

**PRODUCT STANDARD PS7-66  
WIRE BAR SUPPORTS FOR REINFORCED CONCRETE CONSTRUCTION**

Product Standard (PS) 7-66 War Bar Supports for Reinforced Concrete Construction was withdrawn by the Department of Commerce on February 19, 1974.

This product standard was replaced by the following American Society for testing and Materials (ASTM) standards: 1/A615, Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2/ A615M, Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (metric), and 3/ A617, Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement.

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**WITHDRAWN**

**PRODUCT STANDARD PS7-66**

**Wire Bar Supports For  
Reinforced Concrete Construction**

**A RECORDED VOLUNTARY  
STANDARD OF THE TRADE**



**WITHDRAWN**

**U.S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS**

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**U.S. DEPARTMENT OF COMMERCE**

JOHN T. CONNOR, *Secretary.*

**NATIONAL BUREAU OF STANDARDS**

A. V. ASTIN, *Director*

**Office of Engineering Standards Services**

**EFFECTIVE DATE**

Having been passed through the regular procedures of the Office of Commodity Standards (now the Office of Engineering Standards Services, National Bureau of Standards) and approved by the acceptors hereinafter listed, this Product Standard is issued by the National Bureau of Standards, effective August 1, 1966.

A. V. ASTIN, *Director.*

**PRODUCT STANDARDS**

Product Standards are developed by manufacturers, distributors, and users in cooperation with the Office of Engineering Standards Services of the National Bureau of Standards. The purpose of a Product Standard may be either (1) to establish standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; or (2) to establish quality criteria, standard methods of testing, rating, certifying and labeling of manufactured products.

The adoption and use of a Product Standard is voluntary. However, when reference to a Product Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforceable through usual legal channels as a part of the sales contract.

Product Standards usually originate with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Office of Engineering Standards Services, the necessary data to be used as the basis for developing a standard of practice. The Office, by means of organized conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedures of the Office assures continuous servicing of each Product Standard through review and revision whenever, in the opinion of the industry, changing conditions warrant such action.

The initial printing of Product Standard P87-66 was made possible through the cooperation of the Concrete Reinforcing Steel Institute in securing copies for its members.

# Wire Bar Supports For Reinforced Concrete Construction

(Effective August 1, 1966)

## 1. PURPOSE

1.1 The purpose of this Product Standard is to establish a standard for the various types and sizes of wire bar supports used to position reinforcement bars for reinforced concrete construction. It is intended to serve as a guide in the manufacture, selection, and utilization of wire bar supports by listing the types and sizes in greatest demand and in most general use. The use of simplified sizes enables producers and distributors to improve their service to the customer, reduce inventories and to maintain a current stock.

## 2. SCOPE

2.1 The standard lists twelve types of wire bar supports and the sizes of each in greatest demand. The minimum size of wire is given for each type of bar support. Maximum spacings at which the bar supports will function properly in ordinary slabs, joists, beams, and girders are included. The standard also lists a number of modifications of the standard bar supports for special applications in concrete reinforcement, which are not regularly stocked but may be obtained as standard items when specified.

## 3. DEFINITIONS

3.1 The following glossary of terms is applicable to wire bar supports for reinforced concrete construction:

**BAR SUPPORT.**—A device for positioning concrete reinforcement and maintaining the reinforcement in the specified position until the concrete hardens.

**JOIST.**—A single rib, part of a monolithic or precast reinforced concrete ribbed slab.

**BEAM.**—A horizontal framing element used to provide support for a monolithic or precast reinforced concrete solid or ribbed slab.

**GIRDER.**—A horizontal framing element used to provide support for beams.

**ONE-WAY SLAB.**—A solid reinforced concrete slab supported on two opposite sides with main reinforcement only at right angles to supports. Depth is uniform transversely to main reinforcement.

**TWO-WAY FLAT SLAB.**—A concrete slab reinforced in two orthogonal directions, capable of transmitting loads to point supports generally without beams or girders; a thickened portion (drop panel) at supports may be provided.

**TWO-WAY FLAT PLATE.**—A two-way flat slab of uniform depth throughout.

**TWO-WAY JOISTS.**—A two-way ribbed flat slab with ribs in an orthogonal pattern; often called a "waffle slab".

**WAFFLE SLAB.**—Another term for a two-way slab.

**HOT DIP GALVANIZED.**—A process of galvanizing after fabrication of bar supports consisting of dipping the entire support or lower portions thereof in molten zinc to apply a zinc coating of predetermined thickness.

