

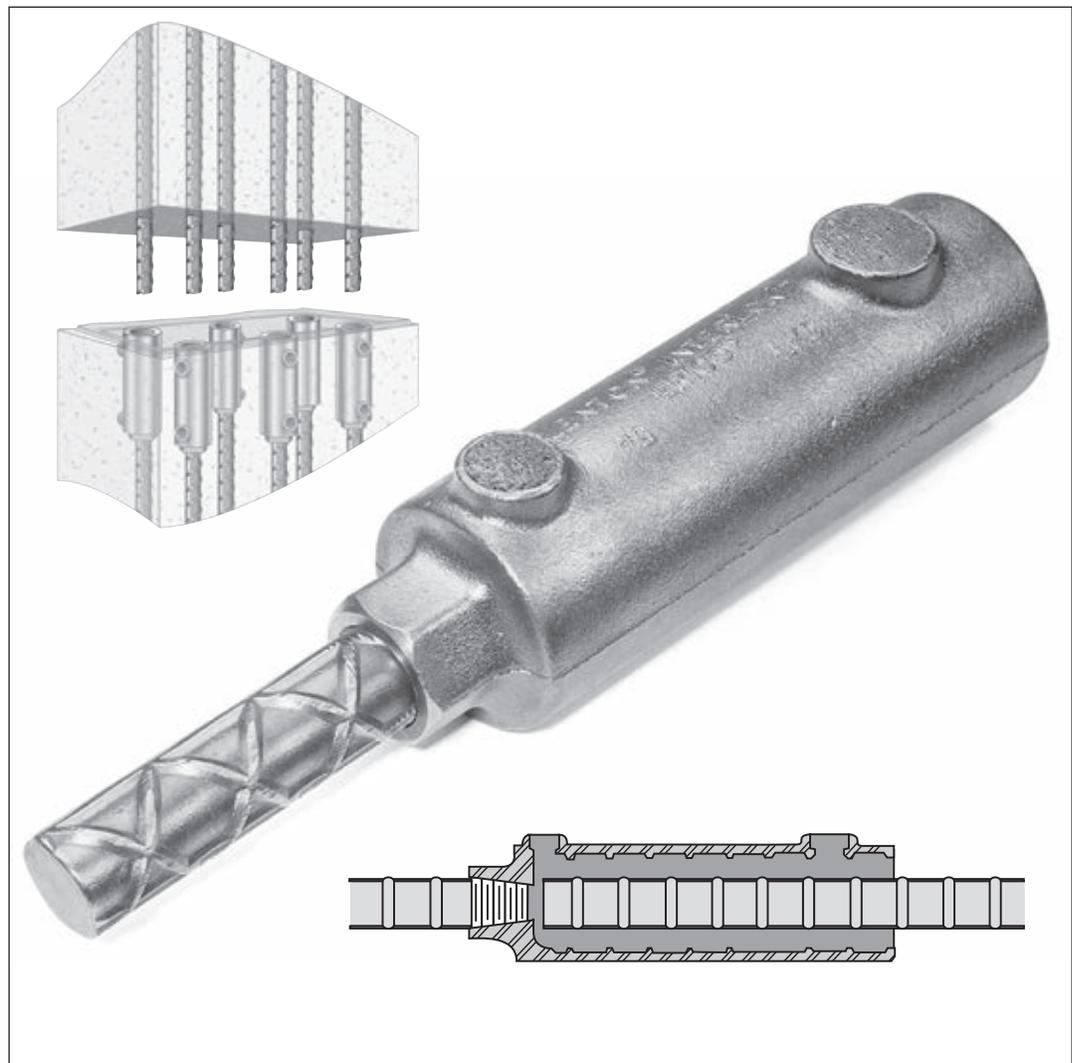
LENTON

nVent LENTON Interlok

Reinforcing Bar Splicing System for Use with HY15LM Grout

Revised September 2018

IP8419_C



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* SDS Available – Contact nVent LENTON

IMPORTANT – GENERAL AND SAFETY INFORMATION

- A. Only nVent LENTON authorized materials should be used to make nVent 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 nVent LENTON 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 HY15LM SDS 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 SDS 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 HY15LM grout 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 expiration date of HY15LM, refer to the lot number located on the end panel of each bag. The manufacture date can be determined as shown below:
- DDMMYY-V-HH:MM**
- Example 30JUN17-A-16:21: Material produced on June 30th, 2017 at 4:21 PM of the day. The middle character "A" is a production code that may vary.
- DO NOT USE** any HY15LM 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 nVent LENTON.
- 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 HY15LM Grout is 32 to 100°F (0 to 38°C). With nVent LENTON temperature additives, HY15LM can be used down to 20°F (-7°C) and up to 122°F (50°C).
- I. Do not use more than 13% water by weight (0.78 gallons or 2.95L per 50 lb (22.7 kg) bag). Do not add any additives or admixtures to the HY15LM grout other than the nVent LENTON temperature additives as instructed by nVent LENTON.
- 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 HY15LM grout is designed to be used with the nVent LENTON Interlok Reinforcing Bar 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 HY15LM grout 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. nVent LENTON 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, visit www.erico.com.

FOREWORD

The nVent LENTON® Interlok System has been designed to exceed the ACI® 318 Building Code Type 1 & 2 requirement of developing, in both tension and compression, a minimum of 125 percent of specified yield strength and the minimum specified ultimate tensile strength for ASTM® A706 Grade 60 & 80 and A615 Grade 60, 75 & 80 rebar specifications. In addition, the system will meet the requirements for 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 HY15LM grout bag are closely followed.

HY15LM High-Strength, Nonmetallic Grout has been developed exclusively for use in the nVent 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 nVent LENTON Interlok System, or other nVent LENTON Reinforcing Steel Splices, please contact your local nVent LENTON representative or customer care.

OVERVIEW

The nVent 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 nVent LENTON taper threaded system in conjunction with a special high-early strength, nonmetallic, nonshrink cementitious grout. Assembly of the connection is normally done in two separate stages: The nVent 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 grout 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 special ready-to-use grout is designed to maintain fluidity for an extended period of time while achieving a high-early- strength. It is a nonmetallic, nonshrink, material capable of developing in excess of 16,000 psi (110.3 MPa) compressive strength at 28 days. To ensure a proper connection, the addition of water must be maintained in strict accordance with nVent LENTON 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 nVent LENTON brand of HY15LM without nVent LENTON approval voids all warranties, both expressed or implied.

The coupler is produced as a casting and nVent LENTON taper threads are machined under strict Quality Control guidelines. Taper threading of the rebar ends are produced using nVent LENTON's equipment. Prethreaded bars can be provided from nVent LENTON'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 nVent LENTON recommended procedures, the splice will meet or exceed the ACI 318, BS8110, AS3600, ISO 15835 or IBC® Building Code requirements.

WARNING

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.

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.

All instructions must be completely followed to ensure proper and safe installation and performance.

