Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

European Technical Assessment Body for construction products

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European Technical Assessment ETA-25/0591 of 29 September 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	GRIPTEC system
Product family to which the construction product belongs	Mechanical splices for reinforcing steel bars
Manufacturer	DEXTRA MANUFACTURING Co., Ltd. Lumpini II Building 247 Sarasin Road 10330 Bangkok THAILAND
Manufacturing plant	DEXTRA Manufacturing locations
This European Technical Assessment contains	40 pages including 3 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	EAD 160129-00-0301

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Specific part

1 Technical description of the product

The GRIPTEC System is used as a mechanical, screwed system for connecting reinforcing bars in reinforced concrete components and for connecting to steel components under static or quasi-static, fatigue and low cycle loading.

The product description is given in Annex A.

The characteristic material values, dimensions and tolerances of the GRIPTEC System not indicated in Annexes A1 to A14 shall correspond to the respective values laid down in the technical documentation[1] of this European technical assessment.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the GRIPTEC System is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the GRIPTEC System of at least 100 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.

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

3.1 Mechanical resistance and stability (BWR 1) [1]

Essential characteristic	Performance
Resistance to static or quasi-static loading	See Annex C1 – C10
Slip under static or quasi-static load	See Annex C1 – C10
Slip after static or quasi-static load	See Annex C1 – C10
Fatigue strength for N = $2 \cdot 10^6$ load cycles	No performance assessed
Fatigue strength for S-N curve with k_1 and k_2 according to EN 1992-1-1	No performance assessed
Fatigue strength for S-N curve with specific k_1 and k_2	See Annex C1 – C10
Resistance to low cycle loading (seismic actions)	See Annex C1 – C5; C7 – C8

3.2 Safety in case of fire (BWR 2) [1]

Essential characteristic	Performance
Reaction to fire	Class A1

[1] The technical documentation of this European technical assessment 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.

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

In accordance with EAD 160129-00-0301 the applicable European legal act is: 2000/606/EC.
The system to be applied is: 1+

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 with Deutsches Institut für Bautechnik.

The following standards are referred to in this European Technical Assessment:

EN 1090-1:2009 + A1:2011	Execution of steel structures and aluminium structures – Part 1: Requirements for conformity assessment of structural components
EN 1992-1-1:2004 + AC:2010 + A1:2014	Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings
EN 1998-1:2004 + AC:2009 + A1:2013	Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
EN ISO 9606-1:2017	Qualification testing of welders – Fusion welding – Part 1: Steels (ISO 9606-1:2012, including Cor 1:2012 and Cor 2:2013)
EN ISO 12944-5:2019	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 5: Protective paint systems (ISO 12944-5:2019)
EN ISO 15609-1:2019	Specification and qualification of welding procedures for metallic materials – Welding procedure specification– Part 1: Arc welding (ISO 15609-1:2019)

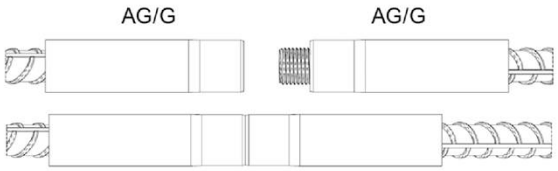
Issued in Berlin on 29 September 2025 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

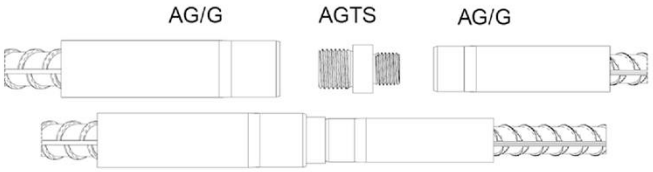
beglaubigt:
Kisan

Deutsches Institut für Bautechnik DIBt

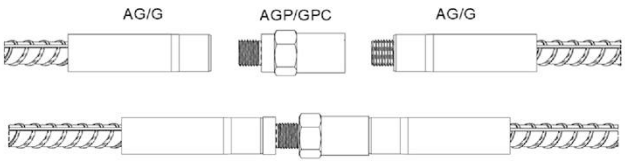
Standard Connection (AG / G)



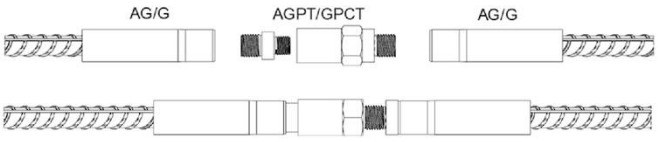
Transition Connection (AGTS)



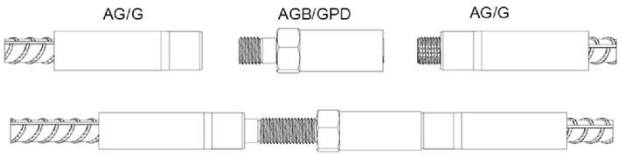
Position Connection (AGP / GPC)



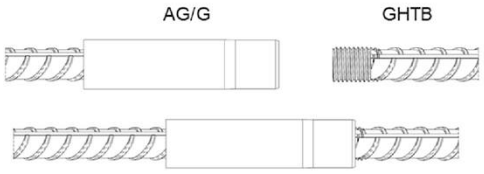
Position Transition Connection (AGPT / GPCT)



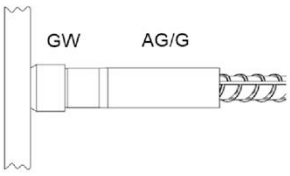
Bridging Connection (AGB / GPD)



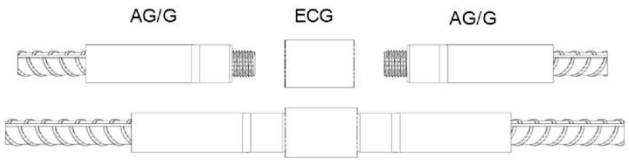
Hybrid Connection (GHC)



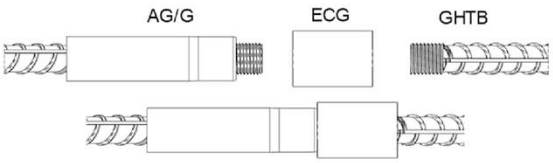
Weldable Connection (WC)



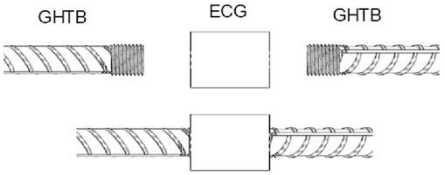
Stainless Steel Connection (ECG)



Hybrid Stainless Steel Connection Type 1 (HECG1)



Hybrid Stainless Steel Connection Type 2 (HECG2)



GRIPTEC system

Product description
Griptec Connection type overview

Annex A1

Table A1: **Standard connection using Griptec standard coupler (AG / G)**

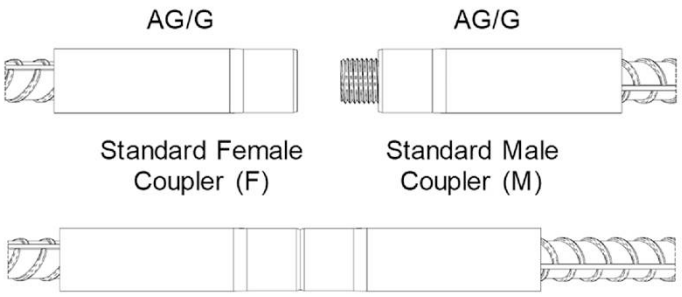


Fig. A1: **Griptec Standard Female-Male Connection**

Connection designation	Combination	Rebar size [mm]
AG12	AG12 F + AG12 M	12
AG14	AG14 F + AG14 M	14
AG16	AG16 F + AG16 M	16
AG20N	AG20N F + AG20N M	20
AG25	AG25 F + AG25 M	25
G25	G25 F + G25 M	
G28	G28 F + G28 M	28
AG32N	AG32N F + AG32N M	32
G32	G32 F + G32 M	
AG40N	AG40N F + AG40N M	40
G40	G40 F + G40 M	

Griptec sleeves are provided as female version without stud (F) and male version with threaded stud (M) for connection. The body of the sleeve is for both versions identical for the same rebar size.

