

Deutsches Institut für Bautechnik
Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt

Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des
öffentlichen Rechts

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Deutsches
Institut
für
Bautechnik

DIBt



Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-09/0346

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

KOELNER Flachdachbefestigungselemente
Flat Roof Fasteners KOELNER

Zulassungsinhaber
Holder of approval

RAWLPLUG S.A.
Kwidzynska 6
51-416 WROCLAW
POLEN

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Befestigungselemente für Dachabdichtungssysteme
Fasteners for flexible roof waterproofing membrane systems

Geltungsdauer:
Validity: vom
from
bis
to

21 June 2013
21 June 2018

Herstellwerk
Manufacturing plant

RAWLPLUG S.A.
Kwidzynska 6
51-416 WROCLAW
POLEN

Diese Zulassung umfasst
This Approval contains

60 Seiten einschließlich 54 Anhänge
60 pages including 54 annexes

Diese Zulassung ersetzt
This Approval replaces

ETA-09/0346 mit Geltungsdauer vom 01.12.2009 bis 01.12.2014
ETA-09/0346 with validity from 01.12.2009 to 01.12.2014



Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by Article 2 of the law of 8 November 2011⁵;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "Mechanically fastened flexible roof waterproofing membranes", ETAG 006.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities L 40, 11 February 1989, p. 12
² Official Journal of the European Communities L 220, 30 August 1993, p. 1
³ Official Journal of the European Union L 284, 31 October 2003, p. 25
⁴ *Bundesgesetzblatt Teil I 1998*, p. 812
⁵ *Bundesgesetzblatt Teil I 2011*, p. 2178
⁶ Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the products and intended use

1.1 Definition of the construction products

The construction products are mechanical fasteners. The fasteners comprise a screw made of galvanic coated carbon steel and a washer with or without integrated sleeve. The washers without integrated sleeve are made of galvanic coated carbon steel whereas the washers with integrated sleeve are made of plastic materials (polyamide or polypropylene).

1.2 Intended use

The fasteners are intended to be used for the fastening of flexible roof waterproofing membranes according to ETAG 006. The possible substructures are steel decks, timber or concrete.

The provisions made in this European technical approval are based on an assumed working life of the fasteners of 10 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

In order to use the fasteners for systems of mechanically fastened flexible roof waterproofing membranes a separate ETA according to ETAG 006 is necessary for the entire roof waterproofing system.

2 Characteristics of the products and methods of verification

2.1 Characteristics of the products

The fasteners shall correspond to the information given in Annexes 1 to 53.

The material properties, dimensions and tolerances not indicated in Annexes 1 to 53 shall correspond to the information laid down in the technical information⁷ to this European technical approval.

2.2 Safety in use (ER 4)

The characteristic values of the axial load resistance of the fasteners are given in Annex 54. The values were determined by axial loading tests according to ETAG 006.

The fasteners are deemed to satisfy the requirements of ETAG 006 concerning unwinding. This was evaluated on the basis of the existing field experience of the manufacturer.

2.3 Aspects of durability

The durability requirements of ETAG 006 (resistance to corrosion of metallic fasteners, impact resistance and brittleness of plastic fasteners before and after heat ageing, requirements for results of Charpy tests for plastic materials before and after heat ageing) are satisfied for the galvanic coated carbon steel, polyamide or polypropylene components of the fasteners.

⁷ The technical documentation is deposited with Deutsches Institut für Bautechnik and as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure is handed over to the approved bodies.

All coated carbon steel components resisted to 15 cycles of the test procedure described in ETAG 006 (Kesternich test) and did not show more than 15 % surface corrosion.

The test results of the tests to check the impact resistance and brittleness of the plastic components showed a drop height of more than 1.0 m before and after heat ageing of these components. Furthermore the results of the corresponding Charpy tests after heat ageing did not show any significant decline compared to the results before heat ageing.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 98/143/EC of the European Commission⁸ system 2+ of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
 - (1) initial type-testing of the products;
 - (2) factory production control;
 - (3) testing of samples taken at the factory in accordance with a prescribed test plan.
- (b) Tasks for the approved body:
 - (4) certification of factory production control on the basis of:
 - initial inspection of factory and of factory production control;
 - continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.⁹

⁸ Official Journal of the European Communities L 42 of 14.02.1998

⁹ The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of "Fasteners for flexible roof waterproofing membranes" in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction products are in conformity with the provisions of this European technical approval.

3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on each packaging of fasteners. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European technical approval,
- the name of the product.

4 Assumptions under which the fitness of the products for the intended use was favourably assessed

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

European technical approval

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4.2 Installation

The installation is carried out according to the manufacturer's instructions. The manufacturer hands over the assembly instructions to the assembler.

In order to use the fasteners for systems of mechanically fastened flexible roof waterproofing membranes a valid ETA according to ETAG 006 is issued for the entire roof waterproofing system. The ETA according to ETAG 006 covers the wind uplift resistance of the entire system as well as the product characteristics of the components of the system.

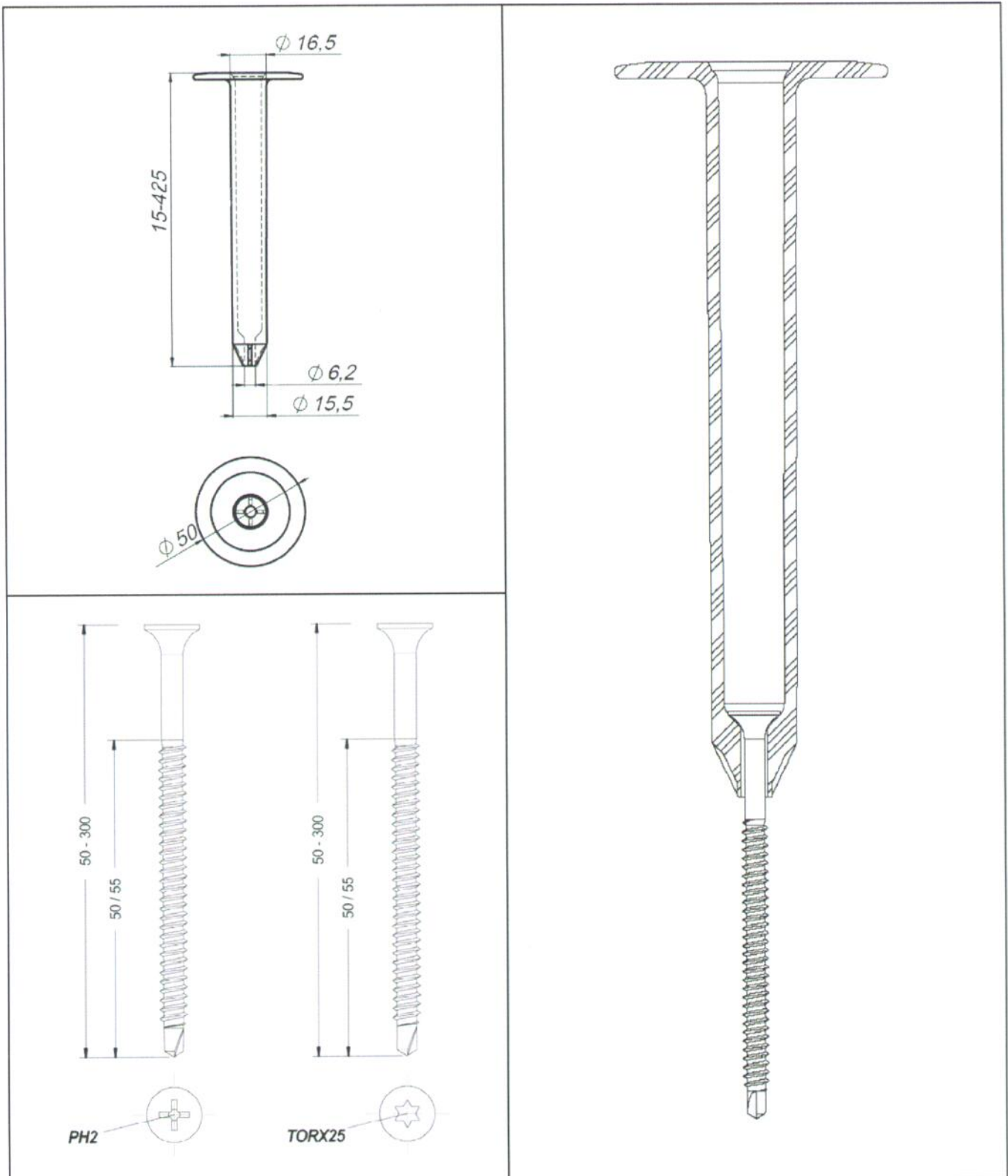
The conformity of the installed fastener with this ETA is attested by the executing company.

5 Indications to the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2 and 4 is given to those who are concerned. The information may be given by reproduction of the European technical approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Spohn

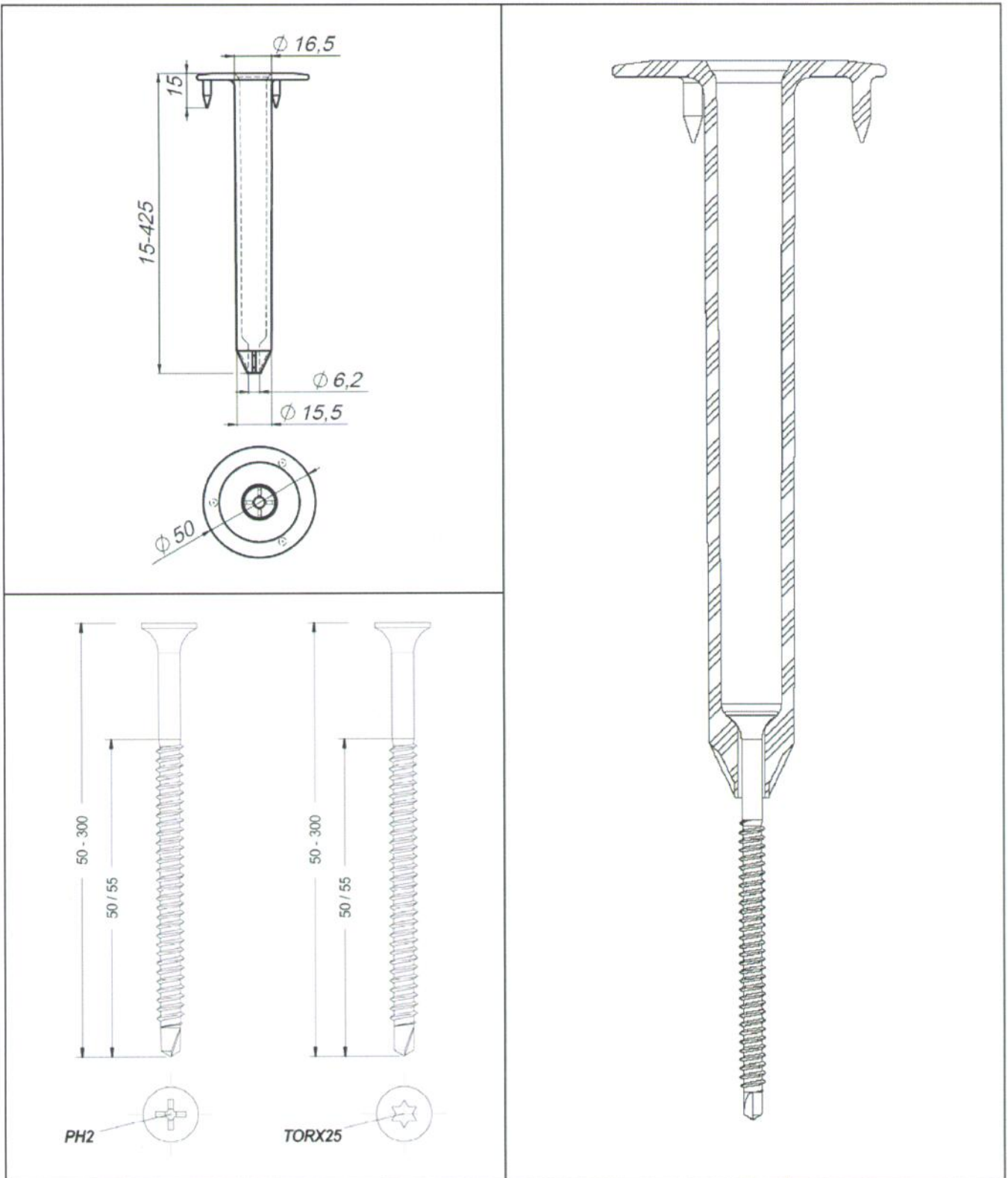


KOELNER S.A. Flat Roof Fasteners

Combination 1

Mount: GOK
 Fastener: WX (PH2- or Torx25-Drive)

Annex 1

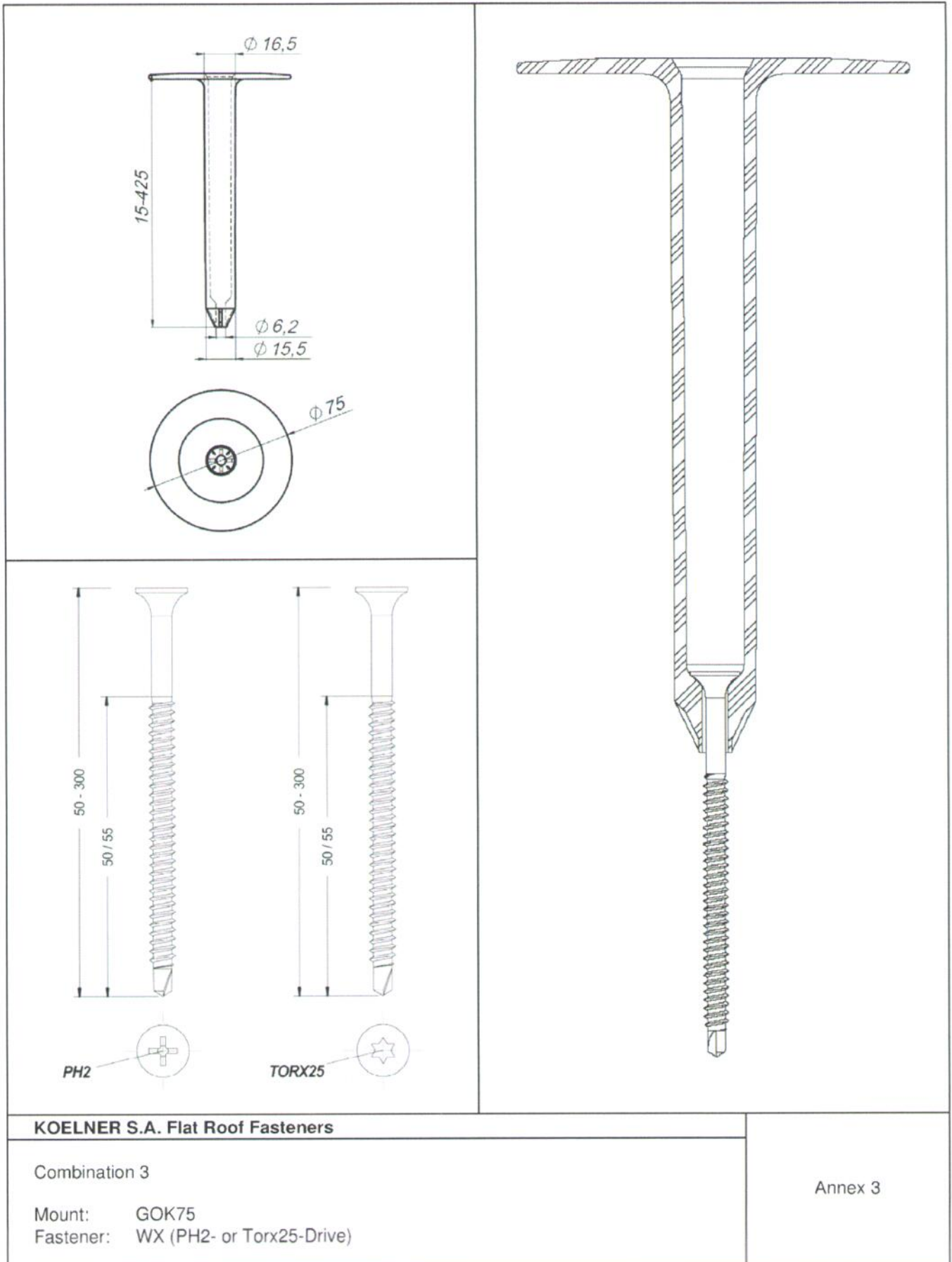


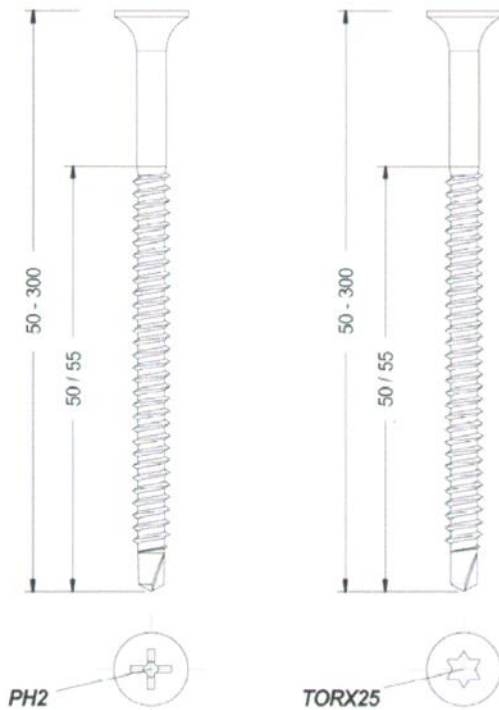
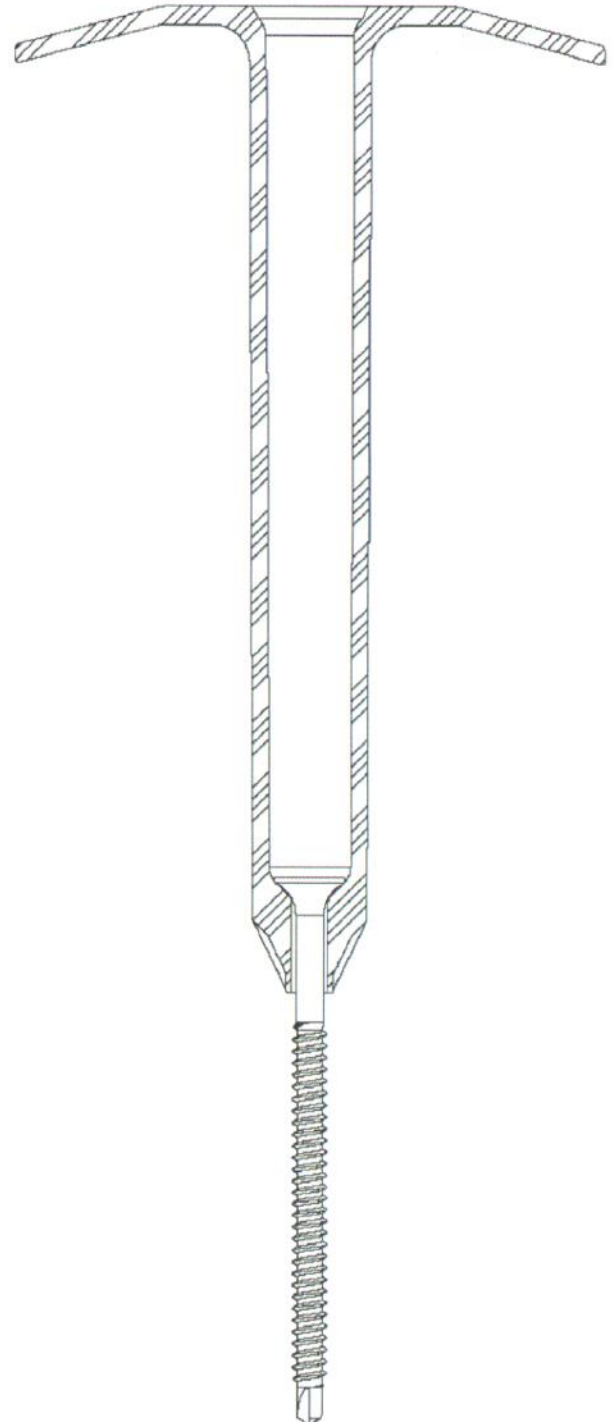
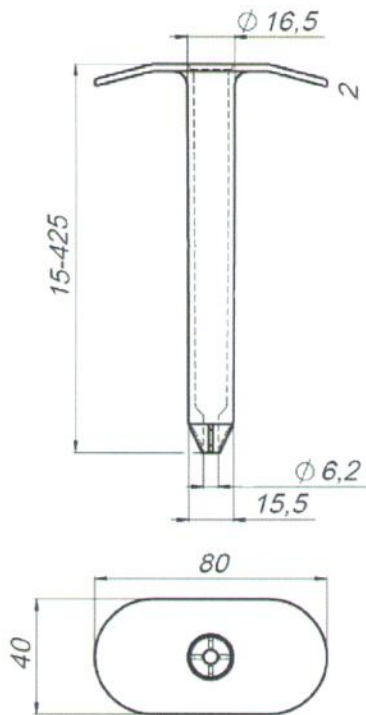
KOELNER S.A. Flat Roof Fasteners

Combination 2

Mount: GOK-PLUS
Fastener: WX (PH2- or Torx25-Drive)

Annex 2





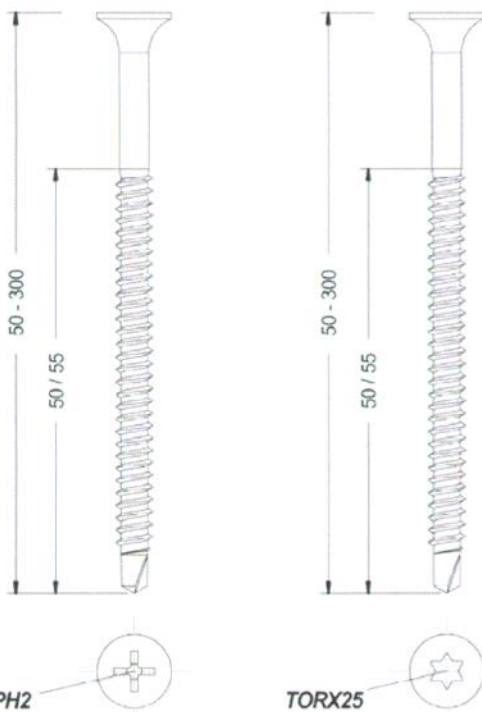
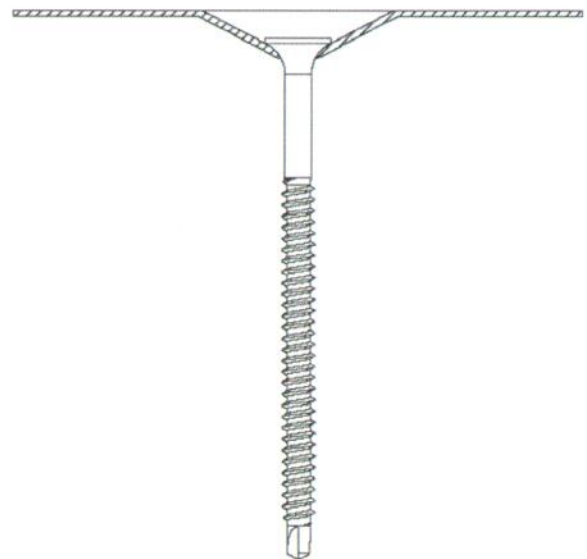
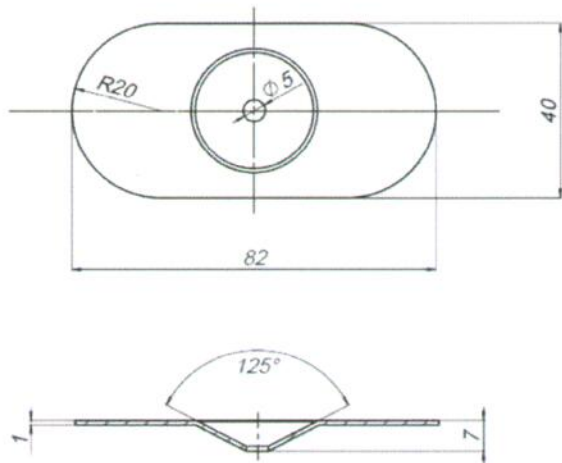
KOELNER S.A. Flat Roof Fasteners

Combination 4

Mount: GOW
Fastener: WX (PH2- or Torx25-Drive)

