

Assembly Instruction N° AI-GT 05 E Rev 02 of 24 August 2016

Step 1

Prepare the 1st stage bars



The coupler caps are correctly fitted.



Concreting 1st stage

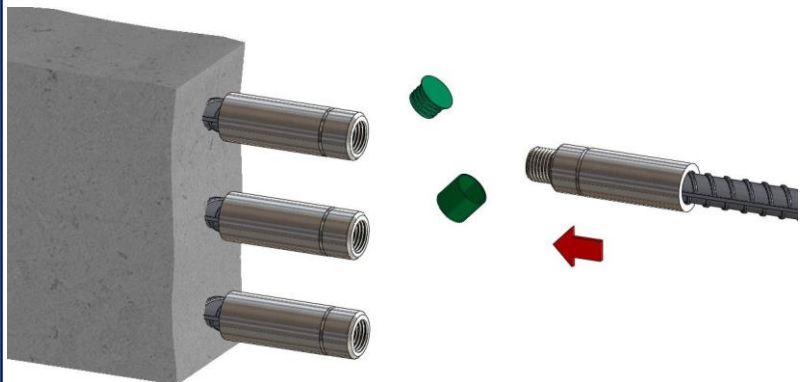
Step 2

Prepare the continuation bars

Remove the plastic caps from the 1st stage bars and the thread protection from the continuation bars.



Both caps are of the same colour.



Assembly Instruction N° AI-GT 05 E Rev 02 of 24 August 2016

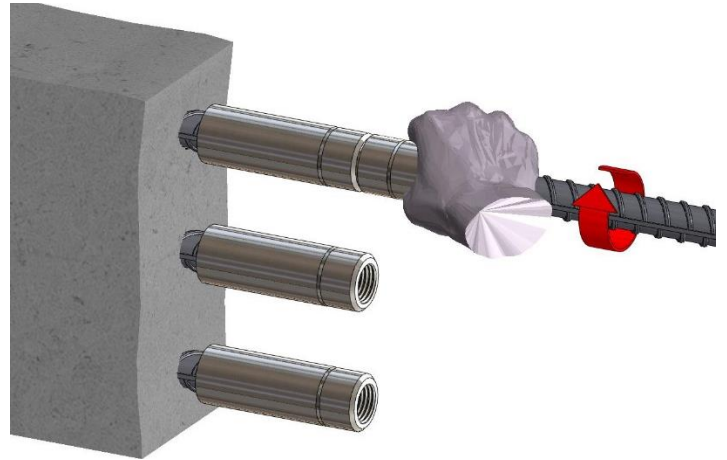
Step 3

Hand screw the continuation 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.

Join the bars



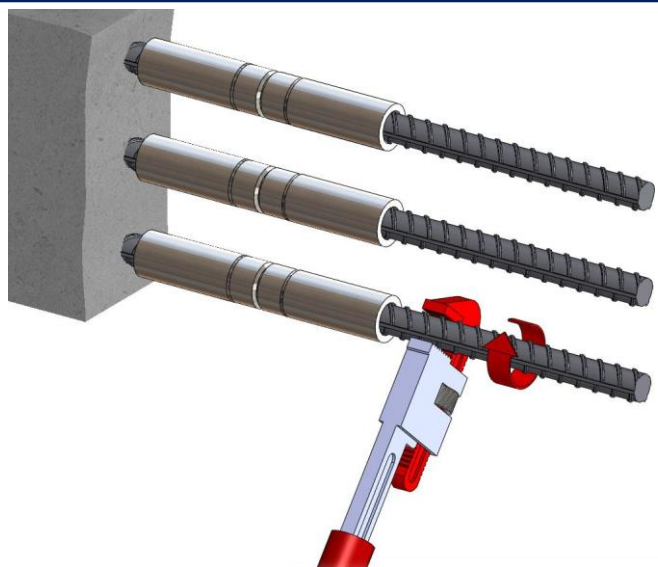
Step 4

Use a stilson or pipe wrench on the continuation bars until the faces of the sleeves are in close contact with one another so that the threaded portion is no longer visible. No specific torque amount is required.



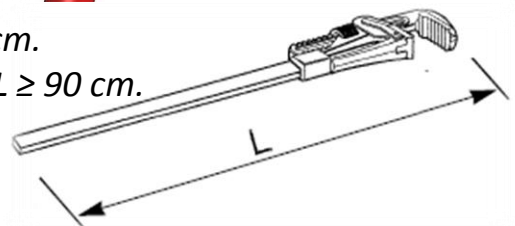
Locking the splice ensures that its permanent elongation meets the code requirement.

Lock the splice



For $\varnothing 32$, $L \geq 60$ cm.

For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.





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POSITION SPLICES

Assembly Instruction N° AI-GT 17 E Rev 05 of 02 October 2019

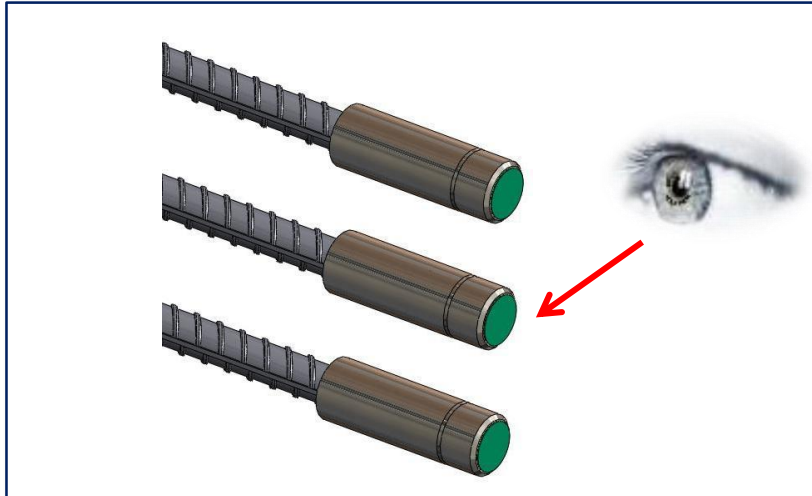
Step 1

(For vertical bars, use male sleeves for the bottom bars.)



The coupler caps are correctly fitted.

Prepare the 1st stage bars



Concreting 1st stage

Step 2

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).

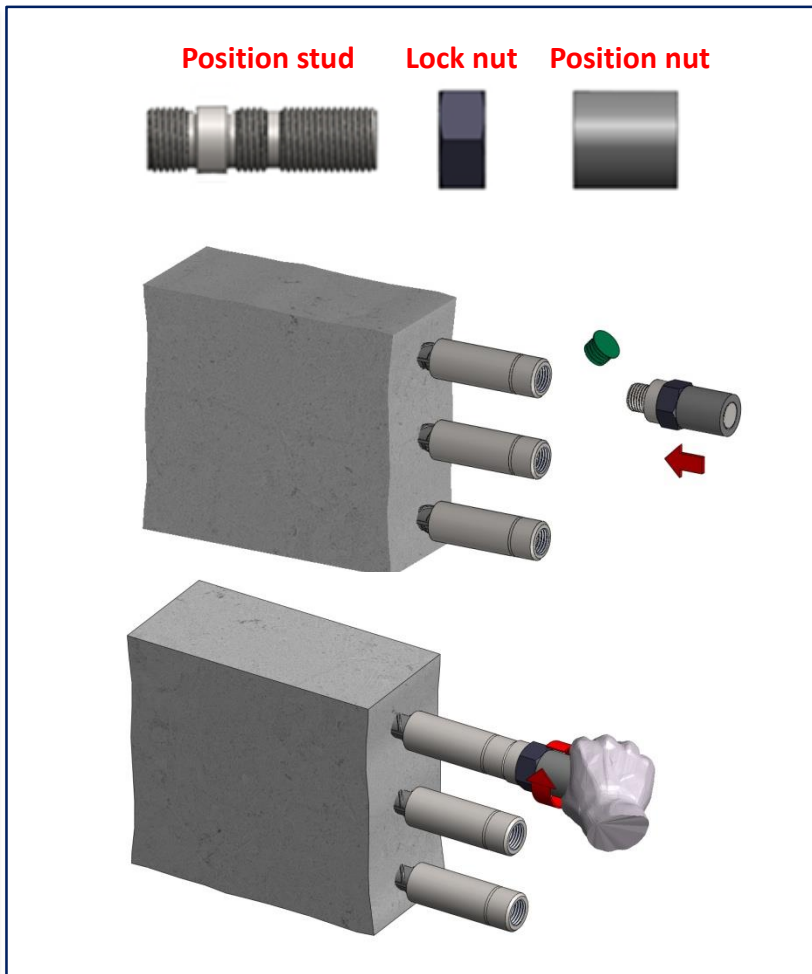


The position stud is fully engaged into the female sleeve.



The position nut is fully engaged, but slightly loose, on the position stud.

