Supplemental Specification
2017 Standard Specification Book

SECTION 03211

REINFORCING STEEL AND WELDED WIRE

Delete Section 03211 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel, steel welded wire reinforcement, dowelled anchors, T-headed bars, mechanical couplers, and grouted splice couplers.

B. Coating for reinforcing steel, steel welded wire reinforcement, and dowelled anchors.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. AASHTO M 31: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

B. AASHTO M 336: Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement

C. AASHTO T 106: Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in Cube Specimens)

D. ASTM A 108: Steel Bar, Carbon and Alloy, Cold-Finished

E. ASTM A 641: Zinc-Coated (Galvanized) Carbon Steel Wire

F. ASTM A 493: Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging

G. ASTM A 706: Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

H. ASTM A 767: Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement

I. ASTM A 775: Epoxy-Coated Steel Reinforcing Bars

J. ASTM A 884: Epoxy-Coated Steel Wire and Welded Wire Reinforcement

K. ASTM A 934: Epoxy-Coated Prefabricated Steel Reinforcing Bars

L. ASTM A 955: Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement

M. ASTM A 970: Headed Steel Bars for Concrete Reinforcement

N. ASTM A 1060: Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete

O. ASTM D 3963: Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars

P. ASTM E 3121: Field Testing of Anchors in Concrete or Masonry

Q. ACI 355.4: Qualification of Post-Installed Adhesive Anchors in Concrete

R. American Welding Society (AWS) Standards

S. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Working Drawings
   1. Detailed shop drawings for review of the following:
      a. Field bending procedure if required. Provide the seal of a Professional Engineer (PE) or Professional Structural Engineer (SE) licensed in the State of Utah.
      b. Mechanical butt splice shop drawings when proposed details differ from the plans and specifications.
         1) Show number and location of mechanical butt splices.
         2) Provide two samples of mechanical butt splices and test to destruction in the presence of the Engineer.

B. Material Submittals
   1. Certificate of Compliance from the manufacturer.
   2. Continuous butt welded reinforcing hoops.
      a. Manufacturer's Quality Control (QC) procedures for the hoop fabrication for review. Include the following as a minimum:

1) The pre-production procedures for the qualification of material and equipment.
2) The methods and frequencies for performing QC procedures during production.
3) The calibration procedures and calibration frequency for all equipment.
4) The welding procedure specification (WPS) for resistance welding.
5) The method for identifying and tracking lots.

b. Two samples of welded splices for verification testing.

3. Grouted Splice Couplers
   a. Independent test report for review confirming coupler compliance for each supplied coupler size with the following:
      1) Develop 150 percent of the specified yield strength of the connected bar.
      2) Determine by testing the amount of time and grout compressive strength required to provide 100 percent of the specified minimum yield strength of the attached reinforcing bar. Use this value to determine when to release bracing.
      3) Use the same grout in the testing that will be used in the construction.
      4) Requirements for the grout including required strength gain to develop the specified minimum yield strength of the connected reinforcing bar.
4. Post-installed adhesive anchor material data sheet and recommended installation instructions for review

C. Continuous resistance butt welded hoop welder certifications
   1. Include welder test reports for each operator, process, and position as required by AWS specifications.
   2. Include a letter that states the certified welders have been using the process without an interruption of more than six months since being certified.

D. Grouted splice coupler quality assurance qualifications for information
   1. Grouted splice coupler installer qualifications
      a. Provide names and state experience or training of personnel responsible for installation of the grouted splice couplers.
         1) Include a certificate or statement of training with the names of the trained individuals signed by the manufacturer's representative
   2. Grouted splice coupler manufacturer's technical support representative qualifications. Include at least the following:
      a. Company name

b. Name and phone number of the technical support representative
c. List of projects using the submitted grouted splice coupler with at least two years of satisfactory performance. List the following for each project:
    1) Project name
    2) Bridge location (state routes and bridge identifiers)
    3) Scope of work
    4) Products used

1.6 QUALITY ASSURANCE

A. Grouted splice coupler manufacturer's technical support representative
    1. Provide a technical support representative onsite during preparation and grouting of the grouted splice coupler

B. Grouted splice coupler installers
    1. Installers must be familiar with installation and grouting of splice couplers and that have completed at least two successful projects in the last two years.
        a. Train new personnel within three months of installation by a manufacturer's technical representative as an acceptable substitution for the experience.

