

SECTION 32 13 13

**CONCRETE PAVEMENT**

*(Sentences and/or paragraphs that are double underlined indicate revisions that were made from the 2008 specification. Additional revisions are indicated with a dashed underline.)*

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This item shall consist of a pavement of Portland cement concrete as herein specified on the prepared base, subbase or subgrade course in conformity with the thickness, typical cross-sections, and to the lines and grades shown on the Plans by the Engineer.

**1.2 MEASUREMENT AND PAYMENT**

- A. Concrete pavement shall be measured by the square yard of surface area of completed and accepted pavement or as shown on the bid documents. When the Plans, Specifications and Proposal required the construction of a "Monolithic Curb" the limits of measurement for concrete pavement shall be from back to back of curb.
- B. The work performed and the materials furnished under this item and measured as provided under "Measurement" shall be paid for at the unit price bid per square yard for the thickness indicated in the Proposal. The unit price bid for "Concrete Pavement" shall be full compensation for shaping and fine grading the subgrade, forming, mixing, placing, jointing, finishing and curing all concrete; for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the work..

**1.3 SUBMITTALS**

See SECTION 03 30 00 - CONCRETE

Paving Plan

Joint Sealing Compound

Expansion Joint Material

**PART 2 – PRODUCTS**

**2.1 MATERIALS**

See SECTION 03 30 00 - CONCRETE

**2.2 TESTING REQUIREMENTS**

See SECTION 03 30 00 - CONCRETE

**PART 3 – EXECUTION**

**3.1 GRADE CONTROL**

The lines and grades shown on the contract drawings for each pavement category of the contract shall be established and maintained by means of line and grade stakes. The finished pavement

grade lines and elevations shown on the contract drawings shall be established and controlled at the site of the work by the Contractor in accordance with benchmark elevations furnished by the Owner. The pavements shall be constructed to the indicated thicknesses and elevations. The tolerances permitted in thickness, smoothness, and grades are the normal deviations that may occur in pavement construction under good supervision. However, construction of pavement or any part thereof with intent to use maximum tolerances will not be permitted.

### 3.2 SUBGRADE, SUBBASE, BASE AND FORMS

#### A. EQUIPMENT:

1. Subgrade Planer: Subgrade planer mounted on visible rollers riding on the forms or edges or previously constructed slabs shall be provided for shaping the final surface of the subgrade, subbase, or base course. Any power equipment used to pull the subgrade planer shall not produce ruts or indentations in the subgrade, subbase or base course. The subgrade planer shall be equipped with steel cutting edge capable of being accurately adjusted to the required cross section. When the subgrade planer rides on the edges of the surface of previously constructed slabs, the planer shall be provided with rubber-tired rollers to prevent damage to surfaces and edges of the existing concrete.
2. Templates: The Contractor shall provide and operate a scratch template for checking the contour of the subgrade, subbase, or base course. The template or roller is to be mounted with the wheels supported on the side forms or concrete in adjacent lanes. It shall be of such strength and rigidity that under a test made by changing the support to the center the template will not show a deflection of more than 1/8 inch. The template shall be provided with adjustable rods projecting downward to the subgrade at not more than 1-foot intervals. These rods shall be adjusted to the required cross section of the bottom of the slab when the ends of the template are supported on the side forms or concrete in the adjacent lanes. The template shall be checked frequently during use to assure that the rods are in the correct position.
3. Forms: The forms shall be made of metal unless noted. Wood forms may be used on curves having a radius of 150 feet or less, as well as for fillets. Forms shall be equal in depth to the edge thickness of the slab as shown on the drawings. Forms shall be in one piece for the full depth required, except as noted. Where the drawings provide several different slab thicknesses, forms may be built up of metal or wood as provided. Forms may be increased in depth 25 percent by securely bolting or welding to the bottom a tubular metal section of the proper thickness or by securely bolting wood planks to the bottom of the steel form. The tubular metal section or wood planks shall completely cover the under side of the base of the steel form. It shall extend beyond the edge of the base a sufficient distance to provide the necessary stability against movement along the vertical face. The base width of the one-piece form, or built-up form, shall be not less than eight-tenths of the vertical height of the form.
  - a.) Metal Forms: Metal forms shall be of a cross section and shall be furnished in sections not less than 10 feet in length. Curves having a radius of 150 feet or less the length of the sections shall be 5 feet unless the sections are flexible or curved to the proper radius. Each 10-foot length of form shall be provided with at least three form braces and pin sockets. The number and spacing of the form braces and pin sockets shall be such that the form will be rigidly braced uniformly throughout its length and at the joints between form sections. Lock

