SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN MEKANIKAL

PEPERIKSAAN AKHIR

SESI I : 2025/2026

DJF51082 : QUALITY CONTROL

TARIKH : 27 NOVEMBER 2025
MASA : 11.30 PAGI – 1.30 PETANG (2 JAM)

Kertas soalan ini mengandungi **SEPULUH (10)** halaman bercetak.

Dokumen sokongan yang disertakan : Buku Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan. Jawap **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1 (a) List **FIVE (5)** benefits of Quality Control.

Senaraikan LIMA (5) manfaat bagi Kawalan Kualiti.

[5 marks]

[5 markah]

CLO1 (b) Explain the following terms:

Terangkan terma-terma berikut:

i. Quality Control

Kawalan Kualiti

ii. Continuous Improvement

Penambahbaikan Berterusan

iii. Zero Defect

Sifar Kecacatan

iv. Internal Customer

Pelanggan Dalaman

v. External Customer

Pelanggan Luaran

[10 marks]

[10 markah]

CLO1 (c) A fabrication company in the oil and gas industry produces welded steel pipes for use on offshore rigs. The weld thickness at the pipe joints is critical and follows a normal distribution with a mean of 8.50 mm and a standard deviation of 0.20 mm. According to quality control procedures, the acceptable specification limits for this thickness are between 8.20 mm and 8.80 mm.

Sebuah syarikat fabrikasi dalam industri minyak dan gas menghasilkan paip keluli yang dikimpal untuk kegunaan pelantar minyak. Ketebalan kimpalan pada sambungan paip adalah kritikal dan didapati mengikut taburan normal dengan min 8.50 mm dan sisihan piawai 0.20 mm. Berdasarkan prosedur kawalan kualiti, had spesifikasi yang boleh diterima untuk ketebalan ini adalah antara 8.20 mm dan 8.80 mm.

i. Calculate the probability that a randomly selected pipe joint will have a weld throat thickness that is within the specification limits.

Kira kebarangkalian bahawa satu sambungan paip yang dipilih secara rawak mempunyai ketebalan tekak kimpal yang berada di dalam had spesifikasi.

[6 marks]
[6 markah]

ii. If a production lot contains 800 pipe joints, estimate the number of joints expected to be rejected (i.e., outside the specification limits).

Jika satu lot pengeluaran mengandungi 800 sambungan paip, anggarkan bilangan sambungan yang dijangka akan ditolak (berada di luar had spesifikasi).

[4 marks]
[4 markah]

QUESTION 2
SOALAN 2

CLO1 (a) State the types of variable control charts and attribute control charts.
Nyatakan jenis carta kawalan pembolehubah dan carta kawalan atribut.

[5 marks]
[5 markah]

CLO1 (b) The X-bar and R chart is a type of control chart widely used in statistical quality control to monitor process stability. The X-bar chart tracks changes in the process average, while the R chart monitors variation within samples. By using both charts together, manufacturers can detect unusual shifts or inconsistencies, ensuring the process remains under control ad products meet quality standards.

Carta X-bar dan R ialah sejenis carta kawalan yang digunakan secara meluas dalam kawalan kualiti statistik untuk memantau kestabilan proses. Carta X-bar mengesan perubahan pada purata proses, manakala carta R memantau variasi dalam sampel. Dengan menggunakan kedua-dua carta ini, pengeluar dapat mengesan perubahan luar biasa atau ketidakselarasan, memastikan proses kekal terkawal dan produk memenuhi piawaian kualiti.

i. Elaborate on the meaning of the central line (CL) in an $\overline{X}$ chart.
Huraikan maksud garisan tengah (CL) dalam carta $\overline{X}$.

[3 marks]
[3 markah]

ii. Explain the meaning of the Upper Control Limit (UCL) and Lower Control Limit (LCL) in a control chart.
Terangkan maksud had kawalan atas (UCL) dan had kawalan bawah (LCL) dalam carta kawalan.

[4 marks]
[4 markah]

iii. Interpret what it means if all data points are within the control limits.
Tafsirkan maksud jika semua titik data berada dalam had kawalan.

[3 marks]
[3 *markah*]

CLO1 (c) A bread factory is conducting quality control on dough weight. A total of 56 samples are taken, each with a sample size of n = 11. The sample mean, $\overline{X}$ and sample standard deviation (s) are provided below:

Sebuah kilang roti menjalankan kawalan kualiti terhadap berat doh roti. Sebanyak 5 sampel diambil, setiap satu dengan saiz sampel n = 11. Nilai purata sampel $\overline{X}$ dan sisihan piawai sampel (s) telah diberikan seperti jadual di bawah:

Table 2 (c) /Jadual 2 (c)

Sampel *Sampel*	Sampel means, $\overline{X}$ *Purata Sampel,* $\overline{X}$	Standard Deviation, s *Sisihan Piawai, s*
1	53.3	1.8
2	52.1	2.1
3	51.8	1.5
4	56.6	1.9
5	51.4	2
6	51.0	2.3

i. Calculate the centre line and control limits for the s-chart.
Kira nilai garis tengah dan had kawalan bagi carta-s.