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:

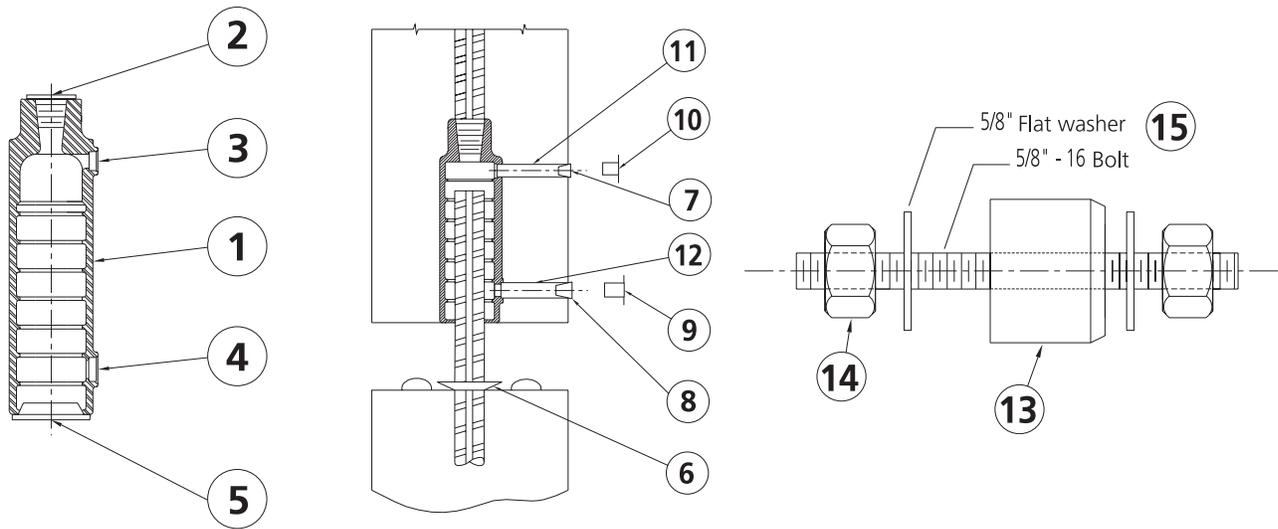
- a. Conformance to all governing codes.
- b. The integrity of structures to which the products are attached, including their capability of safely accepting the loads imposed, as evaluated by a qualified engineer.
- c. Using appropriate industry standard hardware as noted above.

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.

PRECASTER INSTALLATION

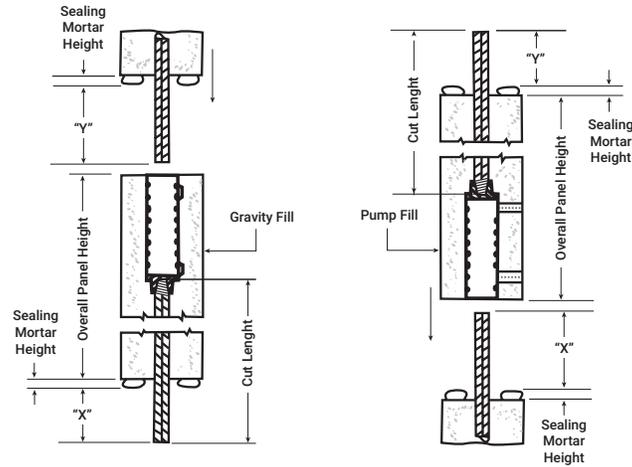
1.1 Component List



Item No.	Description	Standard Item Included	Separate Order
1	nVent 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 nVent LENTON

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



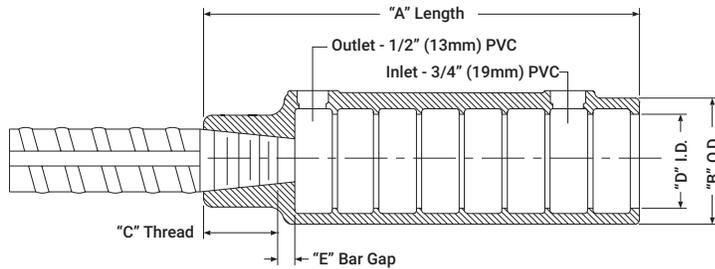
To Determine Typical Cut Length of Reinforcing Steel:

Maximum Cut Length

Gravity or Pump Condition = [Overall Panel Height - E] + Sealing Mortar Height

Dowel Length = X + Sealing Mortar Height

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



Imperial Units:

Rebar Size	Coupler Part No.	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min. Type 1 & 2*	
in-lb	Canadian								
#5	15M	LK16**	7-7/8"	2-5/16"	15/16"	1-5/8"	5/16"	6-5/8"	5-1/4"
#5	15M	LK5	7-13/16"	2-9/16"	7/8"	1-7/8"	13/16"	6-1/8"	5-1/4"
#6	20M	LK20**	8-13/16"	2-7/16"	1-3/8"	1-3/4"	7/16"	7"	5-1/4"
#6	20M	LK6	7-13/16"	2-9/16"	1-1/8"	1-7/8"	9/16"	6-1/8"	5-1/4"
#7	---	LK7	7-13/16"	2-9/16"	1-1/4"	1-7/8"	7/16"	6-1/8"	5-1/4"
#8	25M	LK8	8-5/8"	2-11/16"	1-3/8"	2"	1/4"	7"	6"
#9	30M	LK9	9-3/4"	2-13/16"	1-1/2"	2-1/8"	1/4"	8"	6-7/8"
#10	---	LK10	10-13/16"	3"	1-9/16"	2-5/16"	1/4"	9"	7-3/4"
#11	35M	LK11	11-15/16"	3-1/8"	1-11/16"	2-7/16"	3/8"	9-7/8"	8-1/2"
#14	45M	LKT14	15-3/16"	3-11/16"	2-1/8"	2-3/4"	5/16"	12-3/4"	11"
#18	55M	LKT18	20-5/16"	4-1/2"	2-3/4"	3-1/4"	9/16"	17"	14-3/4"

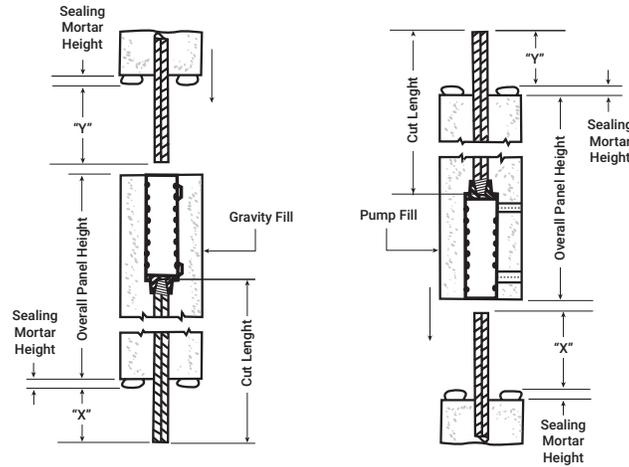
* "X" Min. Type 1 will develop 125% of the specified yield strength of the rebar in tension and compression (125% fy). "X" Min. Type 2 meets Type 1 and will develop the specified tensile strength of the rebar in tension (fu).

** LK16 and LK20 are replacement products for LK5 and LK6 respectively. Each has a smaller diameter allowing for slimmer wall designs.

Contact nVent LENTON for rebar sizes not listed.

All table dimension in mm

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



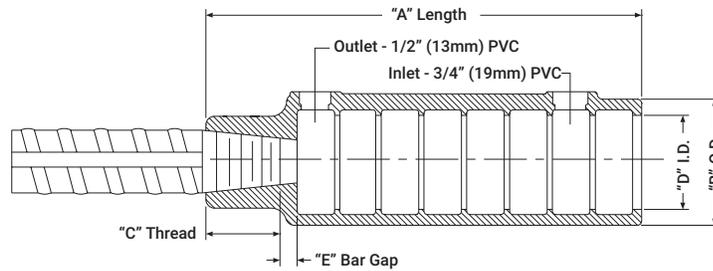
To Determine Typical Cut Length of Reinforcing Steel:

Maximum Cut Length

Gravity or Pump Condition = [Overall Panel Height - E] + Sealing Mortar Height

Dowel Length = X + Sealing Mortar Height

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



Metric Units:

Rebar Size mm	Coupler Part No.	Coupler Article No.	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min. Type 1 & 2*
16	LK16**	---	200	59	25	41	8	168	134
16	LK5	145575	199	65	22	48	21	156	134
20	LK20**	---	224	62	35	45	11	178	134
20	LK6	145580	199	65	29	48	14	156	134
22	LK7	145585	199	65	32	48	11	156	134
25	LK25	---	228	219	40	51	11	178	153
28	LK9	145595	248	72	38	54	6	203	175
32	LK10	145600	275	76	40	59	6	229	197
36	LK36	---	316	81	52	62	11	251	215
38	LK12	---	386	94	53	70	6	324	284
40	LK40	145610	386	94	58	70	4	324	284
43	LKT14	145611	386	94	54	70	8	324	281
50	LKT50	---	516	114	71	83	13	432	382
57	LKT18	145620	516	114	70	83	14	432	375

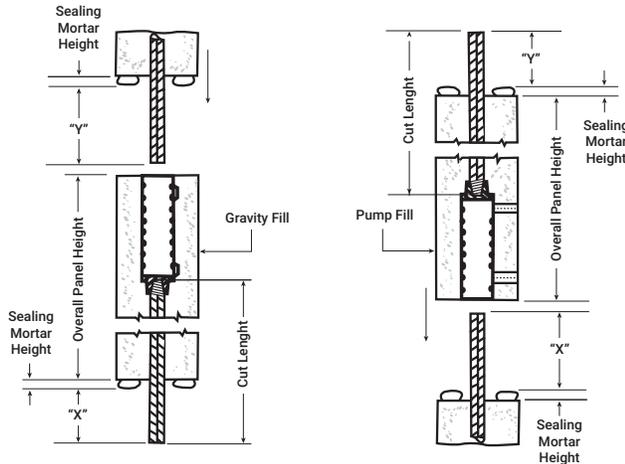
* "X" Min. Type 1 will develop 125% of the specified yield strength of the rebar in tension and compression (125% fy). "X" Min. Type 2 meets Type 1 and will develop the specified tensile strength of the rebar in tension (fu).

** LK16 and LK20 are replacement products for LK5 and LK6 respectively. Each has a smaller diameter allowing for slimmer wall designs.

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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

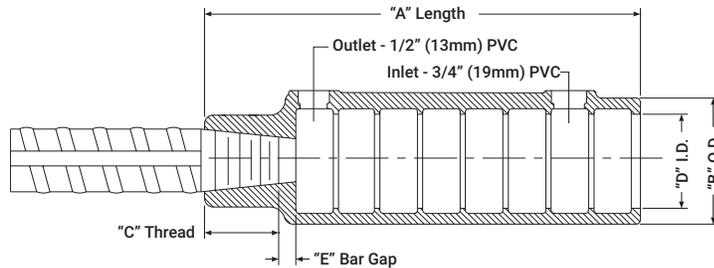
Gravity Condition = [Overall Panel Height - E] + Sealing Mortar Height

Pump Condition = [Overall Panel Height - E - Xmax] + Ymax + Sealing Mortar Height

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 in-lb	Coupler Part No.	Condition	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min. Type 1 & 2*	"Y" Max.	"Y" Min. Type 1 & 2*
#6 to #5+	LK65	Pump	7-13/16"	2-9/16"	7/8"	1-7/8"	13/16"	6-1/8"	5-1/4"	6-1/8"	5-1/4"
#6+ to #5	LK6	Gravity	7-13/16"	2-9/16"	1-1/8"	1-7/8"	9/16"	6-1/8"	5-1/4"	6-1/8"	5-1/4"
#7 to #6+	LK76	Pump	7-13/16"	2-9/16"	1-1/8"	1-7/8"	9/16"	6-1/8"	5-1/4"	6-1/8"	5-1/4"
#7+ to #6	LK7	Gravity	7-13/16"	2-9/16"	1-1/4"	1-7/8"	7/16"	6-1/8"	5-1/4"	6-1/8"	5-1/4"
#8 to #7+	LK87	Pump	8-5/8"	2-11/16"	1-1/4"	2"	3/8"	7"	6"	6-1/8"	5-1/4"
#8+ to #7	LK8	Gravity	8-5/8"	2-11/16"	1-3/8"	2"	1/4"	7"	6"	7"	5-1/4"
#9 to #8+	LK98	Pump	9-3/4"	2-13/16"	1-3/8"	2-1/8"	3/8"	8"	6-7/8"	7"	6"
#9+ to #8	LK9	Gravity	9-3/4"	2-13/16"	1-1/2"	2-1/8"	1/4"	8"	6-7/8"	8"	6"
#10 to #9+	LK109	Pump	10-13/16"	3"	1-1/2"	2-5/16"	5/16"	9"	7-3/4"	8"	6-7/8"
#10+ to #9	LK10	Gravity	10-13/16"	3"	1-9/16"	2-5/16"	1/4"	9"	7-3/4"	9"	6-7/8"
#11 to #10+	LK1110	Pump	11-15/16"	3-1/8"	1-9/16"	2-7/16"	1/2"	9-7/8"	8-1/2"	9"	7-3/4"
#11+ to #10	LK11	Gravity	11-15/16"	3-1/8"	1-11/16"	2-7/16"	3/8"	9-7/8"	8-1/2"	9-7/8"	7-3/4"
#14 to #11+	LK1411	Pump	15-3/16"	3-11/16"	1-11/16"	2-3/4"	3/4"	12-3/4"	11"	12-3/4"	8-1/2"
#14+ to #11	LKT14	Gravity	15-3/16"	3-11/16"	2-1/8"	2-3/4"	5/16"	12-3/4"	11"	12-3/4"	8-1/2"
#18 to #14+	LK1814T	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"	9/16"	17"	14-3/4"	17"	11"

* "X" Min. Type 1 and "Y" Min. Type 1 will develop 125% of the specified yield strength of the rebar in tension and compression (125% fy).

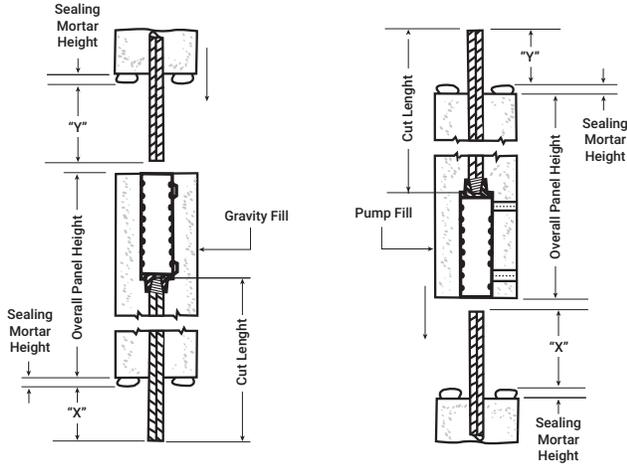
* "X" Min. Type 2 and "Y" Min. Type 2 meet Type 1 and will develop the specified tensile strength of the rebar in tension (fu).

+ Indicates threaded rebar size

Contact nVent LENTON for rebar sizes not listed.