joints between form sections shall be free from play or movement. Metal forms shall have such a strength that when tested as simple beam with a load equal to the weight of the heaviest machine to be used on the forms, the deflection will not exceed 1/8 inch in 10 feet. Forms shall be provided with adequate devices for secure setting to prevent springing, weaving, or settling from the impact and vibrations of the machine. Forms shall be free of warps, bends, or kinks. The top surface of a form shall not vary more than 1/8 inch in 10 feet from a true line. The face of the form shall not vary more than 1/4 inch in 10 feet from a true plane. Forms with battered top surfaces distorted faces or bases shall not be used. They are to be removed from the project site.

- b.) Wood Forms: Wood forms for curves and fillets shall be made from well-seasoned, surfaced plank or plywood. The wood shall also be straight, free from warp or bend, and not less than 2 inches in nominal thickness. Wood forms shall be furnished in sections approximately 5 feet in length and shall be provided with adequate devices for secure setting to withstand springing, weaving, or settling from the impact and vibration of the placing and finishing operations.
4. Subgrade, Subbase or Base Course: The subgrade, subbase or base course shall be tested as to crown, elevation, and density in advance of setting the forms. The subgrade prior to final planing shall be completed to or above the plane of the typical sections shown on the drawings and the lines and grades established by the drawings or as directed. Any discrepancies shall be corrected in accordance with the requirements for subgrade, subbase or base course construction as specified.
5. Form Setting: After the subgrade, subbase or base course has been prepared as described above, the forms shall be set. The subgrade, subbase, or base course under the forms shall be firm and cut true to grade so that each in place form section will be firmly in contact for its entire length and base width. The form shall be staked into position. The top of the form will conform to the requirements specified for the finished surface of the concrete, and the longitudinal axis of the upstanding leg will not vary more than 1/4 inch from the straight-edge when tested by a 12-foot straight-edge. The length and number of pins in any section shall be sufficient to hold the form at the correct line and grade. Form sections shall be tightly locked together. Conformity to the alignment and grade elevations shown on the drawings shall be checked and necessary corrections made by the Contractor immediately prior to placing the concrete. Forms shall be set well in advance of concrete placement. At least 250 feet of forms and prepared subgrade, subbase or base course shall be provided before concrete placement starts. The forms shall be cleaned and oiled each time before concrete is placed.
6. Subgrade Between Forms: The subgrade, subbase, leveling course or base course shall be free of foreign matter, waste concrete, cement and debris at all times; shall be finished to the required section of the bottom of the pavement as shown on the drawings with specified equipment; shall be tested with a template operated and maintained by the Contractor; shall be maintained in a smooth, compacted condition, in conformity with the required section and established grade until the concrete is in place; shall be wetted down sufficiently in advance to insure a firm, moist, and satisfactory condition when the concrete is placed; shall, if required, be thoroughly wetted down the previous night or not less than 6 hours before placing the concrete; shall not be traversed with equipment or hauling on the prepared surface between forms; in cold weather shall be prepared and protected in a satisfactory condition

and entirely free from frost when the concrete is placed; and shall not be treated with chemicals to eliminate frost.