[5 marks]
[5 *markah*]

ii. Construct the s-chart for the six subgroups.
Binakan carta-s untuk enam sub kumpulan.

[5 marks]
[5 *markah*]

QUESTION 3
SOALAN 3

CLO1

(a) i. Explain the purpose of using a p-chart in quality control.
Terangkan tujuan penggunaan carta p dalam kawalan kualiti.

[3 marks]
[3 markah]

ii. Discuss the type of data suitable for a p-chart.
Bincangkan jenis data yang sesuai digunakan untuk carta p.

[2 marks]
[2 markah]

CLO1

(b) A quality inspector in a solar panel manufacturing plant performs surface inspections to monitor the number of defects (e.g.scratches, cracks, or contamination) on finished panels. Eight solar panels were randomly selected, and the number of defects found on each panel is shown in Table 3 (b). Construct a c-chart based on the data provided.

Seorang pemeriksa kualiti di sebuah kilang pembuatan panel solar menjalankan pemeriksaan permukaan untuk memantau bilangan kecacatan seperti calar, retakan, atau pencemaran pada panel siap. Lapan panel solar telah dipilih secara rawak, dan bilangan kecacatan yang ditemui pada setiap panel ditunjukkan dalam Jadual 3 (b). Bina satu c-chart berdasarkan data yang diberikan.

Table 3 (b) / *Jadual 3 (b)*

Panel No. *No. Panel*	Number of defects per solar panel *Bilangan kecacatan setiap panel solar*
1	5
2	3
3	7
4	6
5	4
6	13
7	5
8	2

[10 marks]
[10 markah]

CLO1 (c) A solar panel manufacturer produces batches of 5,000 panels for export. To ensure product quality, the company uses the Acceptance Sampling Method. The quality manager sets an AQL of 0.65% with Inspection Level III for the lot size. Construct a single sampling plan for normal, tightened and reduced inspection.

Sebuah pengeluar panel solar menghasilkan kelompok sebanyak 5,000 panel untuk tujuan eksport. Bagi memastikan kualiti produk, syarikat tersebut menggunakan Kaedah Persampelan Penerimaan (Acceptance Sampling Method). Pengurus kualiti menetapkan AQL sebanyak 0.65% dengan Tahap Pemeriksaan III untuk saiz kelompok tersebut. Bina satu rancangan persampelan tunggal untuk pemeriksaan normal, diperketatkan dan dikurangkan.

[10 marks]
[10 markah]

QUESTION 4
SOALAN 4

CLO1

(a) In quality management, the costs of quality are classified into four categories: Prevention cost, Appraisal cost, Internal failure cost, and External failure cost. These categories help organisations understand where resources are spent to ensure and maintain quality.

For each case below, choose the type of quality cost involved as mentioned above.

Dalam pengurusan kualiti, kos kualiti dibahagikan kepada empat kategori: Kos Pencegahan, Kos Penilaian, Kos Kegagalan Dalaman, dan Kos Kegagalan Luaran. Kategori ini membantu organisasi memahami bagaimana sumber digunakan untuk memastikan dan mengekalkan kualiti.

Bagi setiap situasi di bawah, pilih jenis kos kualiti yang terlibat seperti yang dinyatakan di atas.

i. A frozen food factory trains workers in proper packaging.
Sebuah kilang makanan sejuk beku melatih pekerja dalam pembungkusan.

ii. A smartphone factory reprocesses units after defects are found.
Sebuah kilang telefon pintar memproses semula unit selepas ditemui kecacatan.

iii. A computer manufacturer repairs products under warranty.
Sebuah kilang komputer membaiki produk di bawah waranti.

iv. A bicycle factory buys tools to check wheel alignment.
Sebuah kilang basikal membeli alat untuk memeriksa jajaran roda.

v. A backpack factory scraps defective straps before shipping.
Sebuah kilang beg melupuskan tali rosak sebelum penghantaran.

vi. A shoe company audits suppliers for raw material quality.
Sebuah syarikat kasut mengaudit pembekal bagi kualiti bahan mentah.

[6 marks]
[6 markah]

CLO2

(b) A company produces mountain bicycles and frequently receives customer complaints about paint peeling off the bicycle frame after short use. Using Table 4 (b), categorise the possible causes of this defect under the four main categories: man, machine, Method and material by using a Cause-and-Effect Diagram.

Sebuah syarikat menghasilkan basikal gunung, dan terdapat aduan pelanggan yang kerap mengenai cat yang terkelupas dari rangka basikal selepas penggunaan singkat. Dari Jadual 4 (b), kategorikan kemungkinan punca kecacatan ini di bawah empat kategori utama: manusia, mesin, kaedah dan bahan dengan menggunakan Carta Sebab-dan-Kesan.

