

ICS 29.240.99
CCS F 23

DL

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

DL/T 348-2019

Replacing DL/T 348-2010

The patrol inspection guidelines for the converter station

换流站设备巡检导则

(English Translation)

Issued on: June 4, 2019

Implemented on: October 1, 2019

Issued by: National Energy Administration

Table of Contents

- Foreword
- 1 Scope
- 2 Normative references
- 3 Job requirements
- 4 Inspection classification and cycle
- 5 Routine inspection items and requirements
- 6 Special inspection items and requirements

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard is a revision of DL/T 348-2010. Compared with the original standard, the following contents are mainly modified.

--Added supplements to the "patrol inspection classification and cycle" and revised some items;

- Routine inspection items for DC field power distribution devices, daily inspection items are added, and weekly inspection items are modified;

--Converter transformer and smoothing reactor routine inspection project, adding dry-type smoothing reactor daily inspection project;

--Converter valve routine inspection items, the original weekly inspection items were changed to daily inspections, and the monthly and annual inspection items were revised;

- Routine inspection items of valve cooling system, daily inspection items of drainage system and air cooling system are added;

- Added routine inspection items for valve hall air conditioning;

--The inspection items for severe weather and geological disasters have been revised to standardize severe rain, strong wind (sand), hail, dense fog, etc.

Weather and earthquake and other geological disaster inspection projects.

After the implementation of this standard, it will replace DL/T 348-2010.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the High Voltage Direct Current Transmission

Technology Standardization Technical Committee of the Power Industry.

Drafting organization of this standard. Operation branch of State Grid Corporation of China.

1 Scope

This guideline specifies the converter transformers and smoothing reactors for converter stations with voltage levels of $\pm 800\text{kV}$ and below (hereinafter referred to as converter stations).

Flow valve, DC field power distribution device, AC and DC filters, control and protection equipment, valve cooling system equipment, inspection items of valve hall air conditioning equipment, Cycle and requirements.

This guideline applies to the inspection of the above-mentioned converter station equipment, and the inspection of other equipment in the converter station can be carried out with reference to relevant regulations.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB 26860-2011 Electrical Safety Work Rules for the Electrical Part of Power Plants and Substations

3.1 Basic conditions of the inspection site

- a) The converter station shall have a reliable automatic monitoring and alarm system, and a dedicated person shall be assigned to monitor the disk 24 hours a day. Those who do not meet the requirements shall be appropriately increased Number of inspections.
- b) The production site of the converter station shall have complete safety measures and signs, and the construction area in the station shall be reliably isolated from the operation area.
- c) In order to ensure the safety of night inspection, the converter station should be equipped with complete equipment area lighting.
- d) On-site inspection equipment should be qualified and complete.
- e) The converter station should have standard inspection work instructions.

3.2 Basic conditions for inspectors

The inspection personnel should be familiar with the converter station equipment, comply with the provisions of 4.2 in GB 26860-2011, and be approved by the converter station management department.

3.3 General Rules for Inspection

- a) When the high-voltage equipment needs to be inspected during thunderstorms, insulated boots should be worn and no lightning arresters and lightning rods should be approached.
- b) Inspectors entering the equipment area for inspection must wear safety helmets and keep a safe distance from live equipment. Don't change the temporary the safety fence shall not be removed or crossed over the permanent fence without authorization.
- c) On-site backup converter transformers, smoothing reactors, AC filters, DC filters and high-voltage switchgear in standby state Inspection should be carried out in accordance with the requirements of operating equipment.
- d) The converter station shall make clear regulations on the inspection time, frequency, content, etc. and the relevant regulations shall not be lower than the requirements of this guideline.
- e) The inspection status should be recorded in written or electronic documents and signed and confirmed by the inspector immediately.
- f) The shift inspection is carried out by the shift on-duty and the on-duty personnel.

4.1 Inspection classification

- a) Routine inspection Routine inspection refers to the inspection performed by the operation and maintenance personnel on the equipment during the normal operation of the equipment.
- b) Special inspection Special inspection refers to an additional inspection performed under special changes in equipment operating conditions or under specific conditions, including.
 - a) Inspection after severe weather such as torrential rain, strong wind (sand), hail, dense fog and geological disasters such as earthquake;
 - b) Inspection during the trial operation of new equipment;
 - c) The patrol inspection after the equipment is re-commissioned after maintenance, transformation or long-term outage;
 - d) Inspection of high temperature weather exceeding 35°C, extreme load, equipment overheating or over temperature;

- e) Routine inspection when suspicious phenomena or defects are found during equipment operation;
- f) Inspection after system shock and equipment accident;
- g) Handover inspection;
- h) Inspection by production management personnel.

4.2 Inspection cycle

- a) Routine inspection cycle the routine inspection cycle is divided into four types. daily inspection, weekly inspection, monthly inspection, and annual inspection.
- b) Special inspection cycle
 - a) In severe weather such as heavy fog, strong wind, thunderstorm, snow and hail, etc., inspections should be strengthened and continued to be observed until the weather improves;
 - b) The equipment should be inspected before and after the new operation, at least once a day during the trial operation;
 - c) Inspections should be carried out before and after the equipment is re-commissioned after maintenance, transformation or long-term shutdown;
 - d) In the high temperature weather exceeding 35°C, the load is obviously increased, and the equipment is overheated or overheated, the inspection is mainly infrared temperature measurement. Such as continuous high If the temperature is above 35°C, the temperature of the equipment in the station shall be measured once a day. During overload operation, the relevant equipment in the station shall be checked every 4 hours Measure the temperature once. When voltage heating equipment is overheated, the temperature shall be measured every two hours until the power failure is checked and handled. Current heating equipment when the joint is overheated, the temperature shall be measured once a day until the power failure is checked and handled;
 - e) When suspicious phenomena or defects are found in the operation of the equipment, a reasonable inspection cycle should be established according to the specific conditions to ensure that the equipment can be found in time.

Changes in the abnormal state of the equipment;

- f) Inspections should be carried out immediately after system shocks and equipment accidents;
- g) The shift inspection is carried out every time the shift is transferred;
- h) The main production management personnel of the converter station shall conduct inspections at least once a month, and at least once a week for abnormal or diseased