

**SECTION 32 13 13  
CONCRETE PAVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete sidewalks, walkways and vehicular accessways

**1.02 RELATED REQUIREMENTS**

- A. Section 31 22 00 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.

**1.03 REFERENCE STANDARDS**

- A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- B. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2023.
- C. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2025.
- D. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- E. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010 (Errata 2012).
- F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.
- G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

**1.04 1.4 SUBMITTALS**

- A. See Section 01 33 00 – Submittal Procedures, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Shop Drawings: Indicate plans for each unit or groups of units, elevations with model number, overall dimensions; construction, and anchorage details.

**PART 2 PRODUCTS**

**2.01 PAVING ASSEMBLIES**

- A. Comply with applicable requirements of ACI 301.

**2.02 FORM MATERIALS**

- A. Form Materials: Conform to ACI 301.

**2.03 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 - 60,000 psi yield strength as per Section 03 30 00, Part 2, 2.02

**2.04 CONCRETE MATERIALS**

- A. MATERIALS
- B. Concrete shall have proportions of 1 part cement, 1-3/4 parts fine aggregates, 2-3/4 parts coarse aggregates. These proportions shall be measured separately and on a dry basis. The maximum water to be added is 5 gallons per sack of cement. Concrete shall be entrained with controlled air by the use of air entrained Portland Cement or by the admixture of entraining material added at the time of mixing or by a combination of both. Air entrainment in concrete to be 6% to 7%. Concrete shall have a slump of not more than four inches. Concrete shall be a proportion -strength concrete whose constituent materials are proportioned as above and shall have a 4000 PSI strength after curing for 28 days.

- C. Cement shall be Portland Cement meeting all requirements for Type I, Type II and/or Type III cement of the Standard Specifications for Portland Cement of the American Society for Testing and Materials designation C 150 and/or C 175. All the cement in any containers in which part of the cement has become caked or deteriorated shall not be used. All cement shall be stored in waterproof enclosures. Cement, if used for mixing on the site, shall be delivered in bags or sacks containing 94 lbs. with the name and brand of the manufacturer, type and weight plainly indicated thereon. All sacks shall be in good condition. Broken or ruptured sacks will be rejected.
- D. Coarse aggregate shall consist of broken stone having clean, hard, strong, durable uncoated particles free from soft, friable, thin, elongated or laminated pieces of alkali, organic or other foreign matter. Broken stone shall be roughly cubical or pyramidal fragments. The coarse aggregate shall conform to the following grading requirements:
1. Coarse Aggregate Nominal Size
    - a. Broken Stone 1/2"
  2. Fine aggregate shall consist of sand or crushed stone having clean, hard, strong, rough, durable particles free of soft or flaky material, shale, alkali, loam, lumps or foreign matter. The fine aggregate shall conform to the following grading requirements:
    - a. Percent by Weight Passing Sieves
      - 1) Fine Aggregate 3/8" No.4 No.16 No.50 No.100
      - 2) Crushed Stone or Sand 100 95-100 45-85 10-30 0-6
  3. Run of bank gravel will not be accepted for either fine or coarse aggregate.
  4. Water for concrete shall be clean and free from acid, alkali, oil, organic or other deleterious substances.
- E. Steel reinforcing when required shall be steel reinforcing bars and/or welded, woven wire mesh sheets, (not rolls), of sizes shown on the Drawings. Reinforcing steel bars shall be deformed steel bars conforming to ASTM A-615, grade 40. Welded wire fabric shall conform to ASTM A-82 and A-185. Supports for welded wire mesh shall be "Slab Bolsters with Runners-SBA" as manufactured by Meadow Steel Products or equal. Slab bolsters shall be 2" high for 4" thick concrete slabs, 3" high for 6" thick concrete slabs and shall be placed 4'-0" O.C. max. Specify height when ordering. Local representative is RAW Equipment Co., 2800 College Point Blvd., Flushing, NY 11354, telephone (718) 461.2200.
1. Expansion joint filler shall be one of the following types:
    - a. 1/2 inch wide premolded superior grade, polyethylene, closed cell "MasterSeal 920 and 921" expansion joint-filler as manufactured by BASF Corporation Construction Systems: [www.master-builders-solutions.basf.us](http://www.master-builders-solutions.basf.us) or "Deck-O-Foam" expansion joint-filler as manufactured by W.R. Meadows, Inc.: [www.wrmeadows.com](http://www.wrmeadows.com).
    - b. Joint sealant for vertical use shall be a one component, polyurethane, "Joint sealant NP-1". Joint sealant for horizontal use shall be a one component, polyurethane, "Joint sealant SL-1", both as manufactured by BASF Corporation Construction Systems: [www.master-builders-solutions.basf.us](http://www.master-builders-solutions.basf.us). Or "Deck-O-Seal-125" expansion joint sealant as manufactured by W.R. Meadows, Inc.. Joint sealant color for uncolored concrete shall be "limestone;" joint sealant for colored concrete shall match the concrete color.
  2. Forms for the concrete shall be metal or wood of sufficient thickness to resist distortion.
    - a. They shall be clean, smooth, without blemishes or raised grain. Forms shall extend the full depth of the concrete, shall be sealed to prevent leakage of concrete and shall be rigidly held in position during construction. Forms shall be cleaned and oiled before every pouring. Ties shall be of the type that snap, without cones, and leave no metal within 1- 1/2 inches of the surface. Inserts, anchors, dovetails, anchor bolts, frames, pipe sleeves, dowels, dividing plates and other items shall be installed as specified.
    - b. Curing material shall be liquid applied as a fine mist with spray gun. Curing material shall be "Curing agent 1100-Clear", as manufactured by W.R. Meadows Inc., [www.wrmeadows.com](http://www.wrmeadows.com) or approved equal. It shall dry quickly so that it can be walked

