



European Technical Approval ETA-13/0220

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung <i>Trade name</i>	GRK Betonschraube <i>GRK Concrete Screw</i>
Zulassungsinhaber <i>Holder of approval</i>	GRK Canada Ltd. 1499 Rosslyn Road THUNDER BAY, ONTARIO P7E 6W1 KANADA
Zulassungsgegenstand und Verwendungszweck <i>Generic type and use of construction product</i>	Betonschraube in den Größen 6,2, 7,5 and 10 mm aus galvanisch verzinktem Stahl zur Verankerung im Beton <i>Concrete screw of sizes 6,2, 7,5 and 10 mm made of galvanised steel for use in concrete</i>
Geltungsdauer: <i>Validity:</i>	vom <i>from</i> bis <i>to</i> 17 May 2013 17 May 2018
Herstellwerk <i>Manufacturing plant</i>	Fa. Battenfeld

Diese Zulassung umfasst
This Approval contains

14 Seiten einschließlich 7 Anhänge
14 pages including 7 annexes

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 "Metal anchors for use in concrete - Part 3: Undercut anchors", ETAG 001-03.
- 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 product and intended use

1.1 Definition of the construction product

The GRK Concrete Screw Caliburn is made of galvanised steel of sizes 6.2, 7.5 and 10. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

An illustration of the product and intended use is given in Annex 1.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences.

The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206:2000-12.

The anchor size 6.2 may be used in uncracked concrete only. The anchor sizes 7.5 and 10 may be anchored in cracked and non-cracked concrete.

The anchor made of galvanised steel may only be used in structures subject to dry internal conditions.

The provisions made in this European technical approval are based on an assumed working life of the anchor of 50 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.

2 Characteristics of the product and methods of verification

2.1 Characteristics of the product

The anchor corresponds to the drawings and information given in the Annexes. The characteristic values, dimensions and tolerances of the anchor not indicated in the Annex shall correspond to the respective values laid down in the technical documentation⁷ of this European technical approval.

The characteristic values for the design of the anchorages are given in the Annexes.

⁷ The technical documentation of this European technical approval is deposited at the 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.

Each anchor is marked with the manufacturer ID, the anchor type, the diameter and the length of the anchor according to Annex 2.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Part 1 "Anchors in general" and Part 3 "Undercut anchors", on the basis of option 7 (Size 6,2) or option 1 (sizes 7,5 and 10).

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the decision 96/582/EG of the European Commission⁸ the system 2(i) (referred to as system 1) of attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
 - (1) factory production control;
 - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed control plan;
- (b) Tasks for the approved body:
 - (3) initial type-testing of the product;
 - (4) initial inspection of factory and of factory production control;
 - (5) 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 of 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 / raw / constituent 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.

⁸ Official Journal of the European Communities L 254 of 08.10.1996.

The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Deutsches Institut für Bautechnik.⁹

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 of 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 anchors 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 product is in conformity with the provisions of this European technical approval.

3.2.2 Tasks of approved bodies

The approved body shall perform the

- initial type-testing of the product,
- 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 factory production control 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 the anchor. 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 manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- the number of the guideline for European technical approval,
- use category: ETAG 001-1 Option 7 (size 6.2) Option 1 (sizes 7.5 and 10),
- size.

⁹

The control plan is a confidential part of the documentation of the European technical approval, but not published together with 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.

4 Assumptions under which the fitness of the product 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 the 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 the 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.

4.2 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Annex C, Method A under the responsibility of an engineer experienced in anchorages and concrete work.

Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored.

The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, in cracked or non-cracked concrete, etc.).