PART 2 PRODUCTS

2.1 REINFORCING STEEL

A. Deformed or plain carbon steel bars
    1. Refer to AASHTO M 31, Grade 60.

B. Deformed or plain low-alloy steel bars
    1. Refer to ASTM A 706, Grade 60.

C. Deformed or plain stainless steel bars
    1. Refer to ASTM A 955, Type XM-28.

2.2 WIRE AND WIRE REINFORCEMENT

A. Refer to AASHTO M 336 for cold drawn steel wire.

B. Refer to AASHTO M 366 for steel welded wire reinforcement.

2.3 T-HEADED BARS

A. Use T-headed bars consisting of deformed rebar with steel plates friction welded to one end of the rebar. Friction welding conforms to the authorized quality control manual and AWS C6.2, Friction Welding of Metals.
   1. Headed Bars that meet the requirements of ASTM A 970 may be substituted.

B. Use deformed rebar according to ASTM A 706, Grade 60.

C. Cut plate heads for T-headed bars from flats of hot-rolled steel according to ASTM A 108.

2.4 COATINGS

A. Epoxy Coating
   1. Reinforcing steel
      a. Refer to ASTM A 775 or ASTM A 934.
   2. Wire and wire reinforcement
      b. Refer to ASTM A 884.

B. Galvanized Coating
   1. Reinforcing steel
      a. Refer to ASTM A 767.
   2. Wire and wire reinforcement.
      a. Coat welded wire after fabrication.
      b. Refer to ASTM A 1060.

C. Coat bars as described.
   1. Maintain epoxy coating thickness between 8 and 12 mils.
   2. Maintain galvanized coating thickness according to ASTM A 767.
   3. Coat bars after bending unless the fabricator can show that satisfactory results can be obtained by coating before bending.
   4. Do not use bent bars with visible cracks or damage in the coating.

D. Coating Repair Materials
   1. Meet requirements of ASTM D 3963 for repair of epoxy coatings.
   2. Use Inorganic Zinc-Rich Paint with 65 to 69 percent metallic zinc by weight, or greater than 92 percent metallic zinc by weight in dry film for repair of galvanized coatings.
      a. Do not use spray applied galvanized coating repair materials.

2.5 DOWELLED ANCHORS

A. Post-Installed Adhesive Anchors
   1. Use adhesive satisfying the assessment criteria of ACI 355.4 including qualifications for seismic loading.

B. Use reinforcing steel, bolts, and anchors as shown.

2.6 BAR SUPPORTS AND TIE WIRE

A. Provide epoxy coated, galvanized, plastic coated, or plastic bar supports and tie wire that meet the following requirements when not in contact with stainless steel:
   1. Meet the requirements of Table 1.
   2. Remove contaminants that affect the adhesion of the coating to the wire.
   3. Use an electrostatic spray method, fluidized bed, or flocking to apply an epoxy coating.
   4. Apply plastic coating by spraying, dipping, or using as a powder.
   5. Provide galvanized coating according to ASTM A 641
   6. Use patching material according to the manufacturer's recommendation to repair damaged coating.
      a. Use patching material that is compatible with the coating and that is inert in concrete.
      b. Do not repair hanger marks on the coated bar supports that result from the coating application process. Hanger marks are not considered damaged coating.
   7. Use 16 gauge coated tie wire.
      a. Do not use galvanized tie wire with epoxy coated reinforcing steel.

B. Precast concrete block bar supports that conform to the following:
   1. Provide minimum 28-day compressive strength of 2,500 psi.
   2. Use three inch thick supports with sides ranging from 4 to 6 inches with a minimum ground contact area of 24 in^2.

C. Provide bar supports and tie wires for use with stainless steel bars that meet the following:
   1. Meet the requirements of Table 1.
   2. Provide bar supports that are plastic or stainless steel conforming to the requirements of ASTM A 493, Type 316.
   3. Provide tie wires that are plastic or stainless steel conforming to the requirements of ASTM A 493, Type 316, annealed.

2.7 MECHANICAL SPLICE COUPLER

A. Elastic capacity couplers:
   1. Use reinforcing steel mechanical splice couplers capable of developing in tension 125 percent of the specified yield strength of the reinforcing steel bar.

B. Ultimate strength couplers:
   1. Use where shown.
   2. For Grade 60 reinforcing steel bars
      a. Use reinforcing steel mechanical splice couplers capable of transferring at least 95 ksi in tension between the spliced reinforcing steel bars.