GRIPTEC system	**Annex A2**
Product description Griptec Standard Connection	

Table A2: **Transition connection of different diameters using transition stud (AGTS)**

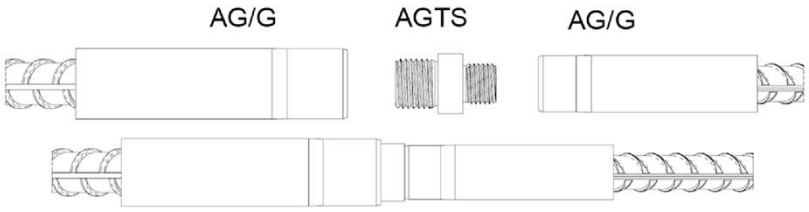
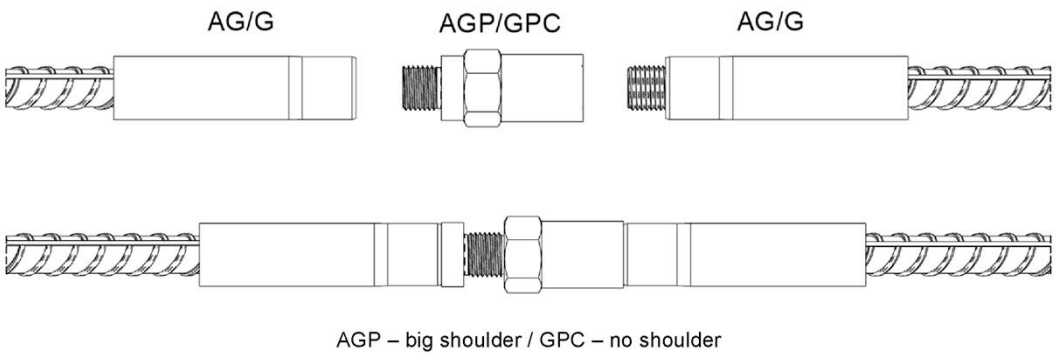


Fig. A2: **Griptec transition connection**

Connection designation	Combination	Rebar size [mm]	
		Large	Small
AGTS14/12	AG14 F + AGTS14/12 + AG12 F	14	12
AGTS16/12	AG16 F + AGTS16/12 + AG12 F	16	12
AGTS16/14	AG16 F + AGTS16/14 + AG14 F	16	14
AGTS20/16	AG20N F + AGTS20/16 + AG16 F	20	16
AGTS25/20	AG25 F + AGTS25/20 + AG20N F	25	20
	G25 F + AGTS25/20 + AG20N F		
AGTS28/25	G28 F + AGTS28/25 + AG25 F	28	25
	G28 F + AGTS28/25 + G25 F		
AGTS32/28	AG32N F + AGTS32/28 + G28 F	32	28
	G32 F + AGTS32/28 + G28 F		
AGTS40/32	AG40N F + AGTS40/32 + AG32N F	40	32
	G40 F + AGTS40/32 + G32 F		

GRIPTEC system	**Annex A3**
Product description Griptec Transition Connection	

Table A3: **Position connection using position stud (AGP / GPC)**



AGP – big shoulder / GPC – no shoulder

Fig. A3: **Griptec position connection**

Connection designation	Combination	Rebar size [mm]
AGP12	AG12 F + AGP12 + AG12 M	12
GPC12	AG12 F + GPC12 + AG12 M	
AGP14	AG14 F + AGP14 + AG14 M	14
GPC14	AG14 F + GPC14 + AG14 M	
AGP16	AG16 F + AGP16 + AG16 M	16
GPC16	AG16 F + GPC16 + AG16 M	
AGP20	AG20N F + AGP20 + AG20N M	20
GPC20	AG20N F + GPC20 + AG20N M	
AGP25	AG25 F + AGP25 + AG25 M	25
GPC25	AG25 F + GPC25 + AG25 M	
AGP25	G25 F + AGP25 + G25 M	
GPC25	G25 F + GPC25 + G25 M	
AGP28	G28 F + AGP28 + G28 M	28
GPC28	G28 F + GPC28 + G28 M	
AGP32	AG32N F + AGP32 + AG32N M	32
GPC32	AG32N F + GPC32 + AG32N M	
AGP32	G32 F + AGP32 + G32 M	
GPC32	G32 F + GPC32 + G32 M	
AGP40	AG40N F + AGP40 + AG40N M	40
GPC40	AG40N F + GPC40 + AG40N M	
AGP40	G40 F + AGP40 + G40 M	
GPC40	G40 F + GPC40 + G40 M	

GRIPTEC system	**Annex A4**
Product description Griptec Position Connection	

Table A4: **Position-Transition connection of different diameters using position-transition stud (AGPT / GPCT)**

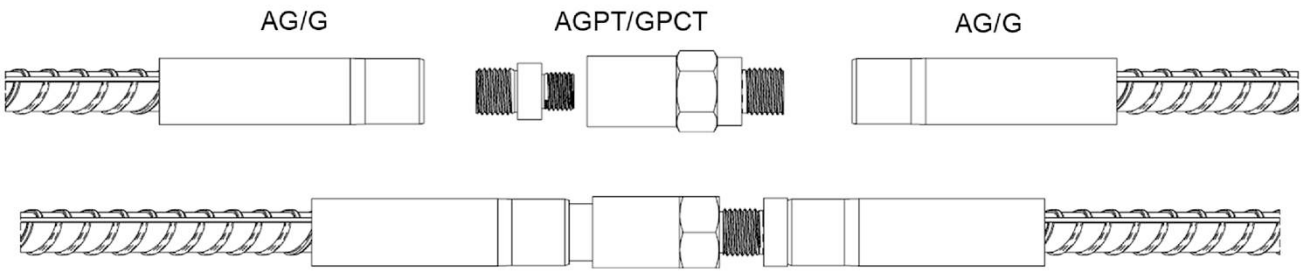
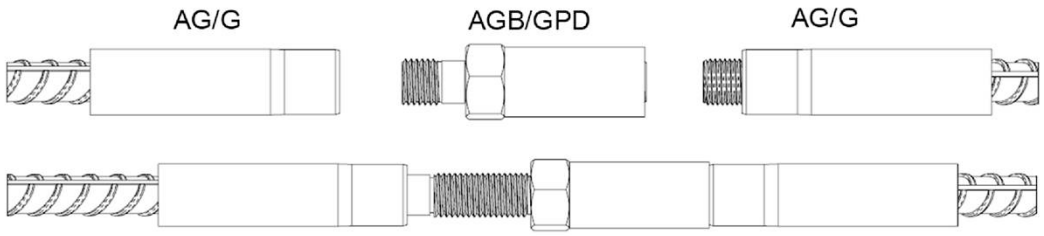


Fig. A4: **Griptec position – transition connection**

Connection designation	Combination	Rebar size [mm]	
		Larger Bar	Smaller Bar
GPCT14/12	AG14 F + AGTS14/12 + GPC12 + AG12 F	14	12
AGPT14/12	AG14 F + AGTS14/12 + AGP12 + AG12 F		
GPCT16/12	AG16 F + AGTS16/12 + GPC12 + AG12 F	16	12
AGPT16/12	AG16 F + AGTS14/12 + AGP12 + AG12 F		
GPCT16/14	AG16 F + AGTS16/14 + GPC14 + AG14 F	16	14
AGPT16/14	AG16 F + AGTS16/14 + AGP14 + AG14 F		
GPCT20/16	AG20N F + AGTS20/16 + GPC16 + AG16 F	20	16
AGPT20/16	AG20N F + AGTS20/16 + AGP16 + AG16 F		
GPCT25/20	AG25 F + AGTS25/20 + GPC20 + AG20N F	25	20
	G25 F + AGTS25/20 + GPC20 + AG20N F		
AGPT25/20	AG25 F + AGTS25/20 + AGP20 + AG20N F		
	G25 F + AGTS25/20 + AGP20 + AG20N F		
GPCT28/25	G28 F + AGTS28/25 + GPC25 + AG25 F	28	25
	G28 F + AGTS28/25 + GPC25 + G25 F		
AGPT28/25	G28 F + AGTS28/25 + AGP25 + AG25 F		
	G28 F + AGTS28/25 + AGP25 + G25 F		
GPCT32/28	AG32N F + AGTS32/28 + GPC28 + G28 F	32	28
	G32 F + AGTS32/28 + GPC28 + G28 F		
AGPT32/28	AG32N F + AGTS32/28 + AGP28 + G28 F		
	G32 F + AGTS32/28 + AGP28 + G28 F		
GPCT40/32	AG40N F + AGTS40/32 + GPC32 + AG32N F	40	32
	G40 F + AGTS40/32 + GPC32 + G32 F		
AGPT40/32	AG40N F + AGTS40/32 + AGP32 + AG32N F		
	G40 F + AGTS40/32 + AGP32 + G32 F		

GRIPTEC system	**Annex A5**
Product description Griptec Position - Transition Connection	

Table A5: **Bridging connection using bridging stud (AGB / GPD)**



AGB – big shoulder / GPD – no shoulder

Fig. A5: **Griptec bridging connection**

Connection designation	Combination	Rebar size [mm]
GPD12	AG12 F + GPD12 + AG12 M	12
AGB12	AG12 F + AGB12 + AG12 M	
GPD14	AG14 F + GPD14 + AG14 M	14
AGB14	AG14 F + AGB14 + AG14 M	
GPD16	AG16 F + GPD16 + AG16 M	16
AGB16	AG16 F + AGB16 + AG16 M	
GPD20	AG20N F + GPD20 + AG20N M	20
AGB20	AG20N F + AGB20 + AG20N M	
GPD25	AG25 F + GPD25 + AG25 M	25
	G25 F + GPD25 + G25 M	
AGB25	AG25 F + AGB25 + AG25 M	
	G25 F + AGB25 + G25 M	
GPD28	G28 F + GPD28 + G28 M	28
AGB28	G28 F + AGB28 + G28 M	
GPD32	AG32N F + GPD32 + AG32N M	32
	G32 F + GPD32 + G32 M	
AGB32	AG32N F + AGB32 + AG32N M	
	G32 F + AGB32 + G32 M	
GPD40	AG40N F + GPD40 + AG40N M	40
	G40 F + GPD40 + G40 M	
AGB40	AG40N F + AGB40 + AG40N M	
	G40 F + AGB40 + G40 M	

