

ELONGATION (STRETCH)

ELASTIC ELONGATION (E.E): Refers to the portion of stretch or extension of a rope that is immediately recoverable after the load on the rope is released. This recoverable tendency is a primary result of the fiber (or fibers) used as opposed to the rope construction. Each type of synthetic fiber inherently displays a unique degree of elasticity. Relatively, HMPE fiber has an extremely low elasticity compared to nylon fiber.

HYSTERESIS: Refers to a recoverable portion of stretch or extension over a period of time after a load is released. In measuring elastic recovery it is the recovery that occurs immediately when a load is removed; thereafter, a remaining small percentage of elastic recovery will occur slowly and gradually over a period of hours or days. This retardation in recovery is measured on a length/time scale and is known as hysteresis or recovery over time.

PERMANENT EXTENSION (P.E.) WHILE WORKING: The amount of extension which exists when stress is removed but no time is given for hysteresis recovery. It includes the non-recoverable and hysteresis extension as one value and represents any increase in the length of a rope in a constant working situation such as during repeated surges in towing or other similar cyclical operations.

The percentage of P.E. over the working load range is generally in order of four or six percent for braided ropes and two to three times as much for plaited. However, it will vary slightly with different fibers and rope constructions.

Allowances must be made for this factor in applications such as sub-surface mooring or when using devices that demand precise depth location and measurement.

PERMANENT EXTENSION (P.E.) AFTER RELAXED: That portion of extension which, due to construction deformation (compacting of braid and helical changes) and some plastic deformation of the yarn fibers, prevents the rope from returning to its original length.

CREEP (COLD FLOW): Fiber deformation (elongation) due to molecular slippage under a constant, static loading situation. Fibers with this inherent characteristic display extremely low or negligible creep if minor fluctuations occur in the rate and/or frequency of load levels. In rope form, this would apply to polypropylene, polyethylene and HMPE fibers.

COMPONENTS OF STRETCH ON A LOADED ROPE

Published Elastic Elongation Data: All reported percentages are averages based on tests of new rope stabilized from 200D². Tested ropes are stabilized by being cycled 50 times at each stated percentage of its average break strength.

