DIN EN 16602-60:2023-10 (E)

Space product assurance - Electrical, electronic and electromechanical (EEE) components; English version EN 16602-60:2023

Table of contents

European Foreword 7

Introduction 7

1 Scope 9

2 Normative references 10

3 Terms, definitions and abbreviated terms 12

3.1 Terms from other standards 12
3.2 Terms specific to the present standard 12
3.3 Abbreviated terms 13
3.4 Conventions 15
3.5 Nomenclature 16

4 Requirements for Class 1 components 17

4.1 Component programme management 17
  4.1.1 General 17
  4.1.2 Components control programme 17
  4.1.3 Parts control board 17
  4.1.4 Declared components list 18
  4.1.5 Electrical and mechanical GSE 19
  4.1.6 EQM components 19
4.2 Component selection, evaluation and approval 20
  4.2.1 General 20
  4.2.2 Manufacturer and component selection 20
  4.2.3 Component evaluation 24
  4.2.4 Parts approval 26
4.3 Component procurement 27
  4.3.1 General 27
  4.3.2 Procurement specification 27
  4.3.3 Screening requirements 28
  4.3.4 Initial customer source inspection (precap) 28
  4.3.5 Lot acceptance 29

4.3.6 Final customer source inspection (buy-off) 30
4.3.7 Incoming inspections 30
4.3.8 Radiation verification testing 31
4.3.9 Destructive physical analysis 31
4.3.10 Relifing 32
4.3.11 Manufacturer's data documentation deliveries 32
4.4 Handling and storage 33
4.5 Component quality assurance 33
4.5.1 General 33
4.5.2 Nonconformances or failures 33
4.5.3 Alerts 34
4.5.4 Traceability 34
4.5.5 Lot homogeneity for sampling test 35
4.6 Specific components 35
4.6.1 General 35
4.6.2 ASICs 35
4.6.3 Hybrids 35
4.6.4 One time programmable devices 35
4.6.5 Microwave monolithic integrated circuits 36
4.6.6 Connectors 36
4.7 Documentation 36
5 Requirements for Class 2 components 38
5.1 Component programme management 38
5.1.1 General 38
5.1.2 Components control programme 38
5.1.3 Parts Control Board 38
5.1.4 Declared Components List 39
5.1.5 Electrical and mechanical GSE 40
5.1.6 EQM components 40
5.2 Component selection, evaluation and approval 40
5.2.1 General 40
5.2.2 Manufacturer and component selection 41
5.2.3 Component evaluation 44
5.2.4 Parts approval 46
5.3 Component procurement 46
5.3.1 General 46
5.3.2 Procurement specification 47

5.3.3 Screening requirements 47
5.3.4 Initial Customer Source Inspection (precap).....48
5.3.5 Lot acceptance.....48
5.3.6 Final customer source inspection (buy-off).....49
5.3.7 Incoming inspections.....49
5.3.8 Radiation verification testing 50
5.3.9 Destructive physical analysis 50
5.3.10 Relifing.....51
5.3.11 Manufacturer’s data documentation deliveries 51
5.4 Handling and storage.....52
5.5 Component quality assurance 52
5.5.1 General.....52
5.5.2 Nonconformances or failures 52
5.5.3 Alerts.....53
5.5.4 Traceability 53
5.5.5 Lot homogeneity for sampling test.....53
5.6 Specific components.....53
5.6.1 General.....53
5.6.2 ASICs.....53
5.6.3 Hybrids.....54
5.6.4 One time programmable devices.....54
5.6.5 Microwave monolithic integrated circuits 55
5.6.6 Connectors 55
5.7 Documentation 55

6 Requirements for Class 3 components 57
6.1 Component programme management 57
6.1.1 General.....57
6.1.2 Components control programme.....57
6.1.3 Parts control board.....57
6.1.4 Declared components list.....57
6.1.5 Electrical and mechanical GSE 58
6.1.6 EQM components 58
6.2 Component selection, evaluation and approval.....58
6.2.1 General.....58
6.2.2 Manufacturer and component selection.....59
6.2.3 Component evaluation 62
6.2.4 Parts approval.....64

6.3 Component procurement 65
  6.3.1 General 65
  6.3.2 Procurement specification 65
  6.3.3 Screening requirements 65
  6.3.4 Initial customer source inspection (precap) 66
  6.3.5 Lot acceptance 66
  6.3.6 Final customer source inspection (buy-off) 66
  6.3.7 Incoming inspections 67
  6.3.8 Radiation verification testing 67
  6.3.9 Destructive physical analysis 67
  6.3.10 Relifing 68
  6.3.11 Manufacturer’s data documentation deliveries 69
6.4 Handling and storage 69
6.5 Component quality assurance 69
  6.5.1 General 69
  6.5.2 Nonconformances or failures 70
  6.5.3 Alerts 70
  6.5.4 Traceability 70
  6.5.5 Lot homogeneity for sampling test 71
6.6 Specific components 71
  6.6.1 Overview 71
  6.6.2 ASICs 71
  6.6.3 Hybrids 71
  6.6.4 One time programmable devices 71
  6.6.5 Microwave monolithic integrated circuits 72
  6.6.6 Connectors 72
6.7 Documentation 72

7 Quality levels 74

8 Evaluation and lot acceptance for retinned parts 88

9 Pure tin lead finish – risk analysis 89
9.1 Overview 89
9.2 Requirements 89

Annex A (normative) Component control plan (CCP) - DRD 91
  A.1.1 Requirement identification and source document 91
  A.1.2 Purpose and objective 91
  A.2.1 Scope and content 91

A.2.2 Special remarks 92

Annex B (normative) Declared component list (DCL) - DRD 93

B.1.1 Requirement identification and source document 93

B.1.2 Purpose and objective...93

B.2.1 Scope and content 93

B.2.2 Special remarks 94

Annex C (normative) Procurement specification - DRD............................. 95

C.1.1 Requirement identification and source document 95

C.1.2 Purpose and objective...95

C.2.1 Scope and content 95

C.2.2 Special remarks 96

Annex D (normative) Part approval document (PAD) - DRD....................... 97

D.1.1 Requirement identification and source document 97

D.1.2 Purpose and objective...97

Annex E (informative) EEE documents delivery per review 100

Bibliography.. 103

Tables

Table 4-1: Document requirements list for Class 1 components 36

Table 5-1: Document requirements list for Class 2 components 55

Table 6-1:Document requirements list for Class 3 components 72

Table 7-1: Quality levels for Class 1 components 74

Table 7-2: Quality levels for Class 2 components 78

Table 7-3: Quality levels for Class 3 components 83

Table D-1 : PAD sheet...98

Table E-1 : EEE delivery documents 101