Prepare the continuation bars





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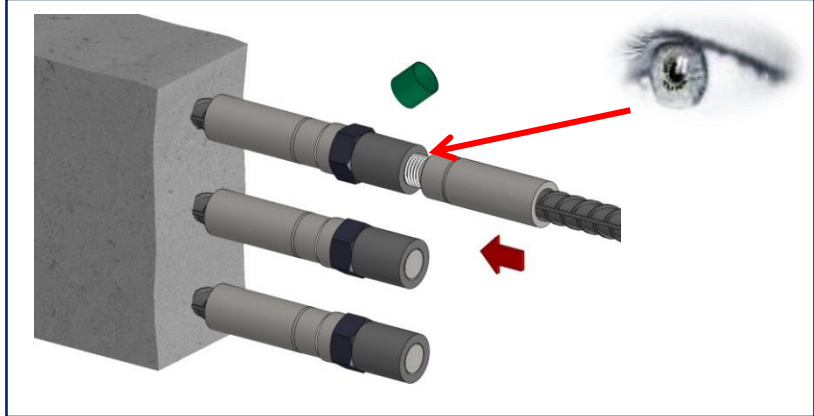
POSITION SPLICES

Assembly Instruction N° AI-GT 17 E Rev 05 of 02 October 2019

Step 3

Remove the plastic caps from the male sleeves and bring the bars in butt-to-butt contact.

Position the continuation bars

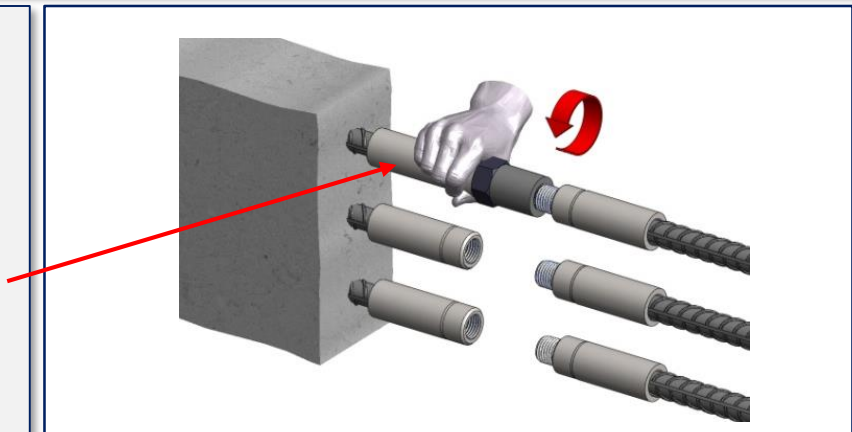


Step 4

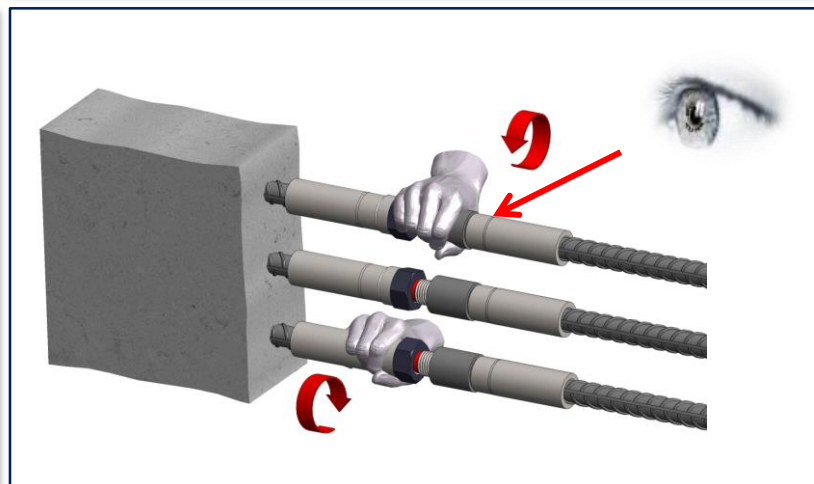
Hand screw the position nuts out of the position studs and onto the male sleeves. (A wrench may be used if it makes the operation easier). Full engagement of the thread is sufficient to develop the full tensile strength of the splice.

Connect the bars

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.





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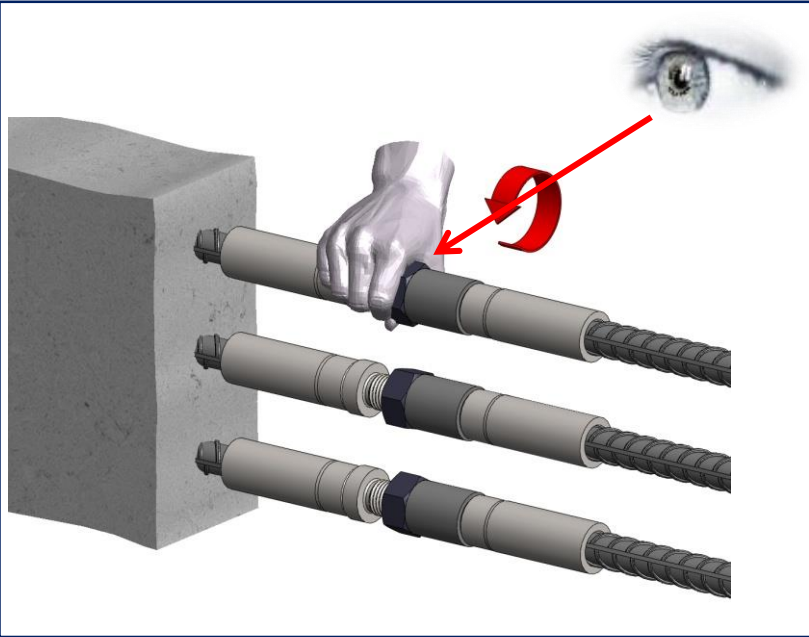
POSITION SPLICES

Assembly Instruction N° AI-GT 17 E Rev 05 of 02 October 2019

Step 5

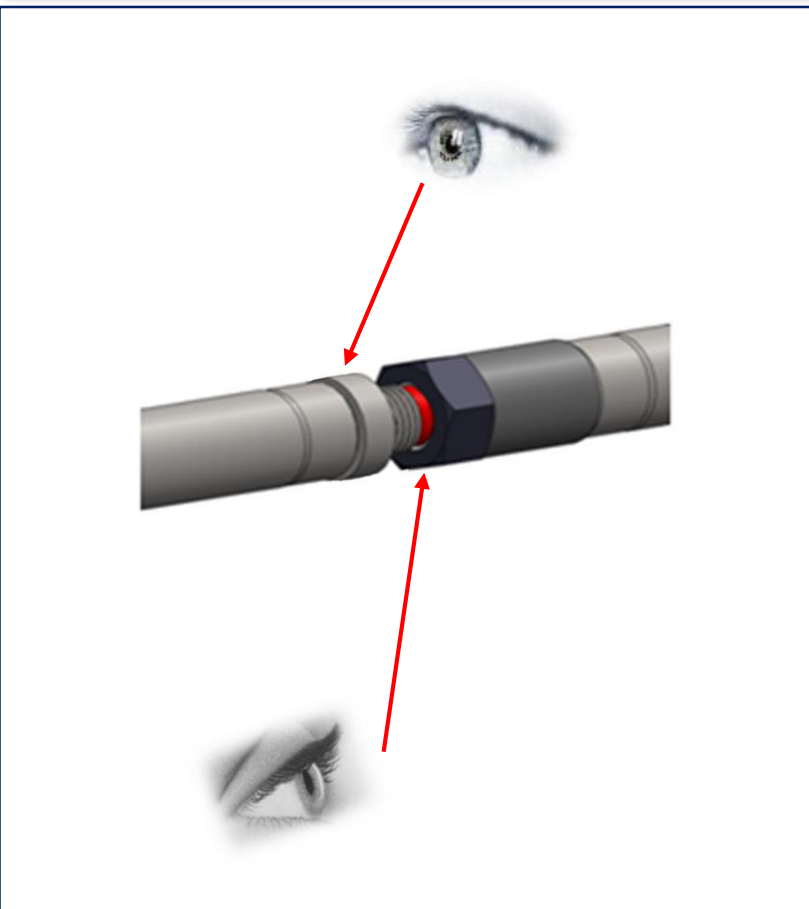
Hand screw the lock nuts until contact with the position nuts.

Screw the lock nuts



Check that the position stud remains fully engaged in the female sleeve.

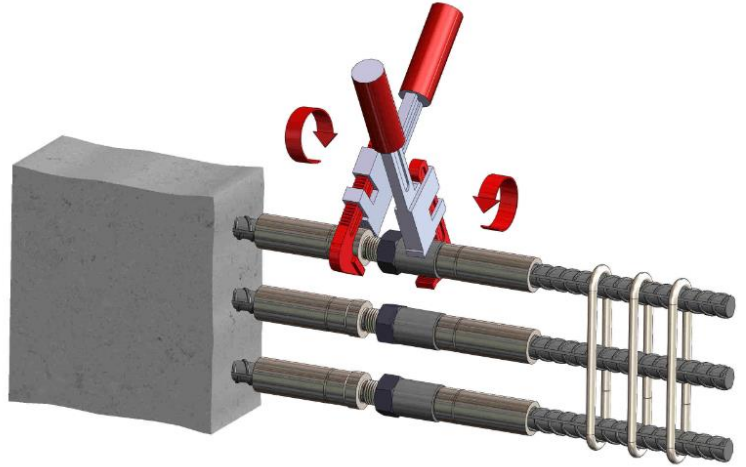
Check that there is no thread appearing beyond the engagement inspection groove of the position stud.