Annex 4

<p>KOELNER S.A. Flat Roof Fasteners</p>		
<p>Combination 5 Mount: GOW-PLUS Fastener: WX (PH2- or Torx25-Drive)</p>		<p>Annex 5</p>



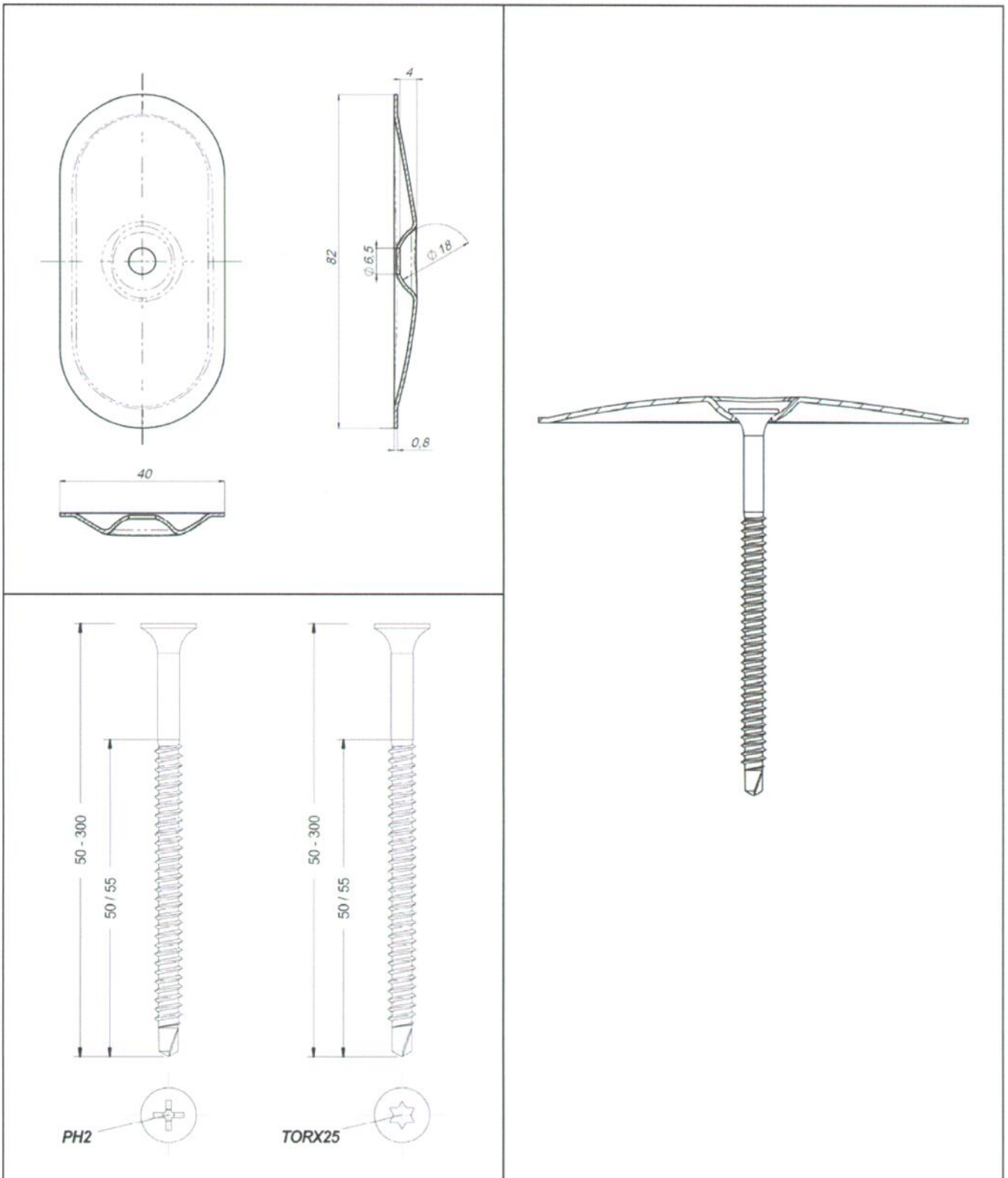
KOELNER S.A. Flat Roof Fasteners

Combination 6

Mount: POW-05-AlZn

Fastener: WX (PH2- or Torx25-Drive)

Annex 6

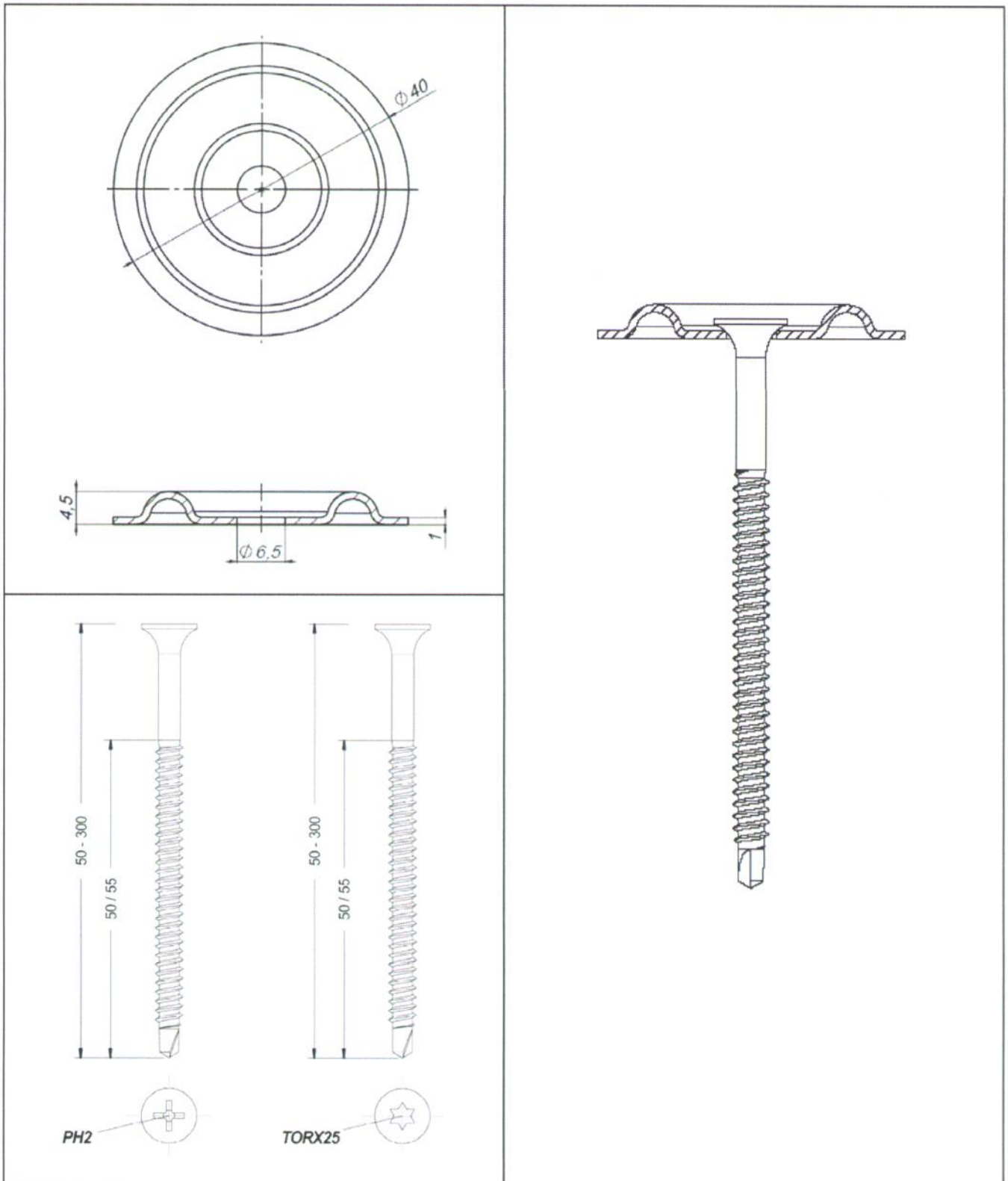


KOELNER S.A. Flat Roof Fasteners

Combination 7

Mount: POW-07-AlZn
Fastener: WX (PH2- or Torx25-Drive)

Annex 7

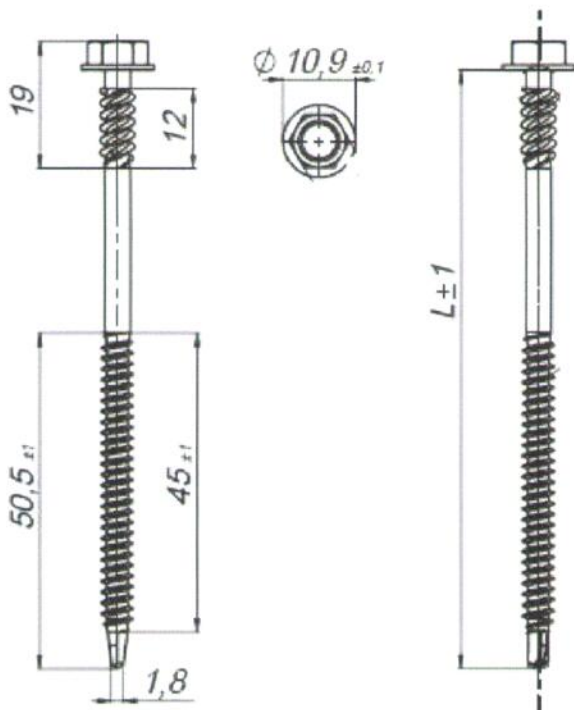
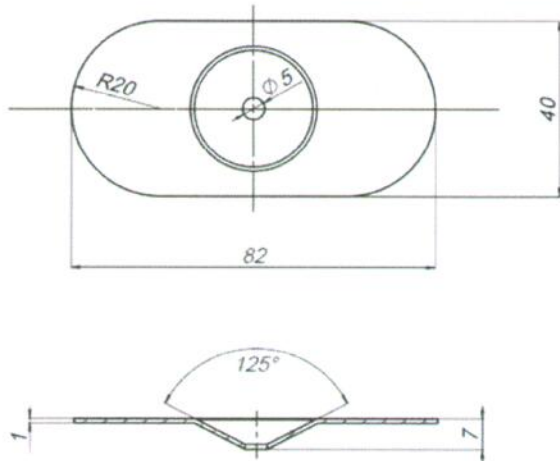


KOELNER S.A. Flat Roof Fasteners

Combination 8

Mount: POK-041-AlZn
Fastener: WX (PH2- or Torx25-Drive)