7. Form Removal: Forms shall remain in place at least 12 hours after the concrete has been placed. Should weather conditions delay the early-strength gain of the concrete, the forms shall remain in place for a longer period. Forms shall be removed without injuring the concrete. Bars or heavy tools are not to be used against the concrete in removing the forms. Any concrete damaged in form removal will be repaired promptly by the Contractor at no cost to the Owner.

### 3.3 FINISHING

Finishing operations shall be started immediately after placement of the concrete. The sequence of operations shall be as follows: transverse finishing, longitudinal floating, straight-edge finishing, carpet drag finishing, and finally the edging of joints. The machine method of finishing shall be employed, except that hand methods may be permitted as approved by the engineer. Finishing equipment and tools shall be maintained clean, free from hardened concrete or grout, and in an approved condition.

#### A. MACHINE FINISHING:

1. Equipment: The transverse and longitudinal finishing machines shall be power driven, be of ample weight and power to produce proper finishing, and be able to withstand the roughest treatment anticipated under job conditions. The transverse-finishing machine shall be designed and operated to strike off, screed, and consolidate the concrete. It shall be equipped with two screeds readily and accurately adjustable for changes in pavement crown and compensation for wear and other causes. The longitudinal - finishing machine shall be provided with a longitudinal float not less than 10 feet in length, readily adjustable to a true plane and properly stiffened to prevent distortion during use. Screed and float adjustments of these machines shall be checked at the start of each day's paving operations and as often as required. Machines that cause frequent delays due to mechanical failure shall be replaced. Finishing machines that ride the edge of a previously constructed slab shall have rubber-tired wheels to prevent damaging the surface and edges of the concrete.
2. Transverse finishing: Concrete, as soon as placed, shall be accurately struck off and screeded to the crown and cross section shown on the drawings. The final surface elevation or grade is to be non-porous when properly consolidated and finished. The finishing machine shall make at least two trips over each area of pavement, and may make one or two additional trips as necessary to properly compact the concrete and produce a surface of uniform texture, as well as true to grade. However, excessive manipulation that brings to the surface an excess of mortar and water will not be permitted. Any equipment that cannot produce the required compaction and surface finish with the indicated number of trips will be considered unsatisfactory. The top of the form or pavement edge upon which the finishing machine travels shall be kept clean by an effective device attached to the machine, and by necessary hand methods. This will insure that the travel of the machine will be maintained true without lift, wobble, or other variation that would affect the precision of the finish.
3. Longitudinal Floating: After completion of finishing with the transverse-finishing machine, the longitudinal mechanical float shall be operated to smooth and finish the pavement to grade. The float shall be operated parallel to the centerline of the pavement with a short, quick motion, and shall travel slowly along the pavement,

maintaining contact with the surface at all times. If contact with the surface is not made at all points, additional concrete as required shall be placed and screeded. The float is to be operated over the same area until a satisfactory surface is produced. In advancing the float, each new position shall lap the previous position by not less than one-half the float length.

