CORMACK PACKAGING
A TRICORBRAUN® COMPANY

TECHNICAL TIPS

WHAT IS ACCEPTABLE QUALITY LEVEL (AQL)?

CORMACK PACKAGING IS OFTEN ASKED, "WHAT DO YOU MEAN BY AQLS?". THEY FORM PART OF OUR FINISHED ITEM SPECIFICATION FORMS (FIS). THESE ARE GLOBAL DEFINITIONS OF THE MAXIMUM NUMBER OF SPECIFIC DEFECTS YOU WOULD SEE IN AN ENTIRE PRODUCTION RUN.

Once a manufacturer has studied their process capabilities, the repeatability of what they make, and the statistical ability to trap and capture defects, this is then used to set the Upper limit on any specific defect type. It is then linked to the US Military statistical sampling plan as the process to set the number and frequency of sampling goods to capture the defects from a given production size.

The definitions of the type of defect and the Acceptable maximum level we use are those set by the US Plastic Closure Manufacturers Associations. The below is a simplified version describing the AQL process.

Acceptable quality level (AQL) is defined in *AS 1199.1-2003 as the ***"quality level that is the worst tolerable process average when a continuing series of lots is submitted for acceptance."***

*AS 1199.1-2003 (Sampling procedures for inspection by attributes-Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection)

The AQL tells you how many defective components are considered acceptable during random sampling quality inspections. It is usually expressed as a percentage or ratio of the number of defects compared to the total quantity.

It is important to note that AQLs are NOT specifying a quantity of any defect that will always be present in these manufactured goods. They identify that when an issue happens in manufacture. It is the largest quantity of a defect a customer could experience at one point in time. Cormack packaging aims to implement corrective actions to rectify the known defects.

Key points to remember:

- The acceptable quality level (AQL) is the worst quality level that is tolerable for a product.
- The AQL is used in conjunction with the sampling plans from AS 1199.1-2003 to determine
  - The number of cartons to be opened
  - The sample size
  - The number of defects that are acceptable / not acceptable.
- The AQL differs depending on the type of defect being sampled. Critical defects (ones that may represent a greater risk) will have a lower AQL than those considered as minor defects. (refer to page 2 of 2 for Cormack's Non-conformance (defect) definitions and AQLs)

FOR EXAMPLE:

A particular lot of product is found to have short-shot during molding.

Lot size:	250 000 pieces
Total Number of Cartons:	100
If AQL:	0.4 (Major defect as per Cormack's NC definitions)

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TECHNICAL TIPS CONTINUED...

AS 1199.1-2003 tells us that:

- For a given lot size with 100 cartons, 10 cartons chosen randomly will need to be sampled.
- For a lot size of 250 000, 800 pieces over those 10 cartons sampled are inspected. i.e., random @80 pieces to be picked from 10 cartons.
- For an AQL of 0.4 (at a normal inspection level), the lot will be rejected if 8 or more defective items are found during sampling. If 7 or fewer defective items are found, the lot is accepted.
- This acceptance criterion will change if the inspection level is set at tightened or reduced.

AQLs for various nonconformities are defined below and/or can be listed separately in the finished items specification (FIS) as agreed with the customer.

1 NONCONFORMITY DEFINITIONS

1.1 Critical (AQL: 0~0.25%, accumulated critical nonconformities: 0.25%)

A critical nonconformity is:

A one which judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, handling, or storing the product;

B one which qualified judgment and experience indicate will cause the product to be in violation of any applicable federal and/or state law or federal regulation.

1.2 Major (AQL: 0.4~0.65%, accumulated major nonconformities: 0.65%)

A major nonconformity is:

A one other than Critical, which would result in obvious failure of the product to fulfill its intended purpose;

B one other than Critical, which, though unrelated to function, is likely to reduce the saleability of the product; i.e., the major appearance nonconformity;

C a packing, packaging, or labeling nonconformity, other than Critical, which is likely to result in either product damage or transport, storage, or inventory error;

D one other than Critical, which judgment and experience indicate will impair the function of downstream automatic processing equipment;

1.3 Minor (AQL: 1.0~4.0%, accumulated minor nonconformities: 4.0%)

A minor nonconformity is:

A one which has no significant effect, discernible or otherwise, on the product's function, but does prevent the product from being what it is supposed to be;

B one which is not likely to reduce the product's saleability but does indicate poor workmanship;

C one other than Critical or Major which, though related to the function of the product, does not adversely affect the usability and/or saleability of the product; e.g., a process control nonconformity discernible only to the manufacturer and knowledgeable inspectors;

1.4 OVERALL accumulated nonconformities (max AQL: 4.65%)

We trust this article gives you a good introduction to what AQLs are, how they are set, and how they are measured.