#### **BUREAU OF INDIAN STANDARDS**

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## मसौदा भारतीय मानक

# इलेक्ट्रॉनिक उपकरणों में उपयोग के लिए जड़ित संधारित्र -भाग 1: सामान्य विशिष्टता

## Draft Indian Standard

# Fixed Capacitors for use in Electronic Equipment - Part 1: Generic Specification

| ICS 31.060.10 |          |             |            |  |
|---------------|----------|-------------|------------|--|
| LITD 05-Semic | conducto | r and other | Electronic | Last Date for Comments: 20 October 2023. |
| Components    | and      | Devices     | Sectional  |  |
| Committee     |          |             |            |  |

#### NATIONAL FOREWORD

(Formal clauses will be added later)

This Draft Indian Standard (Part 1) which is identical with IEC 60384-1:2021 'Fixed capacitors for use in electronic equipment - Part 1: Generic specification' issued by the International Electrotechnical Commission (IEC) *will be* adopted by the Bureau of Indian Standards on the recommendation of the Semiconductor and other Electronic Components and Devices Sectional Committee (LITD 05) and approval of the Electronics and Information Technology Division Council.

IS 7305 standard was originally published in 1973 and was largely based on IEC Publication 384-1: 1972 and subsequently revised in 1984. The first revision of IS 7305 was based on IEC Pub 384-1: 1982. The second revision of IS 7305 was done in 2018 and was based on IEC 60384-1: 2016. IS/QC 300000: 1988 was published in 1988 and was identical to IEC Pub 384-1/ IEC QC 300000: 1982. This superseding of IS 7305 and IS/QC 300000 has been undertaken to

align it with the latest version of IEC 60384-1:2021. On publication of this Indian Standard (Part 1), IS 7305:2018 and IS/QC 300000: 1988 stands withdrawn.

This standard (Part 1) is one of the parts of a series of standards on 'Fixed capacitors for use in electronic equipment'. The other parts in this series are:

Part 2: Fixed metallized polyethylene terephthalate film dielectric DC capacitors

Part 3: Surface mount fixed tantalum electrolytic capacitors with solid (MnO<sub>2</sub>) electrolyte

Part 4: Fixed aluminium electrolytic capacitors with solid (MnO<sub>2</sub>) and non-solid electrolyte

Part 8: Sectional specification: Fixed capacitors of ceramic dielectric, Class 1

Part 9: Sectional specification: Fixed capacitors of ceramic dielectric, Class 2

Part 14: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains

The text of IEC Standard may be approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appears referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

| International standards             | Corresponding Indian standards      | Degree of Equivalence |
|-------------------------------------|-------------------------------------|-----------------------|
|                                     |                                     |                       |
| IEC 60062 Marking codes for         | IS 8186 : 2020 Marking Codes for    | Identical with        |
| resistors and capacitors            | Resistors and Capacitors (First     | IEC 60062 : 2016      |
|                                     | Revision)                           |                       |
| IEC 60063 Preferred number          | IS 824 : 2021 Preferred number      | Identical with        |
| series for resistors and capacitors | series for Resistors and Capacitors | IEC 60063 : 2015      |
| IEC 60068-1:2013                    | IS/IEC 60068-1: 2013                | Identical             |
| Environmental testing – Part 1:     | Environmental Testing Part 1        |                       |
| General and guidance                | General and Guidance                |                       |