Table 4 (b) / *Jadual 4 (b)*

careless spray-painting by workers *pekerja mengecat secara cuai*	improper oven curing *suhu ketuhar pengeringan tidak sesuai*	malfunctioning spray gun *pistol semburan rosak*
low-quality paint *cat berkualiti rendah*	lack of operator training *kurang latihan kemahiran*	improper drying time *masa pengeringan tidak mencukupi*
insufficient surface preparation *penyediaan permukaan tidak sempurna*	contaminated solvent *pelarut cat tercemar*	unsuitable primer *primer tidak sesuai*

[9 marks]
[9 markah]

CLO2

c) Teras Jaya Manufacturing Sdn. Bhd. has received numerous customer complaints regarding the quality of its printed circuit boards (PCB) produced on the assembly line. The Quality Control Department has collected the following defect data over the past month:

Teras Jaya Manufacturing Sdn. Bhd. telah menerima banyak aduan pelanggan berkaitan kualiti papan litar bercetak (PCB) yang dihasilkan di barisan pemasangan. Jabatan Kawalan Kualiti telah mengumpul data kecacatan berikut sepanjang bulan lepas:

Table 4 (c) / *Jadual 4 (c)*

Defect Type *Jenis defect*	Frequency *Kekerapan*
Solder bridge *Lebihan pateri*	45
Missing component *Komponen tidak lengkap*	30
Misaligned component *Komponen tidak sejajar*	25
Open circuit *Litar terbuka*	15
Scratch on surface *Calar pada permukaan*	10
Wrong component *Komponen salah*	5

Construct a Pareto Chart based on the data provided.
Bina Carta Pareto berdasarkan data yang diberikan.

[10 marks]
[*10 markah*]

SOALAN TAMAT

DJF51082 QUALITY CONTROL

FORMULA & TABLE

DIPLOMA IN MECHANICAL ENGINEERING

Formulas

A. Statistics

i. Average

- Ungrouped data

$$\overline{X} = \frac{\Sigma X}{n}$$

- Grouped data

$$\overline{X} = \frac{\Sigma fx}{\Sigma f}$$

ii. Standard Deviation

- ungrouped population

$$\sigma = \sqrt{\frac{\Sigma(X_i - \bar{X})^2}{N}}$$

- Grouped population

$$\sigma = \sqrt{\frac{\Sigma f(X_i - \bar{X})^2}{N}}$$

- (theory) sample data

$$s = \sqrt{\frac{\Sigma(X_i - \bar{X})^2}{(n-1)}}$$

- Ungrouped sample

$$s = \sqrt{\frac{n\Sigma X_i^2 - (\Sigma X_i)^2}{n(n-1)}}$$

- Grouped sample

$$s = \sqrt{\frac{n(\Sigma f_i X_i^2) - (\Sigma f_i X_i)^2}{n(n-1)}}$$

B. Variable Control Charts

i. Average and Range Charts

- $\overline{X}$ chart:
  1. Center line, $\overline{\overline{X}} = \dfrac{\sum_{i=1}^{m} \overline{X}}{m}$
  2. Upper Control Limit, $UCL_{\overline{X}} = \overline{\overline{X}} + A_2\overline{R}$
  3. Lower Control Limit, $LCL_{\overline{X}} = \overline{\overline{X}} - A_2\overline{R}$
- R chart
  1. Center line, $\overline{R} = \dfrac{\sum_{i=1}^{m} R_i}{m}$
  2. Upper Control Limit, $UCL_R = D_4\overline{R}$
  3. Lower Control Limit, $LCL_R = D_3\overline{R}$
- Revising the Charts:
  1. New Center line, $\overline{X} = \overline{\overline{X}}_{new} = \dfrac{\sum_{i=1}^{m} \overline{X} - \overline{X}_d}{m - m_d}$
  2. New Upper Control Limit, $UCL_{\overline{X}} = \overline{X}_0 + A\sigma_0$
  3. New Lower Control Limit, $LCL_{\overline{X}} = \overline{X}_0 - A\sigma_0$
  4. Sigma, $\sigma_0 = {}^{R_0}\!/_{d_2}$
  5. New Center line, $R_0 = \overline{R}_{new} = \dfrac{\sum_{i=1}^{m} R_i - R_d}{m - m_d}$
  6. New Upper Control Limit, $UCL_R = D_2\sigma_0$
  7. New Lower Control Limit, $LCL_R = D_1\sigma_0$

