

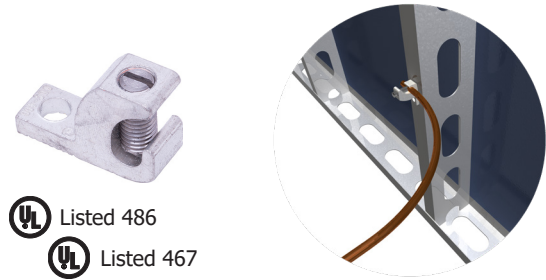
Pool Grounding & Bonding



Harger provides pool grounding & bonding solutions
that meet the requirements of
NEC 2017 *Equipotential Bonding* Article 680.26

Typical Pool Grounding & Bonding Layout

Pool Grounding & Bonding Components



UL Listed 486
UL Listed 467

1 - One-Hole Tinned Copper Lay-In Lug

Part No.	Conductor Range (AWG)	Bolt Hole Size
TCLI414DB	4 - 14	#10

- Suitable for direct burial.



UL Listed 486
UL Listed 467

2 - Copper Split Bolt

Part No.	Range for Equal Main (AWG)	Minimum Tap
GESB8	16 Str. - 8 Str.	16 Sol.
GESB6	4 Sol. - 8 Sol.	16 Str.

- Suitable for direct burial.



UL Listed 486

3 - Copper Offset Terminal Lug

Part No.	Conductor Range (AWG)	Bolt Hole Size
GEOL2	14 Str. - 6 Str.	#8

- Not suitable for direct burial.

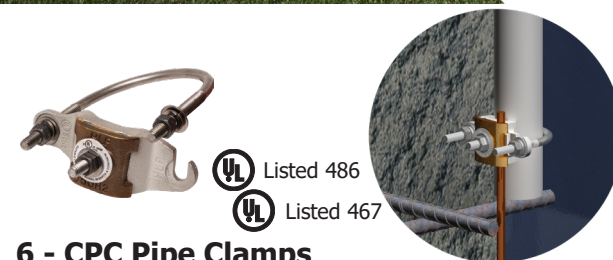


UL Listed 467

4 & 5 - Rebar & Water Pipe Ground Clamps

Part No.	Pipe & Rebar Range	Conductor Range (AWG)
RB12A	3/8" - 1"	10 Sol. - 2 Str.
RB12B	3/8" - 1"	10 Sol. - 2 Str.

- Suitable for direct burial.



UL Listed 486
UL Listed 467

6 - CPC Pipe Clamps

Part No.	Material	Nom. Pipe Size Range	Pipe Outside Diameter
CPC1.5/2	Tinned Bronze	1.5" - 2"	1" - 2.4"
CPC2.5/3	Tinned Bronze	2.5" - 3"	2.25" - 3.5"

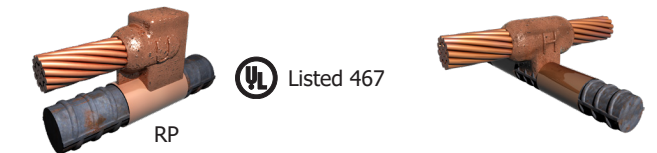
- Suitable for direct burial.
- Conductor Range #6 - 250 MCM.
- Other sizes available.



UL Listed 467

7 & 8 - Cable to Cable Ultraweld Exothermic Connection Molds

Part No.	Weld Metal		Required Handle
	UltraShot	NUWTUBE	
PT8S8SB	US25	NUWTUBE25	MH1
PS8S8SL	US25	NUWTUBE25	MH3 (Included)
PS8S6SL	US25	NUWTUBE25	MH3 (Included)



9 & 10 - Cable to Rebar Ultraweld Exothermic Connection Molds

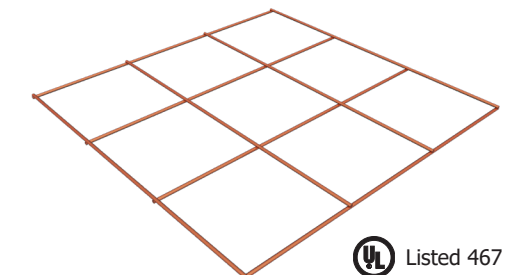
Part No.	Weld Metal		Required Handle	Packing Mat'l No.
	UltraShot	NUWTUBE		
RP38SB	US25	NUWTUBE25	MH1	WRPSLV
RP4L8SA	US25	NUWTUBE25	Included	CERPM1
RO38SB	US65	NUWTUBE65	MH1	WRPSLV
RO48SB	US65	NUWTUBE65	MH1	WRPSLV
RO58SB	US65	NUWTUBE65	MH1	WRPSLV



11 - Rebar Grounding Assembly

Part No.	Rebar Size	Conductor Type (AWG)	Conductor Length (ft.)
RB3GA8SX5	3	8 Sol.	5

- Prefabricated rebar grounding assembly with exothermically welded connection.
- Standard 24" long rebar.
- Can be wire tied or welded to rebar cage prior to concrete pour.