GRIPTEC system	**Annex A6**
Product description Griptec Bridging Connection	

Table A6: **Hybrid connection using Griptec hybrid threaded bar (GHC)**

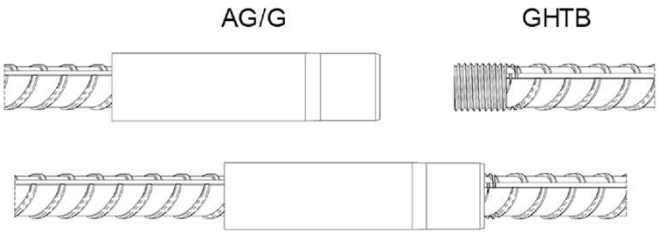


Fig. A6: **Griptec hybrid connection**

Connection designation	Combination	Rebar size [mm]
GHC12	AG12 F + GHTB12	12
GHC14	AG14 F + GHTB14	14
GHC16	AG16 F + GHTB16	16
GHC20	AG20N F + GHTB20	20
GHC25	AG25 F + GHTB25	25
	G25 F + GHTB25	
GHC28	G28 F + GHTB28	28

Table A7: **Weldable connection using weldable coupler (WC)**

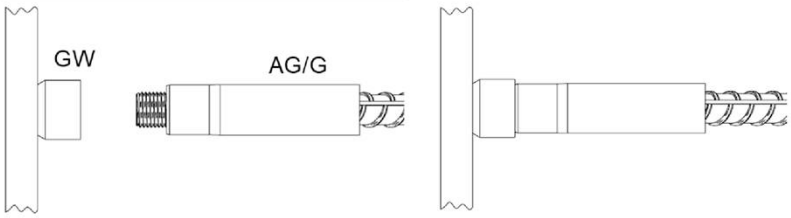


Fig. A7: **Griptec weldable connection**

Connection designation	Combination	Rebar size [mm]
WC12	AG12 M + GW12	12
WC14	AG14 M + GW14	14
WC16	AG16 M + GW16	16
WC20	AG20N M + GW20	20
WC25	AG25 M + GW25	25
	G25 M + GW25	
WC28	G28 M + GW28	28
WC32	AG32N M + GW32	32
	G32 M + GW32	
WC40	AG40N M + GW40	40
	G40 M + GW40	

GRIPTEC system	**Annex A7**
Product description Griptec Hybrid Connection & Griptec Weldable Connection	

Table A9: **Stainless steel connection using stainless steel coupler (ECG)**

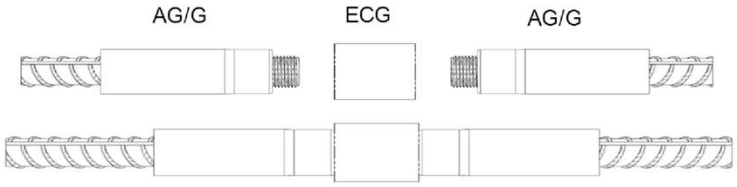


Fig. A9: **Griptec Stainless steel Connection**

Connection designation	Combination	Rebar size [mm]
ECG12	AG12 M + ECG12 + AG12 M	12
ECG14	AG14 M + ECG14 + AG14 M	14
ECG16	AG16 M + ECG16 + AG16 M	16
ECG20	AG20N M + ECG20 + AG20N M	20
ECG25	AG25 M + ECG25 + AG25 M	25
	G25 M + ECG25 + G25 M	
ECG28	G28 M + ECG28 + G28 M	28
ECG32	AG32N M + ECG32 + AG32N M	32
	G32 M + ECG32 + G32 M	
ECG40	AG40N M + ECG40 + AG40N M	40
	G40 M + ECG40 + G40 M	

Table A10: **Hybrid stainless steel connection type 1 using stainless steel coupler and Griptec hybrid threaded bar (HECG1)**

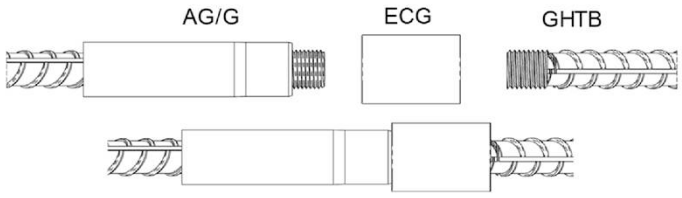


Fig. A10: **Griptec hybrid stainless steel connection type 1**

Connection designation	Combination	Rebar size [mm]
HECG1-12	AG12 M + ECG12 + GHTB12	12
HECG1-14	AG14 M + ECG14 + GHTB14	14
HECG1-16	AG16 M + ECG16 + GHTB16	16
HECG1-20	AG20N M + ECG20 + GHTB20	20
HECG1-25	AG25 M + ECG25 + GHTB25	25
	G25 M + ECG25 + GHTB25	
HECG1-28	G28 M + ECG28 + GHTB28	28

GRIPTEC system	**Annex A8**
Product description Griptec Stainless-Steel Connection & Hybrid Stainless Steel Connection Type 1	

Table A11: **Hybrid stainless steel connection type 2 using stainless steel coupler and Griptec hybrid threaded bar (HECG2)**

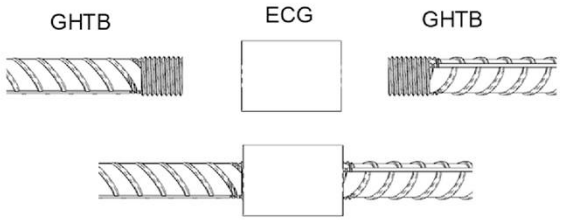


Fig. A11: **Griptec hybrid Stainless Steel Connection Type 2**

Connection designation	Combination	Rebar size [mm]
HECG2-12	GHTB12 + ECG12 + GHTB12	12
HECG2-14	GHTB14 + ECG14 + GHTB14	14
HECG2-16	GHTB16 + ECG16 + GHTB16	16
HECG2-20	GHTB20N + ECG20 + GHTB20	20
HECG2-25	GHTB25 + ECG25 + GHTB25	25
HECG2-28	GHTB28 + ECG28 + GHTB28	28

GRIPTEC system

Annex A9

Product description
Hybrid Stainless Steel Connection Type 2

Fig. A12: **Griptec standard female coupler (G/AG F)**

Fig. A13: **Griptec standard male coupler (G/AG M)**

Table A12: **Dimension of Griptec standard female – male coupler (AG / G)**

Type/Size	Rebar size [mm]	M-Size [mm]	Female (F) & Male (M)			Male (M)
			L [mm]	B [mm]	D [mm]	L1 [mm]
G25	25	M27x3,0	126	30	38	28
G28	28	M30x2,5	105	26	42	25
G32	32	M33x3,5	147	36	47	35
G40	40	M42x4,5	176	44	60	40
AG12	12	M14x2,0	72	15	19	12
AG14	14	M16x2,0	85	17	22	14
AG16	16	M18x2,5	100	17	25	16
AG20N	20	M22x2,5	110	20	31	20
AG25	25	M27x3,0	120	24	38	22
AG32N	32	M33x3,5	140	29	47	28
AG40N	40	M42x4,5	170	35	59	34

GRIPTEC system	**Annex A10**
Product description Dimension of Griptec Standard Connection	

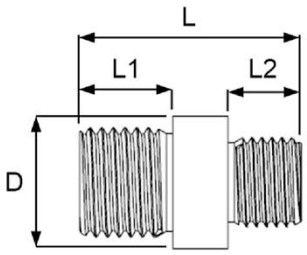


Fig. A14: **Griptec transition stud (AGTS)**

Table A13: **Dimension of Griptec transition stud (AGTS)**

Type/Size	Bar size [mm]		M-Size [mm]		D1 [mm]	L1 [mm]	L2 [mm]	L [mm]
	Large	Small	Large	Small				
AGTS14/12	14	12	M16x2,0	M14x2,0	20	14	12	34
AGTS16/12	16	12	M18x2,5	M14x2,0	22	16	12	37
AGTS16/14	16	14	M22x2,5	M16x2,0	22	16	14	39
AGTS20/16	20	16	M22x2,5	M18x2,5	28	20	16	47
AGTS25/20	25	20	M27x3,0	M22x2,5	35	22	20	55,5
AGTS28/25	28	25	M30x2,5	M27x3,0	38	25	22	62
AGTS32/28	32	28	M33x3,5	M30x2,5	40	29	25	70
AGTS40/32	40	32	M42x4.5	M33x3,5	50	35	29	84,5

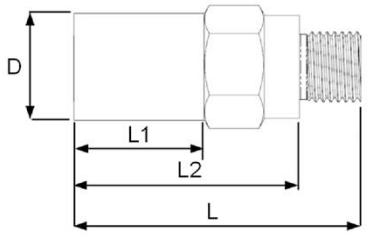


Fig. A15: **Griptec position stud (AGP/GPC)**

Table A14: **Dimensions of Griptec position stud (AGP/GPC)**

Type/Size		Rebar size [mm]	M-Size [mm]	D1 [mm]	L1 [mm]	L2 [mm]	L [mm]
AGP12	GPC12	12	M14x2,0	19	26	48	60
AGP14	GPC14	14	M16x2,0	24	30	55	69
AGP16	GPC16	16	M18x2,5	25	34	61	77
AGP20	GPC20	20	M22x2,5	34	42	74	94
AGP25	GPC25	25	M27x3,0	40	47	85	107
AGP28	GPC28	28	M30x2,5	45	52	94	119
AGP32	GPC32	32	M33x3,5	50	59	105	134
AGP40	GPC40	40	M42x4,5	64	71	127	162

GRIPTEC system

Product description
Dimension of Griptec Transition Stud and Griptec Position Stud

