SECTION 11

CONCRETE CURBS, CURB AND GUTTERS, CONCRETE SURFACING, SIDEWALKS, DRIVEWAYS AND BIKEWAYS

12/08/15

CITY OF KEARNEY
HEART OF NEBRASKA

STANDARD CONSTRUCTION SPECIFICATIONS

Chapter 11 - CONCRETE CURBS, CURB AND GUTTERS, CONCRETE SURFACING, SIDEWALKS, DRIVEWAYS AND BIKEWAYS

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11.00 SCOPE

Concrete curbs, curb and gutters, sidewalks, driveways, and bikeways shall be constructed of the material herein specified, on an approved subgrade, in accordance with these Specifications and in conformance with the lines, grades, typical cross section and details shown on the Plan.

11.10 GENERAL– Curbs and combined curbs and gutters shall consist of air entrained portland cement concrete constructed on prepared subgrade in accordance with these specifications. This work shall conform to the lines and grades, thickness, and typical cross-sections shown on the applicable drawing or established by the Engineer.

Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices. He shall take necessary precautions to protect the work and to safeguard the public. Streets closed to traffic shall be protected by effective barricades and obstructions shall be illuminated during hours of darkness. Warning signs shall be provided to control and direct traffic properly.

11.20 MATERIALS

A. Concrete - The concrete shall be 47B air-entrained in accordance with the Nebraska Department of Roads most current specifications. Concrete shall meet requirements of ASTM C-94, Standard Specifications for Ready-Mixed Concrete; or CSA A23-1, Concrete Materials and Methods of Concrete Construction. Fly Ash substitute will be allowed in accordance with the Nebraska Department of Roads most current specifications.

B. Portland Cement - Portland cement used on City of Kearney projects shall be in accordance with the Nebraska Department of Roads most current specifications.

C. Gradation Limits- Fine Aggregate - Shall be in accordance with the Nebraska Department of Roads most current specifications.

D. Gradation Limits- Course Aggregate - Shall be in accordance with the Nebraska Department of Roads most current specifications.

E. Water - Mixing water shall be as specified in Section 1005 “Water for Concrete” of the most current Nebraska Department of Roads Specifications.

F. Slump - Slump for all hand placed concrete shall maintain a consistency between 1 and 3 inches. Slump shall maintain a consistency between ½ and 2 inches when slip-form placement is being used.

G. Workability - Concrete shall be of such consistency and composition that it can be worked into the forms and around the reinforcement without excessive vibration.

H. Mixing - Ready-mixed concrete shall be mixed and delivered to the site in accordance to AASHTO M-157 and by means of one of the following combinations of operations:

Mixed completely at a central mixing plant and the mixed concrete transported to the point of delivery in a truck agitator or in a truck mixer operating at agitator speed or in approved non-agitating equipment (known as central-mixed concrete).

Mixed partially at a central mixing plant and mixing completed in a truck mixer (known as transit-mixed concrete).

Aggregates and cement proportioned in a central plant and mixed completely in a truck mixer (known as transit-mixed concrete).

All mixers and agitators shall be operated within the limits of the manufacturer's rated capacity. They shall be operated at the speed of rotation for which the equipment was designed. Attached to each truck mixer and truck agitator shall be a metal plate on which is stated the manufacturer's capacities in terms of volume of mixed concrete and the manufacturer's stated speed of rotation for both mixing and agitation.

The truck mixer or agitator shall consist of a closed water-tight revolving drum suitably mounted and fitted with adequate revolving blades. Truck mixers shall be capable of combining aggregates, cement, and water into a thoroughly mixed and uniform mass of concrete and of discharging the concrete without segregation. Truck agitators shall be capable of transporting and discharging concrete without segregation.

For revolving drum type mixers the mixing speed shall not be less than seven (7) revolutions per minute of the drum nor greater than that which will produce a peripheral velocity of more than 225 feet per minute. For revolving blade type mixers, the mixer speed shall not be less than six (6) nor more than sixteen (16) revolutions per minute of the mixing blades. Agitation speed shall not be less than two (2) nor more than six (6) revolutions per minute of the drum or mixing blades.

