

STATISTICAL ACCEPTANCE SCHEME

The scheme adopted by the RTA is Part Q7 of the model specification is what is known as a 10% Producers' Risk scheme.

As in all such schemes samples are taken from a lot and the test results are taken to represent the properties of the lot. The mean and standard deviation of the samples are calculated and the characteristic value of the lot (Q) is determined using the formula

$$Q = \bar{x} - ks$$

The constant k varies with the number of samples and for the 10 used in geotextile testing takes the value 0.83.

Q is compared to the specification limit and the lot is then either accepted or rejected.

The procedure is intended to ensure that there is reasonable confidence that the lot meets the specified requirements, without being unreasonably severe on the producer and can be applied to any material or process for which the specified properties are normally distributed (or are approximately so).

The scheme operates in such a way that there is a 10% chance that a rejected lot would actually comply with the specification requirements, if it were to be tested exhaustively. The consumers' risk (the chance that an accepted lot does not actually confirm to the specification limit) is not uniquely defined under the scheme (it changes with the variability of the material) but is $> 10\%$. The scheme is intended to balance out the cost of testing (and destruction/damage to) materials against the costs of acceptance of inferior materials.

Several things should be noted about the scheme:

- It does not have the effect of reducing the average strength of a lot by 17%. If the mean strength is 100 kN and s is 10 kN, $Q = 91.7$. If s is 5 kN, $Q = 95.8$ kN.
- It does not imply an average rejection rate of 10%, or that acceptable lots have a 10% chance of rejection. The potential rejection rate varies with the statistical properties of the material. It is lowest (negligible) when material is uniform and average strengths are somewhat above the specification limit. It increases as materials become more variable and their mean strengths become closer to the specification limit.

R63 is unique in that it allows retesting. This recognises the difficulty in obtaining random samples across all rolls leading to a risk that the tests from one sample from one roll may not be representative of the lot. The permitted resampling in R63 is more generous than the resampling rules in AS 3706.1 and reduces the producer's risk below the usual 10%.