| IEC 60068-2-1 Environmental                          | IS/IEC 60068-2-1 : 2007   | Identical with      |
|--|---|---------------------|
| testing – Part 2-1: Tests – Tests                    | Environmental Testing Part 2 Tests  | IEC 60068-2-1:2007  |
| A: Cold  | Section 1 Test A: Cold  |                     |
| IEC 60068-2-2:2007                                   | IS/IEC 60068-2-2 : 2007   | Identical           |
| Environmental testing – Part 2-2:                    | Environmental Testing Part 2 Tests  |                     |
| Tests – Tests B: Dry heat                            | Section 2 Test B Dry Heat   |                     |
| IEC 60068-2-6 Environmental                          | IS/IEC 60068-2-6 : 2007   | Identical with      |
| testing – Part 2-6: Tests – Test                     | Environmental Testing Part 2 Tests  | IEC 60068-2-6:2007  |
| Fc: Vibration (sinusoidal)                           | Section 6 Test Fc: Vibration  |                     |
|  | sinusoidal  |                     |
| IEC 60068-2-13 Environmental                         | IS/IEC 60068-2-13 : 2021  | Identical with      |
| testing – Part 2-13: Tests – Test                    | Environmental Testing Part 2 Tests  | IEC 60068-2-13:2021 |
| M: Low air pressure                                  | Section 13 Test M: Low air pressure   |                     |
| IEC 60068-2-14 Environmental                         | IS/IEC 60068-2-14 : 2009  | Identical with      |
| testing – Part 2-14: Tests – Test                    | Environmental testing Part 2: Tests   | IEC 60068-2-14:2009 |
| N: Change of temperature                             | Section 14: Test N: Change of   |                     |
|  | temperature   |                     |
| IEC 60068-2-17 Basic                                 | IS/IEC 60068-2-17 : 1994 Basic  | Identical with      |
| environmental testing procedures                     | environmental testing procedures  | IEC 60068-2-17:1994 |
| – Part 2-17: Tests – Test Q:                         | Part 2: Tests Section 17: Test Q:   |                     |
| Sealing  | Sealing   |                     |
| IEC 60068-2-20 Environmental                         | IS/IEC 60068-2-20 : 2021  | Identical with      |
| testing – Part 2-20: Tests – Test                    | Environmental testing Part 2 Tests  | IEC 60068-2-20:2021 |
| Ta and Tb: Test methods for                          | Section 20 Tests Ta and Tb: Test  |                     |
| solderability and resistance to                      | methods for solderability and   |                     |
| soldering heat of devices with                       | resistance to soldering heat of   |                     |
| leads  | devices with leads  | T1 - 1 - 1          |
| IEC 60068-2-21 Environmental                         | IS/IEC 60068-2-21:2021  | Identical with      |
| testing – Part 2-21: Tests – Test                    | Environmental testing - Part 2-21:  | IEC 60068-2-21:2021 |
| U: Robustness of terminations                        | Tests - Test U: Robustness of   |                     |
| and integral mounting devices                        | terminations and integral mounting  |                     |
| IEC (00(9.2.27 Engine and 1.1                        | devices (Under Development)   | T.1                 |
| IEC 60068-2-27 Environmental                         | IS 9000 (Part 7/Sec 1) : 2018 Basic   | Identical with      |
| testing – Part 2-27: Tests – Test                    | environmental testing procedures  | IEC 60068-2-27:2008 |
| Ea and guidance: Shock                               | for electronic and electrical items:  |                     |
|  | Part / impact test: Sec I snock (Test   |                     |
| IEC (0068 2 20 Environmental                         | Ea) (Second Revision)   | Identical with      |
| LEC 00008-2-30 Environmental                         | IS/IEC 00008-2-30:2003<br>Environmental testing Dart 2 Tests  |                     |
| 1 = 12 = 12 = 12 $1 = 12$ $1 = 12$ $1 = 12$ $1 = 12$ | Saction 20 Test Dhy Down back   | ILC 00000-2-30:2003 |
| but Damp near, cyclic $(12 \text{ n} + 12)$          | avalia 12 h 12 h avala (Under   |                     |
|  | $\begin{array}{cccc} \text{Cyclic} & 12 & 11 & 12 & 11 & \text{Cyclic} & (011001) \\ \text{Development} & as I ITD & 01/21008 \\ \end{array}$ |                     |
|  | Development as LITD $01/21900$ )  |                     |