Annex A11

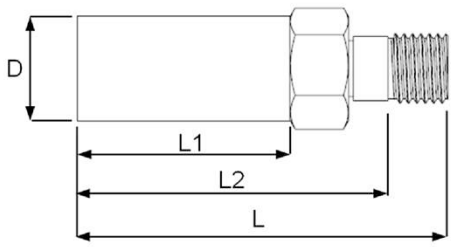


Fig. A16: **Griptec bridging stud**

Table A15: **Dimensions of Griptec bridging stud (AGB/GPD)**

Type/Size		Rebar size [mm]	M-Size	D1 [mm]	L1 [mm]	L2 [mm]	L [mm]
AGB12	GPD12	12	M14x2,0	19	59	84	96
AGB14	GPD14	14	M16x2,0	24	61	88	102
AGB16	GPD16	16	M18x2,5	25	68	98	114
AGB20	GPD20	20	M22x2,5	34	77	110	130
AGB25	GPD25	25	M27x3,0	40	89	129	151
AGB28	GPD28	28	M30x2,5	45	97	136	164
AGB32	GPD32	32	M33x3,5	50	101	148	176
AGB40	GPD40	40	M42x4,5	64	117	172	207

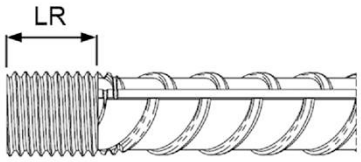


Fig. A17: **Griptec hybrid threaded bar (GHTB)**

Table A16: **Dimensions of Griptec hybrid threaded bar (GHTB)**

Type/Size	Rebar size [mm]	LR [mm]
GHTB12	12	15
GHTB14	14	17
GHTB16	16	17
GHTB20	20	20
GHTB25	25	24
GHTB28	28	26

GRIPTEC system	**Annex A12**
Product description Dimension of Griptec Position-Transition Stud and Griptec Hybrid Threaded Bar	

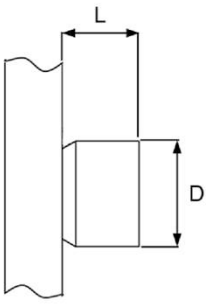


Fig. A18: **Griptec weldable coupler (GW)**

Table A17: **Dimensions of Griptec weldable coupler (GW)**

Type/Size	Rebar size [mm]	M-size [mm]	D [mm]	L [mm]
GW12	12	M14x2,0	38	22
GW14	14	M16x2,0	38	24
GW16	16	M18x2,5	42	26
GW20	20	M22x2,5	45	28
GW25	25	M27x3,0	60	35
GW28	28	M30x2,5	60	40
GW32	32	M33x3,5	70	45
GW40	40	M42x4,5	85	50

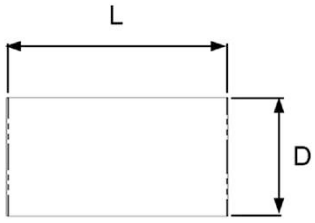


Fig. A19: **Griptec bridging nut (BN)**

Table A18: **Dimensions of Griptec bridging nut (BN)**

Type/Size	Rebar size [mm]	M-size [mm]	D [mm]	L [mm]
BN12	12	M14x2,0	19	59
BN14	14	M16x2,0	24	61
BN16	16	M18x2,5	25	68
BN20	20	M22x2,5	34	77
BN25	25	M27x3,0	49	89
BN32	32	M33x3,5	50	101
BN40	40	M42x4,5	64	117

GRIPTEC system	**Annex A13**
Product description Dimension of Griptec Weldable Coupler and Griptec Bridging Nut	

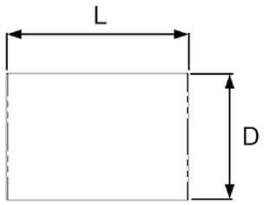


Fig. A20: **Griptec stainless steel connector (ECG)**

Table A19: **Dimensions of Griptec stainless steel connector (ECG)**

Type/Size	Rebar size [mm]	M-Size [mm]	D [mm]	L [mm]
ECG12	12	M14x2,0	23	45
ECG14	14	M16x2,0	27	50
ECG16	16	M18x2,5	30	55
ECG20	20	M22x2,5	38	60
ECG25	25	M27x3,0	45	65
ECG28	28	M30x2,5	53	75
ECG32	32	M33x3,5	59	85
ECG40	40	M42x4,5	74	95

GRIPTEC system	**Annex A14**
Product description Dimension of Griptec Stainless Steel Connector	

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Intended Use

GRIPTEC are used as mechanical coupling in accordance with EN 1992-1-1 and EN 1998-1 and annex C for reinforcing steel bars and de-coiled bars in accordance with EN 1992-1-1, clause C.1:

- B500B and B500C with a nominal diameter of 12 to 40 mm
- B500 NR and B670B NR with a nominal diameter 12 to 28 mm and
- B700B NR with a nominal diameter of 12 to 14 mm

for:

- Transmission of static or quasi-static tension and compression loads according to EN 1992-1-1, clauses 8.7 and 8.8(4)
- Limitation of slip according to EN 1992-1-1, clause 7.3
- Resistance to low-cycle seismic loading according to EN 1998-1, clause 5.6.3(2)
- Resistance to high-cycle fatigue loads with fatigue resistance according to EN 1992-1-1, Clause 6.8.4
- Weldable couplers are used to connect reinforcement steel bars with structural steel components. The responsible engineer must verify the load transmission from the steel reinforcement bar to the structural steel component through the weld for each individual case.

The Dextra Griptec coupler system allows the following splicing variants:

- Standard Connection: The Griptec standard connection is intended for connections where at least one of the two rebars can be rotated. The connection consists of two steel sleeves, which are pressed onto reinforcing bars with the help of a Griptec machine. A connection consists of a male (G / AG M) and a female sleeve (G / AG F) with ISO threads, which allow the two rods to be connected to each other.
- Position Connection: The Griptec position connection is intended if neither of the two reinforcing bars can be rotated for technical reasons. Like the standard connection, the position connection consists of a socket rod and a connection rod, which is extended by a position assembly with lock nut and position sleeve. The stud of the position connection can be designed without (GPC) or with a large shoulder (AGP).
- Transition Connection: The Griptec transition connection allows the connection of two rebars of different diameters. The transition connection consists of two connecting female sleeves and a transition stud (AGTS).
- Position-Transition Connection: The position-transition connection is a combination of the components of the position (GPC / AGP) and the transition connection (AGTS) and allows the connection of two rebars of different diameters when none of the reinforcement bars can be rotated.
- Bridging Connection: The Griptec bridging connection is intended for connections where the two reinforcing bars cannot be brought butt-to-butt to each other. This is a variant of the position connection that uses a longer stud and a longer nut. Gaps between bar ends can be bridged by this system. The stud of the bridging connection can be designed without (GPD) or with a large shoulder (AGB).
- Hybrid Connection: The Griptec hybrid connection can be used to connect to prefabricated elements. The connection consists of a Griptec female sleeve and a hybrid threaded rebar (GHTB).
- Welded Connection: The Griptec welded connection is used to connect a reinforcing bar to a steel structure. The welded connection consists of a Griptec male sleeve and a weldable coupler (GW). The weldable coupler is connected to the steel structure with a 45° weld seam (α).
- Stainless-Steel Connection: The stainless-steel connection is used to connect two reinforcing bars with Griptec male sleeves and a stainless-steel coupler (ECG).
- Hybrid Stainless-Steel Connection: The hybrid stainless-steel connection is a combination of the components of the hybrid connection and the stainless-steel connection. It is available in two variants using either a combination of Griptec male sleeve and Griptec hybrid threaded bar (Type 1) or two Griptec hybrid threaded bars (Type 2) that are joint with a stainless-steel coupler.

GRIPTEC system	**Annex B1**
Intended use Specifications and Installation Requirements	

Deutsches Institut für Bautechnik DIBt

Specifications and Installation Requirements

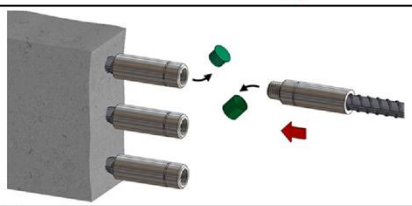
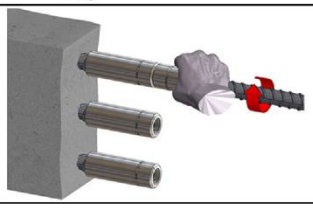
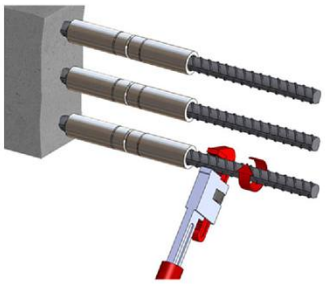
- Splices may be loaded under static and quasi-static tensile and compression load with a maximum of 100% of the non-spliced bar according to EN 1992-1-1, 8.7.2 (4).
- For the concrete cover of the coupler surface and the spacing between the outer edges of adjacent couplers, the same criteria as non-spliced bars according to EN 1992-1-1 shall be applied. The spacing required for the installation shall remain untouched.
- Bends in the bars may only begin at a distance of at least 5 times the nominal rebar diameter from the coupler end. With special equipment used in the manufacturing plant for the bending, the distance may be reduced to 2 times the nominal diameter of the rebar.
- The couplers shall only be installed by trained staff under supervision of the responsible site manager. The installation shall follow the written instructions provided by the manufacturer.
- All threads shall be protected against penetration of concrete deposition, water or other pollution with adequate measures (e.g. plastic cap).
- Prior to installation the regular condition of the inner and outer thread shall be checked. Pollutions of any kind shall be removed.
- Griptec couplers can be installed to the formwork by means of hexagonal bolts, pocket formers or nailing plates during the installation phase.
- Installation of GRIPTEC system according to assembly instruction, see Annex B3 to B12
- In order to connect the welding coupler (GW) a welding procedure specification WPS in accordance with EN ISO 15609-1 shall be available and shall be observed by the welding personnel. The welding manufacturer shall submit a welding certificate in accordance with EN 1090-1, Table B.1. The welders shall have valid welders test certificates in accordance with EN ISO 9606-1. The welding coupler and the steel component shall be protected against corrosion in accordance with the applicable provisions, see EN ISO 12944-5.