ii. Average and Standard Deviation Charts

- $\overline{X}$ chart:
  1. Center line, $\overline{\overline{X}} = \dfrac{\sum_{i=1}^{m} \overline{X}}{m}$
  2. Upper Control Limit, $UCL_{\overline{X}} = \overline{\overline{X}} + A_3\bar{s}$
  3. Lower Control Limit, $LCL_{\overline{X}} = \overline{\overline{X}} - A_3\bar{s}$
- s chart
  1. Center line, $\bar{s} = \dfrac{\sum_{i=1}^{m} s_i}{m}$
  2. Upper Control Limit, $UCL_s = B_4\bar{s}$
  3. Lower Control Limit, $LCL_s = B_3\bar{s}$
- Revising the Charts:
  1. New Center line, $\overline{X} = \overline{\overline{X}}_{new} = \dfrac{\sum_{i=1}^{m} \overline{X} - \overline{X}_d}{m - m_d}$
  2. New Upper Control Limit, $UCL_{\overline{X}} = \overline{X}_0 + A\sigma_0$
  3. New Lower Control Limit, $LCL_{\overline{X}} = \overline{X}_0 - A\sigma_0$
  4. Sigma, $\sigma_0 = {}^{s_0}\!/_{c_4}$
  5. New Center line, $s_0 = \bar{s}_{new} = \dfrac{\sum_{i=1}^{m} s_i - s_d}{m - m_d}$
  6. New Upper Control Limit, $UCL_s = B_6\sigma_0$
  7. New Lower Control Limit, $LCL_s = B_5\sigma_0$

C. Capability Index

i. $C_p = \dfrac{USL - LSL}{6\sigma}$

ii. $C_{PK} = \dfrac{USL - \overline{X}}{3\sigma}, \dfrac{\overline{X} - LSL}{3\sigma}$

D. Attribute Control Charts

i. Fraction Nonconforming (p) Chart

1. Fraction, $p = \frac{np}{n}$
2. Center line, $\bar{p} = \frac{\sum_{i=1}^{n} np}{\sum_{i=1}^{n} n}$
3. Upper Control Limit, $UCL_{\bar{p}} = \bar{p} + 3\frac{\sqrt{\bar{p}(1-\bar{p})}}{\sqrt{n}}$
4. Lower Control Limit, $LCL_{\bar{p}} = \bar{p} - 3\frac{\sqrt{\bar{p}(1-\bar{p})}}{\sqrt{n}}$

- Revising the Charts:
  1. New Center line, $\bar{p}_{new} = \frac{\sum_{i=1}^{n} np - np_d}{\sum_{i=1}^{n} n - n_d}$
  2. New Upper Control Limit,
     $UCL_{\bar{p}_{new}} = \bar{p}_{new} + 3\frac{\sqrt{\bar{p}_{new}(1-\bar{p}_{new})}}{\sqrt{n}}$
  3. New Lower Control Limit,
     $LCL_{\bar{p}_{new}} = \bar{p}_{new} - 3\frac{\sqrt{\bar{p}_{new}(1-\bar{p}_{new})}}{\sqrt{n}}$

ii. Percent Nonconforming (100p) Chart

1. Center line, $100\bar{p} = 100\left[\frac{\sum_{i=1}^{n} np}{\sum_{i=1}^{n} n}\right]$
2. Upper Control Limit, $UCL_{100\bar{p}} = 100\left[\bar{p} + 3\frac{\sqrt{\bar{p}(1-\bar{p})}}{\sqrt{n}}\right]$
3. Lower Control Limit, $LCL_{100\bar{p}} = 100\left[\bar{p} - 3\frac{\sqrt{\bar{p}(1-\bar{p})}}{\sqrt{n}}\right]$

iii. Number of Nonconforming (np) Chart

1. Center line, $\overline{np} = \frac{\sum_{i=1}^{n} np}{m}$
2. Upper Control Limit, $UCL_{\overline{np}} = \overline{np} + 3\sqrt{\overline{np}(1-\bar{p})}$
3. Lower Control Limit, $LCL_{\overline{np}} = \overline{np} + 3\sqrt{\overline{np}(1-\bar{p})}$

iv. Count of Nonconformities (c) Chart

1. Center line, $\bar{c} = \frac{\sum_{i=1}^{n} c}{m}$
2. Upper Control Limit, $UCL_{\bar{c}} = \bar{c} + 3\sqrt{\bar{c}}$
3. Lower Control Limit, $LCL_{\bar{c}} = \bar{c} - 3\sqrt{\bar{c}}$

- Revising the Charts:
  1. New Center line, $\bar{c}_{new} = \frac{\sum_{i=1}^{n} c - c_d}{m - m_d}$
  2. New Upper Control Limit, $UCL_{\bar{c}_{new}} = \bar{c}_{new} + 3\sqrt{\bar{c}_{new}}$
  3. New Lower Control Limit, $LCL_{\bar{c}_{new}} = \bar{c}_{new} - 3\sqrt{\bar{c}_{new}}$

v. Nonconformities per Unit (u) Chart

1. Nonconformities per unit, $u = \frac{c}{n}$
2. Center line, $\bar{u} = \frac{\sum_{i=1}^{n} c}{\sum_{i=1}^{n} n}$
3. Upper Control Limit, $UCL_{u} = \bar{u} + 3\frac{\sqrt{\bar{u}}}{\sqrt{n}}$
4. Lower Control Limit, $LCL_{u} = \bar{u} - 3\frac{\sqrt{\bar{u}}}{\sqrt{n}}$

