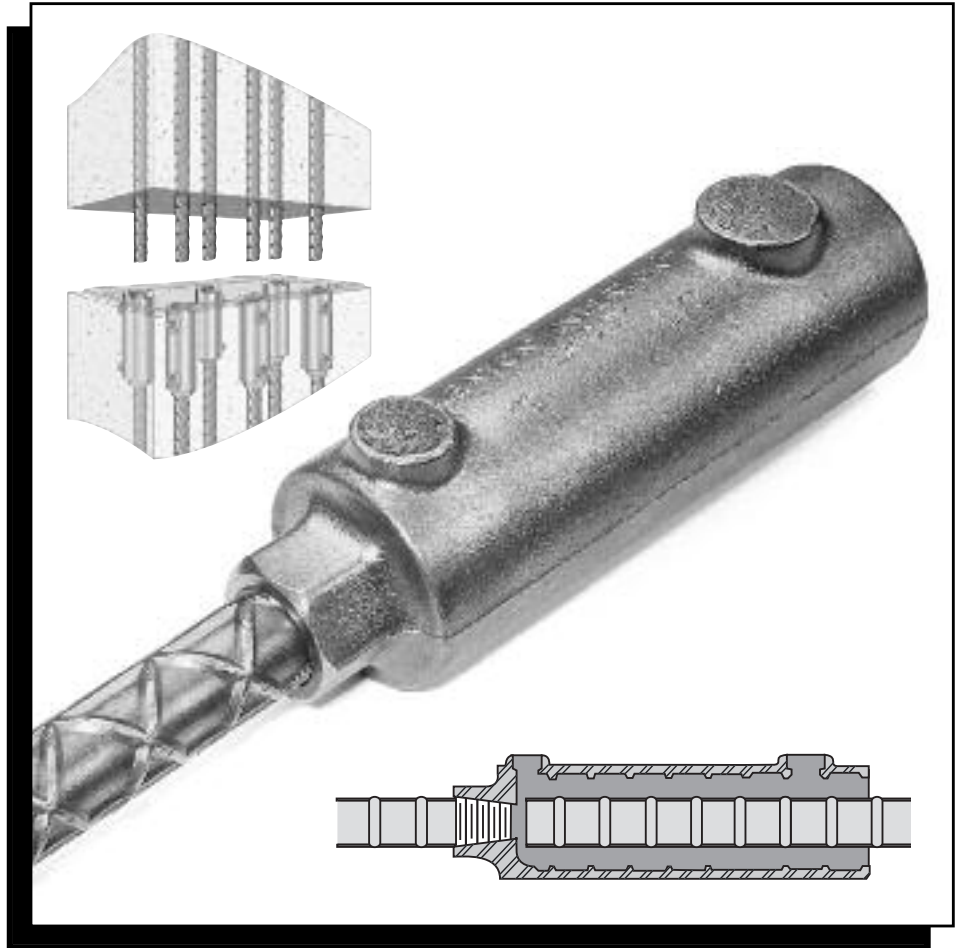


LENTON®

Instruction Manual

LENTON® INTERLOK
Rebar Splicing System



ERICO®

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*MSDS Available - Contact ERICO

IMPORTANT – General and Safety Information

- A. Only ERICO authorized materials should be used to make LENTON® INTERLOK Rebar Splices.
1. Do not splice except as detailed in the instructions.
 2. Do not alter materials without manufacturer authorization.
 3. Do not substitute for ERICO authorized materials.
- Failure to comply with the above may result in hazards to the individual, improper splices, or damage to items being connected.
- B. Make splices in accordance with described splicing procedures and in consideration of surrounding conditions and personnel. Refer to the HY10L MSDS prior to beginning work with the grout.
1. Personnel should be properly trained in the use of this product.
 2. Avoid breathing concentrations of grout dust as it may be hazardous to health. Refer to MSDS for control measures.
 3. Avoid skin contact with grout slurry.
- C. Unusual applications or conditions may exist which require special considerations.
1. Provide adequate ventilation where natural air flow is not sufficient to prevent personnel from breathing concentrations of dust.
- D. Storage of HY10L Filler Material should be in a clean, dry, secure area and should be restricted to access by authorized personnel only. Discard any torn, wet, or otherwise damaged bags. Discard any bags which have become wet or where material clumping is observed. Material consistency should be that of a free flowing fine powder.
- E. To determine the date of HY10L manufacture, refer to the lot number located on the end panel of each bag. The manufacturing date can be determined as shown below:

 X Y MM DD B
MFG. DATE

Example B 00620 1: Material produced June 20, 2000 batch 1 of the day. The 1st Alpha character "B" is a production code.

DO NOT USE any HY10L which is in excess of 1 year beyond the manufacturer's date noted on the package.

- F. Refer to grout mixing directions located on the bag for proper mixing guidelines or contact ERICO.
- G. Refer to Pump Fill or Gravity Fill Installation Instructions located in this Manual for proper installation guidelines.
- H. The recommended temperature range of the HY10L Filler Material is 50 to 80°F (10 to 27°C). At no time during placing and curing should the temperature of the coupler, rebar, and HY10L be allowed to be outside the range of 40 to 90°F (4 to 32°C).
- I. Do not use more than 13.5% water by weight (0.8 gallons or 3.0L per 50 lb. (22.7Kg) bag) or obtain an ERICO Flow Template reading of greater than 6.5" (16.5cm). Do not add any additives or admixtures to the HY10L.
- J. Keep walls and panels undisturbed for at least 24 hours [at 68°F (20°C)]. Movement during curing will result in decreased splice performance. Temperatures below 50°F (10°C) considerably increase the time it takes freshly placed grout to develop strength. Therefore, there is a risk of damage or collapse if the structure is loaded before it develops adequate strength. This strength may vary depending on the structural loading and the temperature. Therefore, the strength must be determined by the structural engineer and should be based upon the expected construction loading.
- K. The HY10L Filler Material is designed to be used with the LENTON INTERLOK Rebar Splicing System. Unauthorized use of other grouts will void all warranties, whether expressed or implied.
- L. While working on the job site, observe all Federal, State, and Local safety regulations.
1. Wear a hard hat and safety glasses.
 2. Wear gloves to avoid cuts.
 3. Prior to installing connections, read and understand all operating, mixing, and safety instructions found in this Manual and on the HY10L bag.
- M. Deviations from the specified recommendations outlined in this manual will void all warranties. It is the responsibility of the user(s) to observe proper grouting conditions, (e.g., temperature, water to cement ratio, placing consistency, etc.) and utilize quality workmanship.
- N. ERICO reserves the right to revise these documents contained herein for any reason, including but not limited to conformity with standards established by various agencies, utilization of advances in the state of technical arts, or the reflection of changes in the design of any components, techniques, or procedures described or referred to herein.
- To assure that you have the most recent edition of this manual, contact ERICO.

Foreword

The LENTON® INTERLOK System has been designed to exceed the ACI® 318 Building Code requirement of developing, in both tension and compression, a minimum of 125 percent of specified yield for ASTM® A706 and A615 Grade 60 specifications. In addition, the system will meet the requirements for ACI 318 Type 2, BS8110 and AS3600 for specified tensile strength performance. In order to achieve these stress levels, it is imperative that all procedures shown in this manual and on the HY10L bag are closely followed.

HY10L High-Strength Filler Material has been developed exclusively for use in the LENTON INTERLOK system. Use of other grouts will void all warranties and product claims, both expressed or implied.

Before beginning any project, we ask that the ENTIRE manual be reviewed, and thoroughly understood.

For technical assistance, on the LENTON INTERLOK System, or other ERICO Reinforcing Steel Splices, please contact your local ERICO office.

WARNING

1. ERICO products shall be installed and used only as indicated in ERICO product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative.
2. ERICO products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be completely followed to ensure proper and safe installation and performance.
4. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.
The customer is responsible for:
 - a. Conformance to all governing codes.
 - b. The integrity of structures to which the products are attached, including their capability of safely accepting the loads imposed, as evaluated by a qualified engineer.
 - c. Using appropriate industry standard hardware as noted above.

SAFETY INSTRUCTIONS:

All governing codes and regulations and those required by the job site must be observed. Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.

Overview

The LENTON® INTERLOK Mechanical Reinforcing Steel Splice is designed to connect #5 (16 mm) through #18 (57 mm) rebar, conforming to ASTM® A615/A615M, A706/A706M, BS4449, CSA G30.18 or AS1302 standards. The connection incorporates the LENTON® taper threaded system in conjunction with a special high-early strength cementitious volume stable filler material (grout). Assembly of the connection is normally done in two separate stages: The LENTON threaded end is fastened to the coupler at a precaster's plant prior to placement of concrete in the precast member. The connection is completed at the job site, where the exposed dowel of the adjoining panel is positioned within the interior of the coupler. The filler material is either poured or pumped into the cylindrical end of the coupler. The coupler can be oriented in either a vertical, inclined or horizontal position.

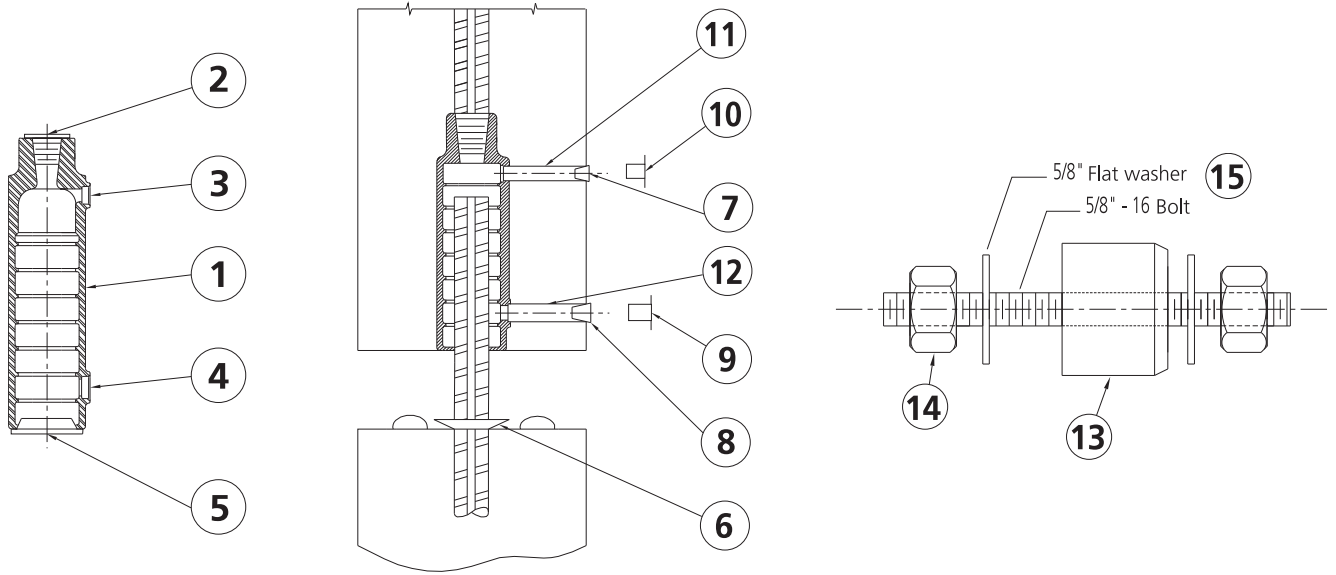
The filler material is a special ready-to-use grout, designed to maintain fluidity for an extended period of time while achieving a high-early-strength. It is a metallic, volume-stable, material capable of developing in excess of 8,500 psi (58.6 MPa) compressive strength at 28 days. To ensure a proper connection, the addition of water must be maintained in strict accordance with ERICO recommended procedures. In addition, the temperature of the grout during placing and curing must be maintained within the recommended guidelines. Misapplication or use of grouts other than ERICO brand of HY10L without ERICO approval voids all warranties, both expressed or implied.