4. Other Types of Finishing Equipment: Other types of concrete finishing equipment may be used on a trial basis. Such finishing equipment shall be approved by the Engineer before being put into service. The use of equipment that fails to produce approved results when finishing concrete of the quality and consistency required by these specifications shall be discontinued. The concrete shall then be floated and finished with equipment in the manner as specified above.
- B. HAND FINISHING: This method shall be employed only under the conditions previously specified, except as otherwise permitted and authorized by the Engineer.
1. Equipment: An approved strike and tamping template and a longitudinal float shall be provided for hand finishing. The template shall be at least 1 foot longer than the pavement width, be equipped with handles, and have edges at least 4 inches wide. The longitudinal float shall be 10 to 16 feet in length, with a cross section of an inverted T made of a 2 X 6 inch or wider plank for the base and a 2 X 8 inch plank for the vertical leg. The float shall be rigid, substantially braced, be able to maintain a plane surface on the bottom of the base, and shall have suitable handles for smooth and effective manipulation from the foot bridges. The bottom edges of the base of the float shall be rounded on a radius not exceeding 3/8 inch. Floats made of metal or a combination of wood and metal may be used provided they conform to the requirements for wood floats.
  2. Finishing and Floating: Immediately after placement, concrete shall be struck off and screeded to the crown and cross section shown on the drawing. The consolidated and finished surface elevation shall be in accordance with the drawings or as specified. The entire surface shall be tamped, and the tamping operation is to be continued until accomplishing the required compaction and reduction of internal and surface voids. Concrete that is inaccessible to the vibrating consolidating equipment shall be consolidated with the aid of hand-manipulated vibrators under provisions of the subparagraph 125.06 (C)"Vibration". Immediately following the final tamping of the surface, the pavement shall be floated longitudinally by hand from bridges resting on the side forms and spanning but not touching the concrete. If contact with the pavement is not made at all points by the float, additional concrete shall be placed as required and screeded, and the float operated until a satisfactory surface has been produced. After a section has been smoothed so that the float maintains contact with the surface of the concrete at all points, the bridges may be moved forward half the length of the float. The operation is to be repeated over the new and previously floated surfaces.
  3. Straight-edge Finishing: Minor irregularities and score marks in the pavement surface shall be eliminated by means of long-handled wood floats and straight-edges after the longitudinal floating is completed, but while the concrete is still plastic. When necessary, excess water and laitance shall be removed from the surface transversely by means of a finishing straight-edge. The long-handled floats may be used to smooth and fill in open-textured areas in the pavement surfaces. The final finish shall be made with the straight-edges. The use of long-handled floats shall be held to a minimum as necessary to correct local surface unevenness not corrected by the longitudinal float. Long-handled floats shall not be used to float the entire pavement surface. Straight-edges shall be 12 feet in length and may be operated

from bridges and from the side of the pavement. A straight-edge operated from the side of the pavement shall be equipped with a handle 3 feet longer than one-half the width of the pavement. The surface shall then be tested for trueness with a 12-foot straight-edge held in successive positions parallel and at right angles to the centerline of the pavement in contact with the surface. The whole area is to be covered as to detect variations. The straight-edge shall be advanced along the pavement in successive stages of not more than one-half the length of the straight-edge. Depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. Projections above the required elevation shall also be struck off and refinished. The straight-edge testing and finishing shall continue until the entire surface of the concrete is free from observable departure from the straight-edge, conforms to the required grade and contour and when hardened, will satisfy the surface requirements specified under subparagraph 125.13(B) "Surface Smoothness".

4. Carpet Drag Finishing: Use an artificial grass-type carpet having a molded polyethylene pile face with a blade length of 5/8 inch to 1 inch, a minimum weight of 70 ounces/square yard, and a strong, durable, rot-resistant backing material bonded to the facing. The surface of the pavement shall be dragged longitudinally in the direction of the concrete placement with the carpet drag when most of the water glaze or sheen has disappeared and before the concrete becomes non-plastic. The carpet drag should be of sufficient transverse length to span the full width of the pavement being placed and adjustable so that a sufficient longitudinal length of carpet is in contact with the concrete being placed to produce the desired texture. The leading transverse edge of the drag shall be securely fastened to a traveling bridge or a moveable support system. The carpet drag shall be cleaned and changed as required. The dragging shall be carefully done to produce a finished surface having a fine granular or sandy texture without leaving disfiguring marks. The surface of the pavement at joint edges shall be dragged as necessary with a small hand-operated drag following edge tooling. No tool marks of any kind shall be present on the finished surface.

### 3.4 CONSTRUCTION JOINTS

Construction joints shall be prepared for receiving the next pour by sweeping the surface of the joint clean with a stiff broom or wire brush to remove all laitance. All loose particles and debris shall be removed. The surface is to be dampened just prior to casting of concrete against the joint. Construction joints will be made only at locations shown on the Plans unless written permission is granted by the Engineer to make additional joints.

