

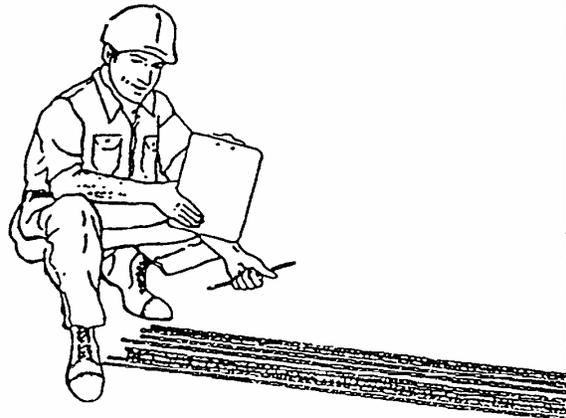


field identification
guide for
reinforcing bars



CONCRETE
REINFORCING
STEEL
INSTITUTE

field identification
guide for
reinforcing bars



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**U.S. MANUFACTURERS OF GRADE 60 [420]
CONCRETE REINFORCING BARS**

CONTACT INFORMATION FOR CRSI MILL MEMBERS

GERDAU AMERISTEEL

Charlotte Steel Mill Division
6601 Lakeview Road
Charlotte, NC 28213
Tel: 704-596-0361
Fax: 704-597-5031
Web: www.ameristeel.com

GERDAU AMERISTEEL

Jacksonville Steel Mill Division
Highway 217 & Yellow Water Road
Baldwin, FL 32234
Tel: 904-266-4261
Fax: 904-266-4244
Web: www.ameristeel.com

GERDAU AMERISTEEL

Knoxville Steel Mill Division
1919 Tennessee Avenue
Knoxville, TN 37950
Tel: 865-546-5472
Fax: 865-637-8293
Web: www.ameristeel.com

GERDAU AMERISTEEL

West Tennessee Steel Mill Division
801 AmeriSteel Road
Jackson, TN 38305
Tel: 901-424-5600
Fax: 901-422-4247
Web: www.ameristeel.com

GERDAU AMERISTEEL

St. Paul Mill
1678 Red Rock Road
St. Paul, MN 55164
Tel: 651-731-5600
Fax: 651-731-5699
Web: www.cargillsteel.com/carnss

AUBURN STEEL COMPANY, INC.

Auburn Division
25 Quarry Road
Auburn, NY 13021
Tel: 315-253-4561
Fax: 315-253-5377
Web: www.austeel.com

NUCOR STEEL BIRMINGHAM, INC.

Alabama Steel Division
2301 Shuttlesworth Drive
Birmingham, AL 35234
Tel: 205-252-8777
Fax: 205-250-7465
Web: www.birminghamsteel.com

NUCOR STEEL KANKAKEE, INC.

Illinois Steel Division, Kankakee Plant
972 East 4500 North Road
Bourbonnais, IL 69014
Tel: 815-937-3131
Fax: 815-939-5599
Web: www.birminghamsteel.com

NUCOR STEEL JACKSON, INC.

Mississippi Steel Division
3630 Fourth Street
Jackson, MS 39208
Tel: 601-939-1623
Fax: 601-936-6200
Web: www.birminghamsteel.com

NUCOR STEEL SEATTLE, INC.

Seattle Washington Steel Division
2424 SW Andover
Seattle, WA 98106
Tel: 206-933-2222
Fax: 206-933-2207
Web: www.birminghamsteel.com

CASCADE STEEL ROLLING MILLS, INC.

3200 Northeast Highway 99W
McMinnville, OR 97128
Tel: 503-472-4181
Fax: 503-434-5739
Web: www.schn.com

**U.S. MANUFACTURERS OF GRADE 60 [420]
CONCRETE REINFORCING BARS**

CONTACT INFORMATION FOR CRSI MILL MEMBERS

AUBURN STEEL COMPANY, INC.

Lemont Division
New Avenue at Ceco Road
Lemont, IL 60439
Tel: 630-243-0012
Fax: 630-243-0031
Web: www.austeel.com

MARION STEEL COMPANY

912 Cheney Avenue
Marion, OH 43302
Tel: 740-383-4011
Fax: 740-383-6429
Web: www.marionsteel.com

NORTH STAR STEEL COMPANY

Beaumont Mill
PO Box 2390
Beaumont, TX 77704
Tel: 409-768-1211
Fax: 409-769-1978
Web: www.cargillsteel.com/carnss

SHEFFIELD STEEL CORP.

