SINTEF

SINTEF Certification

No. 20019

Technical Approval

Issued first time: 21.09.2009
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Valid until: 01.11.2022
Provided listed on www.sintefcertification.no

SINTEF Building and Infrastructure confirms that

Rawlplug/Koelner Fastening System

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document

1. Holder of the approval

RAWLPLUG SA
Kwidzyńska 6
51-416 Wrocław, POLAND

2. Product description

Rawlplug/Koelner Fastening System is a system for mechanical fastening of roofing membranes for different underlays in external roof constructions, and consists of the following components, see fig. 1 and 2:

- GOK tube washer made of polypropylene, fig. 1a
- GOK-PLUS tube washer made of polypropylene with three studs, fig. 1b
- GOK-N tube washer made of polyamide, fig. 1c
- GOK- PLUS-N tube washer made of polyamide with three studs, fig. 1d
- WX screw for steel underlay, made of multilayer coated steel, fig. 2a.
- WO screw for steel underlay, made of multilayer coated steel, fig. 2b.
- WW screw for wood underlay, made of multilayer coated steel, fig. 2c.
- WBT screw for concrete underlay, made of multilayer coated steel, fig. 2d.

The product is CE marked in accordance with ETA-09/0346.

3. Fields of application

Rawlplug/Koelner Fastening System is used as mechanical fastening of bituminous and polymeric roofing membranes on flat, compact roofs with a supporting construction of steel sheathing, concrete or wood. Tube washers GOK-N and GOK- PLUS-N cannot be used together with bituminous membranes.

4. Properties

Anchor load capacities

Design load capacities for fastening in various roofing membranes are shown in Table 1. Table 2 shows the pullout capacity of screws from the substructure. The lowest value in Table 1 and 2 shall always be used.

Corrosion protection

All steel components in the Rawlplug/Koelner Fastening System have a corrosion protection corresponding to application category KLA as defined in SINTEF Byggforsk Design Guide No. 544.206, and which corresponds to corrosion protection according to ETAG 006, cl. 5.3.7 Annex D, 15 Kesternich-cycles.

All screws in the Rawlplug/Koelner Fastening System are made of steel and coated with zinc base and a multilayer top coat.

Safety against self-unscrewing

WX screw to steel has been tested for safety against self-unscrewing, and is considered safe in use. WO has not been tested for safety against self-unscrewing.

Application properties

Rawlplug/Koelner Fastening System has been evaluated as being acceptable for use under the following conditions:

- Installation at air temperatures down to –20 °C.
- Oblique loading when fastened at the edge of membrane sheets or at flaps.
- Strength against loads caused by dynamic wind loads
- Torch welding and moderate drying of asphalt roofing membrane
- Durability when applied together with PVC roofing membranes for both types of the tube washers, and durability when applied together with bituminous membranes for GOK and GOK-PLUS.

5. Environmental aspects

Substances hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

Waste treatment/recycling

The products shall be sorted as metal waste or residual waste on the building/demolition site. The products shall be delivered to an authorized waste treatment plant for material recovery (metal parts) and energy recovery (nonmetal parts).

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Environmental declaration

No environmental declaration (EPD) has been worked out for the product.

6. Special conditions for use and installation

General

Tube washers GOK-N and GOK-PLUS-N are not recommended to be used together with bituminous membranes, since tests have not shown satisfactory durability.

Anchor load design capacities

The number of fixing points is calculated according to SINTEF Building Research Design Sheet No. 544.206 or "TPF Informs No. 5", using the design capacities shown in Table 1 and 2. Axial design capacities are given based on method EOTA ETAG 006 Ch. 5.1.4.1 and Nordtest NT BUILD 307 method. The lowest value in Table 1 and 2 shall always be used.

The values are valid for Norwegian conditions with load factor $\gamma_f = 1{,}5$ and reduction factor $k_L = 0{,}9$ for safety class 1 according to NS 3490.