Annex 8

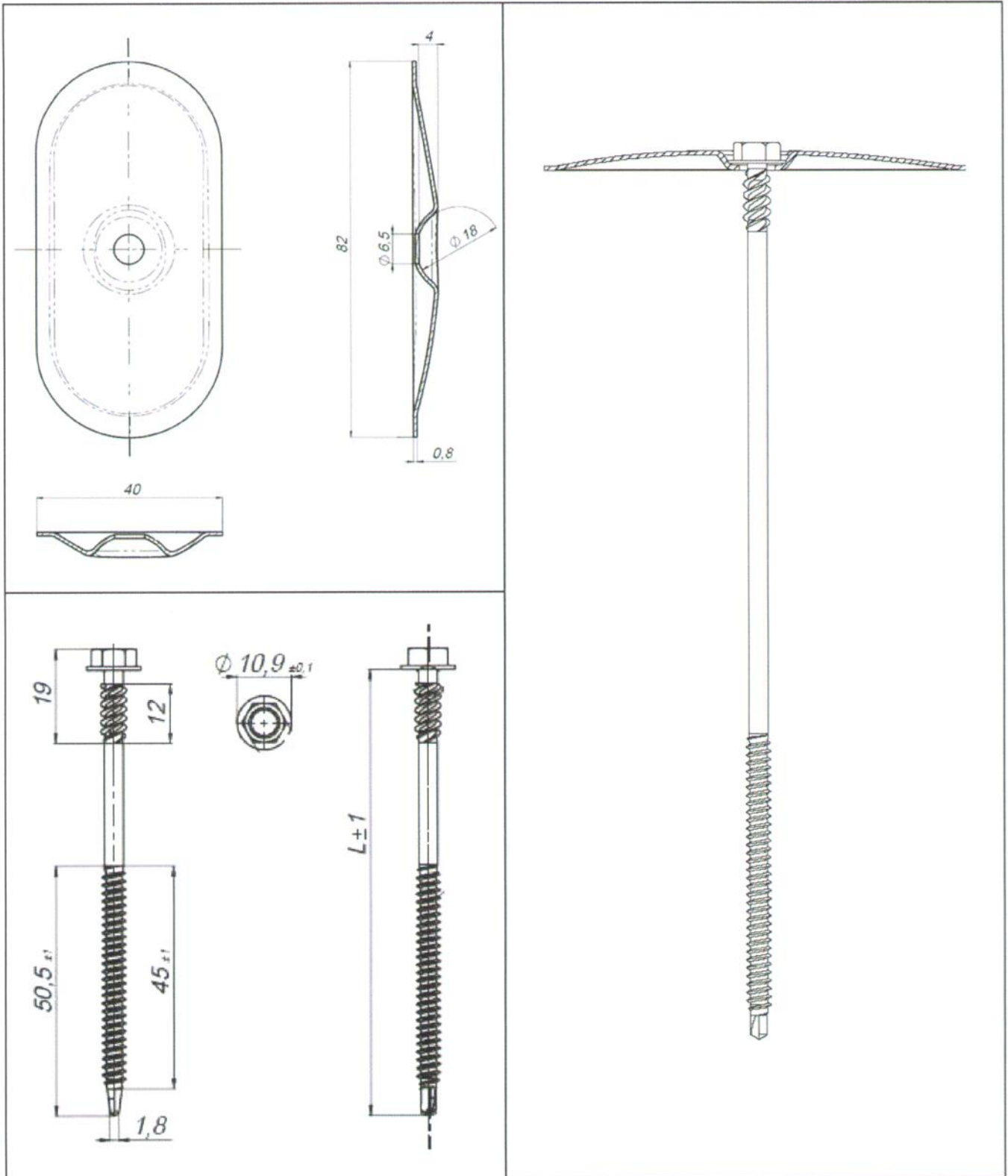


KOELNER S.A. Flat Roof Fasteners

Combination 9

Mount: POW-05-AlZn
Fastener: WB

Annex 9

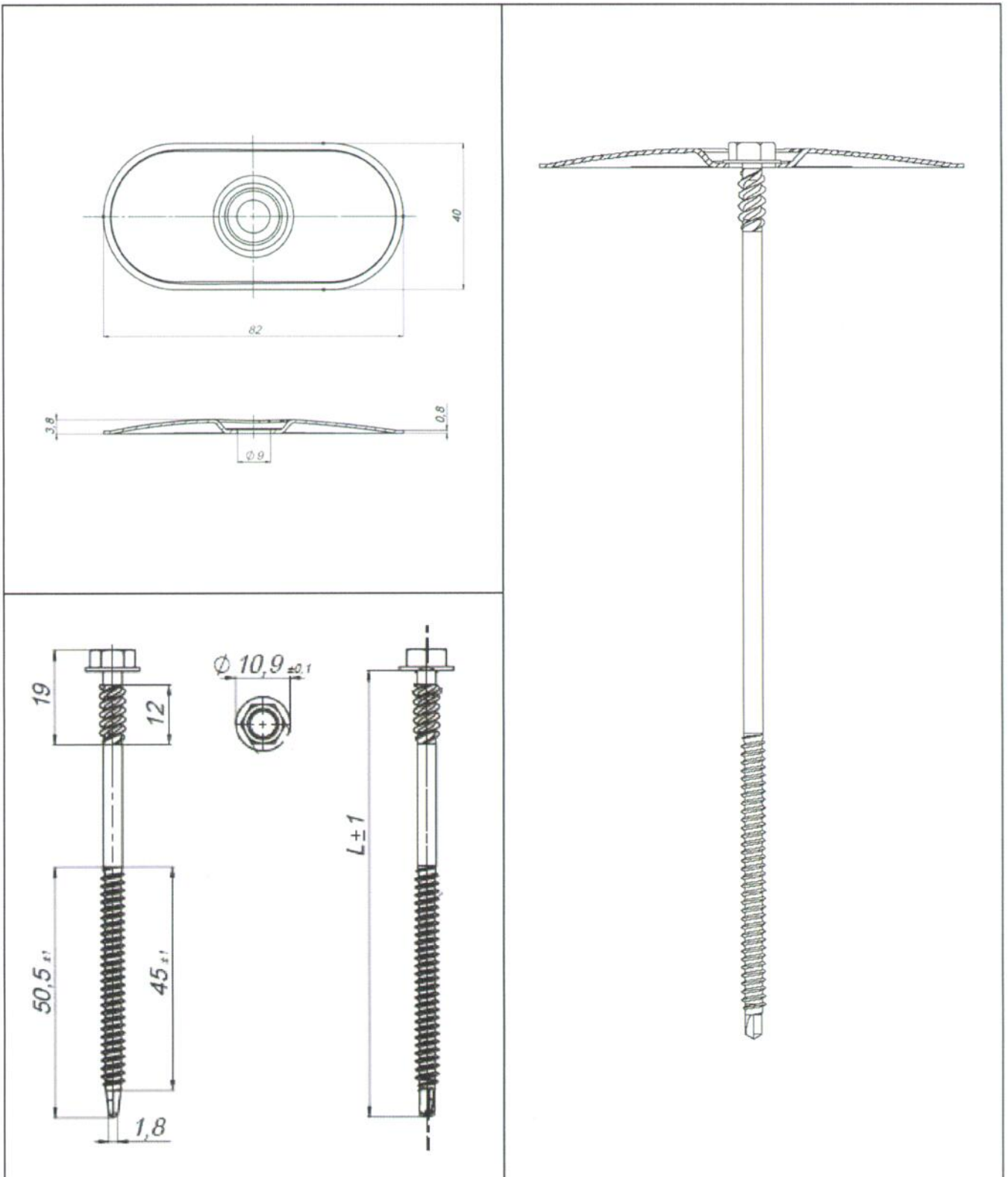


KOELNER S.A. Flat Roof Fasteners

Combination 10

Mount: POW-07-AlZn
Fastener: WB

Annex 10

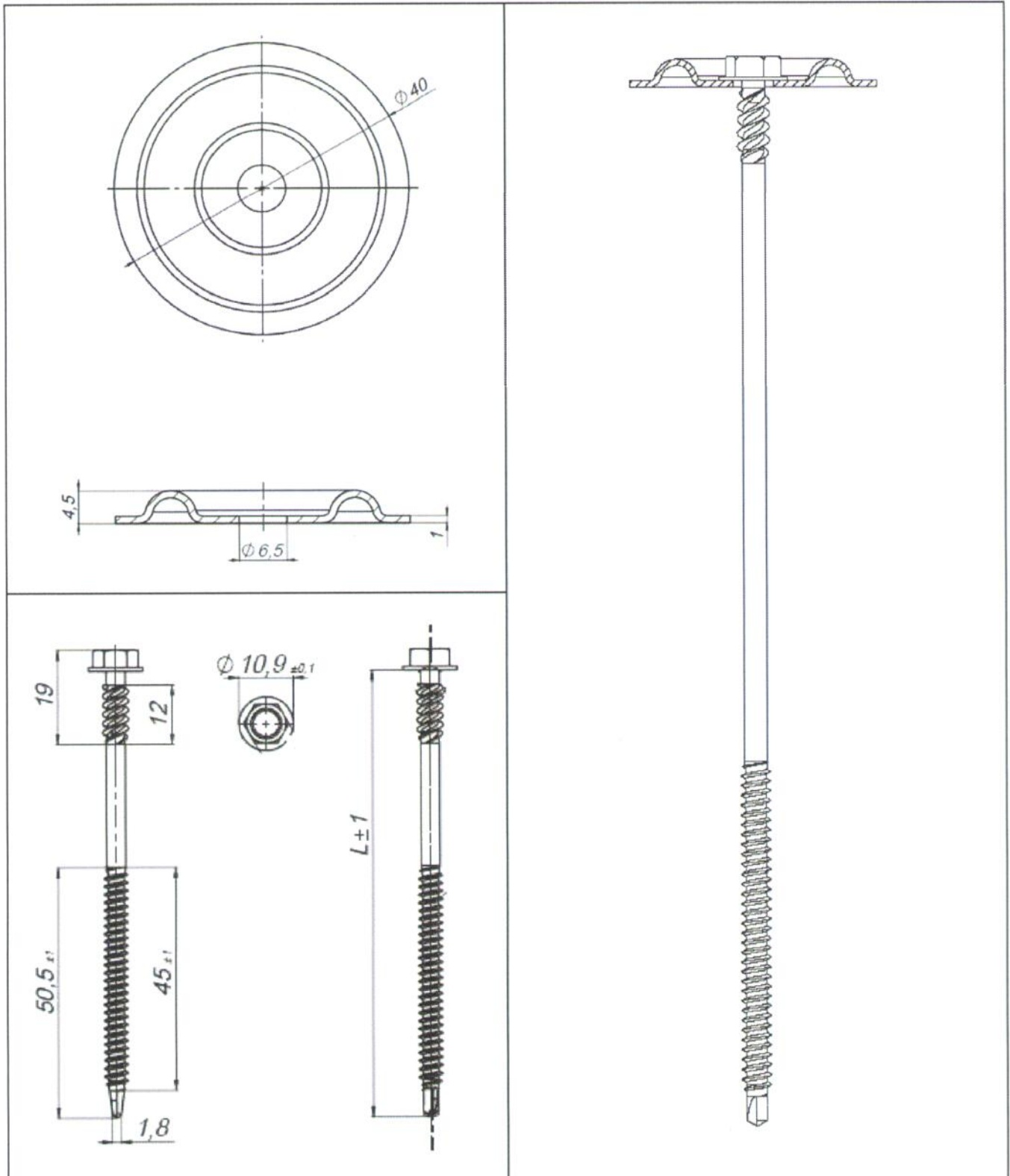


KOELNER S.A. Flat Roof Fasteners

Combination 11

Mount: POW-09-AlZn
 Fastener: WB

Annex 11

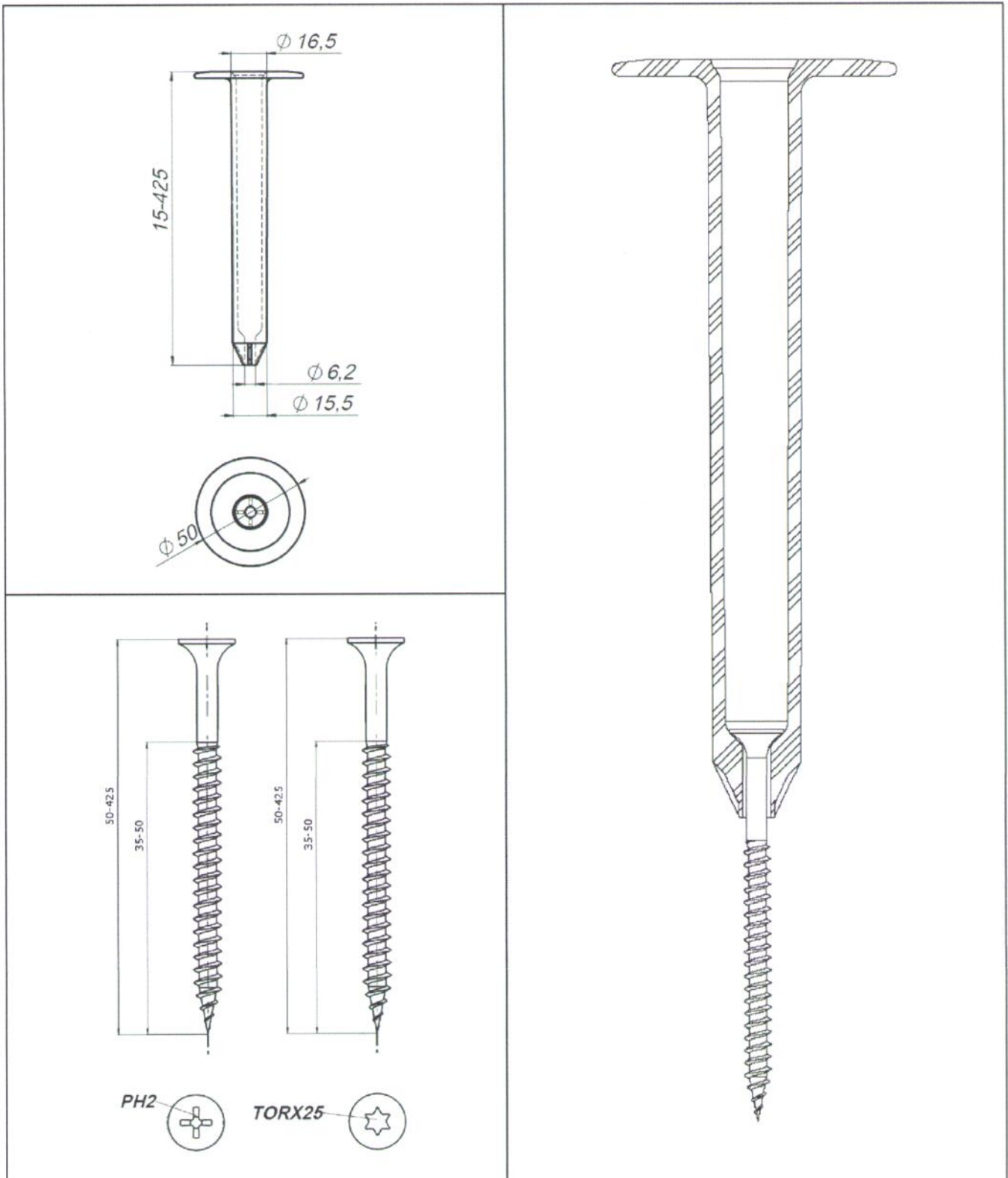


KOELNER S.A. Flat Roof Fasteners

Combination 12

Mount: POK-041-AlZn
Fastener: WB

Annex 12

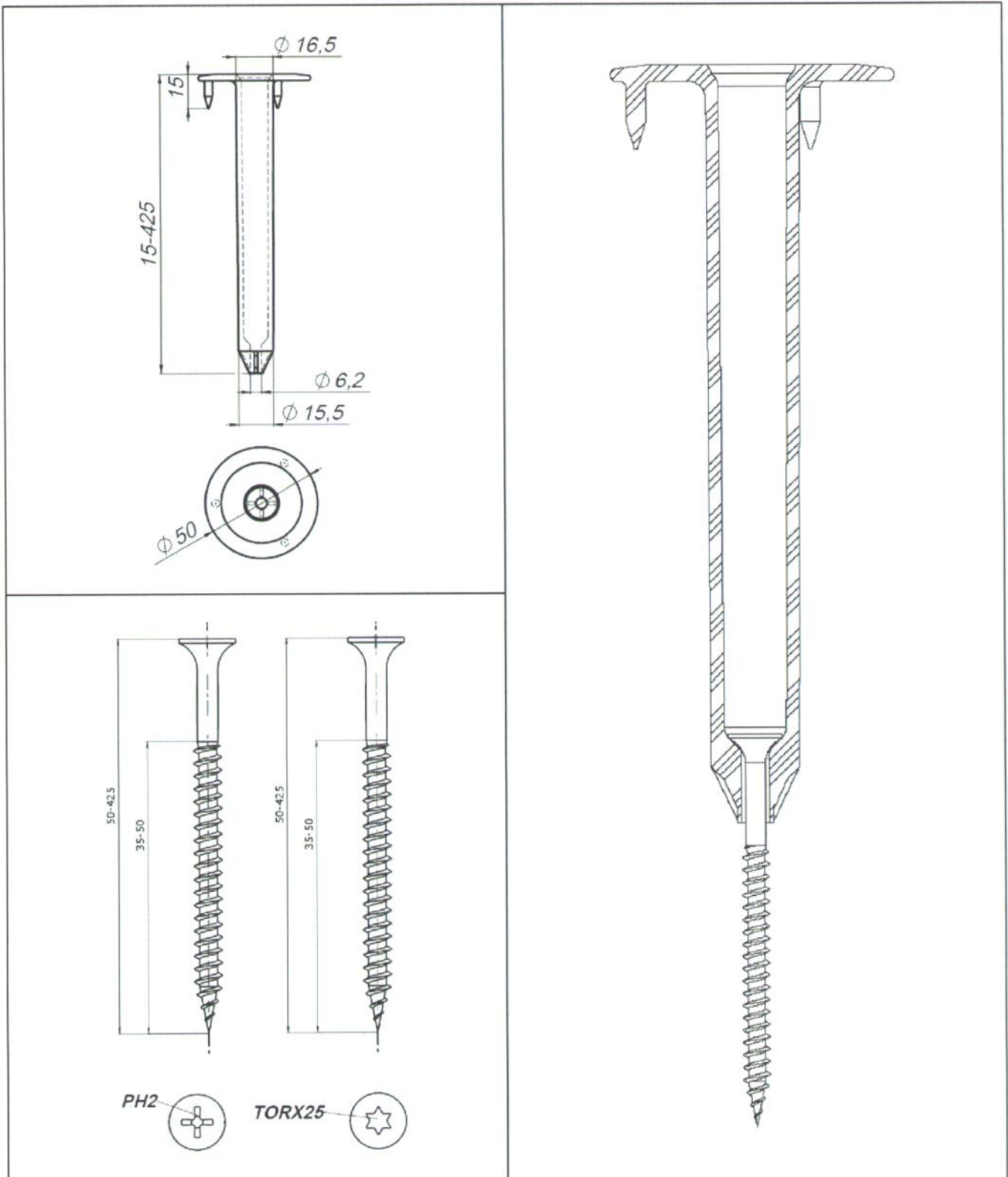


KOELNER S.A. Flat Roof Fasteners

Combination 13

Mount: GOK
 Fastener: WO (PH2- or Torx25-Drive)

Annex 13

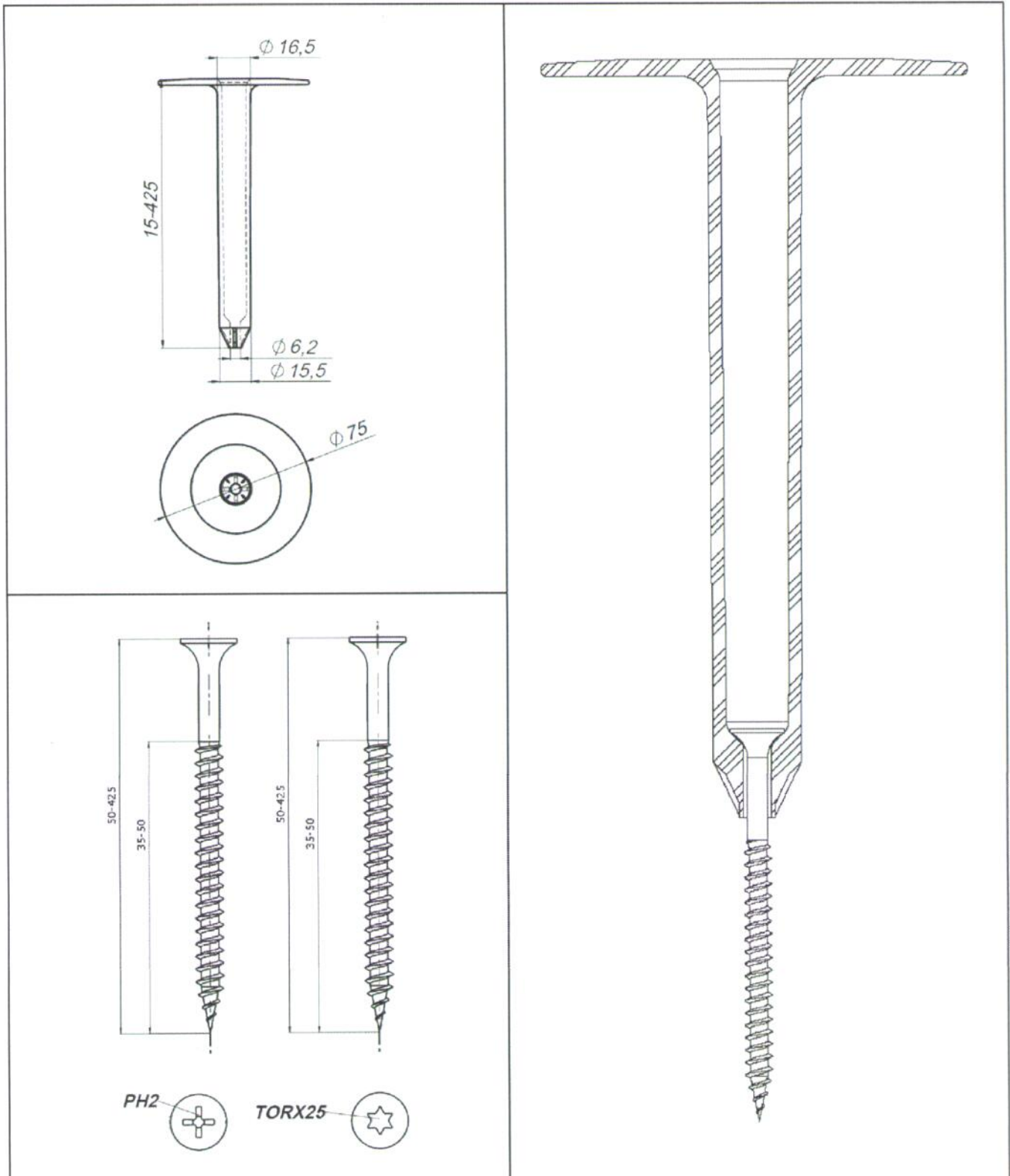


KOELNER S.A. Flat Roof Fasteners

Combination 14

Mount: GOK-PLUS
Fastener: WO (PH2- or Torx25-Drive)

Annex 14

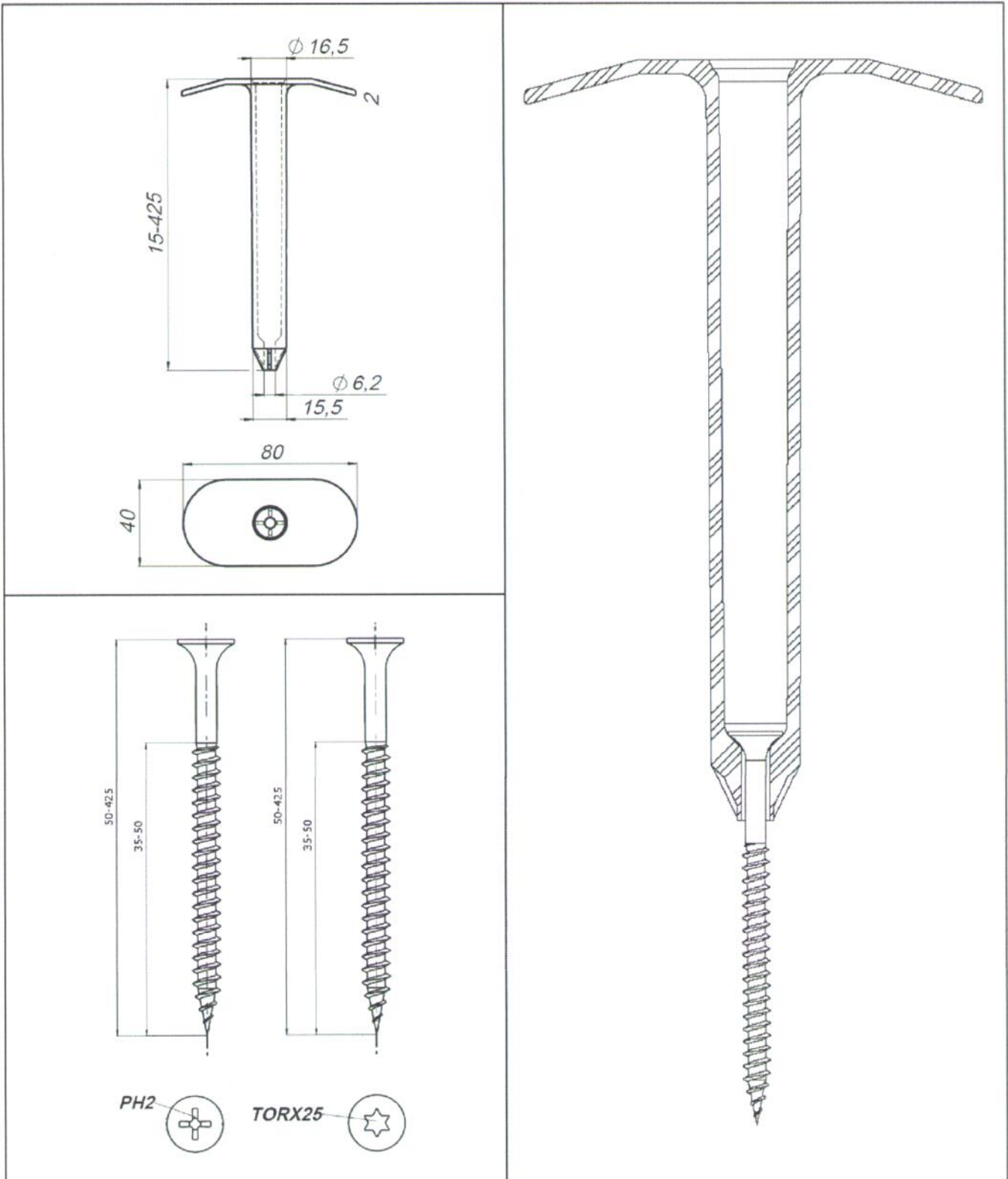


KOELNER S.A. Flat Roof Fasteners

Combination 15

Mount: GOK75
Fastener: WO (PH2- or Torx25-Drive)

Annex 15

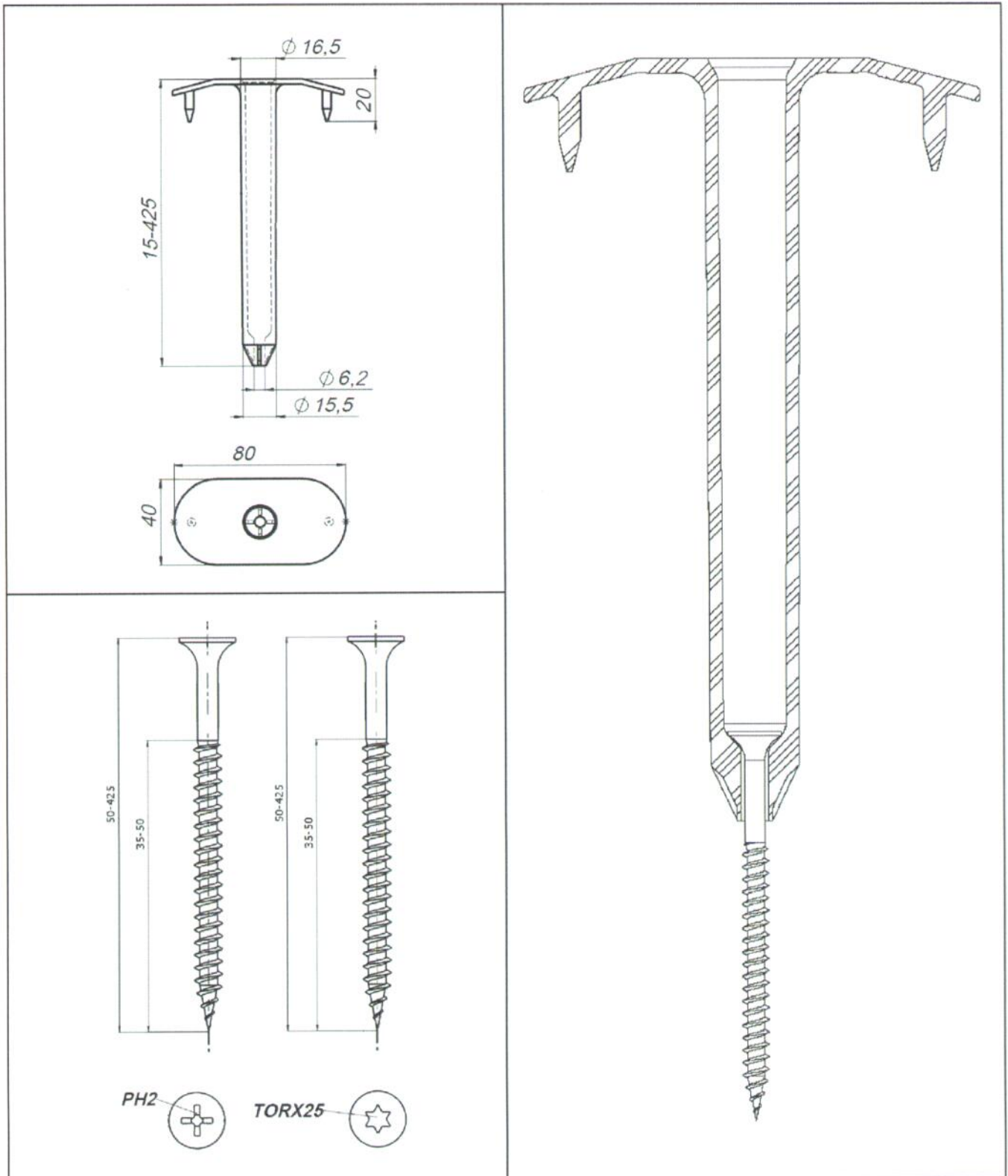


KOELNER S.A. Flat Roof Fasteners

Combination 16

Mount: GOW
Fastener: WO (PH2- or Torx25-Drive)

Annex 16

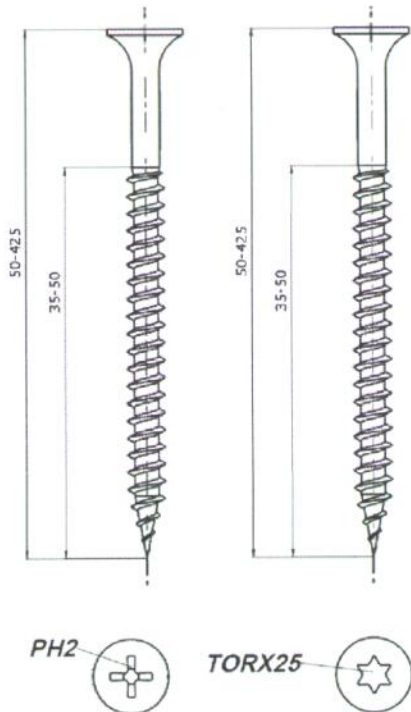
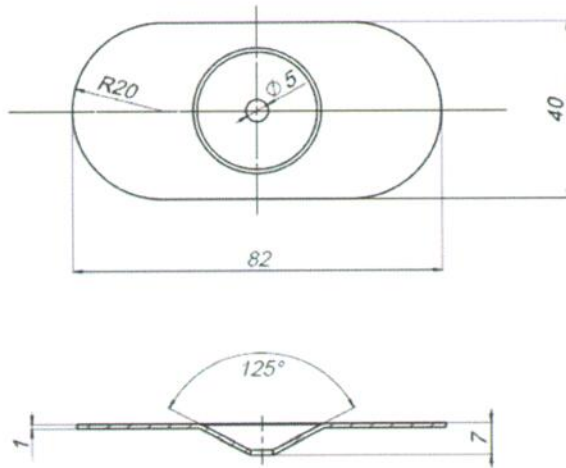


KOELNER S.A. Flat Roof Fasteners

Combination 17

Mount: GOW-PLUS
Fastener: WO (PH2- or Torx25-Drive)

Annex 17

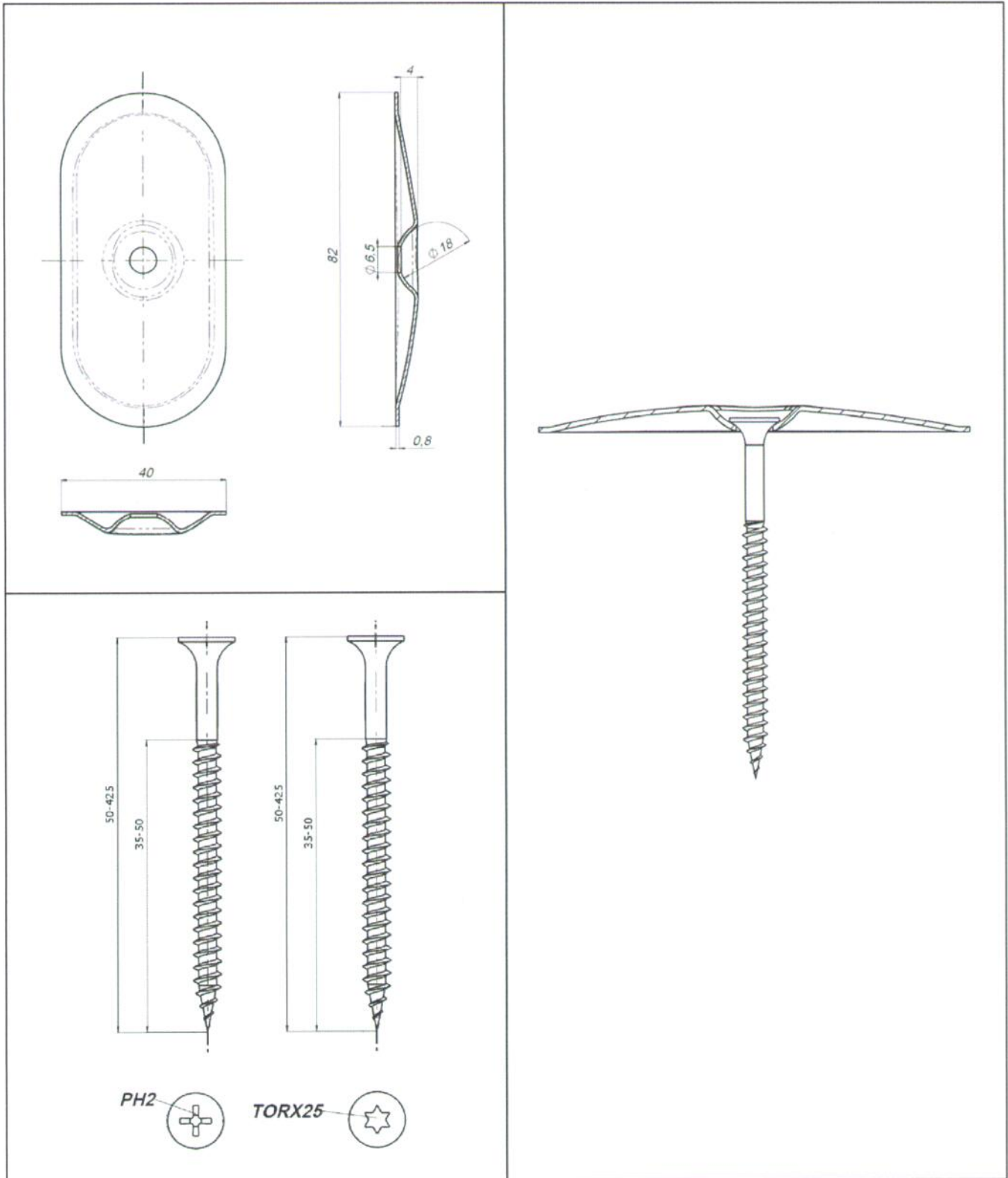


KOELNER S.A. Flat Roof Fasteners

Combination 18

Mount: POW-05-AlZn
Fastener: WO (PH2- or Torx25-Drive)