C. Use coated couplers with the same type of coating as the reinforcing steel being spliced.

D. Use stainless steel splice coupler with stainless steel reinforcement.

2.8 GROUTED SPLICE COUPLER

A. Use grouted splice couplers to join precast elements as shown.
   1. Provide couplers that use cementitious grout placed inside a steel casting. Grout is part of the proprietary system and is provided by the coupler manufacturer.

B. Use one of the following grouted splice coupler manufacturers according to the requirements of this Section. Refer to http://www.udot.utah.gov/go/standardsreferences for information on the following providers:
   1. NMB Splice Sleeve
      Splice Sleeve North America, Inc.
      38777 West Six Mile Road, Suite 205
      Livonia, MI 48152
   2. Sleeve-Lock Grout Sleeve System
      Dayton Superior Corporation
      1125 Byers Road
      Miamisburg, OH 45342
   3. Lenton Interlok
      Pantair USA
      34600 Solon Road
      Solon, OH 44139

C. Use grouted splice couplers that provide 150 percent of the specified yield strength of the connected bar.

D. Use grout supplied by the manufacturer of the coupler and that matches the certified test report for the coupler.

E. Use the same coating system as used for the reinforcing steel.
   1. Use grouted splice couplers that join the reinforcing steel without removal of the epoxy coating on the spliced bar when using epoxy coated reinforcing steel.

2.9 CONTINUOUS RESISTANCE BUTT WELDED HOOPS

A. Weld only reinforcing steel conforming to ASTM A 706 as shown.
   1. Use resistance butt welded splices for continuous hoops.

B. Refer to AWS D1.4: Structural Welding Code - Reinforcing Steel.

C. Change welding procedures to reflect chemical composition of the steel.
   1. Welders must have correct mill test report (chemical analysis) from the heat in which the steel was made.

D. Apply coating after all welding has been completed.

2.10 FABRICATION

A. Use Department Prequalified Suppliers for all reinforcing steel products.

B. Bend reinforcement to the shapes as shown. Refer to CRSI Manual of Standard Practice.

C. Do not heat the bars during the bending operations.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Protect the bars and the coating during handling and storage.
   1. Use systems with padded contact areas when handling epoxy coated bars.
   2. Pad all bundling bands for epoxy coated bars.
   3. Lift all bundles with strong-back, multiple supports, or a platform bridge.
   4. Do not drop or drag bars.

B. Store bars above the ground surface on wooden or padded supports.
   1. Place timbers between bundles when stacking is necessary.
   2. Space the supports close enough to prevent sags in the bundles.

C. Cover epoxy coated reinforcing steel with an opaque covering upon delivery to the project site.
   1. Protect epoxy coated reinforcing steel that has been partially embedded in concrete or placed in formwork.
      a. Cover with an opaque covering before 30 days exposure to sunlight.
   2. Place the opaque coverings to provide air circulation and prevent condensation on the reinforcing steel.

D. Ship, handle, and store stainless reinforcing steel so it does not come in contact with carbon steel.
   1. Cover stainless reinforcing steel with tarps during outdoor storage.
   2. Separate bundles of stainless reinforcing steel from other types of reinforcing steel with wooden spacers.
   3. Store stainless reinforcing steel on wooden supports off the ground or floor.

3.2 COATING REPAIR

A. General
   1. Follow product manufacturer recommendations for repairs.
   2. Clean and dry repair area.
   3. Protect nearby surfaces from overspray.
   4. Allow at least 45 minutes of drying time before encasing repaired reinforcing bar in concrete.

B. Epoxy Coatings
   1. Do not apply repair materials at temperatures below 50 degrees F except where application instructions explicitly state lower temperatures are allowed.
   2. Apply multiple coats when using spray applied coating repair materials.
      a. Allow a few minutes between coats to avoid drips and runs.

C. Limits for Repair
   1. Repair minor damage to coatings and cut reinforcing steel bar ends with specified coating repair materials before placement.
      a. Refer to this Section, Article 3.2.
   2. Do not use bars with moderate damage to coatings within any one foot length of the reinforcing steel bar or as determined by the Engineer.
      a. Cut ends are not considered damage for this purpose.
   3. Replace installed reinforcing steel bars that have significant damage to coatings within any one foot length of the reinforcing steel bar or as determined by the Engineer.

