# THE NOVEL GROUP CHAIN ACCEPTANCE SAMPLING PLAN (GChSP-1) FOR GENERALIZED EXPONENTIAL DISTRIBUTION USING FIRST QUARTILE

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Truncated life testing is used in attribute acceptance sampling, to determine the lifetime of items. Although the Single Sampling Plan is widely used, it has two shortcomings: if the acceptance number is zero or one, the probability of lot acceptance decreases rapidly, and SSP does not involve multiple inspections. Subsequently, the Chain Sampling Plan and the Group Sampling Plan were introduced and they formed the foundation for the development of GChSP-1. Most acceptance sampling plans developed under the assumption of symmetrical data with the mean as the quality parameter. Since it is difficult to find perfect symmetrical data, this paper introduces a novel GChSP-1 for Generalized Exponential distribution for non-symmetrical data. The $1^{st}$ quartile is used as the quality parameter while the median was already used. In acceptance sampling, it is essential to minimize both the producer's and consumer's risks. However, the consumer's risk is often prioritized. Thus, the Minimum Angle Method is used since it ensures the smallest angle on the OC curve. The optimal number of groups, and the corresponding smallest angle, for proposed GChSP-1 across different design parameters is then obtained. The effect of each design parameter on the optimal number of groups is considered and observed that the findings align with the previous studies. Specifically, the optimal number of groups increases when the shape parameter and the quartile ratio increase. Conversely, the optimal number of groups decreases while the specified constant, the number of preceding lots, and the items in a group increase. Finally, the performance comparison among GChSP-1 with the $1^{st}$ quartile and the median reveals that the median performs better for the GChSP-1 as it produces the smallest number of groups. The findings of this study may offer practical guidance for industrial professionals in selecting acceptance sampling plans that best align with their data and quality control objectives.

***Keywords:*** *Consumer's risk, Group chain accepting sampling plan, Minimum angle method, Producer's risk.*