Table B1: **Wrench size**

Rebar size [mm]	Wrench length [cm]	Torque [Nm]
12	60	20
14	60	30
16	60	40
20	60	60
25	60	100
28	60	140
32	60	250
40	90	500

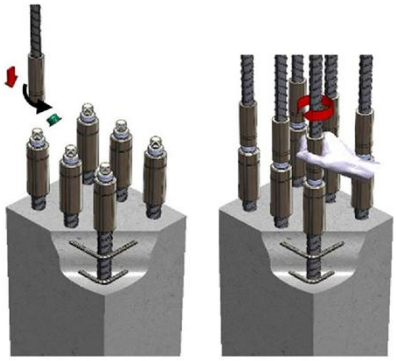
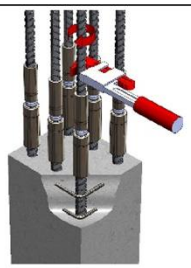
GRIPTEC system	**Annex B2**
Intended use Specifications and Installation Requirements	

Table B2: **Assembly instruction of Griptec standard connection**

Step	Process	Details	Illustration
1	Prepare the 1st stage bars	The coupler caps are correctly fitted.	
2	**Concreting 1st stage**: Prepare the connecting bars	Remove the plastic caps from the 1st stage bars and the thread protection from the connecting bars. Both caps are of the same colour.	
3	Join the bars	Hand screw the connecting bars into the couplers. (A wrench may be used if it makes the operation easier). Full engagement of the thread is sufficient to develop the full tensile strength of the splice.	
4	Lock the splice	Use a pipe wrench or torque wrench on the connecting bars until the faces of the sleeves are in close contact with one another so that the threaded portion is no longer visible. Use wrench length or torque as given in table B1. Locking the splice ensures that its permanent elongation meets the code requirement.	

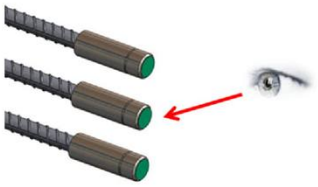
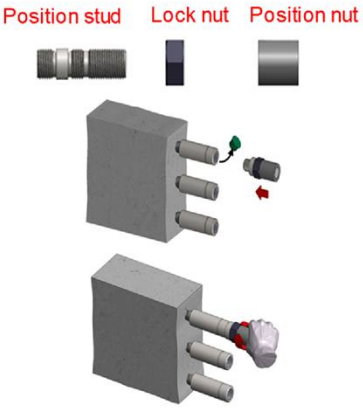
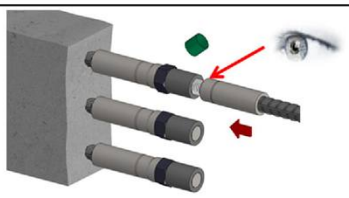
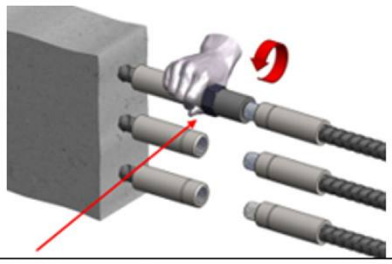
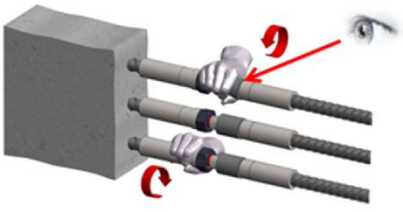
GRIPTEC system	**Annex B3**
Intended use Assembly Instruction of Griptec Standard Connection	

Table B3: **Assembly instruction of Griptec transition connection**

Step	Process	Details	Illustration
1	Prepare the 1st stage bars	Prepare bars with female sleeves. The coupler caps are correctly fitted.	
2	**Concreting 1st stage:** Prepare the connecting bars	Remove the plastic caps from the first stage bars and hand screw the transition studs into the female sleeves. (A wrench may be used if it makes the operation easier). Prepare the connecting bars with female sleeves. The transition stud is fully engaged into the female sleeve.	
3	Connect the bars	Remove the plastic caps from the connecting bars and hand screw them onto the transition studs. (A wrench may be used if it makes the operation easier). Full engagement of the thread is sufficient to develop the full tensile strength of the splice.	
4	Lock the splices	Use a pipe wrench or torque wrench on the connecting bar. Use wrench length or torque as given in table B1. Locking the splice ensures that its permanent elongation meets the code requirement.	

GRIPTEC system	**Annex B4**
Intended use Assembly Instruction of Griptec Transition Connection	

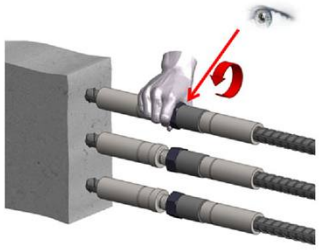
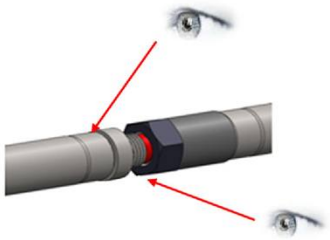
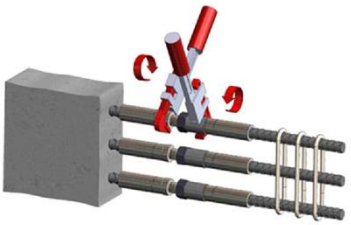
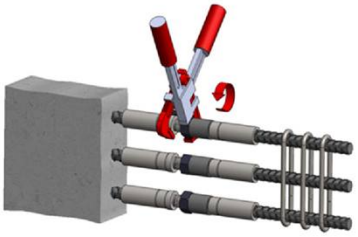
Table B4: **Assembly instruction of Griptec position connection**

Step	Process	Details	Illustration
1	Prepare the 1st stage bars	(On vertical connections, use male sleeves on the bottom bars.) The coupler caps are correctly fitted.	
2	Concreting 1st stage: Prepare the connecting bars	Remove the plastic caps from the female sleeves and screw the position stud assemblies into them. (A wrench may be used if it makes the operation easier). The position stud is fully engaged into the female sleeve. The position nut is fully engaged, but slightly loose, on the position stud.	
3	Position the connecting bars	Remove the plastic caps from the male sleeves and bring the bars in butt-to-butt contact.	
4	Connect the bars	Hand screw the position nuts out of the position studs and onto the male sleeves. (A wrench may be used if it makes the operation easier). Full engagement of the thread is sufficient to develop the full tensile strength of the splice.	
		Unscrew the position stud so that the start of the position nut thread is in front of the start of the male sleeve thread.	
		After completing the assembly, the position nut is in contact with the face of the male sleeve. Then screw back the position stud into the female sleeve until no thread is apparent between the stud shoulder and the female sleeve.	

GRIPTEC system

Intended use
Assembly Instruction of Griptec Position Connection

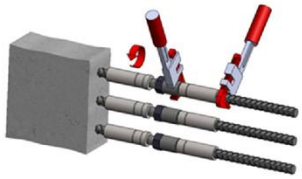
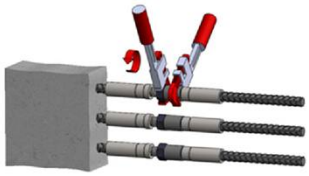
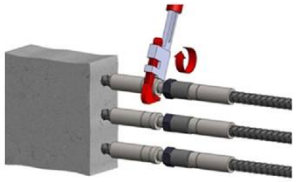
Annex B5

Step	Process	Details	Illustration
5	Screw the lock nuts	Hand screw the lock nuts until contact with the position nuts.	
		Check that the position stud remains fully engaged in the female sleeve. Check that there is no thread appearing beyond the engagement inspection groove of the position stud.	
6.1	Lock the splice (for connections of welded assemblies)	Use a wrench on the position stud and a pipe wrench or torque wrench on the position nut until snug fit on both sides. Use wrench length or torque as given in table B1.	
		Repeat the operation with the lock nut and the position stud. Locking the splice ensures that its permanent elongation meets the code requirement	

GRIPTEC System

Intended use
Assembly Instruction of Griptec Position Connection

Annex B6

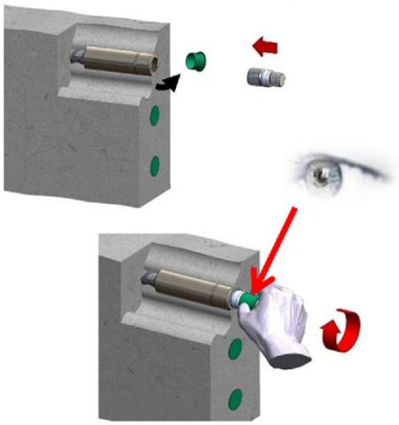
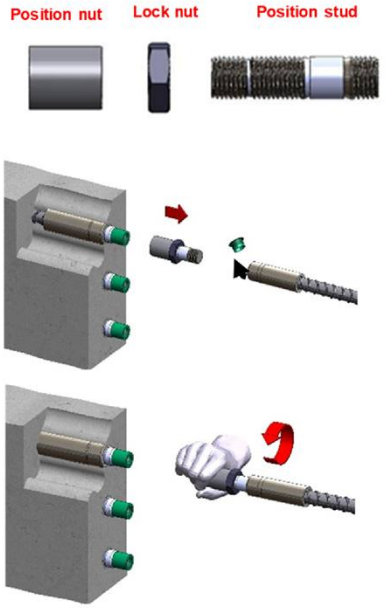
Step	Process	Details	Illustration
6.2	Lock the splice (for connections of wire-tied assemblies	Hold the connecting bar with a wrench and use another wrench to tighten the position nut until snug fit. Use wrench length or torque as given in table B1.	
		Hold the position nut with a wrench and use another wrench to tighten the lock nut until snug fit. Use wrench length or torque as given in table B1.	
		Use a pipe wrench or torque wrench to tighten the position stud until snug fit. Use wrench length or torque as given in table B1. Locking the splice ensures that its permanent elongation meets the code requirement	