Concrete shall not be used when the cement has been in contact with the aggregate more than 1-1/2 hours before it is placed. When the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes.

I. Admixtures - Admixtures are materials added to portland cement concrete to change characteristics such as workability, strength, imperviousness, freezing point, and curing. Prior approval from the City Engineer or authorized representative must be obtained when the use of admixtures is warranted by the contractor. Admixtures must meet testing requirements describe in ASTM C-494.

J. Fly Ash - Mixes containing Fly Ash substitute will be allowed in accordance with the Nebraska Department of Roads most current specifications.

K. Water Reducing, Set Controlling Admixture - A Water-Reducing Admixture that reduces the quantity of mixing water required to produce concrete of a given slump may be use following approval of the City Engineer or authorized representative. Admixture must also follow ASTM C-494 specifications.

L. Reinforcing Steel - All steel shall be thoroughly cleaned of oil, mill scale, rust, and dirt before it is tied in place, and shall be re-cleaned if necessary prior to placement of concrete. All steel shall be accurately positioned and securely tied with suitable wire, or

clips at intersections, and shall be adequately supported by concrete or metal chairs, spacers, hangers, etc., to prevent movement during placement of the concrete.

The distance between parallel bars shall be exactly as shown on the plans. The bars nearest and parallel to the forms shall be placed such that the minimum distance between the face of the bars and the forms shall be 2 inches.

At splices, bars shall be lapped at least 24 diameters or as shown in details and in all cases the lap shall be sufficient to transfer the stress between bars by bond and shear and to develop the full strength of each bar. Supports and ties shall be placed such that they will not be exposed or discolor the finished concrete.

In the event any steel moves or is displaced during placement of concrete, the steel shall be restored to its proper position before it is completely covered.

M. Reinforcing Bars - Reinforcing steel bars shall meet the applicable requirements and conform to ASTM A-615, Grade 40, Deformed Bars.

N. Dowel Bars - Shall be round bars conforming to ASTM A-615. Imperfections in bars that impair movement within concrete will not be allowed.

O. Expansion Joints - Expansion joint shall be of a premolded bituminous fiber type conforming to these specifications, and shall conform to ASTM M-33, M-153 Type III Standard Specifications and AASHTO M-58-42 and M-59-42.

P. Joint Sealing Material: - The joint sealing material shall be melted uniformly and with constant stirring in an asphalt kettle of such design that direct flames are not applied to the immediate surfaces of the kettle which are in contact with the joint sealing material. The material shall be furnished or prepared in pieces of such size and shape that the material can be melted readily to the proper pouring consistency. The rubber-asphalt shall meet Federal Specification SS-S-164 or most current revisions. The heating of the material shall be arranged to minimize the length of time during which the temperature of the material exceeds 350 degrees Fahrenheit. In no case shall the temperature exceed the maximum recommended by the manufacturer. The joints shall be filled with the use of a pouring device which is satisfactory to the City Engineer or authorized representative. Precautions shall be taken to prevent spilling material on surfaces of the pavement adjacent to the joint.

11.30 CONSTRUCTION METHODS

A. PREPARATION OF SUBGRADE - Subgrade shall be excavated or filled with suitable material to the required grades and lines. Clearing and grubbing will be performed. Soft-yielding and otherwise unsuitable material shall be removed and replaced with select base coarse. Filled sections shall be compacted and extended a minimum of 1 foot (0.3 m) outside the form lines.

Upper six (6) inches of subgrade shall be scarified, harrowed, air dried wetted and/or compacted by Contractor to 95% of maximum dry density obtained at optimum moisture content, plus or minus 3% as determined by procedure outlined in ASTM D-698 or 75% relative density, ASTM D-2049. A test supplied by the Contractor from an approved laboratory, will be required for each type of excavation or borrow material encountered.

Before placing concrete, the subgrade shall be tested for conformity with the cross-section shown in these contract specifications. Contractor shall remove or add material to bring all portions of subgrade to correct elevation. Subgrade preparation procedure shall then be repeated and conformity tests taken again.