Step 6.1

Use a stilson or pipe wrench on the position stud and on the position nut until snug fit on both sides. No specific torque amount is required.

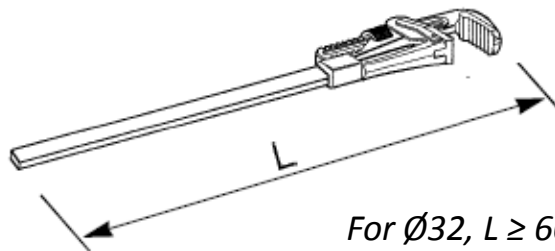
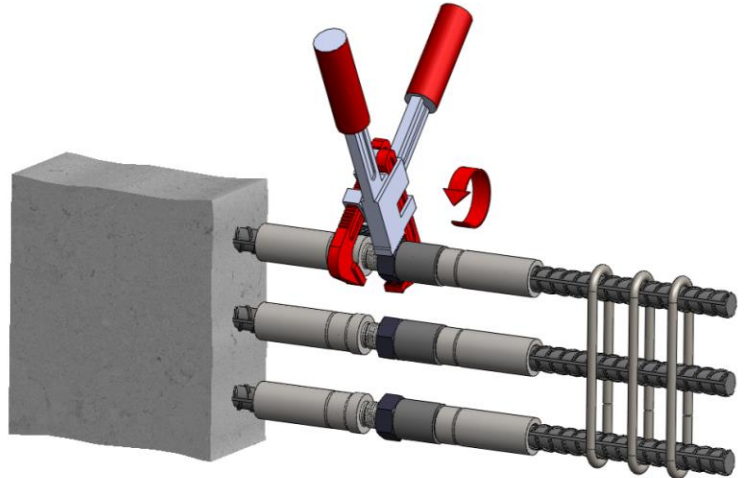
Lock the splice (Case of connections of welded assemblies)



Repeat the operation with the lock nut and the position stud.



Locking the splice ensures that its permanent elongation meets the code requirement



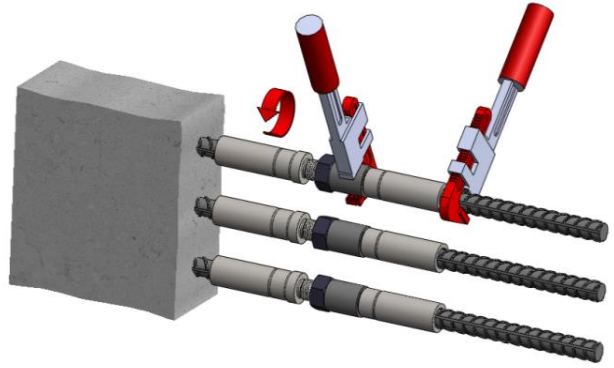
For $\varnothing 32$, $L \geq 60$ cm.
For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.

Step 6.2

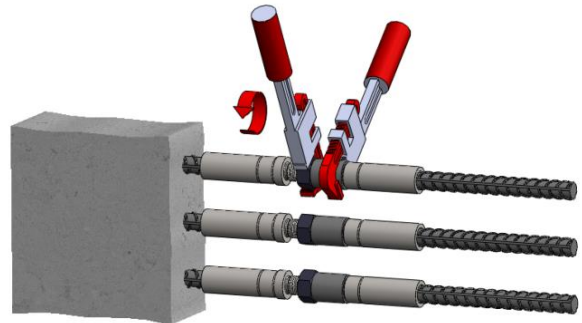
Lock the splice

(Case of connections of wire-tied assemblies)

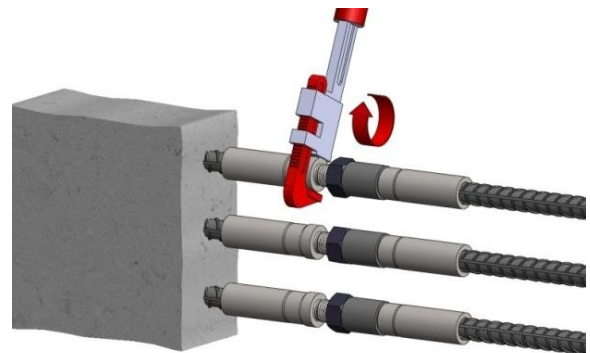
Hold the continuation bar with a stilson or a pipe wrench, and use another wrench to tighten the position nut until snug fit. No specific torque amount is required.



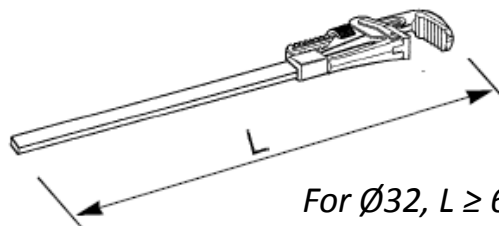
Hold the position nut with a stilson or pipe wrench, and use another wrench to tighten the lock nut until snug fit. No specific torque amount is required.



Use a stilson or pipe wrench to tighten the position stud until snug fit. No specific torque amount is required.



Locking the splice ensures that its permanent elongation meets the code requirement



*For $\varnothing 32$, $L \geq 60$ cm.
For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.*



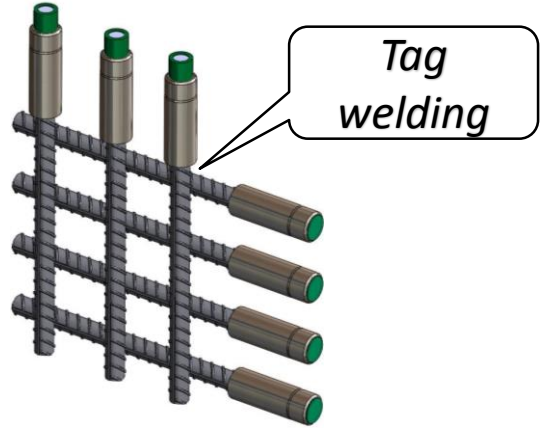
Step 1

(For vertical bars, use male sleeves for the bottom bars.)



The coupler caps are correctly fitted.

Prepare the 1st stage bars



Concreting 1st stage

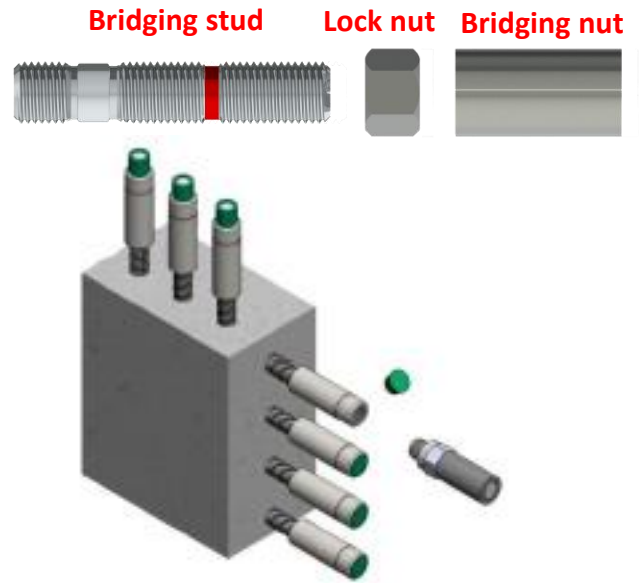
Step 2

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).

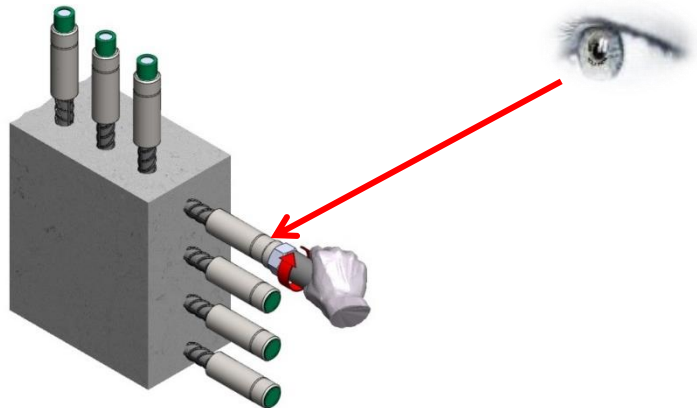


The bridging stud is fully engaged into the female sleeve.

