658.562 ASTMq 1951

CONTENT

Page

PART 1
PRESENTATION OF DATA

Summary 1

Introduction

1. Purpose 1
2. Type of Data Considered 1
3. Homogeneous Data 2
4. Typical Examples of Physical Data 4

Ungrouped Frequency Distributions

5. Ungrouped Frequency Distributions 5
6. Remarks 5

Grouped Frequency Distributions

7. Introduction 5
8. Definitions 5
9. Choice of Cell Boundaries 6
10. Number of Cells 6
11. methods of classifying Observations 7
12. Cumulative Frequency Distribution 8
13. Tabular Presentation 9
14. Graphical Presentation 9
15. Remarks 11

Functions of a Frequency Distribution

16. Introduction 11
17. Relative Frequency 12
18. Average (Arithmetic Means) 13
19. Other measures of Central Tendency 13
20. Standard Deviation 14
21. Other Measures of Dispersion 15
22. Skewness 15
23. Remarks 16

Methods of Computing $\overline{X}$, σ, and k

24. Computation of Average and Standard Deviation 16
25. Short Method of computation When n is Large 19
26. Remarks 20

Amount of Information Contained in p, X, σ and k

27. Introduction 20
28. The Problem 21
29. Several Values of Relative Frequency, p 21
30. Single Value of Relative Frequency, p 21
31. Average, $\overline{X}$, Only 22
32. Average, $\overline{X}$, and Standard Deviation, σ 23
33. Average, $\overline{X}$, Standard Deviation, σ, and Skewness, k 25
34. Use of Coefficient of Variation Instead of Standard Deviation 26
35. General Comment on Observed Frequency Distributions of a Series of A.S.T.M. Observation 27
36. Summary 28

Essential Information

37. Introduction 29
38. What Functions of the Data Contain the Essential Information 29
39. Presenting $\overline{X}$ Only Versus Presenting $\overline{X}$ and σ 30
40. Observed Relationships 31
41. Summary 32

Presentation of Relevant Information

42. Introduction 33
43. Relevant Information 33
44. Evidence of Control 34

Recommendations

45. Recommendations for Presentation of Data 35

Supplements

A. Glossary of Symbols Used in Part 1 36
B. General References for Part 1 37

PART 2
PRESENTING ± LIMITS OF UNCERTAINTY OF AN OBSERVED AVERAGE

1. Purpose 41
2. The Problem 41
3. Theoretical Background 42
4. Computation of limits 42
5. Experimental Illustration 45
6. Presentation of Data 46
7. Number of Places to be Retained in computation and Presentation 47
8. General Comments on the Use of Confidence Limits 49

Supplements

A. Glossary of Symbols Used in Part 2 50
B. General References for Part 2 51

PART 3
CONTROL CHART METHOD OF ANALYSIS AND PRESENTATION OF DATA

General Principles

1. Purpose 55
2. Terminology and Technical Background 56
3. Two Uses 57
4. Breaking up Data into Rational Subgroups 57
5. General Technique in using Control Chart Method 58
6. Control Limits 58

Control – No Standard Given

7. Introduction 59
8. Control Charts for Averages, $\overline{X}$, and for Standard Deviations, σ Large Samples 59
9. Control Charts for Average, $\overline{X}$, and for Standard Deviations, σ Small samples 60
10. Control Charts for Average, $\overline{X}$, and for Ranges, R – Small Samples 61
11. Summary, Control Charts for $\overline{X}$, σ, and R – No Standard Given 63
12. Control Charts for Attributes Data 64
13. Control Chart for Fraction Defective, p 64
14. Control Chart for Number of Defectives, pn 65
15. Control Chart for Defects per Unit, u 66
16. Control Chart for Number of Defects, c 68
17. Summary, Control Charts for p, pn, u, and c – No Standard Given 69

Control With Respect to a Given Standard

18. Introduction 69
19. Control Charts for Average, $\overline{X}$, and for Standard Deviations, σ 71
20. control Chart for Ranges, R 71
21. Summary, Control Charts for $\overline{X}$, σ and R – Standard Given 72
22. Control Charts for Attributes Data 73
23. Control Chart for Fraction Defective, p 73
24. Control Chart for Number of Defectives, pn 73
25. Control Chart for Defects per Unit, u 74
26. Control Chart for Number of Defects, c 75
27. Summary, Control Charts for p, pn, u, and c – Standard Given 76

Control Charts for Individuals

28. Introduction 76
29. Control Chart for Individuals, X – Using Rational Subgroups 77
30. Control Chart for Individuals – Using Moving Ranges 78

Examples

31. Control – No standard Given 79
32. Control with Respect to a Given standard 90
33. Control Chart for Individuals 101

Supplements

A. Glossary of Terms and Symbols Used in Part 3 107
B. Mathematical Relations and Tables of Factors for Computing Control Chart Lines 116
C. Explanatory Notes 116
D. General References for Part 3 118

APPENDIX

Tables of Squares and Square Roots 121
List of Some Related Publications on Quality Control and Statistics 128
Comparison of Symbols 129
Recommended Practice for Choice of Sample Size to Estimate the Average Quality of a Lot or Process (ASTM Designation : E 122) 130
Recommended Practices for Designating Significant Places in Specified Limiting Values (ASTM Designation : E 29) α
Recommended Practice for Probability Sampling of Materials (ASTM Designation : E 105) α
Recommended Practice for Acceptance of Evidence Based on the Results of Probability Sampling (ASTM Designation : E 141) α
ASTM Membership Blank 137

(α Available as a Separate Reprint form ASTM Headquarters.)