

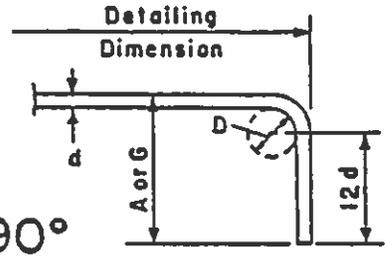
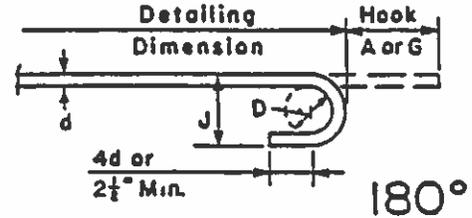
STANDARD HOOKS

All specific sizes recommended by CRSI below meet minimum requirements of ACI 318-83

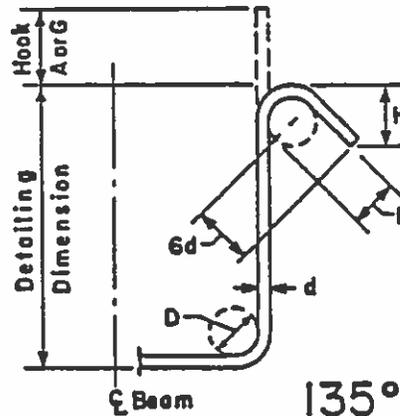
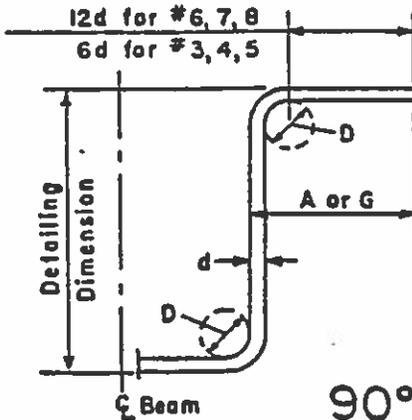
RECOMMENDED END HOOKS All Grades

D=Finished bend diameter

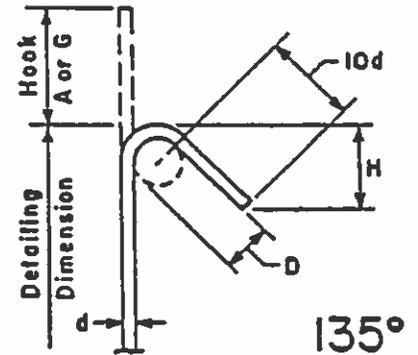
Bar Size	180° HOOKS			90° HOOKS
	D	A or G	J	A or G
# 3	2½	5	3	6
# 4	3	6	4	8
# 5	3¾	7	5	10
# 6	4½	8	6	1-0
# 7	5¼	10	7	1-2
# 8	6	11	8	1-4
# 9	9½	1-3	11¾	1-7
#10	10¾	1-5	1-1¾	1-10
#11	12	1-7	1-2¾	2-0
#14	18¾	2-3	1-9¾	2-7
#18	24	3-0	2-4¾	3-5



STIRRUP AND TIE HOOKS



135° SEISMIC STIRRUP/TIE HOOKS



STIRRUPS (TIES SIMILAR)

STIRRUP AND TIE HOOK DIMENSIONS Grades 40-50-60 ksi

Bar Size	D (in.)	90° Hook		135° Hook	
		Hook A or G	Hook A or G	H Approx.	H Approx.
#3	1½	4	4	2½	
#4	2	4½	4½	3	
#5	2½	6	5½	3¾	
#6	4½	1-0	7¾	4½	
#7	5¼	1-2	9	5¼	
#8	6	1-4	10¾	6	

135° SEISMIC STIRRUP/TIE HOOK DIMENSIONS Grades 40-50-60 ksi

Bar Size	D (in.)	135° Hook	
		Hook A or G	H Approx.
#3	1½	5	3½
#4	2	6½	4½
#5	2½	8	5½
#6	4½	10¾	6½
#7	5¼	1-0½	7¾
#8	6	1-2¾	9

NOTES:

- 180° hook J dimension (sizes #10, #11, #14 and #18), and A or G dimension (#14 and #18) have been revised to reflect recent research using ASTM/ACI bend test criteria as a minimum.
- Tables for Stirrup and Tie Hook dimensions have been expanded to include sizes #6, #7, and #8 to reflect current design practice.

REINFORCING BARS

IDENTIFICATION MARKS – ASTM STANDARD BARS

The ASTM specifications for billet-steel, rail-steel, axle-steel and low-alloy steel reinforcing bars (A 615, A 616, A 617, and A 706 respectively) require identification marks to be rolled into the surface of one side of the bar to denote the producer's mill designation, bar size, type of steel and minimum yield designation. Grade 60 bars show these marks in the following order:

1st – Producing Mill (usually a letter)

2nd – Bar Size Number (#3 through #18)

3rd – Type Steel: **S** for Billet (A 615)

I for Rail (A 616)

I R for Rail meeting Supplementary Requirements S1 (A 616)

A for Axle (A 617)

W for Low-Alloy (A 706)

4th – Minimum Yield Designation

Minimum yield designation is used for Grade 60 and Grade 75 bars only. Grade 60 bars can either have one (1) single longitudinal line (grade line) or the number 60 (grade mark). Grade 75 bars can either have two (2) grade lines or the grade mark 75.