Installation of the caging set

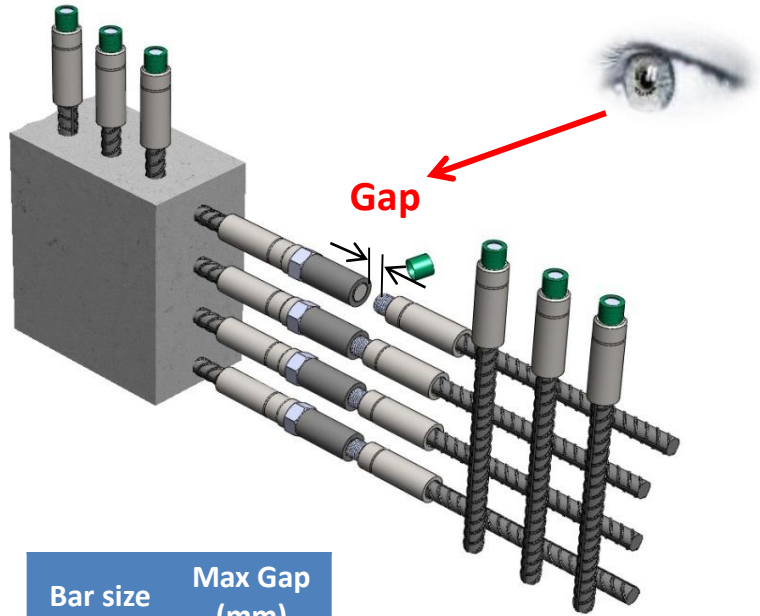


The bridging nut is fully engaged, but slightly loose, on the bridging stud.



**Step 3**

Remove the plastic caps from the male sleeves. Bring the continuation 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.

Position the continuation bars

Bar size	Max Gap (mm)
12	35
14	33
16	36
20	37
24,25,26	45
28	44
30,32	44
36	45
40	47
50	47



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GRIP//TEC

BRIDGING SPLICES

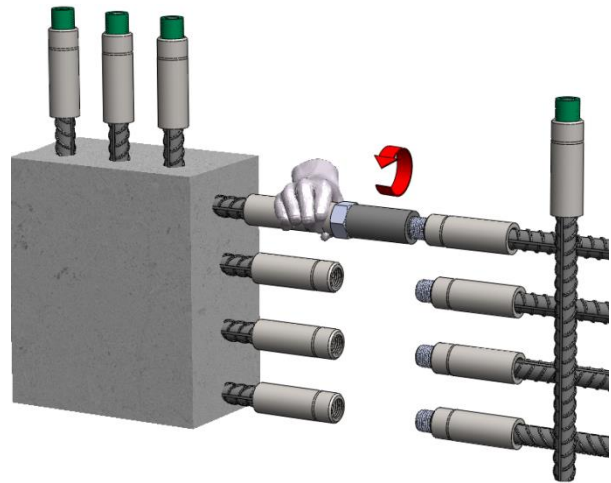
Assembly Instruction N° AI-GT 19 E Rev 05 of 02 October 2019

Step 4

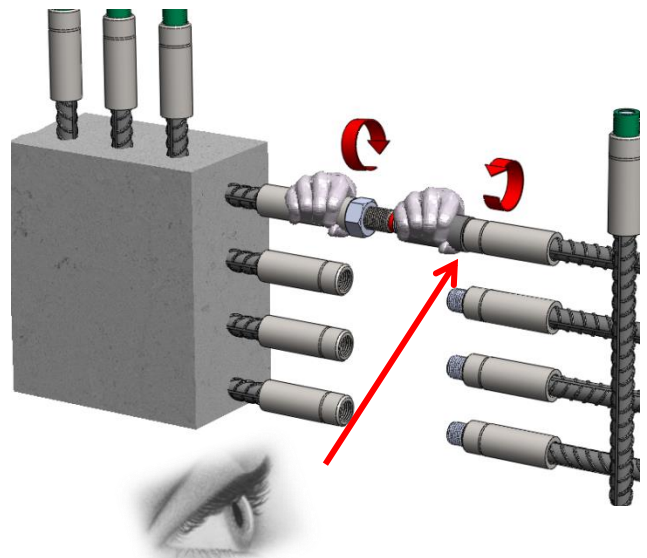
Connect the bars

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.





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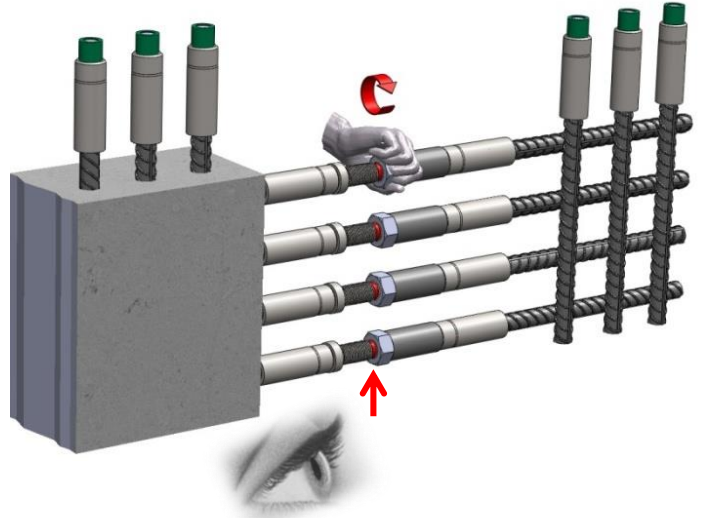
GRIP//TEC BRIDGING SPLICES AGB

Assembly Instruction N° AI-GT 19 E Rev 05 of 02 October 2019

Step 5

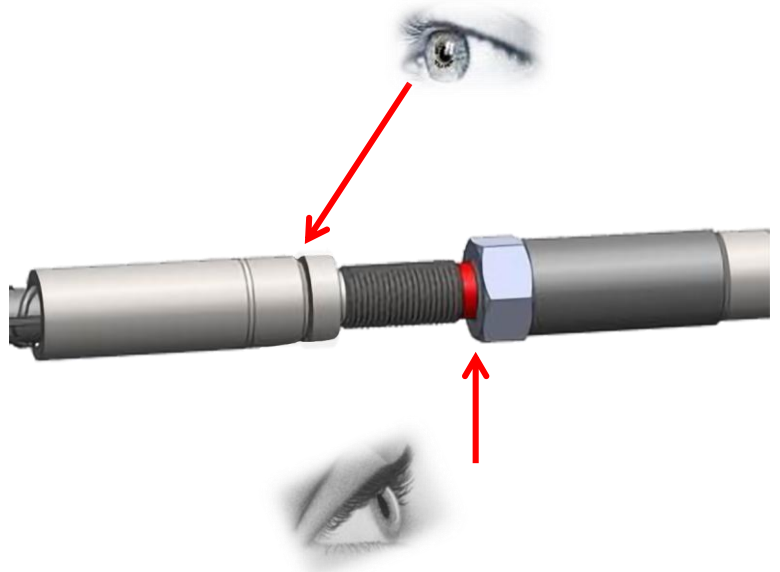
Hand screw the lock nuts until contact with the bridging nuts .

Screw the lock nuts



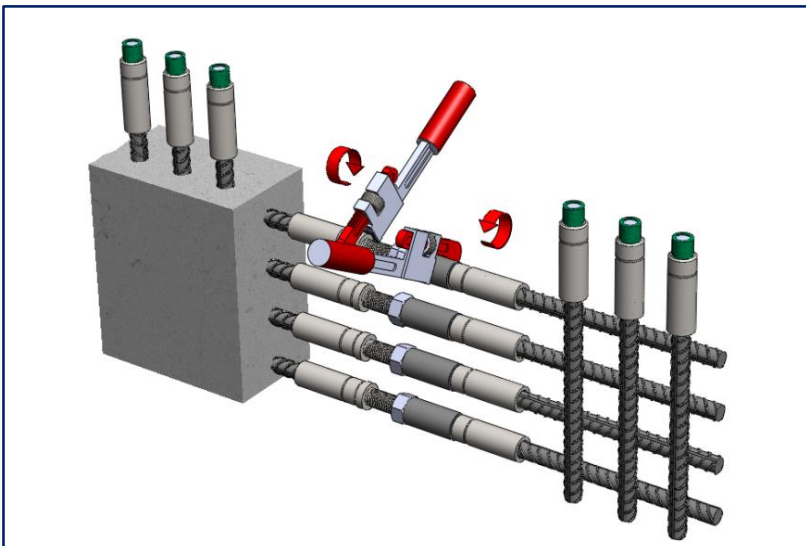
Check that the bridging stud remains fully engaged in the female sleeve.

Check that there is no thread appearing beyond the engagement inspection groove of the bridging stud.

