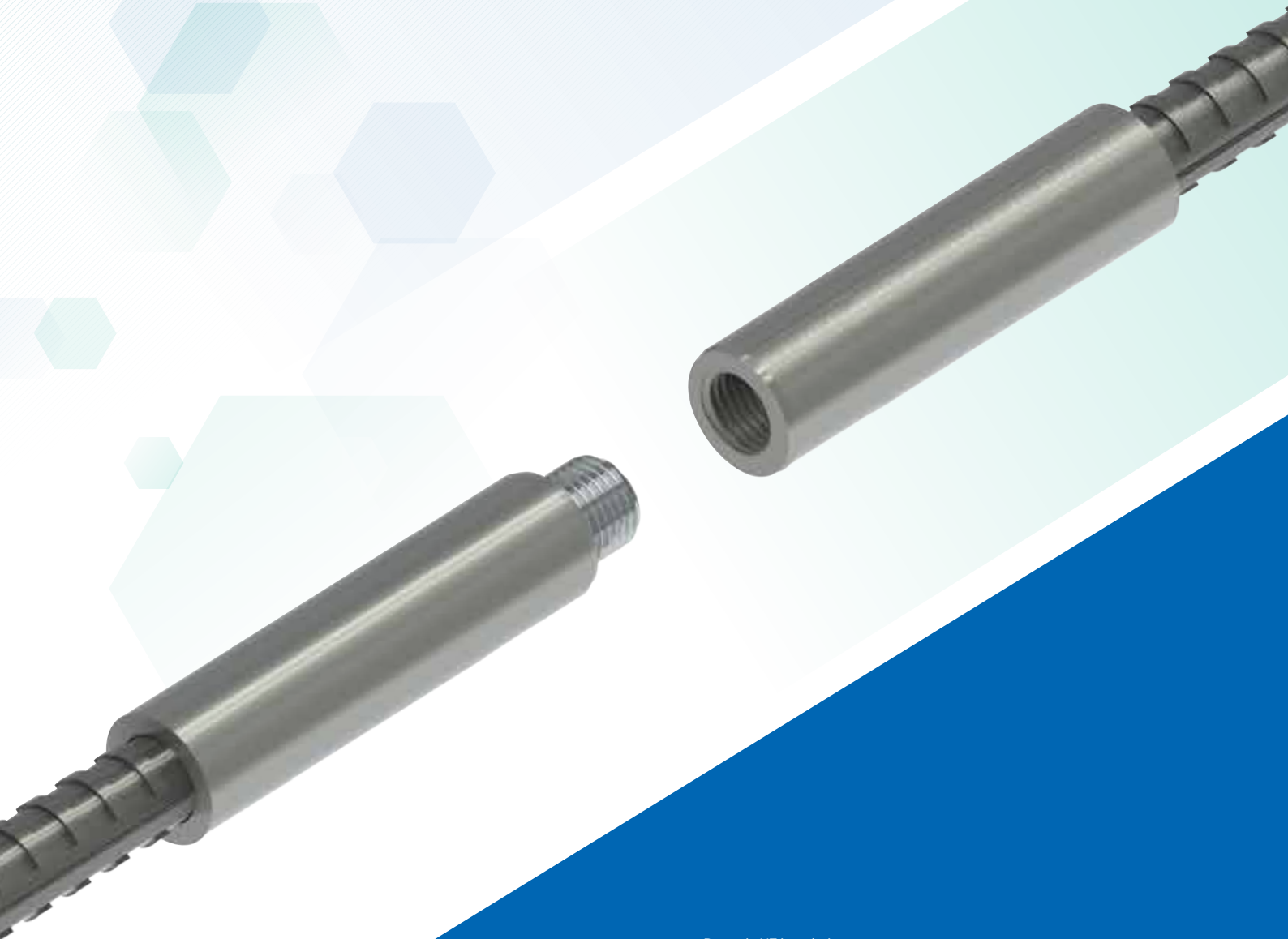




PRODUCT DATASHEET

Griptec® datasheet PDS-018-REV.00_NZ May 2023



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For more information visit
fletcherreinforcing.co.nz/dextra-griptec



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Product Description

The Griptec® system is the most accomplished reinforcing bar end preparation process to-date:

- Effortless: factory-made threaded sleeves are fixed onto the bar ends by a fully-automatic extrusion machine.
- Safe: the CE-compliant, fully-protected extrusion machine doesn't allow access to mobile parts when it is in use.
- Mistake-free: the Griptec machine auto-adjusts its processing parameters when switching from one bar size to another.
- Controlled: the Griptec machine automatically performs a tensile pull on each and every connection that is manufactured.
- Fast: each bar end preparation takes only about 30 seconds.
- Clean: no dirty oil coolant or machining chips.
- Handy: parallel threads do not require a torque wrench for site assembly.

