



NBI Technical Approval

Norwegian Building Research Institute

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Side: 1 of 6

Teleskop / Iso-Fast Fastening System

is approved by Norwegian Building Research Institute with properties, field of application and conditions as stated in this document.

1. Holder of approval

SFS intec AS, Fastening Systems
Solheimsveien 44
N-1473 Lørenskog
Tel.: 67 92 14 40 Fax.: 67 92 14 50
www.sfsintec.biz/no

2. Manufacturers

Iso-Fast: SFS intec AG, Switzerland
Teleskop: Approved manufacturers given in the product control description.

3. Product description

Teleskop/Iso-Fast Fastening System for roofing membranes consists of steel washers, plastic washers with integrated sleeve (fastening plugs), and accompanying nails and screws. The components of the system are illustrated in Fig. 1-10, and include the following:

- Teleskop plastic fastening plugs
- Teleskop washers
- Iso-Fast washers
- Iso-Fast concrete nails
- Teleskop concrete nails
- SFS concrete screws
- Iso-Fast screws for light weight concrete
- Iso-Fast screws for metal sheets
- Iso-Fast screws for wood
- Teleskop roof screw

The material of Teleskop fastening plugs Ø 42 and Ø 45 is a copolymer of polypropylene designated PP 320 FB. Teleskop TP 50 and Dracula TPD 50 is made of nylon.

4. Field of application

Teleskop/Iso-Fast Fastening System is used for mechanical fixing of bitumen- and plastic-based roofing membranes, on roofs made of profiled steel sheets, concrete, light weight concrete, or wooden materials.

5. Properties

Anchorage capacity

Table 1 shows recommended design capacities for the fastening in various roofing materials.

Tables 2 and 3 show anchorage capacities into the substructure for screws and nails. Whenever the values in Tables 2 and 3 are lower than corresponding values in Table 1, the lower value must be used. The method for calculating the necessary number of fastening points is given in NBI's Building Research Design Sheet No. 544.206, and in "TPF Informs No. 5 and 5B."

Protection against corrosion

Table 4 shows the corrosion protection for the individual components of the fastening system, and the corresponding application categories as given in Building Research Design Sheet No. 544.206.

Durocoat corrosion protection is a multi-layer organic coating, applied and hardened at high temperature. Used together with aluminium or stainless-steel washers, the coating is assessed to give acceptable low risk for galvanic corrosion when applied in category KLA.

Ceramic coating used with aluminium or stainless-steel washers is assessed to give acceptable low risk for galvanic corrosion when applied in category KL.

Safety against self-unscrewing

Safety against self-unscrewing has been tested in accordance with NBI Method 162/90. Iso-Fast IT3 - C self-drilling screws and Iso-Fast ID 82 x 40 washers are classified as being safe against self-unscrewing. Iso-Fast IT2 - C self-drilling screws with smaller drill tip than IT3 - C has similarly been classified as being safe against self-unscrewing.

Application properties

Teleskop/Iso-Fast Fastening System has been evaluated as being acceptable for use under the following conditions:

- Installation at temperatures down to -20°C .
- Oblique loading when used at the edge of membrane sheets or at flaps.
- Impact resistance at loads caused by movements in the membrane.
- Torch-on welding and moderate drying-out of asphalt roofing felt.
- Ageing in connection with PVC roofing sheet and asphalt roof covering.

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Reference: Approv.: O8226/O14113 Contr.: O8311

Subject: Roofing membrane fasteners

Main office: Norwegian Building Research Institute
P.O.Box 123 Blindern, N-0314 Oslo
Tel.: +47 22 96 55 55 Fax: +47 22 69 94 38

Trondheim div.: Norwegian Building Research Institute
Høgskoleringen 7, N-7491 Trondheim
Tel.: +47 73 59 33 90 Fax: +47 73 59 33 80

