

Guide to

Statistical interpretation of data —

**Part 6: Comparison of two means in the
case of paired observations**

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- Biometrika*
- British National Committee for Surface Active Agents
- British Paper and Board Industry Federation (PIF)
- Economist Intelligence Unit
- Electronic Components Board
- Institute of Petroleum
- Institute of Quality Assurance*
- Institute of Statisticians*
- Institution of Production Engineers
- Ministry of Defence*
- National Coal Board*
- Post Office
- Royal Statistical Society*
- Society of Analytical Chemists
- University of Essex

The Government department and scientific and industrial organizations marked with an asterisk in the above list were directly represented on the committee entrusted with the preparation of this British Standard.

This British Standard, having been prepared under the direction of The Advisory Committee on Statistical Methods was published under the authority of the Executive Board on 30 June 1976

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The following BSI references relate to the work on this standard:
Committee reference OC/8/2 and draft for approval ISO/DIS 3301

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Contents

	Page
Cooperating organizations	Inside front cover
Foreword	ii
0 Introduction	1
1 Scope	1
2 Definition	1
3 Field of application	1
4 Conditions for application	1
5 Formal presentation of calculations	2
6 Errors of the second kind	5
Figure 1 — Power of Student's one-sample test (one-sided), $\alpha = 0.01$	5
Figure 2 — Power of Student's one-sample test (one-sided), $\alpha = 0.05$	6
Table 1 — Values of the ratio $t_1 - \alpha v / \sqrt{n}$ for $v = n - 1$	3
Table 2 — Shaft-wear after a given working time in 0.000 01 in	4

Foreword

The correct interpretation and presentation of test results have been assuming increasing importance in the analysis of data obtained from manufacturing processes based on sample determinations and prototype evaluations in industry, commerce and educational institutions. It was for this reason that Subcommittee 2 of Technical Committee 69, “Applications of Statistical Methods”, of the International Organization for Standardization (ISO), was charged with the task of preparing a guide to statistical methods for the interpretation of test results. As international agreement is reached on the statistical tests relevant to specific situations it is proposed to publish them as parts of a revised BS 2846 1957: “*The reduction and presentation of experimental results*” as follows.

Statistical interpretation of data

- *Part 1: Routine analysis of quantitative data*;
- *Part 2: Estimation of the mean-confidence interval* [ISO 2602];
- *Part 3: Determination of a statistical tolerance interval* [ISO 3207];
- *Part 4: Techniques of estimation and tests relating to means and variances* [ISO 2854]¹⁾;
- *Part 5: Efficiency of tests relating to means and variances* [ISO 3494]¹⁾;
- *Part 6: Comparison of two means in the case of paired observations* [ISO 3301].

A situation often encountered is one in which a decision in favour of one of two alternatives, whether they be manufacturing processes, machines or medical drugs etc., needs to be taken. There exists a number of criteria for making such judgements depending upon whether it is the “average effect” or the number of “individual items being processed that are better than some tolerance” that is of prime importance. This Part of the standard specifies a technique for testing for (significant) differences between two mean values (e.g. two process averages) and consequently is concerned with problems of the former kind. The latter problem is dealt with in Part 3, and also BS 6002

“Sampling procedures and charts for inspection by variables for percent defective”.¹⁾ The technique of this Part provides a procedure for deciding between two alternatives on the basis of differences between their average performances. This Part of this British Standard is identical with ISO 3301 “*Statistical interpretation of data — Comparison of two means in the case of paired observations*”.

For the purposes of this British Standard the text of ISO 3301 given in this publication should be modified as follows.

Terminology. The words “British Standard” should replace “International Standard” wherever they appear.

The decimal point should replace the decimal comma, wherever it appears.

Cross-reference. The references to other International Standards should be replaced by references to British Standards as follows.

Reference to ISO Standard

ISO 2854 “*Statistical interpretation of data — Techniques of estimation and tests relating to the means and variances*”

Appropriate British Standard

BS 2846 “*Guide to statistical interpretation of data*” Part 4 “*Techniques of estimation and tests relating to means and variances*”^a

^a In course of preparation.

¹⁾ In course of preparation.

The following British Standards also provide practical guidance on the application of statistical methods.

BS 600, *Application of statistical methods to industrial standardization and quality control.*

BS 1313, *Fraction-defective charts for quality control.*

BS 2564, *Control chart technique when manufacturing to a specification, with special reference to articles machined to dimensional tolerances.*

BS 6000, *Guide to the use of BS 6001. Sampling procedures and tables for inspection by attributes.*

BS 6001, *Sampling procedures and tables for inspection by attributes.*

BS 6002²⁾, *Sampling procedures and charts for inspection by variables for percent defective.*

BS ²⁾, *Determination of repeatability and reproducibility for a standard test method.*

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 6 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

²⁾ In course of preparation.