

ICS 33.100
CCS L 06



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

GB/T 37543-2019

**Measurement method for the total electric field strength and ion
current density of DC transmission lines**

直流输电线路和换流站的合成场强与离子流密度的测量方法

Issued on: June 4, 2019

Implemented on: January 1, 2020

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

Table of Contents

1 Scope	
2 Terms and definitions	
3 Measuring instruments	
4 Measurement method	2
5 Measurement records and data processing	
9 Reference	10

1 Scope

China's national method for measuring the total electric field strength and ion current density beneath DC transmission lines. It specifies the terms and definitions, the measuring instruments, the measurement method and the recording and processing of data, with a normative annex on field calibration. A high voltage DC line produces something an AC line does not: corona at the conductors ionises the air, and the ions drift outward under the field, so the ground below carries both an electrostatic field and a real current of charged air. The combination is what determines whether people beneath the line feel anything, whether an ungrounded object under it can hold a shock, and where the limits for a right of way are set. Measuring it is harder than measuring an AC field because the ions accumulate on the instrument itself and distort what it reads, and because wind, humidity and the surface condition of the conductors change the result from hour to hour.

This standard specifies the measuring instruments, measuring methods, measurement records and the combined field strength and ion current density of DC transmission lines and converter stations. data processing. This standard applies to the measurement of combined field strength and ion current density of DC transmission lines and converter stations under normal operating conditions.

2 Terms and definitions

The following terms and definitions apply to this document.

2.1 Synthetic field strength **totalelectricfieldstrength** The electric field strength after field synthesis by the space charge generated by the charge on the DC conductor and the space charge caused by the conductor corona.

Note 1. The unit is kV/m.

Note 2. The electric field strength at the surface of the earth is called the ground combined

field strength.

Note 3. Rewrite DL/T 1088-2008, definition 3.1.

2.2 Ion flow ioncurrent When a corona discharge is generated with a direct current conductor, the charged ions move toward the nearby space under the action of the electric field force to form an ion current.

2.3 Ion current density ioncurrentdensity Ion flow per unit area.

Note 1. The unit is nA/m².

Note 2. Rewrite DL/T 1088-2008, definition 3.2.

2.4 Field mill fieldmil A rotary DC electric field measuring instrument consisting of conductors alternately exposed to the electric field to be measured.

2.5 Wilson plate Wilsonplate A metal conductive plate with a protective tape around it for collecting charge.

3 Measuring instruments

3.1 The measurement of DC combined field strength and ion current density should use special measuring instruments, and the measuring instrument should have automatic recording function.

3.2 The DC composite field strength measuring instrument shall have the function of measuring the amplitude and polarity of the DC combined field strength. Field grinding is usually used to measure the ground In the field, the conductive metal plate of 1m x 1m copper or aluminum should be used as the ground reference plane and grounded reliably.

3.3 The ion current density meter shall have the function of measuring the amplitude and polarity of the ion current density. Usually use Wilson board to collect charge current To measure the ion current density, the acquisition plate size should be 1m x 1m. A schematic diagram of measuring the ion current density using a Wilson plate is shown in Figure 1. Will

9 Reference 10

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed and managed by the National Electromagnetic Compatibility Standardization Technical Committee (SAC/TC246). This standard was drafted. China Electric Power Research Institute Co., Ltd., State Grid Electric Power Research Institute Wuhan NARI Co., Ltd., country Home Grid Co., Ltd., Jiangsu Nanrui Hengchi Electric Equipment Co., Ltd. The main drafters of this standard. Yan Xiong, Wan Baoquan, Zhang Jiangong, Zhang Guangzhou, Liu Wei, Wang Jin, Li Ni, Zhang Yemao, Wang Yanzhao, Lu Yao, Gan Yuyuan, Zhang Xiaowu. Combined field strength of DC transmission lines and converter stations Method for measuring ion current density