All table dimension in mm

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



To Determine Typical Cut Length of Reinforcing Steel:

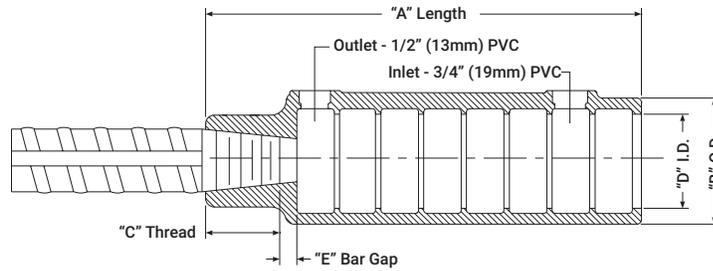
Maximum Cut Length

Gravity Condition = [Overall Panel Height - E] + Sealing Mortar Height

Pump Condition = [Overall Panel Height - E - Xmax] + Ymax + Sealing Mortar Height

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	Coupler Part No.	Coupler Article No.	Condition	"A"	"B"	"C"	"D"	"E" Reference	"X" Max.	"X" Min. Type 1 & 2*	"Y" Max.	"Y" Min. Type 1 & 2*
20 to 16+	LK65	Call nVent LENTON	Pump	199	65	22	48	21	156	134	156	134
20+ to 16	LK6	Call nVent LENTON	Gravity	199	65	29	48	14	156	134	156	134
22 to 20+	LK76	Call nVent LENTON	Pump	199	65	29	48	14	156	134	156	134
22+ to 20	LK7	Call nVent LENTON	Gravity	199	65	32	48	11	156	134	156	134
25 to 22+	LK87	Call nVent LENTON	Pump	219	68	32	51	9	178	153	156	134
25+ to 22	LK8	Call nVent LENTON	Gravity	219	68	35	51	6	178	153	178	134
28 to 25+	LK98	Call nVent LENTON	Pump	248	72	35	54	10	203	175	178	153
28+ to 25	LK9	145595	Gravity	248	72	38	54	7	203	175	203	153
32 to 28+	LK109	Call nVent LENTON	Pump	275	76	38	59	8	229	197	203	175
32+ to 28	LK10	145600	Gravity	275	76	40	59	6	229	197	229	175
36 to 32+	LK1110	Call nVent LENTON	Pump	303	79	40	62	12	251	215	229	197
36+ to 32	LK11	145605	Gravity	303	79	43	62	9	251	215	251	197
40 to 36+	LK1411	Call nVent LENTON	Pump	386	94	43	70	19	324	284	251	215
40+ to 36	LK40	145610	Gravity	386	94	58	70	4	324	284	324	215
43 to 36+	LK1411	Call nVent LENTON	Pump	386	94	43	70	19	324	281	324	215
43+ to 36	LK14	Call nVent LENTON	Gravity	386	94	54	70	8	324	281	324	215
50 to 40+	LK5040	Call nVent LENTON	Pump	516	114	58	83	26	432	382	324	284
50+ to 40	LKT50	145615	Gravity	516	114	71	83	13	432	382	432	284
57 to 43+	LK1814T	Call nVent LENTON	Pump	516	114	54	83	30	432	375	324	281
57+ to 43	LKT18	145620	Gravity	516	114	72	83	14	432	375	432	281

* "X" Min. Type 1 and "Y" Min. Type 1 will develop 125% of the specified yield strength of the rebar in tension and compression (125% fy).

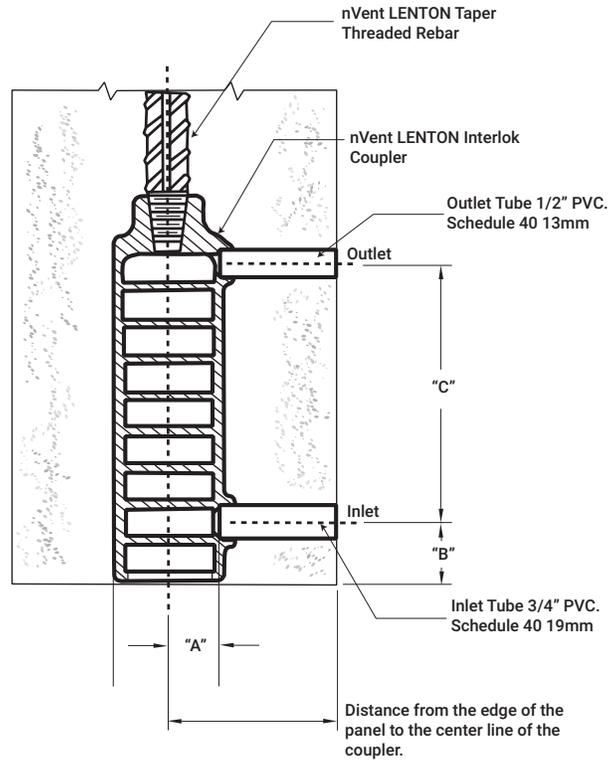
* "X" Min. Type 2 and "Y" Min. Type 2 meet Type 1 and will develop the specified tensile strength of the rebar in tension (fu).

+ Indicates threaded rebar size

Contact nVent LENTON for rebar sizes not listed.

All table dimension in mm

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".

Rebar Size		Canadian	Coupler Part No.	Coupler Article No.	"A"		"B" Length		"C" Length	
in-lb	Metric				inches	mm	inches	mm	inches	mm
#5	16mm	15M	LK16**	---	1-1/16	27	1-15/16	49	4-3/8	111
#5	16mm	15M	LK5	145575	1-3/16"	30	1-7/8"	48	3-15/16"	100
#6	20mm	20M	LK20**	---	1-1/8	29	1-7/8	48	4-13/16	122
#6	20mm	20M	LK6	145580	1-3/16"	30	1-7/8"	48	3-15/16"	100
#7	22mm	---	LK7	145585	1-3/16"	30	1-7/8"	48	3-15/16"	100
#8	25mm	25M	LK25	---	1-1/4	32	1-13/16	46	4-7/8	124
#8	25mm	25M	LK8	145590	1-1/4"	32	1-13/16"	46	4-7/8"	124
#9	28mm	30M	LK9	145595	1-5/16"	33	1-13/16"	46	5-7/8"	149
#10	32mm	---	LK10	145600	1-7/16"	37	1-13/16"	46	6-7/8"	175
#11	36mm	35M	LK36	---	1-1/2	38	1-3/4	44	7-13/16	198
#11	36mm	35M	LK11	145605	1-1/2"	38	1-3/4"	44	7-13/16"	198
---	38mm	---	LK12	---	1-5/8	41	1-15/16	49	10-7/16	265
---	40mm	---	LK40	---	1-5/8"	41	1-15/16"	49	10-7/16"	265
#14	43mm	45M	LKT14	145611	1-5/8"	41	1-15/16"	49	10-7/16"	265
---	50mm	---	LKT50	---	1-15/16"	49	2-5/16"	59	14-1/4"	362
#18	57mm	55M	LKT18	145620	1-15/16"	49	2-5/16"	59	14-1/4"	362

** LK16 and LK20 are replacement products for LK5 and LK6 respectively. Each has a smaller diameter allowing for slimmer wall designs.

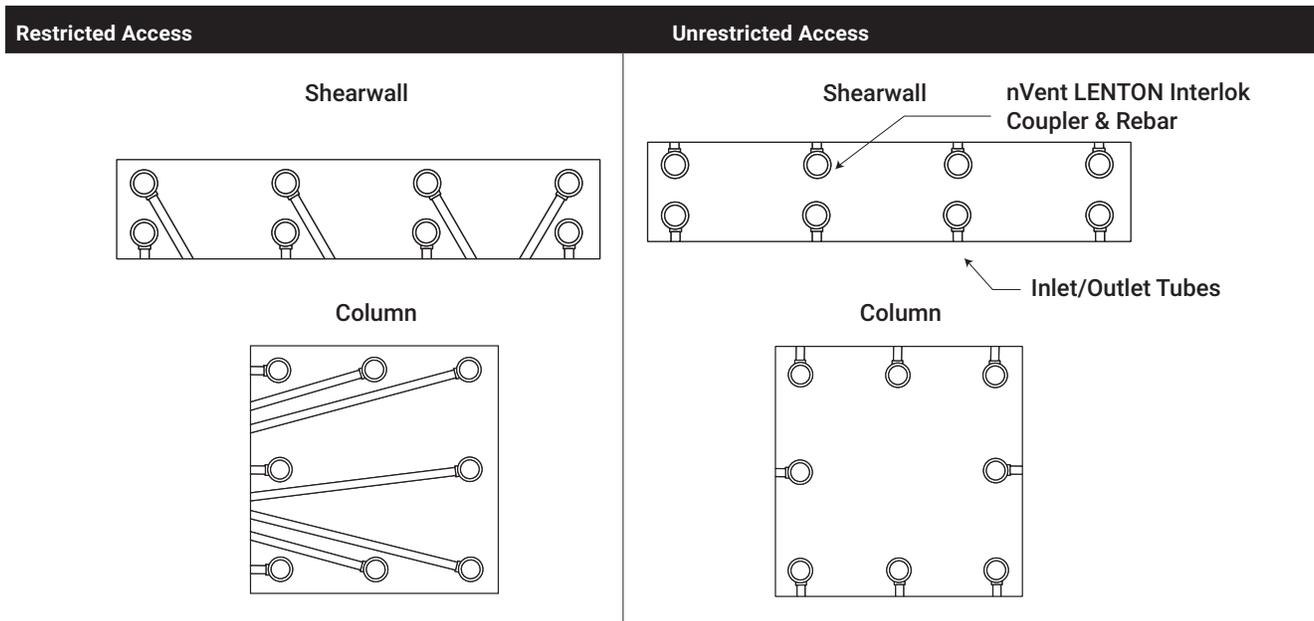
1.5 Locating Inlet/Outlet Tubes for Pump Filling Application

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:



Materials:

Only rigid schedule 40 PVC tubing is recommended for inlet and outlet tubes. nVent LENTON 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.

