

\_\_\_ REINFORCING BARS <sup>1</sup>(AND FABRIC)

a. General. - Reinforcing bars <sup>1</sup>(and fabric) shall be cut, bent, and placed in the concrete where shown on the drawings or where directed. The Contractor shall furnish all reinforcing bars <sup>1</sup>(and fabric) required for completion of the work.

b. Materials. -

(1) Reinforcing bars. - Reinforcing bars shall be deformed bars conforming to <sup>1</sup>[ANSI/ASTM A 615, grade <sup>1</sup>(40)(60), including supplementary requirements] <sup>1</sup>[or ANSI/ASTM A 617, grade <sup>1</sup>(40) (60).]

<sup>1</sup>[(2) Fabric. - Fabric shall be electrically welded-wire fabric and shall conform to ANSI/ASTM A 185 for smooth steel wire or ANSI/ASTM A 497 for deformed steel wire, except that for wire with a specified yield strength exceeding 60,000 pounds per square inch, the yield strength shall be the stress corresponding to a strain of 0.35 percent.]

c. Placing reinforcing bars <sup>1</sup>(and fabric).- The reinforcement shall conform to the requirements shown on drawing \_\_\_ (40-D-6263) unless otherwise shown on the reinforcement design drawings.

<sup>2</sup>[Reinforcing bars will be required to be placed in lengths up to <sup>1</sup>(40) (50) (60) feet.]

Splices shall be located where shown on the drawings: Provided, That the location of splices may be altered subject to the written approval of the Contracting Officer.

Subject to the written approval of the Contracting Officer, the Contractor may, for his convenience, splice bars at additional locations other than those shown on the drawings. In order to meet design and space limitations on splicing, some bent bars may exceed usual shipping clearances. Cutting and bending of such bars from stock lengths may be required at the site.

Unless otherwise prescribed, placement dimensions shall be to the centerlines of the bars. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing, position, and amount after it has been placed.

Before reinforcement is embedded in concrete, the surfaces of the bars <sup>1</sup>(and fabric) and the surfaces of any supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances which, in the opinion of the Contracting Officer, are objectionable. Heavy flaky rust that can be removed by firm rubbing with burlap, or equivalent treatment, is considered objectionable.

Reinforcement shall be accurately placed to meet the following tolerances:

<sup>1</sup>[(1) The amount of concrete covering reinforcement in bridges shall not deviate from that specified by more than 1/4 inch if the cover specified is more than 2-1/2 inches, nor by more than 1/8 inch if the cover specified is 2-1/2 inches or less.

(2) The amount of concrete cover protecting reinforcement <sup>1</sup>(in all other concrete) shall not deviate from that specified by more than 1/2 inch if the specified cover is more than 2-1/2 inches, nor by more than 1/4 inch if the cover specified is 2-1/2 inches or less.

(3) The spacing of reinforcing bars shall not deviate from the required spacing by more than 1 inch.]

Reinforcement shall be secured in position so that it will not be displaced during the placing of the concrete, and special care shall be exercised to prevent any disturbance of the reinforcement in concrete that has already been placed. Bars shall not be field bent to the extent of permanent set, nor straightened, except as approved by the Contracting Officer or shown on the drawings. Bars bent without approval shall be replaced in conformance with drawing \_\_\_ (40-D6263). Welding or tack welding of reinforcing bars will not be permitted except at locations shown on the drawings or where approved by the Contracting Officer. Chairs, hangers, spacers, and other supports for reinforcement shall be of concrete, metal, or of other approved material. Where portions of such supports will be exposed on concrete surfaces designated to receive F2 <sup>1</sup>(or F3) finish, the exposed portion of the supports shall be galvanized or of other corrosionresistant material, except that concrete supports will not be permitted. Unless otherwise shown on the drawings, reinforcement in structures shall be so placed that there will be a clear distance of at least 1 inch between the reinforcement and any anchor bolts, form ties, or other embedded metalwork.

<sup>3</sup>[d. Reinforcement detail drawings to be prepared by the Contractor. Reinforcement detail drawings, for any structure, which the Contractor may require to facilitate fabrication and placement of the reinforcement shall be prepared by the Contractor. Such reinforcement detail drawings shall include bar-placing drawings, bar-bending diagrams, and bar lists.

The Contractor's reinforcement detail drawings shall be prepared from reinforcement design drawings included with these specifications, <sup>4</sup>(or from supplemental reinforcement design drawings to be furnished by the Government. The position, size, and shape of reinforcing bars are not shown in all cases of the drawings included with these specifications. Supplemental reinforcement design drawings in sufficient detail to permit the Contractor to prepare his reinforcement detail drawings will be furnished to the Contractor by the Government after final designs have been completed and after equipment data are received from equipment manufacturers. As the supplemental reinforcement design drawings may not be available in time to enable the Contractor to purchase prefabricated reinforcing bars, it may be necessary for the Contractor to purchase bars in stock lengths, and to cut and bend the bars in the field.)]