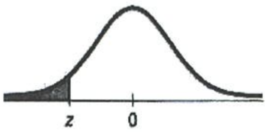
Note:

- **NONE of the formula in page 1 and 2 content "Cube Root" ($3\sqrt{\ }$), only "3 x $\sqrt{\ }$ ".**
- **Symbol 'm' in this booklet refers to the number of group (g).**

TABLES

A. Normal Distribution Table

Table Z
Areas under the standard Normal curve

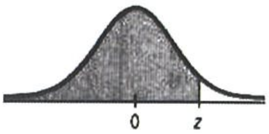


$$Z = \frac{X_i - \mu}{\sigma}$$

Second decimal place in z										
0.09	*0.08*	*0.07*	*0.06*	*0.05*	*0.04*	*0.03*	*0.02*	*0.01*	*0.00*	*z*
									0.0000†	−3.9
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	−3.8
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	−3.7
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	−3.6
0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	−3.5
0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	−3.4
0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	−3.3
0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	−3.2
0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	−3.1
0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0012	0.0013	0.0013	0.0013	−3.0
0.0014	0.0014	0.0015	0.0015	0.0016	0.0016	0.0017	0.0018	0.0018	0.0019	−2.9
0.0019	0.0020	0.0021	0.0021	0.0022	0.0023	0.0023	0.0024	0.0025	0.0026	−2.8
0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0035	−2.7
0.0036	0.0037	0.0038	0.0039	0.0040	0.0041	0.0043	0.0044	0.0045	0.0047	−2.6
0.0048	0.0049	0.0051	0.0052	0.0054	0.0055	0.0057	0.0059	0.0060	0.0062	−2.5
0.0064	0.0066	0.0068	0.0069	0.0071	0.0073	0.0075	0.0078	0.0080	0.0082	−2.4
0.0084	0.0087	0.0089	0.0091	0.0094	0.0096	0.0099	0.0102	0.0104	0.0107	−2.3
0.0110	0.0113	0.0116	0.0119	0.0122	0.0125	0.0129	0.0132	0.0136	0.0139	−2.2
0.0143	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	0.0170	0.0174	0.0179	−2.1
0.0183	0.0188	0.0192	0.0197	0.0202	0.0207	0.0212	0.0217	0.0222	0.0228	−2.0
0.0233	0.0239	0.0244	0.0250	0.0256	0.0262	0.0268	0.0274	0.0281	0.0287	−1.9
0.0294	0.0301	0.0307	0.0314	0.0322	0.0329	0.0336	0.0344	0.0351	0.0359	−1.8
0.0367	0.0375	0.0384	0.0392	0.0401	0.0409	0.0418	0.0427	0.0436	0.0446	−1.7
0.0455	0.0465	0.0475	0.0485	0.0495	0.0505	0.0516	0.0526	0.0537	0.0548	−1.6
0.0559	0.0571	0.0582	0.0594	0.0606	0.0618	0.0630	0.0643	0.0655	0.0668	−1.5
0.0681	0.0694	0.0708	0.0721	0.0735	0.0749	0.0764	0.0778	0.0793	0.0808	−1.4
0.0823	0.0838	0.0853	0.0869	0.0885	0.0901	0.0918	0.0934	0.0951	0.0968	−1.3
0.0985	0.1003	0.1020	0.1038	0.1056	0.1075	0.1093	0.1112	0.1131	0.1151	−1.2
0.1170	0.1190	0.1210	0.1230	0.1251	0.1271	0.1292	0.1314	0.1335	0.1357	−1.1
0.1379	0.1401	0.1423	0.1446	0.1469	0.1492	0.1515	0.1539	0.1562	0.1587	−1.0
0.1611	0.1635	0.1660	0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841	−0.9
0.1867	0.1894	0.1922	0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119	−0.8
0.2148	0.2177	0.2206	0.2236	0.2266	0.2296	0.2327	0.2358	0.2389	0.2420	−0.7
0.2451	0.2483	0.2514	0.2546	0.2578	0.2611	0.2643	0.2676	0.2709	0.2743	−0.6
0.2776	0.2810	0.2843	0.2877	0.2912	0.2946	0.2981	0.3015	0.3050	0.3085	−0.5
0.3121	0.3156	0.3192	0.3228	0.3264	0.3300	0.3336	0.3372	0.3409	0.3446	−0.4
0.3483	0.3520	0.3557	0.3594	0.3632	0.3669	0.3707	0.3745	0.3783	0.3821	−0.3
0.3859	0.3897	0.3936	0.3974	0.4013	0.4052	0.4090	0.4129	0.4168	0.4207	−0.2
0.4247	0.4286	0.4325	0.4364	0.4404	0.4443	0.4483	0.4522	0.4562	0.4602	−0.1
0.4641	0.4681	0.4721	0.4761	0.4801	0.4840	0.4880	0.4920	0.4960	0.5000	−0.0

†For $z \leq -3.90$, the areas are 0.0000 to four decimal places.

