Acceptance Sampling: Probability of Acceptance (OC Curve)

Probability of accepting a lot under a single sampling plan (n, c) at a given fraction defective, with the Poisson approximation, AOQ and average total inspection.

Method: Single sampling plans and the OC curve

Input parameters

Unit system: SI

Parameter	Value	Unit
Lot fraction defective	2.0000	%
Sample size	80.000	
Acceptance number	2.0000	
Lot size	2,000.0	

Calculated results

Parameter	Value	Unit
Probability of acceptance (binomial)	78.442	%
Probability of acceptance (Poisson)	78.336	%
Average outgoing quality (rectifying)	1.5061	%
Average total inspection per lot	493.92	

Notes for this case

• A lot is accepted if the sample of n contains c or fewer defectives, so P_a = Σ C(n,d)p^d(1 − p)^(n−d) for d = 0…c (binomial, for lots much larger than the sample); the Poisson form with λ = np is the usual chart approximation for small p. Plotting P_a against p gives the operating characteristic (OC) curve. Under rectifying inspection rejected lots are fully screened, giving AOQ = P_a·p(N − n)/N and ATI = n + (1 − P_a)(N − n).

Formula and method

$$P_a = \sum_{d=0}^{c} \binom{n}{d} p^d (1-p)^{n-d}, \quad AOQ = \frac{P_a\, p (N-n)}{N}$$

Variables

p	Lot fraction defective	-
n	Sample size	-
c	Acceptance number	-
N	Lot size	-
P_a	Probability of acceptance (binomial)	-
$P_{a,Poisson}$	Probability of acceptance (Poisson)	-
AOQ	Average outgoing quality (rectifying)	-
ATI	Average total inspection per lot	-

Method and standards

OC curve.

Assumptions and limits

- Random sampling; binomial model; rectifying inspection for AOQ and ATI.

References

Single sampling plans and the OC curve

Report details

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Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/geometry/acceptance-sampling-oc

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.