



BarGrip[®] XL

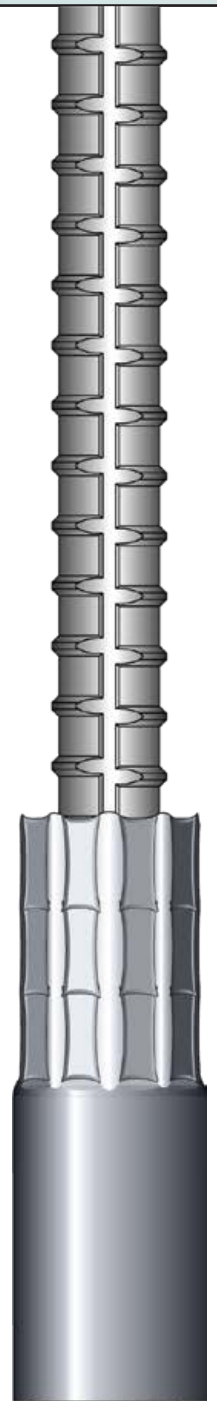
**COLD-SWAGED STEEL
COUPLING SLEEVES AND
CONNECTORS FOR
REINFORCING BARS**

BarGrip[®] XL

COLD-SWAGED SPLICES AND EQUIPMENT



- ✓ Full TYPE 2 splice
- ✓ POSITIVE mechanical interlock
- ✓ POWERFUL range of hydraulic presses
- ✓ SPLICES for all bar sizes – USA and International
- ✓ UNCOATED, EPOXY or GALVANIZED Bars
- ✓ NEW CONSTRUCTION, REPAIR or RETROFIT
- ✓ FIELD or SHOP-FIELD installation
- ✓ SHEARED, FLAME or SAW cut bars
- ✓ TRUE CONTINUITY and load path where you need it



BarGrip XL cold-swaged coupling sleeves consist of seamless steel sleeves that slip over the ends of reinforcing bars. They are deformed onto the reinforcing bar profile to produce mechanical interlock.

Bar sizes No. 3 through 18 (Dia.10 – 57mm) can be spliced by this method including bars of different sizes. BarGrip XL coupling sleeves are available for use with reinforcing bars that comply with ASTM A615, ASTM A706, ASTM A996, Grades 60, 75 and 80.

Epoxy-coated* steel reinforcing bars that comply with ASTM A775 can be spliced by cold-swaged steel coupling sleeves without shielding or removing the epoxy coating from the bar. *Not recommended for ASTM A934 bars unless bar ends have been shielded from purple coating.

Hot-dipped galvanized cold-swaged steel coupling sleeves can be ordered for mechanically splicing zinc-coated (galvanized) steel bars that comply with ASTM A767.

The cold-swaged splicing method is suitable for new construction, field repair applications, and the splicing of older types of reinforcing bars, provided such bars have suitable deformations for mechanical interlock.

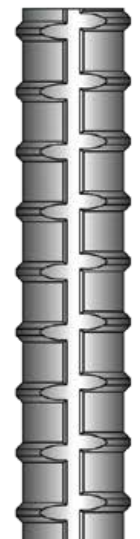
No special bar end preparation is required so ends can be sheared, sawed, or flame cut; however, a bar-end check is recommended. Bars can be connected from any orientation because special positioning of the press around the bar is not required. In the structure, linear alignment is preserved across the splice by using reinforcing bars with straight ends and securing the loose continuation bar in the desired position at the time of swaging.



INSTALLATION

The reinforcing bar is marked and inserted halfway into the sleeve. A hydraulic press fitted with a removable two-piece die set is used for field installation. The die set deforms the first half of the coupling sleeve in a radial direction onto the reinforcing bar in a series of overlapping pressings. The coupling sleeve is slipped over the bar in-situ and the remaining unswaged portion of the sleeve is swaged. Field-type presses, including dies, weigh between 20 and 230 lb (9 and 105 kg) and can be supported for use in any orientation.

Bench presses with adjustable stops and insertion gauges are available for shop use. These machines efficiently half-swage a coupling sleeve onto the end of a reinforcing bar before shipping. Adapter kits allow the field presses to be used in the same way.