2300 South Highway 97
Sand Springs, OK 74063
Tel: 918-245-1335
Fax: 918-245-9343
Web: www.sheffieldsteel.com

NORTH STAR STEEL COMPANY

Kingman Mill
3000 Highway 66 South
Kingman, AZ 86413
Tel: 520-718-0119
Fax: 520-718-7093
Web: www.cargillsteel.com/carnss

STRUCTURAL METALS, INC.

Arkansas Mill
PO Box 1147
Magnolia, AR 71753
Tel: 870-234-8703
Fax: 870-234-8706
Web: www.steelnet.org/cmc

NORTH STAR STEEL COMPANY

Monroe Mill
3000 East Front Street
Monroe, MI 48161
Tel: 734-243-2446
Fax: 734-243-2751
Web: www.cargillsteel.com/carnss

STRUCTURAL METALS, INC.

South Carolina Mill
310 New State Road
Cayce, SC 29033
Tel: 803-936-3700
Fax: 803-936-3711
Web: www.steelnet.org/cmc

GERDAU AMERISTEEL

St. Paul Mill
1678 Red Rock Road
St. Paul, MN 55164
Tel: 651-731-5600
Fax: 651-731-5699
Web: www.cargillsteel.com/carnss

STRUCTURAL METALS, INC.

Texas Mill
PO Box 911
Seguin, TX 78156
Tel: 830-372-8200
Fax: 830-379-9873
Web: www.steelnet.org/cmc

GERDAU AMERISTEEL

Wilton Mill
Highway 38 Greens Road
Wilton, IA 52778
Tel: 319-732-3231
Fax: 319-732-4575
Web: www.cargillsteel.com/carnss

TAMCO

12459 Arrow Highway
Rancho Cucamonga, CA 91739
Tel: 909-899-0660
Fax: 909-899-1910

MATERIAL SPECIFICATIONS FOR REINFORCING BARS

Identification Marks*—ASTM Standard Rebars

The ASTM specifications for billet-steel, rail-steel, axle-steel and low-alloy reinforcing bars (A615, A616, A617 and A706, 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 #11, #14, #18)
- 3rd—Type of Steel:

S for Billet (A615)

W for Low-Alloy (A706)

I for Rail (A616)

I R for Rail meeting Supplementary Requirements S1 (A616)

A for Axle (A617)

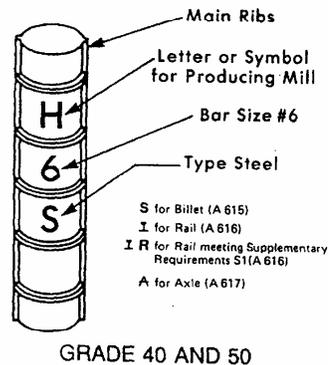
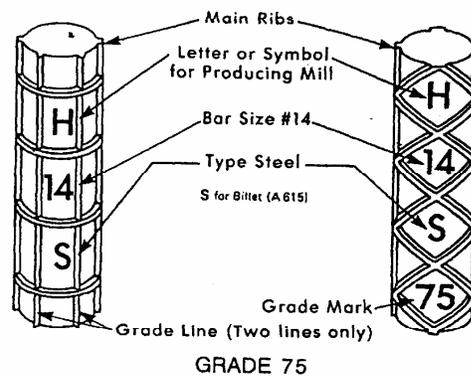
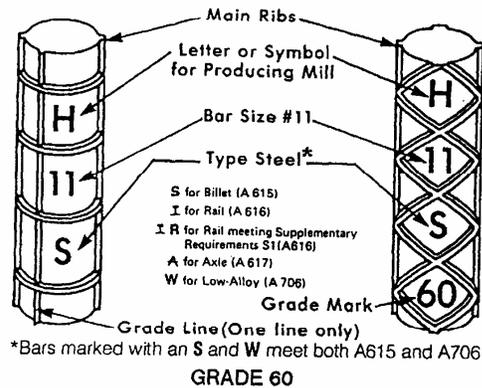
4th—Minimum Yield Designation

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

A grade line is smaller and is located between the two main ribs which are on opposite sides of all bars made in the United States. A grade line must be continued through at least 5 deformation spaces, and it may be placed on the same side of the bar as the other markings or on the opposite side. A grade mark is the 4th mark on the bar.