The coupler is produced as a casting and LENTON taper threads are machined under strict Quality Control guidelines. Taper threading of the rebar ends are produced using ERICO's equipment. Prethreaded bars can be provided from ERICO's network of threading centers, or by positioning a threader at the precasters plant. The threads are right hand and tapered to match the accompanying coupler.

When assembled in accordance with ERICO recommended procedures, the splice will meet or exceed the ACI 318, BS8110, AS3600, UBC® or IBC® Building Code requirements.

Precaster Installation

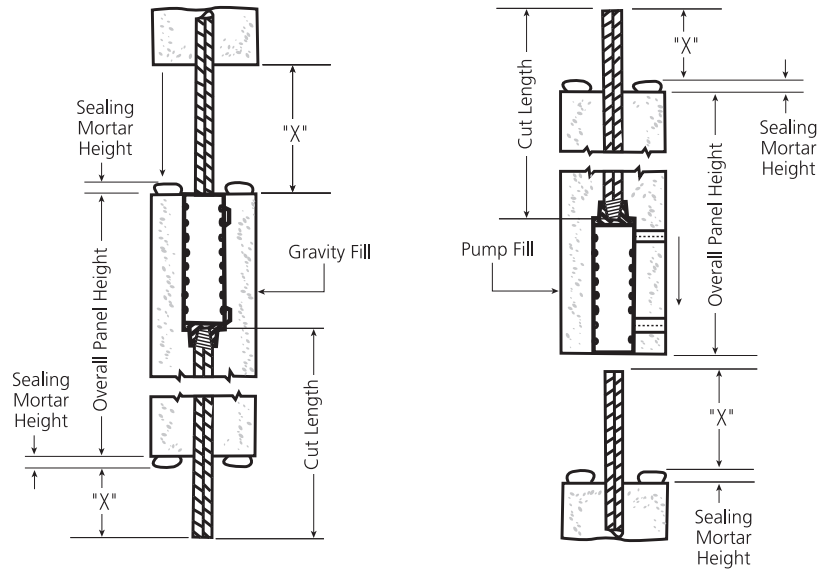
I.I Component List:



Item No.	Description	Standard Item Included	Separate Order
1	LENTON® INTERLOK Coupler	Standard	
2	Thread Protector	Standard	
3	1/2" Outlet Plug		Order separately or Obtain locally ^b
4	3/4" Inlet Plug		Order separately or Obtain locally ^b
5	Dust Cap		Order separately or Obtain locally ^b
6	Sealing Disc		Order separately
7	1/2" (13mm) Plastic Dust Cap		Order separately or Obtain locally ^b
8	3/4" (19mm) Plastic Dust Cap		Order separately or Obtain locally ^b
9	3/4" (19mm) Rubber Stopper		Order separately or Obtain locally ^b
10	1/2" (13mm) Rubber Stopper		Order separately or Obtain locally ^b
11	1/2" (13mm) SCH40 PVC		Obtain locally ^c
12	3/4" (19mm) SCH40 PVC		Obtain locally ^c
13	Urethane Grommet ^a		Order separately
14	5/8-16 x 3-1/2 Bolt & Nut ^a		Order separately
15	5/8 Flat Washer ^a		Order separately

a Included with Form Mounting Fixture
b Non-stock item typically found locally
c Not supplied by ERICO

1.2 Coupler Dimensions and Determining Cut Length of Reinforcing Steel – Imperial Units



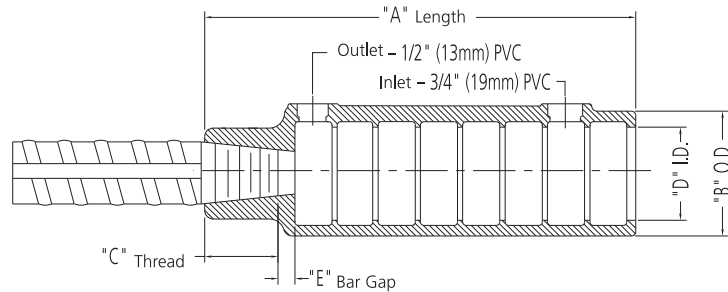
TO DETERMINE TYPICAL CUT LENGTH OF REINFORCING STEEL:

MAXIMUM CUT LENGTH = [Overall Panel Height - E] + Sealing Mortar Height

MINIMUM CUT LENGTH = Maximum Cut Length - 1 Bar Diameter

DOWEL LENGTH = X + Sealing Mortar Height

Note: For last lift, reduce cut length as determined by design requirements



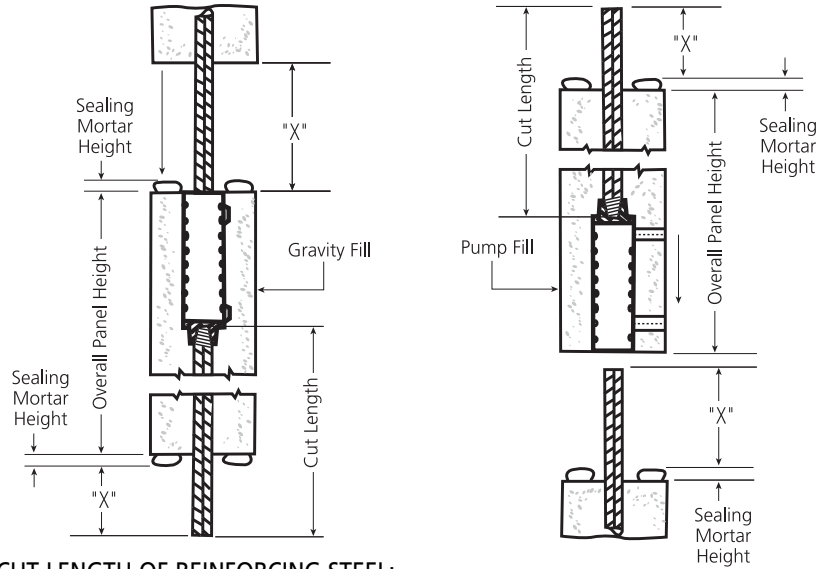
Imperial Units:

Rebar Size US (soft Metric) Canadian	Part No.	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min.*
#5 [16] 15M	LK5	7-5/8"	2-7/16"	7/8"	1-7/8"	5/8"	6-1/8"	5-1/4"
#6 [19] 20M	LK6	7-5/8"	2-7/16"	1-1/8"	1-7/8"	3/8"	6-1/8"	5-1/4" **
#7 [22] ---	LK7	7-5/8"	2-7/16"	1-1/4"	1-7/8"	1/4"	6-1/8"	5-1/4"
#8 [25] 25M	LK8	8-5/8"	2-5/8"	1-3/8"	2"	1/4"	7"	6"
#9 [29] 30M	LK9	9-3/4"	2-3/4"	1-1/2"	2-1/8"	1/4"	8"	6-7/8"
#10 [32] ---	LK10	10-13/16"	2-15/16"	1-9/16"	2-5/16"	1/4"	9"	7-3/4"
#11 [36] 35M	LK11	12"	3-1/8"	1-11/16"	2-7/16"	1/16"	9-7/8"	8-1/2"
#14 [43] 45M	LKT14	15"	3-11/16"	2-1/8"	2-3/4"	5/16"	12-3/4"	11"
#18 [57] 55M	LKT18	20-5/16"	4-1/2"	2-3/4"	3-1/4"	1/8"	17"	14-3/4"

* "X" minimum is to develop 125%fy (Type 1). For Type 2: "X" minimum = "X" max - 1/4".