11.32 FORMS

A. RIGID FORMS - Upon completion and approval of the subgrade, the Contractor shall erect substantial forms of not less than the depth of the concrete to be placed. The forms shall be built straight and true and in conformance with established line and grade. Unless otherwise shown on the plans, sidewalks and bikeways shall be constructed so that, when finished, they shall have a uniform transverse slope toward the curb of two percent (2%). Where sidewalks and bikeways are constructed adjoining the curb, the forms shall be so set that the sidewalk adjacent to the curb shall be 3/8 inch above the curb. The forms shall not be removed until new concrete is at least twelve (12) hours old. During the operation of form removal the edges of the concrete shall be cured as hereinafter provided or, if approved by the Engineer, the exposed edges may be covered with moist earth.

B. SLIP FORMS - At the option of the Contractor and with the approval of the Engineer, slip form equipment may be used for construction of concrete sidewalks or bikeways. Slip form equipment shall be provided with traveling side forms and screed of suitable dimensions, shapes, and strength to support the concrete for a sufficient length of time during placement to produce sidewalk of the required cross section. The equipment shall spread, consolidate and screed the freshly placed concrete in such a manner as to provide a dense and homogeneous product. The slip form equipment shall have automatic sensor controls for both line and grade which operate from an offset control line. No measurement or direct payment will be made for forms. The cost of forms shall be considered subsidiary to other items of work for which direct payment is made.

11.33 CONCRETE PLACEMENT - The concrete shall be placed in the forms on an accepted subgrade and spread in an approved manner. The concrete then shall be consolidated thoroughly, using an approved vibrating screed or in a manner approved by the Engineer. The concrete shall be so placed that no segregation of the materials occur.

A. VIBRATING - All concrete shall be thoroughly compacted by means of approved mechanical vibrators. The vibrator shall consolidate the full depth and width of the concrete to a uniform mass without segregation. No measurement or direct payment will be made for vibrating. The cost of vibrating shall be considered subsidiary to other items of work for which direct payment is made.

B. FINISHING - The consolidation and finishing of concrete sidewalk or driveway may be accomplished by either machine or hand methods. The following requirements shall apply and all equipment used shall meet the approval of the Engineer.

1. Machine Finish - The finish machine shall be capable of placing, consolidating, striking off, shaping and float-finishing the freshly placed concrete to the desired line, grade, and thickness in one continuous passage in such a manner that a minimum of

finishing by hand methods will be required. The finish machine shall be kept in good repair at all times and shall operate so as to give the desired finish over the entire surface. The finish machine shall be of a size and type capable of giving the desired results and shall be approved by the Engineer. Plastic concrete shall be finished smooth, and given a final surface texture using a light broom at right angles to direction of travel or burlap drag parallel to the direction of travel.
2. Hand Finish the concrete shall be placed in such a manner that it can be consolidated, struck off, shaped and float finished so there will be no segregation of the concrete. After the concrete has been deposited and spread, it shall be struck off and consolidated using vibrating screeds approved by the Engineer until the concrete is true to prescribed cross section. The vibrating screeds shall be of a design and construction suitable and adequate for the purpose required and for convenient use. They shall be designed to ride on the side forms. Screeds shall be metal or metal-shod wood and shall have sufficient strength and stiffness to retain their shape under all working conditions. The template or screed used for striking off shall be arranged so that when riding on the side form, the working edge will have an excess of concrete above grade. When finishing small and irregular areas, the concrete shall be consolidated with approved mechanical vibrators before the concrete is struck off. Care shall be taken so the flow line of the gutter is not obstructed by the construction of driveways where they meet the curb and gutter section. In general, the addition of superficial water to the surface of the concrete to assist in finishing operations will not be permitted. However, due to unavoidable delay in finishing or an unusual drying condition, a slight quantity of water may be added to the surface of the concrete as an aid in finishing. If it becomes necessary to sprinkle the surface with water to complete the finishing of the concrete, all mixing operations shall be discontinued immediately until the finishers catch up to a point where extra water for finishing is no longer required. If the application of water to the surface is permitted, it shall be applied in a fog spray by means of an approved orchard-type sprayer. Spray equipment which is attached to the mechanical finisher or any other paving equipment will not be permitted. The addition of superficial water to the surface of the concrete shall be at the Contractor's risk. No measurement or direct payment will be made for placing and finishing the concrete. Placing and finishing the concrete shall be considered subsidiary to other items for which direct payment is made. Plastic concrete shall be finished smooth, by means of a float and given a final surface texture using a light broom at right angles to direction of travel or burlap drag parallel to the direction of travel.