Annex 18

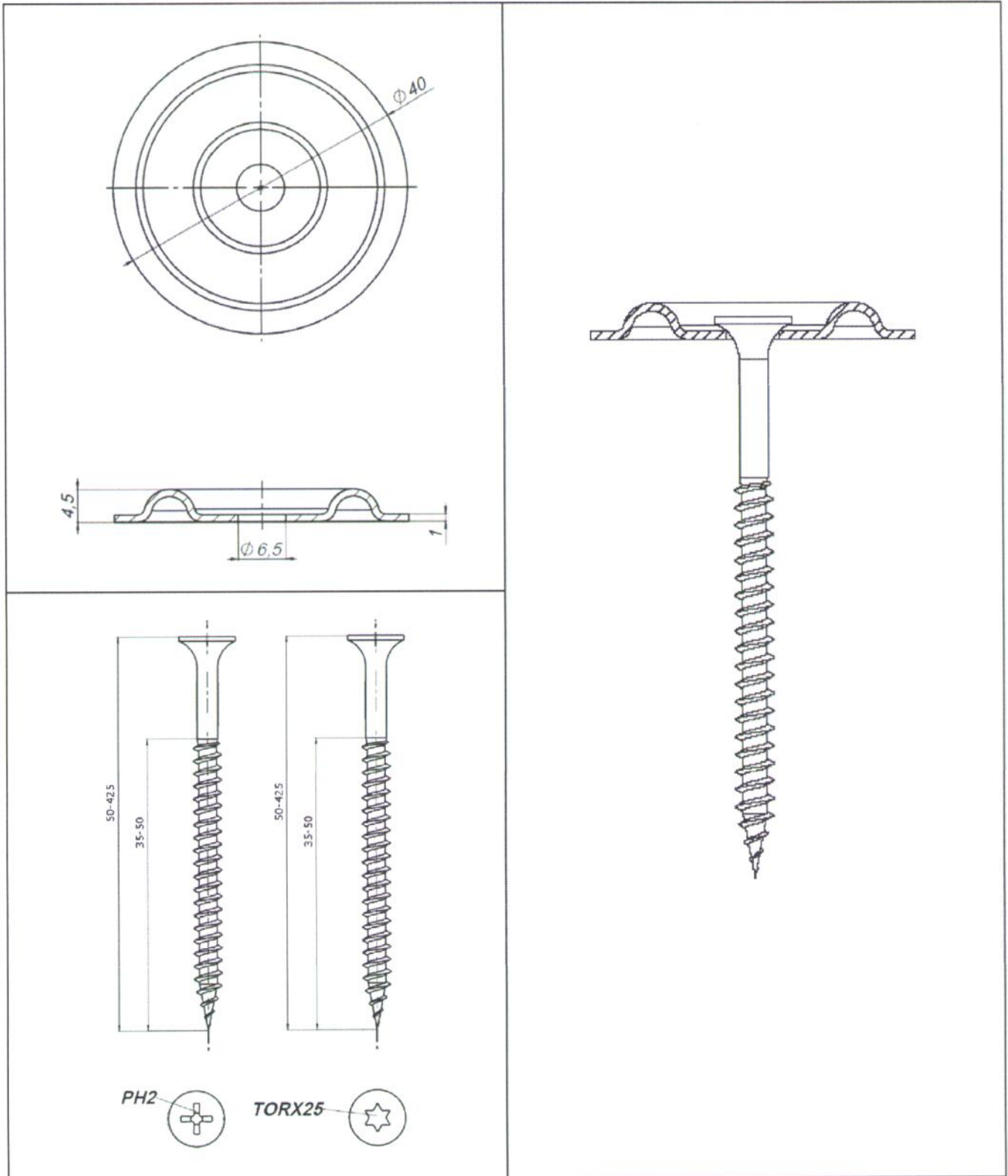


KOELNER S.A. Flat Roof Fasteners

Combination 19

Mount: POW-07-AlZn
Fastener: WO (PH2- or Torx25-Drive)

Annex 19

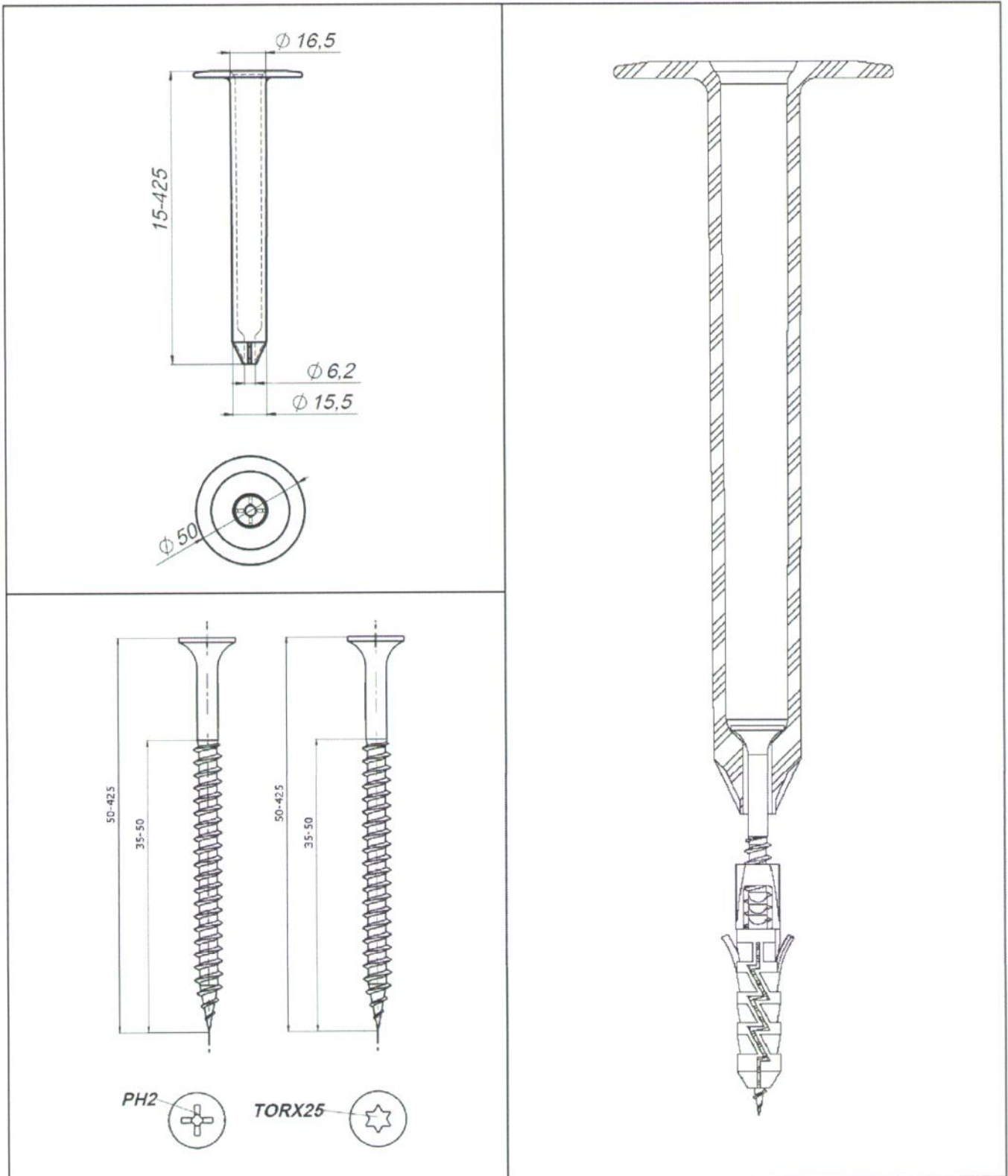


KOELNER S.A. Flat Roof Fasteners

Combination 20

Mount: POK-041-AlZn
 Fastener: WO (PH2- or Torx25-Drive)

Annex 20

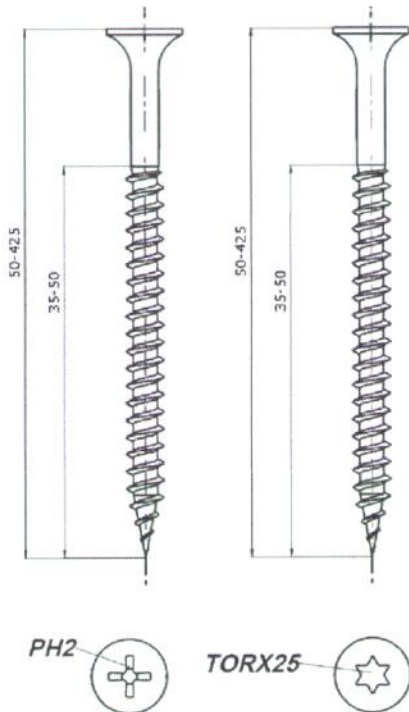
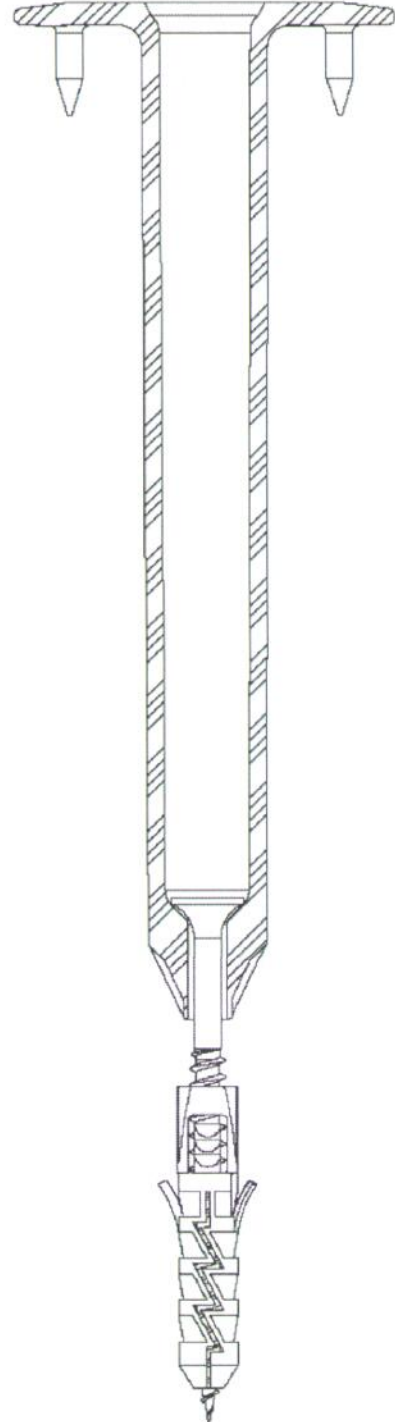
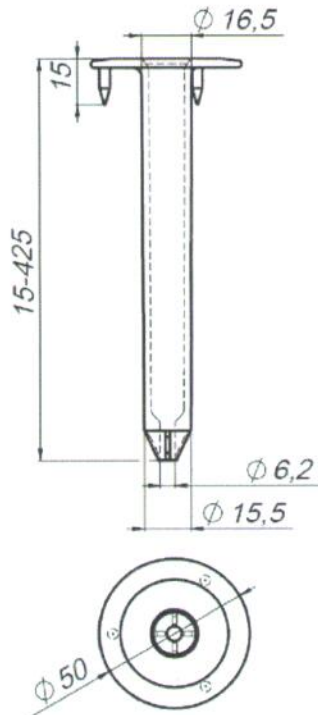