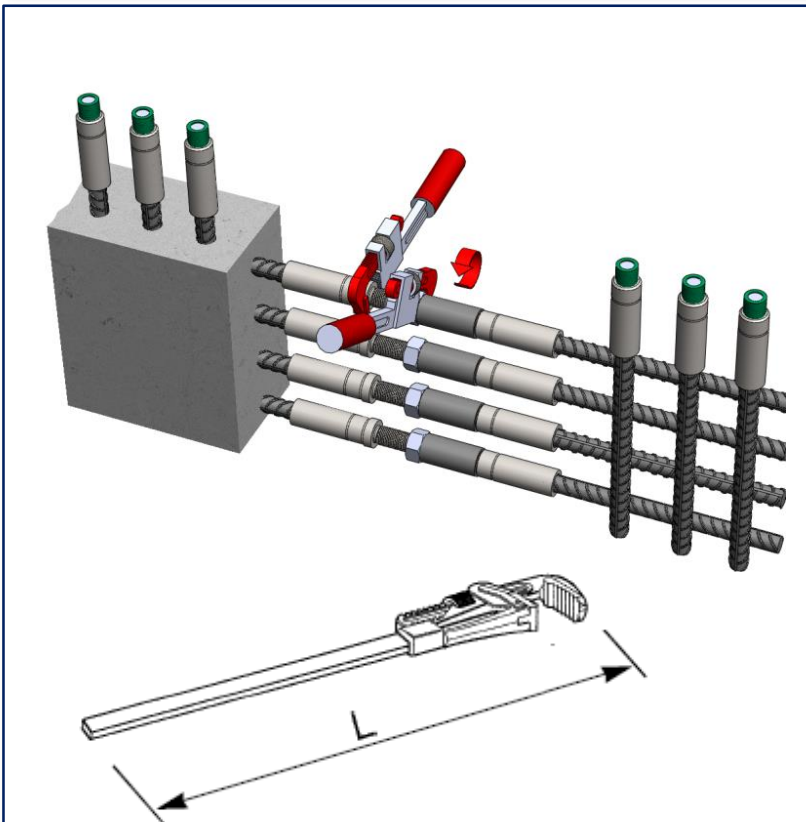


**Step 6.1****Lock the splice***(Case of connections of welded assemblies)*

Use a stilson or pipe wrench on the bridging stud and the bridging nut until snug fit on both sides. No specific torque amount is required.



Repeat the operation with the lock nut and the bridging stud.

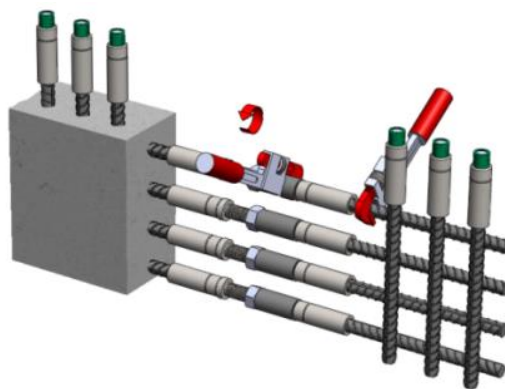


Locking the splice ensures that its permanent elongation meets the code requirement

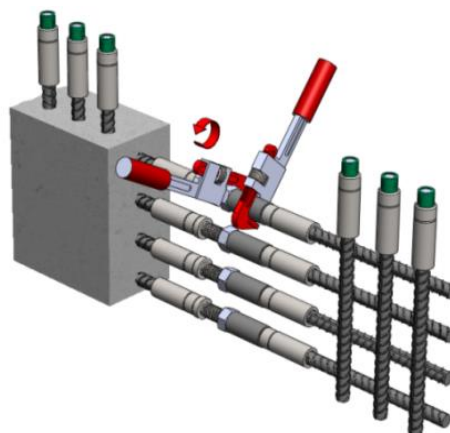
*For \varnothing 32, $L \geq 60$ cm.
For \varnothing 40 & \varnothing 50, $L \geq 90$ cm.*

**Step 6.2****Lock the splice***(Case of connections of wire-tied assemblies)*

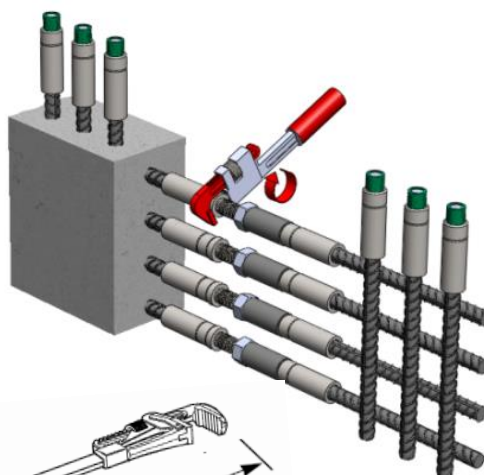
Hold the continuation bar with a stilson or pipe wrench, and use another wrench to tighten the bridging nut onto the male sleeve until snug fit. No specific torque amount is required.



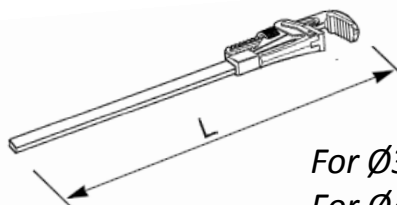
Hold the bridging nut with a stilson or pipe wrench, and use another wrench to tighten the lock nut against the bridging nut until snug fit.



Use a stilson or pipe wrench to tighten the position stud into the female sleeve until snug fit. No specific torque amount is required.



Locking the splice ensures that its permanent elongation meets the code requirement.



*For $\varnothing 32$, $L \geq 60$ cm.
For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.*



Step 1

The Caging assembly sets are delivered fully assembled as one set.

Hand screw the tapered caging studs into the female sleeves of the lower rebar cage (A wrench may be used if it makes the operation easier.)

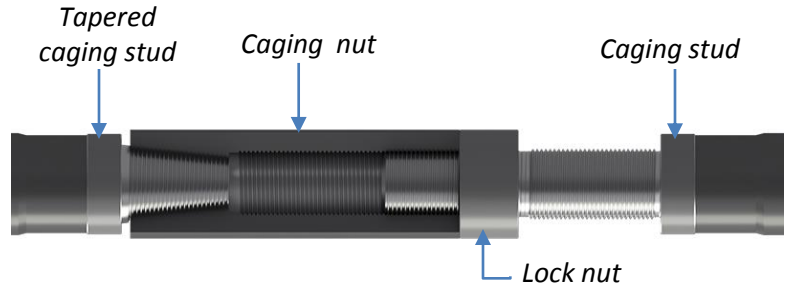


Ensure that the tapered caging stud is fully engaged into the female sleeve.

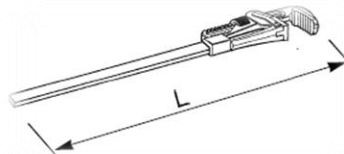
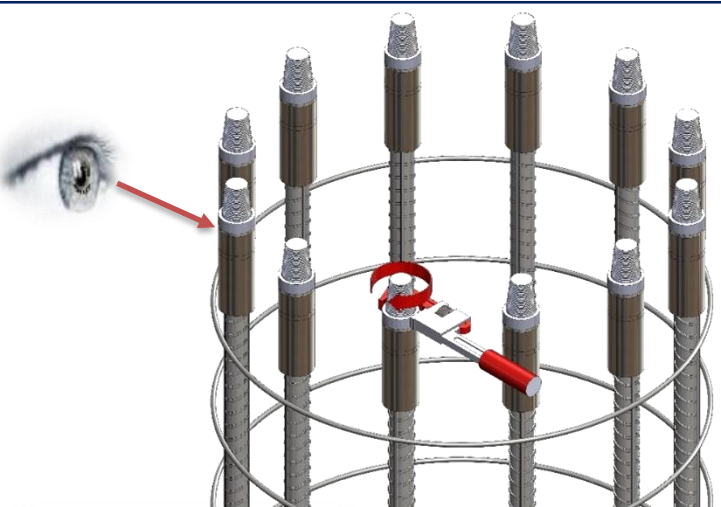
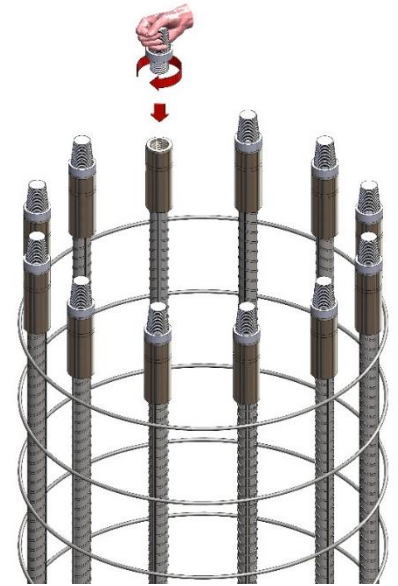


Check that the face of the tapered caging is in the close contact with the face of the sleeve.

Installation of the caging set



Tapered Caging stud



For $\varnothing 32$, $L \geq 60$ cm.
For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.

