ICS 49.020
CCS V 41

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 29084-2026

Replacing GB/T 29084-2012

Grounding requirements for spacecraft

航天器接地要求

Issued on: May 25, 2026 **Implemented on: September 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB/T 29084-2012 "Spacecraft Grounding Requirements". Compared with GB/T 29084-2012, except for structural adjustments and rewriting... Aside from the logical changes, the main technical changes are as follows:

a) The scope has been changed (see Chapter 1, Chapter 1 of the.2012 edition);

b) The terms and definitions for "protective ground," "signal ground," "shell ground," and "structural ground" have been added (see 3.1-3.4);

c) Added requirements for the installation grounding of equipment requiring secondary insulation and for the grounding piles of spacecraft modules or structures (see 4.1);

d) The requirement for the number of overlap points in multilayer insulation components has been changed [see 4.2.1b), 2.2.1b) of the.2012 edition];

e) Added requirements for the insulation installation of equipment requiring high-resistance grounding (see 5.1);

f) Changed the grounding requirements for the primary power bus return line and the primary power supply requirements for all equipment directly connected to the spacecraft's primary power bus. The requirement for isolation between the bus return line and the equipment housing [see 5.2a), 5.2b, and 3.2a) and 3.2b of the.2012 edition];

g) Added grounding design requirements for high-voltage equipment (including electric propulsion power processing units) [see 5.2e)];

h) Modified the input and output isolation of the DC-DC converter and the isolation between the DC-DC converter output loop and the equipment housing. Requirements (see 5.3,

3.3 in the.2012 edition);

i) The grounding requirements for high-frequency equipment, low-frequency equipment, and cable shielding have been changed (see 5.5~5.7, 3.5~ in the.2012 edition). 3.7), the technical requirements have been removed (see

4.1 in the.2012 edition);

j) Increased grounding requirements for multi-module spacecraft and multi-spacecraft assemblies (see Chapter 6);

2 Normative references

This document has no normative references.

4 Spacecraft Equipotential Grounding

4.1 Structural equipotential grounding The structural equipotential grounding requirements are as follows:

a) Spacecraft metal structural components should be interlocked, and the interlocking resistance of all metal parts installed on the metal structural components should preferably be less than 5mOmega;

b) Electrically conductive composite materials (such as carbon fiber) in structural components should overlap with the structural ground, and the overlap resistance should be less than 1kOmega;

c) The carbon fiber plates used for mounting the instrument should overlap each other, and the overlap resistance should not exceed 10mOmega;

d) The outer casing of equipment requiring secondary insulation (such as high-resistance grounding equipment like solar panel substrates, battery packs, and solar panel drive mechanisms) should be... Connect an electrostatic discharge resistor, typically 50kOmega~150kOmega;

e) External equipment should be connected to the spacecraft via a bonding connection, with a bonding resistance not exceeding 10 mOmega;

f) The overlap resistance of the docking surfaces of multi-module spacecraft modules should not exceed 5mOmega;

g) Grounding stakes shall be installed on all spacecraft modules or structures, and each grounding stake shall be a single-point grounding point for each module;

h) Grounding should be achieved through a dedicated grounding wire (multi-strand copper wire or copper wire braided tape), with a total cross-sectional area of not less than

4.2 Equipotential grounding of thermal control materials

4.2.1 Multi-layer thermal insulation components The requirements for overlapping of multi-layer thermal insulation components are as follows:

a) Grounding method and bridging resistance. The conductive bellows blades are embedded in each layer of the multi-layer thermal insulation assembly, and a grounding point is drilled at the center of the blade. A 4mm diameter through hole is provided for riveting; a section of wire is taken as required, and a unidirectional solder pad should be welded to each end of the wire. Connect to a nearby grounding stake; use hollow copper rivets to rivet another welding piece to the bellows blade and multi-layer insulation assembly, ensuring... The lap resistance should be less than 10Omega.

b) Number of overlap points. For low-temperature and medium-temperature multilayer insulation components, at least one grounding point should be installed when the area is no more than 100cm2. For high-temperature multi-layer insulation components, at least one grounding point should be provided when the area is no greater than 500 cm^2. When the component size increases, the number of grounding points should be increased appropriately and distributed as evenly as possible, but they should not be concentrated in a small area of the component.

c) Location of the overlap point. The grounding point should be about 10mm away from the edge of the multi-layer structure.

4.2.2 Secondary Surface Mirror-Type Thermal Control Coating The metal portion of the secondary surface mirror-type thermal control coating should be connected to the structural ground by conductive adhesive, and the resistance between the metal portion and the structural ground should be [value missing]. 5Omega~10Omega.

5 Spacecraft equipment grounding

5.1 Grounding of spacecraft structure to spacecraft equipment The equipment casing should be grounded by connecting it to the spacecraft structure via a grounding wire, structural component, or copper foil. The bridging resistance between components should not exceed 10mOmega. This applies to equipment requiring high-resistance grounding (such as solar panel substrates, battery banks, and solar panel drives). High-resistance grounding equipment (such as moving mechanisms) should be installed in an insulated manner, and an electrostatic discharge resistor should be connected to the outer casing.

5.2 Primary power supply grounding The primary power supply grounding requirements for spacecraft are as follows:

a) For all equipment directly connected to the spacecraft's primary power bus, the primary power bus return line should be isolated from the equipment casing. The resistance should be no less than 5MOmega~10MOmega;

b) Grounding of the primary power bus return line (including spacecraft using multiple primary power buses) is generally achieved through a power distribution unit or power control unit. The device is structurally connected to the spacecraft at one end;

c) The cross-sectional area of the grounding wire should not be less than

0.5 mm^2, and the lap resistance between the grounding wire and the grounding stake should not be greater than 10 mOmega;

d) The structure of a spacecraft should not be used as the primary power return line for electrical equipment;

e) The grounding method for the output return line of the electric propulsion power processing unit should be designed in accordance with the characteristics of the thruster. The output return line can be connected via a clamping network. Grounding;

f) High-voltage secondary power supplies should preferably use high-resistance grounding to avoid the secondary ground sharing a common ground within floating ground equipment, and the secondary ground being further grounded through other... The problem of secondary connection between the equipment and the casing.

5.3 Grounding of DC-DC converter The grounding requirements for DC-DC converters directly powered from the primary power bus are as follows:

a) Input and output isolation of the DC-DC converter; the isolation resistance should be no less than 10MOmega.

b) For low-frequency equipment using DC-DC converters, the DC-DC converter output return line should be isolated from the equipment housing, with an isolation resistance value of [value missing]. It should be no less than 10MOmega;

c) For high-frequency equipment using DC-DC converters, the DC-DC converter output return line should be connected to the equipment housing.

5.4 Grounding of pyrotechnic devices The grounding requirements for pyrotechnic devices are as follows:

6 Grounding of multi-module spacecraft and multi-spacecraft combinations

6.1 Primary power supply grounding The primary power supply grounding requirements are as follows:

a) For multi-module spacecraft or multi-spacecraft assemblies, where non-isolated power supply is used between modules (or spacecraft), this should be addressed through design (e.g., by adopting...). A grounding switching circuit is used to ensure that the primary power return line of the spacecraft is grounded at a single point in both combined and stand-alone