

AQL - Acceptable Quality Level / Límite de Calidad Aceptable

What does AQL mean?

June 11, 2011 - Camilo Tafurth

When using the services of quality control companies, an important factor to understand is the standard used to select a sample in the visual or appearance review. The most commonly used standard for product inspections is ISO 2859-1 (ANSI / ASQC Z1.4-2003). This standard uses the concept of AQL or Acceptable Quality Limit.

The definition of the AQL (Acceptable Quality Limit) is “the maximum defective percent (or the maximum number of defects per hundred units) that, for purpose of sampling inspection, can be considered satisfactory as a process average”.

A **sampling size**, based on the AQL tables, will be selected and then inspected for defects.

Defects are broken into 3 categories: Minor, Major and Critical. While these can vary from client to client, the typical definitions are as follow:

- A **Minor defect** is a discrepancy from the standards, but one that is not likely to affect the usability of an object.
- A **Major defect** is one that is likely to create failure of the unit for its intended purpose.
- A **Critical defect** is one that is deemed to be hazardous or unsafe.

According to the number of defects found for each type and according to the number of defects allowed (figures given by the AQL sampling tables), your QC company can advise you to **accept** or to **reject** your shipment.

How to use the AQL Tables?

Client can set their Acceptable Quality Tolerance but the AQL tables will help to determine the sampling size we will need to inspect according to your ordered quantity and your level of severity. You can choose Levels I, II or III, with Level III being the most stringent testing and Level I being the least. The standard level, the one used by default and by 98% of the people is the **Level II**. This is up to the client, but it is the recommended level.

In order to find the necessary sampling size to be inspected, you must first look at the first chart and find on the left side the range of items being produced in total. For example, if you are producing 8000 items, at Level II you have the letter L, which in the second table corresponds to a sample size of 200.

On the top of the second chart are the defect levels, ranging from 0 to 6.5 (we cut the higher values out of the chart, because they are not relevant for buyers of consumer goods).

You can choose which level to apply for your type of defect: critical, major and minor. Usually most importers will choose standard defect levels which are 0/2.5/4.0, **AQL 2.5**, but one can choose 0/1.5/2.5 if he wishes.

Using the standard 0/2.5/4 defect levels and a sample size of 200, we see that if you have more than 0 critical defects, 10 major defects or 14 minor defects, you should reject your shipment.

Of course the decision about what to do after your received the inspection results belongs to you. Most importers will wish to discuss all inspection findings with their vendor/manufacturer in order to improve whatever possible. In case the inspection results are very close to AQL limits, it is important that you double check if the level of found defects is acceptable to you or not.

SAMPLING SIZE CODE LETTERS

Lot size	GENERAL INSPECTION LEVELS			SPECIAL INSPECTION LEVELS			
	I	II	III	S1	S2	S3	S4
2 to 8	A	A	B	A	A	A	A
9 to 15	A	B	C	A	A	A	A
16 to 25	B	C	D	A	A	B	B
26 to 50	C	D	E	A	B	B	C
51 to 90	C	E	F	B	B	C	C
91 to 150	D	F	G	B	B	C	D
151 to 280	E	G	H	B	C	D	E
281 to 500	F	H	J	B	C	D	E
501 to 1 200	G	J	K	C	C	E	F
1 201 to 3 200	H	K	L	C	D	E	G
3 201 to 10 000	J	L	M	C	D	F	G
10 001 to 35 000	K	M	N	C	D	F	H
35 001 to 150 000	L	N	P	D	E	G	J
150 001 to 500 000	M	P	Q	D	E	G	J
500 001 and over	N	Q	R	D	E	H	K

SINGLE SAMPLING PLANS FOR NORMAL INSPECTION

Sample size code letter	Sample size	ACCEPTABLE QUALITY LIMITS FOR NORMAL INSPECTIONS																					
		0.065		0.1		0.15		0.25		0.4		0.65		1		1.5		2.5		4		6.5	
		Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re
A	2																					0	1
B	3																					0	1
C	5																					0	1
D	8																					0	1
E	13																					0	1
F	20																					0	1
G	32																					0	1
H	50																					0	1
J	80																					0	1
K	125																					0	1
L	200																					0	1
M	315																					0	1
N	500																					0	1
P	800																					0	1
Q	1250																					0	1
R	2000																					0	1

↓ Use first sampling plan below arrow. If sample size equals, or exceeds lot or batch size, do 100% inspection.

↑ Use first sampling plan above narrow.

Ac Acceptance number
Re Rejection number

General inspection level of the AQL table

The inspector uses a general sample for cosmetic controls, of the finished products inspected. The identified defects are listed and counted to calculate the AQL result. It is indicated in the inspection report.

The special sample is used to verify that the product is respecting the buyer's requirements.

It includes: the control of the measurements and the weight of the products, the control of their packaging, labels and much more. This same sampling also serves the inspector to perform the various tests on the products.

The buyer is the person responsible for defining the general and special inspection levels of the AQL table. Otherwise, the inspector will take into account the standard protocol usually used. Each inspector, or quality control company, has its own protocols where it defines the level of general and special inspection to be applied according to the specificity of the product inspected. On the other hand, the level of inspection applied to each controlled detail is usually indicated in the inspection report in order to inform the buyer.