

Obsolescence management — Guide to the substitution of components in electronic equipment

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Foreword

This Published Document is one of several which have been issued by the British Standards Society. Established in 1960, the Society has, as one of its key aims, the assistance of management in the application of standards in design, manufacture, quality assurance, in-service support, information technology and other relevant activities. The Society has a number of special interest groups dealing with the application of standards in various specialist technical areas, one of which is the Electronics Standards Group.

The Electronics Standards Group has prepared this Published Document as a result of difficulties experienced by its members and their contacts throughout industry when components designed into electronic equipment are no longer available or have to be replaced for other reasons. Many pieces of equipment (other than those for domestic use) are designed on the basis that they will remain substantially unchanged for several years and will have a service life of twenty years or more, but the components industry is continuously changing its products as the cost of making improvements comes down. This Published Document aims to give guidance to those responsible for finding components to suit such equipment, and it lists sources of supply for some of those components which are no longer made by the original manufacturers. Details are also given of several organizations which are examining this problem on a global basis and which may be able to give assistance when particular difficulties arise.

The document was drafted by members of the Electronics Standards Group and further refined as a result of discussions with engineers in several companies. The Society is grateful to all the members who have been involved in its preparation, and particularly to Tom Anderson (Zetex International), Graham Goring (Racal Avionics) and the Group's Chairman, Bob Vallance.

NOTE The telephone and fax numbers given in this document reflect the changes due to be introduced from 1 June 1999.

The document will be periodically updated. Users of the document are invited to submit comments to the Secretary, British Standards Society (see inside front cover).



R V Wright
Chairman, British Standards Society

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

Introduction

The aim of this Published Document is to give guidance on the substitution of electronic components, used in the manufacture of electronic equipment. Substitution may be necessary for various reasons (see clause 3). The most common reasons are obsolescence or unavailability. A considerable number of organizations deal with the subject of obsolescence and an attempt has been made to cover these in annex A. The information given in annex A is correct at the time of publication, but is liable to change.

It is always the responsibility of the equipment designer to check the availability of the required components over the life of the equipment to reduce the problem of obsolescence, although in practice this information is often difficult to obtain. If substitution becomes unavoidable, it is necessary to ensure that compliance with any mandatory requirements that the equipment has to meet, such as interference regulations or electrical safety, is not affected. This can be accomplished by consultation with component manufacturers using the guidelines set out in this Published Document. These guidelines may also be useful with respect to assembled units which are treated as components in a larger assembly.

1 Scope

This Published Document gives guidance on the substitution of electronic components used in the manufacture of electronic equipment. It is intended for use by both procurement personnel and design personnel. It includes guidance on those components for which it is safe to use "better than" characteristics, as well as on those for which it is not safe. Examples of each type of component family are given (e.g. resistors, integrated circuits). Guidance is also given on how to deal with changes in the quality approval systems applicable to electronic components.

Annex A gives details of organizations which are currently considering the subject of obsolescence. Possible sources of supply for some semiconductors which are no longer available from the original manufacturers are given in annex B.

This Published Document is not intended for use by maintenance personnel for replacement of defective components in the field, although some of the guidance may be helpful.

2 Terms and definitions

For the purposes of this Published Document, the following definitions apply.

2.1

obsolete

no longer in production by the manufacturer

2.2

obsolescent

subject to an announced end of production date by the manufacturer

2.3

item

an object which is identified by a part number and manufacturer

NOTE An item may also be defined by one or more specifications.

2.4

component

item (or sub-assembly of items) used in the composition of an apparatus, but which is not itself an apparatus with an intrinsic function intended for the final customer

NOTE 1 Examples of a component are integrated circuits, unpopulated boards, miniature resistors or small capacitors. A component may be more complex and may even be a sub-assembly, as long as it does not have an intrinsic function and its only purpose is to be incorporated inside an apparatus.

NOTE 2 The above definition comes from *Explanatory document on Council Directive 89/336/EEC of 3rd May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility*.