**PRE-GALVANIZED BAR SUPPORT.**—A bar support fabricated from standard commercial galvanized wire.

**SMOOTH WIRE.**—A wire having no deformations impressed on its surface to increase the bond with the concrete.

**CORRUGATED WIRE.**—A wire which has been crimped into a regular wave pattern.

**RUNNER WIRE.**—A horizontal wire attached to and forming a support for individual wire legs of a bar support.

**RADIUS BEARING LEGS.**—A wire leg of a bar support bearing upon a hook or spherical foot at the lower end.

**SAND-PLATE.**—A bearing plate of sheet metal attached to the lower end of individual wire bar support legs.

## 4. REQUIREMENTS

4.1 **Material.**—It is recommended that the bar supports for reinforced concrete construction be made of cold-drawn steel wire of the sizes shown in Table 1.

4.2 **Standard types and sizes.**—The recommended types and sizes of bar supports are given in Table 2.

4.3 **Modifications of standard types.**—When specified, the following modifications of the stand-

TABLE 1.—Sizes of steel wire for bar supports.

Gage No. <sup>1</sup>	Nominal diameter
0.....	<i>Inch</i> 0.3065
1.....	.2830
2.....	.2625
3.....	.2437
4.....	.2253
5.....	.2070
6.....	.1920
7.....	.1770

<sup>1</sup> Steel Wire Gage (A. S. & W.).

ard types of bar supports may be furnished for special conditions of use.

**4.3.1 Earth-bearing bases.**—Types CHC, SB, SS, BB, and HC bar supports may be provided with earth-bearing bases (sand plates) of 20 gage (0.0359 inch)<sup>1</sup> sheet steel. Such supports are designated by the suffix "P", ie, CHCP, SBP, SSP, BBP, or HCP. When so ordered, horizontal runner wires can be substituted for sand plates. In either case, the height of the bar support shall be the distance from the bottom of the sand plate or runner wire to the bottom of the reinforcing bar.

**4.3.2 Radius bearing legs.**—Types BC, JC, HC and CHC are furnished with straight legs as shown in the illustrations in Table 2, but can be furnished with radius bearing legs in the form of a hook or spherical foot at the lower end when specified. The hook shall consist of elevating the cut end of the support at least 1/8 inch above the supporting base. The spherical foot shall have an outside diameter of not less than 1 1/2 times the specified wire diameter and shall be not less than 1/8 inch above the supporting base.

#### **4.3.3 Rust protection.**

##### **4.3.3.1 Zinc-coated supports.**

**4.3.3.1.1 Pre-galvanized supports.**—The bar supports may be furnished with the legs only fabricated of pregalvanized (zinc-coated) cold-drawn wire. The legs shall be turned up a minimum of 1/8 inch. Spherical feet may not be used on pregalvanized wire supports.

**4.3.3.1.2 Hot-dip galvanized.**—The bar supports may be furnished with the legs only hot-dip galvanized after fabrication. Points of weld or lacing need not be galvanized. It is recommended that the zinc-coating conform to the requirements for Class D material of Table 1 of ASTM Designation A153-61<sup>2</sup>, Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

**4.3.3.2 Plastic-coated supports.**—Bar supports coated with a plastic material suitable for the application are available for rust protection. It is recommended that the coating thickness be not less than 3/32 inch at any point, with an average thickness of 1/8 inch at points of contact with the form. The coating should extend upward on the wire to a point at least 1 inch above the forms.

**4.3.4 Standard spacings for bar supports.**—Standard wire bar supports should be used at the spacings<sup>3</sup> shown in Table 3 for ordinary reinforced concrete construction. The spacings and end overhangs shown are maximum. To maintain

<sup>1</sup> Manufacturers Standard Gage (within commercial tolerances).

<sup>2</sup> Later issues of the ASTM publication may be used providing the requirements are not lower than the issue designated. Copies of ASTM publications are obtainable from the American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

<sup>3</sup> The standard spacings are designed principally to maintain sag within tolerances on position of reinforcement adopted as standard practice under the 1963 Building Code Requirements for Reinforced Concrete of the American Concrete Institute, 22400 W. Seven Mile Rd., Detroit, Mich. 48219.

an even multiple of interior spacings and not exceed maximum edge distances at the ends of the bars supported, maximum spacings should be reduced as necessary. Bar supports are not intended to and should not be used to support runways for concrete buggies or similar loads.