KOELNER S.A. Flat Roof Fasteners

Combination 21

Mount: GOK
 Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 21

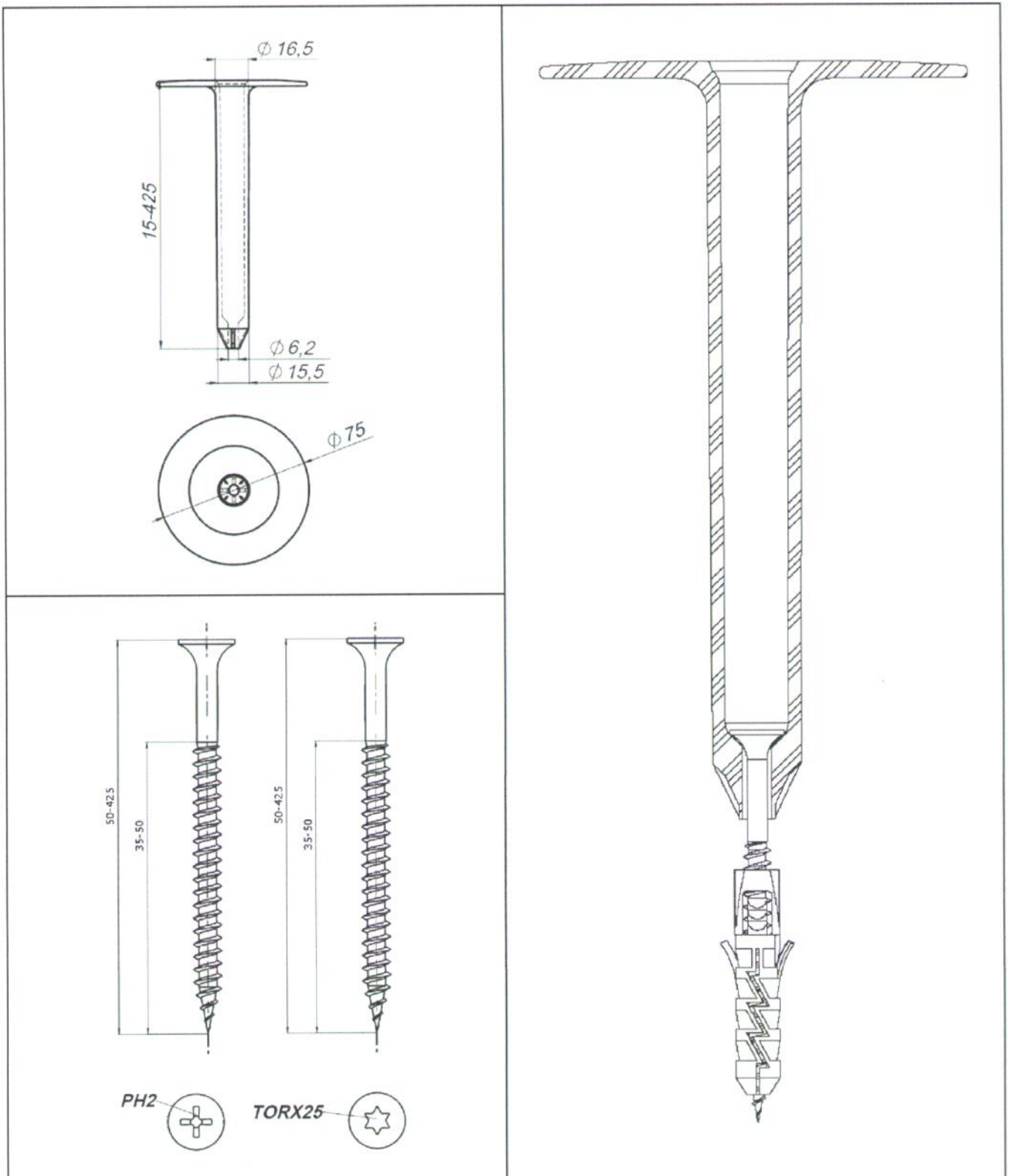


KOELNER S.A. Flat Roof Fasteners

Combination 22

Mount: GOK-PLUS
Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 22

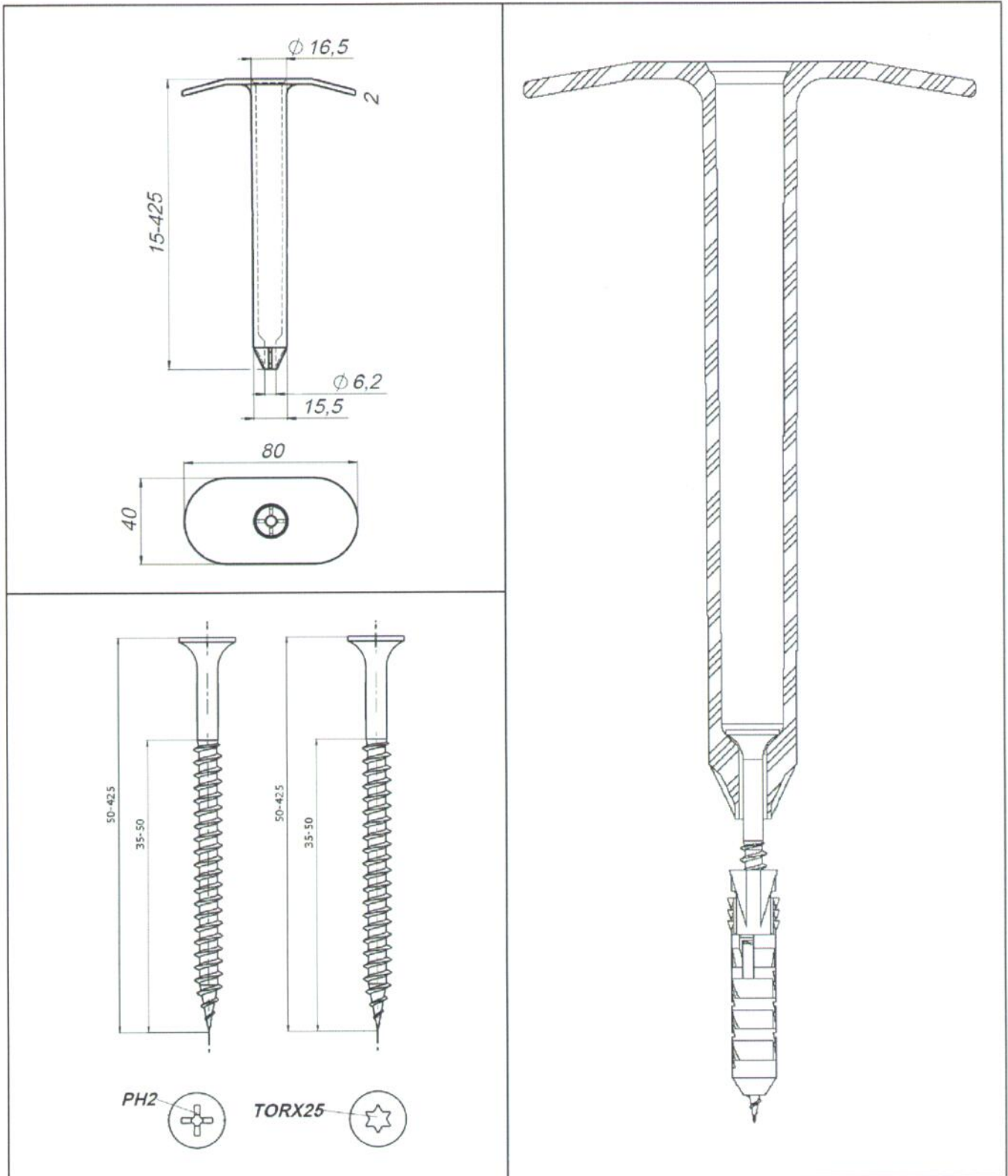


KOELNER S.A. Flat Roof Fasteners

Combination 23

Mount: GOK75
Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 23

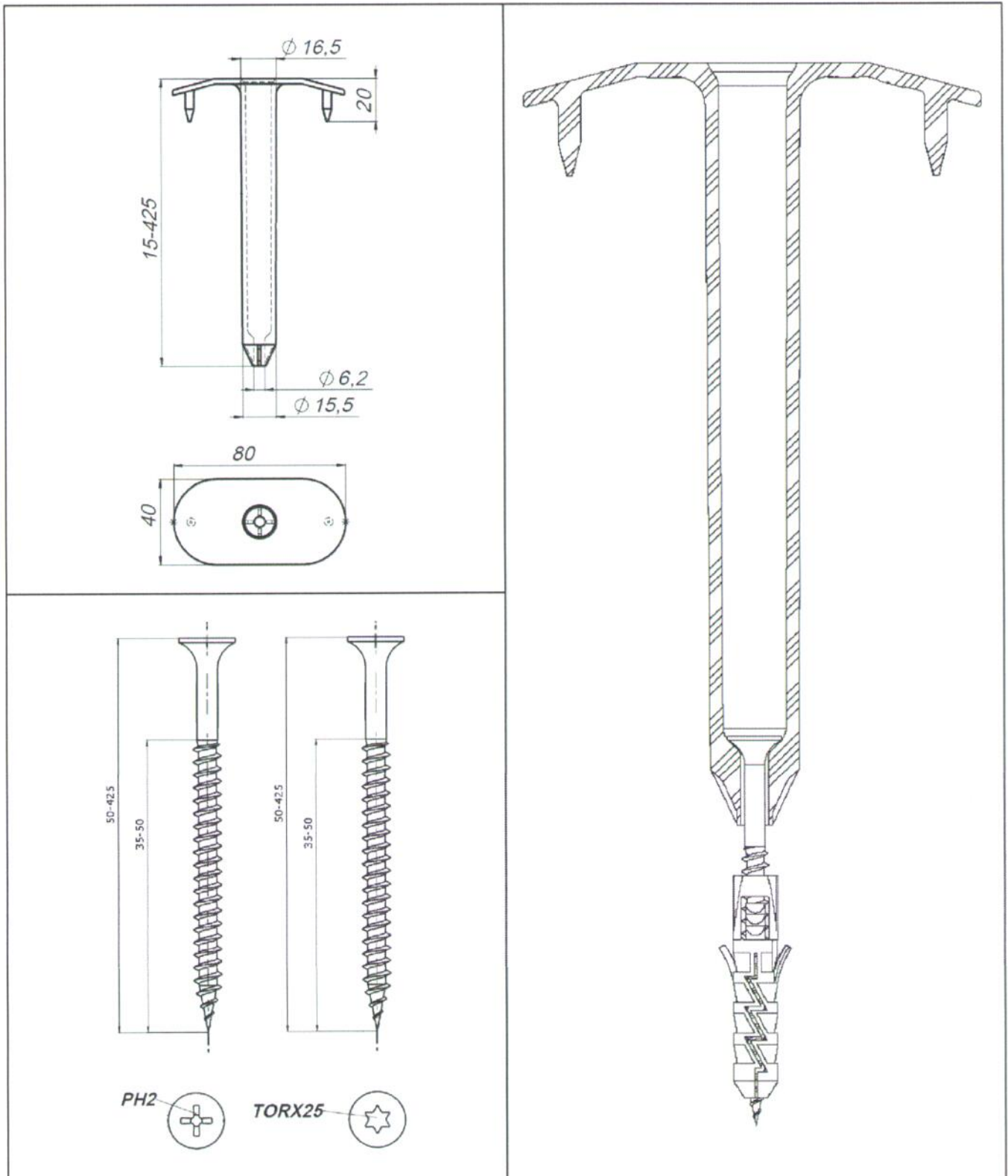


KOELNER S.A. Flat Roof Fasteners

Combination 24

Mount: GOW
 Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 24

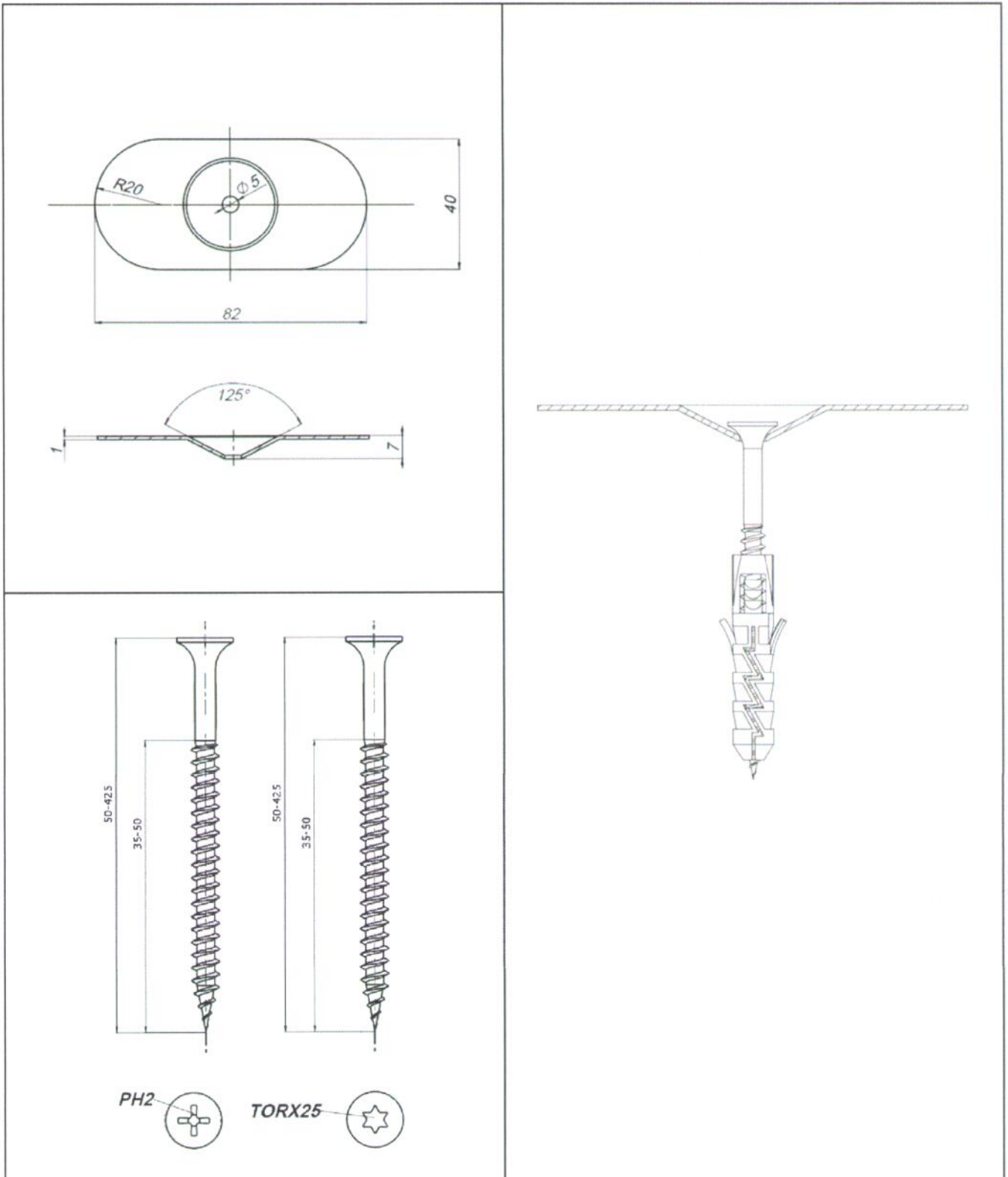


KOELNER S.A. Flat Roof Fasteners

Combination 25

Mount: GOW-PLUS
Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 25

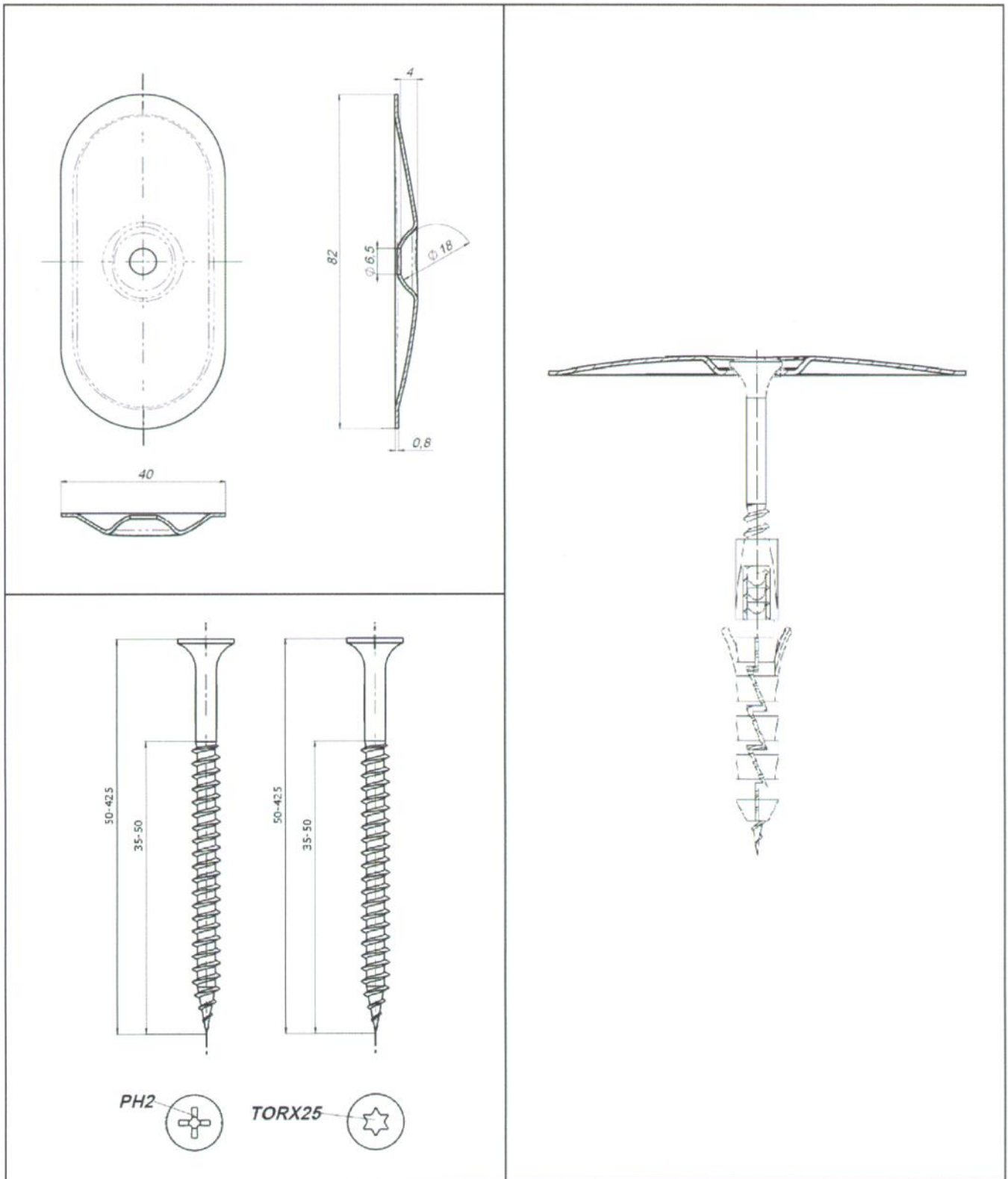


KOELNER S.A. Flat Roof Fasteners

Combination 26

Mount: POW-05-AlZn
 Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 26

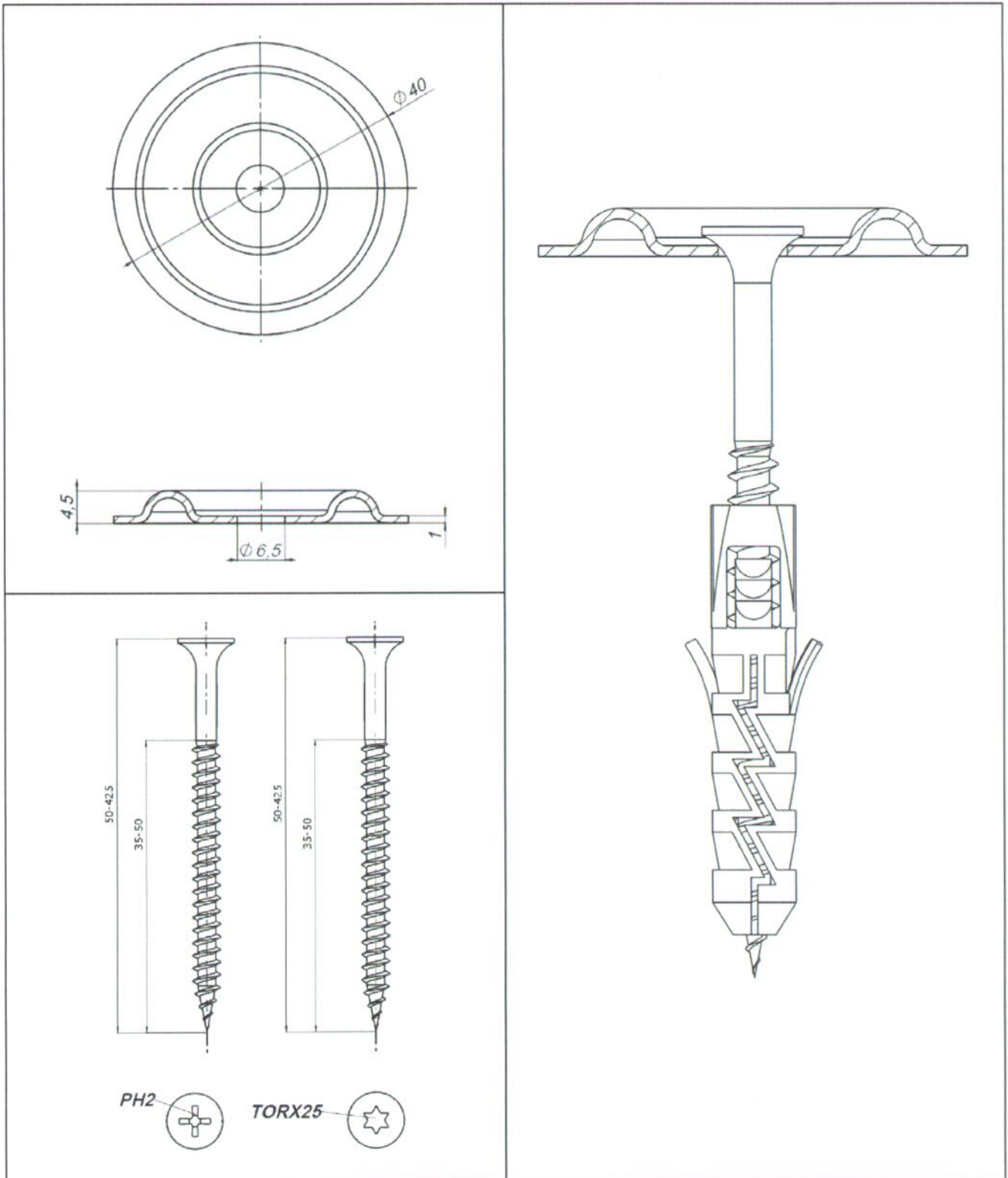


KOELNER S.A. Flat Roof Fasteners

Combination 27

Mount: POW-07-AlZn
Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 27

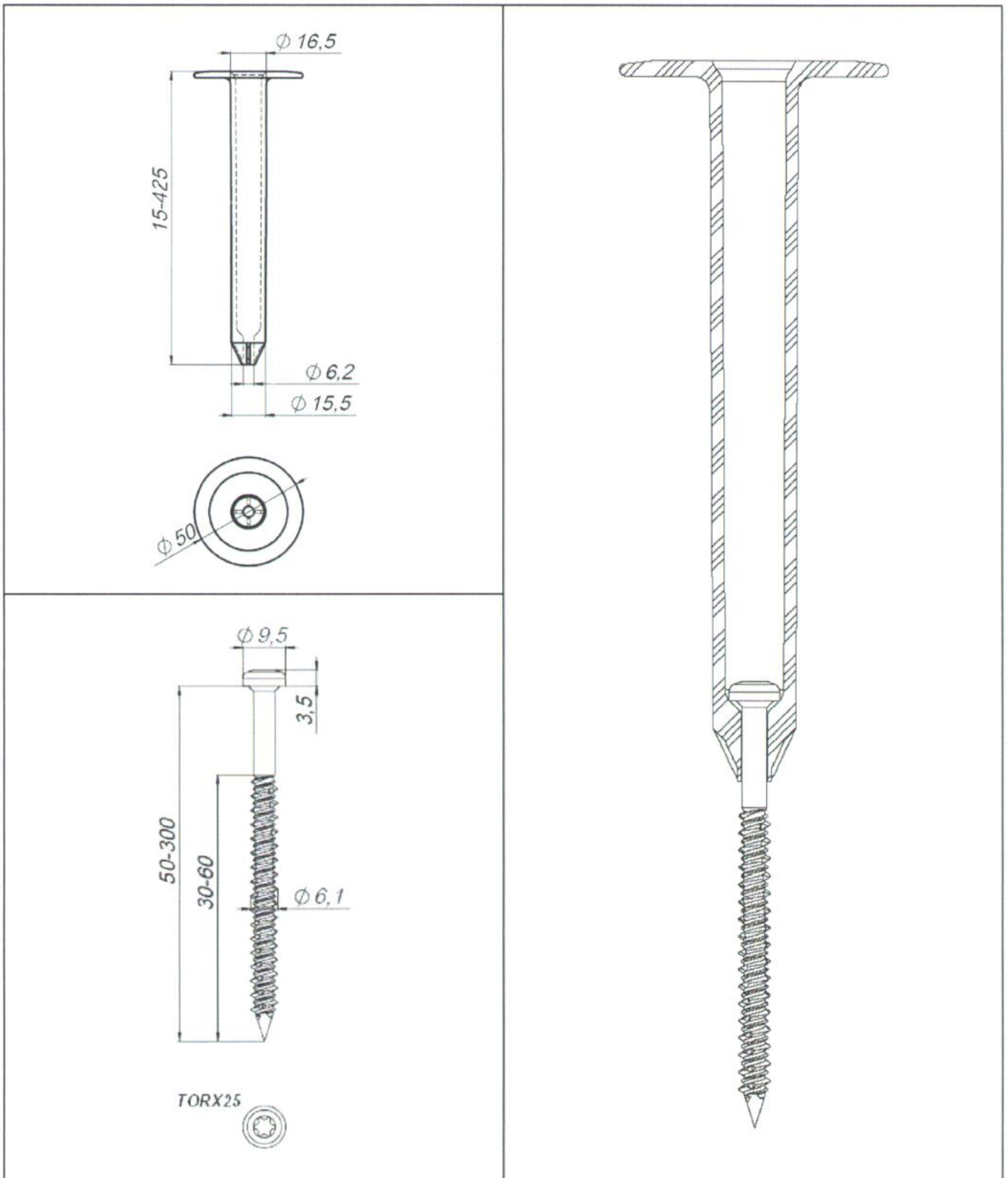


KOELNER S.A. Flat Roof Fasteners

Combination 28

Mount: POK-041-AlZn
Fastener: WO (PH2- or Torx25-Drive) with K08

Annex 28

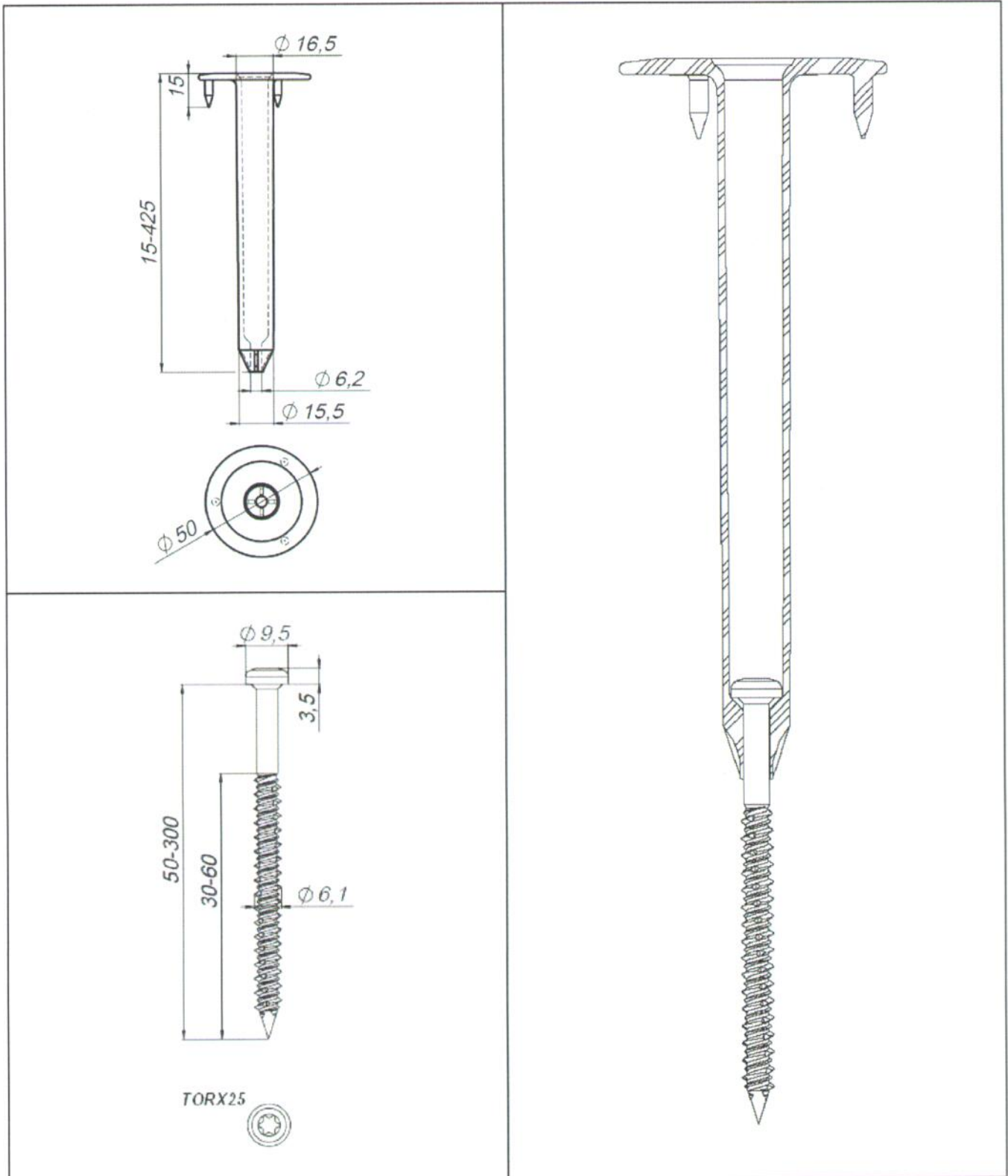


KOELNER S.A. Flat Roof Fasteners

Combination 29

Mount: GOK
Fastener: WBT

Annex 29

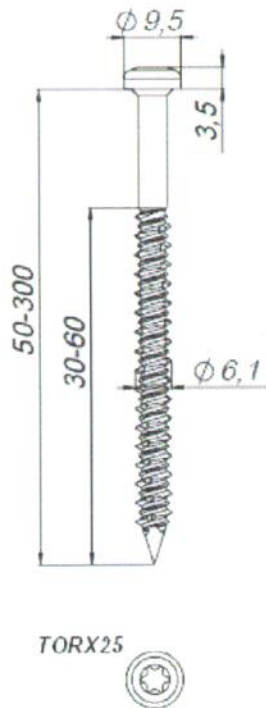
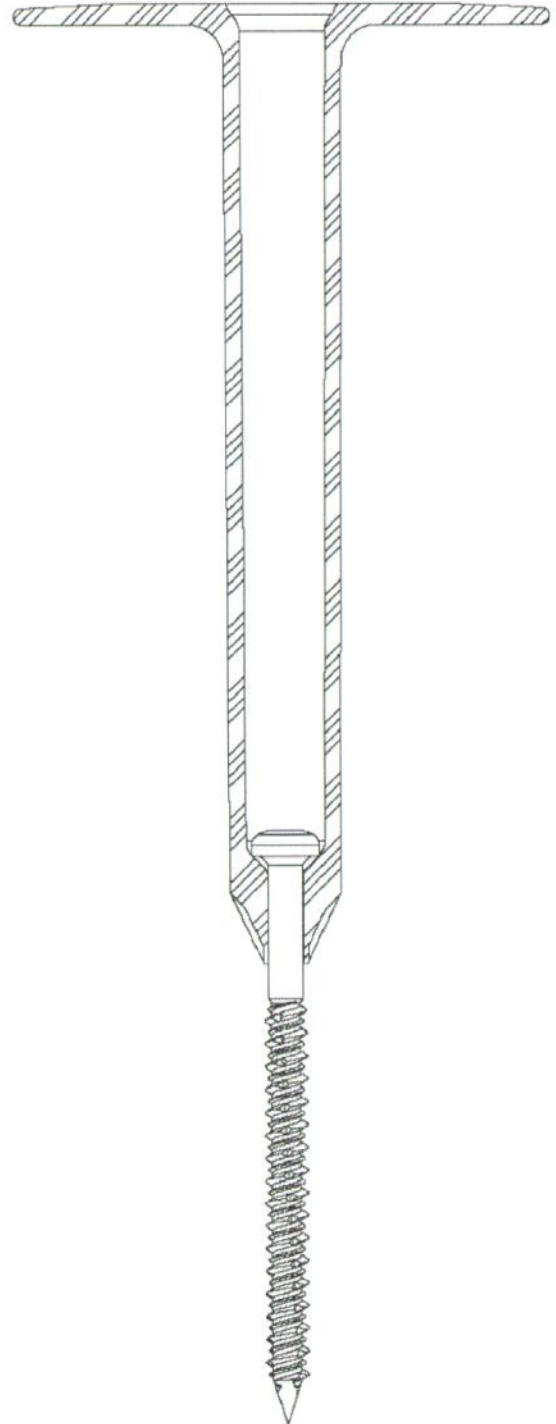
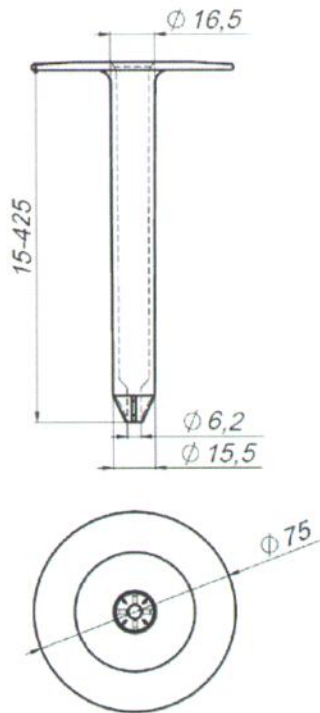


KOELNER S.A. Flat Roof Fasteners

Combination 30

Mount: GOK-PLUS
Fastener: WBT

Annex 30

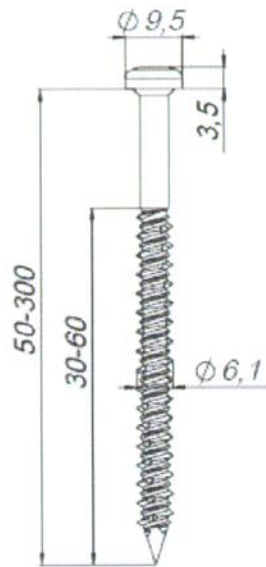
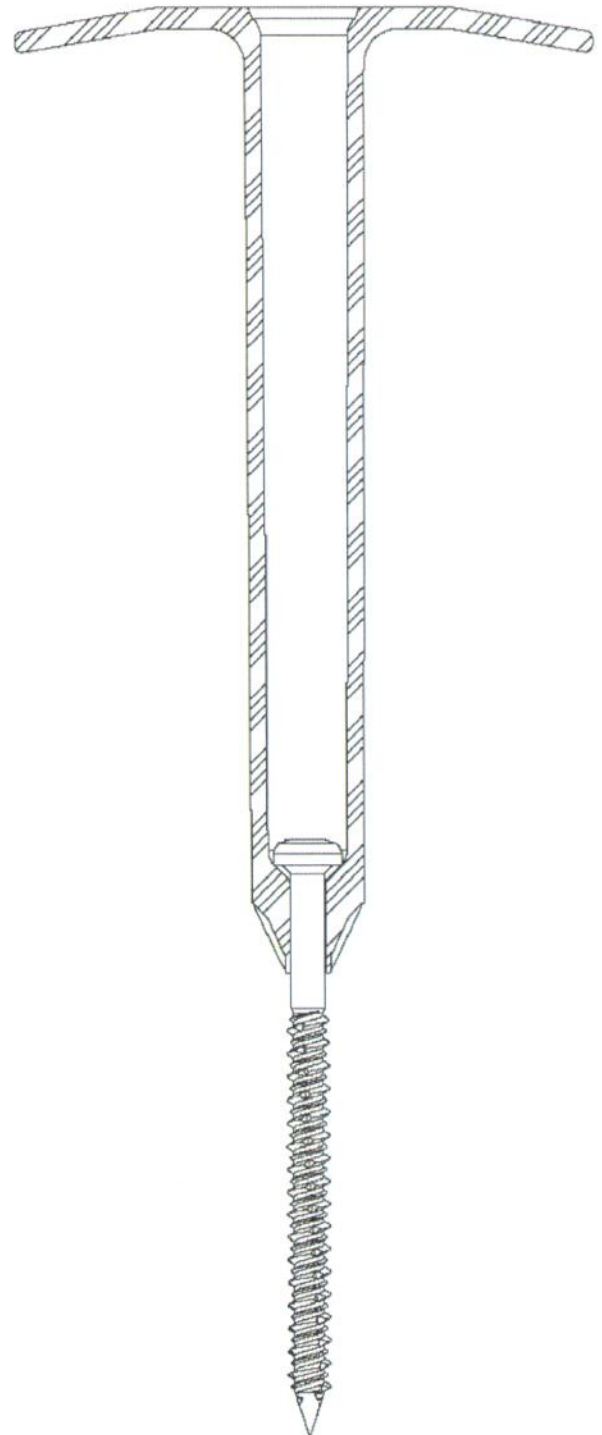
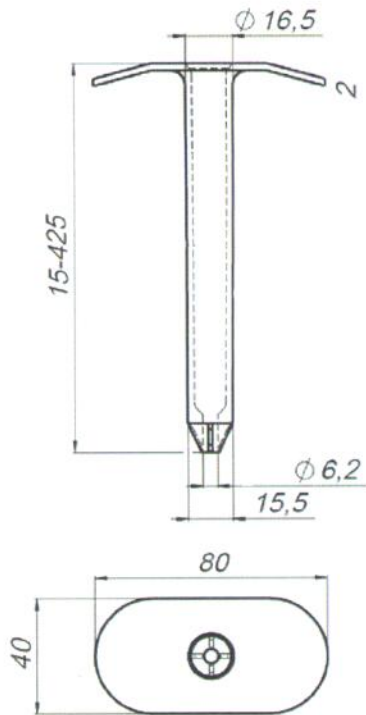


