

## ***Concrete Encased Underground Electrical Duct Banks***

The ASCC Hotline was almost stumped by a hotline call where the concrete contractor was placing concrete for underground electrical duct banks. The concrete contractor said that he usually spaded the concrete around the ducts while placing concrete, but the inspector insisted that a vibrator had to be used for proper consolidation. The contractor worried that using a vibrator would cause the ducts to float up during concrete placement. We asked the contractor what specification section the inspector was citing for this requirement. The contractor indicated that the inspector was requiring vibration because section 03300 Cast-in-Place Concrete required all concrete to be vibrated.

Fortunately, we were familiar with and directed the contractor to Division 2, Site Construction, and, in particular, to section 02584 Underground Ducts and Utility Structures. Shown below are the relevant paragraphs from an older AIA MasterSpec section 02584.



### **Concrete-Encased Ducts: Support ducts on duct separators.**

1. **Separator Installation:** Space separators close enough to prevent sagging and deforming of ducts, with not less than 5 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
2. **Concreting Sequence:** Pour each run of envelope between manholes or other terminations in one continuous operation.
  - a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
  - b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch reinforcing rod dowels extending 18 inches into concrete on both sides of joint near corners of envelope.
3. **Pouring Concrete:** Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Use a plank to direct concrete down sides of bank assembly to trench bottom. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.
4. **Reinforcement:** Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
5. **Forms:** Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
6. **Minimum Space between Ducts:** 3 inches between ducts and exterior envelope wall, 2 inches between ducts for like services, and 4 inches between power and signal ducts..
7. **Depth:** Install top of duct bank at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 30 inches below finished grade in deliberate traffic paths for vehicles, unless otherwise indicated.

### **Of particular importance are the parts that require the duct installer to:**

- Secure duct separators to the earth and the ducts to prevent floating during concreting.

- Spade concrete during the pours.
- **Not** use power-driven agitating equipment unless specifically designed for duct-bank application. We found this sentence to be interesting and checked to see if any vibrators were specifically designed for duct-bank application, but could find no references to such vibrators, or to power-driven agitating equipment.

We sent this information to the contractor and suggested that he show it to the inspector, then ask to see the part of the Division 2 contract specifications requiring vibration of the concrete around duct banks. We'll keep you posted on the outcome.