



NSAI
Standards

Irish Standard
I.S. EN 16602-60-05:2014

Space product assurance - Generic procurement requirements for hybrids

I.S. EN 16602-60-05:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 16602-60-05:2014

Published:

2014-09-17

*This document was published
under the authority of the NSAI
and comes into effect on:*

2014-10-04

ICS number:

49.140

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 16602-60-05

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2014

ICS 49.140

English version

Space product assurance - Generic procurement requirements for hybrids

Assurance produit des projets spatiaux - exigences
génériques d'approvisionnement des composants hybrides

Raumfahrtproduktsicherung - Allgemeine
Beschaffungsanforderungen an Hybride

This European Standard was approved by CEN on 13 March 2014.

CEN and 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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN and CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN and CENELEC members are the national standards bodies and national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



**CEN-CENELEC Management Centre:
Avenue Marnix 17, B-1000 Brussels**

Table of contents

Foreword	6
Introduction.....	7
1 Scope.....	8
2 Normative references	9
3 Terms, definitions and abbreviated terms.....	10
3.1 Terms from other standards.....	10
3.2 Terms specific to the present standard	10
3.3 Abbreviated terms.....	11
4 Sequence of procurement activities	13
5 Selection of hybrid microcircuit manufacturer	16
5.1 General.....	16
5.2 Hybrid microcircuit manufacturer categories	16
5.2.1 Category 1 manufacturer (preferred case)	16
5.2.2 Category 2 manufacturer (non-preferred case)	16
6 Validation procedure for a hybrid microcircuit manufacturer	17
6.1 General.....	17
6.2 Hybrid circuit technology identification form (HTIF)	17
6.2.1 General	17
6.2.2 HTIF for approved manufacturers (category 1).....	17
6.2.3 HTIF for manufacturer pending capability approval by the approving authority (category 1)	18
6.2.4 HTIF for manufacturer not approved by the approving authority (category 2).....	18
6.3 Validation of category 2 manufacturers.....	19
6.3.1 General	19
6.3.2 Construction analysis on representative samples.....	19
6.3.3 Quality and technical audit	19
7 Design requirements	21

7.1	General.....	21
7.1.1	Overview.....	21
7.1.2	Design activities	21
7.2	Detail specification for hybrid circuits	22
7.3	Design approval (circuit type approval).....	22
7.3.1	General	22
7.3.2	Procedure for a new hybrid circuit which is “non similar” to a reference circuit	23
7.3.3	Procedure for a new hybrid circuit which is “similar” to a reference circuit	24
7.3.4	Procedure for a “recurrent” hybrid circuit.....	24
8	Procurement of passive and active chips	25
8.1	General.....	25
8.1.1	Introduction	25
8.1.2	Selecting chip suppliers	27
8.1.3	Specifications.....	27
8.1.4	Requirements for chip lots.....	27
8.2	Procurement of passive chips	28
8.2.1	General	28
8.2.2	Bondability test.....	28
8.2.3	Lot acceptance test (LAT).....	28
8.3	Procurement of active chips.....	29
8.3.1	General	29
8.3.2	Bondability test.....	30
8.3.3	User LAT.....	30
8.4	Procurement of hermetically encapsulated chips	32
9	Procurement of materials and piece parts	33
9.1	Overview	33
9.2	Selection of materials and piece parts	33
9.3	Specifications	33
9.4	Requirements for materials and piece parts.....	34
10	Manufacturing and screening of hybrid circuit lots	35
10.1	Manufacturing.....	35
10.2	Marking.....	35
10.2.1	General	35
10.2.2	Special cases.....	36
10.3	Screening	36

EN 16602-60-05:2014 (E)

10.3.1	General	36
10.3.2	Thermographic test	39
10.3.3	Pre-seal burn-in	40
10.3.4	Photograph of circuits	40
10.3.5	Conditions for constant acceleration and mechanical shock.....	40
10.3.6	Test condition for PIND	40
10.3.7	Leak tests	41
10.3.8	Physical dimensions.....	41
10.3.9	Burn-in test	41
10.3.10	Radiographic inspection.....	41
10.4	Lot rejection	41
10.4.1	Definition of failure modes.....	41
10.4.2	Criteria for lot rejection	42
10.4.3	Disposition of rejected lots	43
10.5	Repair provisions	43
10.5.1	General	43
10.5.2	Element replacement	43
10.5.3	Wire re-bonding	43
10.5.4	Compound bonding.....	44
10.5.5	Delidding of hybrid circuits	44
11	Customer inspection and review	45
12	Lot acceptance tests for hybrid circuits.....	46
12.1	General.....	46
12.1.1	Overview	46
12.1.2	Samples.....	46
12.2	Category 1 manufacturer	47
12.2.1	Option 1: Production lot control	47
12.2.2	Option 2: Lines under TRB management and statistical process control.....	48
12.3	Category 2 manufacturer (validated for the project)	49
13	Hybrid delivery and data package.....	53
13.1	General.....	53
13.2	Data documentation.....	53
13.2.1	General	53
13.2.2	Cover sheets.....	54
13.2.3	Certificate of conformity	54
13.3	Packaging and despatch.....	54

14 DPA test sequence	55
Bibliography.....	76

Figures

Figure 4-1: Sequence of activities in the procurement of hybrid microcircuits	14
Figure 4-2: Hybrids procurement flow	15
Figure 8-1: Flow of Procurement of Active and Passive components	26
Figure 10-1: Screening test sequence	37
Figure 12-1: Lot acceptance tests for the first production lot manufactured by a category 2 manufacturer	51

Tables

Table 8-1: Sample size and acceptance criteria for LAT of passive chips.....	29
Table 8-2: Sample size and acceptance criteria for user LAT on active chips.....	31
Table 10-1: Test conditions for constant acceleration and mechanical shock	40
Table 12-1: Sample size for hybrids lot acceptance tests	47
Table 12-2: Lot acceptance tests and sample size	47
Table 12-3: Production acceptance tests and sampling.....	50
Table 12-4: Definition of tests	51

Foreword

This document (EN 16602-60-05:2014) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-60-05:2014) originates from ECSS-Q-ST-60-05C Rev. 1.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2015, and conflicting national standards shall be withdrawn at the latest by March 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The objective of this Standard is to define the requirements for the procurement of hybrid microcircuits for use in space systems.

This Standard covers the following requirement domains:

- Validation procedure for a hybrid microcircuit manufacturer.
- Design of hybrid microcircuits.
- Procurement of active and passive chips.
- Procurement of materials and piece parts.
- Screening of hybrid microcircuit lots.
- Lot acceptance tests for hybrid microcircuits.
- Customer involvement, key inspection points.
- Repair provisions.
- Hybrids and data package delivery.

1

Scope

The procurement requirements for hermetic hybrid microcircuits for use in space projects are defined in this Standard.

This Standard also provides details concerning the documentation requirements and the procedures relevant to obtain approval for the use of hybrid microcircuits in the fabrication of space systems and associated equipment.

The provisions of this Standard apply to all participants in the production of space systems, at all levels and are applicable to manned and unmanned spacecraft, launchers, satellites, payloads, experiments, and their corresponding organizations.

This standard may be tailored for the specific characteristic and constraints of a space project in conformance with ECSS-S-ST-00.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-