3.3 PLACEMENT

A. Maintain a clean surface keeping all reinforcement free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease.

B. Place all reinforcement in designated position and securely hold in position while placing and vibrating concrete.
   1. Placing Tolerances
      a. Decks or members 10 inches or less in thickness
         1) Cover: -⅛ inch, + ¼ inch.
         2) Longitudinal spacing for individual bars: ±1 inch.
            a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
         3) Average spacing for 10 bars: $+^{1}/_{16}$ inch.
            a) Do not use tolerance to decrease number of bars or increase bar spacing.
      b. Members 10 to 20 inches in thickness
         1) Cover: ±¼ inch.
         2) Longitudinal spacing for individual bars, stirrups, or ties: ±1 inch.
            a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
         3) Average spacing for 10 bars: $+^{1}/_{16}$ inch.
            a) Do not use tolerance to decrease number of bars or increase bar spacing.
      c. Members greater than 20 inches in thickness
         1) Cover: -¼ inch, + ½ inch.
         2) Spacing for stirrups or ties: ±3 inches.
            a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
         3) Longitudinal bar spacing ±3 inches.
            a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
         4) Average spacing for 20 bars: +¼ inch.
            a) Do not use tolerance to decrease number of bars or increase bar spacing.
      d. Length of bar laps -1 inch
      e. Embedment length -1 inch

C. Tie bars together with ties at intersections except when spacing is less than 9 inches in each direction, in which case tie at alternate intersections.
    1. Tie bundled bars together at not more than 6 ft centers.

D. Maintain the required distance from the forms and between layers of reinforcement with prefabricated chairs, ties, hangers, or other devices.

E. Do not tack weld reinforcing bars in place.

F. Overlap at least one panel of welded wire reinforcement sheets to each other and fasten at the ends and edges.

G. Support reinforcing steel for concrete “T” beams, pier caps, approach slabs, and deck slabs on metal chairs or bar supports according to this Section, Article 2.6.

H. Space chairs for supporting the top steel and bolsters for supporting the bottom steel not more than 4 ft on center of the bar in each direction.

I. Tie deck steel to beams or forms at regular intervals of not more than 5 ft on center along the beams to prevent steel movement during concrete placement.

J. Support reinforcing steel for slabs on grade on metal chairs attached to a sand plate or use precast concrete block supports according to this Section, Article 2.6.
    1. Precast concrete block supports may only be used to support the bottom mat of bars.
        a. Do not use blocks that are cracked or damaged.

K. Do not place concrete until the Engineer has verified the reinforcement placement and fastening.

L. Place stainless steel reinforcement so that it does not come in contact with carbon steel.
    1. Do not tie stainless steel to uncoated or coated carbon steel reinforcement, galvanized attachments, or galvanized conduits.
        a. Maintain at least 1 inch clearance between the metals using nylon or polyethylene spacers when stainless steel reinforcing or dowels must be near coated or uncoated reinforcing, or galvanized metals.
            1) Bind using nylon cable ties.
            2) Maintain at least 1 inch clearance unless insufficient space exists.

a) Either bar may be sleeved with a $^{1}/_{8}$ inch minimum thick insulator material, such as polyethylene, nylon or rubber tube, extending at least 1 inch in either direction past the point of closest contact between the two dissimilar bars.
b) Sleeves are not allowed for bars that run parallel to each other.

3.4 FIELD CUTTING

A. Saw or shear coated bars that are specified to be cut in the field.
   1. Do not flame cut.

B. Repair the coating at the sawed or sheared end using the specified patching or repair material.

3.5 SPLICING

A. Furnish all reinforcing steel in the lengths shown.

B. Do not splice bars except where shown.

C. Stagger splices as far as possible.

D. Place and tie lapped splices to maintain the clearance to the surface of the concrete shown.

E. Do not allow lap splices in vertical column reinforcing bars unless shown.

F. Do not lap splice No. 14 and No. 18 bars.
   1. Use mechanical splice couplers.

G. Use mechanical splice couplers when shown.
   1. Follow the manufacturer's published recommendations for equipment and splicing procedures.

3.6 FIELD BENDING

A. Do not field bend reinforcing steel unless shown.

B. Follow the authorized field bending procedures.

C. Use methods that do not damage coatings.

D. Do not heat the bars during the bending operations.

E. Do not bend bars partially embedded in concrete except as shown or pre-approved by the Engineer.
   1. Do not field straighten or re-bend fabricated bent bars.

