

CODE BREAKERS

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Unlock the Secrets of Specifying Underground Precast Concrete Structures by Using Standards Rather than Codes.

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Choosing the right code can make the difference between a successful project and a project riddled with problems. When writing specifications for a project, many engineers will require adherence to ACI 318 and/or ACI 350 for underground precast concrete structures. This approach covers only part of the details needed to obtain a precast concrete product that will successfully do the job.

The problems engineers face are based on ACI 318 and ACI 350 publications being codes and not standard specifications. The fact is that they are general guidelines and, as stated in both codes, "only the minimum requirements necessary to provide for public health and safety." ACI 350 states in its introduction that the code is intended to cover environmental engineering concrete structures of the usual types, both large and small, but is not intended to supersede American Society for Testing and Materials International (ASTM) standards for precast structures.

The engineer specifying contract documents is advised to use published "standards" as a requirement for a product instead of codes such as ACI 318 and ACI 350. Details specific for a product are contained within standard specifications. Items such as design, strength of concrete and watertightness are all contained in one document. It is not necessary to repeat the contents of the specification. Making a reference to the codes is the only mandatory requirement.

The growth of the precast concrete industry created a need for the publication of many standard specifications written specifically for the underground precast concrete product. ASTM has been a leader in promoting the writing and publishing of specifications for these structures.

Specifications tend to be written by volunteer members of committees that are not biased to either users or manufacturers. ASTM committee membership must consist of an equal division of manufacturers and users: 50 percent manufacturers and 50 percent representatives of users and general interest groups. A specification is not approved if there is one negative ballot. This rigid voting process to create specifications gives the specifications credibility. Adding even more credibility to ASTM is the stringent requirement that all specifications must be updated every five years.

Standard specifications for precast concrete products recognize the advantages of quality control in plant-produced concrete. The ability to produce consistent high-strength concrete with low water-cement ratios yields a dense material and a durable product. The engineering community can specify with confidence when the products shipped to the job site are guaranteed to perform satisfactorily without special inspections.

The American Association of State Highway and Transportation Officials (AASHTO) recognized the credibility of ASTM specifications by adopting them rather than rewriting them. The Standard Specification for Precast Concrete Manhole Sections carries the AASHTO Designation M 199. This is a copy of ASTM C478. For many years AASHTO designations M 259 & M 273 have been assigned to the ASTM documents C879 and C850 for box culverts.

ASTM has produced specifications for many precast products. A list of some of these specifications:

- **ASTM C478**, "Standard Specification for Precast Reinforced Concrete Manhole Sections," covers the round structures used as manholes in the sewer and water industries.
- **ASTM C858**, "Standard Specification for Underground Precast Concrete Utility Structures," covers rectangular boxes used by the electric utility and telephone industries to provide access to underground stations. This specification can also be useful for meter pits and valve vaults.
- **ASTM C913**, "Standard Specification for Precast Concrete Water and Wastewater Structures," covers rectangular boxes used to contain water and wastewater. The specification addresses the problem of watertightness to prevent contamination in these structures.
- **ASTM C1227**, "Standard Specification for Precast Concrete Septic Tanks," was written specifically for septic tanks used in residential homes.
- **ASTM C1433**, "Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers," covers the box culvert used to carry water from streams under highways. This specification was written to replace ASTM C789 and ASTM C850. Design is based on the load factor method.
- **ASTM C1577**, "Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO RFD (Resistance Factor Design)," also covers design of the box culvert. While results are similar to ASTM C1433, design is based on the recently introduced load and resistance provisions as given in AASHTO LRFD (Load and Resistance Factor Design) bridge design specifications.
- **ASTM C1613**, "Standard Specification for Precast Concrete Grease Interceptor Tanks," is written specifically for the grease interceptor tanks. These products are used to control kitchen waste associated with the food service industry.

The engineer preparing contract documents for underground precast concrete products will benefit by referencing a standard specification for that particular product rather than a code such as ACI 350 or ACI 318. In most cases the standard specifications contain reference to sections of those codes that contain method for design.

The precast concrete manufacturing industry has geared its equipment and procedures to adhere to the standard specifications published by ASTM. By doing so, precast concrete manufacturers are able to supply products that are structurally sound, functionally appropriate and cost-effective. These goals help to provide the specifying engineer with a successful project.

Find All of These Standards in the 2007 ASTM Manual

This manual contains all standards that are applicable to the production and testing of precast concrete products. Also offered as a CD, the Manual is screen-viewable and print-friendly allowing you to build a custom manual with only the standards specific to your operations.

To order visit [The NPCA Shop](#) or call (800) 366-7731.

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