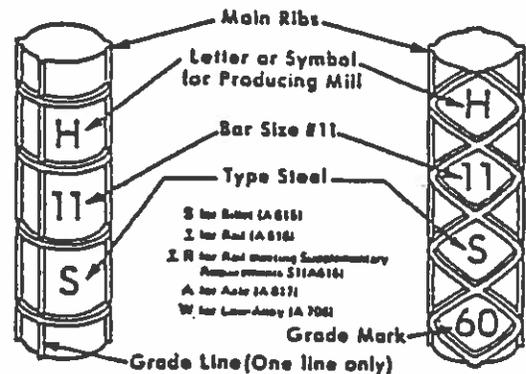
A grade line is smaller and between the two main ribs which are on opposite sides of all U.S. made bars. A grade line must be continued at least 5 deformation spaces. A grade mark is the 4th mark on a bar.

Grade 40 and 50 bars are required to have only the first three identification marks (no minimum yield designation).

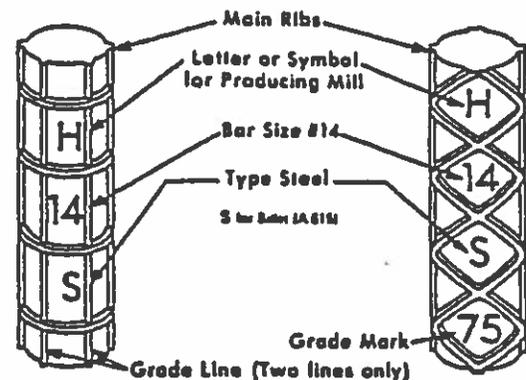
ASTM STANDARD REINFORCING BARS

BAR SIZE	NOMINAL AREA (sq. inches)	WEIGHT (pounds per ft.)	NOMINAL DIAMETER (inches)
# 3	0.11	0.376	0.375
# 4	0.20	0.668	0.500
# 5	0.31	1.043	0.625
# 6	0.44	1.502	0.750
# 7	0.60	2.044	0.875
# 8	0.79	2.670	1.000
# 9	1.00	3.400	1.128
#10	1.27	4.303	1.270
#11	1.56	5.313	1.410
#14	2.25	7.650	1.693
#18	4.00	13.600	2.257

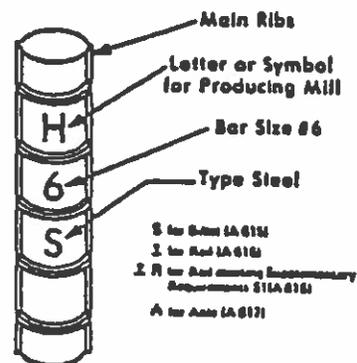
VARIATIONS: Bar identification marks may be oriented as illustrated or rotated 90°. Grade mark numbers may be placed within separate consecutive deformation spaces. Grade line may be placed on the side opposite the bar marks.



GRADE 60 AND A 706



GRADE 75

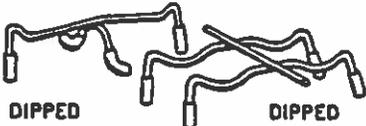
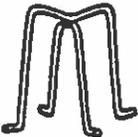
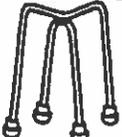
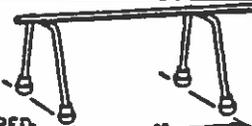
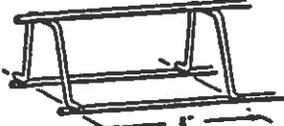


GRADE 40 AND 50

BAR IDENTIFICATION MARKS

BAR SUPPORTS

TABLE I — TYPES AND SIZES

SYMBOL	BAR SUPPORT ILLUSTRATION	BAR SUPPORT ILLUSTRATION PLASTIC CAPPED OR DIPPED	TYPE OF SUPPORT	SIZES
SB		 CAPPED	Slab Bolster	$\frac{3}{4}$, 1, 1½, and 2 inch heights in 5 ft. and 10 ft. lengths
SBU*			Slab Bolster Upper	Same as SB
BB		 CAPPED	Beam Bolster	1, 1½, 2, over 2" to 5" heights in increments of ¼" in lengths of 5 ft.
BBU*			Beam Bolster Upper	Same as BB
BC		 DIPPED	Individual Bar Chair	$\frac{3}{4}$, 1, 1½, and 1¾" heights
JC		 DIPPED DIPPED	Joist Chair	4, 5, and 6 inch widths and $\frac{3}{4}$, 1 and 1½ inch heights
HC		 CAPPED	Individual High Chair	2 to 15 inch heights in increments of ¼ inch
HCM*			High Chair for Metal Deck	2 to 15 inch heights in increments of ¼ in.
CHC		 CAPPED	Continuous High Chair	Same as HC in 5 foot and 10 foot lengths
CHCU*			Continuous High Chair Upper	Same as CHC
CHCM*			Continuous High Chair for Metal Deck	Up to 5 inch heights in increments of ¼ in.
JCU**		 DIPPED	Joist Chair Upper	14" Span Heights - 1" thru +3½" vary in ¼" increments

*Usually available in Class 3 only, except on special order.
 **Usually available in Class 3 only, with upturned or end bearing legs.

