




	QUALITY PROCEDURES SAMPLING PLAN	Doc No:	JTPL/QP/16
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SAMPLING PLAN & ACCEPTANCE CRITERIA

1. One of most important activities in different stages of lifecycle of any product is analysis of its critical parameters and its performance to ensure that the Product will both meet its Requirement Specifications and be of Acceptable Quality. It may not be possible to test/ record parameters of each individual product, as it requires a huge amount of time, resources and money. Hence, a sample of the total population is taken up for obtaining the parameters / observe the performance. It is statistically accepted fact that as long as a sufficiently sized sample is randomly chosen from a population, the sample will contain characteristics that roughly mirror those of the entire population.

2. A Sampling Plan hence contains 3 important aspects, Random Selection from the Population, (sufficiently large) Sample Size and Quality Acceptance (or Rejection) Criteria/ Level.

3. Even though Jodova, as a quality conscious organisation, would ideally the ideal have an acceptable quality level that has zero-defect products, we may have to settle for an Acceptable Quality Level (AQL) that will help us monitor and avoid batches with unsatisfactory quality levels. It is important to note that AQL is not constant across all industries. For instance, AQL for critical / safety products is more stringent since any defects pose a higher risk to the end-user.

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4. We use different settings based on AQL defects. AQL defects are quality issues highlighted during inspections. They are categorized into three groups:

(a) Critical defects. These are serious defects that can harm the end-user severely. Usually use AQL of 0.0 for critical defects. If inspectors find a single critical defect in the selected sample size, the entire order fails the inspection. The criteria for defining a critical defect are:




- Pose a safety hazard to the expected user
- Cause product recalls
- Brand damaging defects

(b) Major defects. These defects are less serious but are not acceptable by the end-users since they increase the risk of product failure. Typically assign the AQL standard of 2.5% to major defects. The criteria for defining a Major defect are:

- Affects the performance or function of a product
- Affects product specifications
- Causes the end customer to not buy or return the product

(c) Minor defects. They are small defects with a low impact on safety and the usability of the product. Use the AQL standard of 4% for minor defects. The criteria for defining a minor defect are:

- It doesn't affect the function or use of the product
- Barely noticeable at arm distance
- Would be unlikely to cause a return or make the product unsellable




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5. Each defect is not interpreted similarly by all inspection companies but, can be agreed with the suppliers on an AQL standard that is acceptable to both parties based on the level of risk they assume. Once an AQL standard is agreed on, it will be used as a reference during pre-shipment inspections. However, as most of our applications are for Defence and Aerospace, AQL 0.0 is adopted.

6. In performing sampling inspection, inspectors exclusively apply the ISO 2859 standard and the tables provided by it. This document, published by the International Organization for Standardization (ISO), is an international standard with equivalents in all national regulations (ANSI/ASQC Z1.4, NF06-022, BS 6001, DIN 40080). AQL (Acceptable Quality Limit) Sampling is a method widely used to define a Production Order sample to find whether or not the entire product order has met the client's specifications. Based on the sampling data, the customer can make an informed decision to accept or reject the lot. The AQL sampling plan is designed to help in determining the right sample size for inspection and the acceptable number of defects. Insight into the dynamics of the AQL table can also enhance your understanding and the interpretation of inspection results. It is vital for data-driven decision-making.

7. The AQL sampling plan table (ANSI ASQ Z1.4 table) is easy to use. It is divided into three columns for lot or batch size, sample size code letter, and sample size level I, with one larger section on the right for AQL. The AQL section consists of three sub-sections for AQL 2.5, AQL 4.0, and AQL 6.5, with Acceptable (Ac) and Rejectable (Re) column each.




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8. Example: for a hypothetical inspection of a production with 4,000 units, the client selected level II normal inspection and AQL of 2.5. In Table A below, the intersection of the respective Lot Size and General Inspection Level indicates sample size code letter L. Then, referring to Table B, we locate row L, which indicates the required sample size of 200. To comply with AQL 2.5, no more than 10 units from that sample size may fail inspection.

SAMPLE 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 1200	G	J	K	C	C	E	F
1201 to 3200	H	K	L	C	D	E	G
3201 to 10000	J	L	M	C	D	F	G
10001 to 35000	K	M	N	C	D	F	H
35001 to 150000	L	N	P	D	E	G	J
150001 to 500000	M	P	Q	D	E	G	J
500001 and over	N	Q	R	D	E	H	K

ANSI/ASQ Standard Z1.4 - 2008




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SINGLE SAMPLING PLANS FOR NORMAL INSPECTION

Sample Size Code Letter	Sample Size	Acceptable Quality Levels (Normal Inspection)																													
		0.065		0.10		0.15		0.25		0.40		0.65		1.0		1.5		2.5		4.0		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 above arrow, if sample size equals or exceeds lot or batch size, do 100 percent inspection. ↓ Use first sampling plan below arrow AC : Acceptance number Re : Rejection number

9. **Effectiveness of Sampling Plan** The Final Inspection Report will clearly state whether the Production has passed or failed the selected Acceptable Quality Tolerance level for the components. In case, the Production fails to get accepted during the QC Final Inspection, then the AQL needs a revision for that particular component from that Supplier. This helps in developing and maintaining Suppliers who provide quality sub-products for use in our Products, whilst saving effort, time and money in Incoming Inspections.

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