# Optimal Designs of Simple Step Stress Accelerated Life Tests for Lognormal Lifetime Distributions under Type I Censoring

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*Abstract*

This paper considers optimal designs of simple step stress accelerated life tests in which each lognormally distributed test item is first run at low stress (at high stress) and, if it does not fail for a specified time, then it is run at high stress (at low stress) until a predetermined time. It is assumed that a log-linear relation exists between the lognormal location parameter and stress, and that the cumulative exposure model for the effect of changing stress holds.

The optimum stress change point is obtained which minimizes the asymptotic variance of maximum likelihood estimator of a specified 100pth percentile at design stress and the optimum stress change point is also obtained minimizing the generalized asymptotic variance of the maximum likelihood estimators of the model parameters. For selected values of the design parameters the optimum plans are tabulated, and the effects of the incorrect pre-estimates of the design parameters are investigated.

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