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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 31840.1-2025

Replacing GB/T 31840.1-2015

**Aluminium alloy power cables with extruded insulation for rated
voltages from 1 kV up to 35 kV - Part 1: Cables for rated
voltages of 1 kV and 3 kV**

额定电压1kV ($U_m=1.2\text{kV}$) 到35kV ($U_m=40.5\text{kV}$) 铝合金芯挤包绝缘电力电缆
第1部分：额定电压1kV ($U_m=1.2\text{kV}$) 和3kV ($U_m=3.6\text{kV}$) 电缆

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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 is GB/T 31840 "Aluminum Alloy Core Extruded Insulation with Rated Voltage of 1kV ($U_m=1.2kV$) to 35kV ($U_m=40.5kV$)".

Part 1 of GB/T 31840, "Power Cables". The following parts have been published.

- Part 1: Cables with rated voltages of 1kV ($U_m=1.2\text{kV}$) and 3kV ($U_m=3.6\text{kV}$);
- Part 2: Cables with rated voltages from 6kV ($U_m=7.2\text{kV}$) to 30kV ($U_m=36\text{kV}$);
- Part 3: Cables with a rated voltage of 35kV ($U_m=40.5\text{kV}$).

This document replaces GB/T 31840.1-2015 "Aluminum Alloys with Rated Voltages from 1kV ($U_m=1.2\text{kV}$) to 35kV ($U_m=40.5\text{kV}$)".

"Core-Extruded Insulated Power Cables Part 1: Cables with Rated Voltages of 1kV ($U_m=1.2\text{kV}$) and 3kV ($U_m=3.6\text{kV}$)", and Compared with GB/T 31840.1-2015, apart from structural adjustments and editorial changes, the main technical changes are as follows.

- Product naming has been added (see Chapter 5);
- The requirements for the maximum and minimum outer diameter of the conductor have been changed (see 6.3, 5.4 in the 2015 edition);
- The overlap requirement for metal shielding has been changed (see 9.2.2.3, 2015 version of 9.2.3);
- Added stainless steel wire (non-magnetic) and stainless steel strip (non-magnetic) materials to the metal armor (see 9.4.2);
- Painted steel strip material has been removed (see 11.2 in the 2015 edition);
- The thickness requirements for non-metallic sheaths have been changed (see 10.3, 12.3 in the 2015 edition);
- Added measurement requirements for wrapping overlap ratio, wrapping gap ratio, and wrapping inner lining thickness (see 11.3.12, 11.3.13, and 11.3.14);
- The requirements for bundled flame retardant testing have been revised (see 11.5.16.2, 17.14.2 in the 2015 edition);
- A test method for compressive creep resistance of aluminum alloy conductors has been added (see 11.5.27);
- The requirement for compressive creep testing of single aluminum alloy wires has been removed (see 17.25 in the 2015 edition);
- The test requirements for the connection performance of aluminum alloy conductors and fittings have been changed (see 11.5.29, 17.27 of the 2015 version);
- Inspection rules for products have been added (see Chapter 12);
- Added product labeling, tagging, and accompanying documentation (see Chapter 13);
- Added product packaging, transportation, and storage (see Chapter 14);

- The requirement for supplementary clauses on aluminum alloy core cable products has been removed (see Chapter 19 and Appendix H of the 2015 edition);
- The list of aluminum alloy conductor compositions has been revised (see Appendix A, Appendix A of the 2015 edition);
- The technical requirements for aluminum alloy strips for metal shielding have been revised (see Appendix B, Appendix B of the 2015 edition).

This document was proposed and is under the jurisdiction of the China Electricity Council.

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Co., Ltd., Aerospace Electric Group Co., Ltd., Zhejiang Chenguang Cable Co., Ltd., Wenzhou Aneng Technology Co., Ltd., Wuxi Jiangnan Electric Cable Co., Ltd., Jiangsu Changfeng Cable Co., Ltd., Jiangsu Tongguang Qiangneng Transmission Line Technology Co., Ltd., Zhejiang Chint Cable Co., Ltd., Anhui Xinyi Cable Co., Ltd., Anhui Pacific Cable Co., Ltd., Jiangsu Zhongchao Cable Co., Ltd., and Jinbei Electric Hengyang Cable Co., Ltd. Company, Shuangdeng Cable Co., Ltd., and Mingda Cable Group Co., Ltd.

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The release history of this document and the document it replaces is as follows.

- First published in 2015 as GB/T 31840.1-2015;
- This is the first revision.

Introduction

In recent years, the contradiction between the rapid development of the power grid and the relative scarcity of copper resources has become increasingly prominent. Relying solely on copper core cables will significantly increase the distribution costs.

Power grid construction costs. To implement the national strategic goal of "saving copper with aluminum" and optimize the life-cycle cost of the distribution network, aluminum alloy core power supplies...

This type of cable is gradually being used. It uses aluminum alloy as the conductor, and its

conductivity is comparable to that of an aluminum core conductor, but its mechanical properties and resistance are different.

The creep performance is significantly improved, avoiding the problems of poor ductility and unstable connection that exist in aluminum core cables; at the same time, compared with copper core cables, aluminum alloy...

Gold-core cables offer significant economic advantages. China is a country rich in aluminum but poor in copper; therefore, in certain applications and while ensuring cable product quality, [this advantage is crucial].

The development and application of aluminum alloy core cables can solve resource problems, reduce power grid construction costs, and promote the sustainable development of the power grid.

GB/T 31840 "Aluminum Alloy Core Extruded Insulated Power Cables with Rated Voltages from 1kV ($U_m=1.2\text{kV}$) to 35kV ($U_m=40.5\text{kV}$)" refers to...

The standards for the design, production, and testing of aluminum alloy cables in China are proposed to consist of three parts.

- Part 1: Cables with rated voltages of 1kV ($U_m=1.2\text{kV}$) and 3kV ($U_m=3.6\text{kV}$). The purpose is to specify the rated voltage.

Structure, dimensions, and testing of 1kV ($U_m=1.2\text{kV}$) and 3kV ($U_m=3.6\text{kV}$) aluminum alloy core extruded insulated power cables Require.

- Part 2: Cables with rated voltages from 6kV ($U_m=7.2\text{kV}$) to 30kV ($U_m=36$). The purpose is to specify the rated voltage.

Structure, dimensions and test requirements for 6kV ($U_m=7.2\text{kV}$) to 30kV ($U_m=36$) aluminum alloy core extruded insulated power cables.

- Part 3: Cables with a rated voltage of 35kV ($U_m=40.5\text{kV}$). The purpose is to specify the rated voltage of cables with a rated voltage of 35kV ($U_m=$ Structure, dimensions and test requirements for 40.5kV aluminum alloy core extruded insulated power cables.

Aluminum alloy core power cable technology was introduced to China in 2007. After more than ten years of research, its manufacturing technology and application level have made significant progress.

Improvements have been made since the first edition of GB/T 31840 was released in 2015, providing a basis for the manufacturing, inspection, and application of aluminum alloy core power cables in China.

It has provided crucial support. After nearly ten years of application, the industry has gained a deeper understanding of the performance and testing requirements for aluminum alloy core power cables.