The finished surface of the curb and gutter or valley gutters shall be checked by the use of the 10’ straightedge and corrected, if necessary. While the concrete is still plastic, the drainage at the gutter should be checked by pouring water at the gutter summit and observing its flow to the inlet. In order to prevent damage to the concrete surface, water should be poured onto a piece of burlap or curing paper.

C. CURING - Protect fresh concrete from direct rays of sunlight, drying winds, and wash by rain.

Cure surfaces with curing compound applied in accordance with manufacturer’s directions and as soon as surface water has dissipated. Cure exposed surfaces for at least 3 days after placement. Use curing compound complying with ASTM C-309 on all exposed surfaces. Perform application in accordance with manufacturer’s directions but at a rate of not more than 400 square feet per gallon. Apply within 4 hours after finishing or as soon as

surface moisture has dissipated. Curing shall include back of curb and all exposed surfaces.

D. PROTECTION - The Contractor shall provide and maintain substantial barricades, warning signs, and lights to provide the public and the construction work adequate protection and keep all traffic off the pavement.

Contractor shall have materials available at all times to protect the surface of the plastic concrete against the rain. These materials shall consist of waterproof paper or plastic sheeting. For slipform construction, materials such as wood planks or forms to protect the edges shall also be required.

When it is expected that, during the progress of the work, the air temperature may fall below 40 degrees Fahrenheit, a sufficient supply of burlap, insulated blankets, straw, hay, grass, or other insulation material suitable in the judgment of the Engineer, must be maintained on hand, to cover the concrete and to sufficiently protect the surface and edges against freezing until it is a least 10 days old. Hay, straw or similar lightweight, moisture absorbing material shall be covered with waterproof paper, burlap or plastic anchored to keep the material in place. In such case, at the discretion of the Engineer, wetting and spraying may be omitted. Manure shall not be used as a protection for green concrete. Whenever the temperature falls below 40 degrees Fahrenheit, at the Contractor's option, freshly finished concrete shall be protected by frames enclosed by canvas or other type of housing and the temperature of the air surrounding the concrete shall be maintained at no less than 45 degrees Fahrenheit. Sufficient heating apparatus, such as lanterns, suitable stoves or steam equipment, shall be furnished and maintained by the Contractor. Any concrete showing injury by freezing or uncovering shall be removed and replaced at the expense of the Contractor.

11.34 CURBS, CURB AND GUTTERS AND VALLEY GUTTERS – All joints in the curbs, curb and gutters and valley gutters shall be sealed with joint sealing material. Depressed curbs shall be provided at all driveway entrances and at such other locations as designated by the Engineer.

Place concrete in forms and consolidate with a mechanical vibrator. In placing concrete curb, sufficient spading shall be done to secure adequate bond and eliminate all voids in the curb.

Curbs shall be formed to the cross section with a mule or templates supported on the side forms, and shaped with a float not less than 4 feet in length. Bring to proper surface by running a straightedge over steel templates with sawing motion, to fill holes and depressions. Immediately after using the straightedge, float surface with a wood float to draw cement to surface. Edge with appropriate tool.

11.35 MEDIAN SURFACING – Unless otherwise indicated, median surfacing shall have a minimum depth of 4 inches, and shall be constructed to the lines and grades determined by the Engineer. All joints in the median surfacing shall be sealed with joint sealing material.

11.35 STAMPED AND COLORED BRICK PATTERN CONCRETE SURFACING – Unless otherwise indicated, concrete surfacing shall have a minimum depth of 4 inches, and

shall be constructed to the lines and grades determined by the Engineer. All joints in the median surfacing shall be sealed with joint sealing material.
Where indicated on the plans the Contractor will be required to construct island surfacing with concrete which has a powdered or liquid coloring agent added to the mix to produce integral full depth color. Staining or application of coloring to the surface is not acceptable as an option. Coloring agent shall be added at the manufacturer's recommended rate to produce a deep non-fading red color. Color shall be C-32 "Quarry Red" as specified by Chromix Admixtures.