KOELNER S.A. Flat Roof Fasteners

Combination 31

Mount: GOK75
Fastener: WBT

Annex 31

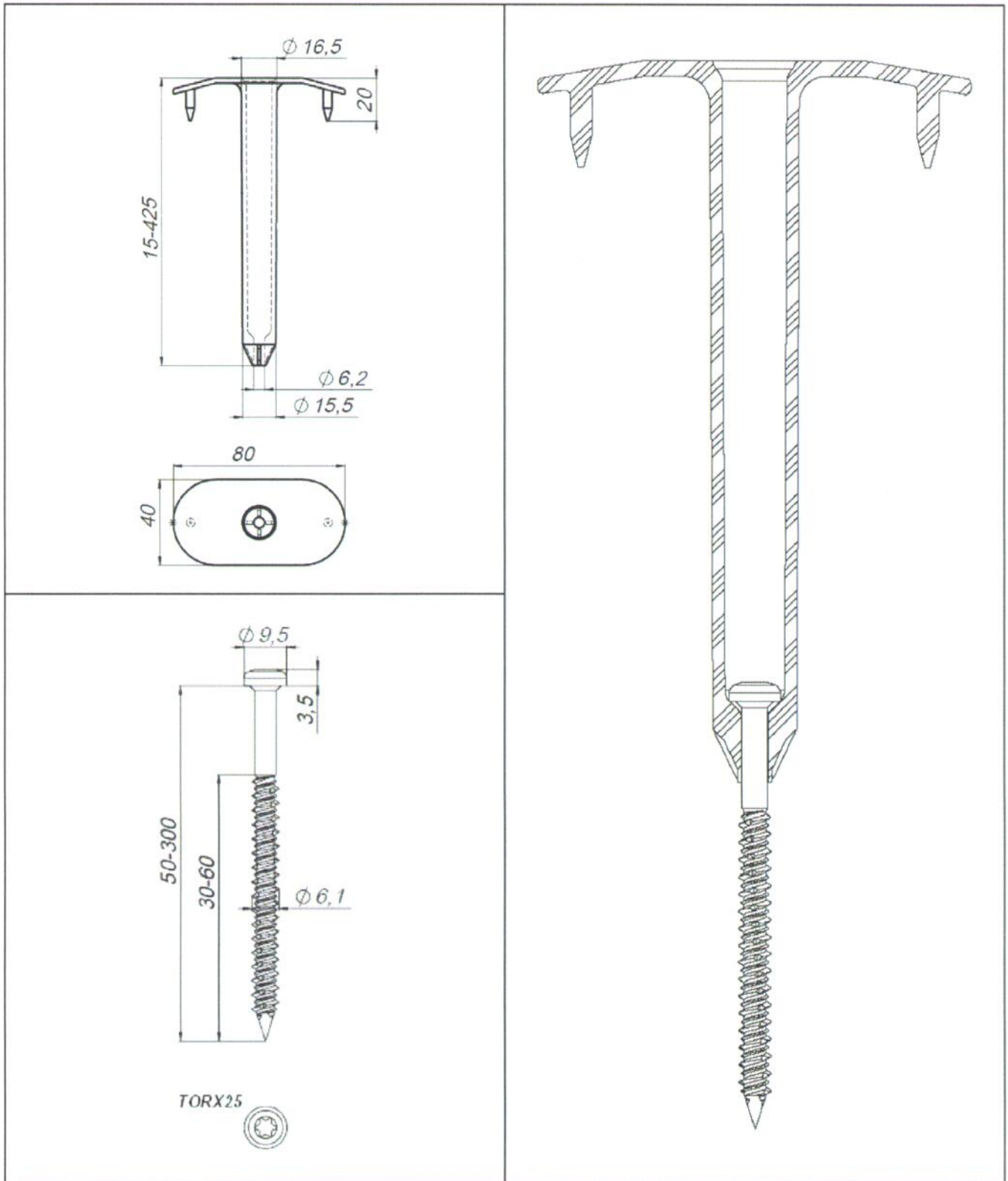


KOELNER S.A. Flat Roof Fasteners

Combination 32

Mount: GOW
Fastener: WBT

Annex 32

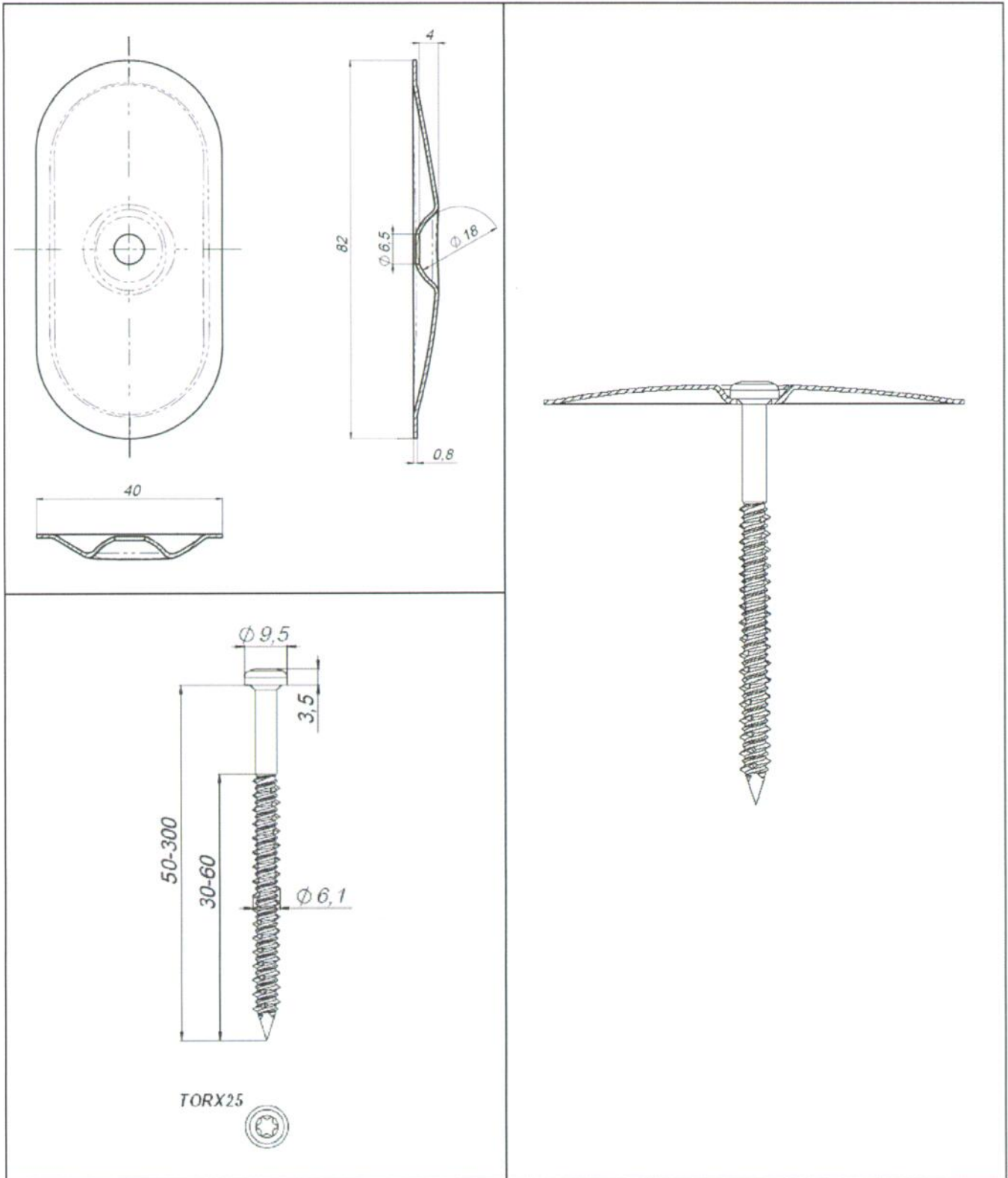


KOELNER S.A. Flat Roof Fasteners

Combination 33

Mount: GOW-PLUS
Fastener: WBT

Annex 33

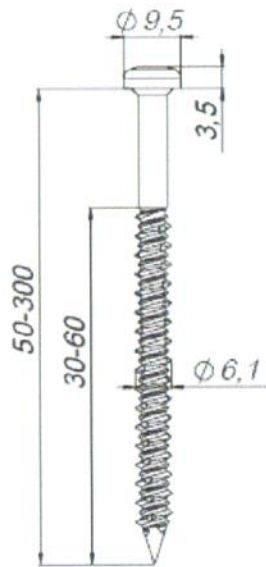
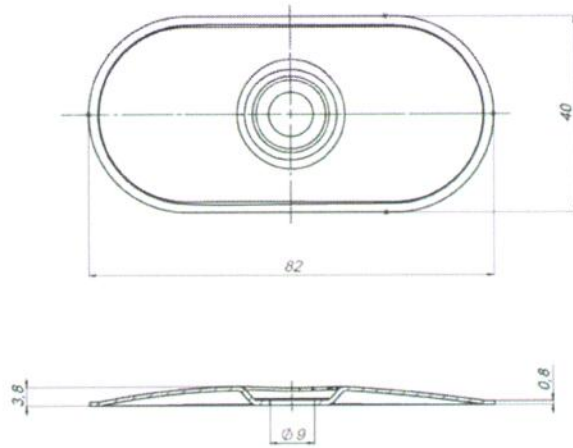