BarGrip® XL

CHOICES AND PERFORMANCE



BARGRIP® XL

COLD-SWAGED STEEL COUPLING SLEEVE

- **TYPE 2 FULL MECHANICAL SPLICE** – ACI 318-14 Section 18 (ACI 318-11 Section 21) and 2018 International Building Code. Exceeds specified tensile strength (f_u) ASTM A615 Grades 60 & 75 and ASTM A706 Grades 60 & 80 uncoated deformed bars.
- **ICC ES EVALUATION REPORT ESR-2299**
- **NUCLEAR SAFETY RELATED SPLICE** – ASME Section III, Division 2 Boiler & Pressure Vessel Code for Swaged Splices. Exceeds ASTM A615 Grade 60 tensile strength of 90,000 psi.
- **SEISMIC LOADING** – Withstands plastic strain excursions to 5 x rebar yield strain value and stress reversals in accordance with ICC Acceptance Criteria AC-133.
- **DYNAMIC LOADING** – Structures designed to resist the effects of accidental explosions; capable of developing the dynamic yield stress of Grade 60 reinforcing in 10-15 milliseconds.
- **CALTRANS “SERVICE” AND “ULTIMATE” APPROVED** – Meets slip test CT670 & capable of exceeding 80,000 psi, the specified tensile strength of uncoated deformed bars ASTM A706.
- **AASHTO AND DOT PROJECTS** – Exceeds 125% x specified yield (f_y) per AASHTO LRFD Bridge Design Specifications. Achieves 135% x f_y and 100% x f_u Grade 60 uncoated bars.
- **COATED BARS** – Type 1 splice per ACI 318-14 Section 25 (ACI 318-11 Section 12), developing in tension or compression, as required, at least 125% x specified yield (f_y) with capacity to exceed 135% x f_y , Grade 60 when swaged directly over ASTM A775 epoxy coated bars or ASTM A767 galvanized bars. Coating removal or shielding is not necessary on these coated bars.
- **CONVENIENCE** – No special bar end preparation or thread cutting. Can be partially pre-installed using a BPI shop press, or field installed using additional BPI equipment. For bar sizes #3 – #18 (Ø 10 – 57 mm).

BARGRIP® XL TRANSITION

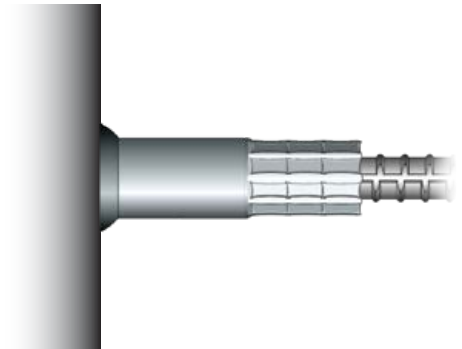
COLD-SWAGED STEEL COUPLING SLEEVE



- **PURPOSE** – Used to mechanically splice bars of two different sizes.
- **TYPE 2 FULL MECHANICAL SPLICE** – ACI 318-14 Section 18 (ACI 318-11 Section 21) and 2018 International Building Code. Exceeds specified tensile strength (f_u) of the smaller ASTM A615 Grades 60 & 75 and A706 Grades 60 & 80 uncoated deformed bars.
- **ICC ES EVALUATION REPORT ESR-2299**
- **NUCLEAR SAFETY RELATED SPLICE** – ASME Section III, Division 2 Boiler & Pressure Vessel Code for Swaged Splices. Exceeds ASTM A615 Grade 60 tensile strength of 90,000 psi.
- **SEISMIC LOADING** – Withstands plastic strain excursions to 5 x rebar yield strain value and stress reversals in accordance with ICC Acceptance Criteria AC-133.
- **ADVERSE CONDITIONS** – High tolerance to field contamination, concrete spatter, corroded rebars or undersize and missing deformations. Meets or exceeds the performance attributes of BarGrip XL. Inherently provides added level of assurance under more severe conditions.
- **PROBLEM SOLVER** – Highly ductile steel splicing system, adaptable for special details.
- **CONVENIENCE** – No special bar end preparation or thread cutting. Can be partially pre-installed using a BPI shop press, or field installed using additional BPI equipment.