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

VARIATIONS: Bar identification marks may also be oriented to read horizontally (at 90° to those illustrated). Grade mark numbers may be placed within separate consecutive deformation spaces to read vertically or horizontally.



*See Appendix A for complete identification marks of Grade 60 concrete reinforcing bars produced by all U.S. Manufacturers. The marks, listed alphabetically by producing mill, include the identification requirements of ASTM and the deformation pattern used by each mill.

ASTM STANDARD REINFORCING BARS

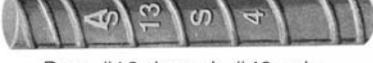
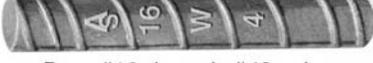
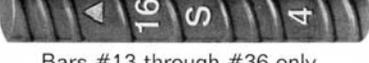
English Bar Size	Diameter (inches)	Metric Bar Size	Diameter (mm)
#3	0.375	#10	9.5
#4	0.500	#13	12.7
#5	0.625	#16	15.9
#6	0.750	#19	19.1
#7	0.875	#22	22.2
#8	1.000	#25	25.4
#9	1.128	#29	28.7
#10	1.270	#32	32.3
#11	1.410	#36	35.8
#14	1.693	#43	43.0
#18	2.257	#57	57.3

ASTM STANDARD REINFORCING CONVERSION BAR SIZE & GRADE CHARTS

<u>SIZE</u>			<u>GRADE</u>	
<u>English</u>	=	<u>Metric</u>	<u>English</u>	<u>Metric</u>
#3	=	#10	Grade 40	300 MPa
#4	=	#13	Grade 60	420 MPa
#5	=	#16	Grade 75	520 MPa
#6	=	#19		
#7	=	#22		
#8	=	#25		
#9	=	#29		
#10	=	#32		
#11	=	#36		
#14	=	#43		
#18	=	#57		

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

<p>1 A.B. STEEL MILL, INC. (Cincinnati, OH)</p> <p>S </p> <p style="text-align: center;">Bars #3 and #4 only Grade mark line used for #3 (same side)</p>	<p>2 GERDAU AMERISTEEL CRSI (West Tennessee Steel Mill Division in Jackson, TN)</p> <p>S </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>1 A.B. STEEL MILL, INC. (Cincinnati, OH)</p> <p>S </p> <p style="text-align: center;">Bars #5 through #8 only</p>	<p>2 GERDAU AMERISTEEL CRSI (West Tennessee Steel Mill Division in Jackson, TN)</p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>2 GERDAU AMERISTEEL CRSI (Charlotte Steel Mill Division in Charlotte, NC)</p> <p>S </p> <p style="text-align: center;">Bars #13 through #25 only</p>	<p>2 GERDAU AMERISTEEL CRSI (West Tennessee Steel Mill Division in Jackson, TN)</p> <p>W </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>2 GERDAU AMERISTEEL CRSI (Charlotte Steel Mill Division in Charlotte, NC)</p> <p>W </p> <p style="text-align: center;">Bars #13 through #25 only</p>	<p>3 AUBURN STEEL COMPANY, INC. CRSI (Auburn Division in Auburn, NY)</p> <p>S </p> <p style="text-align: center;">Bars #13 through #43 only</p>
<p>2 GERDAU AMERISTEEL CRSI (Jacksonville Steel Mill Division in Baldwin, FL)</p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only (#10 through #16 coiled)</p>	<p>3 AUBURN STEEL COMPANY, INC. CRSI (Auburn Division in Auburn, NY)</p> <p>W </p> <p style="text-align: center;">Bars #13 through #43 only</p>
<p>2 GERDAU AMERISTEEL CRSI (Jacksonville Steel Mill Division in Baldwin, FL)</p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only (#10 through #16 coiled)</p>	<p>3 AUBURN STEEL COMPANY, INC. CRSI (Lemont Division in Lemont, IL)</p> <p>S </p> <p style="text-align: center;">Bars #13 through #36 only</p>
<p>2 GERDAU AMERISTEEL CRSI (Knoxville Steel Mill Division in Knoxville, TN)</p> <p>S </p> <p style="text-align: center;">Bars #13 through #36 only</p>	<p>3 AUBURN STEEL COMPANY, INC. CRSI (Lemont Division in Lemont, IL)</p> <p>W </p> <p style="text-align: center;">Bars #13 through #36 only</p>
<p>2 GERDAU AMERISTEEL CRSI (Knoxville Steel Mill Division in Knoxville, TN)</p> <p>W </p> <p style="text-align: center;">Bars #13 through #36 only</p>	<p>4 BAYOU STEEL CORP. (Harriman, TN)</p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>2 GERDAU AMERISTEEL CRSI (West Tennessee Steel Mill Division in Jackson, TN)</p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>	<p>5 NUCOR STEEL BIRMINGHAM, INC. CRSI (Alabama Steel Division in Birmingham, AL)</p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