The Contractor will be required to purchase and use stamping tools identified as "Running Bond New Brick" pattern #FM-5150 and may be obtained by contacting the manufacturer at the following location: Brickform, 11061 Jersey Blvd., Rancho Cucamonga, CA, 91730, Telephone: 800/483-9628, Fax: 909/484-3318, Website: www.brickform.com

Prior to placement of any colored concrete, the Contractor shall protect the surrounding pavement by covering with plastic sheeting to prevent any inadvertent staining. Place concrete, vibrate, screed, tamp, and wood float to an even surface. Establish a straight reference line. Apply a liquid release agent to the surface of the concrete and the surface of the tools immediately prior to stamping. Don't seat any tool until it is lined up and tight with the adjacent tools. Stamp the brick pattern running in the same direction as the center line of the roadway.

Apply two coats of Kure-N-Seal 30 manufactured by Sonneborn. Both applications shall be applied with a short-nap roller. Apply the first coat evenly and uniformly after final finishing and after the concrete is firm to the touch. Apply the second coat evenly and uniformly at least 24 hours after application of the first coat.

11.37 SIDEWALKS – Unless otherwise indicated, concrete sidewalks shall have a minimum width of 4 feet and a depth of 4 inches, and shall be constructed to the lines and grades determined by the Engineer. Surfaces shall be marked off in square block having an area of not less than 16 or more than 36 square feet. On these lines, the concrete shall be cut through not less than ¼ inch thickness with a pointed trowel or suitable spading tool and the concrete edged on both sides.

Sidewalks that are being constructed across driveway openings shall have a minimum depth of 6 inches.

The surface shall be floated with a steel float just enough to produce a smooth surface, free from irregularities. All edges and joints shall be rounded to a radius of ¼ inch with an approved finishing tool. The surface shall then be brushed with fine bristle broom or wood float to slightly roughen the surface and remove the finishing tool marks.

11.38 DRIVEWAYS – Unless otherwise indicated, concrete driveways shall be constructed to the lines and grades set by the Engineer. The minimum depth of concrete for driveways shall be 6 inches, and in the event heavy loads are anticipated, the depth shall be increased to handle the expected loads.

11.39 HANDICAPPED RAMPS – Handicapped ramps shall be constructed in accordance with the most recent version of the Nebraska Department of Roads Standard Specifications and Standard Drawings and shall be

constructed at all intersections of public roadways owned by the City Of Kearney. Handicapped ramps shall meet the requirements of current ADA standards. Truncated domes panels will be provided by the City of Kearney for all ramps at the intersection of two public roadways owned by the City of Kearney, but not for private drives or private roadways. Panels will be a one piece colored plastic panel. All panels shall be set and finished during the concrete pour/finishing process. Panels shall be installed by the contractor per the manufactures recommendations. Exposed areas of the panels shall be cleaned of all concrete prior to the concrete hardening. Ramps shall not be installed on frozen subgade or in otherwise inclement weather. Truncated dome panels will be colored as follows: yellow in school zones and at school crossings, black in all other areas unless approved otherwise by the City Engineer.

11.40 CONSTRUCTION APPURTENANCES

11.41 PLACING REINFORCING STEEL – When reinforcement is required, it shall be paced as shown on the drawings.

All reinforcing metal must be kept clean and free from foreign material that will prevent the proper bon with the concrete. Welded sheet fabric and welded bar mats shall be furnished in flat sheets and shall be handled carefully during the placing and kept straight until installed.

Bars used shall be parallel to the centerline and surface of the slab or walls. Tolerance of this placement shall be plus or minus ¼ inch both horizontally and vertically.

To install welded fabric, or welded mats or reinforced bars, the layer of concrete shall be placed upon the subgrade to such a depth that when struck off and vibrated, its surface will be at the elevation specified for the reinforcing metal to be installed. Each layer shall be struck off with a template of a design and construction reviewed by the Engineer. When the reinforcing metal is properly placed, it shall be covered at once, before the bottom course has taken any initial set, with a layer of concrete so deposited and distributed thereon that the slab shall have the required thickness and crown.

