SLOVENSKI STANDARD
SIST EN 62005-4:2001

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Reliability of fibre optic interconnecting devices and passive optical components - Part 4: Product screening (IEC 62005-4:1999)

Reliability of fibre optic interconnecting devices and passive optical components -- Part 4: Product screening

Betriebszuverlässigkeit von Lichtwellenleitern - Verbindungselemente und passive Bauteile -- Teil 4: Produktsortierprüfung

Fiabilité des dispositifs d'interconnexion et des composants optiques passifs à fibres optiques -- Partie 4: Sélection des produits

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Reliability of fibre optic interconnecting devices and passive optical components
Part 4: Product screening
(IEC 62005-4:1999)

Fiabilité des dispositifs d'interconnexion et des composants optiques passifs à fibres optiques
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(CEI 62005-4:1999)

Betriebszuverlässigkeit von Lichtwellenleitern Verbindungselemente und passive Bauteile
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This European Standard was approved by CENELEC on 1999-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

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Foreword

The text of document 86B/1212/FDIS, future edition 1 of IEC 62005-4, prepared by SC 86B, Fibre optic interconnecting devices and passive components, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62005-4 on 1999-10-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2000-07-01
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Endorsement notice

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Partie 4: Sélection des produits

Reliability of fibre optic interconnecting devices and passive optical components –

Part 4: Product screening

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RELIABILITY OF FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE OPTICAL COMPONENTS –

Part 4: Product screening

FOREWORD

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International Standard IEC 62005-4 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

The text of this standard is based on the following documents:

FDIS	Report on voting
86B/1212/FDIS	86B/1249/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

RELIABILITY OF FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE OPTICAL COMPONENTS –

Part 4: Product screening

1 Scope

This International Standard describes product screening. A proper product screen is actually a process, not a test. As a process, it is maintained and constantly validated to ensure it achieves the purpose for which it was defined. This process is applied to a product in order to induce products with a known failure mechanism, to fail in a controlled situation before the product is deployed in the field. If this process is properly applied, then all infant mortality failures in the field, associated with the failure mechanism(s) for the screen, will be eliminated.

Figure 1 shows the classical "bathtub" three-region curve of failure rates for most products. Although the failure rates of passive optical components have not been conclusively shown to follow this curve, it is useful for illustrative purposes. Screening is known for some products as a proof stress or in the case of electronics, as a "burn-in process". When applied to a product, it will normally affect the failure rate applied during the infant mortality portion of the product life cycle. If the screen is properly chosen, it will induce a portion of the infant mortality failures caused by the chosen failure mechanism(s) to occur in the manufacturing cycle, earlier than would normally be seen in the unscreened population shown in the dashed line. Also, it should be noted that a properly applied screen does not weaken or degrade the wear-out or end of life performance of a product population. In any case, the screen should also not affect the middle region of normal life utilization.

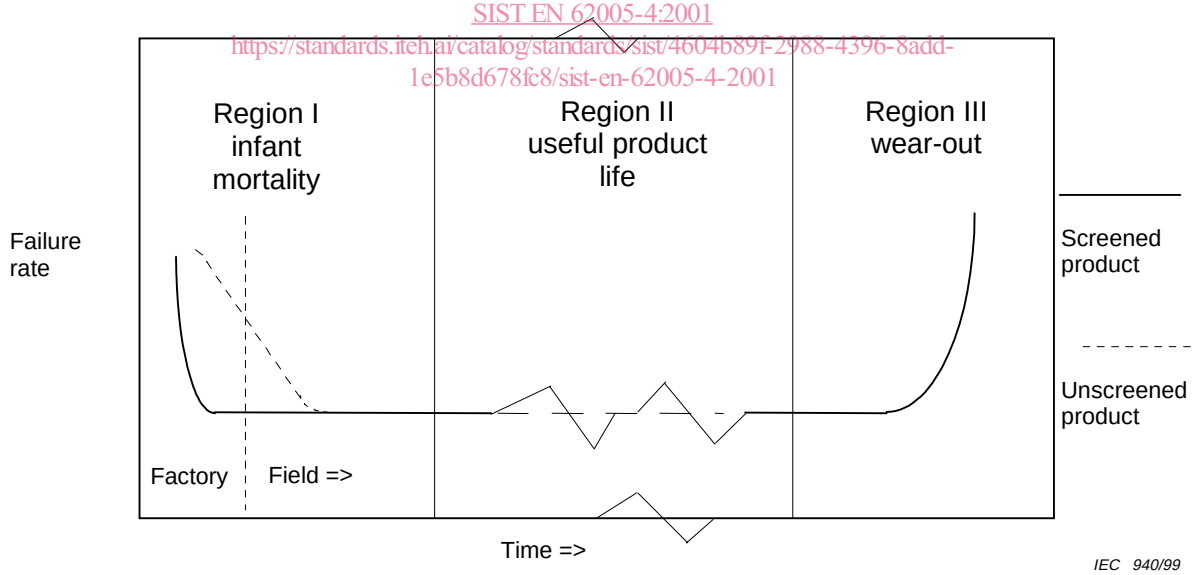

Figure 1 – Classic bathtub curve of product failure rate versus time

Screening and the decision to apply a screen to a product process should never be a requirement. It should be designated as an option or an alternative. Once product testing identifies a failure mechanism in a population or sub-population of a product, screening to remove that mechanism is only one alternative. Equally valid, and in most cases preferable, is the alternative to make design or manufacturing process improvements to eliminate the mechanism. Obviously, any changes to the product are then revalidated, and the screen is revalidated as well. However, the decision to choose whether to screen or improve the product should be based on economics, customer expectations, and product use.

2 Screen versus testing

There are several key differences between screens, tests and quality sampling. The fundamental difference is the expected outcome. In quality related testing, test failures are not desired, while in screening, failure of some units is acceptable and even expected. Screens are applied to 100 % of all pieces manufactured. Quality testing can be performed on a sampling basis or on 100 % of all products. Sometimes these terms are used with a degree of interchangeability which can be confusing. For example a commonly used screening process for optical fibre is known as a "proof test", but is in fact a valid screening example.

3 Proper design and implementation of a screening process

To properly design a screen process, it is necessary to isolate and identify the failure mechanism(s) involved. It is impossible to properly apply a screen process to a product, if the mechanism affected is not understood. Once the failure mechanisms are isolated, the following steps should be followed:

a) identify acceleration stresses and methodologies for failure mechanism(s);

b) identify stress limits of product design and materials, and ensure that the tests selected are within safe limits;

c) identify the earliest possible step in the process to apply the screen process;

d) validate the screen – effective and harmless to good products:

   1) run the screen on a sample population of product with known or deliberately induced defects of the type addressed by the screen. Ensure that the screening test effectively identifies defective products with a low rejection of good products;

   2) run the screen on a "good" population several times, then lifetest this population versus an unscreened population, to ensure that no unacceptable degradation in the product due to the performance of the screen has occurred;

e) as the screen is implemented in normal production, track and report product fallout;

f) continue to validate the relevance of a screen on an ongoing basis.