<p>5 NUCOR STEEL BIRMINGHAM, INC. CRSI <small>(Alabama Steel Division in Birmingham, AL)</small></p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only</p>	<p>6 BORDER STEEL, INC. <small>(El Paso, TX)</small></p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>5 NUCOR STEEL KANKAKEE INC. CRSI <small>(Illinois Steel Division, Kankakee Plant in Bourbonnais, IL)</small></p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>	<p>6 BORDER STEEL, INC. <small>(El Paso, TX)</small></p> <p>S </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>5 NUCOR STEEL KANKAKEE, INC. CRSI <small>(Illinois Steel Division, Kankakee Plant in Bourbonnais, IL)</small></p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only</p>	<p>6 BORDER STEEL, INC. <small>(El Paso, TX)</small></p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>5 NUCOR STEEL JACKSON, INC. CRSI <small>(Mississippi Steel Division in Jackson, MS)</small></p> <p>S </p> <p style="text-align: center;">Bars #13 through #36 only</p>	<p>6 BORDER STEEL, INC. <small>(El Paso, TX)</small></p> <p>W </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>5 NUCOR STEEL JACKSON, INC. CRSI <small>(Mississippi Steel Division in Jackson, MS)</small></p> <p>W </p> <p style="text-align: center;">Bars #13 through #36 only</p>	<p>7 CASCADE STEEL ROLLING MILLS, INC. CRSI <small>(McMinnville, OR)</small></p> <p>S </p> <p style="text-align: center;">Bars #10 through #19 only (#10 through #19 coiled)</p>
<p>5 NUCOR STEEL SEATTLE, INC. CRSI <small>(Seattle Washington Steel Division in Seattle, WA)</small></p> <p>S </p> <p style="text-align: center;">All bar sizes</p>	<p>7 CASCADE STEEL ROLLING MILLS, INC. CRSI <small>(McMinnville, OR)</small></p> <p>S </p> <p style="text-align: center;">Bars #16 through #22 only</p>
<p>5 NUCOR STEEL JACKSON, INC. CRSI <small>(Seattle Washington Steel Division in Seattle, WA)</small></p> <p>W </p> <p style="text-align: center;">All bar sizes</p>	<p>7 CASCADE STEEL ROLLING MILLS, INC. CRSI <small>(McMinnville, OR)</small></p> <p>S </p> <p style="text-align: center;">Bars #25 through #57 only</p>
<p>5 NUCOR STEEL SEATTLE, INC. CRSI <small>(Seattle Washington Steel Division in Seattle, WA)</small></p> <p>S </p> <p style="text-align: center;">All bar sizes</p>	<p>7 CASCADE STEEL ROLLING MILLS, INC. CRSI <small>(McMinnville, OR)</small></p> <p>W </p> <p style="text-align: center;">Bars #13 through #19 only (#13 through #19 coiled)</p>
<p>5 NUCOR STEEL SEATTLE, INC. CRSI <small>(Seattle Washington Steel Division in Seattle, WA)</small></p> <p>S </p> <p style="text-align: center;">All bar sizes</p>	<p>7 CASCADE STEEL ROLLING MILLS, INC. CRSI <small>(McMinnville, OR)</small></p> <p>W </p> <p style="text-align: center;">Bars #16 through #22 only</p>