The Contractor will be required to furnish suitable metal supports of a type and design approved by the Engineer for all steel reinforcing bars and for all dowel bars. The work will not be paid for directly but will be considered as subsidiary work and the cost thereof included in the unit price for the Bid items for which payment is made.

Front and back forms shall extend the full depth of the concrete. All forms shall be braced and staked so as to remain in both horizontal and vertical alignment until their removal. They shall not at any time show a variation of more than 1/8 inch in a 10 foot length from a true plane of top of form. Shimming with loose earth, pebbles, etc. will not be permitted. Forms shall be cleaned and coated with an approved form-release agent before concrete is placed against them.

Concrete shall be deposited into the form without segregation and then tamped and spaded or mechanically vibrated for thorough consolidation. No concrete shall be placed if there is not enough to completely fill one complete 10 foot (0.3 m) section. No concrete shall be deposited adjacent to concrete that has taken its initial set, unless the specified expansion joint is provided. Low roll or mountable curbs may be formed without the use of a face form by using a straight-edge and template to form curb face. When used, face forms shall be removed as soon as possible to permit finishing. Front and back forms shall be removed as soon as possible without damage to the concrete after it has set.

11.42 JOINTS

A. CONTRACTION JOINTS - Before finishing the wearing surface, the concrete shall be jointed by cutting with a power driven saw to a minimum depth of one-fourth the slab thickness. Sidewalks and Bikeways shall be jointed at intervals approximating the design width and as square as possible. Driveways shall be jointed as indicated on the plans or as directed by the Engineer.

B. EXPANSION JOINTS – Expansion joints for curb, curb and gutter shall be constructed at intervals not exceeding 100 feet (30 m) at right angles to the curb line, at immovable structures and at points of curvature for short-radius curves. Filler material for expansion joints shall conform to the requirements of ASTM D994, D1751 or D1752 and shall be furnished in a single 1 inch thick piece for the full depth and width of the joint.

Sidewalk Expansion Joints. At 50 foot intervals and where the concrete sidewalk abuts existing buildings or curb, there shall be placed a ½" expansion joint. Expansion joint material shall also be placed at the same locations in the concrete subbase for brickwork. The expansion joints shall be ½" wide and the expansion joint material shall be left below the surface approximately ½" with a removable ½" plastic or wood cap to insure a straight and uniform joint. The expansion joints shall then be filled with a single component, gun-grade elastomeric sealing compound which shall be Thiokol, Sonneborn or approved equal. Joints shall be clean and dry at the time of sealing. Prime joints if recommended by the sealant compound manufacturer or if necessary to obtain adhesion. Apply the sealant with a pressure gun having a nozzle of the proper size to fit into the joints. Fill the joints solidly and smoothly and remove any excess material leaving the adjoining surfaces clean. The joints shall be watertight.

No direct payment shall be made for installation of expansion joints as it shall be considered subsidiary to the installation of the sidewalk.

Expansion joints shall be placed as indicated on the drawings or at each location where new construction connects with existing construction. Specifically, joints shall be placed where new curb and gutter joins existing curb and gutter, where sidewalks connect to curb and gutter, and at such other locations as the Engineer may direct. On long runs of new construction, joints shall be placed as directed. All expansion joints shall be sealed according to the previous paragraphs.

Where replacement sidewalks or driveways are being constructed, expansion material shall be placed at the appropriate locations, irrespective of whether such material was present in the sidewalks, driveways, or bikeways which were removed.

C. JOINT SEALING - Expansion joints and joints in commercial drives shall be sealed as provided in Section 3.07, Paragraph D. Construction joints in sidewalks and residential driveways shall not be sealed. No measurement or direct payment will be made for joints or joint sealing. This work shall be considered subsidiary to other items of work for which direct payment is made.

12.43 COLD WEATHER CONCRETING

A. Cold Weather Concreting - Except by specific written authorization, cease concrete placing when descending air temperature, in shade and away from artificial heat falls below 40 degrees F. Do not resume until ambient temperature has risen to 40 degrees F.