<sup>5</sup>[d. Reinforcement detail drawings to be prepared by the Contractor. The Contractor shall prepare and submit to the Government, for approval, reinforcement detail drawings for all structures, including bar-placing drawings, bar-bending diagrams, and bar lists.

The Contractor's reinforcement detail drawings shall be prepared from reinforcement design drawings included with these specifications <sup>6</sup>(and from supplemental reinforcement design drawings to be furnished by the Government). The position, size, and shape of reinforcing bars are not shown in all cases on the drawings included with these specifications. Supplemental reinforcement design drawings in sufficient detail to permit the Contractor to prepare his reinforcement detail drawings will be furnished to the Contractor by the Government after final designs have been completed and after equipment data are received from equipment manufacturers. As the supplemental reinforcement design drawings may not be available in time to enable the Contractor to purchase prefabricated reinforcing bars, it may be necessary for the Contractor to purchase bars in stock lengths, and to cut and bend the bars in the field. <sup>7</sup>[However, the Government-furnished supplemental reinforcement design drawings will be available in accordance with paragraph \_\_\_\_\_ (Concrete Placement Schedule).]

The Contractor shall submit to the <sup>8</sup>(\_\_\_\_\_), for approval, <sup>1</sup>(three prints) (one print and one reproducible that will permit clear, legible copies to be made) of each of his reinforcement detail drawings at least <sup>9</sup>(\_\_\_\_\_) calendar days before scheduled concrete placement. The Government will require 25 calendar days for review of reinforcement detail drawings, and this review time will apply to each separate submittal or resubmittal as provided in paragraph \_\_ (Submittal Requirements). No reinforcement shall be placed in any structure until reinforcement detail drawings describing the reinforcement are approved by the <sup>8</sup>(\_\_\_\_\_).

The Contractor's reinforcement detail drawings shall be prepared following the recommendations established by the American Concrete Institute's "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures" (ACI 315 R-80) unless otherwise shown on the reinforcement design drawings. The Contractor's drawings shall show necessary details for checking the bars during placement and for use in establishing payment quantities.

The Contractor's reinforcement detail drawings shall be clear, legible, and accurate. If any reinforcement detail drawing or group of drawings is not of a quality acceptable to the Government, the entire set or group of drawings will be returned to the Contractor, without approval, to be corrected and resubmitted. Acceptable reinforcement detail drawings will be reviewed by the Contracting Officer for adequacy of general design and controlling dimensions. Errors, omissions, or corrections will be marked on the prints, or otherwise relayed to the Contractor, and one print of each drawing will be returned to the Contractor for correction. The Contractor shall make all necessary corrections shown on the returned prints. The corrected drawings need not be resubmitted unless the corrections are extensive enough, as determined by the Contracting Officer, to warrant resubmittal. Such Government review

and approval shall not relieve the Contractor of his responsibility for the correctness of details or for conformance with the requirements of these specifications.]

<sup>10</sup>[d. Reinforcement detail drawings to be prepared by the Contractor. The Contractor shall prepare and submit reinforcement detail drawings, including bar-placing drawings, bar-bending diagrams, and bar lists, in accordance with the following provisions.

The Contractor's reinforcement detail drawings shall be prepared from reinforcement design drawings included with these specifications.

At least 60 days before scheduled concrete placement, the Contractor shall submit to the <sup>8</sup>(\_\_\_\_\_), for approval, <sup>1</sup>(three prints) (one print and one reproducible that will permit clear, legible copies to be made) of each of his reinforcement detail drawings for the following structures:

- (1)
- (2)
- (3)
- (4)
- (5)

The Government will require 25 calendar days for review of reinforcement detail drawings, and this review time will apply to each separate submittal or resubmittal as provided in paragraph \_\_\_\_ (Submittal Requirements). No reinforcement shall be placed in any structure until reinforcement detail drawings describing the reinforcement are approved by the <sup>8</sup>(\_\_\_\_\_).

At least 30 days before scheduled concrete placement, the Contractor shall submit to the <sup>1</sup>(Project) Construction Engineer at the above address, for informational purposes, one reproducible of each of his reinforcement detail drawings for all structures not listed above.

The Contractor's reinforcement detail drawings shall be prepared following the recommendations established by the American Concrete Institute's "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures" (ACI 315 R-80) unless otherwise shown on the reinforcement design drawings. The Contractor's drawings shall show necessary details for checking the bars during placement and for use in establishing payment quantities.