Fastening in metal sheets

Loadbearing profiled sheets made of steel shall have a minimum thickness of 0.7 mm. In particularly exposed areas the recommended minimum thickness is 0.8 mm for fixing roofing membranes to steel sheets.

Fastening in concrete

For fastening in concrete, WBT screw shall be used. The drill-hole diameter shall be 5 mm, the drill-hole depth shall be 40 mm and minimum anchorage depth shall be 30 mm.

Fastening in wood

For fastening in wood, WW screw shall be used. For this screw no pullout values are given. Pullout tests shall normally be performed on site.

Re-roofing

In case of re-roofing, where it may be difficult to assess the quality of the substructure, SINTEF generally recommends to perform pullout tests on site.

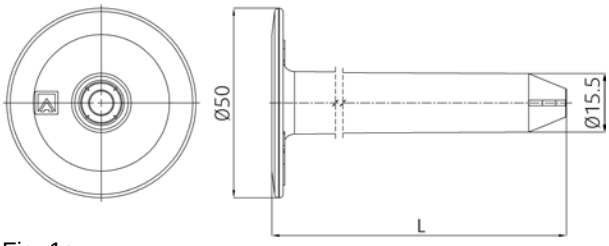


Fig. 1a
Tube washer GOK

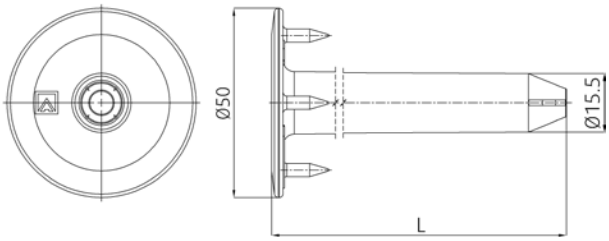


Fig. 1b
Tube washer GOK-PLUS

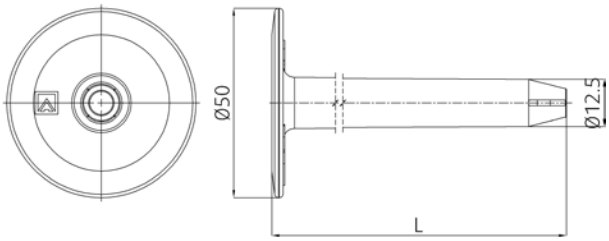


Fig. 1c
Tube washer GOK-N

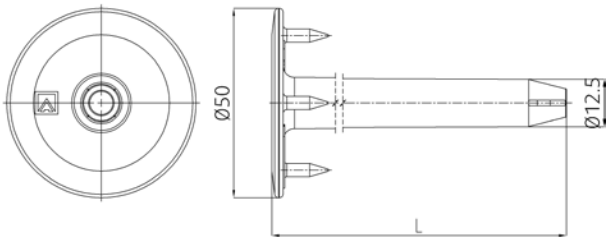
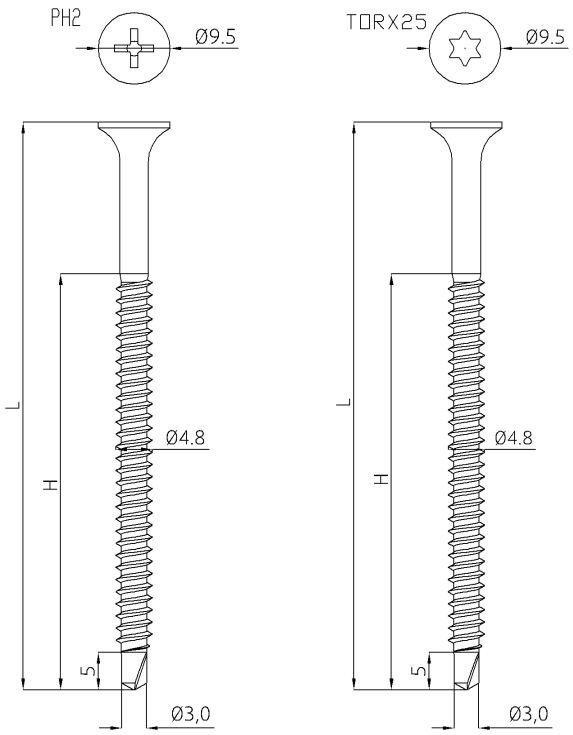
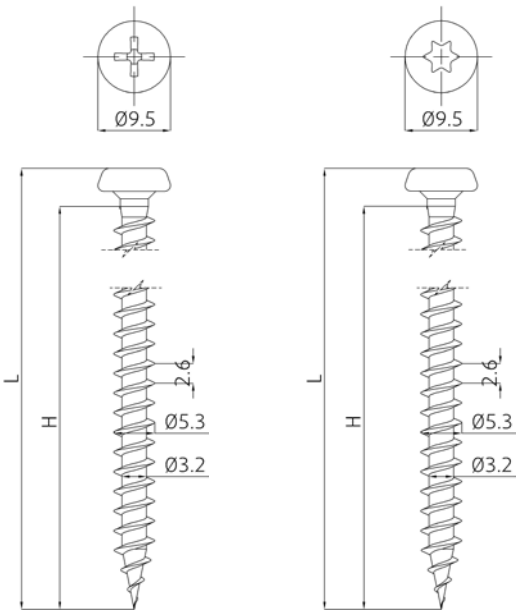