KOELNER S.A. Flat Roof Fasteners

Combination 34

Mount: POW-07-AlZn
Fastener: WBT

Annex 34

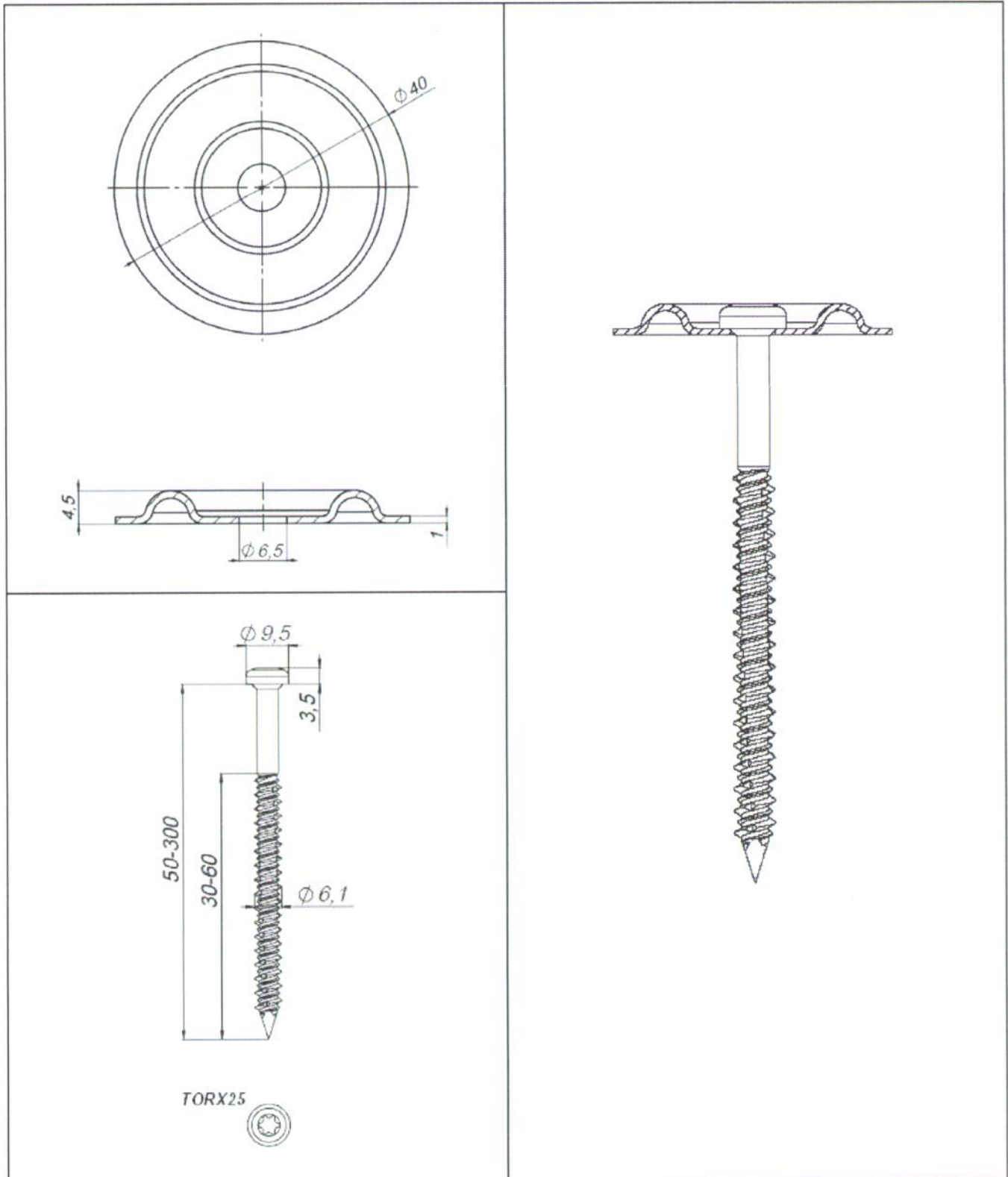


KOELNER S.A. Flat Roof Fasteners

Combination 35

Mount: POW-09-AlZn
Fastener: WBT

Annex 35

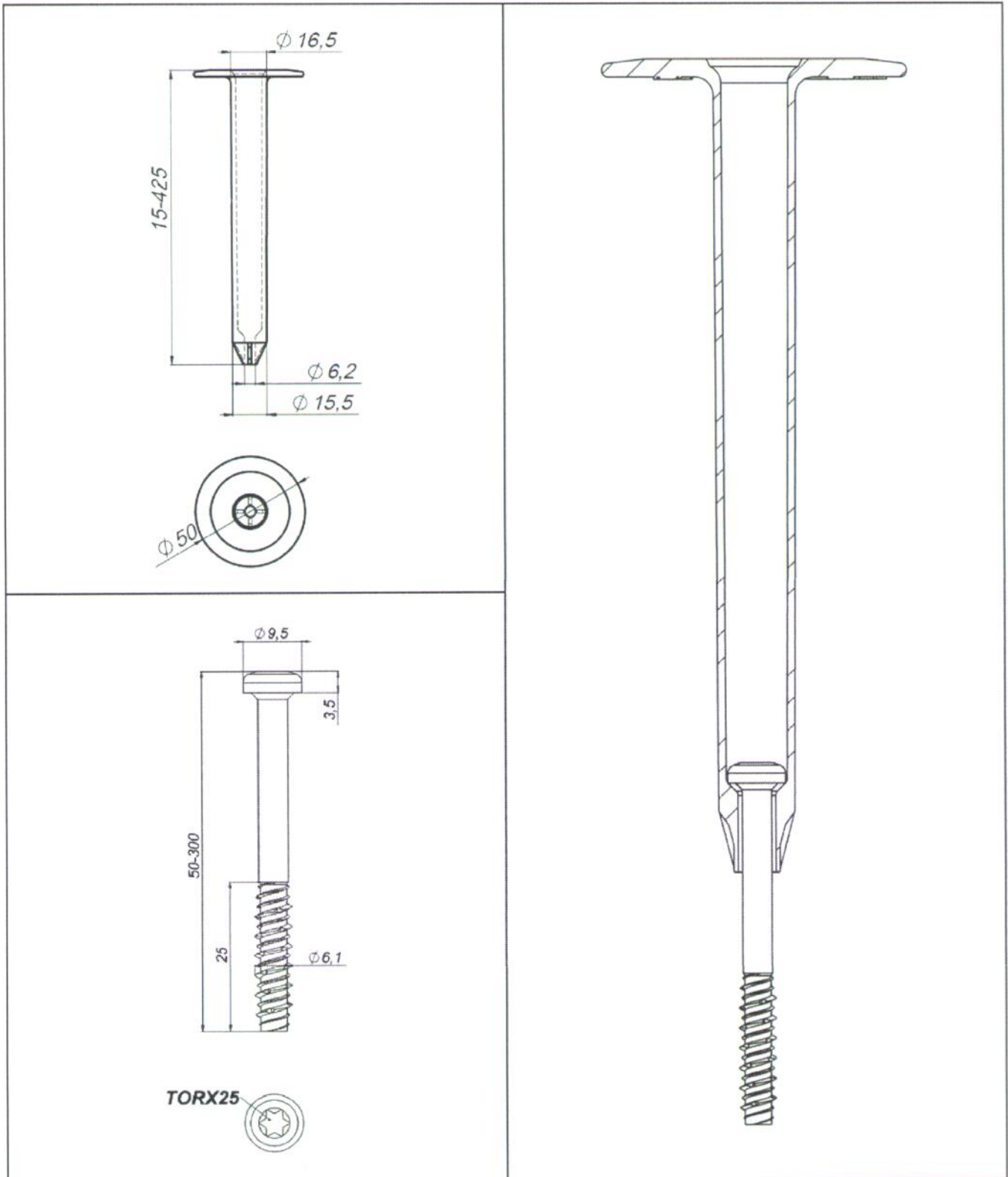


KOELNER S.A. Flat Roof Fasteners

Combination 36

Mount: POK-041-AlZn
Fastener: WBT

Annex 36

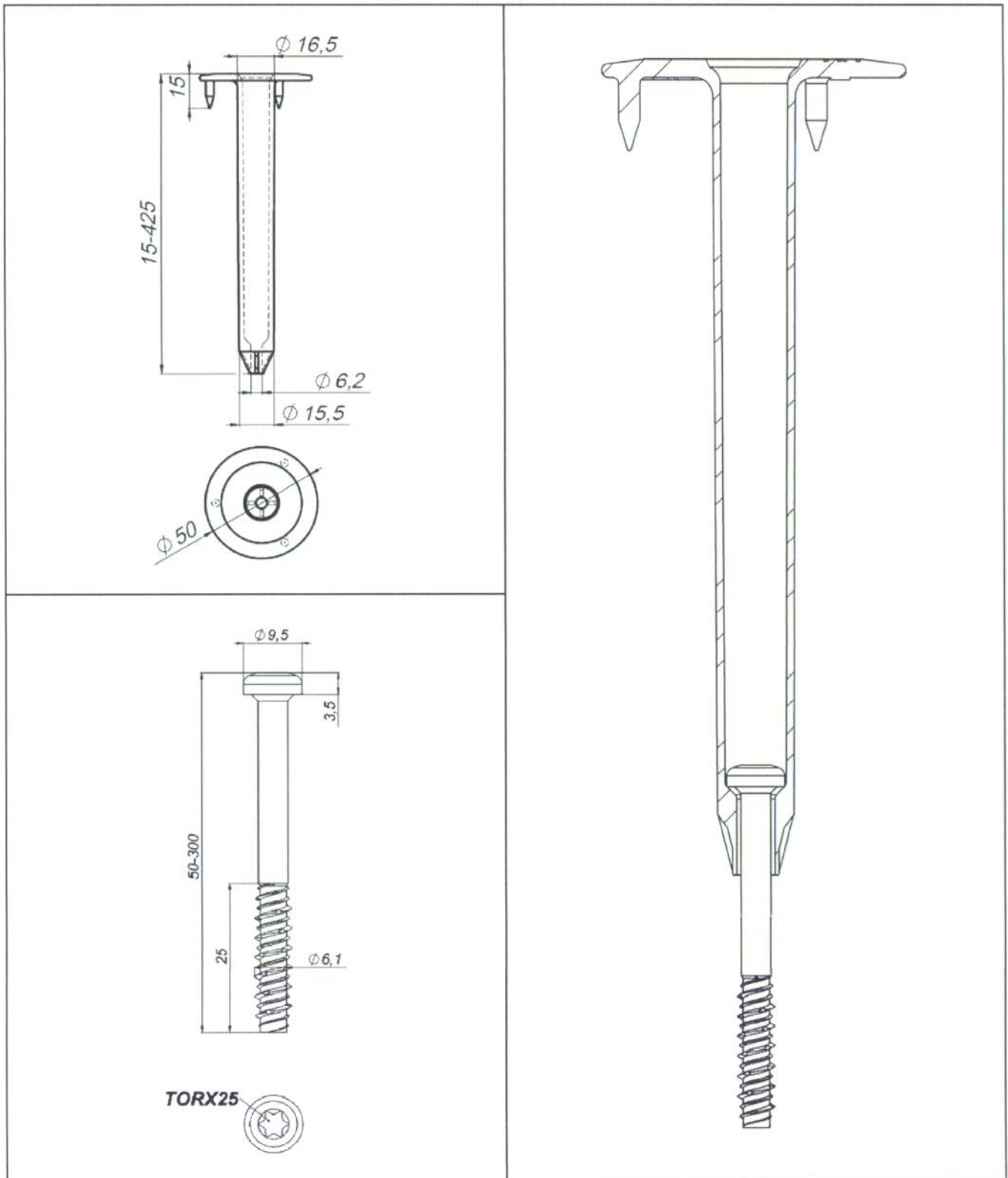


KOELNER S.A. Flat Roof Fasteners

Combination 37

Mount: GOK
 Fastener: WBT-A

Annex 37

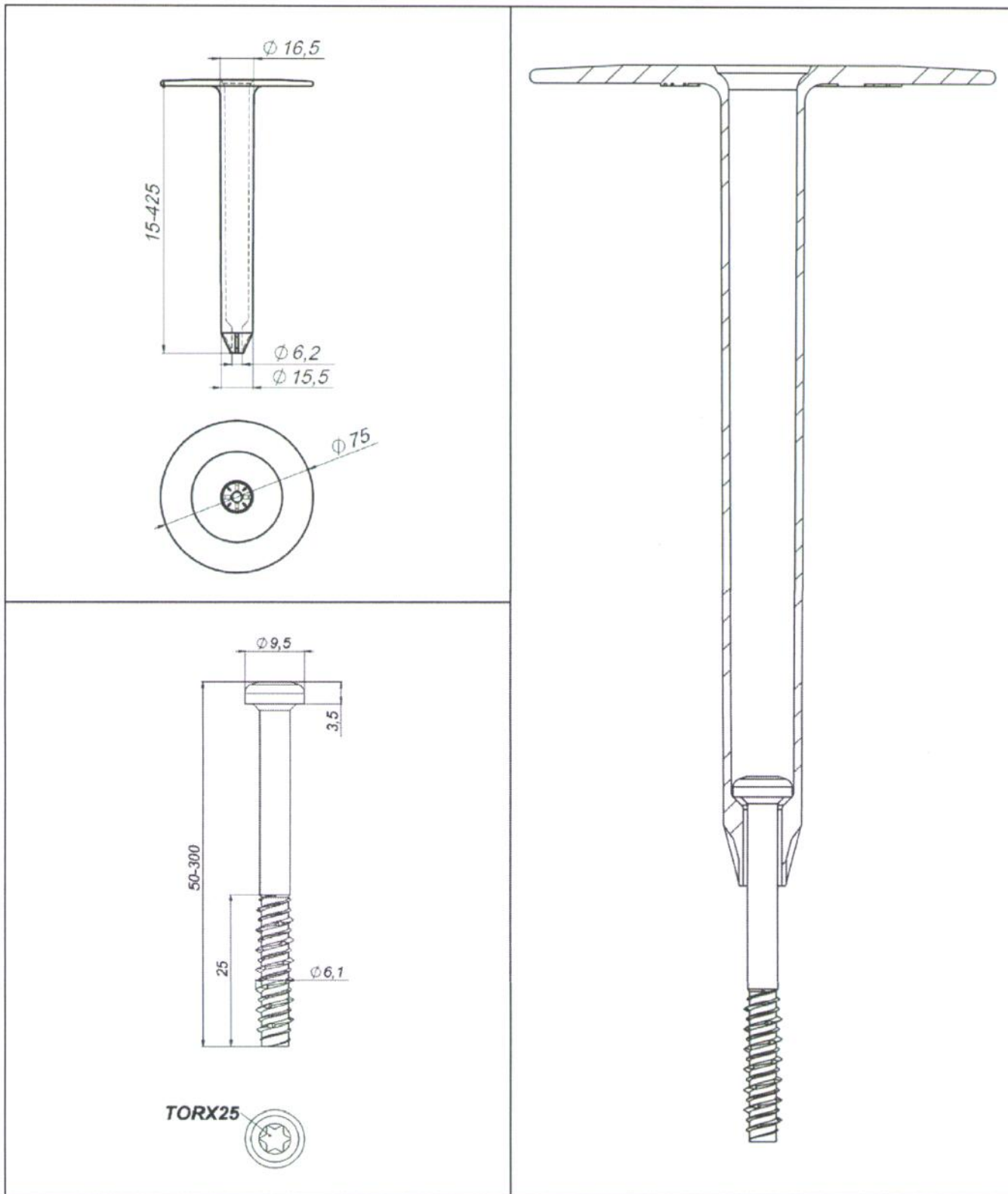


KOELNER S.A. Flat Roof Fasteners

Combination 38

Mount: GOK-PLUS
Fastener: WBT-A

Annex 38

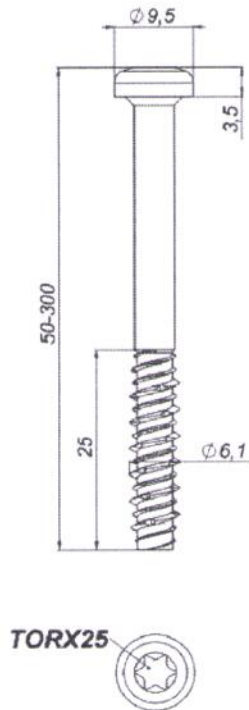
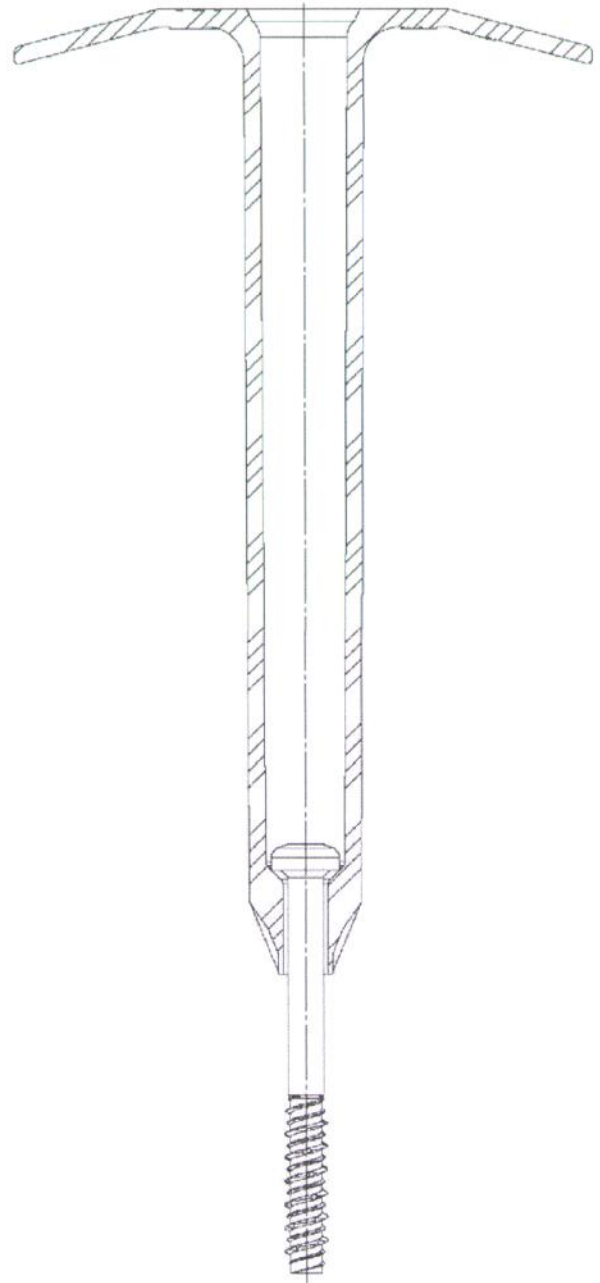
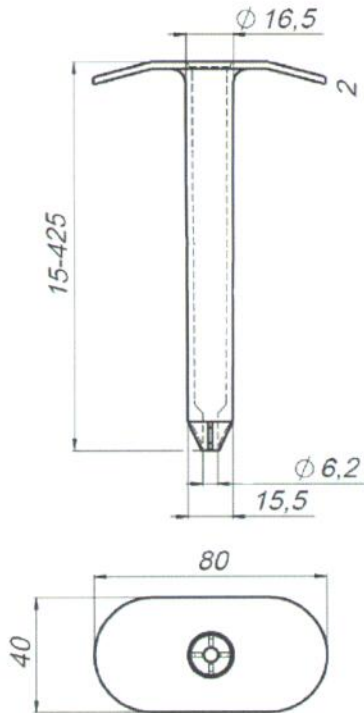


KOELNER S.A. Flat Roof Fasteners

Combination 39

Mount: GOK75
Fastener: WBT-A

Annex 39

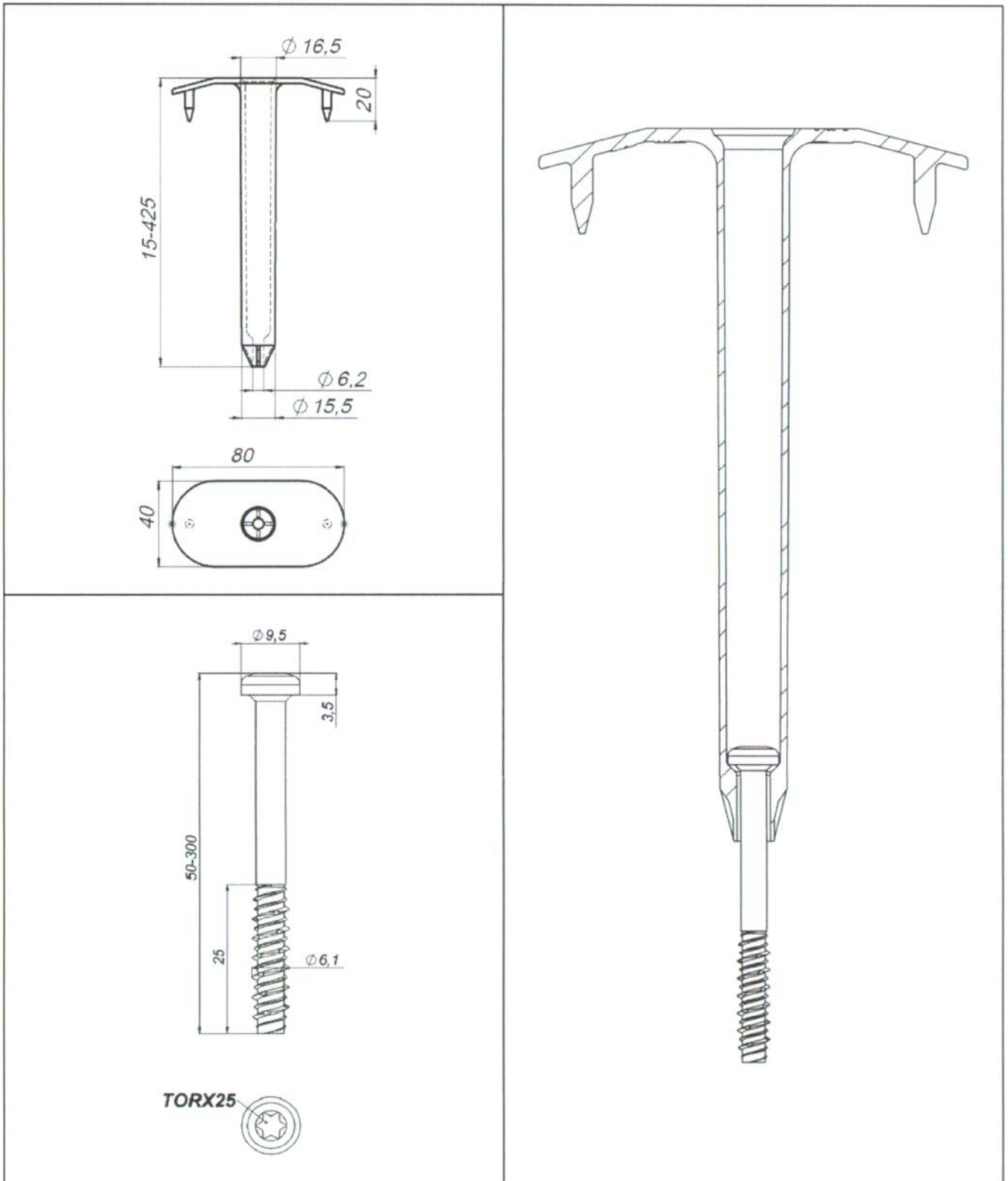


KOELNER S.A. Flat Roof Fasteners

Combination 40

Mount: GOW
Fastener: WBT-A

Annex 40

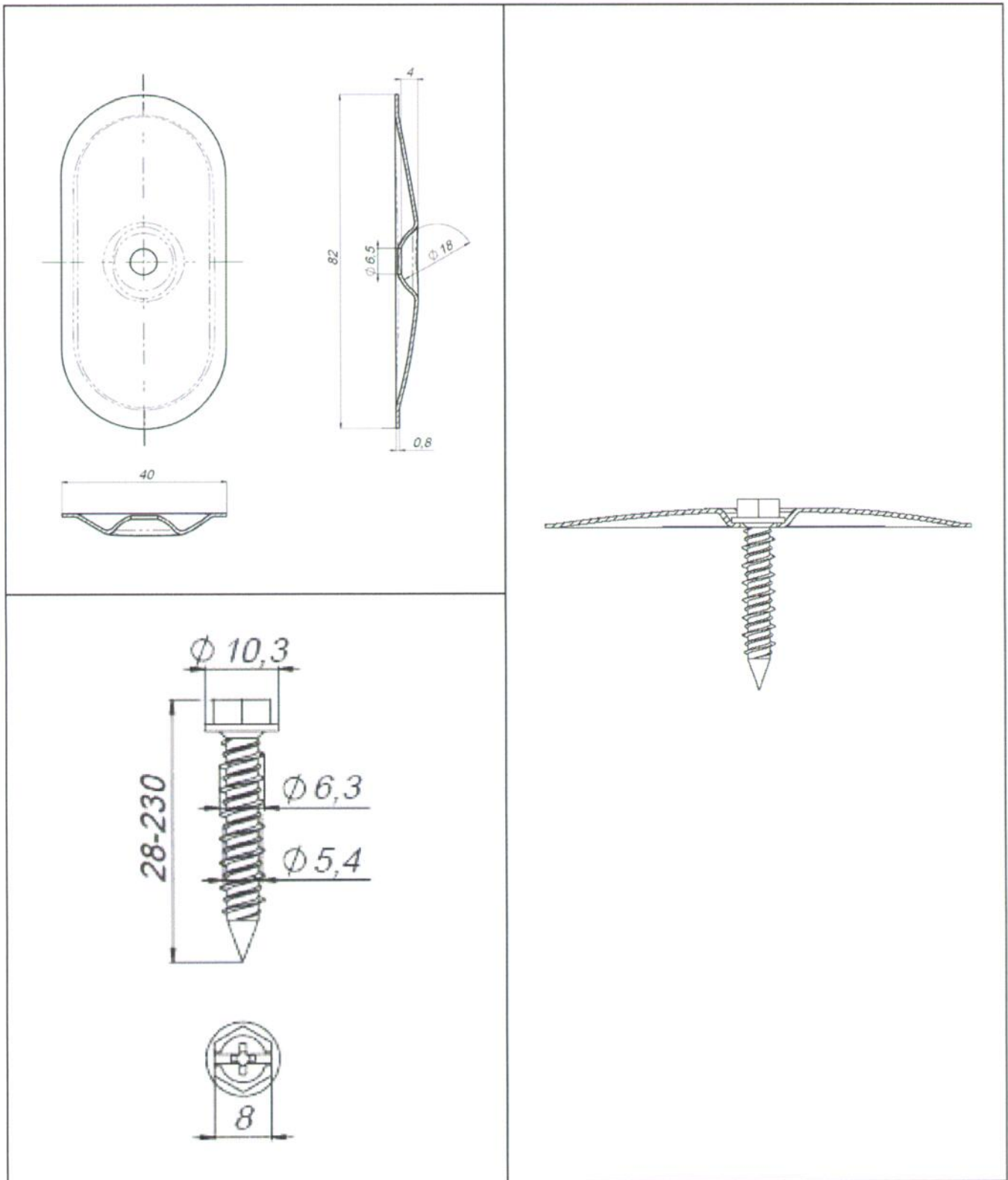


KOELNER S.A. Flat Roof Fasteners

Combination 41

Mount: GOW-PLUS
Fastener: WBT-A

Annex 41

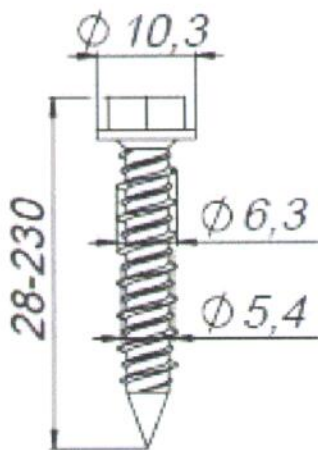
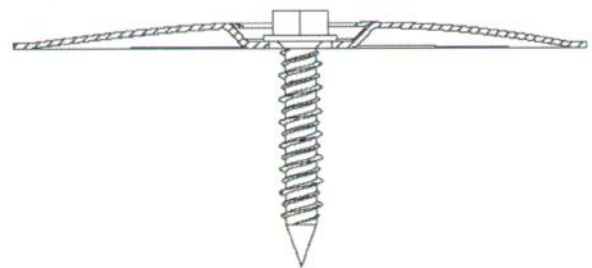
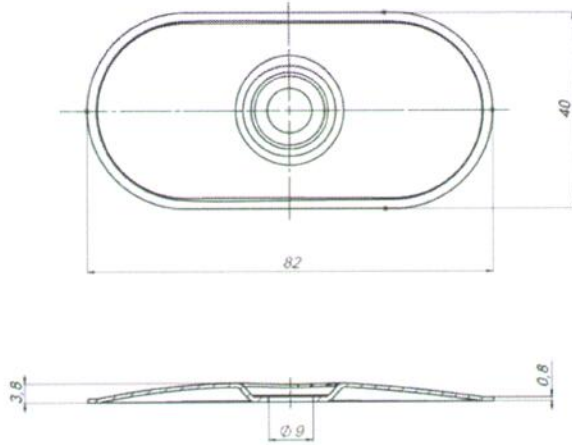


KOELNER S.A. Flat Roof Fasteners

Combination 42

Mount: POW-07-AlZn
 Fastener: WCS

Annex 42

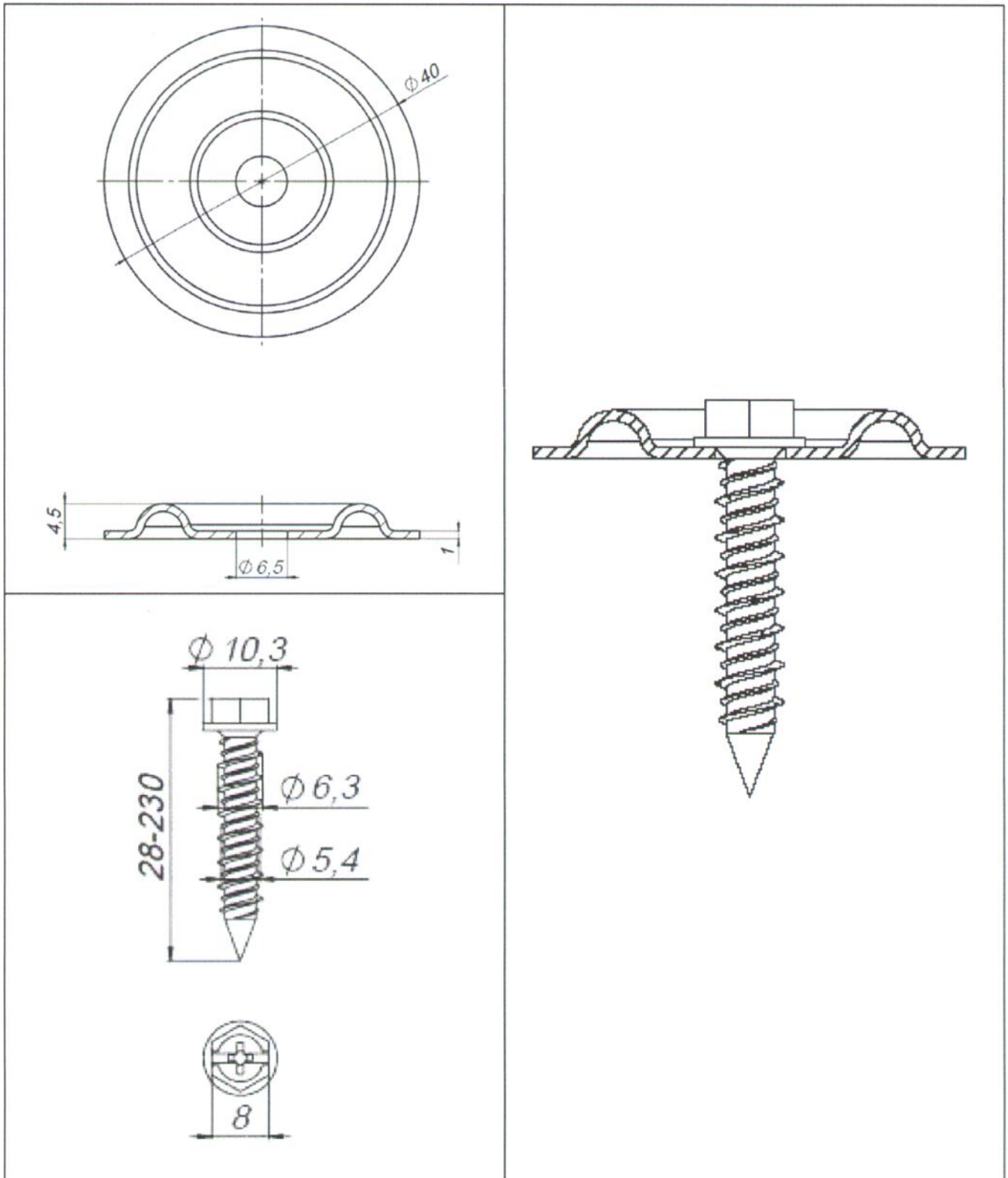


KOELNER S.A. Flat Roof Fasteners

Combination 43

Mount: POW-09-AlZn
Fastener: WCS

Annex 43

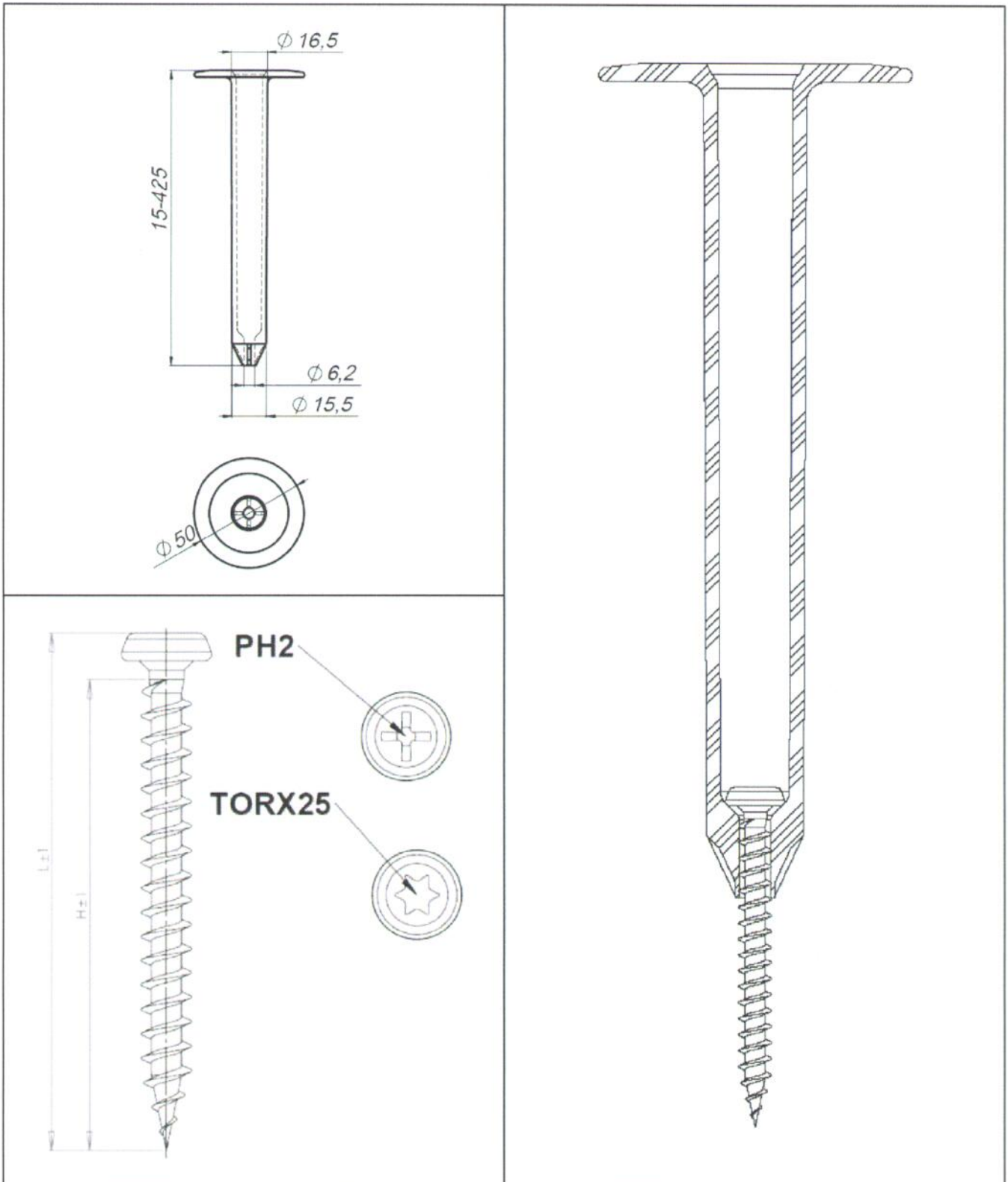


KOELNER S.A. Flat Roof Fasteners

Combination 44

Mount: POK-041-AlZn
Fastener: WCS

Annex 44



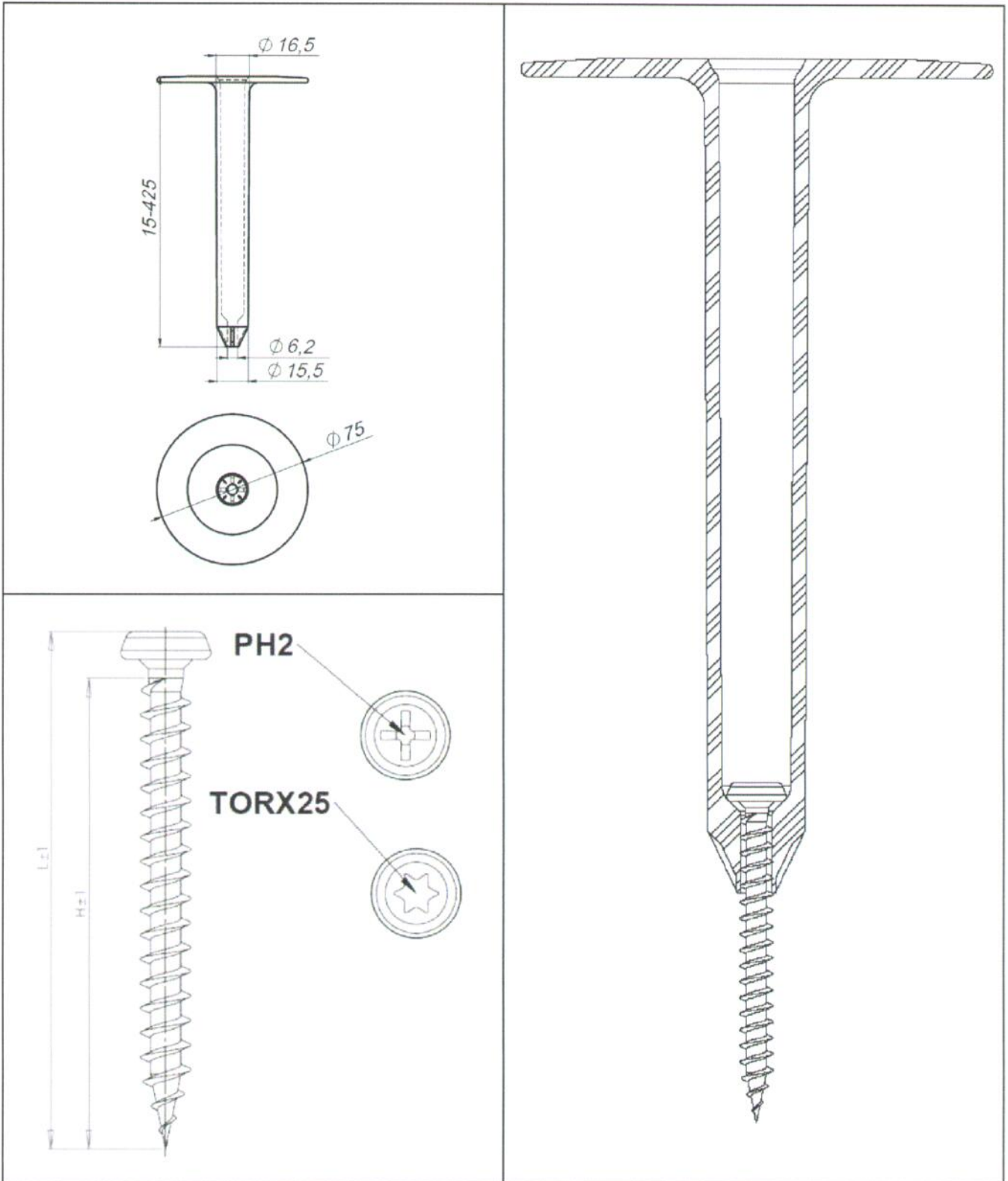
KOELNER S.A. Flat Roof Fasteners

Combination 45

Mount: GOK
Fastener: WW (PH2- or Torx25-Drive)

