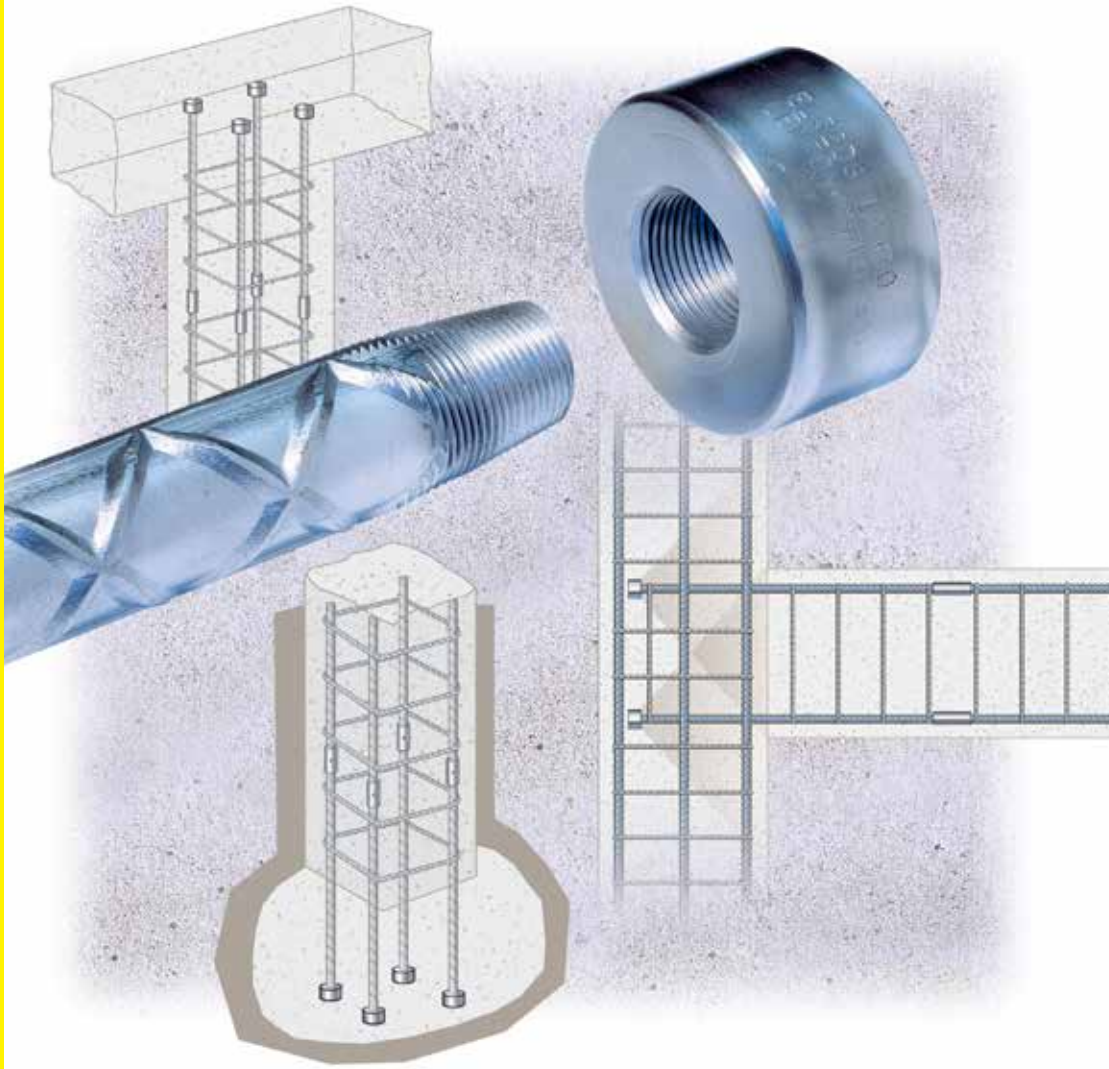
PENTAIR

LENTON TERMINATOR

FOR REBAR ANCHORAGE

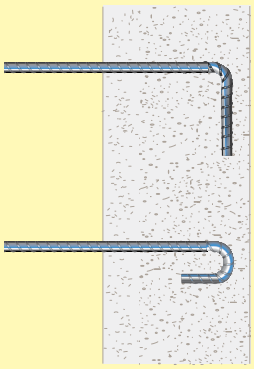


LENTON

Hooked Rebar Anchorage vs. LENTON TERMINATOR

For many years, the traditional method of connecting roof/column and beam/column connections has been with hooked rebar anchorage. But as many structural engineers, architects and specifiers have discovered, this method of anchorage has very few advantages. Explore the reasons why you should consider the LENTON TERMINATOR – your efficient alternative for hooked rebar anchorage.