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:

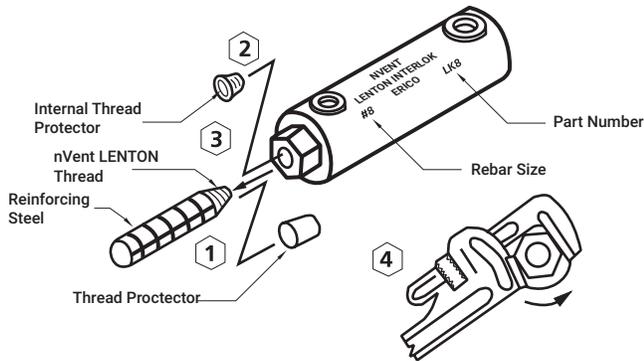
1. Heat the PVC gradually and uniformly with an electric heater specifically manufactured for bending PVC. These are commonly available from electrical supply stores and home hardware centers.
2. Bend the PVC gradually using the maximum possible bend radius.
3. Avoid kinking, collapsing, puncturing or 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 1/2 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).

Rebar Size		Canadian	Coupler Part No.	Coupler Article No.	Inspection Wrench Setting†	
in-lb	Metric				ft-lb	N·m
#5	16mm	15M	LK16**	---	90	120
#5	16mm	15M	LK5	145575	90	120
#6	20mm	20M	LK20**	---	120	180
#6	20mm	20M	LK6	145580	120	180
#7	22mm	---	LK7	145585	160	220
#8	25mm	25M	LK25	---	200	270
#8	25mm	25M	LK8	145590	200	270
#9	28mm	30M	LK9	145595	200	270
#10	32mm	---	LK10	145600	200*	300
#11	36mm	35M	LK36	---	200	270
#11	36mm	35M	LK11	145605	200*	300
	38mm		LK12	---	200	270
	40mm	---	LK40	---	200*	350
#14	43mm	45M	LKT14	145611	200*	350
	50mm	---	LKT50	---	200*	350
#18	57mm	55M	LKT18	145620	200*	350

† Metric and Imperial values are not a direct conversion.

* For Americas only

** LK16 and LK20 are replacement products for LK5 and LK6 respectively. Each has a smaller diameter allowing for slimmer wall designs.

Comment on Tightness:

Proper tightness may be checked by the installer using a nVent 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.

1.6 Coupler Installation Procedures at Precasting Plant

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.

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 sealed with plugs or some suitable method (duct tape).

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 ensure 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 nVent LENTON Interlok coupler, it is important that the following areas be inspected prior to pouring the precast panel.

1. Check to see that the nVent LENTON thread is properly installed and tight. Refer to page 12 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, and comply to the required lengths defined in this instruction manual.

E. Pour Concrete Into Form:

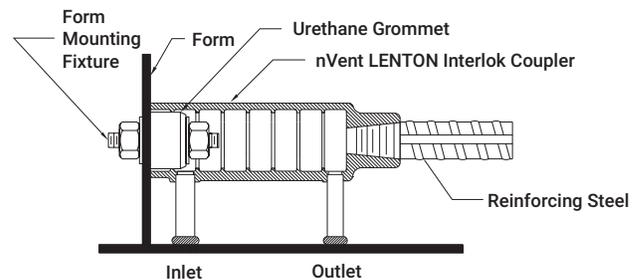
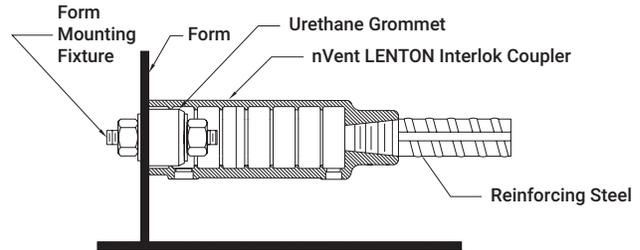
After all other requirements of the Placing Drawings are complete, concrete can be poured.

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 during storage and transport of the panel, insert a plastic dust cover into the open mouth of the coupler.



JOB SITE GROUTING

2.1 Quantity of nVent LENTON Interlok Splices per Bag of HY15LM

HY15LM is provided in 50 lb (22.7 kg) bags

Rebar Size			Coupler Part No.	Coupler Article No.	Theoretical Volume of Grout Required to Fill Coupler		Estimated Number of Splices per 50 lb. (22.7 Kg) Bag
in-lb	Metric	Canadian			Quarts	Liters	
#5	16mm	15M	LK16**	---	1/3	0.30	26
#5	16mm	15M	LK5	145575	1/3	0.33	24
#6	20mm	20M	LK20**	---	1/3	0.30	26
#6	20mm	20M	LK6	145580	1/3	0.31	25
#7	22mm	---	LK7	145585	1/3	0.30	26
#8	25mm	25M	LK25	---	3/8	0.37	21
#8	25mm	25M	LK8	145590	3/8	0.37	21
#9	28mm	30M	LK9	145595	1/2	0.45	17
#10	32mm	---	LK10	145600	5/8	0.57	13.5
#11	36mm	35M	LK36	---	3/4	0.67	11.5
#11	36mm	35M	LK11	145605	3/4	0.67	11.5
	38mm		LK12	---	1 3/8	1.25	6.5
---	40mm	---	LK40	---	1-1/4	1.13	7
#14	43mm	45M	LKT14	145611	1-1/8	1.07	7
---	50mm	---	LKT50	---	2	1.93	4
#18	57mm	55M	LKT18	145620	1-3/4	1.66	4.5

** LK16 and LK20 are replacement products for LK5 and LK6 respectively. Each has a smaller diameter allowing for slimmer wall designs.

The values given in the above table are estimates only, assuming maximum rebar embedment in the coupler. 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% to account for scrap or wasted material.

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 HY15LM Mixing Instructions

1 Preparation:

1.1 Materials and Equipment Needed for Proper Use and Installation:

To permit rapid and continuous work with the HY15LM 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
- nVent LENTON Interlok Slump Flow Template
- Power mixer (electric) 500 RPM min.
- Paddle/propeller mixing blade
- Mixing bucket
- 4 & 100 oz. (0.1 & 3 L) measuring containers
- Trowel
- Thermometer (hot/cold weather)
- Commercial/hand grout pump
- Plastic plugs for inlet/outlet tubes
- 2" (50mm) cube test molds

1.2 Preparation for grout:

Before working with HY15LM grout, remove all debris, oil, dirt, and moisture from the areas and sleeves to be filled with grout. Make sure all panels and forms are securely anchored to prevent movement during pouring and curing.

To help ensure a quality structural connection, it is important to provide a routine quality control process during the mixing and installation of the grout. Refer to the relevant sections of this instruction manual or contact nVent LENTON. Observe all warnings and cautions noted.