Table Z (cont.)
Areas under the standard Normal curve



	Second decimal place in z									
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.9	1.0000†									

†For $z \geq 3.90$, the areas are 1.0000 to four decimal places.

B. Factors For Computing Center Line And Three-Sigma Control Limits

Observations in Sample, n	$\bar{X}$-Charts			s-Charts						R-Charts						
	Factors for Control Limits			Factors for Center line		Factors for Control Limits				Factors for Center line		Factors for Control Limits				
	A	A_2	A_3	c_4	$1/c_4$	B_3	B_4	B_5	B_6	d_2	$1/d_2$	d_3	D_1	D_2	D_3	D_4
2	2.121	1.880	2.659	0.7979	1.2533	0	3.267	0	2.606	1.128	0.8865	0.853	0	3.686	0	3.267
3	1.732	1.023	1.954	0.8862	1.1284	0	2.568	0	2.276	1.693	0.5907	0.888	0	4.358	0	2.574
4	1.500	0.729	1.628	0.9213	1.0854	0	2.266	0	2.088	2.059	0.4857	0.880	0	4.698	0	2.282
5	1.342	0.577	1.427	0.9400	1.0638	0	2.089	0	1.964	2.326	0.4299	0.864	0	4.918	0	2.114
6	1.225	0.483	1.287	0.9515	1.0510	0.030	1.970	0.029	1.874	2.534	0.3946	0.848	0	5.078	0	2.004
7	1.134	0.419	1.182	0.9594	1.0423	0.118	1.882	0.113	1.806	2.704	0.3698	0.833	0.204	5.204	0.076	1.924
8	1.061	0.373	1.099	0.9650	1.0363	0.185	1.815	0.179	1.751	2.847	0.3512	0.820	0.388	5.306	0.136	1.864
9	1.000	0.337	1.032	0.9693	1.0317	0.239	1.761	0.232	1.707	2.970	0.3367	0.808	0.547	5.393	0.184	1.816
10	0.949	0.308	0.975	0.9727	1.0281	0.284	1.716	0.276	1.669	3.078	0.3249	0.797	0.687	5.469	0.223	1.777
11	0.905	0.285	0.927	0.9754	1.0252	0.321	1.679	0.313	1.637	3.173	0.3152	0.787	0.811	5.535	0.256	1.744
12	0.866	0.266	0.886	0.9776	1.0229	0.354	1.646	0.346	1.610	3.258	0.3069	0.778	0.922	5.594	0.283	1.717
13	0.832	0.249	0.850	0.9794	1.0210	0.382	1.618	0.374	1.585	3.336	0.2998	0.770	1.025	5.647	0.307	1.693
14	0.802	0.235	0.817	0.9810	1.0194	0.406	1.594	0.399	1.563	3.407	0.2935	0.763	1.118	5.696	0.328	1.672
15	0.775	0.223	0.789	0.9823	1.0180	0.428	1.572	0.421	1.544	3.472	0.2880	0.756	1.203	5.741	0.347	1.653
16	0.750	0.212	0.763	0.9835	1.0168	0.448	1.552	0.440	1.526	3.532	0.2831	0.750	1.282	5.782	0.363	1.637
17	0.728	0.203	0.739	0.9845	1.0157	0.466	1.534	0.458	1.511	3.588	0.2787	0.744	1.356	5.820	0.378	1.622
18	0.707	0.194	0.718	0.9854	1.0148	0.482	1.518	0.475	1.496	3.640	0.2747	0.739	1.424	5.856	0.391	1.608
19	0.688	0.187	0.698	0.9862	1.0140	0.497	1.503	0.490	1.483	3.689	0.2711	0.734	1.487	5.891	0.403	1.597
20	0.671	0.180	0.680	0.9869	1.0133	0.510	1.490	0.504	1.470	3.735	0.2677	0.729	1.549	5.921	0.415	1.585
21	0.655	0.173	0.663	0.9876	1.0126	0.523	1.477	0.516	1.459	3.778	0.2647	0.724	1.605	5.951	0.425	1.575
22	0.640	0.167	0.647	0.9882	1.0119	0.534	1.466	0.528	1.448	3.819	0.2618	0.720	1.659	5.979	0.434	1.566
23	0.626	0.162	0.633	0.9887	1.0114	0.545	1.455	0.539	1.438	3.858	0.2592	0.716	1.710	6.006	0.443	1.557
24	0.612	0.157	0.619	0.9892	1.0109	0.555	1.445	0.549	1.429	3.895	0.2567	0.712	1.759	6.031	0.451	1.548
25	0.600	0.153	0.606	0.9896	1.0105	0.565	1.435	0.559	1.420	3.931	0.2544	0.708	1.806	6.056	0.459	1.541