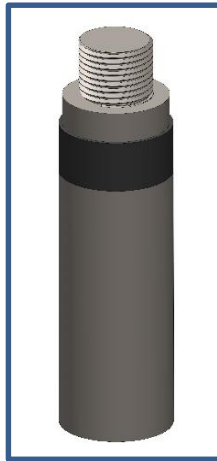


Concreting 1st stage

Step 2

Hand screw the Griptec caging assembly until contact with the female sleeve of the uppers.

Mount the Griptec caging assembly



Griptec caging assembly



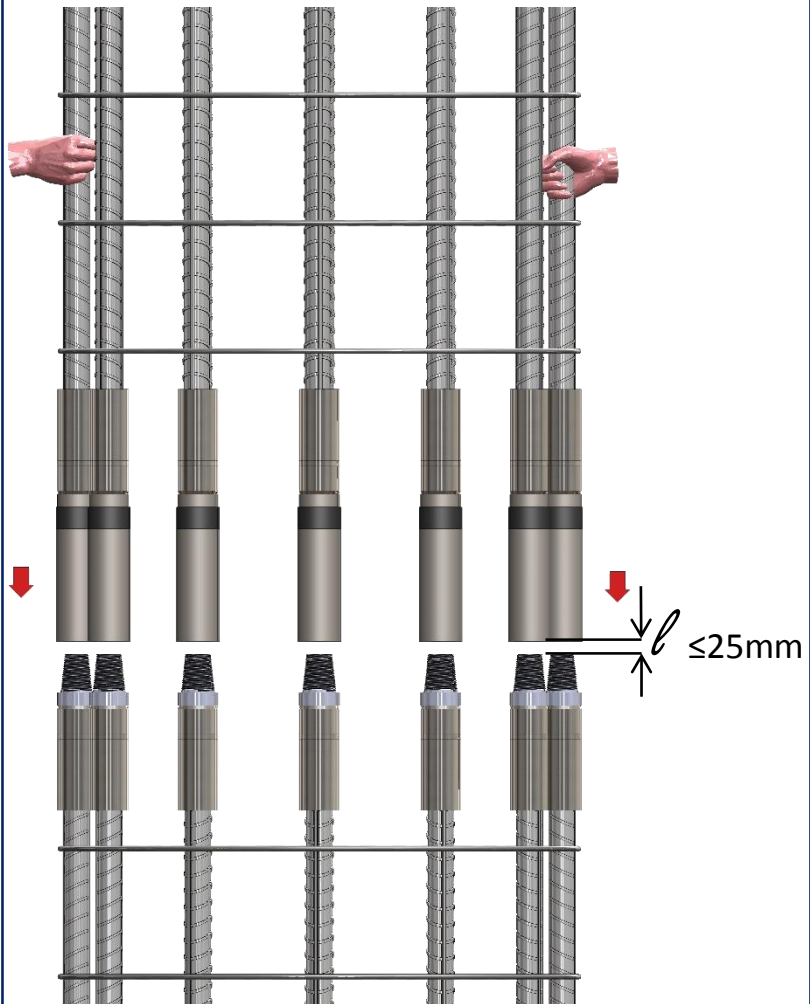


Step 3

Position the top cage so that its bars are aligned with the bars of the lower cage, which may have been pre-assembled at the workshop.

Bring the upper cage as close as possible to the lower cage. The distance ℓ of the bars should not exceed $\ell_{Max} = 25 \text{ mm}$.

Align the cages above each others





Step 4

Assemble the splices by hand screwing the caging nut and lock nut onto the tapered caging stud. (A wrench may be used if it makes the operation easier.)

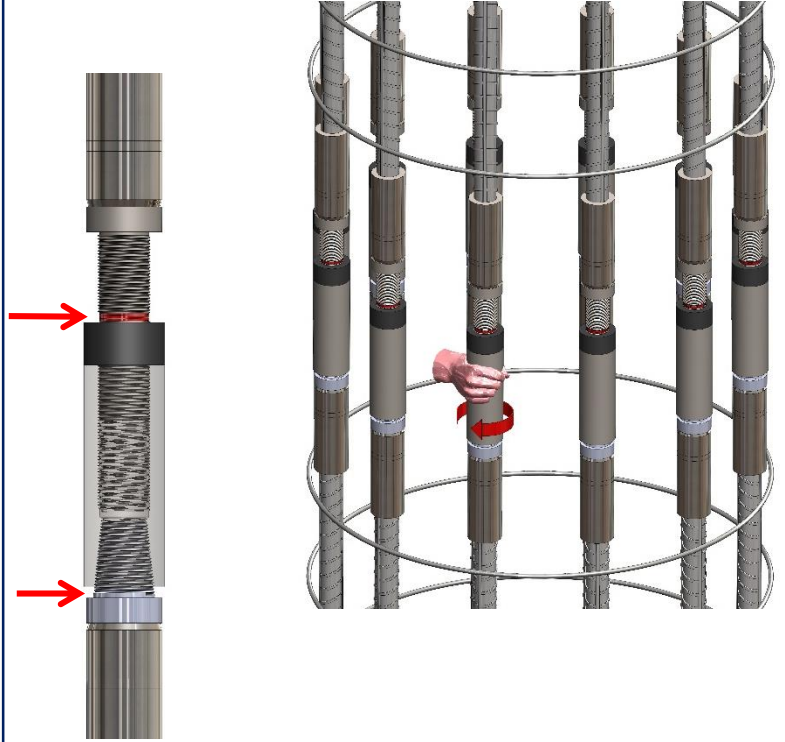


After full engagement ensure that there is no thread appearing beyond the engagement inspection groove of the caging stud.



Check that the taper threads do not cross.

Connect the cages



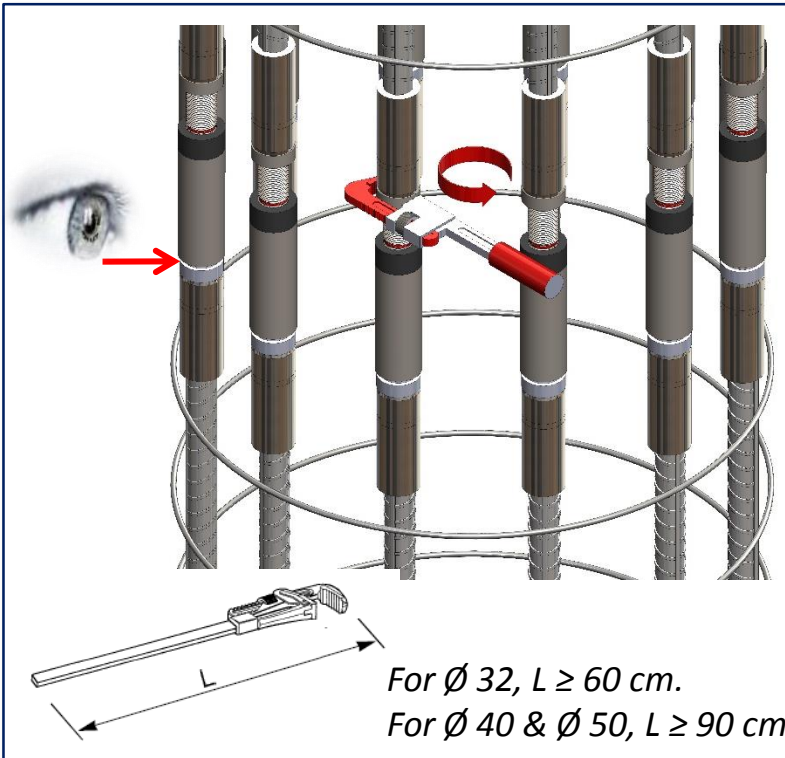
Step 5

Use a stilson or pipe wrench to tighten the caging stud to the upper Griptec female sleeve. No specific torque amount is required



Check that the face of the caging stud is in close contact with the face of the sleeve.

Lock the caging stud



For $\varnothing 32$, $L \geq 60$ cm.
For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.



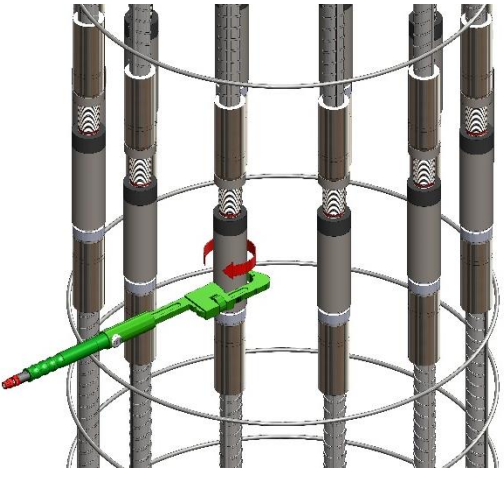
Step 6

Lock the taper thread

Use a torque wrench to tighten the caging nuts onto the taper thread (of the caging coupler). Adjust it to the torque value specified in the table below.



Ensure that the calibration certificate of the torque wrench is less than 1 year old.