| IEC 60068-2-45.1980 Basic         | IS/IFC 60068-2-45 · 1980 Basic       | Identical                  |
|-----------------------------------|--------------------------------------|----------------------------|
| anyironmental testing procedures  | anvironmental testing procedures     | Identeal                   |
| Dart 2 45: Testa Test VA and      | Port 2 Tests Test VA and midanes     |                            |
| - Falt 2-43. Tests - Test AA and  | Fait 2 Tests Test AA and guidance    |                            |
|                                   | Sec 45 minersion in cleaning         |                            |
| solvents                          | solvents                             |                            |
| IEC 60068-2-45:1980/AMD1:1993     | IG/IEC (00(0 0 50 0015               | T1 / 1 /1                  |
| IEC 60068-2-58 Environmental      | IS/IEC 60068-2-58: 2015              | Identical with             |
| testing – Part 2-58: Tests – Test | Environmental testing Part 2 Tests   | IEC 60068-2-58:2015        |
| Td: Test methods for              | Section 58 Test Td: Test methods     |                            |
| solderability, resistance to      | for solderability resistance to      |                            |
| dissolution of metallization and  | dissolution of metallization and to  |                            |
| to soldering heat of surface      | soldering heat of surface mounting   |                            |
| mounting devices (SMD)            | devices SMD                          |                            |
|                                   |                                      |                            |
| IEC 60068-2-69 Environmental      | IS/IEC 60068-2-69 : 2017             | Identical with             |
| testing – Part 2-69: Tests – Test | Environmental testing Part 2 Tests   | IEC 60068-2-69:2017        |
| Te/Tc: Solderability testing of   | Section 69 Test Te/Tc: Solderability |                            |
| electronic components and         | testing of electronic components     |                            |
| printed boards by the wetting     | and printed boards by the wetting    |                            |
| halance (force measurement)       | halance force measurement method     |                            |
| Method                            | budnee loree measurement method      |                            |
| IEC 60068-2-78 Environmental      | IS $9000$ (Part 4) $\cdot$ 2020      | Identical with             |
| testing Dert 2 78: Tests Test     | Environmental Testing Dart 4 Tests   | EC = 60069 - 2 - 79 + 2012 |
| Cabi Dama haat staady state       | Environmental Testing Part 4 Tests   | IEC 00008-2-78:2012        |
| Cab. Damp near, steady state      | - Test Cab: Damp Heat, Steady State  |                            |
|                                   | (Second Revision)                    |                            |
| IEC 60068 2 82:2010               | IS/IEC 60068 2 82 · 2010             | Identical                  |
| Environmental testing Part 2      | Environmental testing Part 2 Tests   | Idenical                   |
| 22. Tests Test Yey1. Which ar     | Environmental testing Fait 2 Tests   |                            |
| 82: Tests – Test AWI: Whisker     | Section 82 Test XWI: Whisker test    |                            |
| test methods for components and   | methods for components and parts     |                            |
| parts used in electronic          | used in electronic assemblies        |                            |
|                                   | 10 12554 2020 M                      | T1 / 1 / 1                 |
| IEC 60294 Measurement of the      | IS 13554 : 2020 Measurement of the   | Identical with             |
| dimensions of a cylindrical       | Dimensions of a Cylindrical          | IEC 60294 : 2012           |
| component with axial              | Component with Axial                 |                            |
| terminations                      | Terminations (First Revision)        |                            |
| IEC 60695-11-5 Fire hazard        | IS/IEC 60695-11-5 : 2016 Fire        | Identical with             |
| testing – Part 11-: Test flames – | Hazard Testing Part 11 Test Flames   | IEC 60695-11-5:2016        |
| Needle-flame test method –        | Section 5 Needle - Flame test        |                            |
| Apparatus, confirmatory test      | method - Apparatus, confirmatory     |                            |
| arrangement and guidance          | test arrangement and guidance        |                            |
|                                   | (First Revision)                     |                            |

| ISO 3 Preferred numbers – Series of preferred numbers | IS 1076 (Part 1) : 1985<br>Preferred numbers: Part 1 series of | Identical with<br>ISO 3 : 1973 |
|---|--|--------------------------------|
|   | preferred numbers (Second Revision)                            |                                |

The technical committee has reviewed the provisions of the following International Standard referred in this adopted draft standard and has decided that it is acceptable for use in conjunction with this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

| International Standards | Title   |
|-------------------------|---|
| IEC 60068-2-67          | Environmental testing – Part 2-67: Tests – Test Cy: Damp<br>heat, steady state, accelerated test primarily intended for<br>components   |
| IEC 60717               | Method for the determination of the space required by capacitors and resistors with unidirectional terminations   |
| IEC 61193-2             | Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages   |
| IEC 61249-2-7           | Materials for printed boards and other interconnecting<br>structures – Part 2-7: Reinforced base materials clad and<br>unclad – Epoxide woven E-glass laminated sheet of defined<br>flammability (vertical burning test), copper-clad |

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:2022 'Rules for rounding off numerical values (Second Revision)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

#### SCOPE OF IEC 60384-1:2021

"This part of IEC 60384 is a generic specification and is applicable to fixed capacitors for use in electronic equipment.

It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose."

**Note: -** The Technical content of this document has not been enclosed as these are identical with the corresponding IEC Standard. For details please refer to IEC 60384-1:2021 or kindly contact.

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