GRIPTEC System

Intended use
Assembly Instruction of Griptec Position Connection

Annex B7

Table B5: **Assembly instruction of Griptec position-transition connection**

Step	Process	Details	Illustration
1	Prepare the 1st stage bars	Prepare bars with female sleeves. The coupler caps are correctly fitted.	
2	**Concreting 1st stage:** Prepare the transition studs	Remove the plastic caps from the first stage bars and hand screw the transition studs into the female sleeves. (A wrench may be used if it makes the operation easier). The transition stud is fully engaged into the female sleeve.	
3	Prepare the continuation bars	Remove the plastic caps from the female sleeves and screw the position stud assemblies into them. (A wrench may be used if it makes the operation easier). The position nut is fully engaged, but slightly loose, on the position stud. The position stud is fully engaged into the female sleeve.	

GRIPTEC System	**Annex B8**
Intended use Assembly Instruction of Griptec Position-Transition Connection	

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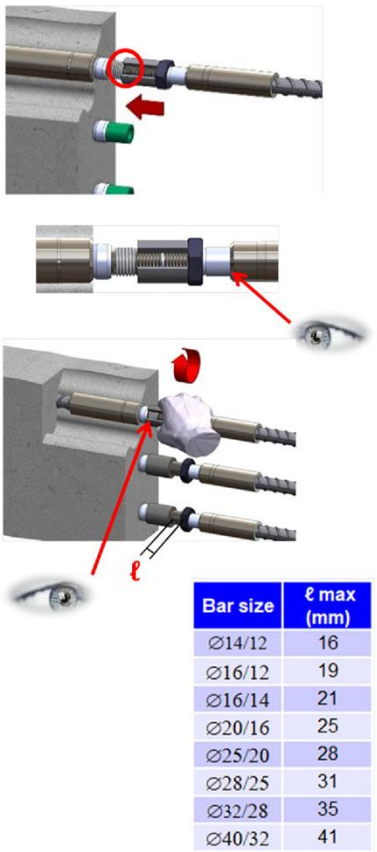
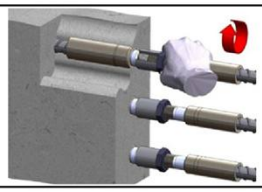
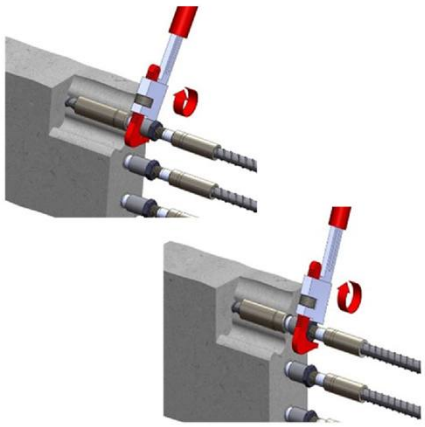
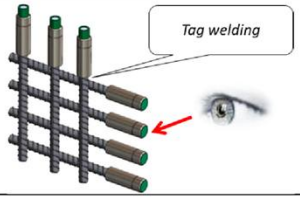
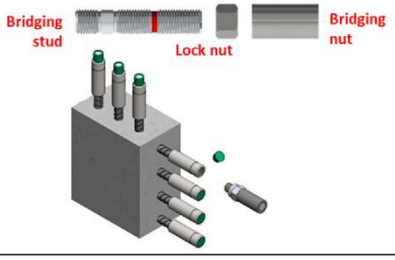
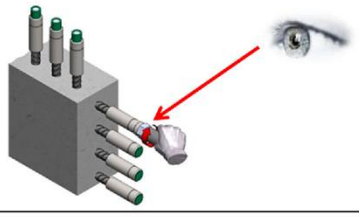
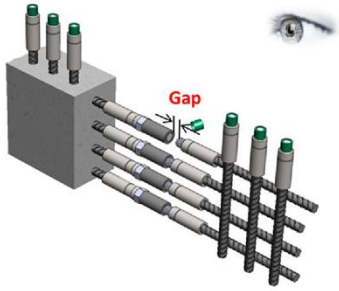
Step	Process	Details	Illustration
4	Connect the bars	Bring the connecting bars in contact with the first stage bars and hand screw the position nuts out of the position studs and onto the transition studs. (A wrench may be used if it makes the operation easier). Make sure that the position stud remains fully engaged in the female sleeve. There is no thread appearing beyond the engagement inspection groove of the position stud. (If the groove is not clearly visible, an alternative is to check that the distance l between the faces of the position nut and the male sleeve doesn't exceed the value in the table). After screwing, the position nut is in contact with the shoulder of the transition stud. Full engagement of the thread is sufficient to develop the full tensile strength of the splice.	 Bar size / ℓ max (mm) ∅14/12 — 16 ∅16/12 — 19 ∅16/14 — 21 ∅20/16 — 25 ∅25/20 — 28 ∅28/25 — 31 ∅32/28 — 35 ∅40/32 — 41
5	Screw the lock nuts	Hand screw the lock nuts until contact with the position nuts.	
6	Lock the splices	Use a pipe wrench or torque wrench to tighten the position nuts and the locknuts. Use wrench length or torque as given in table B1. Locking the splice ensures that its permanent elongation meets the code requirement.	

GRIPTEC System

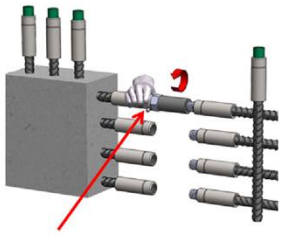
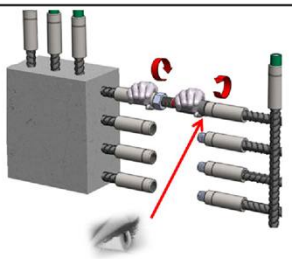
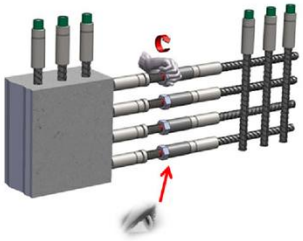
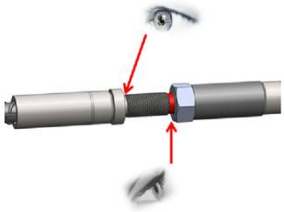
Intended use
Assembly Instruction of Griptec Position-Transition Connection

Annex B9

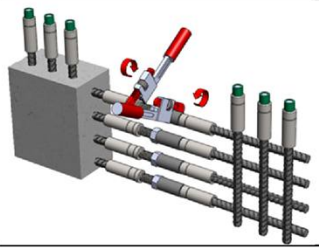
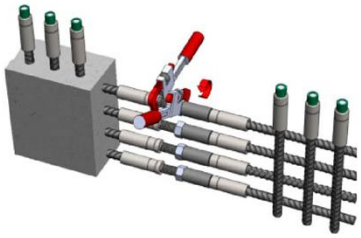
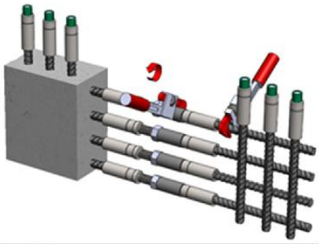
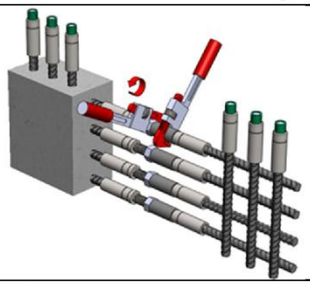
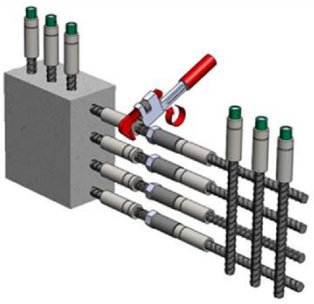
Table B6: **Assembly instruction of Griptec bridging connection**

Step	Process	Details	Illustration
1	Prepare the 1st stage bars	(On vertical connections, use male sleeves on the bottom bars.) The coupler caps are correctly fitted.	
2	**Concreting 1st stage:** Installation of the caging set	Remove the plastic caps from the female sleeves and screw the bridging stud assemblies into them. (A wrench may be used if it makes the operation easier). The bridging stud is fully engaged into the female sleeve.	
		The bridging nut is fully engaged, but slightly loose, on the bridging stud.	
3	Position the connecting bars	Remove the plastic caps from the male sleeves. Bring the connecting bars as close as possible to the first stage bars, and check that the gap between two bar ends doesn't exceed the value in the table.	 Bar size / Max gap (mm) 12 / 35 14 / 33 16 / 36 20 / 37 25 / 45 28 / 44 32 / 44 40 / 47

GRIPTEC System	**Annex B10**
Intended use Assembly Instruction of Griptec Bridging Connection	

Step	Process	Details	Illustration
4	Connect the bars	Hand screw the bridging nuts out of the bridging studs and onto the male sleeves. (A wrench may be used if it makes the operation easier). Full engagement of the thread is sufficient to develop the full tensile strength of the splice.	
		Unscrew the bridging stud so that the start of the bridging nut thread is in front of the start of the male sleeve thread.	
		After completing the assembly, the bridging nut is in contact with the face of the male sleeve. Then screw back the bridging stud into the female sleeve until no thread is apparent between the stud shoulder and the female sleeve.	
5	Screw the lock nuts	Hand screw the lock nuts until contact with the bridging nuts.	
		Check that the bridging stud remains fully engaged in the female sleeve. Check that there is no thread appearing beyond the engagement inspection groove of the bridging stud.	

