DESCRIPTION OF THE GEOCONNECT® LL DOWEL CONNECTORS

A1 Description of the components (male and female)

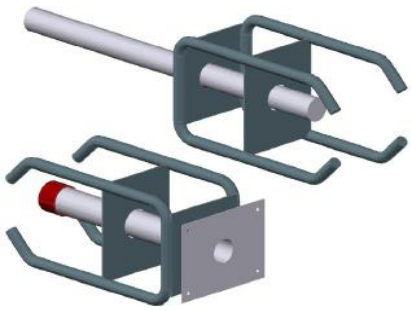


Figure A1.1: Connector Geoconnect® LL of family A1 (male and female components).

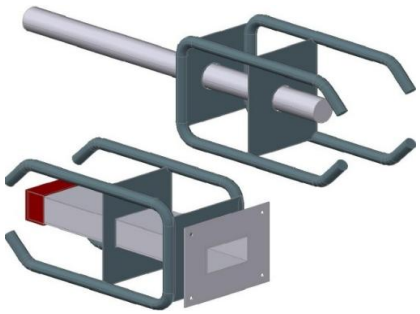
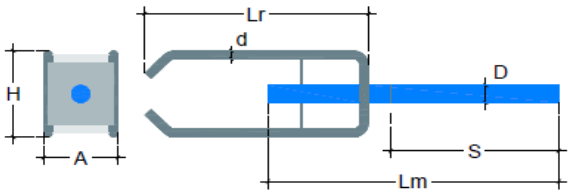


Figure A1.2: Connector Geoconnect® LL of family A2 (male and female components).

Note:
Only the variant with stainless steel sleeve is shown in both figures for clarification purposes.



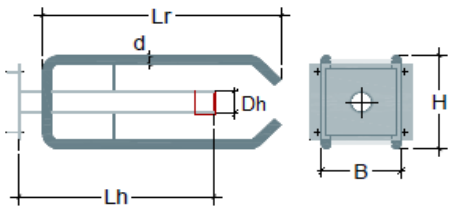
D_m Dowel bar diameter
L_m Dowel bar length
S Overhung
d Reinforcement bar diameter
L_r Reinforcement bar length
H Height
A Width

Figure A1.3: Dimensions of the male component.

Reference	Dimensions of the male component (mm)						
	Dowel bar			Fixed reinforcement			
	D_m	L_m	$S_{(1)}$	d	L_r	H	A
GC-LL-20	20	320	190	10	260	110	85
GC-LL-22	22	350	205	10	260	110	85
GC-LL-25	25	390	225	12	300	125	100
GC-LL-30	30	450	255	12	300	125	100
GC-LL-35	35	520	290	16	350	140	120
GC-LL-40	40	580	320	16	350	140	120

(1) Minimum overhung (for a concrete cover of 30 mm).

Table A1.1: Dimensions of the male component.



D_h Interior sleeve diameter
L_h Sleeve length
d Reinforcement bar diameter
L_r Reinforcement bar length
H Height
B Width

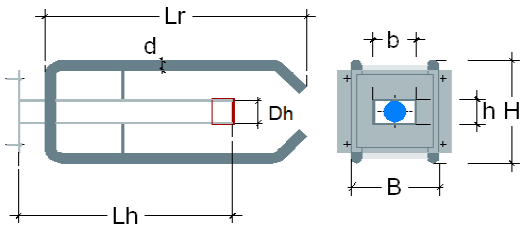
Figure A1.4: Female component of family A1.

Reference	Dimensions of the female component of family A1 (mm)					
	Sleeve		Fixed reinforcement			
	D_h	L_h	d	L_r	H	B
GC-LL-20	21	210	10	260	110	120
GC-LL-22	23	225	10	260	110	120
GC-LL-25	26	245	12	300	125	130
GC-LL-30	31	275	12	300	125	130
GC-LL-35	36	310	16	350	140	150
GC-LL-40	41	340	16	350	140	150

Table A1.2: Dimensions of the female component of the family A1.

Reference	Dimensions of the nailing plate in the female component of family A1 (mm)			
	Stainless steel sleeve		Polypropylene sleeve	
	Width	Height	Width	Height
GC-LL-20	120	100	90	90
GC-LL-22				
GC-LL-25	130			
GC-LL-30				
GC-LL-35	150			
GC-LL-40				

Table A1.3: Dimensions of the nailing plate in the female component of family A1.



D_h Sleeve height
b Sleeve width
L_h Sleeve length

d Reinforcement bar diameter
L_r Reinforcement bar length
H Height
B Width

Figure A1.5: Componente Hembra de la familia A2.

Reference	Dimensions of the female component of family A2 (mm)						
	Sleeve			Fixed reinforcement			
	h	b	L_h	d	L_r	H	B
GC-LL-20-DM	21	46	210	10	260	110	120
GC-LL-22-DM	23	47	225	10	260	110	120
GC-LL-25-DM	26	56	245	12	300	125	130
GC-LL-30-DM	31	62	275	12	300	125	130
GC-LL-35-DM	36	76	310	16	350	140	150
GC-LL-40-DM	41	77	340	16	350	140	150

Table A1.4: Dimensions of the female component of family A2.

Reference	Dimensions of the nailing plate in the female component of family A2 (mm)			
	Stainless steel sleeve		Polypropylene sleeve	
	Width	Height	Width	Height
GC-LL-20-DM	120	100	90	90
GC-LL-22-DM				
GC-LL-25-DM	130			
GC-LL-30-DM				
GC-LL-35-DM	150			
GC-LL-40-DM				

Table A1.5: Dimensions of the nailing plate in the female component of family A2.