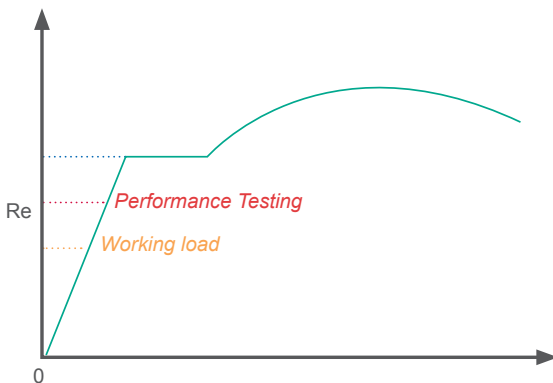
The Griptec® system guarantees an ultimate tensile strength greater than bars, up to 700 MPa.

No room for error: Systematic proof-testing of each and every bar end produce!

Load testing of the bar end is an integral part of the Griptec® bar end preparation process.



This is a non-destructive test: The tensile load is less than the nominal yield strength of the bar, typically at 90% of Re (70% for dia 40 up), by which 100% of the bar ends are tested at a load higher than their design working load.



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The Griptec® system doesn't apply to smooth bars.

Bar end preparation must be done exclusively with machines provided by Dextra. Consult us for technical details of our range of machinery (please specify the minimum and maximum bar diameters that you need to process).

Griptec® couplers and anchor plates can be epoxy-coated by any means. Their internal threads must be protected before processing.

The surface condition of Griptec® couplers and anchor plates conforms to ACI 318 (2008) § 7.4.2, ACI 349 (2006) § 7.4, ASME Section III Division 2 § CC-4360 and B.S. 5400 Part 7 § 4.5. Weldable couplers furthermore conform to ANSI/AWS D1.1-88 § 3.2.1.

CAD & BIM

CAD & BIM tools to support design engineers in the drawing and modeling of structures are available in the download section of www.dextragroup.com

For designer tools support, contact us at: cadbim@dextragroup.com

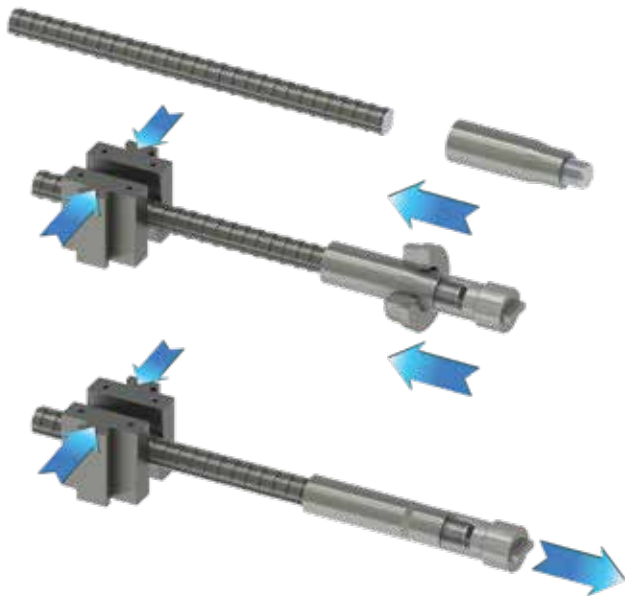


About Griptec®

The Griptec® mechanical splice system consists of threaded sleeves that are fixed onto the reinforcing bar ends. A combination of male and female sleeves creates the connection. The GRIPTEC® system uses isometric parallel threads, so its mechanical performance in compression equals that in tension.

Female sleeves are generally used on first-phase bars, in order to ease the closing of the formworks. Male sleeves are generally used on continuation bars. However pocket formers are available when male sleeves are used in first place bars.

For all types of connections, the preparation of the reinforcing bar is the same : either a female or a male sleeve is swaged onto the end of the bar by deforming the material of the sleeve so that it interlocks intimately with the ribs of the bar.

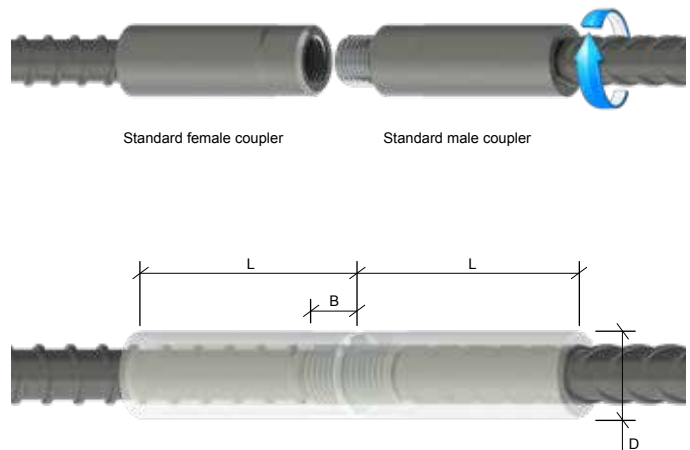


Standard splices use nothing else than a female sleeve and a male sleeve.