- A. LONGITUDINAL CONSTRUCTION JOINTS: Longitudinal construction joints between paving lanes shall be located as indicated on the drawings. Dowels or keys shall be installed in the longitudinal construction joints as required and in accordance with the indicated details. Metal keyway forms shall be used for forming horizontal keyways. The dimensions of the keyway forms shall not vary more than plus or minus 1/16 inch from the indicated dimensions. The keyway form shall be securely fastened to the concrete form so that it will be at the mid-depth of the pavement within a tolerance of plus or minus 1/8 inch. All longitudinal construction joints shall be edged and subsequently sawed to provide a groove at the top conforming to the indicated details and dimensions.
- B. TRANSVERSE CONSTRUCTION JOINTS: Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for 30 minutes or longer. All transverse construction joints in non-reinforced pavements shall be installed in the location of a

planned transverse contraction or expansion joint. Transverse construction joints located at planned transverse joints shall be of the doweled type with one end of each dowel painted and greased to permit movement at the joint. These joints shall be edged and subsequently sawed to provide a groove at the top conforming to the indicated details and dimensions. When concrete placing is resumed, the planned joint spacing shall be used beginning with the first regularly scheduled transverse joint.

### 3.5 EXPANSION JOINTS

Three quarter (3/4) inch expansion joints shall be provided at forty (40) feet on center or of the type, size, and spacing shown on the Plans. The expansion joint materials shall be as shown on the plans or a recycled material, 1/2" thick as manufactured by J.D. Russel Co., or approved equal. The joint sealing compound shall be Sonneborn SL-1 or approved equal. Manufacturers' recommendations must be strictly adhered to. Devices used for installing the joints shall be adequate to hold the parts of the joint in proper position while protecting the filler from damage during concreting operation. The devices shall also be removable without permanent detriment to the pavement. Adjacent sections of filler shall be fitted tightly together and held in line to insure continuity. Concrete shall be prevented from entering the expansion space. Any concrete that has flowed into a gap between an expansion joint strip and edge forms of the pavement shall be cut out immediately after removing the forms. Expansion joints shall be formed about structures and features that project through, into, or against the pavement. Joint filler must be of the type, thickness, and width as indicated or directed and installed to form a complete, uniform separation between the structure and pavement.

### 3.6 CONTRACTION JOINTS

- A. Contraction joints shall be provided at twenty (20) feet on center or of the type, size, and spacing shown on the Plans. Contraction joints may be either tooled or sawed but must provide a minimum depth of 1/4 of the thickness of the concrete and sealed as shown on the plans or with Sonneborn SL-1 or approved equal. When sawed joints are used, the sawing should begin as soon as the concrete has obtained adequate strength to resist raveling of the joint edges, generally between 4 and 24 hours. The joints must be flushed or blown clean immediately after sawing to keep the residue from setting up.
- B. Transverse and longitudinal contraction joints shall be of the weakened-plane or dummy type, and shall be constructed in conformance with the indicated details and dimensions. Longitudinal contraction joints shall be constructed by sawing a groove in the hardened concrete with a power-driven saw. Tie bars in longitudinal contraction joints shall be prepared and placed across joints where indicated in the plans. They shall be correctly aligned and securely held in the proper horizontal and vertical position during the placing and finishing operations to the satisfaction of the Engineer.
  1. Sawed Joints: The groove of contraction joints shall be not less than 1/4 inch nor greater than 3/8 inch in width for the entire depth of saw cut shown on the drawings. The upper portion of the groove is to be widened to not less than 3/8 inch nor more than 5/8 inch for a depth of 1/4 of the pavement thickness, plus or minus 1/8 inch, below the pavement surface.