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

1.3 Grout temperatures:

The standard working temperature range for the installation of the nVent LENTON Interlok sleeve, reinforcing bar, and HY15LM is 32° F to 100° F (0° C to 38° C). However, it can be used in an extended temperature range of 20° F – 122° F (-7° C – 50° C) with special considerations and nVent LENTON additives. For more information refer to Hot and Cold Weather Instructions.

2.2 HY15LM Mixing Instructions

When grouting below 50°F (10°C), nVent LENTON recommends following ACI Cold Weather instructions. This involves heating the panels after grouting to 50°F (10°C) to allow the grout to cure and gain strength.

!!CAUTION!!

When grouting in cold weather, precautions MUST be taken to keep the HY15LM 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 Standard Mixing Instructions, 32°F to 100°F (0°C to 38°C):

- 2.1 Measure out 91.3 oz (2.7 L) of potable water for one 50 lb (22.7 kg) bag of dry grout (this is equivalent to 12% water by weight). Do not use less than 11% (84.5 oz or 2.5 L) or more than 13% (99.8 oz or 2.95 L) water by weight with one bag of HY15LM. When grouting below 50°F (10°C), water must be at least at 70°F (21°C).
- 2.2 Place the correct water amount in the mixing bucket.
- 2.3 With the mixer energized and spinning, carefully add HY15LM grout to the water in the bucket (avoid splashing) until the full 50 lb bag (22.7 kg) is empty.
- 2.4 After mixing for approximately one minute, stop the mixer and scrape dry grout from the sides and bottom of the bucket, repeat as needed.
- 2.5 Continue mixing until a homogeneous mix is obtained (total time of approximately 3 minutes).
- 2.6 Determine pumpability by performing the slump flow test as described later in these instructions. Properly mixed HY15LM will have a spread of 7" (180 mm) to 12" (305 mm) which will allow approximately 40 minutes of pumping at 100°F (38°C) and 50 minutes at 70°F (21°C). To obtain special nVent LENTON additives for additional working time, contact nVent LENTON customer service.
- 2.7 Once the mix is homogeneous with the proper flow, it is ready for filling the nVent LENTON Interlok sleeves by pump or gravity fill.
- 2.8 For sustaining the flowability of the grout while filling the sleeves, mix the remaining grout in the bucket by running the mixer for 20 seconds every five to seven minutes.

3 Measuring Slump Flow with the nVent LENTON Interlok Template Kit (LK430):

One nVent LENTON Interlok Slump Flow Template kit is provided with each initial order of HY15LM grout. If additional kits are required, they can be purchased from nVent LENTON. The nVent LENTON Slump Flow Template is a modified slump test used to determine the fluidity of HY15LM grout. The slump flow test consists of a 2" (51 mm) diameter by 4" (102 mm) tall cylinder and a calibrated template. This test is to be completed within 2 minutes after completion of a batch mix and without interruption. The intent of this test is to determine the pumpability of the grout.

3.1 To use the nVent LENTON Interlok Slump Flow Template Kit:

Both the template and cylinder should be clean and dry prior to use.

- 3.1.1 Place the template on a flat level surface with the 4" (102 mm) long cylinder standing upright in the center of the circle.
- 3.1.2 Fill the cylinder to the top with HY15LM grout. Slowly raise the cylinder vertically, allowing the grout to flow on to the center of the template.

- 3.1.3 To determine the slump flow of the grout, note the flow diameter (spread) over the template. Read and/or measure the spread at several places, preferably 90° from each other. Average the readings to determine actual fluidity of grout.

It is recommended that a slump flow test be performed on every bag until one becomes familiar with the proper consistency of the HY15LM grout. Typical HY15LM flow will be between 7"-12" (180-305mm).

!!MIXING CAUTION!!

DO NOT USE MORE THAN 13% WATER by weight (99.8 ounces or 2.9L per 50 lb. (22.7 kg) bag).

If any of the conditions listed below occur while using the HY15LM grout, the batch must be discarded and a fresh batch must be made.

1. Under no conditions should HY15LM grout be retempered by adding additional water once initial set (stiffen) has started.
2. Do not add cement, sand, additives or admixtures to the HY15LM grout other than the nVent LENTON grout additives for extreme temperatures.
3. No hand mixing is permitted. A proper sized power mixer must be used to mix the HY15LM grout.

Contact nVent LENTON for a list of recommended power mixers and accessories.

nVent LENTON Interlok Warranty and Conditions: Contact nVent LENTON for specific terms of the warranty.

Shelf Life and Storage:

HY15LM grout has a shelf life of 12 months from the date of manufacture as noted on each bag. The grout is to be stored in a cool, dry indoor environment to ensure shelf life and physical properties. Product that is damaged, exposed to wet conditions, or with a manufacturing date exceeding 12 months should be discarded. The manufacturing date can be referenced on each bag of HY15LM grout.

2.3 Hot and Cold Weather Grouting Instructions

The HY15LM grout is designed to be used with the nVent LENTON Interlok rebar splicing system. Unauthorized use of other grouts will void all warranties, whether expressed or implied.

The standard working temperature range for the installation of the nVent LENTON Interlok sleeve, reinforcing bar, and HY15LM is 32°F to 100°F (0°C to 38°C). However, it can be used in an extended temperature range of 20°F – 122°F (-7°C – 50°C) with special considerations and nVent LENTON additives.

When grouting below 50°F (10°C), nVent LENTON recommends following ACI Cold Weather instructions. This involves heating the panels after grouting to 50°F (10°C) to allow the grout to cure and gain strength.

4 Hot Weather Grouting, Grout and Ambient Temperature of 100°F to 122°F (38°C to 50°C):

- 4.1 Measure the desired amount of water and place it in the mixing bucket, as indicated in the Standard Mixing Instructions - Section 2 of these HY15LM mixing instructions. Water must not be warmer than 70°F.
- 4.2 Add the HY15LM Hot Weather additive to the bucket right before adding the grout dry powder to the mix - Part No. HYA15HT. If more than 2 minutes lapse between the addition of the additive and the grout, the batch of grout should be discarded as it will delay setting and curing more than designed.
- 4.3 Follow steps 2.3 through 2.8 on the Standard Mixing Instructions Section. Mixing time might need to be increased by approximately an extra minute due to the addition of this additive.

By using the HY15LM Hot Weather additive, HY15LM will have approximately 60 minutes of working time at 122°F and 90 minutes at 100°F.

!!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.

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

5 Cold Weather Grouting, Grout and Ambient Temperature of 20°F to 50°F (-7°C to 10°C):

- 5.1 Follow the nVent LENTON HY15LM Grout Standard Mixing Instructions on the grout bag, IP8411, or on this User's Manual, with the only difference of adding HYA15CT to the grout mix after 2 minutes of mixing the bag of grout.

Mixing time will be increased by 1 minute for a total mixing time of approximately 4 minutes.

By using the HY15LM Cold Weather additive, HY15LM does not need to be heated, however, ACI 306 Cold Weather practices must be followed for the precast members. This generally includes to heat (for example, with space heaters) the nVent LENTON Interlok coupler, the rebar, the panel, and the areas to be grouted until the panels have reached a uniform temperature of above 50°F (10°C) through the thickness (usually about 12-24 hours).

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

!!CAUTION!!

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

!!CAUTION!!

Grout should never be placed into frozen concrete or nVent LENTON Interlok couplers.

!!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 nVent LENTON Interlok connections, the test results can be misleading.

2.4 Working Time at Temperature

Working Time at Temperature:

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

To determine the approximate working time of the mixed HY15LM grout at the temperature of interest, follow these instructions.

