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\*\*\*\*THIS IS A NEW IM. – PLEASE READ CAREFULLY.\*\*\*\*

## PRECAST CONCRETE NOISE WALLS

### GENERAL

Approval to furnish precast concrete noise walls shall be on the basis of certification from approved sources (approved plant prior to letting) and shall conform to all applicable specifications and design requirements. Approved sources are listed in IM 445.06, Appendix A.

### PLANT APPROVAL

Plant approval shall be on the basis of certification, approved quality control plant and a recommendation by the District Materials Engineer responsible for the inspection of the plant.

An up-to-date Quality Control Plan that ensures all materials, mix design(s), workmanship and fabrication methods is required and shall be subject to the approval of the engineer.

### MATERIALS

All aggregates, cementitious materials, admixtures and reinforcing steel, shall be from approved sources and shall comply with the requirements of the Iowa Department of Transportation Standard Specifications.

### CONCRETE

- Cement content per cubic yard (cubic meter) shall be not less than 600 lbs. (360 kg).
- Coarse aggregate shall be Class 3 durability (as defined in Article 4115.04). The use of gravel is subjected to the approval of the Engineer, based on past history of deleterious and stain-producing material found in the aggregate source.
- Air content shall be 7.5% as a target value, with a maximum variation of  $\pm 1.5\%$ . When specified, or authorized, approved admixtures for the purpose of improving workability or for retardation may be used with prior approval of the Engineer.
- Mix design is subject to the approval of the Engineer.
- Compressive Strength
- Design strength – 3500 psi (24 MPa) or as specified in the plan
- Form removal/moving strength – minimum 2000 psi (13.8 MPa) or as specified in the plan.

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- A minimum of nine cylinders per lot shall be cast to evaluate design strength. A lot shall be considered one week unless established otherwise by the Engineer. Three cylinders shall be used to determine form removal/moving strength, three shall be used to determine design strength and three shall be maintained as back-ups. The average of the three test specimens shall be considered as the test result.
  - Strength samples shall be cured with the element until curing operations have ceased.
  - Elements shall be considered acceptable for shipping when the required design strength has been achieved for a given lot.

### **PATCHING**

- Polymer grouts shall be accepted based on approved brands as noted in IM 491.11, Appendix A.
- Hydraulic cement grouts shall be accepted based on approved brands as noted in IM 491.13, Appendix A.
- Lifting devices shall be filled with patching material that will bond and be similar in texture and color to the underlying concrete. Methods for filling lifting devices shall be approved by the Engineer.
- All patching shall be conducted such that it is visually blended with surrounding material and is not visually objectionable. A test patch shall be conducted for review by the Engineer to ensure acceptability.

### **CURING**

- The elements shall be cured until form removal/moving strength is achieved, but for a minimum of 24 hours.
- As soon as practical (after initial set) after casting, but not later than 30 minutes, wall and columns shall be covered with wet burlap and continuously wet until form removal/moving strength is achieved.
- After the initial curing period is completed, walls and panels may be moved from casting beds to a secondary curing area and covered with wet burlap and polyethylene (plastic) 3.0 mil (60  $\mu$ m) thick, properly secured to retain moisture.
- Other curing methods may be used as approved by the Engineer.

### **TOLERANCES**

- A. All dimensions within 1/4 inch (5 mm)
- B. Angular distortion with regard to the height of the wall shall not exceed 1/4 inch in 5 feet (5 mm in 1.5 m)
- C. Surface defects shall not be acceptable if objectionable, however on smooth-formed surfaces defect shall not exceed 1/8 inch in 5 feet (2.5 mm in 1.5 m). On textured surfaces defect shall not exceed 5/16 inch in 5 feet (8 mm in 1.5 m).

### **REJECTION**

- A. Failure to meet any of the specified requirements
- B. Defects that indicate imperfect molding
- C. Defects that indicate honeycomb or open texture concrete
- D. Surface defects that exceed 5/16 inch (8 mm) in 5 feet (1.5 m)
- E. Chipping, cracking or fractures

### **HANDLING, STORAGE & SHIPPING**

- Units shall be handled with care, lifting shall be with padded straps or padded contact areas and shall be stored above ground on wooden or padded supports.
- Support shall be adequate, firm, and shall be placed evenly to prevent sagging.
- Handling shall be minimized.
- Handling, storage and shipping shall be in a manner as to prevent and/or eliminate the causes of cracking, fracturing, damaging and excessive bending stresses.

### **LEVELING PAD**

Leveling pad shall be concrete and shall have a nominal strength of 3500 psi.

### **REINFORCING & ANCHORS**

- Anchor bolts shall be set in accordance with Article 2405.09 of the Iowa DOT Standard Specifications and shall be from an approved source listed in IM 453.08, Appendix A.
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- All masonry plates, anchor bolts, nut, washers and threaded rods shall be galvanized in accordance with Article 4100.07 of the Standard Specifications.
  - Threaded rods and anchor bolts shall meet the requirements of ASTM F1554, Grade 55 psi (380 MPa),
  - Only plastic supports for reinforcing steel shall be accepted based on approved brands as noted in IM 451.01, Appendix A.
  - Lifting anchors shall be galvanized in accordance with the Standard Specification 4100.07.
  - Panels in the splash zone shall require epoxy-coated steel.

### **MARKING**

The length and placement identification number shall be clearly scribed on the bottom of each column. Special panels shall have a unique mark identifying the piece and unique characteristics. The mark shall be placed in an area visible during handling, but concealed in final placement.

### **CERTIFICATION DOCUMENTS**

The producer/fabricator of precast concrete noise walls shall furnish on each shipment day a certified bill of materials or invoice, which identifies the county, project number, contractor's name and the number of panels. The certification of compliance shall be signed by a designated or responsible company representative and shall be stated as follows:

The materials itemized in this shipment are certified to be in compliance with the applicable ASTM Standards and the Iowa Department of Transportation Standard Specifications.

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Authorized Signature & Date

One copy of the above-described documents shall be forwarded to the project engineer on the day the item(s) are delivered to the project and one copy shall be sent to the respective District Materials Engineer.