Which system is more reliable and economical?



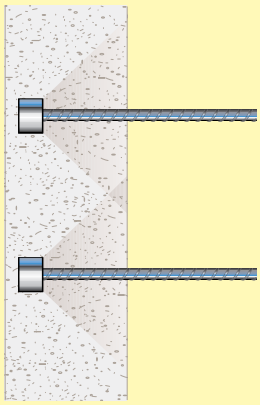
Hooked Rebar Anchorage

- Requires longer development lengths
  - Increases rebar congestion
  - Restricts flow of larger aggregates
- Hidden costs
  - The larger the bar, the longer the lap
- Inhibits rebar placement
  - Increases rebar placing costs
- Jeopardizes job site safety
  - Increases safety hazards through exposed rebar
- Restricts removal of column forms and shaft casings
  - Labor intensive

VS.

LENTON TERMINATOR

- Eliminates rebar hook
  - Simplifies bar placement
- Minimizes development lengths
  - Reduces congestion
- Simplifies concrete placement
  - Better concrete consolidation
- More embedment options
  - Greater design flexibility
- Faster installation
  - Lowers in-place cost
- Standard product dimensions
  - Minimal detailing required
- Allows for future extensions
  - Simplifies expansion



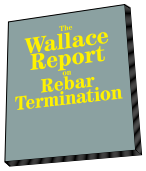
How LENTON TERMINATOR Works

The LENTON TERMINATOR design builds on the extensive testing conducted for headed anchors. Most recently the American Concrete Institute (ACI®) published Building Code Requirements (318-08) defining the development of headed and mechanically anchored deformed bars in tension (Section 12.6). Additionally, the International Building Code (IBC®) references ACI 318. LENTON TERMINATOR effectively reduces the length of reinforcing bar required, thus minimizing congestion. For example, to develop the specified yield strength in a #8 (25 mm) rebar:

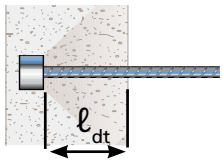
LENTON TERMINATOR Embedment*	15″ (381 mm)
Hooked Rebar Embedment	19″ (483 mm)

20% reduction in development length.
44% less rebar congestion in the anchorage zone plus related labor savings.

* Example for anchors meeting conditions in ACI 318-08 Section 12.6.
ASTM® A615 Grade 60 Reinforcing Steel: Minimum fy=60 ksi, fuk=90 ksi
Normal Weight Concrete = f′c = 4,000 psi



Ask your Pentair representative or contact Pentair for a copy of The Wallace Report – the paper on the full scale test for LENTON TERMINATOR.



Tension Development Lengths for Headed Reinforcing Uncoated Bars (ACI)

Bar Size ASTM	f′c = 3,000 psi	f′c = 4,000 psi	f′c = 5,000 psi	f′c = 6,000 psi
#4	9	8	7	6
#5	11	10	9	8
#6	13	12	10	10
#7	16	14	12	11
#8	18	15	14	13
#9	20	17	16	14
#10	23	20	18	16
#11	25	22	19	18

1 inch = 24 milimeters

Notes:

1. Tabulated values are based on a minimum yield strength of 60,000 psi [420MPa]. Lengths are in inches.
2. Tension development lengths of headed bars are calculated per ACI 318-08, Section 12.6.
3. Tabulated values have been rounded up to nearest whole number.

Faster Rebar Placement & Reduced Rebar Congestion

Why LENTON TERMINATOR?

Recent code changes have significantly increased the amount of rebar required, while at the same time, designers are striving for more compact structural elements. This results in rebar congestion and placement problems. The LENTON TERMINATOR answers these challenges by eliminating the majority of rebar embedment lengths required, while reducing job-site related man-hours.

LENTON TERMINATOR is designed for use in concrete with ASTM® A615 Grade 60/75 or A706, ENV10080, BS4449, AS3102, and other international grades of rebar in sizes #4 (12 mm) through #18 (57 mm). The LENTON TERMINATOR requires no special training, minimizes detailing and is ideal for all types of concrete construction projects. The system is supplied through a network of local rebar fabricators utilizing standard LENTON threading equipment.