## **HISTORY OF PROJECT**

In a letter dated September 13, 1963, the Concrete Reinforcing Steel Institute requested the cooperation of the Office of Commodity Standards in the establishment of a Simplified Practice Recommendation for Wire Bar Supports for Reinforced Concrete Construction, and submitted technical data as a basis for the standard.

The Commodity Standards Division circulated copies of the proposed Simplified Practice Recommendation to representative producers, distributors and users, including Government agencies, for constructive comment. All comments and suggestions received were carefully considered and adjustments were made to the proposal to satisfy the comment wherever practicable. The Recommended Simplified Practice Recommendation was circulated to the trade on August 30, 1965.

On May 16, 1966, the Office of Product Standards (formerly the Office of Commodity Standards) announced that acceptances had been received representing a satisfactory majority of the industry, and the Simplified Practice Recommendation to be designated R268-66 (since changed to Product Standard PS7-66) would be considered effective beginning August 1, 1966.

Project Manager: D. R. Stevenson, Office of Product Standards, National Bureau of Standards

## **STANDING COMMITTEE**

In accordance with the established procedure for keeping recommendations abreast of current conditions and best industry practice, this program will be reviewed from time to time, and revised whenever necessary. For this purpose, a standing committee composed of representatives of the industry has been appointed. All comments and suggestions concerning the standard will be referred to the standing committee for consideration. This committee also serves as the medium through which the industry may be consulted, and through which the industry may in turn make known its views concerning the standard. The members of this committee are:

### **MANUFACTURERS**

A. E. Kerstetter, Superior Concrete Accessories, Inc., 9301 King St., Franklin Park, Ill. 60131 (chairman).  
Carl W. Meisterlin, Master Accessories, Inc., P.O. Box 2818, 13033 Telegraph Rd., Santa Fe Springs, Calif.  
Powell Awbrey, Ankortite Co., Inc., 1900 Wilson, Parsons, Kans.  
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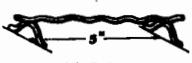
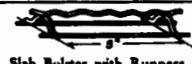
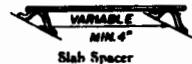
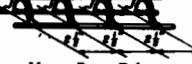
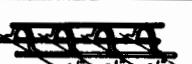
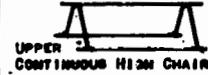
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Lynn B. Hirshorn, Bethlehem Steel Corp., Bethlehem, Pa., 18016.  
 Thomas J. Galligan, Carroll-McCreary Co., Inc., Corona, N.Y.  
 Paul F. Rice, Concrete Reinforcing Steel Institute, 228 North La Salle St., Chicago, Ill. 60601.  
 H. A. Kutscha, Joseph T. Ryerson & Son, Inc., Chicago, Ill. 60680.  
 George C. Cooper, U.S. Steel Supply Division, U.S. Steel Corp., 15535 South Torrence, Chicago, Ill.

USERS

Samuel J. Henry, American Concrete Institute, P.O. Box 4754, Redford Station, Detroit, Mich. 48219.  
 Robert G. Free, Western Concrete Reinforcing Steel Institute, 1490 Bayshore Highway, Suite 111, Burlingame, Calif. 94010.  
 Richard C. Elstner, Wiss, Janney, Elstner and Associates, 570 Northwest Highway, Des Plaines, Ill. 60016.  
 Robert J. Cowling, The American Institute of Architects, 1735 New York Av., Washington, D.C. 20006.

Table 2. Standard types and sizes of bar supports

Symbol	Type of support	Wire Gage No. (min.)		Standard sizes	Description
		Top	Legs		
SB	 Slab Bolster	4	3/4 inch high-6 Over 3/4 inch-5	3/4, 1, 1-1/2, and 2 inch height in 5 and 10 foot lengths	Legs spaced on 5 inch centers. Corrugations in a vertical plane, spaced on 1 inch centers.
SBR	 Slab Bolster with Runners	4	Same as SB	Same as SB	Same as SB except with No. 7 gage wire runners.
SS	 Slab Spacer	5	Same as SB	3/4, 1, 1-1/2 and 2 inch heights. Minimum leg spacing 4 inches.	Legs spaced to provide supporting leg under each reinforcing bar.
BB	 Beam Bolster	7	7	1, 1-1/2 and 2 inch heights in 5 foot lengths	All legs spaced 2-1/2 inch centers.
HBB	 Heavy Beam Bolster	4	4	1-1/2 to 5 inch heights in increments of 1/4 inch	Same as BB
UBB	 Upper Beam Bolster	7	7	Same as BB	Same as BB except with No. 7 runner wire.
UHBB	 Upper Heavy Beam Bolster	4	4	Same as HBB	Same as UBB except with No. 4 runner wire.
BC	 Individual Bar Chair	7	7	3/4, 1, 1-1/2, 1-3/4 inch height	_____
JC	 Joint Chairs	6	6	4, 5, and 6 inch widths in 3/4, 1, 1-1/2 inch heights.	_____
HC	 Individual High Chair	4 from 2 to 6 inches 2 over 6 to 9 inches 0 over 9 inches		2 to 15 inches high in 1/4 inch increments. Larger heights to special order.	Legs at 20° or less with vertical. Legs reinforced on supports over 12 inches high with welded cross wire or encircling wire.
CHC <sup>1/</sup>	 Continuous High Chair	2	Same as HC	Same as HC	Legs spaced on 8-1/4 inch centers (max.) with leg within 4 inches of end of chair
UCHC	 UPPER CONTINUOUS HIGH CHAIR	2	Same as HC	Same as HC	Same as CHC with No. 4 runner wire.