4.3 Installation of anchors

The fitness for use of the anchor can only be assumed if the following conditions of installation are met:

- Anchor installation carried out by appropriately qualified personnel under the supervision of the person responsible for technical matters on site,
- Use of the anchor only as supplied by the manufacturer,
- Anchor installation in accordance with the manufacturer's specifications and drawings,
- Checks before placing the anchor, to ensure that the characteristic values of the base material in which the anchor is to be placed, is identical with the values, which the characteristic loads apply,
- Check of the concrete being well compacted, e.g. without significant voids,
- Edge distances and spacing not less than the specified values without minus tolerances,
- Placing drill holes without damaging the reinforcement,
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application,
- Cleaning of the hole of drilling dust,
- Anchor installation such that the embedment depth of the anchor in the concrete is not smaller than the value h_{nom} given in Annex 3, Table 2,
- The fixture is fully pressed on the concrete surface without intermediate layers,
- Further turning of the anchor is not possible,
- The head of the anchor is fully supported on the fixture and is not damaged.

5 Indications to the manufacturer

The manufacturer is responsible to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to 4.2 and 4.3 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European technical approval. In addition, all installation data shall be shown clearly on the packaging and/or on an enclosed instruction sheet, preferably using illustrations.

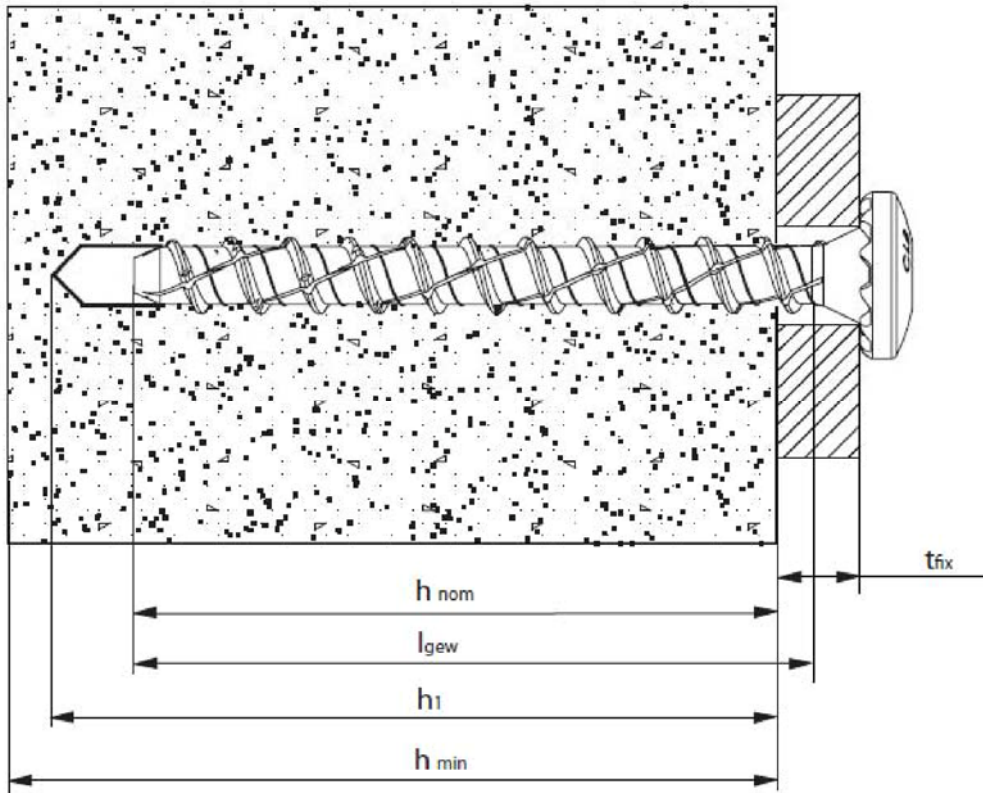
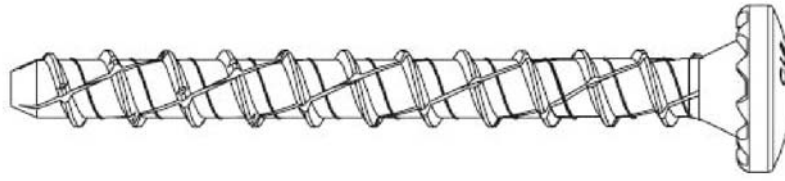
The minimum data required are:

- Drill bit diameter,
- Size of the anchor,
- Maximum thickness of the fixture,
- Minimum embedment depth,
- Minimum hole depth,
- Information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- Reference to any special installation equipment needed,
- Identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

Uwe Bender
Abteilungsleiter

beglaubigt:
Lange

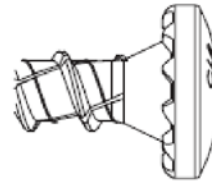
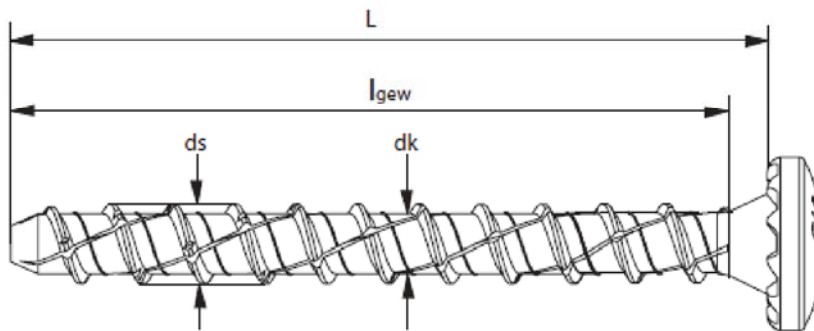


GRK Concrete Screw Caliburn

Installed GRK concrete screw

Annex 1

GRK Caliburn



Imprint:

Manufacturer ID: X
Screw type: CLB
Screw size: e.g. 7.5
Screw length in mm: L (e.g. 92 or 125)

Table 1: Dimensions and Materials

Anchor type			Caliburn 6.2			Caliburn 7.5			Caliburn 10	
Screw Length	L	[mm]	70	90	125	92	125	125		
Setting depth	h_{nom}	[mm]	55		65	70	70	85	70	85
Length of thread	l_{gew}	[mm]	60		87	72	87	87	87	87
Pitch of thread	h_t	[mm]	5,0			5,7			7,60	
Length of cone end	h_s	[mm]	3,0			3,0			3,0	
Minor diameter	d_k	[mm]	4,35			5,5			7,4	
Major diameter	d_s	[mm]	6,2			7,6			9,6	
Material	Steel according to EN 10263-4									

GRK Concrete Screw Caliburn

Head shapes, dimensions and materials

Annex 2

Table 2: Installation data

Anchor type			Caliburn 6.2			Caliburn 7.5			Caliburn 10		
Screw Length	L	[mm]	70	90	125	92	125	125			
Setting depth ¹⁾	h_{nom}	[mm]	55	55	65	70	70	85	70	85	
Depth of drill hole ¹⁾	$h_{t \geq}$	[mm]	70	70	80	85	85	100	85	100	
Nominal diameter of drill bit	d_0	[mm]	5			6			8		
Cutting diameter of drill bit	$d_{cut \leq}$	[mm]	5,40			6,55			8,51		
Effective anchorage depth	h_{ef}	[mm]	40	40	40	48	48		54	64	
Max. thickness of the fixture ^{1),3)}	t_{fix}	[mm]	15	35	70	60	22	55	40	55	40
Diameter of clearance hole in the fixture	d_f	[mm]	7,0			8,0			12,0		
Installation torque	T_{inst}	[Nm]	- ²⁾			- ²⁾			- ²⁾		

1) see Figure in Annex 1

2) only allowed to set with an impact screw driver (max. power output 45 Nm)

3) $t_{fix} \geq L - l_{gew}$ (see Table 1), thread must reach into the fixture

Table 3: Design Method A

Minimum thickness of concrete member, minimum spacing and minimum edge distances of anchors