Other types of connections use additional elements, which combine with the male and female sleeves in order to achieve the function sought. The product codes of the male and female sleeves are given at the Standard Splices section. In the other sections, only the product codes of the additional elements are given ; the sleeves must be purchased as per the product codes given in the Standard Splices section.

Standard Splices

Standard Griptec® splices are accomplished by use of a standard female coupler and a standard male coupler of the matching size.



See Assembly instruction n° AI-GT05E.

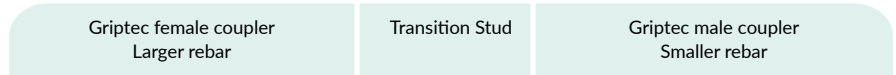
Bar size	Model	Product code		Approximate dimensions (mm)		
		Female sleeve	Male sleeve	D	B	L
12	AG12	FPGS1214003	FPGS1214004	19	16	72
16	AG16	FPGS1618003	FPGS1618004	25	21	100
20	AG20N	FPGS2022005	FPGS2022006	31	25	110
25	AG25	FPGS2527005	FPGS2527006	38	26	120
32	AG32N	FPGS3233003	FPGS3233004	47	40	140
40	AG40N	FPGS4042005	FPGS4042006	61	52	170

Table 1: Dimensions of Griptec Standard splices.

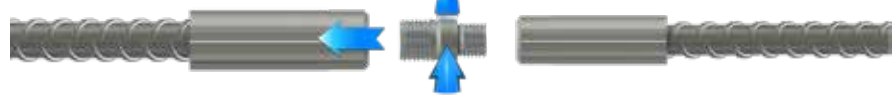
Note: B is the distance between the face of the sleeve and the end of the bar inside the sleeve. The values of B and L are indicative, as they depend on the actual dimensions of the bar, its ribs and the shape of the cut.

Transition Splices (Non Stock Item)

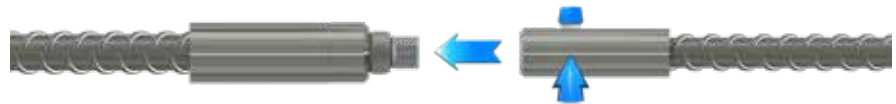
When there is a need to splice bars of different sizes, the Griptec® connects two standard female sleeves with a two-stepped threaded stud.



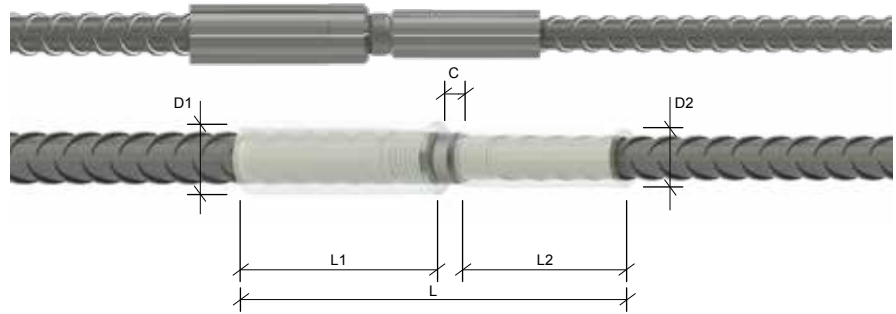
STEP1 Hand screw the transition studs into the female sleeves.



STEP2 Hand screw the continuation bar onto the transition stud.



STEP3 Use a pipe wrench on the continuation bar to lock the splice.



Bar size D1/D2	Model	Product code Transition stud	Approximate dimensions (mm)					
			D	D2	L1	L2	C	L
16/12	AGTS16/12	FPGT1612002	25	19	100	72	9	181
20/12	AGTS20/12	FPGT2012002	31	19	110	72	11	193
20/16	AGTS20/16	FPGT2016002	31	25	110	100	11	221
25/16	AGTS25/16	FPGT2516002	38	25	120	100	13.5	234
25/20	AGTS25/20	FPGT2520002	38	31	120	110	13.5	244
32/20	AGTS32/20	FPGT3220002	47	31	140	110	16.5	267
32/25	AGTS32/25	FPGT3225002	47	38	140	120	16.5	277
40/25	AGTS40/25	FPGT4025002	61	38	170	120	21	311
40/32	AGTS40/32	FPGT4032002	61	47	170	140	21	331