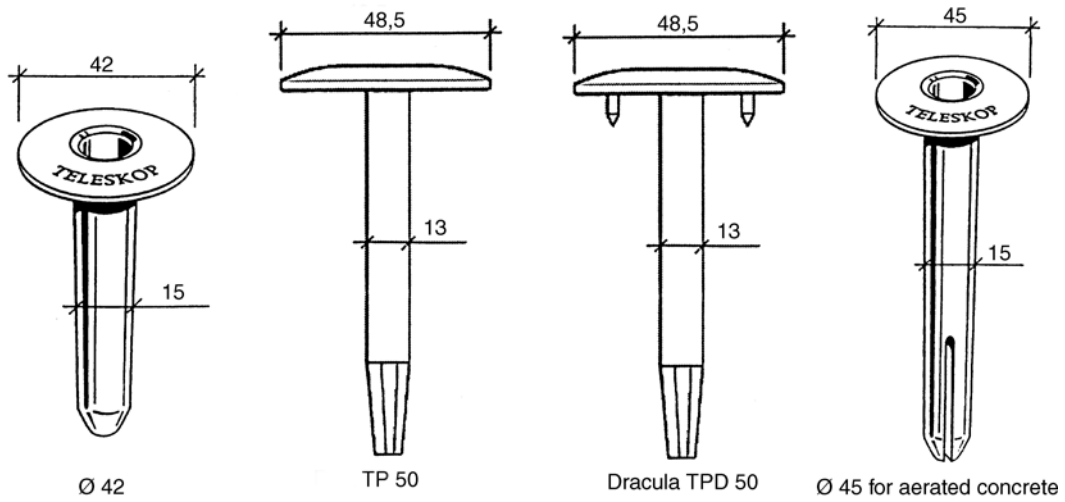


Fig. 1
Teleskop plastic fastening plugs

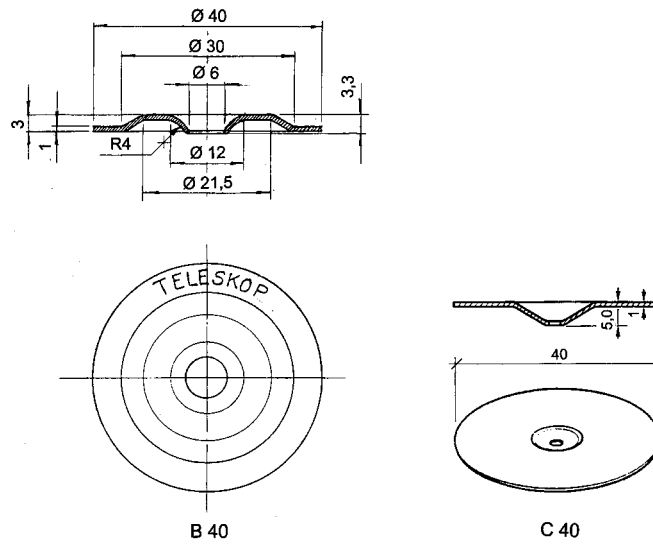


Fig. 2
Teleskop steel washers (used together with all steel- and wood screws)

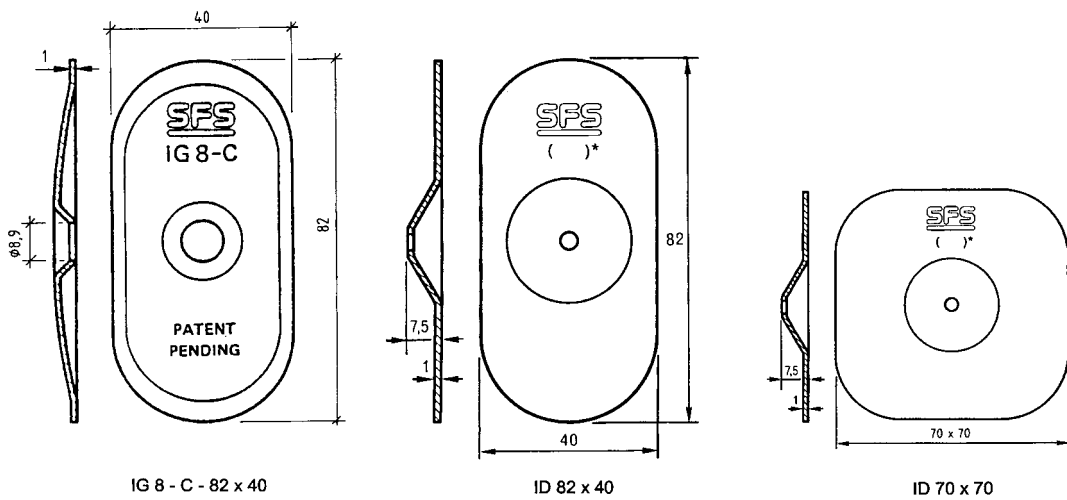


Fig. 3
Iso-Fast steel washers (used together with screw 16R) (Used together with all steel- and wood screws)