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<p>7 CASCADE STEEL ROLLING MILLS, INC. CRSI (McMinnville, OR)</p> <p>W  Bars #25 through #57 only</p>	<p>13 MARION STEEL COMPANY CRSI (Marion, OH)</p> <p>S  Bars #13 through #36 only Grade mark line opposite side, "I" may be under "S" for #13 or #16</p>
<p>8 CHICAGO HEIGHTS STEEL (Chicago Heights, IL)</p> <p>I  Bars #4 through #8 only</p>	<p>13 MARION STEEL COMPANY CRSI (Marion, OH)</p> <p>W  Bars #13 through #36 only Grade mark line on opposite side</p>
<p>9 CONNECTICUT STEEL CORP. (Wallingford, CT)</p> <p>S  Coiled bars #10 and #13 only</p>	<p>14 NORTH STAR STEEL COMPANY CRSI (Beaumont Mill in Beaumont, TX)</p> <p>S  Coiled bars #10 through #16 only</p>
<p>10 GERDAU AMERISTEEL (Perth Amboy, NJ)</p> <p>S  Coiled bars #10 through #19 only</p>	<p>14 NORTH STAR STEEL COMPANY CRSI (Kingman Mill in Kingman, AZ)</p> <p>S  All bar sizes (#10 through #16 coiled)</p>
<p>10 GERDAU AMERISTEEL (Perth Amboy, NJ)</p> <p>W  Coiled bars #10 through #19 only</p>	<p>14 NORTH STAR STEEL COMPANY CRSI (Kingman Mill in Kingman, AZ)</p> <p>W  Bars #10 through #36 only (#10 through #16 coiled)</p>
<p>11 GERDAU AMERISTEEL (Sayreville, NJ)</p> <p>S  All bar sizes</p>	<p>14 NORTH STAR STEEL COMPANY CRSI (Monroe Mill in Monroe, MI)</p> <p>S  Bar #13 only Grade mark line on opposite side</p>
<p>11 GERDAU AMERISTEEL (Sayreville, NJ)</p> <p>W  All bar sizes</p>	<p>14 NORTH STAR STEEL COMPANY CRSI (Monroe Mill in Monroe, MI)</p> <p>W  Bar #13 only Grade mark line on opposite side</p>
<p>12 GST STEEL COMPANY (Kansas City, MO)</p> <p>S  Coiled bars #3 and #4 only</p>	<p>14 GERDAU AMERISTEEL CRSI (St. Paul Mill in St. Paul, MN)</p> <p>S  Bars #13 through #36 only Grade mark line on opposite side</p>
<p>12 GST STEEL COMPANY (Kansas City, MO)</p> <p>W  Coiled bars #3 and #4 only</p>	<p>14 GERDAU AMERISTEEL CRSI (St. Paul Mill in St. Paul, MN)</p> <p>S  Bars #43 and #57 only Grade mark line on opposite side</p>

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ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