2.5

manufacturer

company which holds the original design rights for the item

NOTE 1 This company is not necessarily still able to supply the item.

NOTE 2 Some types of component (e.g. switches, connectors) may have their final assembly carried out by a distributor or stockist.

2.6

fit

physical dimensions of an item

2.7

form

physical attributes of an item other than dimensions

2.8

function

purpose for which an item is used

NOTE The function can differ from the purpose for which the item was originally designed (see clause 5).

2.9

specific application

function in which the effects of deviation from the item's original published parameters can be evaluated

2.10

general application

function in which the effects of deviation from the item's original published parameters cannot easily be determined



2.11**supplier**

source of supply other than the manufacturer

2.12**qualified manufacturer's line (QML)**

US Military approval scheme in which a manufacturer's process procedures and statistical process controls are deemed suitable for the supply of components to US Military contracts

3 Reasons for substitution

Substitution may be necessary for the following reasons which are unrelated to the product design:

- a) the item is obsolete;
- b) the item is obsolescent;
- c) minimum order quantity is too high;
- d) the manufacturer is in financial difficulty or receivership;
- e) the item is on long delivery;
- f) the item is single-sourced;
- g) component quality problems.

Alternatively, substitution may be necessary because changes are to be made to the product design for the following reasons:

- h) value engineering (this includes variety reduction and standardization);
- i) reliability improvement;
- j) customer requirements;
- k) equipment quality problems.

Clause 4 is relevant when the reasons given in a) to g) apply.

If reasons h) to k) apply, an existing component is invariably replaced by one which is currently available. It may nevertheless be difficult to obtain the same quality as in the original design, and the guidelines given in clause 4 may therefore be relevant.

Whenever a substantial number of components in an old equipment design are obsolete or obsolescent, a redesign initiated under a value engineering regime should be considered (see also 4.3).

4 General principles

4.1 As early as possible in the design process, an attempt should be made to ascertain the likelihood of obsolescence of any current component that is to be specified. If possible, requirements relating to obsolescence should be stipulated (e.g. minimum component availability and advice of withdrawal). Some of the suppliers listed in annex B may be able to give advice on impending obsolescence.

4.2 If the substitute item is to be used in a "general application", it should be a "fit, form and function" replacement, except that the original quality assessment requirements may be waived as described in clause 5. In some substitutions, it is necessary to consider the item's minimum dimensions as well as the maximum ones, for example if the item is used with a heat sink fixing or heat plane.

4.3 It is always worth checking existing stock for a possible substitute that may be stored under an alternative or different identity from the original.

4.4 If the substitute is for a particular item used in a specific equipment or function, it can be a "specific application" substitute. In this case, the item can usually be a "better than" substitute, but caution should be observed. In general, where the quality or screening level of a "better than" substitute is higher there will be no disadvantage (see also clause 5), but care should be taken with parameters which are open-ended. If the substitute has a better tolerance or temperature coefficient, it will normally be satisfactory unless the component is used as a temperature compensating device (see clause 6).

If the only available substitute is "worse than" the original, it should not be ruled out. Analysis of the equipment specification may reveal that the original choice of component was dictated by a general policy requirement to design-in the "best available" components rather than those which were adequate.

4.5 If it becomes increasingly difficult to find any type of substitute, the costs of a redesign using up-to-date components should be analysed. This analysis should be on a complete equipment basis, through all levels of assembly and sub-assembly, as there may be other components which are likely to become difficult to obtain. It is recommended that when notification of obsolescence is given by the manufacturer, the usage of that component in all previous designs, as well as in current production, be researched.

4.6 Obsolete components may have functional equivalents. The manufacturer can advise on this (see also clause 6).

4.7 Care should be taken to distinguish between suppliers which are recognized by the manufacturer and those which are not recognized or franchised.

5 Quality and screening levels**5.1 General**

In the past, many components were available with a variety of quality and screening levels supported by third-party surveillance of the component manufacturer. This availability was dictated by the military market, which was a much larger user of such components than is the case today.

