

NEED FOR LONG-TERM MECHANICAL PROPERTIES

It is remarkable, but true, that most manufacturers of plastic sewer and drain pipe have developed no credible data base defining the strength of their pipe wall section. ***"No engineer should consider approval of any plastic drain pipe product for any sanitary sewer, storm sewer, or culvert application if the manufacturer is unable to provide credible long-term mechanical properties (e.g. compressive strength, tensile strength, tensile modulus, etc.) for the plastic pipe product."***

It is important to note that the long-term mechanical properties of plastic pipes cannot be determined without testing of extruded pipe specimens in accordance with ASTM D 2837 "Standard Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials." Testing of plastic pipe specimens in accordance with ASTM D 2837 establishes the long-term strength of the specific plastic material.

It is impossible to calculate the structural design required without confirmed long-term design data. It is imperative that the structural design of plastic pipes be based upon established long-term strength data.

Plastics will typically exhibit short-term strengths (per AASHTO Sections 18.4.3.1 and 18.4.3.2) much greater (3 to 4 times) than long-term strengths (50 years or more).

The strength of thermoplastic and thermoset plastics is time and temperature dependent. The strength of such products should be based upon stress regression analysis of long-term stress data (minimum 10,000 hours at 73.4°F) derived from hydrostatic testing of pipe specimens in accordance with the procedures defined in ASTM D 2837.

The strength of plastic products are based upon an ambient temperature of 73.4°F. If the temperatures exceed 73.4°F, the strength must be reduced by a factor appropriate to the specific plastic material.