If placing is authorized maintain temperature of mix between 60 and 80 degrees F. Heat aggregates, water or both. Water temperature may not exceed 175 degrees F, aggregates, 150 degrees F.

Remove and replace frost damaged concrete.

Salt or other antifreeze is not permitted.

Comply with ACI 306.

12.44 HOT WEATHER CONCRETING

A. Hot Weather Concreting - Except by specific written authorization, cease concrete placing when plastic mix temperature cannot be maintained less than 90 degrees F.

Aggregates or water or both may be cooled. Cool water with crushed ice; aggregates by evaporation of water spray.

Never batch cement hotter than 175 degrees F.

Comply with ACI 305.

12.70 QUALITY ASSURANCE

A. Concrete Testing Service - Contractor shall employ and pay for services of testing laboratory acceptable to the City Engineer to perform materials evaluation, testing, and design of concrete mixes.

B. Mix Design – Mix designs shall be submitted for review to the engineer at least 15 days before placing any concrete by the Contractor, at no expense to the owner. The design of the proposed concrete shall show water cement ratio, all ingredient weights and other physical properties necessary for the mix design, sieve analysis of the aggregate to be used, amount of air entraining agent required, slump and 7 and 28 day compressive strength in pounds per square inch.

C. Quality Control - All tests shall be performed in accordance with ACI testing procedures.

All tests shall be performed by ACI Concrete Field Testing Technician's or in direct supervision of project engineer.

Sampling procedures, Slump testing, Air Content, and Compressive Strength test will be in accordance to the appropriated ASTM standard: ASTM C-172, ASTM C-143, ASTM C-231, ASTM C-173, ASTM C-138, ASTM C-31.

Subgrade will be tested prior to placing concrete, at a minimum, once for each 180 square yards of subgrade prepared or for each independent pour of less than 18 square yards prepared.

Concrete shall be sampled and tested for each 150 cy of concrete placed or one set for everyday concrete is placed if less than 150 cy are placed. If the day's placement is less than 25 cubic yards tests may be waived with the approval of the City Engineer or authorized representative. Three specimens shall be taken. One specimen will be used to indicate quality and strength on 7 days. The two additional specimens will be used for the 28 day test.

11.90 MEASURMENT AND PAYMENT

A. Measurement and payment - The following methods of measurement and payment to the Contractor will be used on all projects Owned and let by the City of Kearney unless otherwise specified in the Detailed specifications. Items not specifically listed in the Bid or defined by this specification shall be considered subsidiary to construction and direct payment will not be made for these items.

B. CURBS AND GUTTERS – Curbs and combination curbs and gutters will be measured for payment in horizontal length in linear feet. The line for the purpose of measurement will be the back of curb. No deduction will be made for lengths of drop inlets and grates. Separated measurements will not be made for straight and curved sections.

Curb drops shall be considered incidental to the Bid price for curb. Curb and gutter in the radius of a newly constructed valley gutter shall be considered incidental to the Bid price of valley gutter. No direct payment will be made.

C. VALLEY GUTTERS – Valley gutters including radius curbs and gutters will be paid for at the Bid unit price.

D. MEDIAN SURFACING – Median surfacing will be measured for payment by area in square feet according to the Bid.

E. STAMPED AND COLORED BRICK PATTERN CONCRETE SURFACING – Stamped and colored brick pattern concrete surfacing will be measured for payment by area in square feet according to the Bid.

F. SIDEWALKS – Sidewalks will be measured for payment by area in square feet according to the Bid.

G. DRIVEWAYS – Driveways as referred to in this paragraph are that portion of existing driveway approaches having to be removed behind the construction lines of pavement due to the driveway approach lying partly within the area between construction lines. Driveways will be measured for payment by area in square yards according to the Bid.

H. DETECTABLE TRUNCATED SURFACEING – When the plans call for the installation of Detectable Truncated Surface material, separate payment for the installation will not be made but will be considered incidental to the concrete placement operation. Said payment shall be full compensation for the cost of the material as well as all costs associated with its placement.