Bar size	Torque (Nm)
32	350
40	500
50	650

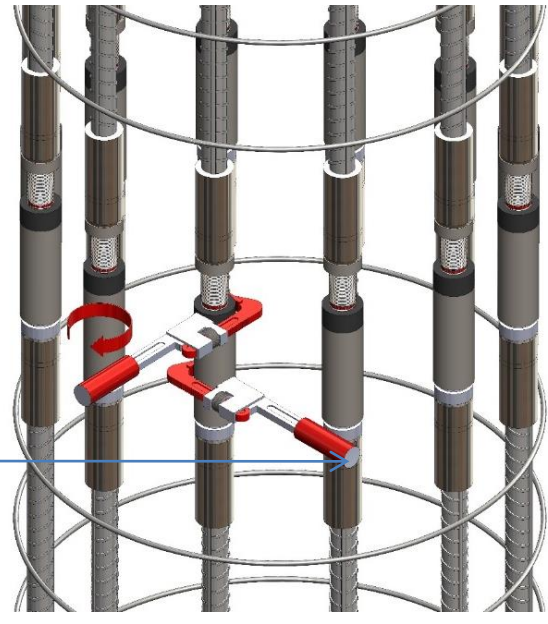
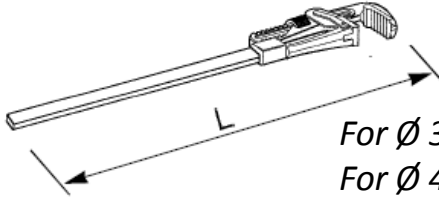
Step 7

Lock the splice

Use one Stilson or pipe wrench to hold the Caging nut and another to tighten the lock nut.



Hold Stilson or pipe wrench until lock nut has been tightend

For \varnothing 32, $L \geq 60$ cm.
For \varnothing 40 & \varnothing 50, $L \geq 90$ cm.

Concreting final stage

Assembly Instruction N° AI-GT 09 E Rev 01 of 24 August 2016

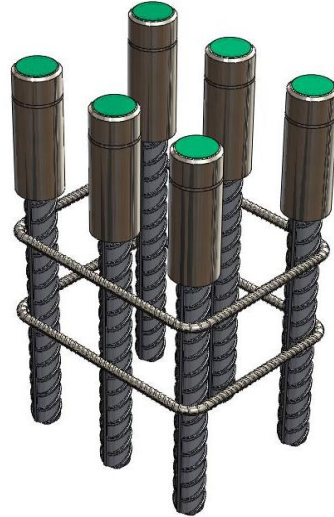
Step 1

Prepare bars with female sleeves.



The coupler caps are correctly fitted.

Prepare the 1st stage bars



Concreting 1st stage

Step 2

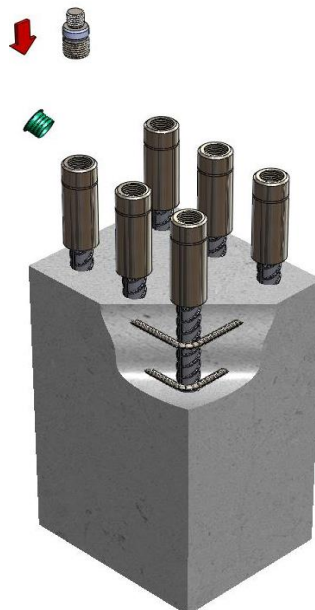
Remove the plastic caps from the first stage bars and hand screw the transition studs into the female sleeves. (A wrench may be used if it makes the operation easier).

Prepare the continuation bars with female sleeves.



The transition stud is fully engaged into the female sleeve.

Prepare the continuation bars



Assembly Instruction N° AI-GT 09 E Rev 01 of 24 August 2016

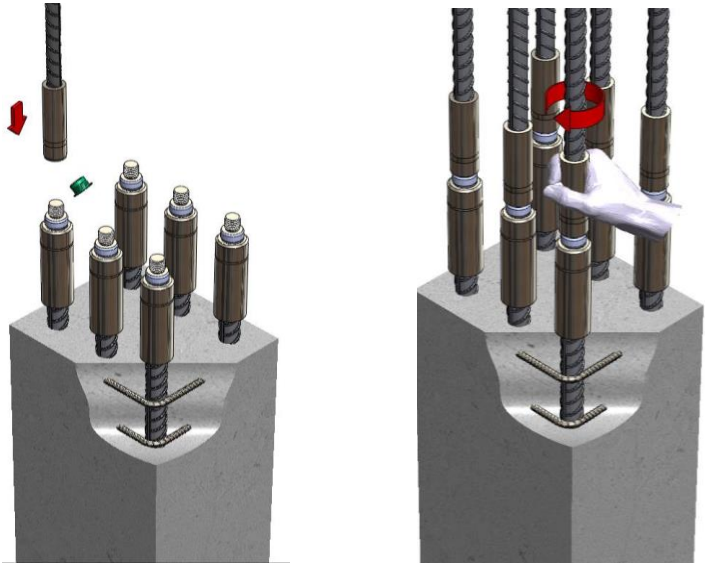
Step 3

Remove the plastic caps from the continuation 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.



Connect the bars



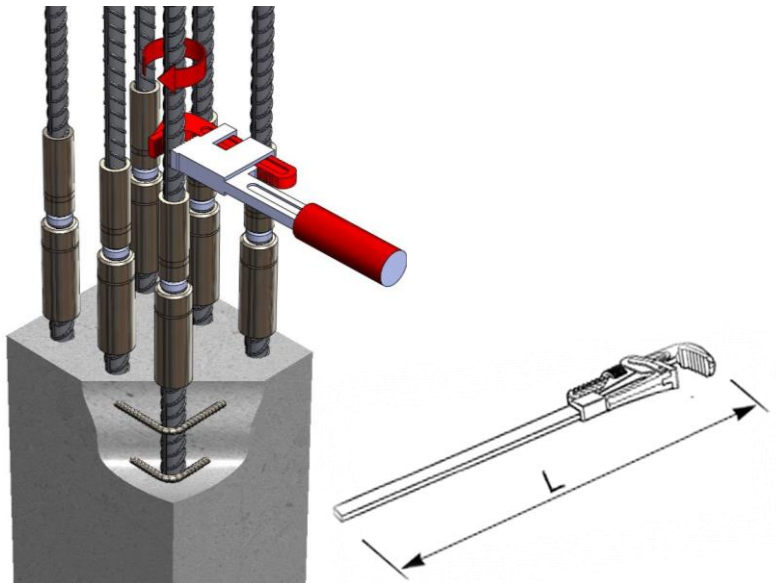
Step 4

Use a stilson or pipe wrench on the continuation bar. No specific torque amount is required.

Locking the splice ensures that its permanent elongation meets the code requirement.



Lock the splices



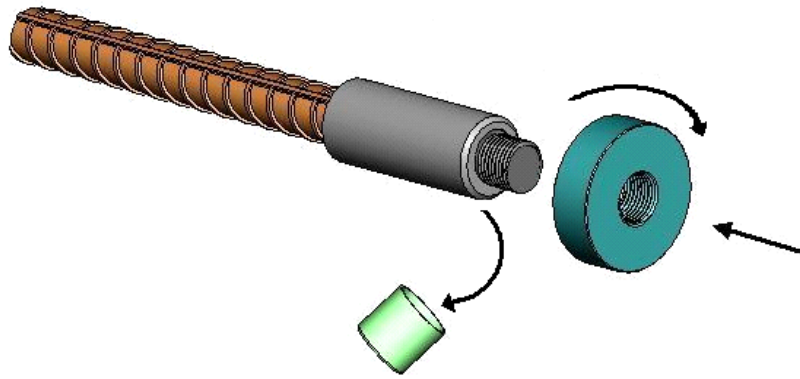
For $\varnothing 32$, $L \geq 60$ cm.

For $\varnothing 40$ & $\varnothing 50$, $L \geq 90$ cm.

Step 1

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Remove plastic cap from the thread protection. Screw the anchor plate onto the Griptec reinforcing bar.



Before screwing the plate on, check that the thread on the bar is not an extended thread meant for a position splice.



After screwing the plate, check that there is no gap between the plate and the face of the sleeve. By design and tolerances, the thread of the sleeve may slightly protrude out of the plate or be in recess inside the plate.



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WELDABLE COUPLERS

Assembly Instruction N° 11 Rev 00_en - 05 August 2020

Introduction

Griptec weldable couplers are a straightforward solution for the attachment of reinforcing bar to a steel superstructure or individual assemblies. The couplers have the same mechanical properties as our standard range of couplers and have one bevelled end for welding.

Prior to the welding operation, a welding procedure conforming to recognised welding standards should be in place. Most fabrication companies are aware of the fulfilment of welding procedures, welding approvals and welder certification; those who have little or no welding conformity experience should seek advice from their local welding institute.

Griptec weldable couplers can be welded with most arc welding processes in the fabrication workshop or at the construction site. The weld design and choice of relevant welding factors will depend principally on the mechanical properties of the material of the superstructure to which the coupler is being welded.

Coupler material

Griptec weldable couplers are made of low-carbon steel of the following specification. Values of chemical composition are given as product analysis.