** FOR #6 ONLY: "X" minimum is to develop 125%fy (Type 1). For Type 2: "X" minimum = "X" max - 3/4".

1.2 Coupler Dimensions and Determining Cut Length of Reinforcing Steel – Metric Units



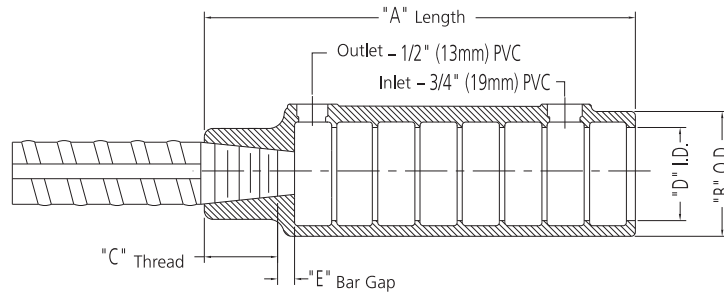
TO DETERMINE TYPICAL CUT LENGTH OF REINFORCING STEEL:

MAXIMUM CUT LENGTH = [Overall Panel Height - E] + Sealing Mortar Height

MINIMUM CUT LENGTH = Maximum Cut Length - 1 Bar Diameter

DOWEL LENGTH = X + Sealing Mortar Height

Note: For last lift, reduce cut length as determined by design requirements



Metric Units:

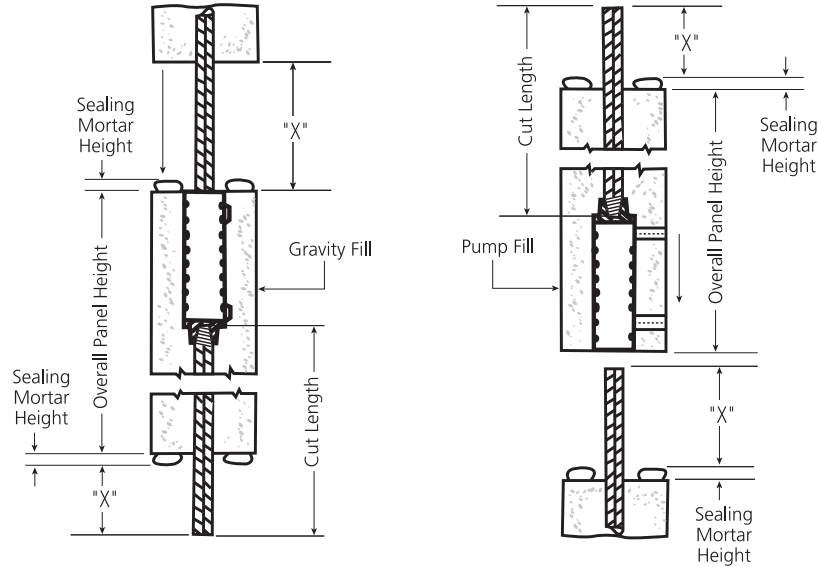
Rebar Size	Part No.	Article No.	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min.*
16 mm	LK5	145575	195	62	22	48	17	156	134
20 mm	LK6	145580	195	62	29	48	10	156	134**
22 mm	LK7	145585	195	62	32	48	6	156	134
25 mm	LK8	145590	219	67	35	51	6	178	153
28 mm	LK9	145595	248	70	38	54	6	203	175
32 mm	LK10	145600	275	75	40	59	6	229	197
36 mm	LK11	145605	295	79	43	62	1	251	215
40 mm	LK14SP	145610	381	94	56	70	1	324	284
43 mm	LK14	145611	381	94	54	70	8	324	281
50 mm	LKT18SP	145615	516	114	71	83	13	432	382
57 mm	LKT18	145620	516	114	72	83	3	432	375

* "X" minimum is to develop 125%fy (Type 1). For Type 2: "X" minimum = "X" max - 6 mm.

** "X" minimum is to develop 125%fy (Type 1). For Type 2: "X" minimum = "X" max - 19 mm.

All table dimension in mm

1.3 Coupler Dimensions and Determining Cut Length of Reinforcing Steel – Transitions – Imperial Units



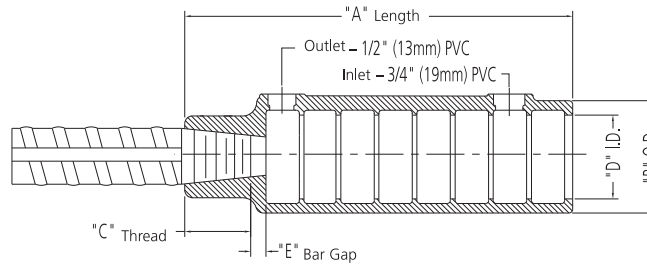
TO DETERMINE TYPICAL CUT LENGTH OF REINFORCING STEEL:

MAXIMUM CUT LENGTH = [Overall Panel Height - E] + Sealing Mortar Height

MINIMUM CUT LENGTH = Maximum Cut Length - 1 Bar Diameter

DOWEL LENGTH = X + Sealing Mortar Height
Y + Sealing Mortar Height

Note: For last lift, reduce cut length as determined by design requirements



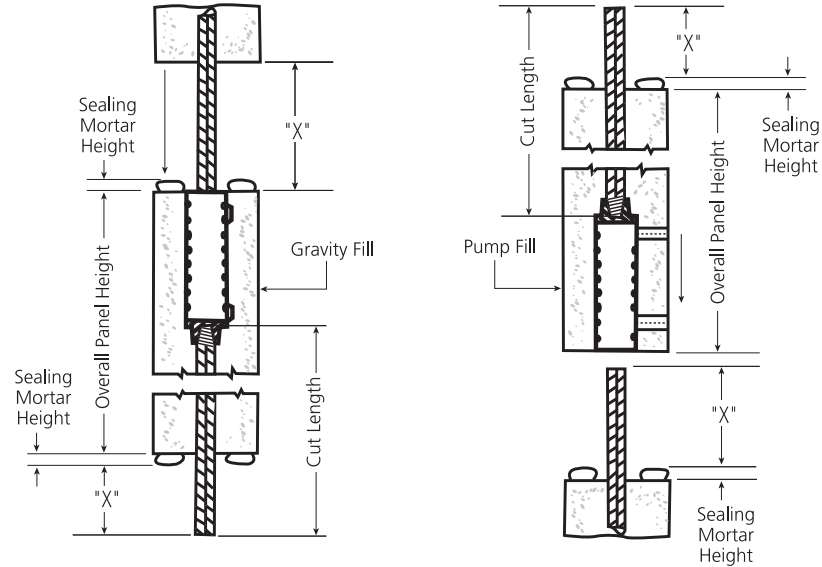
Imperial Units:

Rebar Size	Part No.	Condition	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min.*	"Y" Max.	"Y" Min.*
#8 to #7 ⁺	LK87	Pump	8-5/8"	2-5/8"	1-1/4"	2"	7/16"	7"	6"	6-1/8"	5-1/4"
#8 ⁺ to #7	LK8	Gravity	8-5/8"	2-5/8"	1-3/8"	2"	1/4"	7"	6"	7"	5-1/4"
#9 to #8 ⁺	LK98	Pump	9-3/4"	2-3/4"	1-3/8"	2-1/8"	3/8"	8"	6-7/8"	7"	6"
#9 ⁺ to #8	LK9	Gravity	9-3/4"	2-3/4"	1-1/2"	2-1/8"	1/4"	8"	6-7/8"	8"	6"
#10 to #9 ⁺	LK109	Pump	10-13/16"	2-15/16"	1-1/2"	2-5/16"	5/16"	9"	7-3/4"	8"	6-7/8"
#10 ⁺ to #9	LK10	Gravity	10-13/16"	2-15/16"	1-9/16"	2-5/16"	1/4"	9"	7-3/4"	9"	6-7/8"
#11 to #10 ⁺	LK1110	Pump	12"	3-1/8"	1-9/16"	2-7/16"	9/16"	9-7/8"	8-1/2"	9"	7-3/4"
#11 ⁺ to #10	LK11	Gravity	12"	3-1/8"	1-11/16"	2-7/16"	7/16"	9-7/8"	8-1/2"	9-7/8"	7-3/4"
#14 to #11 ⁺	LK1411	Pump	15"	3-11/16"	1-11/16"	2-3/4"	9/16"	12-3/4"	11"	9-7/8"	8-1/2"
#14 ⁺ to #11	LKT14	Gravity	15"	3-11/16"	2-1/8"	2-3/4"	1/8"	12-3/4"	11"	12-3/4"	8-1/2"
#18 to #14 ⁺	LK1814	Pump	20-5/16"	4-1/2"	2-1/8"	3-1/4"	1-3/16"	17"	14-3/4"	12-3/4"	11"
#18 ⁺ to #14	LKT18	Gravity	20-5/16"	4-1/2"	2-3/4"	3-1/4"	1/8"	17"	14-3/4"	17"	11"

* "X" AND "Y" minimum is to develop 125%fy (Type 1). For Type 2 : "X" minimum = "X" max - 1/4" and "Y" minimum = "Y" max - 1/4"

+ Indicates threaded rebar size

1.3 Coupler Dimensions and Determining Cut Length of Reinforcing Steel – Transitions – Metric Units



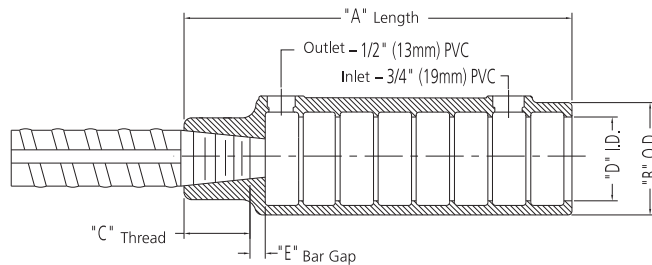
TO DETERMINE TYPICAL CUT LENGTH OF REINFORCING STEEL:

MAXIMUM CUT LENGTH = [Overall Panel Height - E] + Sealing Mortar Height

MINIMUM CUT LENGTH = Maximum Cut Length - 1 Bar Diameter

DOWEL LENGTH = X + Sealing Mortar Height
Y + Sealing Mortar Height

Note: For last lift, reduce cut length as determined by design requirements

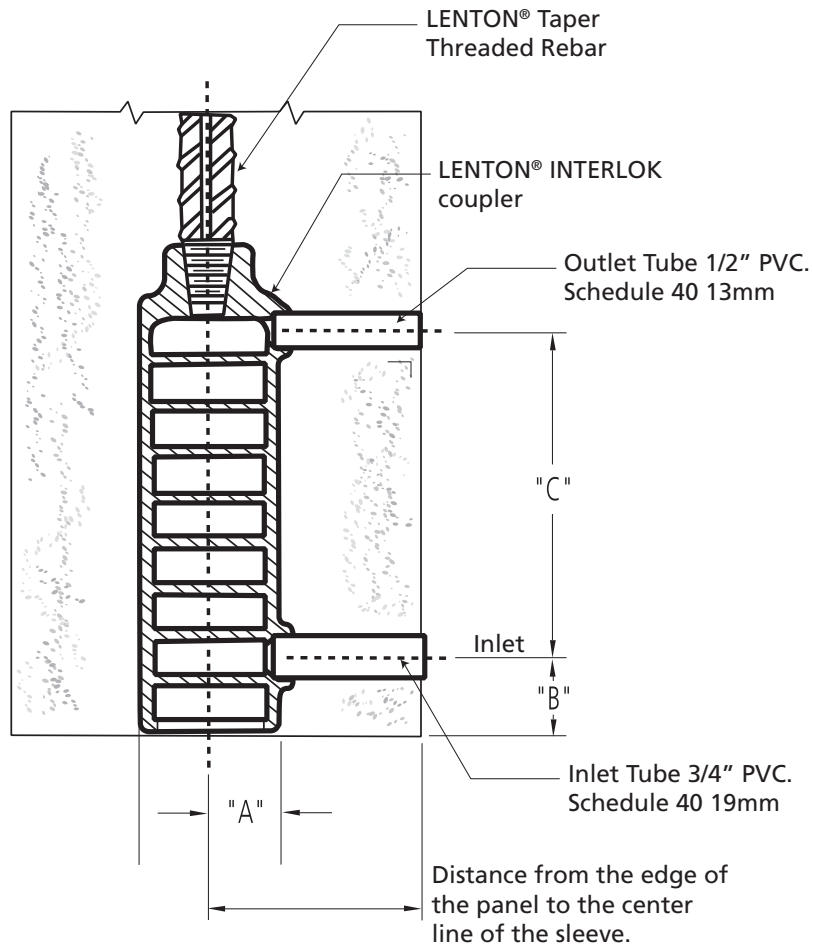


Metric Units:

Rebar Size	Part No.	Condition	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min.*	"Y" Max.	"Y" Min.*
28 to 25 ⁺	LK98	Pump	248	70	35	54	10	203	175	178	153
28 ⁺ to 25	LK9	Gravity	248	70	38	54	6	203	178	178	153
32 to 28 ⁺	LK109	Pump	275	75	38	59	8	229	197	203	175
32 ⁺ to 28	LK10	Gravity	275	75	40	59	6	229	201	203	175
36 to 32 ⁺	LK1110	Pump	295	79	40	62	14	251	215	229	197
36 ⁺ to 32	LK11	Gravity	295	79	43	62	1	251	219	229	197
40 to 36 ⁺	LK1411	Pump	381	94	43	70	14	324	284	251	215
40 ⁺ to 36	LK14SP	Gravity	381	94	56	70	1	324	288	251	215
50 to 40 ⁺	LK1814	Pump	516	114	56	83	14	432	382	324	284
50 ⁺ to 40	LKT18SP	Gravity	516	114	71	83	13	432	392	324	284
57 to 43 ⁺	LK1814	Pump	516	114	54	83	12	432	375	324	281
57 ⁺ to 43	LKT18	Gravity	516	114	72	83	3	432	389	324	281

* "X" and "Y" minimum is to develop 125%fy (Type 1). For Type 2 : "X" minimum = "X" max - 6mm and "Y" minimum = "Y" max - 6mm

1.4 How to Determine Inlet and Outlet Straight Tube Lengths



TO DETERMINE INLET AND OUTLET TUBE LENGTH:

Distance from edge of panel to center line of coupler (minus) "A".

In/lb	Rebar Size		"A"		"B" Length		"C" Length	
	Metric	Canadian	Inches	mm	Inches	mm	Inches	mm
#5/#6/#7	16mm/20mm/22mm	15M/20M	1-3/16"	81	1-7/8"	48	3-15/16"	100
#8	25mm	25M	1-1/4"	32	1-13/16"	46	4-7/8"	124
#9	28mm	30M	1-5/16"	33	1-13/16"	46	5-7/8"	149
#10	32mm	---	1-7/16"	37	1-13/16"	46	6-7/8"	175
#11	36mm	35M	1-1/2"	38	1-3/4"	45	7-13/16"	198
---	40mm	---	1-5/8"	41	1-15/16"	49	10-7/16"	265
#14	43mm	45M	1-5/8"	41	1-15/16"	49	10-7/16"	265
---	50mm	---	2-5/16"	59	2-5/16"	59	14-5/16"	364
#18	57mm	55M	2-5/16"	59	2-5/16"	59	14-5/16"	364

1.5 Locating Inlet/Outlet Tubes for Pump Filling Application

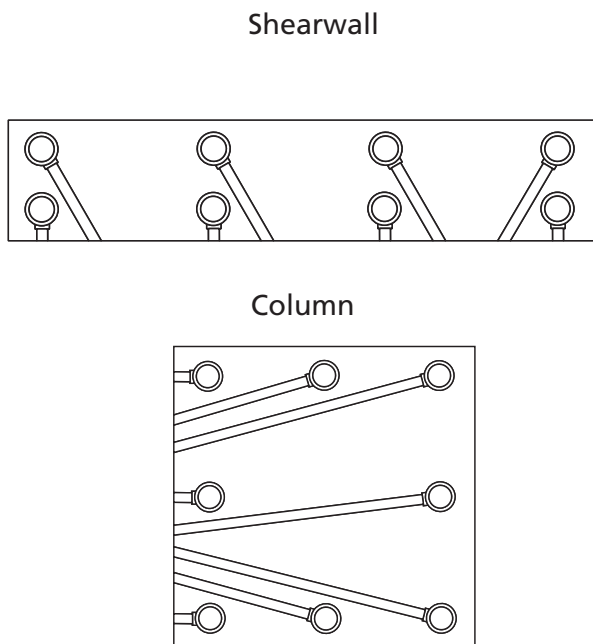
When the Placing Drawings specify a Pump Fill Application, inlet and outlet tubes are required to be installed. For the Pump Fill Application, many options are available for locating the inlet/outlet tubes. In general, grout can be installed from any face of the precast member and tube orientation can be to any of the walls of the panel.

In determining where to locate the tubes it is necessary to consider:

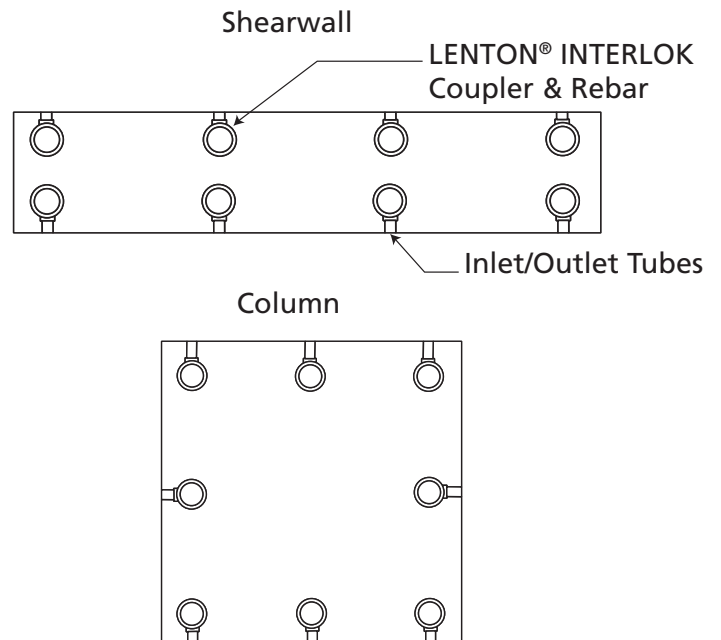
- 1) Ease of access to the tubes at the job site for grouting.
- 2) Location of the tubes with respect to the exterior facade of architectural panels.
- 3) The degree of bending of the tubes that may be required.
- 4) The length of the tubes. Maximum recommended is 3 feet (1 meter)

Examples of inlet/outlet tube configuration:

I. Restricted Access



II. Unrestricted Access



MATERIALS:

Only rigid schedule 40 PVC tubing is recommended for inlet and outlet tubes. ERICO recommends not using flexible tubing as this may collapse or kink during casting of the precast member – preventing the coupler from being filled with grout at the job site.

1.5 Locating Inlet/Outlet Tubes for Pump Filling Application

Forming:

Occasionally it is necessary to bend the PVC tube to route it around other connections within the precast panel. The Placing Drawings should show the correct locations for inlet/outlet ports.

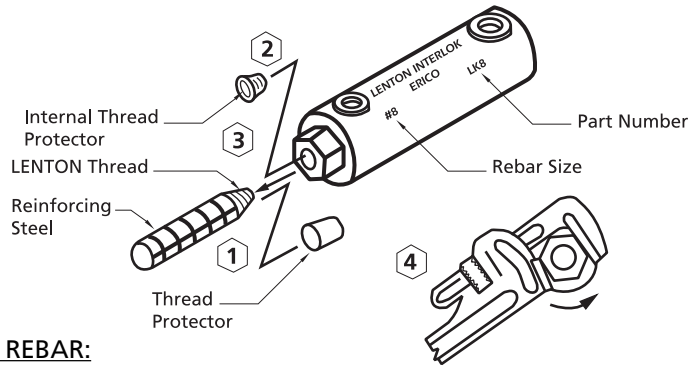
To Properly Bend The PVC Tube:

- 1) Heat the PVC gradually and uniformly with an electric heater specifically manufactured for bending PVC. These are commonly available from electrical supply stores and home hardware centers.
- 2) Bend the PVC gradually using the maximum possible bend radius.
- 3) Avoid kinking, collapsing, puncturing or otherwise damaging the PVC tube.
- 4) Allow the tubes to cool before completing their installation.
- 5) The ends of the inlet/outlet tubes should be made to sit flush against the surface of the form.
- 6) Secure the tubes sufficiently to prevent them from moving while the concrete is being poured into the form.

CAUTION: All inlet and outlet tubes must be fully seated in their respective ports on the coupler. The tubes should also be secured to the form.

Refer to the Coupler Installation Procedures for additional information on installing inlet and outlet tubes.

1.6 Coupler Installation Procedures at Precasting Plant



A. ATTACHING COUPLER TO REBAR:

1. Remove the thread protector. Examine threaded bar end to make sure it is undamaged and clean. If cleaning is required, a wire brush should be used.
2. Determine whether the coupler is the correct size for the bars being spliced. Each coupler is identified with the bar size and the part number (see chart). Remove the internal thread protector if installed.
3. Install the coupler by rotating by hand until tight - approximately 4 turns (Right Hand Thread).
4. While holding the bar stationary, rotate the coupler with a standard 18" pipe wrench until the connection is fully tightened (see figure).

In/lb	Rebar Size			Sleeve Part Number	Inspection Wrench Setting	
	Soft Metric	Canadian	mm		ft lbs	Nm
#5	16	15M	16	LK5	120	90
#6	19	20M	20	LK6	130	180
#7	22	---	22	LK7	160	220
#8	25	25M	25	LK8	200	270
#9	29	30M	28	LK9	200	270
#10	32	---	32	LK10	200*	300
#11	36	35M	36	LK11	200*	300
---	---	---	40	LKT14SP	200*	350
#14	43	45M	43	LKT14	200*	350
---	---	---	50	LKT18SP	200*	350
#18	57	55M	57	LKT18	200*	350

* For Americas only

Comment on Tightness:

Proper tightness may be checked by the installer using a LENTON® brand of inspection wrench. Refer to chart for inspection wrench settings.