1. On Figure 1 below, 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.

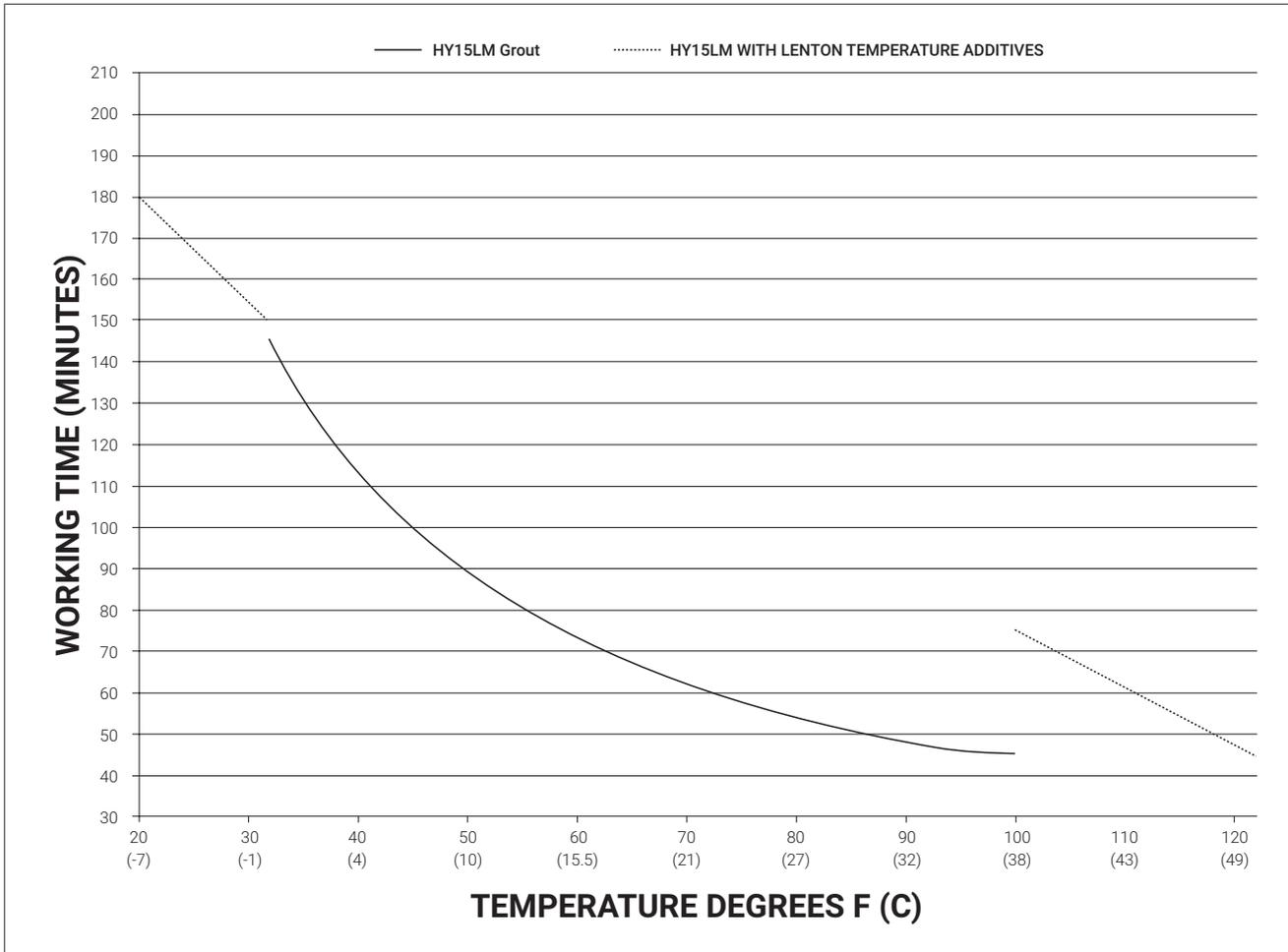


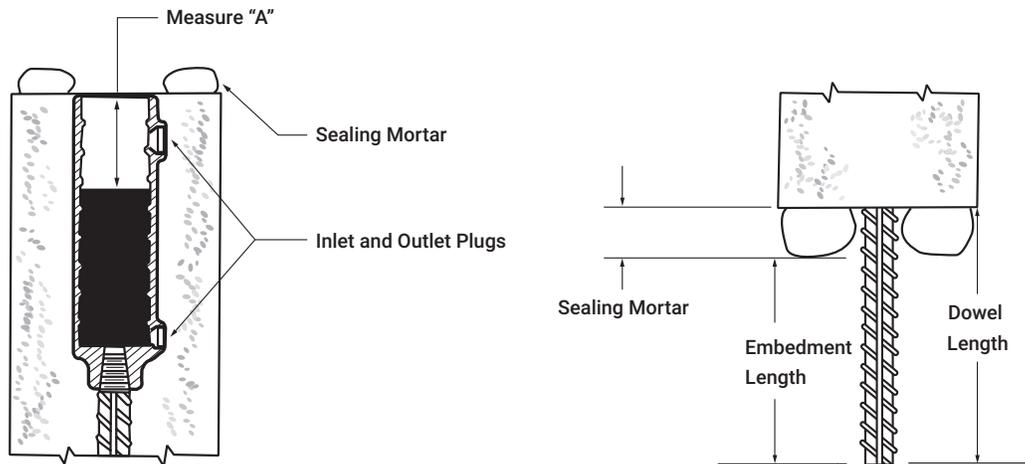
FIGURE 1: HY15LM - Approximate Working Time vs. Temperature

NOTE: This information is provided for reference only using water at 70F (21C). Actual working times will vary. Contact nVent LENTON when further information is required.

2.5 Gravity Fill Installation Instructions For HY15LM Grout

The HY15LM grout is designed to be used with the nVent 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:



Rebar Size			Coupler Part No.	Coupler Article No.	Maximum Distance from Top of Coupler "A"		Embedment Length			
in-lb	Metric	Canadian			Inches	mm	Maximum Inches	mm	Minimum Inches	mm
#5	16mm	15M	LK16**	-	3/4"	10	6-5/8"	168	5-1/4"	134
#5	16mm	15M	LK5	145575	3/4"	19	6-1/8"	156	5-1/4"	134
#6	20mm	20M	LK20**	-	3/4"	10	7"	178	5-1/4"	134
#6	20mm	20M	LK6	145580	3/4"	19	6-1/8"	156	5-1/4"	134
#7	22mm	---	LK7	145585	1"	25	6-1/8"	156	5-1/4"	134
#8	25mm	25M	LK8	145590	1-3/8"	35	7"	178	6"	153
#9	28mm	30M	LK9	145595	1-5/8"	41	8"	203	6-7/8"	175
#10	32mm	---	LK10	145600	1-3/4"	44	9"	229	7-3/4"	197
#11	36mm	35M	LK11	145605	2"	51	9-7/8"	251	8-1/2"	215
---	40mm	---	LK40	145610	3-3/8"	86	12-3/4"	324	11-3/16"	284
#14	43mm	45M	LKT14	145611	3-3/8"	86	12-3/4"	324	11"	281
---	50mm	---	LKT50	145615	6-3/4"	171	17"	432	15"	382
#18	57mm	55M	LKT18	145620	6-3/4"	171	17"	432	14-3/4"	375

**LK16 and LK20 are replacement products for LK5 and LK6 respectively. Each has a smaller diameter allowing slimmer wall designs.

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 6-9 of this manual for correct embedment and dowel lengths.
3. Before beginning work with HY15LM, 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 HY15LM, 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 HY15LM 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, nVent LENTON 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.

2.5 Gravity Fill Installation Instructions For HY15LM Grout

6. Mix the HY15LM according to the mixing directions on the bag. Use only full bags of HY15LM for each batch made.
7. Grout may be placed by hand or a grout pump may be used to place the HY15LM. Contact nVent LENTON 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 HY15LM 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 overflow 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. 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 HY15LM leaks out onto the surface of the precast panel remove it with flushing water.