Size	h_{nom}	h_{ef}	Minimum member thickness h_{min}	Minimum edge distance c_{min}	Minimum spacing s_{min}
[-]	[mm]	[mm]	[mm]	[mm]	[mm]
Cracked and uncracked concrete					
6.2	55	40	100	50	50
6.2	65	40	110	50	50
7.5	70	48	110	60	60
7.5	85	48	135	60	60
10	70	54	110	51	203
10	85	64	135	51	203

GRK Concrete Screw Caliburn

**Installation data, minimum member thickness,
minimum spacing and minimum edge distances**

Annex 3

Table 4: Design method A –
Characteristic resistance for tension loads

GRK Caliburn (gvz)			6.2	6.2	7.5	7.5	10	10
Setting depth	h_{nom}	[mm]	55	65	70	85	70	85
Steel failure								
Characteristic resistance	$N_{RK,S}$	[kN]	10,7		17,1		31,0	
Partial safety factor	γ_{Ms} ¹⁾	[-]	1,4					
Pullout failure								
Characteristic resistance in cracked concrete C20/25	$N_{RK,p}$	[kN]	X		2,5	3	2,5	4
Characteristic resistance in non-cracked concrete C20/25	$N_{RK,p}$	[kN]	6	7,5	9	9	9	12
Increasing factors for $N_{RK,p}$ in cracked or non-cracked concrete	ψ_c	C30/37	1,17					
		C40/50	1,32					
		C50/60	1,42					
Partial safety factor	γ_{Mp} ¹⁾	[-]	1,5		2,1		2,1	
Concrete cone failure								
Effective anchorage depth	h_{ef}	[mm]	40	40	48	48	54	64
Characteristic spacing	$s_{cr,N}$	[mm]	$3h_{ef}$					
Characteristic edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$					
Partial safety factor	γ_{Mc} ^{1), 2)}	[-]	1,5		2,1		2,1	
Splitting failure								
Effective anchorage depth	h_{ef}	[mm]	40	40	48	48	54	64
Characteristic spacing	$s_{cr,sp}$	[mm]	$2c_{cr,sp} > 1,5h_{ef}$					
Characteristic edge distance	$c_{cr,sp}$	[mm]	63	63	82	101	82	100
Partial safety factor	γ_{Msp} ¹⁾	[-]	1,5		2,1		2,1	

¹⁾ In absence of other national regulations.

²⁾ The installation factor $\gamma_2 = 1,0$ ($\varnothing 6,2$) and $\gamma_2 = 1,4$ ($\varnothing 7,5$ and $\varnothing 10$) are included.

GRK Concrete Screw Caliburn

Design method A - Characteristic resistance for tension loading

Annex 4

Table 5: Design method A –
Characteristic resistance for shear loads

GRK Caliburn (gvz)			6.2	6.2	7.5	7.5	10	10	
Setting depth	h_{nom}	[mm]	55	65	70	85	70	85	
Steel failure without lever arm									
Characteristic resistance	$V_{Rk,s}$	[kN]	2,7		8,2		10,8		
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,5						
Steel failure with lever arm									
Characteristic resistance	$M_{Rk,s}^{1)}$	[Nm]	7		14,1		34,4		
Partial safety factor	$\gamma_{Ms}^{1)}$	[-]	1,5						
Concrete pryout failure									
Effective anchorage depth	h_{ef}	[mm]	40	40	48	48	54	64	
Factor in Eq. (5.6) of ETAG001, Annex C, Section 5.2.3.3)	k	[-]	1					2	
Partial safety factor	$\gamma_{Mcp}^{1)}$	[-]	1,5						
Concrete edge failure									
Effective length of anchor in shear loading	l_f	[mm]	40	40	48	48	54	64	
Effective diameter of anchor	d_{nom}	[mm]	4,35	4,35	5,5	5,5	7,4	7,4	
Partial safety factor	$\gamma_{Mc}^{1)}$	[-]	1,5						

¹⁾ In absence of other national regulations.

