

Summary - Statistical Rationale for Raw Material Sampling

Operating characteristic (OC) curves illustrate the probability of accepting a lot over varying percent defective rates (Figure 1). When evaluating sampling plans, two points on the curve are of primary interest: the defective rate when lots will be routinely passed and the defective rate when lots will be routinely failed. It is fairly common to use the 95% probability of accepting a lot as the routinely passing point and the defective rate is called the acceptable quality level or limit (AQL). Lots with a defective rate at or below the AQL would be expected to pass the sampling plan criteria 95% of the time. The 10% probability of accepting a lot is typically used as the failing point and the defective rate is commonly called the unacceptable quality level (UQL) or lot tolerance percent defective (LTPD). Lots with a defective rate at or above the UQL would be expected to pass the sampling plan criteria 10% of the time (fail 90% of the time).

The minimum LTPD of all the plans is 11.62 and the minimum AOQL is around 2.5. Long term outgoing defective rates would be in the 2-7% range if these plans were implemented. When the quality requirements of sampling plans are met by these AQL, LTPD, and AOQL levels, $\sqrt{N}+1$ plans, as well as the corresponding Military Standard plans, could be used. $\sqrt{N}+1$ sampling plans offer similar protection as Military Standard plans with specified AQL levels between 1.0 and 1.5 (2.5 for the 16 to 25 lot size) percent for small lot sizes up to 150 units. In these cases the two sampling plan approaches can be used interchangeably with similar risks to lot acceptability decisions and outgoing quality.

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