10. 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 HY15LM 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 HY15LM be checked under job site curing conditions according to the procedures outlined in ASTM C-109 before proceeding with upper story erection.
11. 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 nVent LENTON Interlok bag before mixing or doing any work with the HY15LM. 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 HY15LM to keep on hand to avoid this situation.
3. If grouting is interrupted, keep recirculating the HY15LM by operating the pump with the nozzle in the hopper. This movement of the HY15LM will aid in keeping it fluid. If the shut down exceeds the limits of time specified in this manual noted in Figure 1 of Working Time at Temperature, the grout will not be pumpable and will need to 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 HY15LM to gain the required strength.
6. Immediately after filling the Interlok sleeves, verify that grout has not leaked from the couplers. Refer to the Trouble Shooting Guide located in this manual for additional guidelines.

2.6 Pump Fill Installation Instructions For HY15LM Grout (Vertical, Horizontal and Inclined Application as Shown in Figure 1)

The HY15LM grout is designed to be used with the nVent 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 ensure 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 HY15LM, 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 6-9 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 HY15LM, 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 in this document or on the HY15LM bag for tools and materials needed for proper pump fill installation

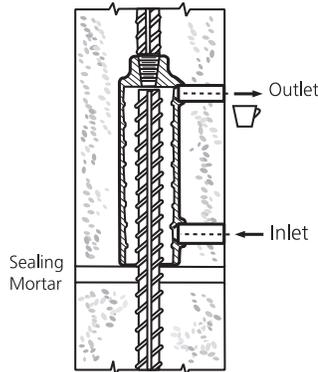


FIGURE 1: Pump Fill Installation

5. A hand-operated or pneumatic grout pump may be used to place the HY15LM. Contact nVent LENTON 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 HY15LM according to the mixing directions on the bag. Use only full bags of HY15LM for each batch made. DO NOT MIX grout in the pump hopper.
8. Pour the mixed HY15LM 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 HY15LM is flowing from the nozzle, insert the nozzle into the inlet tube at the lower end of the coupler, as shown above.
10. Pump the HY15LM 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 HY15LM.
11. Once the HY15LM 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 HY15LM from the coupler. DO NOT REMOVE THE STOPPERS until after the HY15LM has reached final set (usually 8 hours at 70°F-21°C to harden). Premature removal of the stoppers may allow some of the HY15LM 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 HY15LM has leaked out of the joint, remove it immediately with flushing water. Check that no HY15LM 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.

12. Once the HY15LM has set (usually after 8 hours), 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.
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 HY15LM has reached a compressive strength of at least 3,000 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 HY15LM 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:

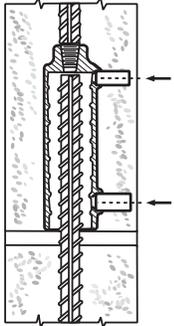
1. For Horizontal Pump Fill application, make sure coupler is sealed sufficiently before pumping the grout into it.
2. Make sure that the rebar is inserted completely into the coupler for the application.
3. Make sure that the coupler is completely filled with grout and that a smooth continuous stream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

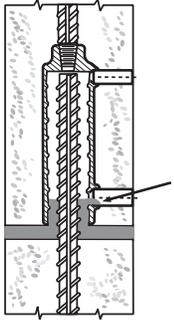
2.7 Grouting Troubleshooting Guide

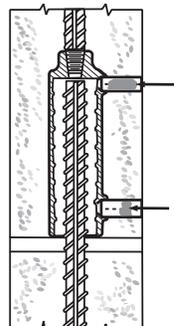
I. Recommended Equipment:

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

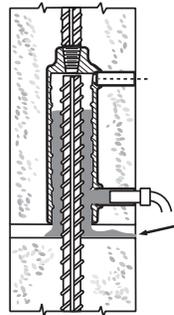
The above equipment should be on-hand and available during grouting.

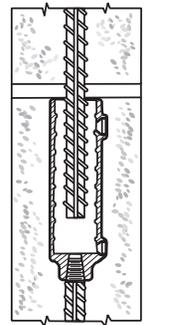
TROUBLE	SOLUTION
 <p>1. Inlet/outlet tubes do not reach the surface.</p>	<ol style="list-style-type: none"> 1. Check and mark the position of the inlet/ outlet tubes according to the drawings 2. Chip down the marked positions to the embedded tubes. Remove all debris. 3. Blow out the tubes with compressed air and confirm a clear passage from the inlet to outlet tubes. 4. To aid in confirming a clear passage, shine a light into the inlet and outlet tubes.

 <p>2. Due to omissions of sealing disc, inlet tube is blocked with sealing mortar from the joint</p>	<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 coupler. If not, contact the Structural Engineer.
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TROUBLE	SOLUTION
 <p>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>	<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.
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 <p>4. Leakage during pumping of HY15LM grout from the joint due to incomplete sealing.</p>	<ol style="list-style-type: none"> 1. Seal the joint with rags, polyurethane, etc. 2. Start regrouting.
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 <p>5. Panel won't seat to proper embedment length.</p>	<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.
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2.8 HY15LM Grout Product Specification

HY15LM grout is a proprietary, nonmetallic, high-strength, mix designed exclusively for use in the nVent LENTON Interlok rebar splicing system. Unauthorized use of other grouts will void all warranties, whether expressed or implied.

Product Description:

HY15LM is a pre-mixed, nonshrink, nonmetallic, high-strength grout. HY15LM is a high-early strength grout that offers an extended working range and can be placed at temperatures ranging from 20°F to 122°F (-7°C to 50°C) when installed in accordance with nVent LENTON guidelines. Due to the excellent fluidity of HY15LM, it offers the additional advantage of being pumped with a commercially available grout pump into the nVent LENTON Interlok coupler.

Technical Data:

For grout performance data, please contact your regional nVent LENTON office. HY15LM grout is capable of developing in excess of 3,500 psi (24.1 MPa) compressive strength after 24 hours and 16,000 psi (110.3 MPa) compressive strength in 28 days. Depending on the ambient temperature and other job site conditions, variations in compressive strength may be encountered. The technical data is based on controlled laboratory tests. All test specimens should be made according to nVent LENTON guidelines.

Test samples are 2" (50mm) cube specimens cured at 72F (22°C) and tested in accordance with ASTM C109.

Placing Consistency:

HY15LM, when mixed with approximately 11-13% water by weight of HY15LM dry material, will flow to a diameter of 7 to 12 inches (180 - 305 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% water by weight (99.8 oz or 2.9L per 50 lb. (22.7 kg) bag).

A flow reading of below 7" (180 mm) will reduce the amount of pumping time, which may increase the difficulty of the pumping operation and may result in insufficient filling of the coupler. This may result in inadequate connection strength. A flow reading greater than 12" (305 mm) could cause leakage of the grout through the sealing disks and therefore improper filling. A mechanical mixer must be used to mix the HY15LM. Contact nVent LENTON for a list of suitable mixers and accessories.

Setting Time:

HY15LM mixed to the placing consistency and tested in accordance with ASTM C191, will have a time of initial setting of about 1-1/2 hours at 68°F (20°C), (working time of 1 hour).

Packaging:

HY15LM is packaged in 50 lb (22.7 kg) multiply moisture-resistant bags for optimum performance and shelf life. The HY15LM has a shelf life of 12 months, when stored in accordance with nVent LENTON guidelines. HY15LM expiration date is printed on the bag. Do not use grout that is beyond the expiration date.

Temperature Guidelines:

HY15LM can be mixed and pumped in temperatures ranging from 20°F to 122°F (-7°C to 50°C) when installed in accordance with nVent LENTON guidelines

Refer to HY15LM Mixing Instructions and Hot and Cold Weather Installation Instructions located in this manual for complete guidelines.



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