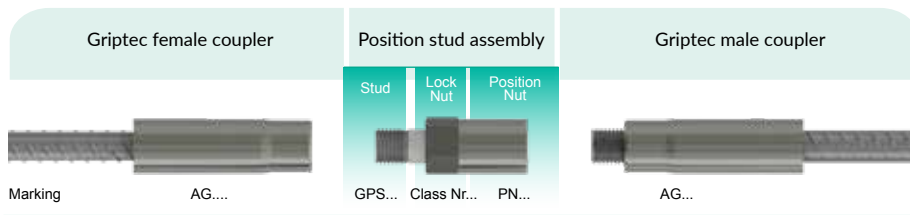
Table 2: Griptec AGTS Transition splices

Note: Ordering information for the transition stud assembly / The table gives the product codes to mention in your purchase orders. Please note that the male and female sleeves have to be ordered separately.

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Position Splices



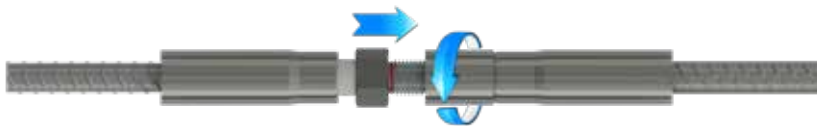
STEP1 The position stud assembly is screwed into the female sleeve.



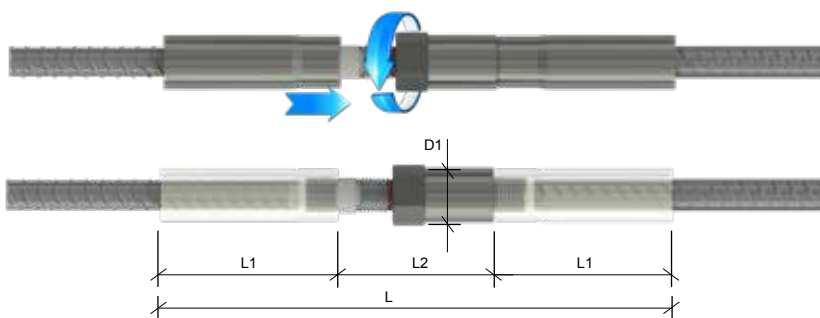
STEP2 The male coupler is brought to contact with the position nut.



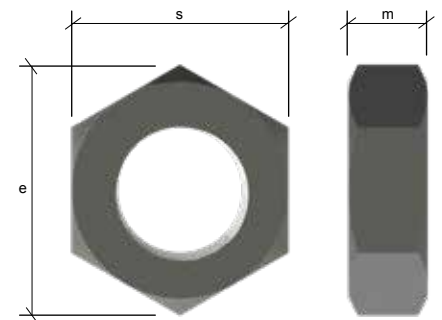
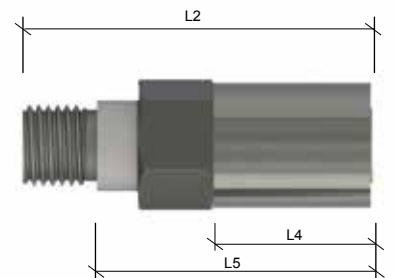
STEP3 The position nut is screwed onto the male coupler.



STEP4 The lock nut is tightened against the position nut.



When neither bar can be rotated (or if both bars would be a burden to rotate, for example because of their size, shape or length), the GRIPTEC® Position splice system uses a “Position stud assembly” set combined with standard male and female sleeves.



See Assembly instruction n° AI-GT17E

Bar size	Model	Product code Position stud assembly	Approximate dimensions (mm)			
			D1	L1	L2	L
12	GPC12	FPGP1214021	19	72	60	204
16	GPC16	FPGP1618021	25	100	77	277
20	GPC20	FPGP2022021	34	110	94	314
25	GPC25	FPGP2527021	40	120	107	347
32	GPC30	FPGP3233021	50	140	134	414
40	GPC40	FPGP4042021	64	170	162	502

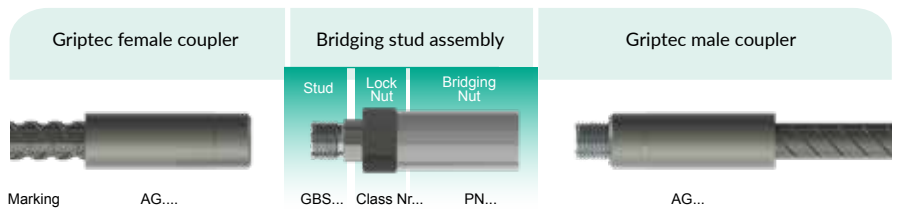
Table 3: Griptec AGP Position splices & Lock nuts

Note: Ordering information for the position stud assembly / The table gives the product codes to mention in your purchase orders. Please note that the male and female sleeves have to be ordered separately.