Annex 45

<p>KOELNER S.A. Flat Roof Fasteners</p>	
<p>Combination 46</p> <p>Mount: GOK-PLUS</p> <p>Fastener: WW (PH2- or Torx25-Drive)</p>	<p>Annex 46</p>

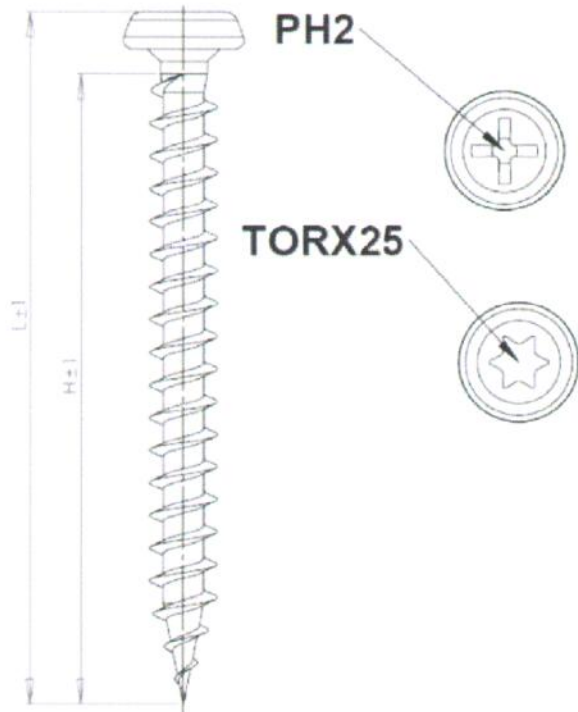
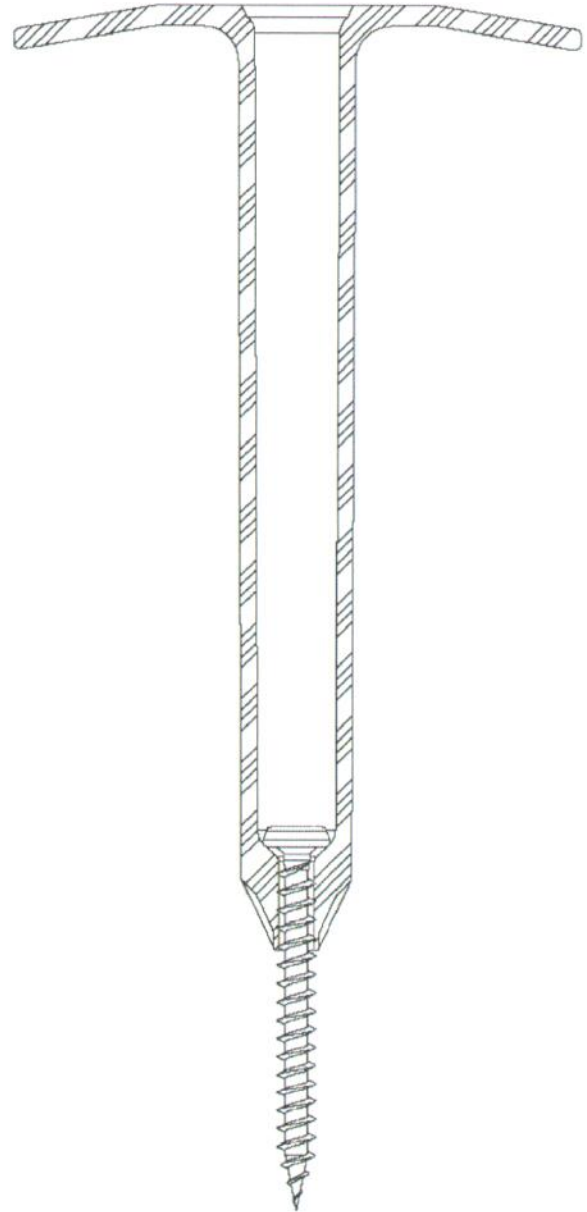
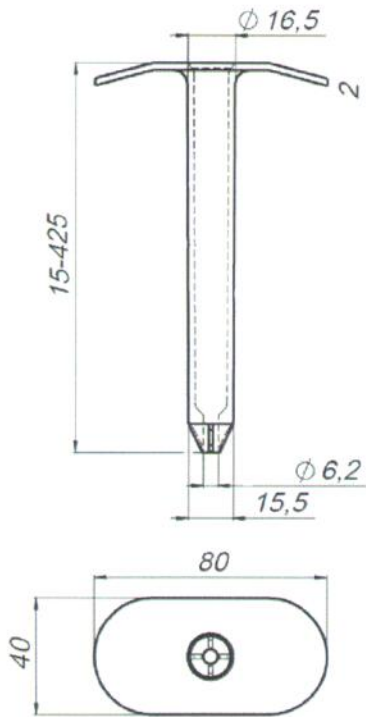


KOELNER S.A. Flat Roof Fasteners

Combination 47

Mount: GOK75
Fastener: WW (PH2- or Torx25-Drive)

Annex 47

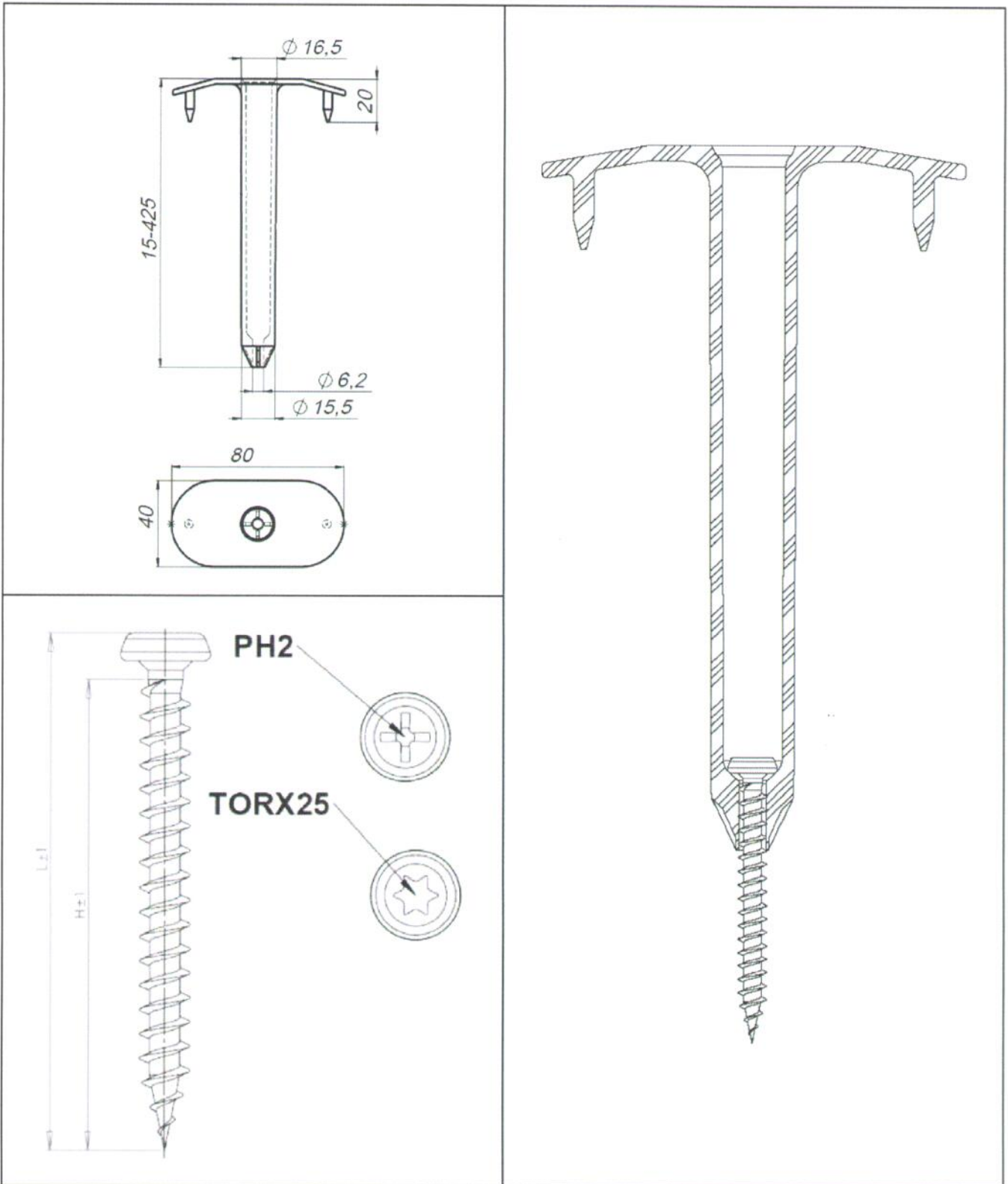


KOELNER S.A. Flat Roof Fasteners

Combination 48

Mount: GOW
Fastener: WW (PH2- or Torx25-Drive)

Annex 48

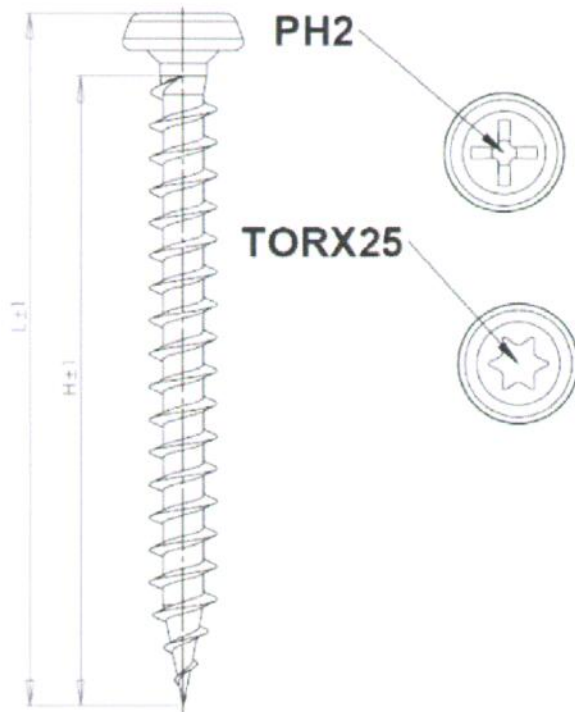
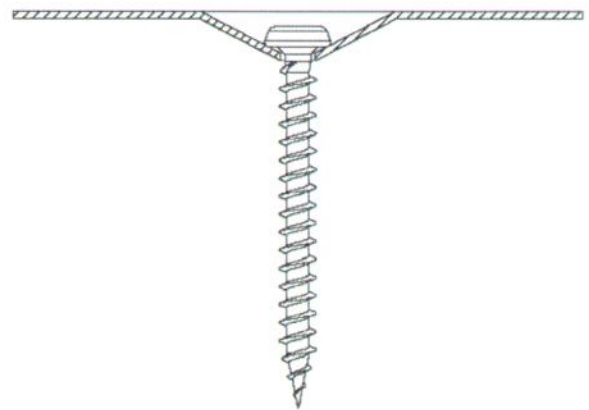
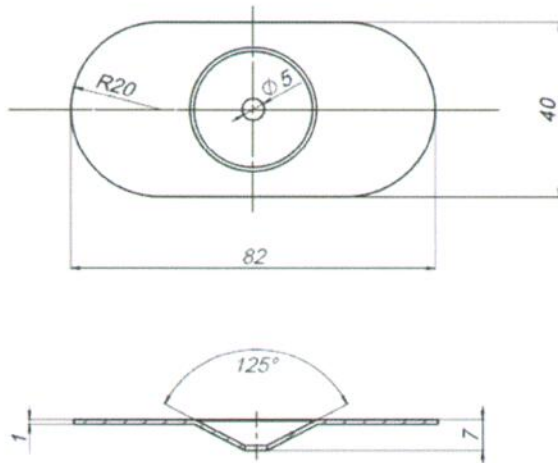


KOELNER S.A. Flat Roof Fasteners

Combination 49

Mount: GOW-PLUS
Fastener: WW (PH2- or Torx25-Drive)

Annex 49

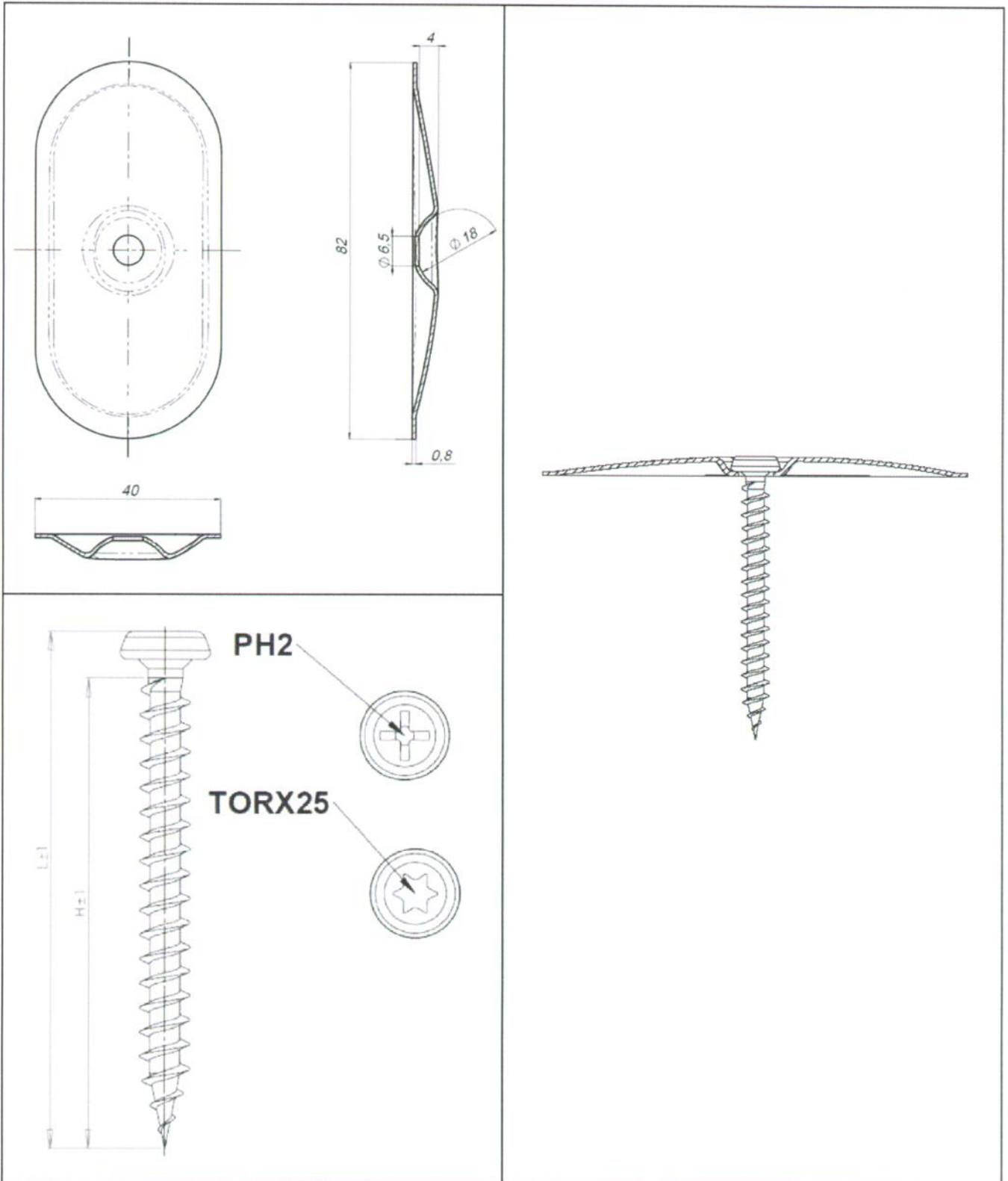


KOELNER S.A. Flat Roof Fasteners

Combination 50

Mount: POW-05-AlZn
Fastener: WW (PH2- or Torx25-Drive)

Annex 50

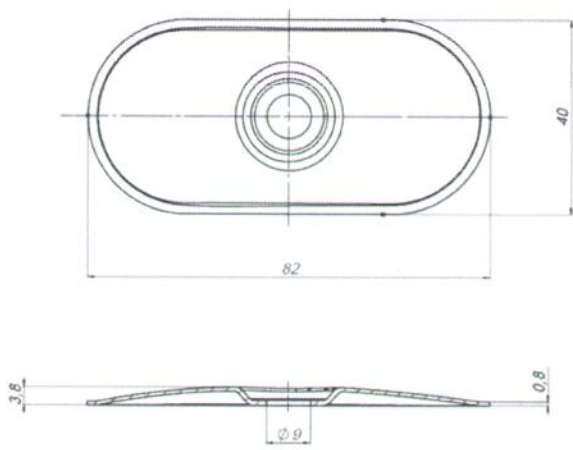
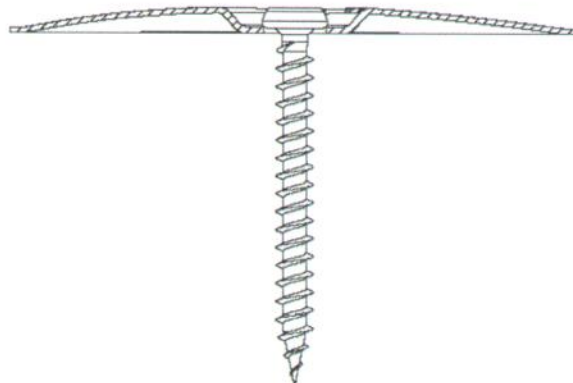
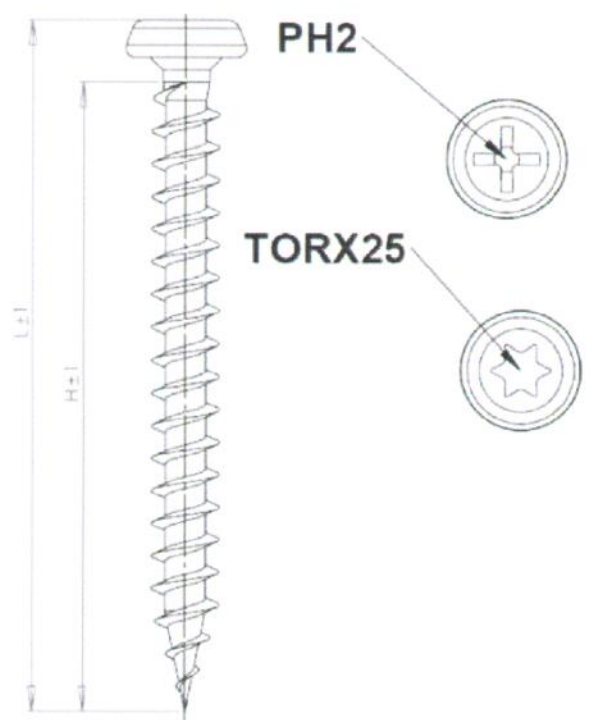


KOELNER S.A. Flat Roof Fasteners

Combination 51

Mount: POW-07-AlZn
Fastener: WW (PH2- or Torx25-Drive)

Annex 51

	
	
<p>KOELNER S.A. Flat Roof Fasteners</p>	
<p>Combination 52</p> <p>Mount: POW-09-AlZn</p> <p>Fastener: WW (PH2- or Torx25-Drive)</p>	<p>Annex 52</p>

<p>KOELNER S.A. Flat Roof Fasteners</p>		<p>Annex 53</p>
<p>Combination 53 Mount: POK-041-AIZn Fastener: WW (PH2- or Torx25-Drive)</p>		

Nr.	Screw	Mount	Metal sheetings ¹⁾							Structural Timber ²⁾	Plywood ³⁾	OSB/3 ⁴⁾	Concrete ⁵⁾ Lightconcrete ⁶⁾		
			0,50	0,63	0,75	0,88	1,00	1,25	1,50						
1	WX (T25 / PH2)	GOK	—	0,76	1,01	1,28	1,53	1,71	1,71	—	—	—	—		
2		GOK-PLUS												1,66	1,66
3		GOK75												1,73	1,73
4		GOW												1,71	1,71
5		GOW-PLUS												2,05	2,57
6		POW-05-AlZn													
7		POW-07-AlZn													
8		POK-041-AlZn													
9	WB	POW-05-AlZn	—	0,68	0,96	1,25	1,53	2,10	2,68	—	—	—			
10		POW-07-AlZn													
11		POW-09-AlZn													
12		POK-041-AlZn													
13	WO (T25 / PH2)	GOK	0,40	0,68	0,93	1,20	1,45	1,71	1,71	1,45	1,57	1,08	—		
14		GOK-PLUS												1,66	1,66
15		GOK75												1,73	1,73
16		GOW												1,71	1,71
17		GOW-PLUS												1,97	2,50
18		POW-05-AlZn													
19	POW-07-AlZn														
20	POK-041-AlZn														
21	WO (T25 / PH2) mit Dübel K08	GOK	—	—	—	—	—	—	—	—	—	—	1,66		
22		GOK-PLUS											1,73		
23		GOK75											1,71		
24		GOW											1,97		
25		GOW-PLUS													
26		POW-05-AlZn													
27	POW-07-AlZn														
28	POK-041-AlZn														
29	WBT	GOK	—	—	—	—	—	—	1,59	1,47	0,98	—	1,66		
30		GOK-PLUS											1,73		
31		GOK75											1,71		
32		GOW											5,04		
33		GOW-PLUS											4,29		
34		POW-07-AlZn											3,84		
35	POW-09-AlZn														
36	POK-041-AlZn														
37	WBT-A	GOK	—	—	—	—	—	—	—	—	—	—	1,66		
38		GOK-PLUS											1,73		
39		GOK75											1,71		
40		GOW													
41	GOW-PLUS														
42	WCS	POW-07-AlZn	—	—	—	—	—	—	—	—	—	—	4,71		
43		POW-09-AlZn											4,29		
44		POK-041-AlZn											3,84		
45	WW	GOK	—	—	—	—	—	—	1,66	1,66	1,32	—	1,66		
46		GOK-PLUS											1,73		
47		GOK75											1,71		
48		GOW											1,79		
49		GOW-PLUS													
50		POW-05-AlZn													
51		POW-07-AlZn													
52	POW-09-AlZn														
53	POK-041-AlZn														

1) Steel S280GD - EN 10346, nominal thickness t_N in mm
2) Structural timber / C24 - EN 338; effective embedment depth (penetration length of threaded part) $l_{ef} \geq 24$ mm
3) Plywood - EN 12369-2; effective embedment depth (penetration length of threaded part) $l_{ef} \geq 20$ mm
4) OSB/3 - EN 12369-1; effective embedment depth (penetration length of threaded part) $l_{ef} \geq 18$ mm
5) Concrete C25/30 - EN 206-1; for WO with KR08, $d_{pd} = \varnothing 8,0$ mm and $l_{ef} \geq 40$ mm or for WBT / WBT-A / WCS with $d_{pd} = \varnothing 5,0$ mm and $l_{ef} \geq 30$ mm
6) Lightconcrete C12/15 - EN 206-1; for WO with KR08, $d_{pd} = \varnothing 8,0$ mm and $l_{ef} \geq 40$ mm or for WBT / WBT-A / WCS with $d_{pd} = \varnothing 5,0$ mm and $l_{ef} \geq 30$ mm

KOELNER S.A. Flat Roof Fasteners	Annex 54
Characteristic Values of Axial Load Resistance in kN	