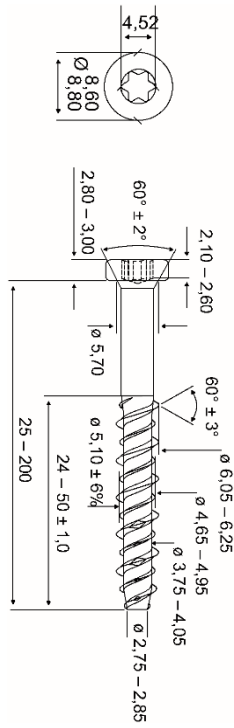


Fig. 10
Milletech Itech 6,1 T25 for fixing in concrete

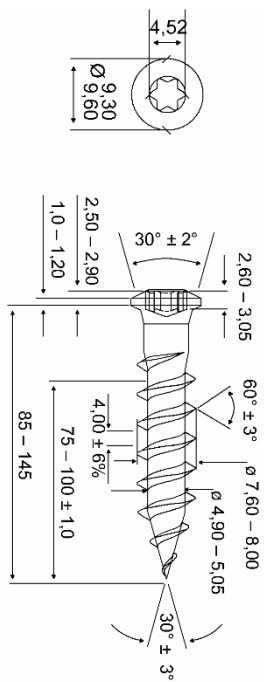


Fig. 11
Milletech Itech 8,0 T25 for fixing in light weight concrete

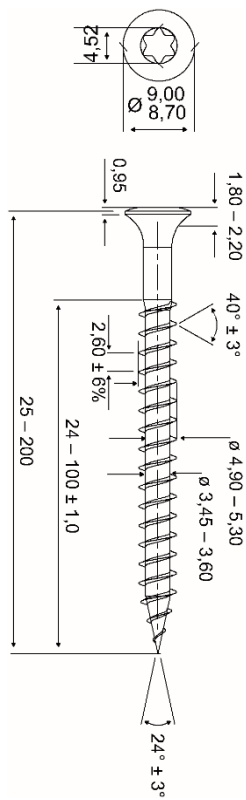


Fig. 12
Milletech Itech 5,2 T25 mm for fixing in wood

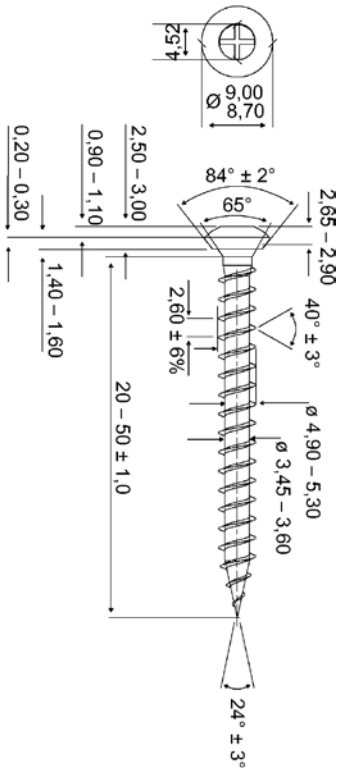


Fig. 13
Milletech Itech 5,2 PH2 for fixing in wood

Performance of Milletech Fastening system on different substrates

Characteristic values are calculated from the following formula:

$$W_{char}: \alpha (X_m - (k \times s))$$

where: W_{char} = characteristic y values of axial load resistance

α = corr. factor for tested substrate spec. compared with nominal substrate spec.

X_m = mean axial pull-out load for 10 specimens

$k = 1,92$ (according to Table D1 in EN-1990:2002)

s = standard deviation

Table 2: Profiled steel sheets substrate ¹⁾²⁾

Fastener	Substrate	Washer	Characteristic values of axial load resistance (kN)	Resistance to unwinding ETAG 006 Annex D cl. D.2.2 Durability ETAG 006 cl. 5.3.7 D.3.1
Milletech Itech 4.8 T25	Steel 0.65mm ²⁾	Milletech Itec 40	0.99	Approved
Milletech Itech 4.8 T25	Steel 0.70mm ¹⁾	Milletech Itec 40	0.81	Approved
Milletech Itech 4.8 T25	Steel 0.80mm ¹⁾	Milletech Itec 40	0.98	Approved
Milletech Itech 4.8 T25	Steel 0.90mm ¹⁾	Milletech Itec 40	1.55	Approved
Milletech Itech 4.8 T25	Steel 1.00mm ¹⁾	Milletech Itec 40	1.85	Approved
Milletech Itech 5.2 T25	Steel 0.70mm ¹⁾	Milletech Itec 40	1.13	Approved
Milletech Itech 6.1 T25	Steel 0.65mm ²⁾	Milletech Itec 40	2.01	Approved
Milletech Itech 6.1 T25	Steel 0.70mm ²⁾	Milletech Itec 40	1.80	Approved

¹⁾ Steel sheets, galvanized, min S280 according to EN 10147

²⁾ Steel sheets, galvanized, yieldstrength 420 MPa

³⁾ Obtained value from the axial load test in steel sheets substrates, table 2, and the pullover test, table 6, of washers is compared and the lowest of the two gives the characteristic value for the fastener / sleeve, washer combination of the application.

Table 3: Concrete substrate ¹⁾

Fastener	Substrate	Washer	Characteristic values of axial load resistance (kN)
Milletech Itech 6.1 T25 concrete	C25/30	Milletech Itec 40	1.60

¹⁾ See clause 2 regarding hole diameter and drill depth

Table 4: Light weight concrete substrate ¹⁾

Fastener	Substrate	Characteristic values of axial load resistance (kN)
Milletech Itech 8,0 T25	Light weight concrete	1.38

¹⁾ See clause 2 regarding hole diameter and drill depth

Table 5: Wood substrate

Fastener	Substrate	Washer	Characteristic values of axial load resistance (kN)
Milletech Itech 5.2 T25	Plywood 18 mm	Milletech Itec 40	2.80
Milletech Itech 5.2 T25	Roof boards	Milletech Itec 40	2.23

¹⁾ See clause 2 regarding minimum thickness of timber based materials

Table 6: Pullover test of washer

Fastener	Substrate	Characteristic values of axial load resistance (kN)	Durability ETAG 006 Annex D cl. 2.3 and cl. D.3.1
Milletech Itech 4,8 mm	Quadro T	4,83	Approved
Milletech Itech 4,8 mm	Quadro	2,88	Approved
Milletech Itech 4,8 mm	Quadro T	1,68	Approved
Milletech Itech 4,8 mm	Quadro	1,54	Approved
Milletech Itech 4,8 mm	Quadro T	2,48	Approved
Milletech Itech 4,8 mm	Quadro	5,30	Approved
Milletech Itech 5.2 T25	Quadro	1.40	Approved
Milletech Itech 8,0 T25	Quadro	1.37	Approved

¹⁾Obtained values from the axial load test in different substrates (table 2 - 5) and the pullover test (table 6) of washers compared and the lowest of the two gives the characteristic value for the fastener / washer combination of the application.