Dimensions of the position stud assembly:

Approximate dimensions (mm)					
L2	L4	L5	e	S	m
60	26	48	23	21	13
77	34	61	30	27	16
94	42	74	37	34	19
107	47	85	45	41	23
134	59	105	55	50	28
162	71	127	71	65	33

Bridging Splices (Non Stock Item)



STEP1 The bridging stud assembly is screwed into the female sleeve.



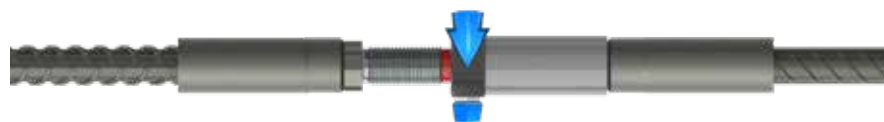
STEP2 The male coupler is brought as closed as possible to the bridging nut.



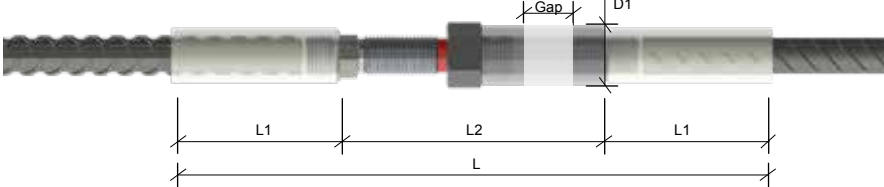
STEP3 The bridging nut is screwed out of the bridging stud and onto the male coupler.



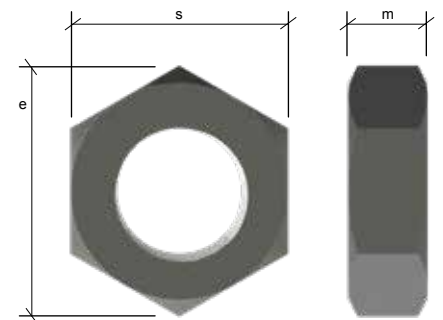
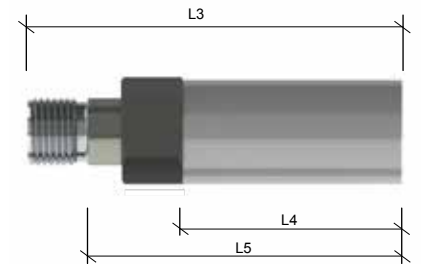
STEP4 The lock nut is tightened against the bridging nut.



See Assembly instruction n° AI-GT19E



When the bars cannot be brought butt to butt (as it happens often in cages manufacturing), GRIPTEC® Bridging Splices are the answer. This is a variant of the position splice that uses a longer stud and a longer nut. Gaps between bar ends can be bridged by this system.



Overall dimensions of the splice

Bar size	Model	Product code	Approximate dimensions (mm)				
			D1	L1	L2	L	Gap
12	GPD12	FPGB1214001	19	72	131	275	35
16	GPD16	FPGB1618001	25	100	150	350	36
20	GPD20	FPGB2022001	34	110	167	387	37
25	GPD25	FPGB2527005	40	120	196	436	45
32	GPD32	FPGB3233005	50	140	220	500	44
40	GPD40	FPGB4042001	64	170	254	594	47

Table 4: Griptec AGB Bridging splices & Lock nuts

Note: Ordering information for the bridging stud assembly / The table gives the product codes to mention in your purchase orders. Please note that the male and female sleeves have to be ordered separately.

Dimensions of the bridging stud assembly

Approximate dimensions (mm)					
L3	L4	L5	e	S	m
96	59	84	23	21	13
114	68	98	30	27	16
130	77	110	37	34	19
151	89	129	45	41	23
176	101	148	55	50	28
207	117	172	71	65	33

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Headed Bars

Development or anchorage of reinforcement is the main use of headed bars. They conveniently replace hooked bars as end anchorages in congested areas. They can also be used to reduce lapping length, or as confinement or shear reinforcement where placing of stirrups is difficult.

Typical applications include exterior beam-column connections, roof corners, pile feet, pile caps, cantilevered members, corbels, etc.

Headed bars can provide full design anchorage by either the head bearing alone or a combination of the head bearing together and rebar bond. The selection of approach will primarily depend on the design standard adopted, the size of the head and the strength of concrete.

Standard GRIPTEC® mechanical anchorages are circular in shape and are fixed to the end of the rebar by screwing them onto the end of the male GRIPTEC® sleeve. Two sizes of heads are available:

- Small heads, with a net bearing area greater than or equal to four times the cross section area of the reinforcing bar (4A).
- Large heads, with a net bearing area greater than or equal to nine times the cross section area of the reinforcing bar (9A).