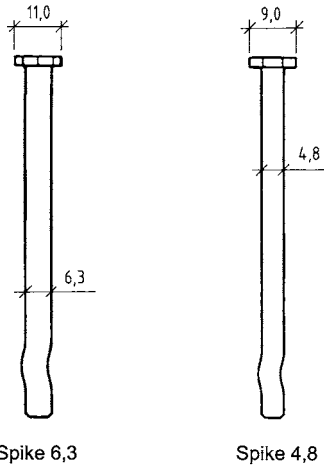


Fig. 4
Iso-Fast Spike concrete nails

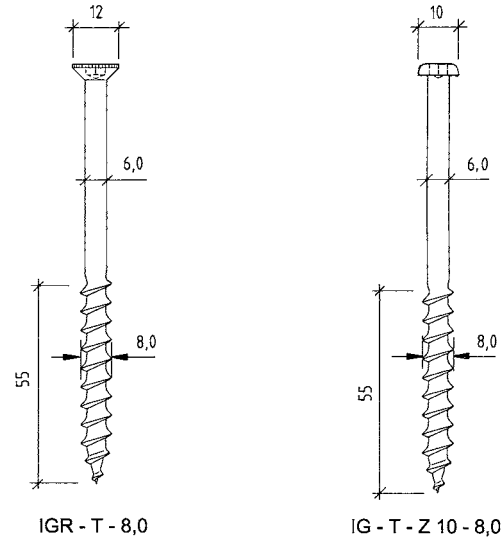


Fig. 7
Iso-Fast screws for light weight concrete

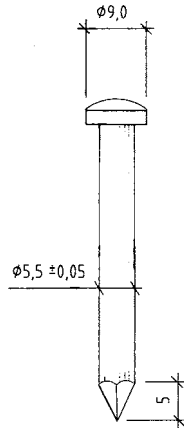


Fig. 5
Teleskop concrete nail

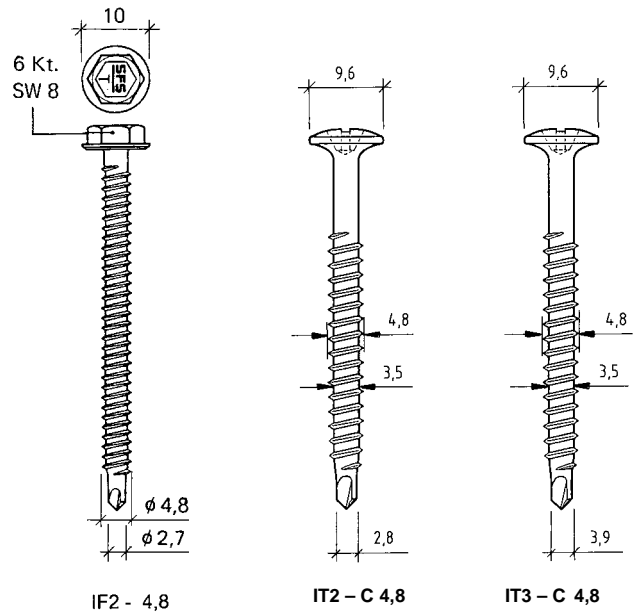
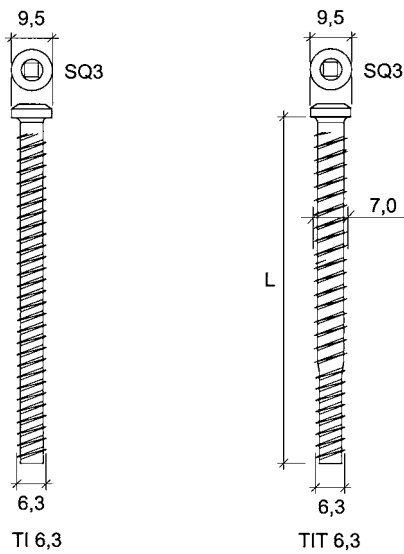


Fig. 8
Iso-Fast self-drilling nails for metal sheets



SFS concrete screws

Fig. 6

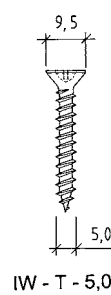


Fig. 9
Iso-Fast self-drilling screw for wood



Fig. 10
Telskop roof screw

Table 1

Design capacities at ultimate-limit state given in N/pcs. for washers and plugs in Teleskop / Iso-Fast Fastening System. The capacities are given for various types of roofing materials, and must not exceed the design fastening capacities of screws/nails in the substructure.