3.7 INSTALLATION OF DOWELLED ANCHORS

A. Use dowelled anchors according to the following:
   1. Drill, brush, and clean all holes and install all doweled anchors according to manufacturer's published recommendations, applicable specifications, and as shown.
   2. Do not install dowelled anchors until the holes are verified by the Engineer.
   3. Test post-installed adhesive anchors when shown, and as follows:
      a. Allow anchor adhesives to cure 48 hours before testing.
      b. Tension test according to ASTM E 3121.
         1) Test in the confined condition.
         2) Tension anchors to 90 percent of the anchor yield strength
         3) Hold tension at the specified load for at least 60 seconds.

3.8 CONNECTIONS USING GROUTED SPLICE COUPLERS

A. Use grouted splice coupler installers according to the submitted grouted splice coupler installer qualifications.

B Remove and clean all debris from the joints before grout application.

C. Keep bonding surfaces free from laitance, dirt, dust, paint, grease, oil, or any contaminants other than water.

D. Embed rebar anchor dowels to the minimum coupler embedment required by the manufacturer.

E. Saturate Surface Dry (SSD) all concrete surfaces in the joint before connecting the elements.

F. Use shims to verify that the reinforcing extensions are within the manufacturers recommended tolerance.

G. Maintain a minimum grout and sleeve temperature of 50 degrees F until the temporary bracing is removed.

H. Mix structural grout and coupler grout just before use according to the manufacturer's instructions.

I. Follow the manufacturer’s recommendations for coupler installation and grouting.

J. Monitor the grouting operation to verify that all sleeves have been filled.

K. Protect sleeves from vibration, shock, or other excessive movement until temporary bracing is removed.

L. Conform to the following when installing couplers above a horizontal joint:
   1. Determine the thickness of shims to provide the specified elevation within tolerance.
   2. Follow non-shrink grout manufacturer’s recommendations for mixing, joint surface preparation, and application.
   3. Place non-shrink grout on the interface between the two elements being joined before setting the element.
      a. Crown the thickness of the grout toward the center of the joint so that the grout can be displaced outward as the element is lowered onto the joint.
      b. Prevent the grout from entering the coupler above elements by using grout dams or seals.
   4. Set the element in place.
      a. Engage all couplers in the joint.
      b. Allow the grout to seep out of the joint.
   5. Trowel off excess grout to form a neat joint once the element is set, plumbed, and aligned.
      a. Pack grout into any voids around the joint perimeter.
   6. Flush out the coupler with clean potable water.
   7. Mix the special coupler grout according to the manufacturer’s recommendations for methods and proportions of mix and water.
   8. Make four sets of three 2 inch cube specimens for testing.
      a. Cure the specimens according to AASHTO T 106.
      b. Test one set of cubes for compressive strength to determine when to release bracing. Refer to this Section, Article 1.5 paragraph B4a2.
      c. Test one set of cubes at 28 days for acceptance.
      d. Store extra sets for longer term testing if necessary.
      e. Use a Department qualified laboratory to take the samples and perform the tests.
   9. Pump the coupler grout into the coupler that is cast into the element.
      a. Start from the lower port.
      b. Pump until the grout is flowing freely from the upper port.

c. Cap the upper port first and then remove the nozzle to cap the lower port.

10. Cure the joint according to the grout manufacturer's recommendations.

M. Conform to the following when installing couplers below a horizontal joint:
1. Determine shim thickness to provide the specified elevation within tolerance.
2. Before setting the element:
   a. Mix the coupler grout paying strict attention to the manufacturer's recommendations for methods and proportions of mix and water.
   b. Clean debris from the interior using compressed air.
      1) Remove any rain water using a vacuum that can remove water from the confined space in the coupler.
   c. Place the coupler grout into the coupler by pouring or pumping.
   d. Place grout on the interface between the two elements being joined.
      1) Crown the thickness of the grout toward the center of the joint so that the grout can be displaced outward as the element is lowered onto the joint.
3. Trowel off excess grout to form a neat joint once the element is set, plumbed, and aligned.
   a. Pack grout into any voids around the joint perimeter.