The time of sawing shall be varied, depending on existing and anticipated weather conditions. Uncontrolled cracking of the pavement shall be prevented. Sawing of the joints shall commence as soon as the concrete has hardened sufficiently to permit cutting the concrete without excessive chipping, spalling, or tearing. The sawed faces of joints will be inspected for undercutting or washing of the concrete due to early sawing. If this action is sufficiently deep to cause structural weakness or

excessive cleaning difficulty, as determined by the Engineer, the sawing operation shall be delayed until directed to resume. The sawing operation shall be carried on regardless of weather conditions. The joints shall be sawed at the required spacing consecutively in the sequence of the concrete placement. A chalk line or other suitable guide shall be used to mark the alignment of the joints. The saw cut shall be straight from edge to edge of the pavement and shall not vary more than 1/2 inch from the true joint alignment. Before sawing a joint, the concrete shall be examined closely for cracks. The joint shall not be sawed if a crack has occurred near the location chosen for a joint. Sawing shall be discontinued when a crack develops ahead of the saw cut.

The surface of pavement cured with membrane-curing compound shall be wetted with water in the region of the intended saw cut prior to sawing to protect the curing membrane from abrasion. Workmen and inspectors shall wear clean, rubber soled footwear, and the number of persons walking on the pavement shall be limited to those actually performing the sawing operation. Immediately after each joint is sawed, the saw cut and adjacent concrete surface shall be thoroughly flushed with water until all waste from sawing is removed from the joint. Any membrane-cured surface damaged during the sawing operations shall be re-sprayed as soon as the free water disappears. The sawing equipment shall be adequate in number of units and power to complete the sawing at the required rate. An ample supply of saw blades shall be available on the job before concrete placement is started. At least one standby sawing unit in good working order shall be available at the job site at all times during the sawing operations.

2. Dowels and Tie Bars: Dowels and tie bars shall be prepared and placed across joints where indicated. They are to be correctly aligned, and securely held in the proper horizontal and vertical position during the placing and finishing operations. Dowels shall be placed by the bonded-in-place method. The portion of the dowel inside the form shall be the bonded end. Dowels may be cut to length at the mill or shop by shearing in lieu of sawing, provided the deformation from true shape caused by shearing does not exceed the diameter of the bar by more than 0.04 inch and provided such deformation does not extend more than 0.04 inch from the end of the dowel. Dowels shall be clean, straight, and cut true to length with ends square and free from burs.

In longitudinal and transverse construction joints, threaded split dowels may be used in lieu of one-piece dowels. The assembled split dowels shall have a length and diameter at least equal to that of a one-piece dowel of the required size. The screw-threaded portions of split dowels shall have a pitch diameter at least equal to the diameter of the one-piece dowel of the required size. The sleeve connector shall be of such length that when the split dowel is assembled the entire screw-threaded portions of the dowel are encased by the sleeve with dowel ends butting each other. Dowels in longitudinal and transverse construction joints shall be held securely in place by means of devices fastened to the forms.

Dowels and tie bars installed within the paving lane shall be held securely in position by means of rigid metal frames or basket assemblies. The assemblies shall consist of a framework of metal bars or wires arranged to provide rigid support for the dowels and tie bars throughout the paving operation. The assemblies shall also have a minimum of four transverse bars or wires, one of which shall be at or near each end of the dowel or tie bars with one for each end of the dowel bar at or near the subgrade. The dowels shall be welded to the assembly or held firmly by mechanical locking arrangements that will prevent the dowels from rising, sliding out, or

becoming distorted under paving operations. The wires shall not be used as locking devices. The dowel-holding devices shall be held securely in the proper location by means of suitable pins or anchors. Dowels in longitudinal and transverse construction joints shall be held securely in place parallel to the surface and within 1/2 dowel diameter of the center of the slab depth. Dowels in expansion joints and tie bars installed within the paving lane shall be held securely in place with the center of the dowel or tie bar within 1/8 inch of the center of the slab depth.

The spacing of dowels in longitudinal construction joints shall be as indicated except where the planned spacing cannot be maintained due to form length or interference with form braces. Spacing shall be closer with additional dowels. Dowels in longitudinal joints shall be omitted when the center of the dowel would be located within a horizontal distance from a transverse joint equal to 1/4 of the slab thickness. The method used in holding dowels in position shall be accurate to detect errors in alignment of any dowel from its required position after the finished pavement. There shall not be an angle greater than one whose tangent is 1/96. The Contractor shall furnish a template for checking the position of the dowels.

