Long Term Stress Relaxation & Creep Testing Services

1. Long Term Stress Relaxation

When a constant strain is applied to a rubber sample, the force necessary to maintain that strain is not constant but decreases with time, this behavior is called stress relaxation. Conversely, when a rubber sample is subjected to a constant stress, an increase in the deformation takes place with time, this behavior is called creep. The processes causing stress relaxation may be physical or chemical in nature, and under all normal conditions both types of process will occur simultaneously. However, at normal or low temperatures, stress relaxation is dominated by physical processes. At high temperatures or long times, chemical processes are dominant

2. Long Term Creep

When a constant stress is applied to a plastic, rubber, solder or other sample, the strain created by the stress is not constant but increases with time. This behavior is called creep. The processes causing creep may be physical or chemical in nature, and under all normal conditions both types of process will occur simultaneously. However, at normal or low temperatures, creep is dominated by physical processes. At high temperatures or long times, chemical processes are dominant.

Experiments can be performed in tension and compression with automated continuous measurements

3. Stress Relaxation & Thermal Recovery Sequence

This is a relatively short duration physical testing sequence designed to provide insight into the early effects of elevated temperature on compressed elastomers. The effects of time and temperature on the reaction force can be measured by compressing an elastomeric material specimen (or actual elastomeric part) and holding it at a constant strain. In particular, the reaction force at sub-ambient temperatures after first being subjected to an elevated temperature can be indicative of the material degradation that occurs in the elastomer while at the elevated temperature.

TEST SEQUENCE
At laboratory temperature (23 C), the specimen is slowly compressed to a strain relevant to the intended application (a typical strain might be between 10% and 20% compressive strain). This strain is maintained throughout the remainder of the sequence. The reaction force is continually measured throughout the remainder of the sequence:

- The specimen is allowed to relax for 1 hour at laboratory temperature
- The specimen is heated to a pre-determined elevated temperature and the temperature is maintained for 4 hours
- The specimen is cooled to laboratory temperature for 1 hour
- The specimen is cooled to a selected sub-ambient temperature and held until the reaction force stabilizes
- Pricing is based on a sequence that is completed within 24 hours; custom extended experiments require custom pricing.

General Pricing for Long Term Stress Relaxation and Creep Testing Services

1. Long Term Stress Relaxation Pricing

Specimens at One Temperature Between 23˚ C and 190˚ C	Set-up fee per specimen	Price per 100 hrs per specimen
	US$	US$
Price per 1	150	65
Price per 2	150	60
Price per 3	150	50
Price per 4 and up	150	45

For example, 3 specimens tested at one temperature, say 125 C, for 1000 hours each, would be priced at:
(3 x $150) plus (3 x $50 x 10) = $450 plus $1500 = $1950.

2. Long Term Creep Testing Pricing

Specimens at One Temperature Between 23˚ C and 120˚ C	Set-up fee per specimen	Price per 100 hrs per specimen
	US$	US$
Price per 1	150	65
Price per 2	150	60
Price per 3	150	50
Price per 4 and up	150	45

For example, 5 specimens tested at one temperature, say 30 C, for 2000 hours each, would be priced at:
(5 x $150) plus (5 x $45 x 20) = $750 plus $4500 = $5250.

3. Single Day Stress Relaxation & Thermal Recovery Sequence_____$400 Each

April 2004. Pricing subject to change.

Notes:

a) There is no additional charge for testing long-term stress relaxation in fluids, other than the expense of obtaining the fluid itself.
b) These are typical stress relaxation and creep experiments. Feel free to request a proposal for other interests or specifications, or for custom part testing
c) Data is delivered via e-mail in an ASCII format.
d) Customer data and materials will be retained for 1 year after initial data delivery.

Purchase Order, VISA, MasterCard, AMEX, and Discover Card are acceptable methods of payment.
Terms: NET 30 Days after Delivery of Data

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