upon, being neither slippery nor tacky, but forming a tough film completely covering the surface. All containers shall have manufacturer's instructions for application and minimum cover lettered thereon. The material shall have no harmful effect upon the concrete. Three days after application, the curing material film shall retain in the concrete at least 90% of water if tested according to A.S.T.M. Specifications C156-44T.

- c. Concrete shall be job-mixed or ready-mixed provided it conforms to the Specifications described therein and meets the requirements of the Building Code of The City of New York. Mixing of concrete shall be subject to inspection at any time by the Authority.
- d. Base course shall be stone screenings or recycled concrete. Stone screenings or recycled concrete shall be clean, hard, durable, sharp angled fragments. Stone shall be limestone, or traprock, 100% passing 1/2 inch sieve, 98-100% passing 3/8 inch sieve, 98% passing 1/4 inch sieve, 95% passing #4 sieve, 68% passing 1/8 inch sieve, 55% passing #8 sieve, 35% passing #16 sieve, 26 % passing #30 sieve, 22% passing #40 sieve, 19% passing #50 sieve, 13% passing #100 sieve, 9.5% passing No. 200 sieve, by weight. Recycled concrete shall have a maximum fragment size of 3/4" and minimum fragment size of 1/4 ". Base course shall be a minimum of 4" deep.

## **2.05 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

## **2.06 MIXING**

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

### **3.02 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.

### **3.03 PLACING CONCRETE**

- A. The Contractor shall accept the conditions and grades as they exist and shall do all excavating including removals and furnish all clean fill as may be required to establish the compacted subgrade at the required levels, below and parallel with the finished surface of the pavement.
- B. Subgrade to receive pavement shall be free of soft or spongy material. Material in soft spots shall be removed to the depth required to provide a firm foundation and shall be replaced with clean fill. The subgrade shall be shaped and compacted with a 5 to 8 ton self-propelled roller. Areas inaccessible to the roller shall be thoroughly compacted with other approved compacting tools. Any work to be constructed below grade must be satisfactorily backfilled before preparation of subgrade is begun. Rolling and compaction of the subgrade shall continue until the surface is hard, uniform, smooth, even-bearing, unyielding and true to grade and cross-section.
- C. Paved areas where new concrete pavement is called for shall be excavated to the required depth and old pavements removed from the site.
- D. Planted areas where new concrete pavement is called for shall be stripped of existing topsoil to the required depth for the paving. The topsoil shall be stockpiled on the site in areas designated by the Development Superintendent. No topsoil shall be removed from the site without permission of the Authority. All debris, vegetation, or other perishable materials shall be removed from the area, except for trees or shrubs designated for preservation.

