AS 2529—1982

Australian Standard

COLLECTION OF RELIABILITY, AVAILABILITY AND MAINTAINABILITY DATA FOR ELECTRONICS AND SIMILAR ENGINEERING USE

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Broadcasting Commission
Confederation of Australian Industry
Department of Defence
Department of Productivity
Department of Transport
Institution of Engineers, Australia
Institution of Radio and Electronics Engineers Australia
Telecom Australia

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PREFACE

This standard was prepared by the Association's Telecommunications and Electronics Committee on Reliability of Electronic Components and Equipment as one of a series of standards on reliability and related subjects.

In its terminology, definitions and general treatment of the subject the standard is technically identical with IEC 362 issued by the International Electrotechnical Commission. It deviates from that document only editorially in that the language used to express some of the ideas has been clarified and the format adopted is different from that used by the IEC. The title of the standard has been simplified for general use. The application of this standard is not restricted to electronic or electrical components but may be extended to any field of engineering where reliability data can be useful.

The major purposes of the collection of reliability data on field performance of components, parts and equipment are—

(a) to provide for a survey of the actual reliability and, hence, to enable the predicted reliability characteristic of the item to be compared with field data, and thereby improve future predictions;

(b) to provide data for improving the reliability, both of the current item and of future developments should this be economically justifiable; and

(c) to provide data for the organization and management of the maintenance operation (preventive maintenance, corrective maintenance, service personnel, spare parts, stores, etc).

For the purposes of this standard, reference may be necessary to the following Australian standards:

AS 1211 Reliability of Electronic Equipment and Components
Part 1—Terminology
Part 2—Reliability Concepts
Part 3—Reliability Program for Equipment

AS 2530 Presentation of Reliability Data on Electronic and Similar Components (or Parts)

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

COLLECTION OF RELIABILITY, AVAILABILITY AND MAINTAINABILITY DATA FOR ELECTRONICS AND SIMILAR ENGINEERING USE

1 SCOPE. This standard provides guidance for the collection of reliability data relating to the field performance of electronic items but may also be applicable to other engineering items. It provides for the acquisition of data sufficiently comprehensive to permit detailed failure and failure-rate analysis of items operating or existing under various conditions of environment, storage, stand-by, maintenance procedures, etc and at various periods of time.

The standard also provides for data from which the maintainability and availability aspects of items may be considered.

2 APPLICATION AND PURPOSE. The standard emphasizes that meaningful reliability data must include the data on successes (performance without failure), as well as data on failures. The standard is not intended to apply only to failure-reporting.

In all cases, it is important to distinguish between primary and secondary failures and items which were removed and on further examination were found not to have failed.

The specific objectives of the collection of reliability data on the field performance of electronic items are—

(a) to provide for a survey of the actual reliability and, hence, to enable the predicted reliability characteristic of an item to be compared with field data, and thereby improve future predictions;

(b) to provide data for improving the reliability, both of the current item and of future developments; and

(c) to provide data for the organization and management of any maintenance operation (preventive maintenance, corrective maintenance, service personnel, spare parts stores, etc).

3 DATA REQUIRED. Consideration of the foregoing objectives defines the need for a system which provides for the collection of documented data covering—

(a) the total population under observation;

(b) operational conditions;

(c) failures of the items; and

(d) maintenance operations.

4 GUIDELINES. It is the intention of this standard to provide guidelines for setting up data collection schemes which are consistent with Clauses 2 and 3, and which can be applied either during investigations of samples of equipment, or on a more widespread basis by large maintenance organizations.

It is considered that, if such guidelines are followed, accuracy and completeness of reporting, which are paramount if such schemes are to be of value, will be promoted by the collection of standardized information. Moreover, such standardization will facilitate the interchange of information between users and manufacturers.

NOTE: To obtain optimum results from the collection of data, it is recommended that the entire program of reporting, analysis and dissemination of results be closely co-ordinated.

5 REPORTS.

5.1 General Comments. The suggested content of reports covering overall use, field failures and preventive maintenance is shown in Clause 6. The performance of individual items and the whole population under consideration is included.

It should be noted that, in the case of reports on individual items, the relative content of use and failure reports will vary markedly with the items considered and the type of operation. For instance, in the case of large installations maintained in situ, the use and failure reports will probably be combined, whereas in the case of smaller equipment maintained at a central workshop, simple failure reports will probably be prepared by the service engineer and use reports by the office controlling the operation of the equipment.

5.2 Use Reporting. Data reporting should be supported by information on the use of the items. Where systems for the reporting of all failures are in operation, it is necessary to collect data on the use of the whole population of items (the total number of similar items under observation).

5.3 Failure Reporting. Failure reports should cover all failures which have been observed. They should also contain sufficient information to identify misuse failures. Failures considered to be attributable to any maintenance action should be so noted.

The proposed content of the report is considered to be sufficiently comprehensive to cover the requirements of detailed investigation of an individual failure. Where economic reasons or lack of resources make it undesirable to collect all of the failure data indicated it may be desirable to agree upon a shortened form of report which can be used to collect limited data on all relevant failures, with an option to call for the full report in specific cases.

The proposed field performance report does not provide the physical format for a failure form. As far as the equipment is concerned, an important part of the data, such as the general operating conditions, may be found in other documents, particularly the use report.

5.4 Preventive Maintenance Reporting. Essentially, preventive maintenance is scheduled so as to forestall failure or eliminate failure entirely. Therefore reporting action taken in this sense is not a failure