GRIPTEC System	**Annex B11**
Intended use Assembly Instruction of Griptec Bridging Connection	

Step	Process	Details	Illustration
6.1	Lock the splice (for connections of welded assemblies)	Use a torque wrench on the bridging stud and the bridging nut until snug fit on both sides. Apply torque as given in table B1.	
		Repeat the operation with the lock nut and the bridging stud. Lock the splices ensures that its permanent elongation meets the code requirement	
6.2	Lock the splice (for connections of wire-tied assemblies)	Hold the connecting bar with a pipe wrench or torque wrench and use another wrench to tighten the bridging nut onto the male sleeve until snug fit. Use wrench length or torque as given in table B1.	
		Hold the bridging nut with a pipe wrench or torque wrench and use another wrench to tighten the lock nut against the bridging nut until snug fit.	
		Use a pipe wrench or torque wrench to tighten the position stud into the female sleeve until snug fit. Use wrench length or torque as given in table B1. Locking the splice ensures that its permanent elongation meets the code requirement.	

GRIPTEC System

Intended use
Assembly Instruction of Griptec Bridging Connection

Annex B12

Table C1: **Total length of Griptec standard connection (AG / G)**

Connection designation	Combination	Rebar size [mm]	Total length L [mm]
AG12	AG12 F + AG12 M	12	144
AG14	AG14 F + AG14 M	14	170
AG16	AG16 F + AG16 M	16	200
AG20N	AG20N F + AG20N M	20	220
AG25	AG25 F + AG25 M	25	240
G25	G25 F + G25 M		252
G28	G28 F + G28 M	28	210
AG32N	AG32N F + AG32N M	32	280
G32	G32 F + G32 M		294
AG40N	AG40N F + AG40N M	40	340
G40	G40 F + G40 M		352

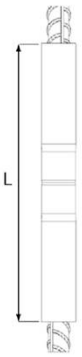


Fig. C1: **Total length of Griptec standard connection (AG/G)**

Table C2: **Essential characteristics - Standard connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR*) $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]	Slip after loading s_2 [mm]	Resistance to low cycle loading **)			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
					U_{20} [mm]	$F_{u,min}$ [kN]		$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
						B500B	B500C			
AG12	540/575	3	0,12	0,1	0,3	61,1	65,0	95	3	5
AG14			0,14			83,1	88,5			
AG16			0,15			108,6	115,6			
AG20N			0,16			169,6	180,6			
AG25			0,17			265,1	282,3			
G25			0,18			265,1	282,3			
G28			0,16			332,5	354,1			
AG32N			0,19			434,3	462,4	80	2	3
G32			0,20			434,3	462,4			
AG40N			0,20			678,6	722,6			
G40			0,20			678,6	722,6			

*) $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

**) $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC system	**Annex C1**
Performance Essential Characteristics - Griptec Standard Connection	

Table C3: **Total length of Griptec transition connection (AGTS)**

Connection designation	Rebar size [mm]	Total length L [mm]		
		AG-AG[1)]	G-G[2)]	AG-G[3)]
AGTS14/12	12	165	-	-
AGTS16/12	12	181	-	-
AGTS16/14	14	194	-	-
AGTS20/16	16	221	-	-
AGTS25/20	20	244	-	-
AGTS28/25	25	-	246	240
AGTS32/28	28	-	269	262
AGTS40/32	32	331	344	-

[1)] Connection AG + AGTS + AG
[2)] Connection G + AGTS + G
[3)] Connection AG + AGTS + G

Fig. C2: **Total length of Griptec transition connection (AGTS)**

Table C4: **Essential characteristics - Transition connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR [*)]	Elongation at connection failure	Slip under loading	Slip after loading	Resistance to low cycle loading[**)]			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
	$f_{u,min,bar,outside}$ [N/mm²]	$A_{gt,act}$ [%]	s_1 [mm]	s_2 [mm]	U_{20} [mm]	$F_{u,min}$ [kN] B500B	$F_{u,min}$ [kN] B500C	$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
AGTS14/12	540/575	3	0,13	0,1	0,3	61,1	65,0	95	3	5
AGTS16/12			0,14			61,1	65,0			
AGTS16/14			0,15			83,1	88,5			
AGTS20/16			0,16			108,6	115,6			
AGTS25/20			0,17			169,6	180,6			
AGTS28/25			0,17			265,1	282,3			
AGTS32/28			0,18			332,5	354,1			
AGTS40/32			0,2			434,3	462,4	80	2	3

[*)] $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)
[**)] $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC system	**Annex C2**
Performance Essential Characteristics – Griptec Transition Connection	

Table C5: **Total length of Griptec position connection (AGP / GPC)**

Connection designation		Rebar size [mm]	Total length L [mm]	
			AG-AG[4)]	G-G[5)]
AGP12	GPC12	12	204	-
AGP14	GPC14	14	239	-
AGP16	GPC16	16	277	-
AGP20	GPC20	20	314	-
AGP25	GPC25	25	347	359
AGP28	GPC28	28	-	329
AGP32	GPC32	32	414	428
AGP40	GPC40	40	502	514

[4)] Connection AG + AGP/GPC+ AG

[5)] Connection G + AGP/GPC + G

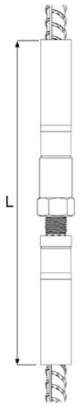


Fig. C3: **Total length of Griptec position connection (AGP/GPC)**

Table C6: **Essential characteristics - Position connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR [*)] $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]	Slip after loading s_2 [mm]	Resistance to low cycle loading[**)]			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
					U_{20} [mm]	$F_{u,min}$ [kN]		$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
						B500B	B500C			
AGP12/GPC12	540/575	3	0,15	0,1	0,3	61,1	65,0	95	3	5
AGP14/GPC14			0,17			83,1	88,5			
AGP16/GPC16			0,19			108,6	115,6			
AGP20/GPC20			0,20			169,6	180,6			
AGP25/GPC25			0,20			265,1	282,3			
AGP28/GPC28			0,20			332,5	354,1			
AGP32/GPC32			0,20			434,3	462,4	80	2	3
AGP40/GPC40			0,20			678,6	722,6			

[*)] $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

[**)] $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC system	**Annex C3**
Performance Essential Characteristics: Griptec Position Connection	

Table C7: **Total length of Griptec position-transition connection (AGPT / GPCT)**

Connection designation		Rebar size [mm]	Total length L [mm]		
			AG-AG[6]	G-G[7]	AG-G[8]
AGPT14/12	GPCT14/12	12	225	-	-
AGPT16/12	GPCT16/12	12	241	-	-
AGPT16/14	GPCT16/14	14	263	-	-
AGPT20/16	GPCT20/16	16	298	-	-
AGPT25/20	GPCT25/20	20	338	-	-
AGPT28/25	GPCT28/25	25	-	353	347
AGPT32/28	GPCT32/28	28	-	388	381
AGPT40/32	GPCT40/32	32	465	478	-

[6] Connection AG + AGPT/GPCT+ AG
[7] Connection G + AGPT/GPCT + G
[8] Connection AG + AGPT/GPCT + G

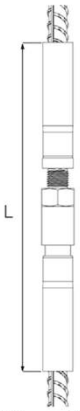


Fig. C4: **Total length of Griptec position-transition connection (AGPT/GPCT)**

Table C8: **Essential characteristics - Position Transition connection**

Connection designation		Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR *) $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]	Slip after loading s_2 [mm]	Resistance to low cycle loading**)			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
						U_{20} [mm]	$F_{u,min}$ [kN]		$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
							B500B	B500C			
AGPT14/12	GPCT14/12	540/575	3	0,16	0,1	0,3	61,1	65,0	95	3	5
AGPT16/12	GPCT16/12			0,17			61,1	65,0			
AGPT16/14	GPCT16/14			0,18			83,1	88,5			
AGPT20/16	GPCT20/16			0,20			108,6	115,6			
AGPT25/20	GPCT25/20			0,20			169,6	180,6			
AGPT28/25	GPCT28/25			0,20			265,1	282,3			
AGPT32/28	GPCT32/28			0,20			332,5	354,1			
AGPT40/32	GPCT40/32			0,20			434,3	462,4	80	2	3

*) $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)
**) $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC system

Performance
Essential Characteristics: Griptec Position-Transition Connection

Annex C4

Table C9: **Total length of Griptec bridging connection (AGB / GPD)**

Connection designation		Rebar size [mm]	Total length L [mm]	
			AG-AG[9)]	G-G[10)]
AGB12	GPD12	12	275	448
AGB14	GPD14	14	305	514
AGB16	GPD16	16	350	606
AGB20	GPD20	20	387	-
AGB25	GPD25	25	436	-
AGB28	GPD28	28	-	418
AGB32	GPD32	32	500	-
AGB40	GPD40	40	594	-