NOTE: The inspection wrench will emit a "click" that can be felt as well as heard when the inspection wrench setting noted in the chart has been reached.

B. ATTACH THE COUPLER TO THE FORM:

Follow the instructions provided with the Form Mounting Fixture. It is important that the Form Mounting Fixture is tightened sufficiently so that the urethane grommet is fully expanded thereby preventing cement from entering the coupler.

1.6 Coupler Installation Procedures at Precasting Plant

C. INSTALL INLET AND OUTLET TUBES:

Refer to the Placing Drawings to determine if inlet/outlet tubes are required. If not required (Gravity Fill): Check to make sure that the inlet/outlet ports are plugged and sealed with the supplied rubber plugs.

If inlet/outlet tubes are required (Pump Fill):

1. Install the inlet and outlet tubes into the ports according to the Placing Drawing Specifications. It is important to follow these specifications to assure that the ports are correctly located for pump filling and that the tubes are cut to the correct length. Some experimentation with tube lengths may be necessary to aid in determining proper tube lengths. Also, it may be necessary to bend the PVC tubes slightly to assure proper port location.
2. Once the tubes have been cut to length and oriented properly, it may be necessary to tap the tubes lightly with a hammer to assure that they are seated fully inside the ports on the coupler.
3. It is important that the inlet/outlet tubes fit snugly inside the ports on the coupler. If this joint is not tight, apply adhesive to secure the tubes into the inlet/outlet ports.
4. Once the tubes are positioned, seal the ends of the tubes with rubber stoppers.

D. INSPECT THE INSTALLATION:

To avoid possible intrusion of cement into the LENTON® INTERLOK coupler it is important that the following areas be inspected prior to pouring the precast panel.

1. Check to see that the LENTON thread is properly installed and tight. Refer to page 9 and the table with wrench settings.
2. Make sure inlet/outlet ports are sealed. If tubes are used, make sure tube is tightly seated in the port and that the opposite end is plugged to prevent entry of concrete. Refer to the Placing Drawings to make sure the inlet/outlet tubes are located in the correct position for pump filling.
3. Inspect Form Mounting Fixture and urethane grommet for proper seal to prevent entry of concrete.
4. Check that the coupler is perpendicular to the form end plate and that it is tightly seated.
5. Check the length of protruding dowel on opposite end of form. Make sure the dimensions meet those on the Placing Drawings.

E. POUR CONCRETE INTO FORM:

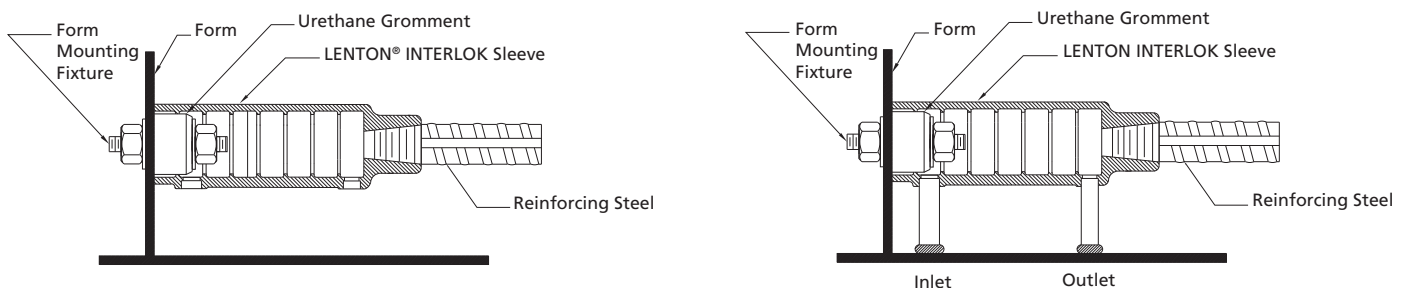
After all other requirements of the Placing Drawings are complete, concrete can be poured.

When pouring the concrete into the form make sure not to disturb any of the PVC tubes as this may cause the tube to slip out of the inlet/outlet ports or cause the tubes to move away from the outside surface of the form which will make locating them at the job site difficult.

F. REMOVE FORMS AND INSPECT:

Once the concrete is cured, remove the Form Mounting Fixtures and the forms, inspect all the inlet/outlet tubes to make sure that they are clean and free of any blockages and not covered with cement. Any cement inside the coupler or PVC tubes should be immediately cleaned out.

Finally, to prevent contaminants from entering the clean coupler, insert a plastic dust cover into the open mouth of the coupler.



Job Site Grouting

2.1 Quantity of LENTON® INTERLOK Splices per Bag of HY10L

HY10L is provided in 50 pound (22.7 Kg) bags

	Coupler Size			Theoretical Volume of Grout Required to Fill Coupler		Estimated Number of Couplers per 50 lb. (22.7 Kg) Bag
	In/lb	Metric	Canadian	IN ³	L	
#5	16	15M		20	0.33	23.5
#6	20	20M		19	0.31	25
#7	22	---		18	0.30	26
#8	25	25M		22	0.36	21.5
#9	28	30M		27	0.44	17.5
#10	32	---		34	0.56	14
#11	36	35M		40	0.66	12
---	40	---		60	0.98	7.5
#14	43	45M		60	0.98	7.5
---	50	---		89	1.46	5
#18	57	55M		89	1.46	5

The values given in the above table are estimates only. Actual values will vary depending on job site practice and conditions.

It is important when determining the amount of grout for the particular application to consider adding an additional 10% during hot and cold weather grouting. This is particularly important during hot weather grouting where there may be more grout discarded due to the reduced working times and shorter potlife.

For pump fill applications it is important to include the volumes of the inlet and outlet tubes in the determination. These volumes become significant in applications where the precast members are unusually thick and the PVC inlet and outlet tubes become long.

2.2 HY10L Mixing Instructions

1 PREPARATION:

1.1 MATERIALS AND EQUIPMENT NEEDED FOR PROPER USE AND INSTALLATION:

To permit rapid and continuous work with the HY10L it is recommended that all necessary tools and materials be as near to the work area as possible. See additional equipment list for pump fill installation.

Potable water	Mixing bucket	Grout pump
Flow Template Kit (Part # LK400)	4 oz. (115 ml) measuring cup	Plastic plugs for inlet/outlet tubes
Electric mixer	1 gallon (3L) graduated water measuring pail	2" (50mm) Cube test molds
Paddle or propeller mixing blade	Thermometer (hot/cold weather)	Spatula

1.2 Preparatory work:

Before beginning work with HY10L, remove all debris, oil, dirt, and moisture from the areas and sleeves to be grouted. Make sure all panels and forms are securely anchored to prevent movement during placing and curing. Verify that the HY10L grout is not beyond the 1 year shelf life by checking the manufacturing date on the bag.

To ensure a quality structural connection it is important to provide for routine quality control during the mixing, grouting, and installation.

NOTE: For a list of suitable equipment and accessories see the manual or contact ERICO.

1.3 Grout temperatures: Refer to Hot and Cold Weather Instructions

!!CAUTION!!

When grouting in cold weather, precautions MUST be taken to keep the HY10L from freezing (32 degrees F; 0°C), during initial setting, as this will result in insufficient strength. Refer to Cold Weather Instructions in this manual.

2. SAMPLE MIX:

2.1 To determine the correct amount of water to add to the HY10L, it is necessary to mix one 50 lb. (22.7 kg) bag as a trial batch.

1. Mix the HY10L according to the mixing steps described in the next section.
2. Use 0.7 gallons of potable water to one bag of dry HY10L. [0.7 gallons is equivalent to 90 fl. oz., 2.8 qts., 2.7 L, or 7-1/2 pop cans (12 oz. size) of water.]
3. Determine the fluidity (spread) by using the Flow Template Kit (ERICO part # LK400, described below).
4. Add additional water in small measurable increments (for example, 4 oz. or 100 ml) to get a Flow Template measurement of 5" to 6".
5. Remix and retest the fluidity of the HY10L after each addition of water.
6. Repeat this procedure (steps 4 to 6) until the recommended spread is achieved.
7. If the fluidity exceeds 6-1/2" as measured on the Flow Template, discard the trial batch and repeat steps 1 thru 8 with a fresh bag of HY10L, making necessary water adjustments.
8. Record the Flow Template measurement and the amount of total water needed and use this amount for further batches of the same lot.

2.2 Using the Flow Template Kit (LK400): (See Cautions)

A Flow Template Kit can be obtained from ERICO. The Flow Template Kit is used for a modified slump test to determine the water content for the LENTON® INTERLOK system. The slump test consists of a 2" (51mm) diameter by 4" (102mm) tall cylinder and a Flow Template (LK405) with preprinted circular dimension rings. This test is to be completed from start to finish within 2 minutes and without interruption. To use the Flow Template:

1. Place the Flow Template on a flat horizontal surface and place the cylinder into the center circle.
2. Fill the cylinder to the top with the HY10L. Tap to remove air bubbles. Slowly lift the cylinder allowing the HY10L to flow out from the bottom and onto the Flow Template.
3. To determine the fluidity, read the flow diameter (spread) off the Flow Template. Read the spread in two places, preferably opposite to each other.
4. Average these two readings to determine the fluidity.

2.2 HY10L Mixing Instructions

It is recommended that the fluidity be measured on every batch (bag) mixed until the user becomes familiar with the system. Depending on the temperature, the mix size, and the specific application, more or less water may be necessary. Additionally, the fluidity should be checked at the beginning of each shift and for every NEW LOT of HY10L, or as required by the engineer. Lot numbers are identified on each bag.

!!CAUTION!!

DO NOT USE MORE THAN 13.5% WATER by weight (0.8 gallons or 3L per 50 lb. (22.7 kg) bag) or obtain a flow template reading of greater than 6-1/2" (165 mm) as this will result in insufficient strength gain. A flow template reading of below 5" (127 mm) will make pumping of the HY10L difficult and will reduce the performance of the system.