<i>Coupler type</i>	<i>Steel grade</i>	<i>CEV * (Max)</i>
<i>GW</i>	<i>S355JR as per EN 10025-2 or St 52-3 as per DIN 17100 or S355A as per ISO620-2 or 1524 as per ASTM A576</i>	<i>0.47</i>

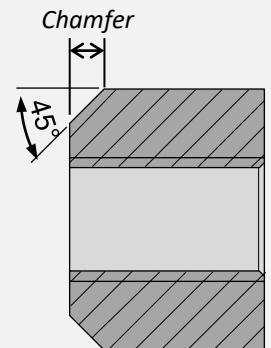
The weldable couplers are delivered with appropriate mill certificates as per procurement standard.

**Assembly Instruction N° 11 Rev 00_en - 05 August 2020**

Weld dimension

The minimum weld size required is defined by the 45° bevelled end of the weldable coupler. The Griptec weldable couplers are designed to accept a circumferential single bevel butt weld.

The designer may request that the single bevel butt weld is to be superimposed with a fillet weld, owing to the properties of the base metal (This will not affect the design strength of the coupler itself).



Welding procedure specification (WPS)

Welding process

For practicability reasons there are two general arc-welding processes that are normally employed on site and at fabrication workshops :

- **Manual metal arc welding (MMA) / (SMAW)** : Most favourable for accessibility problems and site welding conditions.
- **Metal active gas welding (MAG) / (GMAW)** : Mostly employed in fabrication workshops.

According to predominant codes of practice, Griptec weldable couplers do not require preheating prior to welding. However, there are several factors that may call for pre-heating, such as the following :

- The carbon equivalent of the base metal.
- The combined thickness factor.
- Welding process and consumables employed.
- Heat input from the welding process.
- Ambient temperature.

Dextra recommends to follow the American Welding Society (AWS) Structural Welding Code D1.1.

The WPS will also state the type and size of welding electrodes and process to be employed. Any pre-heat requirements will be annotated on a welding procedure specification



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WELDABLE COUPLERS

Assembly Instruction N° 11 Rev 00_en - 05 August 2020

Filler metal

Although there are numerous amounts of electrode specifications, all electrode manufacturers provide data classifying their product to the AWS specifications.

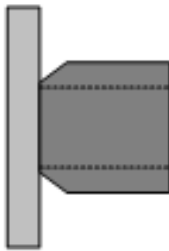
Beside the electrode classification, it is also important to set up the proper welding parameters for welding process that are suitable for each electrode classification as well as the coupler size.

For manual arc welding, we recommend to follow the AWS specification A5.1.

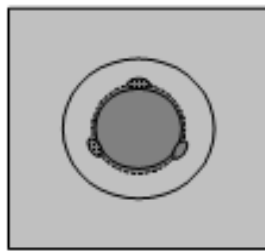
Sequence of operations

Before welding on the Griptec coupler, the localized area should be ground or wire-brushed clean. The correct fit up must be that both surfaces meet flush together with no visible gaps between the coupler and the base metal. The coupler should be tack-welded in three symmetrical positions. Then balanced welding should be carried out to ensure correct alignment.

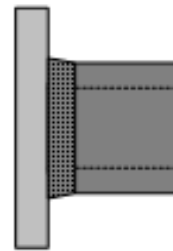
Fit the coupler flush to the surface of the abutting material



Tack-weld the coupler in three symmetrical positions.



Use balance welding to ensure that the coupler is correctly aligned



The WPS may specify post-weld heat-treatment (PWHT) for the larger sized couplers (This redistributes residual stresses induced from the welding operation) ; this again will be based on the base material to which the coupler is being welded to. The WPS may also specify non-destructive testing (This will depend on how critical the procedure is).

Once all the operations are completed, insert the plastic protection in order to protect the threaded area.

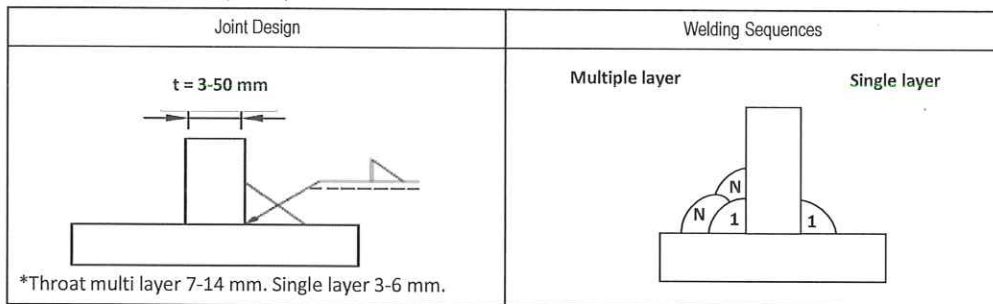


Dextra Manufacturing Co. Ltd.

191 Chaloeam Phra Kiat Ro 9, Soi
48, Dok Mai, Prawet, Bangkok,
Thailand

Welding Procedure Specification : WPS

Location : Dextra Manufacturing Co. Ltd.	Examiner or examining body : N/A
Manufacturer's pWPS No: DM-pWPS-111-S355-03-20	Method of Preparation and Cleaning : Brushing / Grinding
Manufacturer's WPQR No: 111-S355-03-20	Parent Material Specification : EN 10025-2 S355JR
Manufacturer : Dextra Manufacturing Co. Ltd.	Material Thickness (mm): 25 mm
Welder's Name : Mr. Wattana Y.	Outside Pipe Diameter (mm) : N/A
Mode of Metal Transfer : -	Welding Position : PA (Flat)
Joint Type and Weld: Fillet weld	
Weld Preparation Details (Sketch)* :	



Welding Details									
Run	Welding Process	Size of Filler Material	Current A	Voltage V	Type of current / Polarity	Wire Feed Speed	Travel Speed*	Heat input*	Matal transfer
1 st & N	111	3.2	118 - 127	28 - 31	AC	-	2.4 mm/sec	1.95 kJ/mm	

Filler Material Designation and Make : EN ISO 2560-A-E 42 3 B 1 2 H10

Other information* e.g.:

Any Special Baking or Drying : 260 - 424 °C

Weaving (maximum width of run) : 8 mm.

Gas/Flux : shielding: N/A

Oscillation : amplitude, frequency, dwell time

backing: metal

Pulse welding details : N/A

Gas Flow Rate - Shielding : N/A

Distance contact tube/ workpiece: N/A

Backing: N/A

Pulse welding details : Plasma N/A

Tungsten Electrode Type/Size : N/A

Plasma welding details : N/A

Tungsten Electrode Type/Size : N/A

Torch angle : N/A

Preheat Temperature : Minimum 35 °C

Interpass Temperature : Maximum 315 °C

Post-Heating : N/A

Post-Weld Heat Treatment: N/A

(Time, Temperature, Method :

Heating and Cooling Rates)

Prepared by Chatchai Somapee _____ SQE Engineer Date: 27-Nov-2020
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Aproval by Tanarit Kanjanarittakorn _____ SQE Manager Date: 27-Nov-2020
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Welding Procedure Qualification Record (WPQR)



Manufacturer's WPQR No.: 111-S355-03-20

Manufacturer's pWPS No.: DM-pWPS-111-S355-03-20

Manufacturer: Dextra Manufacturing Co. Ltd.

Examiner or examining body: N/A

Address: 191 Chaloeam Phra Kiat Ro 9, Soi 48, Dok Mai,
Prawet, Bangkok, Thailand

Reference No.: N/A

Code/Testing Standard : ISO 15614 -1

	Detail range qualification
Welding Process (ISO 4063)	111 : Manual metal arc welding
Deposited thickness (mm)	N/A
Type Product material	Plate & Pipe
Joint type	Fillet weld
Group material	EN 10025-2 S355JR Group 1.2 to EN 10025-2 S355JR Group 1.2 with ReH 335 N/mm2
material thickness (mm)	(25) : 3 - 50
Throat thickness	(Sl, a=6 mm) (ml, a=14 mm) No restriction
Single layer/Multiple layer	Single layer , Multiple layer
Diameter (mm)	N/A
Filler metal designation	EN ISO 2560-A-E 42 3 B 1 2 H10 (E7016)
Filler metal Manufacturer	Kobelco
Filler metal diameter (mm)	3.2
Gas shielding/Flux	N/A
Backing gas	N/A
Type polarity	AC
Transfer mode (ISO 4063)	N/A
Heat input (kJ/mm)	PA (1.11 - 1.74)
Welding Position (ISO 6947)	PA (And all position)
Preheat temperature (°C)	Minimum 35
Interpass temperature (°C)	Maximum 315
Post weld heat treatment	N/A
Other	-

Attachment:

1. Test report Macrotest MA-20-12-004

Prepared by

 Chatchai Somapee
 SQE Engineer
 Date: 30-Nov-2020

Approval by

 Tanarit Kanjanarittakorn
 SQE Manager
 Date: 30-Nov-2020