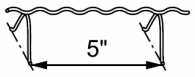
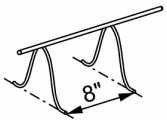
N. Conform to the following when installing couplers in vertical joints (horizontal bar/coupler connection):
1. Establish a method to provide the specified elevations, alignment, and spacing within tolerance.
2. Use washers or seals to prevent mixing the joint grout and the coupler grout.
3. Apply epoxy adhesive to the interface between the two elements being joined.
4. Set the element in place.
   a. Engage all couplers in the joint.
5. Flush out the couplers with clean potable water once the element is set, plumbed, and aligned.
6. Mix the coupler grout paying strict attention to the manufacturer's recommendations for methods and proportions of mix and water.

7. Pump the coupler grout into the coupler that is cast into the element.
    a. Start from the port closest to the joint.
    b. Pump until the grout is flowing freely from the other port.
    c. Cap the port farthest from the joint first and then remove the nozzle to cap the other port.
8. Form the edges of the joint and place grout into the joint.
9. Cure the joint according to the grout manufacturer's recommendations.

3.9 FIELD QUALITY CONTROL

A. Inspect coated bars for damage to the coating after the bars are in place and immediately before concrete placement.

Table 1

Bar Supports							
Types and Sizes				**Minimum Wire Sizes[2] and Geometry**			
Symbol	**Bar Support Illustration**	**Type of Support**	**Standard Sizes**	**Nominal Height**	**Carbon Steel**		**Geometry**
					Top	**Legs**	
SB[1]		Slab Bolster	¾, 1, 1½, and 2 inch heights in 5 ft and 10 ft lengths	All	4 ga. Corrugated	6 ga.	Legs Spaced 5 inches on Center, Vertical Corrugations Spaced 1 inch on Center (See Note 3)
BB[1]		Beam Bolster	1, 1½, and 2 inch; over 2 inch to 5 inch heights in increments of ¼ inch lengths of 5 ft.	Up to 1½ inch incl.	7 ga.	7 ga.	Legs Spaced 2½inches on Center (See Note 3)
				Over 1½ inch to 2 inches incl.	7 ga.	7 ga.	
				Over 2 inches to 3½ inches incl.	4 ga.	4 ga.	
				Over 3½ inch	4 ga.	4 ga.	
BC		Individual Bar Chair	¾, 1, 1½, and 1¾ inch heights	All	-----	7 ga.	(See Note 3)
JC		Joist Chair	4, 5, and 6 inch widths and ¾, 1, and 1½ inch heights	All	-----	6 ga.	(See Note 3)
HC or HPC*	 * SAND PLATE NEED NOT BE COATED	Individual High Chair	2 inch to 15 inch heights in increments of ¼ inch.	2 inches to 3½ inches incl.	-----	4 ga.	Legs at 20 degree or less with vertical. When height exceeds 12 inches, legs are reinforced with welded crosswires or encircling wires (See Note 4)
				Over 3½ inches to 5 inches incl.	-----	4 ga.	
				Over 5 inches to 9 inches incl.	-----	2 ga.	
				Over 9 inches to 15 inches incl.	-----	0 ga.	
CHC		Continuous High Chair	Same as HC in 5 ft and 10 ft lengths	2 inches to 3½ inches incl.	2 ga.	4 ga.	Legs at 20 degree or less with vertical. All legs 8¼ inches on center maximum, with leg within 4 inches of end of chair, and spread between legs not less than 50 percent of nominal height. (See Note 5)
				Over 3½ inches to 5 inches incl.	2 ga.	4 ga.	
				Over 5 inches to 9 inches incl.	2 ga.	2 ga.	
				Over 9 inches to 15 inches incl.	2 ga.	0 ga.	

Notes and Bar Supports Table, see next page.

Notes:

1. Provide top wire on continuous supports, not otherwise designated as corrugated, which may be straight or corrugated at the option of the manufacturer.

2. Provide minimum wire sizes that are American steel and wire gauges.

3. Provide adequate stability against overturning. The leg spread measured between points of support on the minor axis must be at least 70 percent of the nominal height.

4. Provide adequate stability against overturning. The leg spread measured between points of support on the minor axis must be at least 55 percent of the nominal height.

5. Provide adequate stability against overturning and adequate load capacity. The leg spread measured between points of support on the minor axis must not exceed the minimum and maximum percentages of the nominal height as shown.

Table 2

Support Axis		
Nominal Height (inches)	**Distance Between Supports as a Percent of Nominal Height**	
	Minimum	**Maximum**
Under 4	70	No Limit
4	70	95
6	65	90
8	60	85
10	55	80
12	50	75
Over 12	50	75

END OF SECTION