BARGRIP® STRUCTURAL CONNECTOR

COLD-SWAGED STEEL CONNECTOR



- **FULL STRENGTH** – ASME Section III, Division 2 Boiler & Pressure Vessel Code. Exceeds minimum joint strength of 75,000 psi with average tensile strength 90,000 psi (100% x f_u) when used with ASTM A615 Grade 60.*
- **COATED BARS** – Exceeds 125% x specified yield (f_y) Grade 60 when swaged directly over ASTM A775 epoxy coated bars or ASTM A767 galvanized bars. Coating removal or shielding is not necessary on these coated bars.
- **VERSATILITY** – For attachment of reinforcing bars to liner plates, structural steel shapes or for creating headed anchorage. Shop or field weldable, before or after bar placement.
- **CERTIFIED LOW CARBON STEEL** – Conforms to CC-2310(c) material requirements of ASME Section III, Division 2. Meets chemistry AISI Grade 1018 and ASTM A36. (Suited to E7018 electrode)
- **WELDING BEVEL** – For full penetration, provided for greater strength, convenience and quality assurance.
- **LESS WELD STRESS** – Compared to direct butt welds since outside diameter of structural connector is larger than the reinforcing bar so the weld area is disposed over greater length.
- **CONVENIENCE** – No special bar end preparation or thread cutting. Can be pre-installed using a BPI shop press, or field installed using additional BPI equipment. For bar sizes #3 – #18 (Ø 10 – 57 mm).

*Welder qualification, weld procedure, integrity and strength are the responsibility of others.

BarGrip® XL

REASONS AND ADVANTAGES

Cold-swaging technology for mechanical splicing of reinforcing bars is one of the most established, developed, and refined splicing methods worldwide. Key to cold-swaging success is its **simplicity, low cost** and **adaptability**. There is **no loss of reinforcing bar cross-sectional area** at the splice so the BarGrip XL system is a natural choice when considering the objectives of **seismic design, blast resistance** and **safety related nuclear applications**.

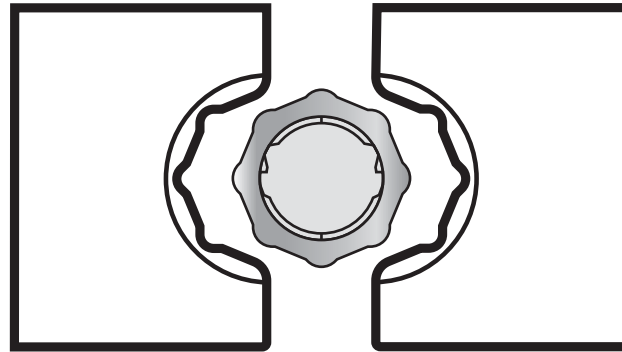
- **Lap splices are not recommended in locations where inelastic yielding could occur because such splices are not reliable under conditions of cyclic loading into the inelastic range.**

Mechanical interlock with reinforcing bar deformations, lugs or protrusions is the basis of swaged splice strength. The “slip test” values of swaged mechanical splices are minimal due to the tight conformation of coupling sleeves to the profile of the bar. Best of all, **true structural continuity** can be established in reinforcing systems because swaged splice strengths, unlike lap splices, are **not dependent** upon the **compressive strength** or **cover requirements** of the **surrounding concrete**.

- **In comparison to manual arc welding, cold swaged splices are faster to install, require a lower skill level, do not require a chemistry determination of the reinforcing bar being spliced, do not require bar pre-heat or post-heat and do not require radiographic examinations.**

BPI® swaging equipment is easy to use and may be leased or purchased. Splicing manuals provided with equipment explain step-by-step installation and safety information.

Swaging dies are stamped and color coded to match the coupling sleeves. Swaging pressure is factory preset and field equipment is automated to release from the splice after each swaging ‘bite’ or pressing.



See dimensional data for clearance requirements for presses.

HOW TO SPECIFY BARGRIP® XL SPLICES AND CONNECTORS

	By Name:	By Generic Description:
BAR-TO-BAR	BarGrip® XL ** or BarGrip® XL Transition ** by BarSplice Products, Inc., Dayton OH	<i>Reinforcing bar mechanical splices shall be the tension-compression cold-swaged sleeve type, which shall be installed by octagonal dies to achieve... (include strength or code requirements).</i>
BAR-TO-HEAD ***	BPI® ButtonHead™ by BarSplice Products, Inc., Dayton OH	<i>Headed Reinforcement shall be the cold-swaged head type, installed by octagonal dies to produce a 5A_s or 10A_s Head size. (specify head size)</i>
BAR-TO-STRUCTURAL STEEL	BarGrip® Structural Connector ** by BarSplice Products, Inc., Dayton OH	<i>Bar-to-structural steel connections shall be the cold-swaged weldable connector type, with weld bevels at one end inclined 30-degrees to the rebar axis, and pressed to the reinforcing bar at the other end by octagonal dies.</i>

** Include bar size(s), bar type and grade. Include statement: "Parts shall be manufactured to the quality requirements of ISO 9001."

*** For information on **BAR-TO-HEAD** connections, see BPI® ButtonHead™ - COLD SWAGED HEADED REINFORCEMENT.

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