SOP Reference #: QS017

Operation/Task:	How to perform random sampling using ANSI tables			Equipment:	NA
Owner:	Quality Manager	Date Created: Revision History:	4/4/2022 See last page	Department:	Quality Systems

ALERTS (see below): Critical Step ◆ Quality Check ☑ Tip ☺ Team Safety ✚

Purpose: This SOP/work instruction describes how to use the ANSI tables to determine sampling requirements

Step #	Alerts	Step Description - "What to Do"	"How to Do it"	"Why to Do it"
1.		Perform Standard Sampling technique	To perform a standard sampling inspection: Pick 4 lifts of 50 pieces from random cartons or pallets and perform 100% inspection of all 200 pieces. If more than 1 piece is found not conforming, expand the sample to an additional 200 pieces from additional random selections. If any additional parts are found non-conforming, perform an enhanced inspection. For lot sizes less than 500, inspect the entire lot (100% inspection).	Standard operating procedure to qualify finished product.
2.		If it is determined that a job or production run will require an Enhanced Inspection, determine lot size.	Use table 1 (attached) to find the lot size for the job requiring the inspection. The lot size is the job quantity	To determine scope of inspection.
3.		Determine inspection level letter.	Once the lot size is determined, find the letter in General Inspection Level II that corresponds to the lot size	To comply with NIST standard for sampling.

4.		Determine the sample quantity.	Compare the result from step 2 to the column in Table 2A (attached) that matches the letter result from step 2. The number in the next column to the right indicates the number of pieces to be sampled.	This reveals the sampling quantity.
5.		Perform the inspection	Draw the number of samples indicated in Table 2A. Perform inspection according to the relevant process quality check requirements.	The inspection technique is the same as the requirements in the individual SOP for each process.
6.		Record the results	Use form CI047 to document the results of the inspection. If any non-conformances are found, pull another equivalent lot of parts and repeat the inspection. If additional non-conformances are found, segregate the lot to the NC material floor and alert your manager or the quality manager.	To determine the level of compliance or non-compliance. To determine the disposition of the material. Solutions may include: 100% inspection, additional sampling and removal of NC parts or reprint.
7.		Complete the record	Fill in all fields, including signature, on the CI047 form and store in the job ticket	

Notes:
This process may be invoked by customer, sales, customer service or production managers if it is determined production standards must be enhanced due to customer requirement.

Definitions:
ANSI is the American National Standards Institute.

Revision History	**Description of Changes**	**Requested by**	**Date**
Rev 1	First issue	Dean Milinkovich	4/2022

Rev 2	Add instruction for initial inspection	Dean Milinkovich	5/2023

Table I—Sample size code letters

(See 9.2 and 9.3)

Lot or batch size	Special inspection levels				General inspection levels		
	S-1	S-2	S-3	S-4	I	II	III
2 to 8	A	A	A	A	A	A	B
9 to 15	A	A	A	A	A	B	C
16 to 25	A	A	B	B	B	C	D
26 to 50	A	B	B	C	C	D	E
51 to 90	B	B	C	C	C	E	F
91 to 150	B	B	C	D	D	F	G
151 to 280	B	C	D	E	E	G	H
281 to 500	B	C	D	E	F	H	J
501 to 1200	C	C	E	F	G	J	K
1201 to 3200	C	D	E	G	H	K	L
3201 to 10000	C	D	F	G	J	L	M
10001 to 35000	C	D	F	H	K	M	N
35001 to 150000	D	E	G	J	L	N	P
150001 to 500000	D	E	G	J	M	P	Q
500001 and over	D	E	H	K	N	Q	R

Table II-A—Single sampling plans for normal inspection (Master table)

(See 9.4 and 9.5)

Sample size code letter	Sample size	Acceptance Quality Limits, *AQLs*, in Percent Nonconforming Items and Nonconformities per 100 Items (Normal Inspection)																												
		0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	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	↓	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	30 31	
B	3														0 1	↑	1 2	2 3	2 3	3 4	5 6	7 8	10 11	14 15	21 22	30 31	44 45	
C	5													0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	30 31	44 45		↑
D	8												0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	30 31	44 45		↑	
E	13											0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	30 31	44 45	↑			
F	20										0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑	↑	↑				
G	32									0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑							
H	50								0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑								
J	80							0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑									
K	125						0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑										
L	200					0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑											
M	315				0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑												
N	500			0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑													
P	800		0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑														
Q	1250	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑															
R	2000	↑		1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑																

↓ = Use the first sampling plan below the arrow. If sample size equals, or exceeds, lot size, carry out 100 percent inspection.

↑ = Use the first sampling plan above the arrow.

Ac = Acceptance number.

Re = Rejection number.

CI035