Characteristic	Performance	Standard
Density (g/cm3)	1,04	EN ISO 1183
Melt flow ratio (g / 10 min)		
(230 ºC / 2,16 kg)	16	EN ISO 1133
(230 ºC / 5,0 kg)	67	EN ISO 1133
Tensile modulus (MPa)	2 600	EN ISO 527-1, -2
Tensile strength (50 mm/min) (MPa)	33	EN ISO 527-1, -2
Flexural modulus (MPa)	2 700	EN ISO 178
Strength to Charpy impact (kJ/m2)		
- Without notch (23 ºC, type 1, edgewise)	32	EN ISO 179
- Without notch (0 ºC, type 1, edgewise)	18	EN ISO 179
- With notch type A (23 ºC, type 1, edgewise)	2,5	EN ISO 179
- With notch type A (0 ºC, type 1, edgewise)	1,5	EN ISO 179
Hardness (indentation ball H 358/30) (MPa)	90,0	ISO 2039-1
Flexural temperature under load B (0,45 MPa; not annealed) (ºC)	115	EN ISO 75B-1, -2
Flexural temperature under load A (1,80 MPa; not annealed) (ºC)	65	EN ISO 75A-1, -2

Table A1.6: Nominal characteristics of the polypropylene of the sleeve and the nailing plate.

The fixed reinforcement is made of steel rebars according to EN 10080 of the following characteristics:

Characteristic	Performance
Yield strength (Re) [N/mm2]	≥ 500
Tensile strength (Rm) [N/mm2]	≥ 550
Ultimate elongation (Ɛu) [%]	≥ 12
Re / Rm	≥ 1,05

Table A1.7: Nominal characteristics of the steel rebars.

The plates used to fix the fixed reinforcement in the male and female components are made of steel sheets 1,5 mm thick of steel S235 according to EN 10025-2. These plates are also used to support the dowel bars and the sleeve.

A2 Schematic views of the dowel connectors

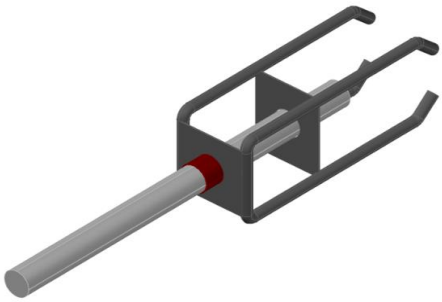


Figure A2.1: Male component.

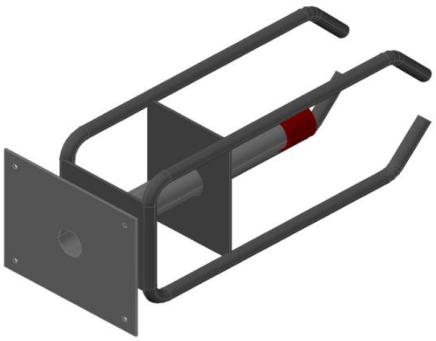


Figure A2.2: Female component with stainless steel sleeve and family A1.

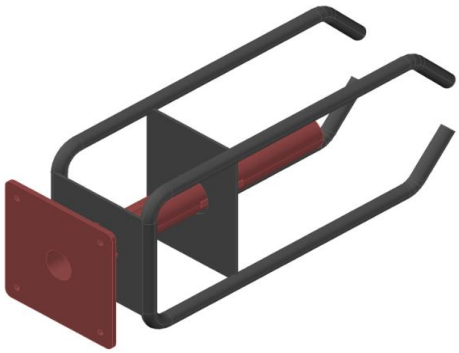


Figure A2.3: Female component with polypropylene sleeve and family A1.

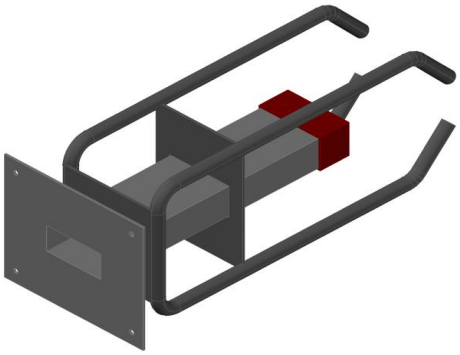


Figure A2.4: Female component with stainless steel sleeve and family A2.

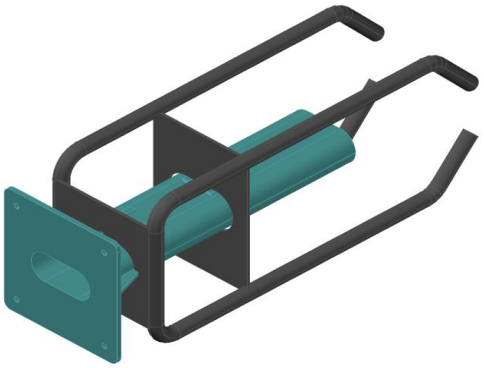


Figure A2.5: Female component with polypropylene sleeve and family A2.

A3 Dimensional limits of the elements to be connected

Reference	Minimum thickness of the concrete elements to be connected (mm)
GC-LL-20	180
GC-LL-22	180
GC-LL-25	200
GC-LL-30	200
GC-LL-35	250
GC-LL-40	250

Table A3.1: Minimum thickness of the concrete elements to be connected.

Reference	Minimum dowel bar introduction in the sleeve (mm)						
	Joint width (w) (mm)						
	0	10	20	30	40	50	60
GC-LL-20	190	180	170	160	150	140	130
GC-LL-22	205	195	185	175	165	155	145
GC-LL-25	225	215	225	235	245	255	165
GC-LL-30	255	245	235	225	215	205	195
GC-LL-35	290	280	270	260	250	240	230
GC-LL-40	320	310	300	290	280	270	260

Table A3.2: Minimum dowel bar introduction in the sleeve (mm).