When loaded in tension and due to the round shape of the head, a cone of overstressed concrete will develop immediately under the head. If the head is large enough and the concrete is strong enough, the full anchorage design strength can be developed via the head alone. If this is not the case, then a contribution of rebar bond is required, immediately beyond the region of overstressed concrete.

Different codes of practice take different design approaches. Some, for example ACI 318, explicitly allow for a 4A head with a provision for a load contribution to be taken via rebar bond. Others, for example, fib Model Code 2010, give a set of simplified prescriptive rules for a minimum head size of 8A only. EN1992-1-1 (Eurocode 2), does not explicitly cover designing with headed bars. However, rules can be derived from the provisions for partially loaded areas. For further information on how to design in accordance with Eurocode 2, please see the Arup/ Dextra Design Guide.

In beam-column connections, headed bars in beam reinforcement should extend to the far side of the column core. In roof corners, the column heads should be located above the beam bars. In both cases this detailing arrangement will provide space for an additional layer of transverse reinforcement, which will further improve the capacity of the anchorage.

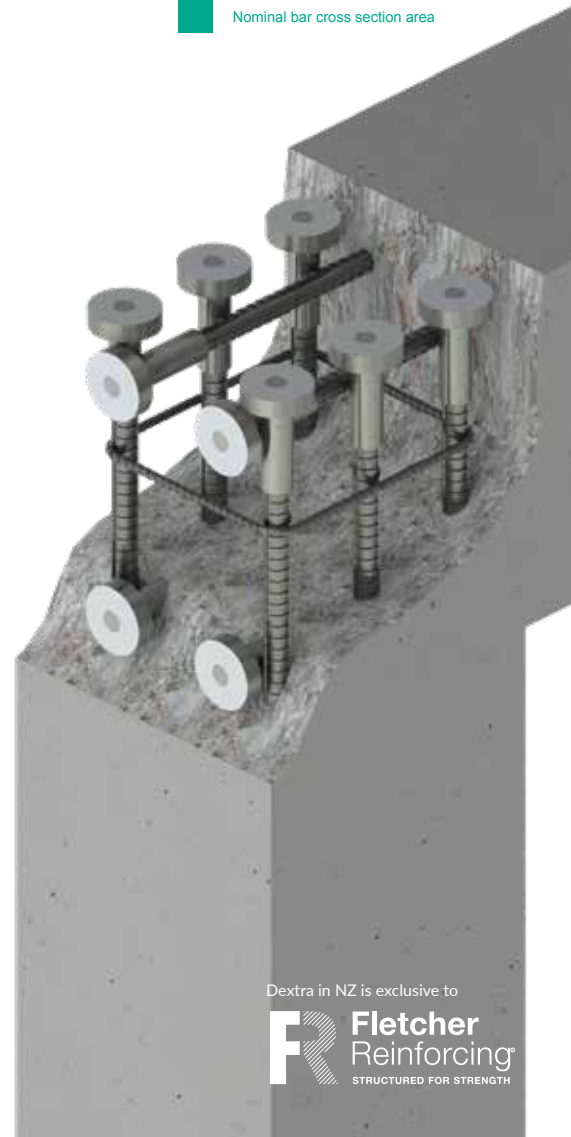
Headed bars can be arranged close to one another: Tests have shown that the overlapping of compression cones does not reduce the effectiveness of the anchorage. However, the relevant code of practice should be followed with regards spacing.

For applications in seismic design, or whenever stress reversal can be expected, the anchorage length in compression should be checked too. (Just like hooks, headed bars do not contribute to anchorage in compression, which must therefore be provided by a straight portion of bar as per the code requirement).

Full-scale cyclic tests of beam-column connections reinforced with headed bars have shown that push-out of the concrete behind the head does not occur until a drift ratio of 6%.



$$\text{Surface ratio} = \frac{\text{Net bearing area}}{\text{Nominal bar cross section area}}$$



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Standard Griptec anchor plates are circular, and are fixed to the bar end by screwing them onto male sleeve.