C. Cumulative Poission Distribution Table

np_0

c	0.01	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	0.990	0.951	0.905	0.819	0.741	0.670	0.607	0.549	0.497	0.449	0.407
1	1.000	0.999	0.995	0.982	0.963	0.938	0.910	0.878	0.844	0.809	0.772
2		1.000	1.000	0.999	0.996	0.992	0.986	0.977	0.966	0.953	0.937
3				1.000	1.000	0.999	0.998	0.997	0.994	0.991	0.987
4						1.000	1.000	1.000	0.999	0.999	0.998
5									1.000	1.000	1.000

c	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	0.368	0.333	0.301	0.273	0.247	0.223	0.202	0.183	0.165	0.150	0.135
1	0.736	0.699	0.663	0.627	0.592	0.558	0.525	0.493	0.463	0.434	0.406
2	0.920	0.900	0.879	0.857	0.833	0.809	0.783	0.757	0.731	0.704	0.677
3	0.981	0.974	0.966	0.957	0.946	0.934	0.921	0.907	0.891	0.875	0.857
4	0.996	0.995	0.992	0.989	0.986	0.981	0.976	0.970	0.964	0.956	0.947
5	0.999	0.999	0.998	0.998	0.997	0.996	0.994	0.992	0.990	0.987	0.983
6	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.998	0.997	0.997	0.995
7					1.000	1.000	1.000	1.000	0.999	0.999	0.999
8									1.000	1.000	1.000

c	2.2	2.4	2.6	2.8	3.0	3.5	4.0	4.5	5.0	5.5	6.0
0	0.111	0.091	0.074	0.061	0.050	0.030	0.018	0.011	0.007	0.004	0.002
1	0.355	0.308	0.267	0.231	0.199	0.136	0.092	0.061	0.040	0.027	0.017
2	0.623	0.570	0.518	0.469	0.423	0.321	0.238	0.174	0.125	0.088	0.062
3	0.819	0.779	0.736	0.692	0.647	0.537	0.433	0.342	0.265	0.202	0.151
4	0.928	0.904	0.877	0.848	0.815	0.725	0.629	0.532	0.440	0.358	0.285
5	0.975	0.964	0.951	0.935	0.916	0.858	0.785	0.703	0.616	0.529	0.446
6	0.993	0.988	0.983	0.976	0.966	0.935	0.889	0.831	0.762	0.686	0.606
7	0.998	0.997	0.995	0.992	0.988	0.973	0.949	0.913	0.867	0.809	0.744
8	1.000	0.999	0.999	0.998	0.996	0.990	0.979	0.960	0.932	0.894	0.847
9		1.000	1.000	0.999	0.999	0.997	0.992	0.983	0.968	0.946	0.916
10				1.000	1.000	0.999	0.997	0.993	0.986	0.975	0.957
11						1.000	0.999	0.998	0.995	0.989	0.980
12							1.000	0.999	0.998	0.996	0.991
13								1.000	0.999	0.998	0.996
14									1.000	0.999	0.999
15										1.000	0.999
16											1.000

Cumulative Poission Distribution Table (cont.)

	np_0										
c	6.5	7.0	7.5	8.0	9.0	10.0	12.0	14.0	16.0	18.0	20.0
0	0.002	0.001	0.001	0.000							
1	0.011	0.007	0.005	0.003	0.001						
2	0.043	0.030	0.020	0.014	0.006	0.003	0.001				
3	0.112	0.082	0.059	0.042	0.021	0.010	0.002				
4	0.224	0.173	0.132	0.100	0.055	0.029	0.008	0.002			
5	0.369	0.301	0.241	0.191	0.116	0.067	0.020	0.006	0.001		
6	0.527	0.450	0.378	0.313	0.207	0.130	0.046	0.014	0.004	0.001	
7	0.673	0.599	0.525	0.453	0.324	0.220	0.090	0.032	0.010	0.003	0.001
8	0.792	0.729	0.662	0.593	0.456	0.333	0.155	0.062	0.022	0.007	0.002
9	0.877	0.830	0.776	0.717	0.587	0.458	0.242	0.109	0.043	0.015	0.005
10	0.933	0.901	0.862	0.816	0.706	0.583	0.347	0.176	0.077	0.030	0.011
11	0.966	0.947	0.921	0.888	0.803	0.697	0.462	0.260	0.127	0.055	0.021
12	0.984	0.973	0.957	0.936	0.876	0.792	0.576	0.358	0.193	0.092	0.039
13	0.993	0.987	0.978	0.966	0.926	0.864	0.682	0.464	0.275	0.143	0.066
14	0.997	0.994	0.990	0.983	0.959	0.917	0.772	0.570	0.368	0.208	0.105
15	0.999	0.998	0.995	0.992	0.978	0.951	0.844	0.669	0.467	0.287	0.157
16	1.000	0.999	0.998	0.996	0.989	0.973	0.899	0.756	0.566	0.375	0.221
17		1.000	0.999	0.998	0.995	0.986	0.937	0.827	0.659	0.469	0.297
18			1.000	0.999	0.998	0.993	0.963	0.883	0.742	0.562	0.381
19				1.000	0.999	0.997	0.979	0.923	0.812	0.651	0.470
20					1.000	0.998	0.988	0.952	0.868	0.731	0.559
21						0.999	0.994	0.971	0.911	0.799	0.644
22						1.000	0.997	0.983	0.942	0.855	0.721
23							0.999	0.991	0.963	0.899	0.787
24							0.999	0.995	0.978	0.932	0.843
25							1.000	0.997	0.987	0.955	0.888
26								0.999	0.993	0.972	0.922
27								0.999	0.996	0.983	0.948
28								1.000	0.998	0.990	0.966
29									0.999	0.994	0.978
30									0.999	0.997	0.987
31									1.000	0.998	0.992
32										0.999	0.995
33										1.000	0.997
34											0.999
35											0.999
36											1.000