<p>14 GERDAU AMERISTEEL CRSI (St. Paul Mill in St. Paul, MN)</p> <p>W  W Bars #13 through #36 only Grade mark line on opposite side</p>	<p>16 NUCOR STEEL (Utah Mill in Plymouth, UT)</p> <p>S  S Bars #10 through #25 only (#10 through #16 coiled)</p>
<p>14 GERDAU AMERISTEEL CRSI (St. Paul Mill in St. Paul, MN)</p> <p>W  W Bars #43 and #57 only Grade mark line on opposite side</p>	<p>16 NUCOR STEEL (Utah Mill in Plymouth, UT)</p> <p>S  S Bars #19 through #25 only</p>
<p>14 GERDAU AMERISTEEL CRSI (St. Paul Mill in St. Paul, MN)</p> <p>S  S Bars #19 through #57 (Patented) Long. groove one side only, marking system not per ASTM</p>	<p>16 NUCOR STEEL (Utah Mill in Plymouth, UT)</p> <p>S  S Bars #19 through #36 only</p>
<p>14 GERDAU AMERISTEEL CRSI (Wilton Mill in Wilton, IA)</p> <p>S  S Bar #13 only Grade mark line on opposite side - "I" is first mark (shown) or under S</p>	<p>16 NUCOR STEEL (Utah Mill in Plymouth, UT)</p> <p>S  S Bars #43 and #57 only</p>
<p>15 NORTHWESTERN STEEL & WIRE CO. (Sterling, IL)</p> <p>S  S Coiled bars #10 through #16 only Inch-pound markings on opposite side</p>	<p>16 NUCOR STEEL (Utah Mill in Plymouth, UT)</p> <p>W  W Bars #10 through #25 only (#13 and #16 coiled)</p>
<p>15 NORTHWESTERN STEEL & WIRE CO. (Sterling, IL)</p> <p>S  S Coiled bars #10 through #16 only Inch-pound markings on opposite side</p>	<p>16 NUCOR STEEL (Utah Mill in Plymouth, UT)</p> <p>W  W Bars #19 through #36 only</p>
<p>16 NUCOR STEEL (South Carolina Mill in Darlington, SC)</p> <p>S  S Bars #13 through #19 only (#16 coiled)</p>	<p>17 RIVERVIEW STEEL CORP. (Glassport, PA)</p> <p>S  S Bars #10 through #19 only</p>
<p>16 NUCOR STEEL (South Carolina Mill in Darlington, SC)</p> <p>S  S Bars #22 through #36 only</p>	<p>18 ROCKY MOUNTAIN STEEL MILLS (Pueblo, CO)</p> <p>S  S Coiled bars #3 through #5 only</p>
<p>16 NUCOR STEEL (Texas Mill in Jewett, TX)</p> <p>S  S Bars #10 through #36 only</p>	<p>18 ROCKY MOUNTAIN STEEL MILLS (Pueblo, CO)</p> <p>S  S Coiled bars #3 through #7 only</p>

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<p>18 ROCKY MOUNTAIN STEEL MILLS <small>(Pueblo, CO)</small></p> <p>W </p> <p style="text-align: center;">Coiled bars #3 through #5 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(South Carolina Mill in Cayce, SC)</small></p> <p>S </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>18 ROCKY MOUNTAIN STEEL MILLS <small>(Pueblo, CO)</small></p> <p>W </p> <p style="text-align: center;">Coiled bars #3 through #7 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(South Carolina Mill in Cayce, SC)</small></p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>18 ROCKY MOUNTAIN STEEL MILLS <small>(Pueblo, CO)</small></p> <p>SW </p> <p style="text-align: center;">Coiled bars #4 #5 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(Arkansas Mill in Magnolia, AR)</small></p> <p>S </p> <p style="text-align: center;">Bars #10 through #19 only</p>
<p>18 ROCKY MOUNTAIN STEEL MILLS <small>(Pueblo, CO)</small></p> <p>SW </p> <p style="text-align: center;">Coiled bars #3</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(Arkansas Mill in Magnolia, AR)</small></p> <p>I </p> <p style="text-align: center;">Bars #10 through #19 only</p>
<p>19 SHEFFIELD STEEL CRSI <small>(Sand Springs, OK)</small></p> <p>S </p> <p style="text-align: center;">Bars #13 through #43 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(South Carolina Mill in Cayce, SC)</small></p> <p>W </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>20 SILVER, INC., W. <small>(El Paso, TX)</small></p> <p>I </p> <p style="text-align: center;">Bar #3 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(Texas Mill in Seguin, TX)</small></p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>20 SILVER, INC., W. <small>(El Paso, TX)</small></p> <p>I </p> <p style="text-align: center;">Bar #3 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(Texas Mill in Seguin, TX)</small></p> <p>S </p> <p style="text-align: center;">Bars #43 and #57 only</p>
<p>20 SILVER, INC., W. <small>(El Paso, TX)</small></p> <p>I </p> <p style="text-align: center;">Bar #3 only Grade mark line on opposite side</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(Texas Mill in Seguin, TX)</small></p> <p>W </p> <p style="text-align: center;">Bars #10 through #36 only</p>
<p>21 STRUCTURAL METALS, INC. CRSI <small>(South Carolina Mill in Cayce, SC)</small></p> <p>S </p> <p style="text-align: center;">Bars #10 through #36 only</p>	<p>21 STRUCTURAL METALS, INC. CRSI <small>(Texas Mill in Seguin, TX)</small></p> <p>W </p> <p style="text-align: center;">Bars #43 and #57 only</p>

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

U.S. MANUFACTURERS OF GRADE 60 [420] CONCRETE REINFORCING BARS

ASTM and AASHTO Specifications require that all reinforcing bars be identified by permanent, mill imprinted markings.