Small size Headed Bars

Bar size	Model	Product code Small anchor plates	Approximate dimensions (mm)				Net bearing area (mm ²)	Surface ratio
			D	T	L1	d		
12	AGEASC12	FPEC0414004	34	12	72	19	624	6
16	AGEASC16	FPEC0518004	42	16	100	25	895	4
20	AGEASC20	FPEC0622004	52	20	110	31	1,369	4
25	AGEASC25	FPEC0827004	65	22	120	38	2,184	4
32	AGEASC32	FPEC1033004	80	28	140	47	3,292	4
40	AGEASC40	FPEC4042014	105	34	170	61	5,737	5

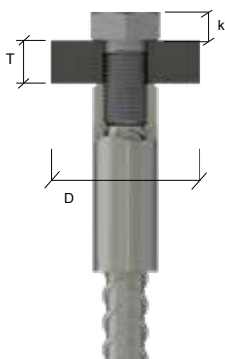
Table 5: Dimensions of Griptec small mechanical anchorages
(Net bearing area at least 4 times the cross-section area of the bar)

Large size Headed Bars (Non Stock Item)

Bar size	Model	Product code Large anchor plates	Approximate dimensions (mm)				Net bearing area (mm ²)	Surface ratio
			D	T	L1	d		
12	AGEALC12	FPEC0414002	45	12	72	19	1,307	12
16	AGEALC16	FPEC0518002	55	16	100	25	1,885	9
20	AGEALC20	FPEC0622002	70	20	110	31	3,094	10
25	AGEALC25	FPEC2527012	90	22	120	38	5,228	11
32	AGEALC32	FPEC1033004	80	28	140	47	3,292	10
40	AGEALC40	FPEC4042012	140	38	170	61	12,471	10

Table 6: Dimensions of Griptec large mechanical anchorages
(Net bearing area at least 9 times the cross-section area of the bar)

For applications where the Griptec sleeve must be a female, it is possible to fix the end anchor plate with a hexagonal head screw



Bolted Headed Bars (Non Stock Item)

Bar size	Model	Product code bolted anchor set	Approximate dimensions (mm)					Net bearing area (mm ²)	Surface ratio
			D	T	L1	d	k		
32	GEAB32	FPEC3200001	110	32	140	47	21	7,768	10
40	GEAB40	FPEC4000001	140	35	170	61	26	12,471	10

Table 7: Dimensions of Griptec mechanical anchorages for Griptec female sleeve. Consult us for bar diameters or head sizes other than those listed in this table.
(Net bearing area at least 9 times the cross-section area of the bar)

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Nailing Plate

Nailing Plates are plastic accessories that are used to fix female Griptec couplers on timber formwork. This is done by nailing the plate to the formwork at the desired location and then screw the coupler onto the plate.

After removing the formwork, the nailing plate is unscrewed, leaving a 10 to 12 mm deep recess between the concrete surface and the female coupler.



Bar size	Product code	Approximate dimensions (mm)		
		D	H	h1
12	GACC3700001	40	20	10
16	GACC3700003	55	25	
20	GACC3700004	55	25	10
25	GACC3700005	55	25	
32	GACC3700007	70	30	12
40	GACC3700009	95	34	

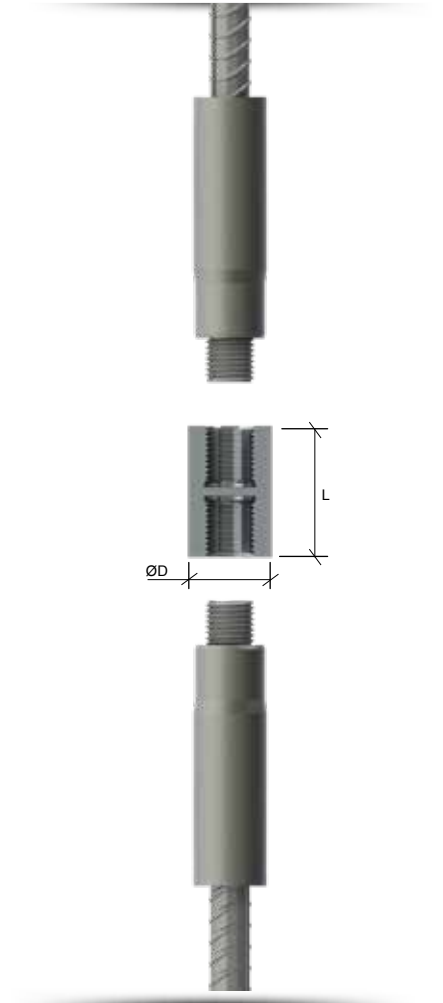
Table 8: Dimensions of Griptec Nailing plates (colour may varies).

Stainless Steel Connectors (Non Stock Item)

Stainless steel connectors are available for future extensions : Their blind holes prevent water ingress and their material prevents corrosion to occur, thereby maintaining the reinforcement in good condition until the day the extension is built. They are made of grade 316Ti as per ASTM A276 or X6CrNiMoTi17-12-2 as per EN 10088-3.