2.3 MIXING STEPS: (See Cautions)

1. Place all the mixing water into the mixing bowl. Add only enough water to meet the flow template requirements.
2. While blending with the mixer, slowly add the HY10L into the water until the bag is empty.
3. **MIX THOROUGHLY FOR A MINIMUM OF 5 MINUTES.** Longer mix times may be necessary to achieve a uniform blend. Improper mixing may result in poor strength, due to unevenly mixed materials. Use **ONLY** full bags of HY10L for each batch made.
4. To assure a uniform blend, periodically during mixing scrape down the sides of the mixing bucket. The useful working time of the HY10L is shown in Figure 1 in the Hot and Cold Weather Grouting Instructions section. The potlife may vary considerably depending on the temperature.

!!CAUTION!!

If any of the items listed below occurs, the material will not develop the required strength and **the batch MUST be discarded and fresh material MUST be used.**

1. Under no conditions should the HY10L be retempered by adding additional water once it has stiffened.
2. Once mixed, if the fluidity of the grout is greater than 6-1/2" (165 mm) as measured on the flow template, **DO NOT ADD ADDITIONAL DRY HY10L** to reduce the fluidity.
3. **DO NOT ADD** cement, sand or any additives or admixtures to the HY10L as this will adversely affect the properties.
4. A mechanical mixer **MUST** be used to mix the HY10L.
DO NOT MIX BY HAND. Contact ERICO for a list of suitable mixers and accessories.

LENTON® INTERLOK Warranty and Conditions:
Contact ERICO for specific terms of the warranty.

STORAGE:

HY10L should be stored in a cool, dry environment. It is recommended that the HY10L be stored indoors to maintain maximum shelf life and physical properties. If the bag is damaged or becomes wet, the HY10L must be discarded.

SHELF LIFE:

HY10L's shelf life is 12 months from the manufacturing date printed on the bag, when stored in accordance with ERICO guidelines. HY10L which has been stored beyond 12 months from the manufacturing date or that is beyond the expiration date should be discarded.

2.3 Hot and Cold Weather Grouting Instructions

The HY10L filler material is designed to be used with the LENTON® INTERLOK rebar splicing system. Unauthorized use of other grouts will void all warranties, whether expressed or implied.

The recommended temperature range for the HY10L filler material is 50 to 80°F (10 and 27°C). At no time during placing and curing should the temperature of the LENTON INTERLOK coupler, rebar, and HY10L be allowed to be outside the range of 40 to 90°F (4 and 32°C),

!!CAUTION!! DO NOT ADD ANY admixtures or additives to the HY10L, as this will affect the properties and void all warranties.

3. HOT WEATHER GROUTING:

As with other grouts, in hot weather 90 to 100°F (32 to 38°C) the HY10L may lose workability rapidly, causing flash setting and loss of compressive strength. In hot weather precautions must be taken to guard against the HY10L from setting too quickly. To overcome these problems, modify the basic procedures as follows:

1. Store the bags of HY10L in a cool, shaded (preferably indoor) location until the time of use.
2. Use chilled mixing water as close to 33°F (0.6°C) as possible. This can be easily accomplished by placing a block of ice in a 55 gallon (200L) drum of water. At the time of placement, the freshly mixed grout should be 80°F (27°C) or below. At no time during placing or curing should the grout temperature be greater than 90°F (32°C).

!!CAUTION!! No pieces of ice must be allowed to be mixed in with the grout as this will result in voids that will affect the connection performance.

3. Keep the areas and panels to be grouted covered with a damp tarp or burlap. Place other tarps above and around the panels so that the area is kept shaded for at least several hours prior to grouting.
4. Locate the mixer in a shaded area as close to the grouting site as possible. Prior to mixing, cool the mixing bucket and mixer with chilled water. Drain all excess water thoroughly from the mixer and mixing bucket.
5. Immediately after grouting, cover the areas and panels that were grouted with a damp tarp or burlap for at least 12 hours. Place additional tarps above and around the panels so as to shade the areas that were grouted from the direct sunlight. Do not soak or spray water directly on or around the areas that were grouted so as to create puddles of water. DO NOT ADD additional water to retemper the HY10L.

!!CAUTION!! Mix only one bag at a time. In hot weather the working time of the HY10L will be significantly reduced, therefore, it will be necessary to work quickly with the grout. Premature stiffening and difficulty in pumping and workability may result in hot weather applications. If the grout becomes too stiff to pump or pour, discard the remaining material and mix a fresh bag.

For additional information on Hot Weather Grouting, refer to the IBC 2009 and ACI 318, 305R and 301.

4. COLD WEATHER GROUTING:

As with other grouts, in cold weather the HY10L will tend to set up more slowly, therefore, the first 24 to 72 hours are critical. When grouting in cold weather, modify the basic procedures as follows:

1. Store the bags of HY10L in a warm building at above 50°F (10°C) for 48 to 72 hours prior to grouting.
2. The LENTON INTERLOK coupler, the rebar, the panel, and the areas to be grouted should be heated (for example, with space heaters) until the panels have reached a uniform temperature of above 50°F (10°C) through the thickness (usually about 12-24 hours).

!!CAUTION!! When using space heaters be sure to observe all manufacturer's safety guidelines.

!!CAUTION!! Grout should never be placed into frozen concrete or LENTON INTERLOK couplers.

To effectively heat the area, construct a protective enclosure out of wood or canvas. Insulate this enclosure and the areas to be grouted with sheets of plastic, canvas, or other insulation to prevent heat loss. Follow common fire safety practices when constructing and heating the working areas.

3. Make sure all couplers and inlet and outlet tubes are clear and free of ice or moisture.
4. Heat the mixing water to no more than 90°F (32°C).

!!CAUTION!! Mixed grout temperatures greater than 90°F (32°C) could cause flash set; mixing water temperatures lower than 80°F (27°C) will have little effect on raising the grout temperatures.

2.3 Hot and Cold Weather Grouting Instructions

5. The HY10L grout at time of placement should be a minimum of 50°F (10°C) and no higher than 80°F (27°C).

!!CAUTION!! The LENTON® INTERLOK coupler, rebar, and the HY10L filler material MUST be maintained at a temperature between 40°F and 90°F (4 to 32°C) (preferably 50 and 80°F; 10 to 27°C), and the grout MUST be protected from freezing (32°F or 0°C) during curing. Heat should be maintained until the HY10L inside the LENTON INTERLOK couplers has reached a *minimum compressive strength of 3000 psi (21 MPa)*. To reach this strength at 40°F (4°C) it may take 2 or more days and should be verified with cube tests. Attainment of this strength must be determined by job site cube testing. HY10L that freezes before reaching this compressive strength will be damaged and can suffer significant strength loss. Refer to ASTM C-109 and C-942 or contact ERICO.

For additional information on Cold Weather Grouting, refer to the IBC 2009 and ACI 318, 306R and 301.

!!CAUTION!! Temperatures below 50°F (10°C) increase the time it takes freshly placed grout to develop strength. Therefore, there is a risk of damage or collapse if the structure is loaded before it develops adequate strength. This strength requirement must be determined by the structural engineer and should be based upon the expected construction loading.

It is a structural engineering decision when to remove bracing - the structural engineer should be consulted before any bracing is removed regardless of the temperature.

TEST SPECIMENS:

Additional test specimens should be made and cured at the job site to assist in determining when bracing can be removed and when the structure can be placed in service. Unless specimens used for these purposes are cured at the same place and as nearly as possible under the same conditions as the LENTON INTERLOK connections, the test results can be misleading.

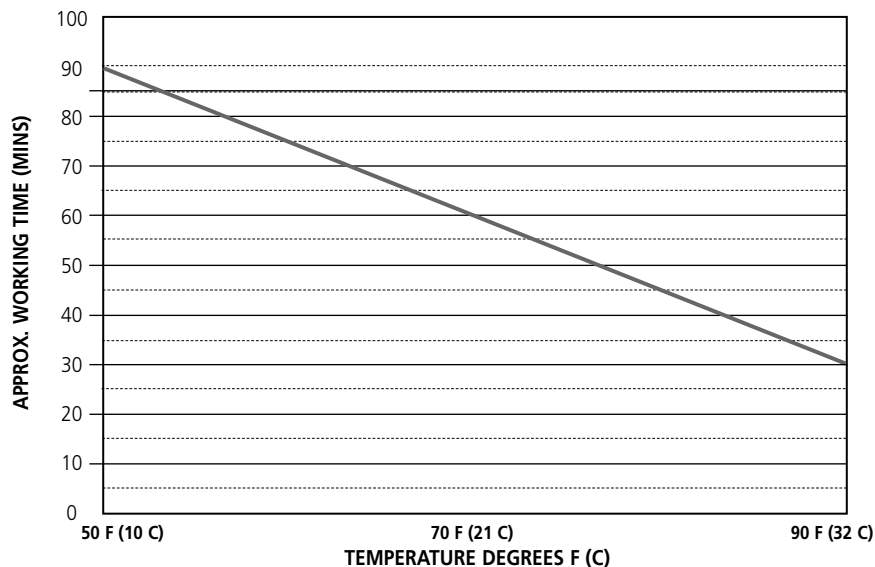
WORKING TIME AT TEMPERATURE:

NOTE: Refer to Figure 1 for approximate working time as a function of ambient temperature.

To determine the approximate working time of the mixed HY10L grout at the temperature of interest, follow these instructions.

1. On Figure 1 locate the temperature of interest in degrees Fahrenheit on the "X-AXIS".
2. Using this as a reference, locate vertically the temperature on the line drawn on the graph.
3. Once the point has been located on the graph, then read across horizontally to obtain the Approximate Working Time on the "Y-AXIS" in minutes at that given temperature.
4. Repeat this procedure for additional temperatures as needed.

FIGURE 1: ERICO brand of HY10L FILLER - Approximate Working Time vs. Temperature

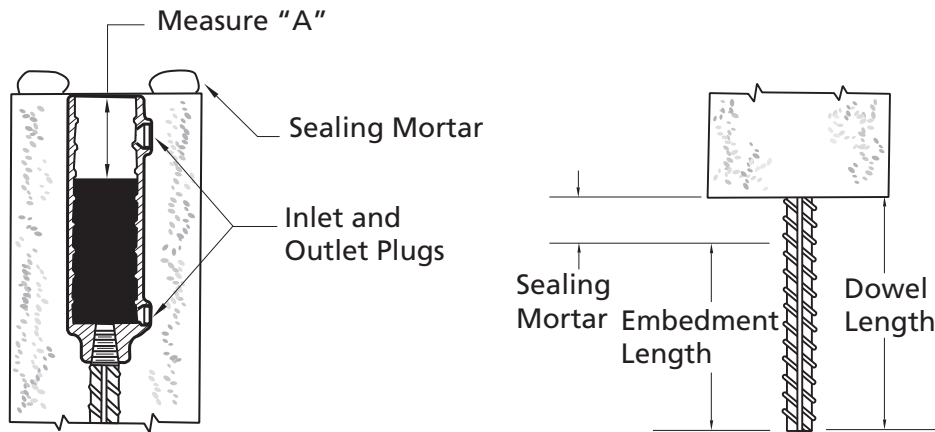


NOTE: This information is provided for reference only. Actual working times will vary. Contact ERICO when further information is required.