BAR SUPPORTS

TABLE II.¹ — WIRE SIZES & GEOMETRY

SYMBOL	NOMINAL HEIGHT ³	WIRE SIZES ²				USUAL GEOMETRY
		CARBON STEEL			STAIN-LESS STEEL	
		TOP	LEGS	RUNNER	LEGS	
SB	All	4 ga. Corrugated	6 ga.	—	8 ga.	Legs spaced 5 in. on center. Vertical corrugations spaced 1 in. on center. ⁴
SBU	All	4 ga. Corrugated	6 ga.	7 ga.	—	Same as SB
BB	Up to 1½" incl. Over 1½" to 2" incl. Over 2" to 3½" incl. Over 3½"	7 ga.	7 ga.	—	9 ga.	Legs spaced 2½ in. on center. ⁴
		7 ga.	7 ga.	—	8 ga.	
		4 ga.	4 ga.	—	7 ga.	
		4 ga.	4 ga.	—	—	
BBU	Up to 2" incl. Over 2"	7 ga.	7 ga.	7 ga.	—	Same as BB.
		4 ga.	4 ga.	4 ga.	—	
BC	All	—	7 ga.	—	9 ga.	— ⁴
JC	All	—	6 ga.	—	9 ga.	— ⁴
HC	2" to 3½" incl. Over 3½" to 5" incl. Over 5" to 9" incl. Over 9" to 15" incl.	—	4 ga.	—	7 ga.	Legs at 20 deg. or less with vertical. When height exceeds 12 in., legs are reinforced with welded crosswires or encircling wires. ⁵
		—	4 ga.	—	—	
		—	2 ga.	—	—	
		—	0 ga.	—	—	
HCM	2" to 5" incl. Over 5" to 9" incl. Over 9" to 15" incl.	—	4 ga.	—	—	Same as HC. The longest leg will govern the size of wire to be used. ⁵
		—	—	—	—	
		—	—	—	—	
		—	—	—	—	
CHC	2" to 3½" incl. Over 3½" to 5" incl. Over 5" to 9" incl. Over 9" to 15" incl.	2 ga.	4 ga.	—	7 ga.	Legs at 20 deg. or less with vertical. All legs 8¼ in. on center maximum, with leg within 4 in. of end of chair, and spread between legs not less than 50% of nominal height. ⁶
		2 ga.	4 ga.	—	—	
		2 ga.	2 ga.	—	—	
		2 ga.	0 ga.	—	—	
CHCU	2" to 5" incl. Over 5" to 9" incl. Over 9" to 15" incl.	2 ga.	4 ga.	4 ga.	—	Same as CHC.
		2 ga.	2 ga.	4 ga.	—	
		2 ga.	0 ga.	4 ga.	—	
CHCM	Up to 2" incl. Up to 2" incl. Over 2" to 5" incl.	4 ga.	6 ga.	—	—	With 4 ga. top wire, maximum leg spacing is 5 in. on center. ⁶ With 2 ga. top wire, maximum spacing is 10 in. on center. ⁶
		2 ga.	4 ga.	—	—	
		2 ga.	4 ga.	—	—	
JCU	-1" to +3½" incl. (Measured from form to top of middle portion of saddle bar) in ¼" increments.	#4 bar or ½" ϕ	2 ga.	—	—	Legs spaced 14 in. on center. Maximum height of JCU at support legs shall be slab thickness minus ¾ in.

¹Top wire on continuous supports, not otherwise designated as corrugated, may be straight or corrugated.

²Wire sizes are American Steel & Wire gauges.

³The nominal height of the bar support is taken as the distance from the bottom of the leg, sandplate or runner wire to the bottom of the reinforcement. Variations of plus or minus ¼ in. from the stated nominal height are generally permitted.

⁴In order to provide adequate stability against overturning, the leg spread measured between points of support on the minor axis of the support is recommended to be not less than 70 percent of the nominal height.

⁵In order to provide adequate stability against overturning, the leg spread measured between points of support on the minor axis of the support is recommended to be less than 55 percent of the nominal height.

⁶In order to provide adequate stability against overturning, and to provide adequate load capacity, the leg spread measured between points of support on the minor axis of the support is recommended to not exceed the minimum and maximum percentages of the nominal height, as shown.

NOMINAL HEIGHT (INCHES)	DISTANCE BETWEEN SUPPORTS, % OF NOMINAL HEIGHT	
	MINIMUM	MAXIMUM
		See note
Under 4	70	95
4	70	95
6	65	90
8	60	85
10	55	80
12	50	75
Over 12	50	75