GRK Concrete Screw Caliburn

Design method A - Characteristic resistance for shear loading

Annex 5

Table 6: Displacements under tension loads

Size	h_{nom}	h_{ef}	Concrete	$N_{Rk,p}$	γ_f	γ_{Mc}	$N =$ $N_{Rk,p}/(\gamma_f \cdot \gamma_{Mc})$	δ_{N0}	$\delta_{N\infty}$
[-]	[mm]	[mm]	[-]	[kN]	[-]	[-]	[kN]	[mm]	[mm]
7.5	70	48	cracked C20/25	2,5	1,4	2,1	0,85	0,30	0,5
7.5	85	48		3,0	1,4	2,1	1,02	0,30	0,5
10	70	54		2,5	1,4	2,1	0,85	0,40	0,6
10	85	64		4,0	1,4	2,1	1,36	0,40	0,6
6.2	55	40	non- cracked C20/25	6,0	1,4	1,8	2,4	0,20	0,5
6.2	65	40		7,5	1,4	1,8	3,0	0,20	0,5
7.5	70	48		9,0	1,4	2,1	3,1	0,30	0,5
7.5	85	48		9,0	1,4	2,1	3,1	0,30	0,5
10	70	54		9,0	1,4	2,1	3,1	0,30	0,6
10	85	64		12,0	1,4	2,1	4,1	0,35	0,6

Table 7: Displacements under shear loads

Size	h_{nom}	h_{ef}	Concrete	$V_{Rk,s}$	γ_f	γ_{Mc}	$V =$ $V_{Rk,s}/(\gamma_f \cdot \gamma_{Ms})$	δ_{V0}	$\delta_{V\infty}$
[-]	[mm]	[mm]	[-]	[kN]	[-]	[-]	[kN]	[mm]	[mm]
6.2	55/65	40	C20/25	2,7	1,4	1,5	1,3	0,65	1,0
7.5	70/85	48		8,2			3,9	0,70	1,1
10	70/85	54/64		13,4			6,4	0,85	1,3

GRK Concrete Screw Caliburn

Displacements

Annex 6

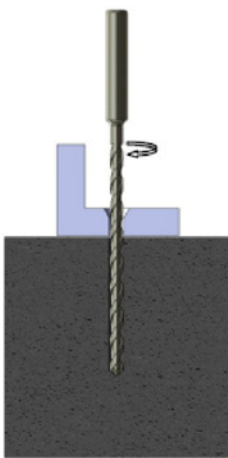


Figure 1

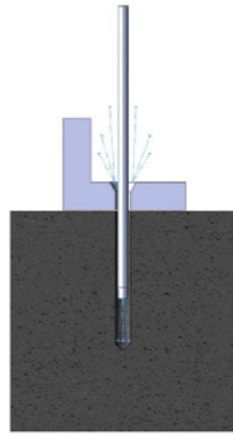


Figure 2

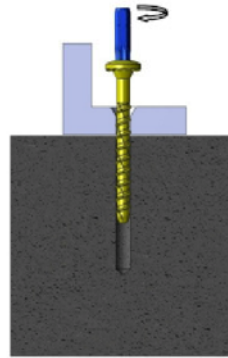


Figure 3

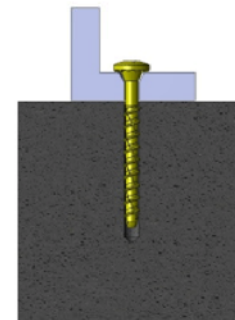


Figure 4

Drilling:

Using the proper drill bit size, drill a hole into the base material to the required depth plus a minimum of 15 mm. The diameter of the drill bit d_{cut} must be considered (see Table 2).

Cleaning:

Remove dust and debris from the hole using a vacuum cleaner, compressed air or a hand pump.

Driving:

The anchor may only be set with an impact screw driver with a maximum power output of 45 Nm. Select proper driver bit and install anchor through the attachment into the hole to the specified embedment depth.

Finish:

The anchor must be sitting properly after installation. The setting depth (Table 3) and the contact of the screw head on the fixture must be ensured. The thread must reach into the fixture.