LENTON TERMINATOR is designed to meet the requirements of ACI® 318 as an alternate to hooked rebar anchorage.

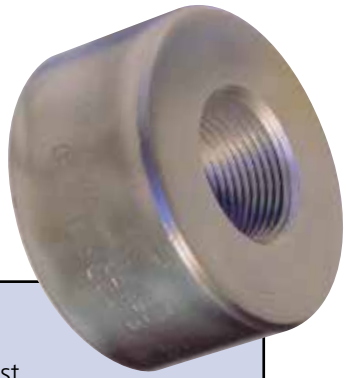
ACI 318 Section 12.6.4 states: "Any mechanical attachment or device capable of developing f_y of reinforcement is allowed, provided that test results showing the adequacy of such attachment or device are approved by the building official."

Simplified Rebar Placement

The LENTON TERMINATOR is an oversized coupling secured to the end of a length of reinforcing steel, creating anchorage within the concrete. This approach greatly simplifies rebar placement and reduces congestion. The LENTON TERMINATOR incorporates the time-tested and field-proven LENTON tapered thread (See below). The LENTON TERMINATOR exceeds Type 2 requirements.

Simplified Future Expansion

There are instances when the design of a structure will involve an expansion sometime in the future. What once was the roof becomes the floor of the added story. The LENTON TERMINATOR A2D6 rebar anchor/splice allows for the addition of new rebar without increasing the size of the component embedded in the concrete.



LENTON Taper Threads

LENTON mechanical rebar couplers are the most widely used system in the world. LENTON couplers and LENTON TERMINATORS for ASTM A615 grade 60 and A706 rebar are ICC® recognized (#3967) and meet or exceed the ACI 318, UBC® and IBC® full tension splices requirement for Type 1 and Type 2 splices. The unique taper threads provide a self aligning, positive lock system that is quickly engaged with only 4-1/2 turns. LENTON also meets the requirements of all European codes such as BS8110, DIN 1045 and Eurocode 2.

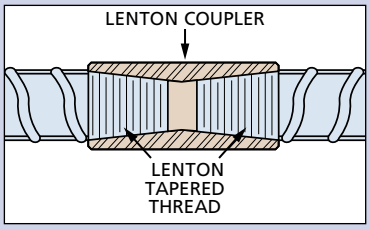


Table of Contents

Recognized product approvals:
Austria: MA35 MA35B/B 558/99
Czechia: TZUS č 01-329
France: AFCAB M97 / 001
Germany: Z-1.5-200
Hong Kong: Hong Kong Building Dept.
Hungary: EMI A-2165-2002
The Netherlands: Komo K7045
Poland: ITB AT-15-4314
Slovakia: TSUS SK04-ZSV-1008, TO-07/0080
United States: ICC-ES ER 3967 IAPMO® ES-0188

Project References

From simple commercial buildings to complex structures, the LENTON TERMINATOR system is used in a wide variety of projects.

Project List:

301 Mission - High Rise Tower
San Francisco, CA USA

Bareg Tunnel
Baden, Switzerland

BWI Airport
Baltimore, MD USA

Charlotte Motor Speedway
Charlotte, NC USA

Cleveland NFL Stadium
Cleveland, OH USA

Cooper River Bridge
Charleston, SC USA

Daimler Chrysler
Stutgartt, Germany

Disney Parking Garage
Anaheim, CA USA

Galena Creek
Reno, NV USA

Golden Ears Bridge
Vancouver, BC CANADA

Hanford Nuclear Canister Storage Building
Hanford, WA USA

Heathrow Airport Airside Road Tunnel
London, UK

Highway 280
San Francisco, CA USA

HQ2, Canary Wharf
London, UK

Jack Murphy Stadium
San Diego, CA USA

Kaufhaus Sparmarkt
Isenherts, Austria

Las Vegas Monorail
Las Vegas, NV USA

Malampaya Off Shore Oil Platform
Phillippines

Microsoft Campus - Augusta Building
Redmond, WA USA

MTA - Pasadena Blue Line - Metro Station
Pasadena, CA USA

Museum of Natural Science
Raleigh, NC USA

Ohio Stadium - Ohio State University
Columbus, OH USA

Pac Bell Stadium
San Francisco, CA USA

Petronas Towers
Kuala Lumpur, Malaysia

San Francisco Int'l Airport
San Francisco, CA USA

Stratosphere Tower
Las Vegas, NV USA

Tacoma Narrows Bridge
Tacoma, WA USA

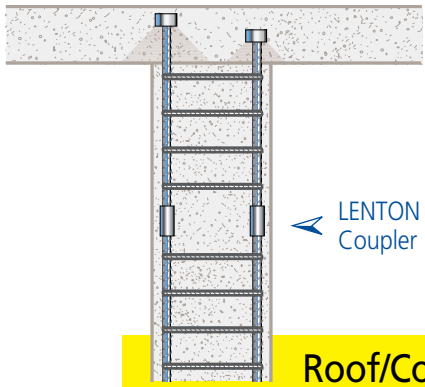
Trump Tower
Chicago, IL USA

VEK Verglasungseinrichtung
Karlsruhe, Germany

Vincent Thomas Bridge
Long Beach, CA USA

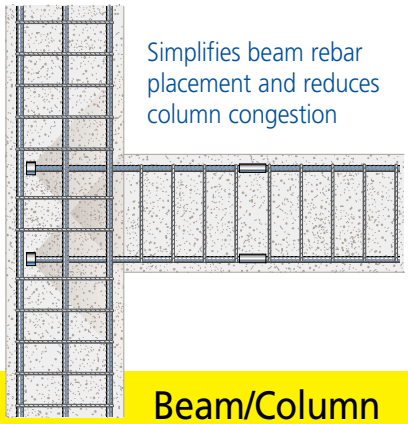
Williamsburg Bridge
New York, NY USA

Application Specific Benefits



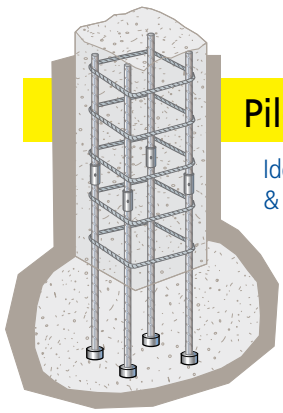
LENTON A-Type Coupler

Roof/Column



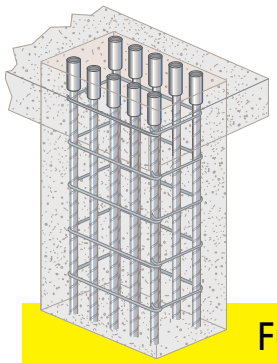
Simplifies beam rebar placement and reduces column congestion

Beam/Column



Piles/Caissons

Ideal for piles & caissons



Future Extension

LENTON TERMINATOR A2D6 can also be used for future extensions in both beam/column and roof/column connections.

The LENTON TERMINATOR provides an alternative to hooked rebar, anchor or stop nut for rebar passing though a pile plank or structural steel element. The front face of the coupler is designed to carry the full tension load of the rebar when the anchor is bearing against concrete or structural steel.

LENTON TERMINATOR – D6 & D16

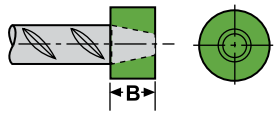
LENTON TERMINATOR – D6

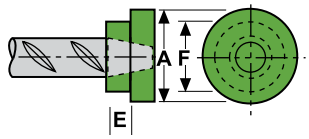
Inch lb	Rebar Size Designation			Part No.	"A"		"B"		"E"		"F"		Weight	
	Metric	Canadian	Soft Metric		in	mm	in	mm	in	mm	in	mm	lb	kg
4	12 mm	10M	13	EL12D6	1-3/8	35	9/16	14	–	–	–	–	0.2	0.09
5	16 mm	15M	16	EL16D6	1-1/2	38	7/8	22	–	–	–	–	0.4	0.18
6	20 mm	20M	19	EL20D6	1-7/8	48	1-1/8	29	–	–	–	–	0.8	0.36
7	22 mm	–	22	EL22D6	2	51	1-1/4	32	–	–	–	–	1.0	0.45
8	25 mm	25M	25	EL25D6	2-1/4	57	1-3/8	35	–	–	–	–	1.3	0.59
9	28 mm	30M	29	EL28D6	2-3/4	70	1-1/2	38	–	–	–	–	2.2	1.00
10	32 mm	–	32	EL32D6	3	76	1-9/16	40	–	–	–	–	2.7	1.22
11	36 mm	35M	36	EL36D6	3-1/4	83	1-11/16	43	–	–	–	–	3.4	1.54
–	40 mm	–	–	EL40D6	3-3/4	95	2-1/2	64	1	25	3	76	5.5	2.49
14	43 mm	45M	43	EL43TD6	4	102	2-1/8	54	1	25	3	76	4.9	2.22
–	50 mm	–	–	EL50TD6	4-1/2	114	2-9/16	65	1	25	3	76	7.1	3.22
18	57 mm	55M	57	EL57TD6	5-1/8	130	2-3/4	70	1	25	3	76	9.8	4.45