Bar size	Model	Product code Stainless steel connectors	Approximate dimensions (mm)	
			ØD	L
12	ECG12	FPSC1214001	23	45
16	ECG16	FPSC1618001	30	55
20	ECG20	FPSC2022001	38	60
25	ECG25	FPSC2527001	47	65
32	ECG32	FPSC3233001	59	85
40	ECG40	FPSC4042001	74	95

Table 9: Dimensions of Stainless steel connectors



Installation

Contrary to taper threads, no torque wrench is necessary. Connections on site must be done as per the correct Assembly Instruction, as referenced in this document for each type of splice. They are available upon request or at www.dextragroup.com/downloads

Quality Assurance

Griptec® couplers and anchor plates are manufactured according to strict technical specifications and under a production process that has been certified to satisfy to ISO 9001 and ASME NCA-3800 quality assurance standards. This quality assurance system complies with the requirements ASME NQA-1 and 10CFR50 Appendix B.

They are warranted to be free from manufacturing defects and to perform in accordance with the manufacturer's specifications providing that they are installed in accordance with the manufacturer's instructions.




Agency	Certificate N°
 The American Society of Mechanical Engineers	QSC-706
 Bureau Veritas ISO 9001:2015	TH010882
ISO 19443 : 2018	FR071147-1
 UK CARES ISO 9001:2015	1086

Table 10: Quality assurance

Custom Code

The usual international customs code for mechanical couplers and anchor plates is 73.08.90.90.00-7 ("Parts of structures, of iron or steel").

However, national preferences may be followed.



All load-bearing elements are individually marked. Full traceability of the production batches and raw material lots is guaranteed. Sleeve studs are marked on their face, either outside or inside the sleeve.

The retention period of our quality records is 12 years.

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Approvals

Griptec® splices have received the following approvals:















Country	Agency	Certificate N°	Details
		N° M02/004	For standard, position, bridging, transition & position- transition splices and anchorages in dia 12 through 40. For standard fatigue in dia 12 through 32. For Standard, bridging seismic in dia 12 through 40.
		N° 5005 for BS 8110 and Eurocode2 applications	For standard, position & transition splices in dia 12 through 50. For position-transition splices in dia 12 through 40. For bridging splices in dia 16 through 50. For caging splices in dia 32 through 50.
		N° 5014 for Sellafield applications	For standard & position splices in dia 12 through 50. For transition & bridging splices in dia 16 through 50. For caging splices, and bridging transition in dia 32 through 40.
		N° 5051 for Highways Agency applications	For standard splices in dia 16 through 40. For position splices in dia 25 through 50. For caging slices in dia 40 and 50.
		N° 5059 for BS8110 & Eurocode 2 applications	For small anchors bars in dia 16 through 40 For large bars in dia 16 through 32, and Bolted Headed bars in dia 32 through 40.
		N° 5059 for Sellafield applications	For small anchors bars in dia 16 through 40 For large bars in dia 16 through 25, and Bolted Headed bars in dia 32 through 40.
		N° Z-1.5-133	For standard, position, bridging, transition & positiontransition splices, anchorages, weldable, stainless steel connectors, and steel connectors in dia 12 through 40.
		N° 327.120/0007-IV/IVVS2/2016	For standard splices in dia 12 through 36
		N° SF2016/39582	For standard splices in dia 12 through 40.

Table 11: Approvals certificate

New Zealand Specific Testing

Couplers

Report 5-24000.20 “Reinforcing Coupler Testing” details testing conducted by WSP Research’s Structures Laboratory (<https://www.wsp.com/en-nz>) to the requirements of NZS 3101.1 clause 8.7.5.2 (a) & (b) for mechanical connectors and ISO 15835-2 clause 5.6 for low cycle loading for category S2 (violent earthquake).

Headed Bars

Holmes Solutions LP (www.Holmessolutions.com) was commissioned to undertake testing of the Griptec® headed bar system following the full qualification testing requirements of ISO 15698, parts 1 & 2, “Steel for the reinforcement of concrete – headed bars”.

Conducted on connections using New Zealand-made reinforcing bar, the required testing involved: both static loading and violent low-cycle (seismic) loading on specimens embedded in nominally 30MPa concrete, and connection robustness through wedge tensile testing. The testing programme was undertaken as Holmes Solutions project 145008.00 – “Fletcher Steel Headed Bar 2023”.

Changes and Updates

As a result of our continuous thrive for technological improvement, Dextra reserves its right to modify the contents of this specification sheet at any time without prior notice.

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Disclaimer Dextra products are warranted to be free from defects in material and workmanship at the time of delivery. No other warranty, whether expressed or implied shall exist in the connection of the sale, lease or use of any Dextra products. This warranty is limited to the original value of the products/ services. Dextra shall in no event be responsible if the products have not been stored or used in accordance with its specifications and recommended procedures / instructions. Dextra is not responsible for any direct or consequential losses or damages of any kind that maybe incurred by the Buyer/User of its products.



Commercial presence in more than 55 countries.



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