[9)] Connection AG + AGB/GPD+ AG

[10)] Connection G + AGB/GPD + G

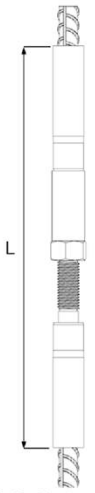


Fig. C5: **Total length of Griptec bridging connection (AGB/GPD)**

Table C10: **Essential characteristics - Bridging connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR [*)] $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]		Slip after loading s_2 [mm]	Resistance to low cycle loading[**)]			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
			AG-AG[9)]	G-G[10)]		U_{20} [mm]	$F_{u,min}$ [kN] B500B	$F_{u,min}$ [kN] B500C	$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
GPD12 / AGB12	540/575	3	0,19	0,20	0,1	0,3	61,1	65,0	95	3	5
GPD14 / AGB14			0,20	0,20			83,1	88,5			
GPD16 / AGB16			0,20	0,20			108,6	115,6			
GPD20 / AGB20			0,20	-			169,6	180,6			
GPD25 / AGB25			0,20	-			265,1	282,3			
GPD28 / AGB28			-	0,20			332,5	354,1			
GPD32 / AGB32			0,20	-			434,3	462,4	80	2	3
GPD40 / AGB40			0,20	-			678,6	722,6			

[*)] $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

[**)] $F_{u,min} = (\pi \cdot d2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC system

Performance
Essential Characteristics: Griptec bridging coupler

Annex C5

Table C11: **Total length of Griptec hybrid connection (GHC)**

Connection designation	Rebar size [mm]	Total length L [mm]	
		AG[11)]	G[12)]
GHC12	12	72	-
GHC14	14	85	-
GHC16	16	100	-
GHC20	20	110	-
GHC25	25	120	126
GHC28	28	-	105

[11)] Connection AG + GHTB

[12)] Connection G + GHTB

Fig. C6: **Total length of GRIPTEC hybrid connection (GHC)**

Table C12: **Essential characteristics - Hybrid connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR *) $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]	Slip after loading s_2 [mm]	Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
					$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
GHC12	540/575	3	0,10	0,1	95	3	5
GHC14			0,10				
GHC16			0,10				
GHC20			0,11				
GHC25			0,11				
GHC28			0,10				

*) $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

**) $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC System	**Annex C6**
Performance Essential Characteristics: Griptec Hybrid Connection	

Table C13: **Total length of Griptec weldable connection (WC)**

Connection designation	Rebar size [mm]	Total length L [mm]	
		AG[13)]	G[14)]
WC12	12	94	-
WC14	14	109	-
WC16	16	126	-
WC20	20	138	-
WC25	25	155	161
WC28	28	-	145
WC32	32	185	192
WC40	40	220	226

[13)] Connection AG + GW

[14)] Connection G + GW

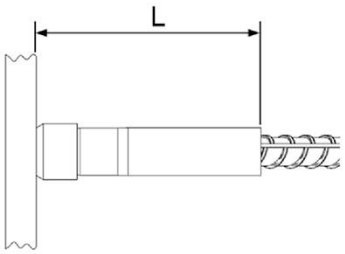


Fig. C7: **Total length of Griptec weldable connection (WC)**

Table C14: **Essential characteristics - Weldable connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR [*)] $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]		Slip after loading s_2 [mm]	Resistance to low cycle loading[**)]			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
			AG[13)]	G[14)]		U_{20} [mm]	$F_{u,min}$ [kN]		$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
							B500B	B500C			
WC12	540/575	3	0,10	-	0,1	0,3	61,1	65,0	95	3	5
WC14			0,10	-			83,1	88,5			
WC16			0,11	-			108,6	115,6			
WC20			0,12	-			169,6	180,6			
WC25			0,13	0,13			265,1	282,3			
WC28			-	0,12			332,5	354,1			
WC32			0,14	0,15			434,3	462,4	80	2	3
WC40			0,16	0,16			678,6	722,6			

[*)] $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

[**)] $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC System	**Annex C7**
Performance Essential Characteristics: Griptec Weldable Connection	

Table C17: **Total length of Griptec stainless steel connection (ECG)**

Connection designation	Rebar size [mm]	Total length L [mm]	
		AG-AG[17)]	G-G[18)]
ECG12	12	189	-
ECG14	14	220	-
ECG16	16	255	-
ECG20	20	280	-
ECG25	25	305	317
ECG28	28	-	285
ECG32	32	365	379
ECG40	40	435	447

[17)] Connection AG + ECG + AG

[18)] Connection G + ECG + G

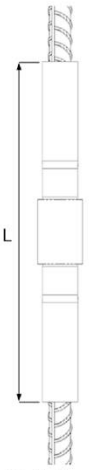


Fig. C9: **Total length of Griptec stainless steel (ECG)**

Table C18: **Essential Characteristics - Stainless steel connection**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR *) $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]	Slip after loading s_2 [mm]	Resistance to low cycle loading**)			Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
					U_{20} [mm]	$F_{u,min}$ [kN]		$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
						B500B	B500C			
ECG12	540/575	3	0,14	0,1	0,3	61,1	65,0	95	3	5
ECG14			0,16			83,1	88,5			
ECG16			0,18			108,6	115,6			
ECG20			0,19			169,6	180,6			
ECG25			0,20			265,1	282,3			
ECG28			0,19			332,5	354,1			
ECG32			0,20			434,3	462,4	80	2	3
ECG40			0,20			678,6	722,6			

*) $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

**) $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B500B NR and B670B NR can only be used with nominal diameters of 12mm to 28mm and B700B NR with nominal diameters of 12mm and 14mm.*

GRIPTEC System	**Annex C8**
Performance Essential Characteristics: Griptec Stainless Steel Connection	

Table C19: **Total length of Griptec hybrid stainless steel connection type1 (HECG1)**

Connection designation	Rebar size [mm]	Total length L [mm]	
		AG[19)]	G[20)]
HECG1-12	12	117	-
HECG1-14	14	135	-
HECG1-16	16	155	-
HECG1-20	20	170	-
HECG1-25	25	185	191
HECG1-28	28	-	180

[19)] Connection AG + HECG1 + GHTB

[20)] Connection G + HECG1 + GHTB

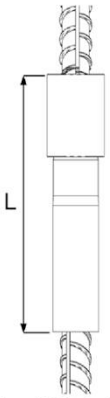


Fig. C10: **Total length of Griptec hybrid stainless steel connection type1 (HECG1)**

Table C20: **Essential Characteristics - Hybrid stainless steel connection Type1**

Connection designation	Resistance to static or quasi-static loading for B500B/ B500C/ B500B NR/ B670B NR/ B700B NR *) $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]		Slip after loading s_2 [mm]	Fatigue resistance (S-N curve with specific defined k_1 and k_2)		
			AG[19)]	G[20)]		$\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
HECG1-12	540/575	3	0,11	-	0,1	95	3	5
HECG1-14			0,12	-				
HECG1-16			0,13	-				
HECG1-20			0,14	-				
HECG1-25			0,14	0,15				
HECG1-28			-	0,14				

*) $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B, B500B NR, B670B NR, B700B NR),
$f_{u,min,bar,outside} = f_{yk} \cdot 1{,}15$ with f_{yk}=500 N/mm² (B500C)

**) $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B700B NR can only be used with nominal diameters of 12mm and 14mm.*

GRIPTEC System

Performance
Essential Characteristics: Griptec Hybrid Stainless Steel Connection Type 1

Annex C9

Table C21: **Total length of Griptec hybrid stainless steel connection type2 (HECG2)**

Connection designation	Rebar size [mm]	Total length L [mm]
HECG2-12	12	45
HECG2-14	14	50
HECG2-16	16	55
HECG2-20	20	60
HECG2-25	25	65
HECG2-28	28	75

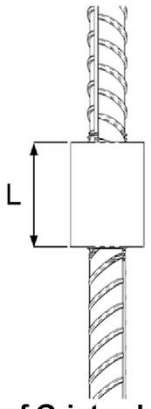


Fig. C11: **Total length of Griptec hybrid stainless steel connection type2 (HECG2)**

Table C22: **Essential characteristics - Hybrid stainless steel connection type2**

Connection designation	Resistance to static or quasi-static loading for B500B NR/ B670B NR/ B700B NR *) $f_{u,min,bar,outside}$ [N/mm²]	Elongation at connection failure $A_{gt,act}$ [%]	Slip under loading s_1 [mm]	Slip after loading s_2 [mm]	Fatigue resistance (S-N curve with specific defined k_1 and k_2) $\Delta\sigma R_{sk}$ [N/mm²]	k_1 [-]	k_2 [-]
HECG2-12	540/575	3	0,10	0,1	95	3	5
HECG2-14			0,10				
HECG2-16			0,10				
HECG2-20			0,10				
HECG2-25			0,10				
HECG2-28			0,10				

*) $f_{u,min,bar,outside} = f_{yk} \cdot 1{,}08$ with f_{yk}=500 N/mm² (B500B NR, B670B NR/ B700B NR)
**) $F_{u,min} = (\pi \cdot d^2)/4 \cdot f_{u,min}$

Note: *Reinforcing steel B700B NR can only be used with nominal diameters of 12mm and 14mm.*

GRIPTEC System	**Annex C10**
Performance Essential Characteristics: Griptec Hybrid Stainless Steel Connection Type 2	