

Sequential acceptance sampling for attributes

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This module is designed to help with the decision whether to accept or reject a lot consisting of individual items, which can be classified as conforming or nonconforming. The decision is based on sequential random sampling. Each item drawn is inspected and information about its status is inputted into the program. After sufficient amount of information has been collected, the program suggests whether the lot should be accepted or rejected. The procedure is called *Sequential acceptance sampling* and usually requires to test only a relatively small number of items before a decision is made. Apart from appropriate parameter choice, the randomness of the sampling is the crucial part of the procedure. When numbers can be assigned to items (e.g. order within the lot), tables of random numbers can be used. Alternatively, the random number generator from the *Simulation* module can be used instead.

Data and parameters

The acceptance sampling plan parameters are entered in the *Acceptance sampling for attributes* dialog panel. They are: producer risk (*Alpha*), consumer risk (*Beta*), acceptable fraction of nonconforming items corresponding to *Alpha* (*P1*) and unacceptable fraction of nonconforming items corresponding to *Beta* (*P2*). The results of individual item checks are inputted in the *Number of items tested* and *Number of nonconforming items* fields, immediately after each check is finished. Both *Number of items tested* and *Number of nonconforming items* are cumulative numbers since the beginning of the sampling procedure. The *Number of items tested* has to increase, the *Number of nonconforming items* must not decrease. The acceptance sampling procedure is finished when message “ACCEPTED” or “REJECTED” appears in the *Conclusion* window instead of the “UNDECIDED” message. A plot can be requested at any stage by pressing the OK button. The plot is a part of the acceptance sampling protocol. The individual test results can be placed to the current sheet by pressing the *Save* button. The table is then attached to the acceptance sampling protocol. When the individual test results are available in the current data sheet, they can be read by the *Read* button. The columns containing the number of items tested and the number of nonconforming items have to be selected. The first number must increase, the second number must not decrease.

Producer risk *Alpha* is defined as the probability (risk) of rejecting a good lot, i.e. a lot with acceptably small fraction of nonconforming items (smaller than *P1*). Consumer risk is defined as the probability (risk) of accepting a bad lot, i.e. a lot which has unacceptably large proportion of nonconforming items (larger than *P2*). When *Save to sheet?* selection is checked, the number of tests and the number of nonconforming items are saved to the current sheet whenever OK or *Save* button is pressed.

Tested Count	Non-conforming count
60	13
48	9
50	9
51	10
53	10
54	11
56	11
57	12
59	12
60	13

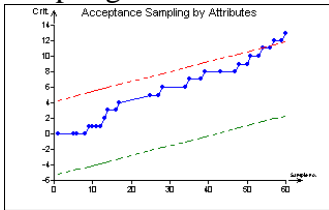
Fig. 1 Acceptance sampling for attributes dialog panel

Protocol

	Values entered in the panel shown in Fig. 20. P1 Acceptable fraction of nonconforming items. P2 Unacceptable fraction of nonconforming items. Alfa Producer risk.. Beta Consumer risk.
Number of items tested, number of nonconforming items Conclusion	Table, containing the number of items checked and the number of nonconforming items. Conclusion related to an individual row.

Graphs

Sequential acceptance sampling chart



Graphical illustration of the acceptance sampling procedure. The cumulative number of tested items is plotted on x-axis, while cumulative number of nonconforming items is plotted on y-axis. The red (upper) line corresponds to the rejection region boundary. When the line is crossed, no further tests are necessary and the whole lot is rejected immediately. The green (lower) line corresponds to the acceptance region boundary. When the line is crossed, no further tests are necessary and whole lot is accepted immediately. When the number of nonconforming items is between these two lines, sampling has to continue. The probability of making a decision increases as the number of inspected items increases.