12 - UL Listed Prefabricated #8 Solid Copper Ground Mesh

Part No.	Width (ft.)	Length (ft.)	Conductor Spacing (in.)	Approx. Wt. (lbs.)
GM350812	3	50	12	32
GM375812	3	75	12	42
GM3100812	3	100	12	51

- Other mesh sizes and wire gauges available.

TECHNICAL NOTES:

• 680.26 Equipotential Bonding* (Summarized)

(A) Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the pool area.

(B) Bonded Parts. The parts specified in 680.26(B)(1) through (B)(7) shall be bonded together using solid copper conductors, insulated covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8**. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes.

(1) Conductive Pool Shells. Bonding to conductive pool shells shall be provided as specified in 680.26(B)(1)(a) or (B)(1)(b).

Poured concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings shall all be considered conductive materials due to water permeability and porosity. Vinyl liners and fiberglass composite shells shall be considered to be nonconductive materials.

(a) *Structural Reinforcing Steel.* Unencapsulated structural reinforcing steel shall be bonded together by steel tie wires or the equivalent. Where structural reinforcing steel is encapsulated in a nonconductive compound, a copper conductor grid shall be installed in accordance with 680.26(B)(1)(b).

(b) *Copper Conductor Grid.* A copper conductor grid shall be provided and shall comply with (b)(1) through (b)(4).

(1) Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing. The bonding shall be in accordance with 250.8 or approved means.

(2) Conform to the contour of the pool.

(3) Be arranged in a 300 mm (12 in.) by 300 mm (12 in.) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 100 mm (4 in.).

(4) Be secured within or under the pool no more than 150 mm (6 in.) from the outer contour of the pool shell.

(2) Perimeter Surfaces. The perimeter surface to be bonded shall be considered to extend for 1 m (3 ft.) horizontally beyond the inside walls of the pool and shall include unpaved surfaces and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft.) less than 1 m (3 ft.) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.

(a) *Structural Reinforcing Steel.* Structural reinforcing steel shall be bonded in accordance with 680.26(B)(1)(a).

(b) *Alternate Means.* Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper conductor(s) shall be utilized where the following requirements are met:

(1) At least one minimum 8 AWG bare solid copper conductor shall be provided.

(2) The conductors shall follow the contour of the perimeter surface.

(3) Only listed splices shall be permitted.

(4) The required conductor shall be 450 to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

(5) The required conductor shall be secured within or under the perimeter surface 100 to 150 mm (4 in. to 6 in.) below the subgrade.

(3) Metallic Components. All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(B)(1)(a), shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, the reinforcing steel shall not be required to be bonded.

(4) Underwater Lighting.

(5) Metal Fittings.

(6) Electrical Equipment.

(7) Fixed Metal Parts. All fixed metal parts shall be bonded including, but not limited to, metal-sheathed cables and raceways, metal piping, metal awnings, metal fences, and metal door and window frames.

Exception No 1: Those separated from the pool by a permanent barrier that prevents contact by a person shall not be required to be bonded.

Exception No 2: Those greater than 1.5 m (5 ft.) horizontally from the inside walls of the pool shall not be required to be bonded.

Exception No 3: Those greater than 3.7 m (12 ft.) measured vertically above the maximum water level of the pool, or as measured vertically above any observation stands, towers, or platforms, or any diving structures, shall not be required to be bonded.

(C) Pool Water. Where none of the bonded parts is in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm² (9 in.²) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities, and it shall be bonded in accordance with 680.26(B).

• 250.8 Connection of Grounding and Bonding Equipment**

(A) Permitted Methods. Equipment grounding conductors, grounding electrodes conductors, and bonding jumpers shall be connected by one or more of the following means:

(1) Listed pressure connectors

(2) Terminal bars

(3) Pressure connectors listed as grounding and bonding equipment

(4) Exothermic welding process

(5) Machine screw-type fasteners that engage not less than two threads or are secured with a nut

(6) Thread-forming machine screws that engage not less than two threads in the enclosure

(7) Connections that are part of a listed assembly

(8) Other listed means

(B) Methods Not Permitted. Connection devices or fittings that depend solely on solder shall not be used.

*NEC 2017 Equipotential Bonding Article 680.26

**NEC 2017 Connection of Grounding and Bonding Equipment Article 250.8