

SECTION 02520 - PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

SUMMARY

Extent of portland cement concrete paving is shown on Drawings, including curbs, gutters, walkways, and pavement.

Prepared subbase is specified in under Section 02210, Excavation and Backfill (Sewers and Water Main).

Concrete and related materials are specified in Division 3.

SUBMITTALS

Provide samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

QUALITY ASSURANCE

Codes and Standards. Comply with Michigan Department of Transportation, Standard Specifications for Construction.

PROJECT CONDITIONS

Traffic Control. Maintain access for vehicular and pedestrian traffic as required for other construction activities specified in Division 1.

PART 2 - PRODUCTS

GENERAL

Materials for forms, steel reinforcement, joint materials and curing materials shall comply with MDOT Standard Specifications.

CONCRETE MIX, DESIGN, AND TESTING

Comply with requirements of applicable Division 3 Sections for concrete mix design, sampling and testing, and quality control and as herein specified.

Design mix to produce normal-weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:

Compressive Strength: 3500 psi, minimum at 28 days, unless otherwise indicated.

Slump Limit: 8 inches minimum for concrete containing high-range water-reducing admixture (superplasticizer); 2 to 4 inches for other concrete.

Air Content: 4 to 7 percent.

All mix designs shall be provided at least seventy-two (72) hour prior to placement to allow time for review and approval.

Wheel Stops. Precast of 3,500 psi air-entrained concrete approximately 6 inches high, 9 inches wide, and 7'-0" long with chamfered corners and drainage slots on underside.

CONCRETE RAMPS

Ramps shall be constructed 6 inches thick and to the width and slope shown on the Drawings using Class A concrete as specified under Section 03315. Type of ramp shall be as noted on the Drawings for different intersection conditions. All concrete ramps shall comply with ADA requirements including truncated domes.

PART 3 - EXECUTION

SURFACE PREPARATION

Remove loose material from compacted subbase or base surface immediately before placing concrete.

FORM CONSTRUCTION

Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of Work and so that forms can remain in place at least 24 hours after concrete placement.

Check completed formwork for grade and alignment to following tolerances:

Top of forms not more than 1/8 inch in 10 feet.

Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

Slope step treads at 1/4 inch per foot to drain.

REINFORCEMENT

Locate, place, and support reinforcement as specified in applicable Division 3 Sections, unless otherwise indicated.

CONCRETE PLACEMENT

General. Comply with requirements of applicable Division 3 Sections for mixing and placing concrete, and as herein specified.

Do not place concrete until subbase, base and forms have been checked for line and grade. Moisten subbase/base if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or

side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.

Fabricated Bar Mats. Keep mats clean and free from excessive rust, and handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to ENGINEER.

Curb and Gutter. Automatic machine may be used for curb and gutter placement at CONTRACTOR's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

JOINTS

General. Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

Joints shall be of the type and location as shown on the Drawings. Joints shall be constructed in accordance with MDOT Specifications.

CONCRETE FINISHING

After striking off and consolidating concrete, smooth surface by screening and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

After floating, test surface for trueness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to ENGINEER.

On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.

Burlap finish by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic. Repeat operation to provide a gritty texture acceptable to ENGINEER.

Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by ENGINEER.

SIDEWALKS

Forms shall be of metal or wood, straight and free of distortion, and of sufficient strength to resist springing during the placing of concrete. Forms shall be securely staked, braced and tied to the required line and grade. Flexible steel or adequately sized lumber may be used for short radius forms.

The walk subgrade shall be compacted to 95 percent compaction by tamping. After wetting the subgrade, the concrete shall be placed to the proper depth and spaded along the form faces.

Concrete shall be alternately tamped and screened until all voids are removed and the surface has been brought to the required grade. The surface shall then be floated to produce a smooth, dense surface, free from irregularities. All edges and joints shall be rounded to a radius of 1/4 inch with an edging tool and trowel. As soon as all excess moisture has disappeared, the surface shall be finished by light brooming.

Walks shall be divided into blocks approximately square, using slab division forms or by cutting joints after floating. These joints shall be 1/2-inch deep by 1/8 to 1/4-inch in width and shall be finished smooth and true to line. Bituminous expansion joints shall be provided at intervals of 50 feet and at junctions with structures and curbs. Control joints shall be located between expansion joints at intervals equal to the sidewalk width.

As soon as concrete surfaces have hardened sufficiently to prevent marring, they shall be covered by an approved curing compound, or they shall be thoroughly wetted and cured by an approved method for a period of six days unless otherwise directed by ENGINEER.

PAVEMENT

The surface of concrete pavements shall be properly consolidated and struck off to such elevations so as to match adjacent pavement and made uniform by transverse floating. As soon as all excess moisture has disappeared, the pavement shall be given a final light brooming finish by dragging a seamless strip of damp burlap or cotton fabric. Edges of all joints shall be tooled.

As soon as concrete surfaces have hardened sufficiently to prevent marring, they shall be covered by an approved curing compound, or they shall be thoroughly wetted and cured by an approved method for a period of six days unless otherwise directed by ENGINEER.

CURB AND GUTTER

Concrete curb and gutter shall be placed prior to the placement of other types of roadway surfaces including concrete pavements.

Curb and gutter to be replaced shall be determined by ENGINEER and shall include any cracked or broken sections and any sections which have settled 0.25 inch or more.

Forms shall be complete front and back type. Back forms resulting in hand forming the curb and gutter will not be allowed. Forms shall be of metal, straight and free of distortion and of sufficient strength to resist springing during the placing of concrete. Forms shall be securely staked, braced and tied to the required line and grade. Flexible steel or adequately sized lumber may be used for short radius forms.

One-inch expansion joints shall be placed opposite expansion joints in an abutting pavement. If curb or curb and gutter does not abut a concrete pavement, place expansion joints at all spring lines of street returns. If intersecting streets are more than 300 feet apart, place expansion joints at 200 foot intervals. For MDOT Standard Details A, B, C5, C6 and D curb and gutter, place expansion joints in abutting pavement.

If the structure does not abut a concrete pavement or base, contraction joints shall be placed at approximately 100-foot intervals.

Intermediate plane of weakness joints shall be placed at approximately 10-foot intervals between other joints as called for above.

Curb returns and curb cuts for driveways shall be installed as required.

The gutter and top of curb shall not vary more than 3/16-inch in 10 feet when checked with a 10-foot straightedge.

After the back forms are removed, honeycomb and minor defects shall be filled with mortar, composed of one part Portland cement and two parts sand.

As soon as concrete surfaces have hardened sufficiently to prevent marring, they shall be covered by an approved curing compound, or they shall be thoroughly wetted and cured by an approved method for a period of six days unless otherwise directed by ENGINEER.

CURING

Protect and cure finished concrete paving in compliance with applicable requirements of applicable Division 3 Sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.

REPAIRS AND PROTECTIONS

Repair or replace broken or defective concrete, as directed by ENGINEER.

Protect concrete from damage until acceptance of Work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 02520