Roofing/Fastning Systems	Teleskop 42 fastening plug	Teleskop TP 50 fastening plug	Teleskop Dracula TDP 50 fastening plug	Teleskop 45 fastener plug for porous concrete	Teleskop B40 steel washer	Teleskop C40 steel washer	Iso-Fast ID 70 x 70 steel washer	Iso-Fast ID 82 x 40 steel washer	Iso-Fast IG 8 - C 82 x 40 steel washer
<i>Asphalt roof covering:</i>									
Icopal system 200/250	800 ¹⁾ /900 ²⁾			800 ¹⁾ /900 ²⁾	800 ¹⁾ /1000 ²⁾	800 ¹⁾ /900 ²⁾			800 ¹⁾ /1000 ²⁾ / 1600 ³⁾
Icopal Base			1000						
Icopal Mono	900	1000	1100	900	1200	1100			1100 ²⁾ /1700 ³⁾
Isola dual-layer							1500	1100	
Isola Mestertekk	900	1000	1100	900					
Isola Elastofol		1100							
Derbigum SP single layer	900	1000	1100	900	1100	1000			
Derbigum Artic foundation	800 ¹⁾ /900 ²⁾			800 ¹⁾ /900 ²⁾	800 ¹⁾ /900 ²⁾	800 ¹⁾ /850 ²⁾			
Index Uno				750					
Index Supertekk			1100						
<i>In edge of lane:</i>									
Protan SE	700	900	1000 ⁴⁾	700	650	650		650	900
Protan EX (with felt)	900				900				
Sarnafil S 328	700		1000 ⁴⁾	700	650	650			
Alkorplan 35276	700		1000 ⁴⁾	700	650	650		650	
Alkorflex 35096	700			700	650	650		900	
Sikaplan 12 VG	700		1050 ⁴⁾	700	650	650		650	
Ektafol PV	700		1000 ⁴⁾	700	650	650			
Ektafol PF+ (w/felt)	900		1100	900	900	850			
Carbofol	650			650	650	650		650	
<i>Through membrane:</i>									
Protan SE	1000			1000	1000	1000	1500	1100	
Sarnafil S 328	1000			1000	1000	1000			
Alkorplan 35376	1000			1000	1000	1000	1500	1100	
Alkorplan 35096	1000			1000	1000	1000	1500	1100	
Sikaplan 12 VG	1000			1000	1000	1000	1500	1100	
Ektafol PV	1000			1000	1000	1000			
Ektafol PF+	1000			1000	1000	1000			
Carbofol	700			700	800	800	900	900	
<i>Through over-lap joint:</i>									
Värnamo Superseal FR	1300			1300	1300				

¹⁾ This value is used for 100 mm welded overlap joint in the lower layer of a dual-layer system

²⁾ This value may be used for 120 mm welded overlap joints

³⁾ This value is used for 150 mm overlap joints or for when fasteners go through the membrane (not edge of lane)

⁴⁾ Tested with 130 mm overlap joint, 40 mm welded.

Table 2

Design capacities at ultimate-limit state in N/pcs. for fastening in profiled steel sheets.

Steel sheet thickness mm	Iso-Fast IT2-C 4.8 x L For steel sheet thickness 0.65 – 1.25 mm	Iso-Fast IT3-C 4.8 x L For steel sheet thickness 1.0 – 1.5 mm	Iso-Fast IF2 4.8 x L For steel sheet thickness 1.0 – 1.5 mm	Teleskop roof screw For steel sheet thickness 0.65 – 1.0 mm
0,65	800		800	850
0,7	950		950	1000
0,8	1200		1200	1250
0,9	1500		1500	1500
1,0	1800	1600	1800	1750

Table 3

Design capacities at ultimate-limit state in N/pcs. for fastening in concrete and aerated concrete.

Fastener and roof structure	Design capacity (N/pcs)
<i>SFS TIT / TI concrete screw 6.3 x L</i>	
• in 50 mm plate, class C55	4300
<i>Teleskop tempered steel nail 5.5 x L</i>	1300
<i>Iso-Fast spike</i>	
• 4.8 x L	1300
• 6.3 x L in 50 mm plate	2900
• 6.3 x L in solid structure	3900
<i>Iso-Fast IGR-T 8 x 65</i>	
• aerated concrete 450 kg/m ³	500
• aerated concrete 500 kg/m ³	700
<i>Iso-Fast IG-T-Z10 8x110</i>	
• aerated concrete 450 kg/m ²	500
• aerated concrete 500 kg/m ²	700
<i>Teleskop Ø45</i>	
• aerated concrete 450 kg/m ³	500
• aerated concrete 500 kg/m ³	700

6. Conditions for use and application

Nail fixings

For Teleskop concrete nails the drill hole diameter shall be 5.0 mm. The drill hole depth should be 40 mm, unless special precautions are taken regarding inspection. Minimum anchorage depth shall be 20 mm.