Fig. 1d
Tube washer GOK-PLUS-N



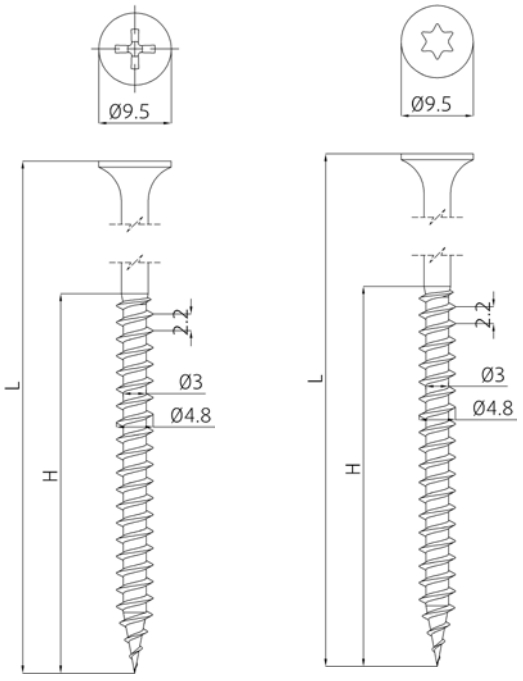
PH2 Torx

Fig. 2a
WX screw for steel



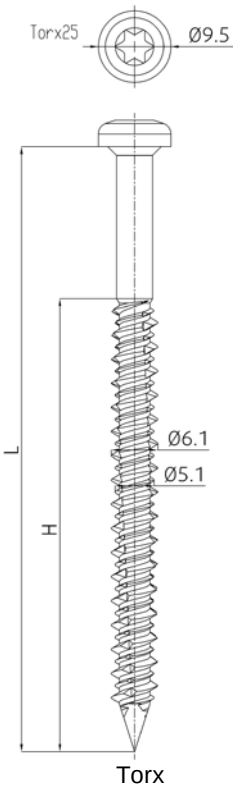
PH2 Torx

Fig. 2c
WW screw for wood



PH2 Torx

Fig. 2b
WO screw for steel



Torx

Fig. 2d
WBT screw for concrete

Table 1
Axial design capacity in ultimate limit state for four tube washers fixing various roofing membranes.