- E. Frames and covers of drainage and other flush surface structures in the construction areas shall be adjusted by the Contractor to the new finished grades. Walls of these structures shall be cut or extended as required. Extensions shall be of brick and mortar, the same thickness as the existing wall. Inside and outside of extension shall be parged with 1:3 cement mortar 1/2 inch thick. Frames of all adjusted structures shall be set on a full bed of mortar. The Contractor shall properly align the frames and covers. He shall provide all safety and protective barricades around open structures.
- F. Forms shall be set in place, fastened together and secured in place to resist distortion and misalignment. Forms shall be located with their tops set at the exact finished grades. Reinforcing bars and/or welded, woven wire mesh shall be set in place and secured to prevent movement while pouring concrete. Bottom bars shall be secured with plastic clips, top bars shall be secured to snap ties. Woven wire mesh shall be suspended by Slab Bolster with Runners, all as specified in Materials Section of these Specifications. The placement of
  1. reinforcing bars must be verified by Authority inspector prior to pouring of concrete. Forms shall remain in place until the concrete has thoroughly hardened.
- G. Frames and covers of drainage and other flush surface structures in the construction areas shall be adjusted by the Contractor to the new finished grades. Walls of these structures shall be cut or extended as required. Extensions shall be of brick and mortar, the same thickness as the existing wall. Inside and outside of extension shall be parged with 1:3 cement mortar 1/2 inch thick. Frames of all adjusted structures shall be set on a full bed of mortar. The Contractor shall properly align the frames and covers. The Contractor shall provide all safety and protective barricades around open structures.
- H. Job mixing of concrete shall be done in an approved batch mixer. After all materials, aggregates, cement and water have been placed in the mixer, they shall be mixed for not less than 1-1/2 minutes. For batches larger than one cubic yard, mixing time shall be increased by 15 seconds for each additional cubic yard or until a uniform mixture of concrete is produced. The mixer and other equipment shall be kept clean and free of hardened mortar. The mixer shall be thoroughly cleaned if not used for a period of 30 minutes. Any concrete mixture which has not been placed within 30 minutes from the time water was first added shall not be used.
  1. Ready-mix concrete shall be mixed and transported from the central plant producing the mixture, to the site in approved mixing trucks. After all materials, aggregates, cement and water have been placed in the mixing drum they shall be mixed for a minimum of one minute per cubic yard of material and then an additional two (2) minutes with the drum reversed. The maximum elapsed time from first introducing water to the mix and placing of the concrete shall be one hour.
  2. Each load of concrete shall be certified by the producer to the owner, whether produced at ready-mix plant or site mixed, as to concrete strength and actual quantities per cubic yard of each material, including water contained therein. A copy of such certificates shall be delivered to the Authority who will make it available to the Department of Buildings during the progress of the work and for two years thereafter. These certificates shall be delivered to the Authority weekly and not later than the Friday following the week in which the work was done.
- I. Placing of concrete shall be done as soon as possible after mixing. It shall be thoroughly spaded, rammed and vibrated in place. Vibrators shall be of internal type applied directly in the area of freshly placed concrete and not to the forms. All possible care is to be exercised to prevent voids and honeycomb. No concrete is to be deposited in water nor on frozen subgrade. Concrete shall not be placed when the temperature is below 40 deg. F. Concrete shall contain no frozen materials. Calcium chloride or other admixtures shall not be used as anti-freeze agents.
  1. Concrete shall be placed in a continuous operation between expansion joints. Expansion joints shall be installed as shown on the drawings and where new concrete abuts new and/or existing pavements, buildings, steps, curbs, walls, etc. Expansion joints shall be 1/2 inch wide filled with premolded joint filler and sealed with a joint sealant. Joint filler shall be as specified above in Materials Section of these Specifications. The joint filler

- shall be set 1/2 inch below the concrete surface. To prevent the joint filler from protruding above the surface, expansion joint capping shall be placed over the joint filler.
2. Capping is available through W.R. Meadows, Inc. [www.wrmeadows.com](http://www.wrmeadows.com). After the concrete has set, the capping shall be removed and the remaining void shall be sealed with 1/2 inch joint sealant. Sealant shall be as specified above in Materials part of this Section. The maximum distance between expansion joints shall be 25 feet unless otherwise shown on the Drawings.
- J. Finishing of the concrete shall be done to true smooth planes. The concrete shall be struck off and screeded with not less than two screeding passes to produce a surface which is uniform in appearance, density and composition. The concrete surface shall be worked only sufficiently to embed the coarse aggregate, to close surface voids and to eliminate porous spots. The working shall not be carried to the point where excess mortar or water are drawn to the surface. The surface shall have a final soft broom finish unless otherwise noted. When the pavement is
1. a walk, the direction of the broom finish shall be across the width of the walk. Edges shall be rounded to 1/4" radius by use of an edging tool, unless otherwise shown on the Drawings.
- K. Control joint markings shall consist of a groove 1/4 inch wide and one half (1/2") inch deep and shall be made with an approved tool. They shall be perpendicular and parallel to the curb and building lines and enclose 5 foot by 5 foot panels, or as shown on the Drawings. In the case of sidewalks, if the final width of any concrete panel is not divisible by five feet, panels shall be marked uniformly as near as 5 feet as possible or as designated on the Drawings. After the concrete has reached its initial set and is free from excess water, the exposed surface shall be treated with a curing material as specified above in Materials Section of these Specifications.
- L. The Contractor shall have sufficient tarpaulins and guards to protect his work from precipitation, drying effects of the sun and wind, traffic or other hazards at all times. When there is danger of frost or freezing, the Contractor shall maintain sufficient hay or other approved material on the site to protect his work. The Contractor is responsible for protecting and maintaining his work in first class condition during the course of the Contract.
- M. The Authority will provide the inspection and field test, if necessary, of concrete at its own cost. Field tests will be made by a testing laboratory to be approved by NYCHA. The Contractor shall provide transportation for concrete samples from the location where concrete is being deposited to the testing laboratory as required.
1. If the tests show that concrete tested is not in accordance with specifications, the Authority will condemn such concrete and the Contractor will be required to replace same, at his own expense, to the satisfaction of the Authority.
  2. Whenever such tests are ordered because original field tests made in accordance with Section C26-10004.5 of the New York City Building Code have shown that the concrete tested was not in compliance with the specifications, then the cost of these tests will be borne by the Contractor. All low results of field tests of concrete will be referred to the Inspector for report and recommendation.
- N. Any concrete flatwork placed between November 1 and March 31, shall be treated with an approved sealer, such as boiled linseed oil, to protect against de-icer scaling.
- O. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

### **3.04 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

**END OF SECTION 32 13 13**