<sup>1/</sup> Continuous high chairs, CHC, may also be composed of individual high chairs, HC, spaced at 4 foot intervals with #5 top deformed reinforcing bar. When this arrangement is used and placed with an overlap as required for a lap splice, the #5 bar may also be considered effective as reinforcement.

Table 3. Standard spacings for bar supports

Reinforced concrete construction element	Position of bars	Type of wire bar support	End bar <sup>5</sup> support spacing (max.)	Interior bar support spacing (max.)
One-way slab	Top	CHC or <sup>1</sup> HC + #5 bar <sup>4</sup>	1'-0"	4'-0"
	Bottom	SB or SS <sup>1</sup>	0'-6"	4'-0"
One-way joist	Top	(Not usually required for top of trussed joist bars)		
	Bottom	JC	1'-0"	5'-0"
Two-way joist ("waffle slab") <sup>2</sup>	Top	(Not usually required for top of trussed joist bars; for solid area at column, same as in flat slab.)		
	Bottom	JC	1'-0"	5'-0"
Two-way flat slab: <sup>2</sup> Two-way flat plate <sup>2</sup>	Top	CHC or <sup>1</sup> HC + #5 bar <sup>4</sup>	1'-0"	4'-0"
	Bottom	SB or SS <sup>1</sup>	0'-6"	4'-0"
Beam or girder (Bars No. 9 or smaller)	Top	(Not usually required for top of trussed bars)		
	Bottom	BB	1'-0"	5'-0"
Beam or girder (Bars larger than No.9)	Top	(Not usually required for top of trussed bars)		
	Bottom	HBB <sup>3</sup>	1'-6"	5'-0"

<sup>1</sup> No bar shall be placed more than 2" beyond the last leg of any continuous bar support.

<sup>2</sup> Where two layers of reinforcement at right angles are used as top or bottom steel the upper layer is supported by the lower.

<sup>3</sup> Heavily reinforced beams and girders may require bottom reinforcement in two or more layers. For this condition, the bar supports HBB support the lower layer of bars upon which bar supports UBB or UHBB are placed to support the layer of bars above.

<sup>4</sup> Individual high chairs (HC) spaced not more than 4'-0" under #5 support bars. Support bars smaller than #5 may be used providing spacing of the individual high chairs prevents undue sagging. Use HC at 3'-0" (max.) under #4 support bars, and at 2'-0" (max.) under #3 support bars. The #3, #4, and #5 support bars are of the deformed concrete reinforcing type.

<sup>5</sup> Dimensions shown are maximum spacing from the edge of span for bottom bars, or from the end of any bars which terminate within the span.

## ACCEPTORS

The manufacturers, distributors, users, and others listed below have indicated in writing their acceptance of this Product Standard prior to its publication.

## ASSOCIATIONS

### (General Support)

American Concrete Institute, Detroit, Mich.  
Building Officials Conference of America, Inc., Chicago, Ill.  
Concrete Reinforcing Steel Institute, Chicago, Ill.  
Prestressed Concrete Institute, Chicago, Ill.  
Rail Steel Bar Association, Chicago, Ill.  
Western Concrete Reinforcing Steel Institute, Burlingame, Calif.

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Alamo Iron Works, San Antonio, Tex.  
Ammann & Whitney, New York, N.Y.  
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Burke Industries, Hayward, Calif.  
Conver Steel & Wire Division, Hico Corp. of America, Bronx, N.Y.  
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Universal Form Clamp Co., Chicago, Ill.

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Southern Testing Laboratories, Inc., Birmingham, Ala.  
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