Washer	Roofing	Capacity* (N/plug)
GOK	Icopal Base 511 PG and Icopal Top 500 P	950
	Icopal Base 500 PG and Icopal Top 500 P	950
	Icopal Base 411P and Icopal Top 500 P	950
GOK-PLUS	Protan SE 1.2 roofing membrane	720
GOK-N	Protan SE 1.2 roofing membrane	760
GOK-PLUS-N	Protan SE 1.2 roofing membrane	990

*) The given design capacities shall be used both when the test results are given according to NT Build 307, ETAG 006 and EN 16002 when a national safety factor of 1,3 is used for Norwegian conditions.

Table 2
Design capacity in ultimate limit state for steel screws for fixing in different underlays

Fastener	Substructure	Design capacity (N/fastener)
WO	Steel, thickness 0.75 mm	860
WO	Wood, C24, thickness 24 mm	1490
WO	BFU 100, thickness 20 mm	1220
WO	OSB/3, thickness 18 mm	830
WX	Steel, thickness 0.70 mm	770
WX	Steel, thickness 0.75 mm	790
WX	Steel, thickness 0.88 mm	870
WX	Steel, thickness 1,00 mm	950
WX	Steel, thickness 1,20 mm	1170
WBT	Concrete	3200
WBT	Wood, C24, thickness 24 mm	1620
WBT	BFU 100, thickness 20 mm	1160
WBT	OSB/3, thickness 18 mm	740

7. Factory production control

The tube washers are manufactured in Polen for RAWLPLUG SA. The screws are manufactured in China and Taiwan for RAWLPLUG SA.

The holder of the approval is responsible for the factory production control in order to ensure that the product is produced in accordance with the preconditions applying to this approval.

The manufacturing of the product is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

Rawlplug SA has a quality system certified by TÜV Rheinland according to ISO 9001, certificate no. 01 100 1331958/1 and ISO 14001, certificate no. 01 104 087143.

8. Basis for the approval

Fastening capacity in roofing membranes

The fastening capacity in various roofings is based on test results from wind load tests according to method Nordtest NT Build 307 or according to the procedures shown in EOTA ETAG 006. The test results are documented in the following reports:

- SINTEF Building and Infrastructure. Report B22336 dated 15.04.2008
- SINTEF Building and Infrastructure. Report 3D053001 dated 29.12.2008
- SINTEF Building and Infrastructure. Report O22218 dated 29.10.2007

Fastening capacity in the underlay

Fastening capacity in steel plates is based on test results according to ETAG 006 § 5.3.4.1. The test results are documented in the following reports:

- Würfel Technischer Prüfservice. Report 815 Koelner, dated 08.10.2007
- Würfel Technischer Prüfservice. Report 814 Koelner, dated 08.10.2007
- Würfel Technischer Prüfservice. Report 811 Koelner, dated 08.10.2007
- SINTEF Building and Infrastructure. Report 3D037359 dated 22.06.2012

Fastening capacity in wood underlay C24, BFU and OSB/3 plates is based on test results according to ETAG 006 § 5.3.4.1. The test results are documented in the following reports:

- Würfel Technischer Prüfservice. Report1218.3 Koelner, dated 31.10.2012
- Würfel Technischer Prüfservice. Report 1218.4.1 Koelner, dated 31.10.2012

Durability

The corrosion protection of screws has been tested according to ETAG 006 cl. 5.3.7.1 The test results are documented in Report 815 Koelner dated 08.10.2007, from MPA NRW Dortmund.
Tube washer GOK and GOK-N has been tested for durability together with bituminous roofing membrane and polymeric roofing membrane, and the results are documented in Report 3D0530 dated 15.06.2009 from SINTEF Building and Infrastructure.

Safety against self-unscrewing

Safety against self-unscrewing is documented in Report Koelner 624.3 dated 13.09.2005, from Würfel Technischer Prüfservice.

9. Marking

Tube washers in the fastening system shall be marked with the approval holder's product name. All packages are marked with product designation and time of manufacture. SINTEF's approval mark for SINTEF Technical Approval No. 20019 may also be applied.

The product is CE marked in accordance with ETA 09/0346.

Approval mark

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402

for SINTEF Building and Infrastructure

Marius Kvalvik

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Approval Manager