2.4 Gravity Fill Installation Instructions For HY10L Filler Material

The HY10L filler material is designed to be used with the LENTON® INTERLOK rebar splicing system. Unauthorized use of other grouts will void all warranties, whether expressed or implied. It is important that all individuals responsible for the grout installation be properly trained.

GRAVITY FILL:



In/Lb	Sleeve Size		Maximum Distance from Top of Sleeve "A"		Volume Needed to Fill Sleeve		Embedment Length			
	Metric	Canadian	Inches	mm	Quarts	L	Inches	mm	Inches	mm
#5	16	15M	3/4"	19	1/3	0.33	6-1/8"	156	5-1/4"	134
#6	20	20M	3/4"	19	1/3	0.31	6-1/8"	156	5-1/4"	134
#7	22	---	1"	25	1/3	0.30	6-1/8"	156	5-1/4"	134
#8	25	25M	1-3/8"	35	3/8	0.35	7"	178	6"	153
#9	28	30M	1-5/8"	41	1/2	0.47	7-7/8"	203	6-7/8"	175
#10	32	---	1-3/4"	44	2/3	0.63	8-7/8"	229	7-3/4"	197
#11	36	35M	2"	51	3/4	0.71	9-7/8"	251	8-1/2"	215
---	40	---	3-3/8"	86	1-1/8	1.10	12-3/4"	324	11-1/8"	284
#14	43	45M	3-3/8"	86	1	0.95	12-3/4"	324	11"	281
---	50	---	6-3/4"	171	2-1/8	2.05	17"	432	15"	382
#18		55M	6-3/4"	171	1-2/3	1.58	17"	432	14-3/4"	375

- 1) Check the lengths of the protruding dowel to make sure the dimensions meet those on the Placing Drawings. If the protruding dowels are too long, they may be cut to the correct length. If the dowels are too short, the panels should not be used and the resident engineer should be contacted.
- 2) Install panel using normal industry practices. Refer to Pages 2-5 of this manual for correct dowel lengths.
- 3) Before beginning work with HY10L, remove all debris, oil, dirt, moisture, and any obstructions from the couplers, rebars, and areas to be grouted. Blow air into the couplers to confirm they are clean and dry. Make sure all panels and forms are securely anchored to prevent movement during placing and curing.
- 4) To permit rapid and continuous work with the HY10L, it is recommended that all necessary tools and materials be on hand and as near to the work area as possible. Refer to the Materials and Equipment List on the HY10L bag and to the Materials and Equipment List located in this manual for tools and materials needed for proper gravity fill installation.
- 5) In order to properly shim and level the precast panels, ERICO recommends that the upper panel is installed and "dry fit" into its final position, such that, the protruding dowels are fully seated into the ungrouted couplers. Once these two panels have been brought together, insert the proper shims between the panels so that the assembly is properly positioned. Once the panels have been properly shimmed and leveled, the upper panel can be removed to allow for filling of the couplers.

2.4 Gravity Fill Installation Instructions For HY10L Filler Material

- 6) Mix the HY10L according to the mixing directions on the bag. Use only full bags of HY10L for each batch made.
- 7) Grout may be placed by hand or a grout pump may be used to place the HY10L. Contact ERICO for recommended grout pumps. NOTE: Before using the grout pump, carefully read and understand the Pump Users Manual. It is important to follow all the manufacturer's recommended guidelines regarding safety, operations, service, and maintenance.
- 8) For gravity fill application, pump or pour the HY10L evenly and continuously into the open end of the coupler. Referring to the table on the following page, fill the coupler to the level "A" shown for the bar size of interest measuring down from the top with a ruler and filling the grout to that level. It is acceptable to slightly overfill the coupler, as any excess grout will be removed when the bars are placed inside the coupler. However, for maximum grout economy it is advised that the couplers be filled with the proper amounts to avoid waste.

!!CAUTION!! DO NOT UNDERFILL the coupler as this will result in reduced connection and performance. Coupler should be filled completely and fully. Grout should be placed into the coupler in one step and no cold joints should be present.

- 9) Once the couplers have been filled to the proper level, remove any air that may be trapped in the HY10L by tamping it with a small diameter rod.
- 10) Once the HY10L has been tamped, immediately lower the precast member until it is properly seated and aligned. It is advised that the precast member be lowered slowly into the coupler to avoid air bubbles. Check to make sure the panels are level and that grout completely surrounds the rebar to the top.

NOTE: It is recommended that all grouting operations are inspected by the engineer to make sure that all the manufacturer's recommended procedures and all applicable building codes have been observed. If any HY10L leaks out onto the surface of the precast panel remove it immediately with flushing water to avoid unsightly rust stains.

- 11) The decision to remove bracing following grouting must be determined solely by the Structural Engineer. In order to ensure a quality structural connection, it is important that the grouted couplers in a precast panel or member be secured and undisturbed by movement, shock, or vibration until the HY10L has reached a compressive strength of at least 3000 psi (21 MPa). Typically this will occur after 1 day at 68°F (20°C), however, this time will vary depending on the temperature and job site conditions. In cold weather, the curing time will be significantly lengthened (2 or more days at 40°F; 4°C), therefore, the bracing time may need to be increased. It is strongly recommended that the compressive strength of the HY10L be checked under job site curing conditions according to the procedures outlined in ASTM C-109 before proceeding with upper story erection.
- 12) Once the installation of the grout is complete and the panels are braced and secured, fill the seam between the two panels with a dry pack sealing mortar.

!!CAUTION!!

ANY OF THE FOLLOWING ITEMS IF NOT OBSERVED MAY RESULT IN REDUCED CONNECTION PERFORMANCE.

- 1) Refer to Mixing Directions and Cautions on the LENTON® INTERLOK bag before mixing or doing any work with the HY10L. Do not use any damaged, wet, or open bags. Do not use grout which is more than 1 year old. These bags should be discarded in accordance with Federal, State, and Local Regulations.
- 2) When pumping, never let the hopper become empty as this will result in air getting into the couplers. Prepare additional HY10L to keep on hand to avoid this situation.
- 3) If grouting is interrupted, keep recirculating the HY10L by operating the pump with the nozzle in the hopper. This movement of the HY10L will aid in keeping it fluid. If the shut down exceeds the limits of time specified in this manual noted in Figure 1 of Hot & Cold Weather Grouting Instructions, (for example 60 minutes at 70°F (21°C), THE GROUT MUST BE DISCARDED.
- 4) Never leave a coupler partially filled for an extended period of time. Make sure all couplers are filled completely and no couplers are left ungrouted. Do not underfill the coupler. Place the grout into the coupler in one step - do not create a cold joint in the coupler.
- 5) After grouting, keep the walls and panels undisturbed for at least 24 hours at 68°F (20°C). The final decision to remove bracing is an engineering decision which must be determined solely by the structural engineer based on job site conditions.

During cold weather grouting (temperature below 50°F; (10°C) the bracing time must be extended to at least 48 hours to allow the HY10L to gain the required strength.

- 6) Immediately following check grouting to make sure that no grout has leaked from the coupler. Refer to the Trouble Shooting Guide located in this manual for additional guidelines.

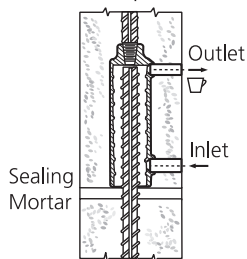
2.5 Pump Fill Installation Instructions For HY10L Filler Material (Vertical, Horizontal and Inclined Application as Shown in Figure 1)

The HY10L filler material is designed to be used with the LENTON® INTERLOK rebar splicing system. Unauthorized use of other grouts will void all warranties, whether expressed or implied. It is important that all individuals responsible for grout installation be properly trained.

To assure proper filling of the couplers during the pump fill application, it is important to follow these important guidelines.

- 1) Check the lengths of the protruding dowel to make sure the dimensions meet those on the Placing Drawings. If the protruding dowels are too long, they may be cut to the correct length. If the dowels are too short, the panels should not be used and the resident engineer should be contacted.
- 2) Before beginning work with the HY10L, remove all debris, oil, dirt, and moisture from the areas, rebars, and couplers to be grouted. Shine a light and blow air into the inlet and outlet tubes to make sure they are free of obstructions and to confirm a clear passage. Make sure all panels and forms are securely anchored to prevent movement during placing and curing.
- 3) Install panel using normal industry practices, using sealing disks and sealing mortar. Refer to Pages 2-5 of this manual for correct dowel lengths. NOTE: Check to make sure no sealing mortar has entered the coupler. Check that the panels are properly shimmed and leveled.
- 4) To permit rapid and continuous work with the HY10L, it is recommended that all necessary tools and materials be on hand and as near to the work area as possible. Refer to the Materials and Equipment List on the HY10L bag and to the Component List located in the manual for tools and materials needed for proper pump fill installation.

FIGURE 1: Pump Fill Installation



- 5) A hand-operated or pneumatic grout pump may be used to place the HY10L. Contact ERICO for recommended grout pumps.

NOTE: Before using the grout pump, carefully read and understand the Pump Users Manual. It is important to follow all the manufacturer's recommended guidelines regarding safety, operations, service, and maintenance.