For Iso-Fast Spike 4.8 the drill hole diameter shall be 4.8 mm, and the depth minimum 40 mm. The anchorage depth shall be minimum 28 mm.

For Iso-Fast Spike 6.3 the drill hole diameter shall be 6.3 mm, and the depth minimum 40 mm. The anchorage depth shall be minimum 32 mm.

This means that fixings in 50 mm thick concrete without penetration require very precise length/depth control.

Screw fixings

For concrete screws SFS TI and TIT the drill hole diameter shall be 5.0 mm. The drill hole depth should be 30 mm, unless special precautions are taken regarding inspection. Minimum anchorage depth shall be 20 mm.

When installing Teleskop Ø45 in aerated concrete the drill hole diameter shall be 15 mm, and the drill hole depth minimum 65 mm.

Load bearing profiled steel sheets must be at least 0.7 mm thick when roofing membranes are to be fastened directly to the sheets. In places with strong wind conditions 0.8 mm thickness is recommended in order to ensure sufficient anchorage for the screws.

Washers

Teleskop 40 washer without recess must only be used when the roofing membrane lies on a firm underlay, f.ex. wood-based sheathing or thermal insulation made of EPS.

Table 4

Application category as specified in NBI's Building Research Design Sheet 544.206

Fastener	Corrosion protection	Appl. category
<i>Steel washers</i>		
Teleskop washer B40	20 µm AlZn	KLA
Teleskop washer B40	Stainless steel	KLA
Teleskop washer C40	20 µm AlZn	KL
Iso-Fast washers	20 µm AlZn	KL
<i>Nails and screws</i>		
Iso-Fast Spike	Durocoat	KLA
Teleskop concrete nail	Stainless steel	KLA
SFS concrete screws	Durocoat	KLA
Iso-Fast screws	Durocoat	KLA
Iso-Fast IT2-S-C-4,8	Stainless steel, A4	KLA
Teleskop roof screw	Ceramic coating	KLA
<i>Fastener plugs</i>	Plastic	KLA

Re-roofing

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

7. Factory production control

Teleskop / Iso-Fast Fastening System is subject to supervisory production and product control according to contract regarding NBI Technical Approval.

SFS intec AS, Lørenskog, and the manufacturers SFS intec AG, Switzerland, and SFS intec, France, all have management quality systems certified by SQS in accordance with ISO 9001:2000 and ISO 14001:1996.

8. Basis for the approval

Fastening capacities in the roofing membranes are based on system testing in accordance with the test methods NT Build 307 and NBI 162/90, supplemented by comparable results from simplified tests according to NBI 163/91. The test results are given in the following reports from Norwegian Building Research Institute:

- O 3524B, May 1990
- O 3524C, June 1990
- O 3662B, January 1992
- O 8226, April 1997
- O 14113-B, 14.10.2002
- Letter from NBI dated 21.11.2002
- O 14254, 11.08.2003

Fastening capacity in substructures made of steel sheets, concrete or aerated concrete has been tested in accordance with method NT Build 306. The test results are given in the following reports from Norwegian Building Research Institute:

- O 3049, August 1986
- O 3524A, April 1990
- O 3709A, June 1992
- O 3759A, March 1993
- O 8715, dated 01.02.2001

Corrosion protection of washers and screws with Durocoat corrosion protection has been tested at the National Institute of Technology (TI), report J. No. 320A-3586. The testing was carried out in a Kesternich chamber, 15 cycles with 2.0 l SO₂ in accordance with SPRI modified procedure.

Corrosion protection for Teleskop B40 steel washer, Iso-Fast Spike and Iso-Fast IT2-C have also been tested at Norwegian Building Research Institute, see report O 8311-K2002 dated 23.09.2002.

9. Marking

All components of the fastening system must be marked with the name of the approval holder, or the abbreviation "T." All packaging shall be furnished with a product description and the date of manufacture. NBI's approval mark for NBI Technical Approval No. 2137 may also be applied.



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 the NBI beyond the provisions of Norwegian Standard NS 3403.

11. Technical management

Project manager for this approval is Knut Noreng, Norwegian Building Research Institute, Dep. of Materials and construction - Trondheim.

Norwegian Building Research Institute

A handwritten signature in black ink, appearing to read "Trond Ø. Ramstad".

Trond Ø. Ramstad
Head of Approvals