NOTE: Thread does not need to be flush with end of LENTON TERMINATOR.
Thread may be +/- 2 threads from backside of coupler.
Diameter exceeds 5x bar area requirements of ICC®-ES AC 347 & ACI®.

A = large diameter
B = length of coupler body
D = bar engagement
E = length of small step
F = small diameter

Meets BS8110, UBC®, DIN1045, IBC, AS3600, ASTM® A970 and ACI318





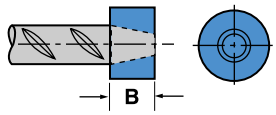
LENTON TERMINATOR – D16

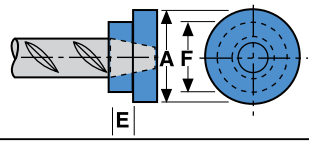
Inch lb	Rebar Size Designation			Part No.	"A"		"B"		"E"		"F"		Weight	
	Metric	Canadian	Soft Metric		in	mm	in	mm	in	mm	in	mm	lb	kg
4	12 mm	10M	13	EL12D16	1-3/8	28	3/4	19	–	–	–	–	0.3	0.13
5	16 mm	15M	16	EL16D16	1-1/2	36	15/16	24	–	–	–	–	0.4	0.16
6	20 mm	20M	19	EL20D16	1-7/8	45	1-3/8	35	–	–	–	–	0.9	0.41
7	22 mm	–	22	EL22D16	2	50	1-7/16	38	–	–	–	–	1.1	0.50
8	25 mm	25M	25	EL25D16	2-1/4	60	1-9/16	40	–	–	–	–	1.5	0.68
9	28 mm	30M	29	EL28D16	2-3/4	65	1-5/8	42	–	–	–	–	2.4	1.10
10	32 mm	–	32	EL32D16	3	75	1-3/4	46	–	–	–	–	3.1	1.39
11	36 mm	35M	36	EL36D16	3-1/4	85	2-1/16	52	–	–	–	–	3.7	1.84
–	40 mm	–	–	EL40D16	3-3/4	90	2-1/4	58	–	–	–	–	5.1	2.22
14	43 mm	45M	43	EL43TD16	4	100	2-1/2	67	1	25	3	76	6.7	2.90
–	50 mm	–	–	EL50TD16	4-1/2	115	2-11/16	71	1	25	3	76	8.3	3.66
18	57 mm	55M	57	EL57TD16	5-1/8	130	3-3/16	84	1	25	3	76	12.7	5.65

Note: Thread does not need to be flush with end of LENTON TERMINATOR.
Thread may be +/- 2 threads from backside of coupler.
Diameter exceeds 5x bar area requirements of ICC-ES AC347 & ACI.

LENTON TERMINATOR – D14 & A2D6

Meets international standards, including BS8110, DIN1045, NFA-35-020, ACI®318, and ASTM® A970.