The Contractor's reinforcement detail drawings shall be clean, legible, and accurate and checked by the Contractor before submittal. If any reinforcement detail drawing or group of drawings requiring approval is not of a quality acceptable to the Government, the entire set or

group of drawings will be returned to the Contractor, without approval, to be corrected and resubmitted. Acceptable reinforcement detail drawings will be reviewed by the <sup>1</sup>(Project) Construction Engineer for adequacy of general design and controlling dimensions. Errors, omissions, or corrections will be marked on the prints, or otherwise relayed to the Contractor, and one print of each drawing will be returned to the Contractor for correction. The Contractor shall make all necessary corrections shown on the returned prints. The corrected drawings need not be resubmitted unless the corrections are extensive enough, as determined by the Contracting Officer, to warrant resubmittal. Such Government review and approval shall not relieve the Contractor of his responsibility for the correctness of details or for conformance with the requirements of these specifications.]

e. Measurement and payment. - <sup>1</sup>(Except as otherwise provided below,) measurement, for payment, of reinforcing bars <sup>1</sup>(and fabric) will be based on the weight of the bars <sup>1</sup>(and fabric) placed in the concrete in accordance with the drawings or as directed.

Measurement for payment will include reinforcing bars placed as shown on the drawings and reinforcing bars in splices located as shown on the drawings, and in relocated splices that are approved by the Contracting Officer. No measurement for payment will be made of reinforcing bars in additional splices allowed for the convenience of the Contractor.

<sup>11</sup>[No measurement for payment will be made for reinforcement used in precast concrete products, reinforcement used in \_\_\_\_\_, and reinforcement used in terms of concrete specified in subparagraph \_\_\_\_\_ b. (Payment for Concrete).]

<sup>12</sup>{Except as otherwise provided below, the quantities of reinforcing bars for each type of <sup>1</sup>(switchyard) (substation) concrete foundation for which payment will be made are shown on drawing \_\_\_\_\_ (\_\_\_\_-D-\_\_\_\_), and regardless of the amount of reinforcing bars placed, payment will be made only on the basis of the quantities of reinforcing bars shown on the drawing.

<sup>13</sup>[The quantities of reinforcing bars for which payment will be made for each of the concrete foundations listed below will be added to drawing \_\_\_\_ (\_\_\_\_-D-\_\_\_\_) after the Government has completed the design of these concrete foundations in accordance with paragraph \_\_\_\_ (Concrete in Structure):

(1)

(2)

The bidding schedule item, "Furnishing and placing reinforcing bars," includes estimated quantities of reinforcing bars for the above-listed foundations.}}

<sup>1</sup>(Except as otherwise provided below,) payment for furnishing and placing reinforcing bars <sup>1</sup>(and fabric) will be made at the <sup>1</sup>(applicable) unit price per pound bid <sup>1</sup>(therefor) in the schedule <sup>1</sup>[for the various sizes of reinforcing bars <sup>1</sup>(and fabric)], which unit price shall

include the cost of preparing reinforcement detail drawings, including bar-placing drawings and bar-bending diagrams; of submitting the drawings to the Government; of preparing all necessary bar lists and cutting lists; of furnishing and attaching wire ties or other approved supports; and of cutting, bending, cleaning, and securing and maintaining in position reinforcing bars <sup>1</sup>(and fabric) as shown on the drawings.

<sup>11</sup>[The cost of reinforcement used in precast concrete products, reinforcement used in \_\_\_\_\_, and reinforcement used in items of concrete specified in subparagraph \_\_\_\_b. (Payment for Concrete) shall be included in the applicable price(s) bid in the schedule for the items for which such reinforcement is required.]

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<sup>1</sup>Delete or revise as required.

<sup>2</sup>Include this statement, with applicable lengths, when long bars without splices are required.

<sup>3</sup>Use this subparagraph d. when Contractor's reinforcement detail drawings will not be submitted and approved by the Government. If submittal is required, approval must also be required, in which case subparagraph d. denoted by superscript <sup>5</sup> is to be used. If submittal will be required only for a particular structure, or a group of structures, the structures are to be listed and appropriate provisions of subparagraphs denoted by superscripts <sup>3</sup> and <sup>5</sup> may be modified and combined as necessary.

<sup>4</sup>Include only when supplemental reinforcement drawings are to be furnished.

<sup>5</sup>Use this subparagraph d. when the Contractor's reinforcement detail drawings require approval of the construction engineer.

<sup>6</sup>Delete inappropriate provisions if no supplemental drawings will be furnished.

<sup>7</sup>Delete if concrete placement schedule (paragraph C-408) is not required.

<sup>8</sup>Insert title and address of construction engineer.

<sup>9</sup>Allow time for approval of drawings, fabrication, and delivery of bars, etc. Normally, this time should not be less than 60 days.

<sup>10</sup>Use this subparagraph d. in specifications for projects where approval of reinforcement drawings for certain structures is desired.

<sup>11</sup>Delete items not applicable, modify as required, and add any other items of concrete where reinforcement is not paid separately.

<sup>12</sup>Use when quantity tables are shown on the drawings.

<sup>13</sup>Use when the Government needs to complete the reinforcement design of some switchyard or substation foundations after the bids are opened.

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