The first Environmental Stress Crack (ESCR) testing was conducted on compression molded tensile bars. As resin manufacturing techniques have improved, samples no longer failed using the ESCR test methods. ESCR testing uses strong detergents at elevated temperatures to evaluate resins.

The PENT test is a good test of resistance to slow crack growth and related failures induced by the presence of stressing agents. Since this test is conducted using HDPE pipe, it is a better test to determine the best resins to use for piping applications.

Traditional broad molecular weight resins are used to produce most high-density polyethylene pipe. Typical PENT Test values for these HDPE pipes are 100 to 600 hours.

The Chart below shows the modular weight distribution for Bimodal, Broad and Narrow molecular weight resins.

**Molecular Weight Distribution**

The dotted line shows a typical molecular weight distribution for a narrow molecular weight HDPE resin. The dashes show just the distribution for a broad molecular weight HDPE. The solid line shows the distribution of a bimodal HDPE resin.

The properties of the HDPE resin can be changed because of the molecular distribution. Density and melt index also are important in tailoring the properties of the HDPE resin.