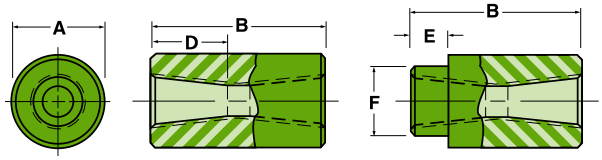
LENTON TERMINATOR – D14

Standard in the Americas, Europe, the Middle East and Africa*

Inch lb	Rebar Size Designation			Part No.	"A"		"B"		"E"		"F"		Weight	
	Metric	Canadian	Soft Metric		in	mm	in	mm	in	mm	in	mm	lb	kg
3	10 mm	–	–	EL10D14	1-3/8	35	11/16	18	–	–	–	–	0.3	0.13
4	12 mm	10M	13	EL12D14	1-3/4	45	11/16	18	–	–	–	–	0.5	0.22
–	14 mm	–	–	EL14D14	1-3/4	45	13/16	21	–	–	–	–	0.5	0.25
5	16 mm	15M	16	EL16D14	2	55	15/16	24	–	–	–	–	0.8	0.42
–	18 mm	–	–	EL18D14	2-1/2	60	1-1/8	29	–	–	–	–	1.5	0.61
6	20 mm	20M	19	EL20D14	2-1/2	65	1-3/8	35	–	–	–	–	1.8	0.84
7	22 mm	–	22	EL22D14	2-3/4	70	1-7/16	37	–	–	–	–	2.3	1.04
8	25 mm	25M	25	EL25D14	3-1/4	80	1-9/16	40	–	–	–	–	3.4	1.45
9	28 mm	30M	29	EL28D14	3-3/4	95	1-5/8	42	1	25	3-1/8	80	3.9	1.76
–	30 mm	–	–	EL30D14	3-3/4	95	2-1/16	52	1	25	3-1/8	80	5.0	2.26
10	32 mm	–	32	EL32D14	4	105	1-3/4	45	1	25	3-1/8	80	4.5	2.14
–	34 mm	–	–	EL34D14	4-3/8	110	2-3/16	55	1	25	3-1/8	80	6.6	2.94
11	36 mm	35M	36	EL36D14	4-1/2	115	2-1/16	52	1	25	3-1/8	80	6.2	2.84
–	38 mm	–	–	EL38D14	4-3/4	120	2-1/8	53	1	25	3-1/8	80	6.9	3.12
–	40 mm	–	–	EL40D14	5	130	2-1/4	58	1	26	2-3/8	58	7.2	3.41
14	43 mm	45M	43	EL43TD14	5-1/2	150	2-5/8	67	1-5/16	34	2-1/2	61	9.1	4.73
–	50 mm	–	–	EL50TD14	6-1/2	160	2-13/16	71	1-5/16	33	3-1/8	80	14.9	6.38
18	57 mm	55M	57	EL57TD14	7-1/2	190	3-5/16	84	1-5/8	41	3-1/8	80	21.5	9.72

*Available in select regions of U.S.

A = large diameter
B = length of coupler body
D = Bar engagement
E = length of small step
F = small diameter



Meets BS8110, UBC®, IBC®, AS3600 and ACI318

LENTON TERMINATOR for Future Extension – A2D6

Standard in the Americas

Inch lb	Rebar Size Designation			Part No.	"A"		"B"		"D"		"E"		"F"		Weight	
	Metric	Canadian	Soft Metric		in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
4	12 mm	10M	13	EL12A2D6	1-3/8	35	1-5/8	41	9/16	14	–	–	–	–	0.62	0.28
5	16 mm	15M	16	EL16A2D6	1-1/2	38	2-3/16	56	7/8	22	–	–	–	–	0.95	0.43
6	20 mm	20M	19	EL20A2D6	1-7/8	48	2-13/16	71	1-1/8	29	–	–	–	–	1.92	0.87
7	22 mm	–	22	EL22A2D6	2	51	3-5/32	80	1-1/4	32	–	–	–	–	2.43	1.10
8	25 mm	25M	25	EL25A2D6	2-1/4	57	3-11/32	85	1-3/8	35	–	–	–	–	3.23	1.47
9	28 mm	30M	29	EL28A2D6	2-3/4	70	3-19/32	91	1-1/2	38	–	–	–	–	5.29	2.40
10	32 mm	–	32	EL32A2D6	3	76	3-25/32	96	1-9/16	40	–	–	–	–	6.52	2.96
11	36 mm	35M	36	EL36A2D6	3-1/4	83	3-31/32	101	1-11/16	43	–	–	–	–	7.97	3.62
14	43 mm	45M	43	EL43TA2D6	4	102	5-1/4	133	2-1/8	54	1	25	3	76	14.64	6.65
18	57 mm	55M	57	EL57TA2D6	5-1/8	130	6-15/32	164	2-3/4	70	1	25	3	76	28.44	12.93

For availability: Contact your local Pentair representative.