D (i) Sample-Size Code Letters

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	1,200	C	C	E	F	G	J	K
1,201	to	3,200	C	D	E	G	H	K	L
3,201	to	10,000	C	D	F	G	J	L	M
10,001	to	35,000	C	D	F	H	K	M	N
35,001	to	150,000	D	E	G	J	L	N	P
150,001	to	500,000	D	E	G	J	M	P	Q
500,001	and	over	D	E	H	K	N	Q	R

D (ii) Single Sampling Plans for Normal Inspection (Master Table)

Sample size code letter	Sample size	Acceptable Quality Levels (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
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	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 first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.

↑ = Use first sampling plan above arrow.

Ac = Acceptance number.

Re = Rejection number.

D (iii) Single Sampling Plans for Tightened Inspection (Master Table)

Acceptable Quality Levels (tightened inspection)

Sample size code letter	Sample size	0.010 Ac Re	0.015 Ac Re	0.025 Ac Re	0.040 Ac Re	0.065 Ac Re	0.10 Ac Re	0.15 Ac Re	0.25 Ac Re	0.40 Ac Re	0.65 Ac Re
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
B	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
C	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
D	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
E	13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
F	20	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
G	32	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1
H	50	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↓
J	80	↓	↓	↓	↓	↓	↓	↓	0 1	↓	↓
K	125	↓	↓	↓	↓	↓	↓	0 1	↓	↓	1 2
L	200	↓	↓	↓	↓	↓	0 1	↓	↓	1 2	2 3
M	315	↓	↓	↓	↓	0 1	↓	↓	1 2	2 3	3 4
N	500	↓	↓	↓	0 1	↓	↓	1 2	2 3	3 4	5 6
P	800	↓	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9
Q	1250	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13
R	2000	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19
S	3150			1 2							

Sample size code letter	Sample size	1.0 Ac Re	1.5 Ac Re	2.5 Ac Re	4.0 Ac Re	6.5 Ac Re	10 Ac Re	15 Ac Re	25 Ac Re	40 Ac Re	65 Ac Re	100 Ac Re	150 Ac Re	250 Ac Re	400 Ac Re	650 Ac Re	1000 Ac Re
A	2	↓	↓	↓	↓	↓	↓	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	27 28
B	3	↓	↓	↓	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	27 28	41 42
C	5	↓	↓	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	27 28	41 42	↑
D	8	↓	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	27 28	41 42	↑	↑
E	13	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	27 28	41 42	↑	↑	↑
F	20	0 1	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑
G	32	↓	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑
H	50	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑
J	80	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑
K	125	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
L	200	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
M	315	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
N	500	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
P	800	12 13	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Q	1250	18 19	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
R	2000	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
S	3150																

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

↑ = Use first sampling plan above arrow.

Ac = Acceptance number.

Re = Rejection number.

D (iv) Single Sampling Plans for Reduced Inspection (Master

Sample size code letter	Sample size	Acceptable Quality Levels (reduced 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
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↓	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	30 31
B	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	2 4	3 5	5 6	7 8	10 11	14 15	21 22	30 31
C	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	14 17	21 24	↑
D	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	14 17	21 24	↑	↑
E	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	14 17	21 24	↑	↑	↑
F	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑
G	13	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑
H	20	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑
J	32	↓	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑
K	50	↓	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
L	80	↓	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
M	125	↓	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
N	200	↓	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
P	315	↓	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Q	500	0 1	↑	↓	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
R	800	↑	↑	0 2	1 3	1 4	2 5	3 6	5 8	7 10	10 13	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

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

↑ = Use first sampling plan above arrow.

✝ = If the acceptance number has been exceeded, but the rejection number has not been reached; accept the lot, but reinstate normal inspection.

Ac = Acceptance number.

Re = Rejection number.