Book 2: Chapter 2 - Stress Rated Materials

DriscoPlex™ polyethylene pipes are manufactured using polyethylene materials that have been evaluated for long-term performance under mechanical stress. This is because pipes are durable goods that are expected to perform for many, many years.

In North America, the recognized method for determining the long-term performance of thermoplastic materials is ASTM D 2837 *Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.*

The hydrostatic design basis, HDB, for a thermoplastic materials is the long-term tensile stress at a specific temperature, that the material can be expected to withstand for 100,000 hours.

For polyethylene materials, ASTM D 2837 requires supplemental validation testing against failure by cracking. This is a critical requirement because when polyethylene is placed under long term mechanical stress, it fails by cracks growing slowly through the material, a process called “slow crack growth”. The supplemental validation requirement in D 2837 verifies that long-term performance can be expected when continuous mechanical stress within the HDB rating is applied.

Without long-term material evaluation, it is impossible to project how long a product may last. Only materials that have been evaluated for long-term performance can be expected to provide long-term service.

Table 2-1 Hydrostatic Design Basis Ratings and Service Temperatures

Property	*ASTM Standard*	*PE 3408*	*PE 2406*
HDB at 73°F (23°C) HDB at 140°F (60°C)	D 2837 D 2837	1600 psi (11.04 MPa) 800 psi (5.52 MPa)	1250 psi (8.62 MPa) 1000 psi (6.89 MPa)
Maximum recommended temperature for Pressure Service	–	140°F (60°C)	140°F (60°C)
Maximum Recommended Temperature for Non-Pressure Service	–	180°F (82°C)	180°F (82°C)

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