** Bar dimensions and weights listed may vary by region. Coupler sizes not shown on these pages are available by special order. Contact your Pentair representative for more information on special sizes. Article numbers used in Europe, Middle East, Africa and Asia exclusively.*

A Look At LENTON Concrete Reinforcement Products

LENTON has been a pioneer in the concrete construction industry for more than 40 years. We changed rebar splicing, first with CADWELD mechanical connections, then with the LENTON mechanical splicing system – the #1 mechanical connector in the world. Pentair now offers a wide range of mechanical splices for almost any construction need:

- **CADWELD** – Premier mechanical splicing system
- **LENTON FORM SAVER** – Ideal for segmental pour
- **LENTON INTERLOK** – Ideal for precast structures
- **LENTON QUICK WEDGE** – Ideal for quick retrofit
- **LENTON SPEED SLEEVE** – Ideal for compression situations
- **LENTON TERMINATOR** – Ideal alternative to hooked rebar anchorage
- **LENTON LOCK** – Ideal for in-situ splices

The entire LENTON line of mechanical rebar splices has replaced many conventional splicing systems, such as welding and lap splicing. Unlike butt welding, LENTON products require no special training or external power source, are quicker to install and inspect, reduce crane time, improve the tensile strength of the splice and can be installed in any weather.

As your rebar splicing specialist, Pentair offers you the expertise you need for all your rebar splicing projects.

Pentair Engineered Electrical & Fastening Solutions is a leading global manufacturer and marketer of superior engineered products for niche electrical, mechanical and concrete applications. These Pentair products are sold globally under a variety of market-leading brands: ERICO welded electrical connections, facility electrical protection, and rail and industrial products; CADDY fixing, fastening and support products; ERIFLEX low voltage power and grounding connections; and LENTON engineered systems for concrete reinforcement.

For more information on ERICO, CADDY, ERIFLEX and LENTON, please visit erico.pentair.com.

LENTON TERMINATOR

How to Order:

To order the correct LENTON TERMINATOR for your construction applications, please call your local Pentair office location listed on the back cover.

How to Specify:

Specific: Rebar terminations shall be LENTON TERMINATOR as manufactured by Pentair.

Generic: The rebar terminations shall meet building code requirements, as required, by local norms/codes. The rebar terminations shall be positive locking, taper threaded type anchor manufactured from high quality steel. The bar end must be taper threaded using the manufacturer's bar threading equipment to ensure proper taper and thread engagement. Bars shall be installed to the manufacturer's requirements. The anchors shall be manufactured using registered quality systems around the world.

erico.pentair.com

AUSTRALIA
Phone 1-800-263-508
Fax 1-800-423-091

CHINA
Phone +86-21-3430-4878
Fax +86-21-5831-8177

HUNGARY
Phone 06-800-16538
Fax +39-0244-386-107

NORWAY
Phone 800-100-73
Fax 800-100-66

SWITZERLAND
Phone 0800-55-86-97
Fax 0800-55-96-15

BELGIUM
Phone 0800-757-48
Fax 0800-757-60

DENMARK
Phone 808-89-372
Fax 808-89-373

INDONESIA
Phone +62-21-575-0941
Fax +62-21-575-0942

POLAND
Phone +48-71-349-04-60
Fax +48-71-349-04-61

THAILAND
Phone +66-2-267-5776
Fax +66-2-636-6988

BRAZIL
Phone +55-11-3623-4333
Fax +55-11-3621-4066

FRANCE
Phone 0-800-901-793
Fax 0-800-902-024

ITALY
Phone 800-870-938
Fax 800-873-935

SINGAPORE
Phone +65-6-268-3433
Fax +65-6-268-1389

UNITED ARAB EMIRATES
Phone +971-4-881-7250
Fax +971-4-881-7270

CANADA
Phone +1-800-677-9089
Fax +1-800-677-8131

GERMANY
Phone 0-800-189-0272
Fax 0-800-189-0274

MEXICO
Phone +52-55-5260-5991
Fax +52-55-5260-3310

SPAIN
Phone 900-993-154
Fax 900-807-333

UNITED KINGDOM
Phone 0808-2344-670
Fax 0808-2344-676

CHILE
Phone +56-2-370-2908
Fax +56-2-369-5657

HONG KONG
Phone +852-2764-8808
Fax +852-2764-4486

NETHERLANDS
Phone 0800-0200-135
Fax 0800-0200-136

SWEDEN
Phone 020-790-908
Fax 020-798-964

UNITED STATES
Phone 1-800-753-9221
Fax +1-440-248-0723

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