<p>22 TAMCO (Rancho Cucamonga, CA) CRSI</p> <p>W </p> <p>Bars #13 through #36 only</p>	<p>23 TXI CHAPARRAL STEEL (Midlothian, TX)</p> <p>S </p> <p>Bars #10 through #36 only Grade mark line on opposite side</p>
<p>22 TAMCO (Rancho Cucamonga, CA) CRSI</p> <p>W </p> <p>Bars #43 and #57 only</p>	<p>23 TXI CHAPARRAL STEEL (Midlothian, TX)</p> <p>W </p> <p>Bars #10 through #36 only Grade mark line on opposite side</p>
<p>22 TAMCO (Rancho Cucamonga, CA) CRSI</p> <p>S </p> <p>Bars #13 through #36 only</p>	
<p>22 TAMCO (Rancho Cucamonga, CA) CRSI</p> <p>S </p> <p>Bars #43 and #57 only</p>	

Note: CRSI mill members are in boldface with the CRSI logo at the top right corner.

MATERIAL SPECIFICATIONS FOR REINFORCING BARS

TABLE 1—MECHANICAL REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS*

Type of Steel and ASTM Designation	Bar Nos. Range	Grade ¹	Minimum ² Yield Strength, psi	Minimum Tensile Strength, psi	Minimum Percentage Elongation in 8 in.	Cold Bend Test ³ Pin Diameter (d=nominal diameter of specimen)
Billet-Steel A615	3-6	40	40,000	70,000	#3 11 #4, #5, #6 12	#3, #4, #5 3 ¹ / ₂ d #6 5d
	3-11, 14, 18	60	60,000	90,000	#3, #4, #5, #6 9 #7, #8 8 #9, #10, #11, #14, #18 7	#3, #4, #5 3 ¹ / ₂ d #6, #7, #8 5d #9, #10, #11 7d #14, #18 (90°) 9d
	6-11, 14, 18	75	75,000	100,000	#6, #7, #8 7 #9, #10, #11, #14, #18 6	#6, #7, #8 5d #9, #10, #11 7d #14, #18 (90°) 9d
Low-Alloy Steel A706	3-11, 14, 18	60	60,000 ⁴	80,000 ⁵	#3, #4, #5, #6 14 #7, #8, #9, #10, #11 12 #14, #18 10	#3, #4, #5 3d #6, #7, #8 4d #9, #10, #11 6d #14, #18 8d

TABLE 2—DEFORMATION REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS

Size No.	Maximum Average Spacing, in.	Minimum Average Height, in.	Maximum ¹ Gap, in.
3	0.262	0.015	0.143
4	0.350	0.020	0.191
5	0.437	0.028	0.239
6	0.525	0.038	0.286
7	0.612	0.044	0.334
8	0.700	0.050	0.383
9	0.790	0.056	0.431
10	0.889	0.064	0.487
11	0.987	0.071	0.540
14	1.185	0.085	0.648
18	1.58	0.102	0.864

¹Chord of 12.5% of nominal perimeter

¹Minimum yield designation.

²Yield point or yield strength. See ASTM specifications.

³Test bends 180° unless noted otherwise.

⁴Maximum yield strength 78,000 psi (ASTM A706 only).

⁵Tensile strength shall not be less than 1.25 times the actual yield strength (ASTM A706 only).

*For the mechanical requirements of rail-steel and axle-steel bars, see ASTM specifications A616 and A617, respectively.

TABLE 3—CHEMICAL COMPOSITION REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS

Type of Steel and ASTM Designation	Condition*	Element									
		Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulfur (S)	Silicon (Si)	Copper (Cu)	Nickel (Ni)	Chromium (Cr)	Molybdenum (Mo)	Vanadium (V)
Billet-Steel A615	1	X	X	X	X						
	2			0.06%							
	3			0.075%							
Low-Alloy Steel A706	1	X	X	X	X	X	X	X	X	X	X
	2	0.30%	1.50%	0.035%	0.045%	0.50%					
	3	0.33%	1.56%	0.043%	0.053%	0.55%					

*CONDITION DEFINITIONS: 1 Analysis required of these elements for each heat.

2 Maximum allowable chemical content for each heat.

3 Maximum allowable chemical content for finished bar.