- 6) To make sure the pump is clean and free of obstructions, fill the hopper with potable water and operate the pump. This will also prime the pump and lubricate the inside of the hopper, pump, and hose. Continue to operate the pump to expel all the water from the hopper and hose.
- 7) Mix the HY10L according to the mixing directions on the bag. Use only full bags of HY10L for each batch made. DO NOT MIX grout in the pump hopper.
- 8) Pour the mixed HY10L into the hopper of the pump, and operate the pump several times to push out any water/cement slurry that may remain in the hose.
!!CAUTION!! DO NOT USE this water/cement slurry in the coupler as it may result in reduced connection performance.
- 9) Once a continuous stream of HY10L is flowing from the nozzle, insert the nozzle into the inlet tube at the lower end of the coupler, as shown.
- 10) Pump the HY10L into the coupler slowly and continuously until it flows evenly and freely from the outlet tube on the top of the coupler. It is recommended that the grout be pumped slowly. This will allow time for excess air bubbles to escape from the HY10L.
- 11) Once the HY10L flowing from the outlet tube is free of air bubbles, stop pumping and insert a plug in the upper outlet tube. Continue pumping until no additional grout can be pumped into the inlet tube. Then remove the nozzle from the inlet tube and quickly plug the inlet tube to prevent any escape of HY10L from the coupler. DO NOT REMOVE THE STOPPERS until after the HY10L has reached final set (usually 1 day to harden). Premature removal of the stoppers may allow some of the HY10L to leak out of the inlet tube thereby allowing voids in the coupler which will result in decreased connection performance.

NOTE: Check the joints between the precast panels during and immediately after grouting. If the HY10L has leaked out of the joint, remove it immediately with flushing water to avoid unsightly rust stains. Check that no HY10L has leaked out of the coupler and that it is properly filled.

It is recommended that all grouting operations are inspected by the engineer to make sure that all the manufacturer's recommended procedures and all applicable building codes have been observed.

2.5 Pump Fill Installation Instructions For HY10L Filler Material

- 12) Once the HY10L has set (usually the next day), the plugs can be removed from the inlet and outlet tubes. The depression that is left in the tube openings can then be filled with a standard non-metallic mortar. A non-metallic mortar is suggested for this application to prevent unsightly rust stains that will develop on the surface of the panel or areas that were grouted. Exposed HY10L will show rust stains. Any exposed HY10L should be covered by plain mortar or other coating after the HY10L has solidified.
- 13) Clean grout pump immediately after use with plenty of clean flushing water. Fill the hopper with water and operate the pump until the water is flowing cleanly and clearly from the nozzle. Rinse off all exterior surfaces with clean flushing water. Never allow the grout to harden inside the hopper, hose, or nozzle as this will damage the pump.
- 14) **The decision to remove bracing following grouting must be determined solely by the Structural Engineer.** In order to ensure a quality structural connection, it is important that the grouted couplers in a precast panel or member be secured and undisturbed by movement, shock, or vibration until the HY10L has reached a compressive strength of at least 3000 psi (21 MPa). Typically this will occur after 1 day at 68°F (20°C), however, this time will vary depending on the temperature and job site conditions. In cold weather, the curing time will be significantly lengthened (2 or more days at 40°F (4°C), therefore, the bracing time may need to be increased. It is strongly recommended that the compressive strength of the HY10L be checked under job site curing conditions according to the procedures outlined in ASTM C-109 before proceeding with upper story erection.

!!CAUTION!!

HORIZONTAL APPLICATIONS:

- 1) For Horizontal Pump Fill application make sure coupler is sealed sufficiently before pumping the grout into it.
- 2) Make sure that the rebar is inserted completely into the coupler sleeve for the application.
- 3) Make sure that the coupler is completely filled with grout and that a smooth continuous stream of grout is flowing from the outlet ports with no air bubbles.

!!CAUTION!!

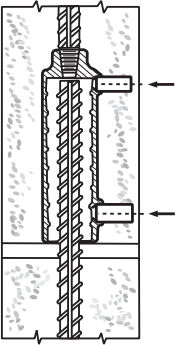
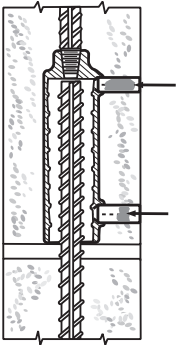
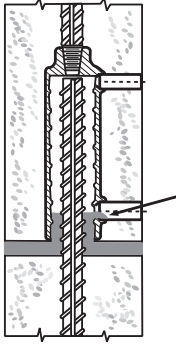
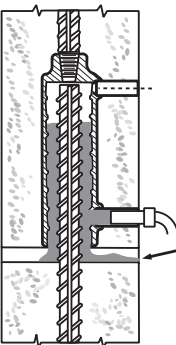
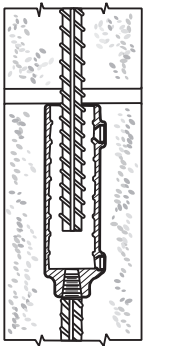
Refer to Cautions noted under Gravity Fill Installation Instructions for HY10L Filler Material for additional cautions and information.

2.6 Grouting Troubleshooting Guide

I. RECOMMENDED EQUIPMENT:

1. A large piston or garden sprayer filled with water (4 gallon or larger) and/or high pressure water hose with sprayer attachment.
2. Compressed Air Source
3. Steel Rod - 1/4 to 3/8 inch (6 to 10mm) in diameter
4. Hammer
5. Rubber Stoppers
6. Electric Drill with masonry bits
7. Flashlight
8. Sealing Disks
9. Dry Pack Mortar

The above equipment should be on-hand and available during grouting.

	TROUBLE	SOLUTION		TROUBLE	SOLUTION
	1. Inlet/outlet tubes do not reach the surface.	<ol style="list-style-type: none"> 1. Check and mark the position of the inlet/outlet tubes according to the drawings. 2. Chip down the marked positions to the embedded tubes. Remove all debris. 3. Blow out the tubes with compressed air and confirm a clear passage from the inlet to outlet tubes. To aid in confirming a clear passage, shine a light into the inlet and outlet tubes. 		3. Inlet and/or outlet tube is blocked with concrete debris etc. or by inlet/outlet plugs that have become wedged inside the tube.	<p>FOR DEBRIS ETC.:</p> <ol style="list-style-type: none"> 1. Insert a steel rod into the tubes and hammer it to clear the tube. 2. Blow out the tubes with compressed air and confirm a clear passage from the inlet and outlet tubes. To aid in confirming a clear passage, shine a light into the inlet and outlet tubes. <p>INLET/OUTLET PLUGS:</p> <ol style="list-style-type: none"> 1. Use a hooked rod or wire to scrape plugs out of the tubes. 2. Blow out the tubes with compressed air and confirm a clear passage from the inlet to outlet tubes.
	2. Due to omissions of sealing disc, inlet tube is blocked with sealing mortar from the joint.	<p>IF SEALING MORTAR IS NOT SET:</p> <ol style="list-style-type: none"> 1. Lift the top panel off and clean out any sealing mortar inside the couplers and any loose mortar using high pressure water. 2. Once clean, reinstall the panel and confirm a clear passage by shining a light into the inlet and outlet tubes. Blow out the tubes with compressed air. <p>IF THE SEALING MORTAR IS HARDENED:</p> <ol style="list-style-type: none"> 1. Insert a steel rod into the tube, and hammer it to strike out the sealing mortar that is blocking the tube. 2. Blow out the tubes with compressed air and confirm a clear passage from the inlet to outlet tubes. A vacuum may also be needed to remove debris from the interior of the coupler. 3. Make sure recommended volume of grout can be placed into sleeve. If not, contact the Structural Engineer. 		4. Leakage during pumping of HY10L grout from the joint due to incomplete sealing.	<ol style="list-style-type: none"> 1. Seal the joint with rags, polyurethane, etc. 2. Start regrouting.
				5. Panel won't seat to proper embedment length.	<ol style="list-style-type: none"> 1. Dowels are too long - cut to proper length. 2. Debris in coupler - remove all debris, hardened cement, or water in bottom of coupler. Blow out with compressed air and confirm that coupler is clean.

2.7 HY10L Filler Material Product Specification

HY10L filler material is a specially formulated ready to use grout designed for use in the LENTON® INTERLOK rebar splicing system. Unauthorized use of other grouts will void all warranties, whether expressed or implied.

PRODUCT DESCRIPTION:

HY10L is a pre-mixed, volume stable, metallic grout. The addition of clean high quality metallic particles gives the HY10L a ductile and reinforcing effect that enables it to withstand impact, torque, and vibrating loads. HY10L is a high-early strength grout that offers an extended working range and can be placed at temperatures ranging from 40 to 90°F (4 to 32°C) when installed in accordance with ERICO guidelines. Due to the excellent fluidity of HY10L, it offers the additional advantage of being pumped with a commercially available grout pump into the LENTON® INTERLOK coupler.

TECHNICAL DATA:

For grout performance data please contact your regional ERICO office. HY10L grout will typically develop in excess of 8,500 psi (58.6 MPa) compressive strength in 28 days. Depending on the ambient temperature and other job site conditions, reasonable variations in compressive strength may be encountered. The technical data is based on controlled laboratory tests. All test specimens should be made according to ERICO guidelines.

Test samples are 2" (50 mm) cube specimens cured at 72F (22°C) and tested in accordance with ASTM C-109-90 and C-942

PLACING CONSISTENCY:

HY10L, when mixed with approximately 11.5% water by weight of HY10L dry material, will flow to a diameter of 5 to 6 inches (127 - 152 mm) as determined by the Flow Template Kit. Depending on the temperature, mix size, and the specific application, more or less water may be necessary.

!!CAUTION!! Do not use more than 13.5% water by weight (0.8 gallons or 3L per 50 lb. (22.7 kg) bag) or use grout which has a flow template reading of greater than 6 1/2" (165 mm). A flow reading of below 5" (127 mm) will make pumping difficult and may result in insufficient filling of the coupler. This may result in inadequate connection strength. A flow reading greater than 6-1/2" (165 mm) will result in reduced grout strength and accompanying splice performance. A mechanical mixer must be used to mix the HY10L. Contact ERICO for a list of suitable mixers and accessories.

SETTING TIME:

HY10L mixed to the placing consistency and tested in accordance with ASTM C-191, will have a time of initial setting of about 2-1/2 hours at 68°F (20°C), (working time of 1 hour).

PACKAGING:

HY10L is packaged in 50 lb. (22.7 Kg) multiply moisture resistant bags for optimum performance and shelf life. The HY10L has a shelf life of **12 months from the manufacturing date printed on the bag**, when stored in accordance with ERICO guidelines. Do not use grout that is beyond the expiration date.

TEMPERATURE GUIDELINES:

The preferred temperature range for the splicing system is between 50 and 80°F (10 and 27°C). As with all grouts, the HY10L, LENTON INTERLOK coupler, and rebar must be maintained at a temperature between 40 and 90°F (4 and 32°C). Refer to Hot and Cold Weather Installation Instructions located in this manual for complete guidelines.

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