The portion of each dowel intended to move within the concrete or expansion cap shall be coated with a thin film of grease or other approved de-bonding material. Provide dowel caps on the lubricated end of each dowel bar used in an expansion joint. Provide dowel caps filled with a soft compressive material with enough range to allow complete closure of the expansion joint.

### **3.7 LONGITUDINAL JOINTS**

Longitudinal joints may be provided to assist in grade control or of the type, size, and frequency shown on the Plans. The longitudinal joint shall consist of a steel keyway or as shown on the plans. Manufacturer's recommendations must be strictly adhered to.

### **3.8 PAVEMENT PROTECTION:**

The Contractor shall protect the paving against all damage prior to final acceptance of the work by the Owner. Traffic shall be excluded from the pavement by erecting and maintaining barricades and signs until the concrete is at least 3 days old or for a longer period if so directed. As a construction expedient in paving intermediate lanes between newly paved lanes, operation of the paving mixer and batch-hauling equipment will be permitted on the pavement after the pavement has been cured for seven days and the joints have been sealed or otherwise protected. Also, the subgrade planer, concrete finishing machines, and similar equipment may be permitted to ride upon the edges of the previously constructed slabs provided the concrete is more than 72 hours old and has attained a minimum flexural strength of 450 psi or a compressive strength of 2,800 psi. Additional protection to the slab edge may be required to prevent damage. The pavement carrying traffic or equipment shall be kept clean. All spillage of materials on concrete shall be cleaned up immediately upon occurrence, at no cost to the Owner.

### **3.9 PLAN GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS:**

The finished surfaces of all pavements shall conform to the grade line and elevations shown on the contract drawings and the surface-smoothness requirements:

- A. PLAN GRADE: The finished surfaces of all pavements shall conform, within the tolerances specified and to the lines, grades, and cross sections shown on the contract drawings. The finished surfaces of the pavements shall not vary more than 0.04 foot above

or below the plan-grade line or elevation established and approved at the site of the work. The finished surfaces of new abutting pavements shall coincide at their juncture. An approved transition pavement strip of the type and width shown on the drawings or as directed shall be installed where a new pavement abuts an existing pavement to provide the required and satisfactory pavement surface at the juncture of the new and existing pavements. Further, the 0.04 foot deviation from the approved grade line and elevation will not be permitted in any area of these pavements where closer conformance with planned grade and elevation is required for the proper functioning of any and all applicable structures.

- B. **SURFACE SMOOTHNESS:** The finished surfaces of all pavements shall not deviate from the testing edge of an approved 12-foot straight-edge more than the tolerance shown for the respective pavement category of Table 350-1. In no instance shall the tolerance exceed more than 1/16 of an inch per foot.

<b>TABLE 350-1</b>		
<b>Pavement Category</b>	<b>Direction of Testing</b>	<b>Tolerances</b>
Pavements having cross slopes of 1% or less	Longitudinal Transverse	1/8 inch 3/16 inch
Pavements having cross slopes greater than 1%	Longitudinal Transverse	1/8 inch 1/4 inch

- C. **EQUIPMENT:** The Contractor shall furnish and maintain at the site one straight-edge in good condition for each longitudinal finishing machine for use by the Owner in testing the hardened portland-cement-concrete surfaces. These straight-edges shall be constructed of aluminum or other approved lightweight metal. They shall have blades with a box or box-girder cross-section with a flat bottom, adequately reinforced to insure rigidity and accuracy. Straight-edges shall be equipped with handles for operation on the pavement. The Contractor shall furnish and maintain at the site devices other than straight-edges, if approved, for surface-smoothness determinations. There shall be one such device for each longitudinal finishing machine for use by the Owner.

**3.10 CURING**

See SECTION 03 30 00 - CONCRETE

**END OF SECTION**