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

GBZ/T 189.3-2018

Replacing GBZ/T 189.3-2007

**Measurement of physical agents in workplace -- Part 3: electric
field and magnetic field between 1Hz and 100kHz
(English Translation)**

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Foreword

This standard is formulated in accordance with the Law of the People's Republic GBZ/T 189 "Measurement of Physical Factors in the Workplace" is now divided into the following 11 parts.

- Part 1. Ultra-high frequency electromagnetic fields;
- Part 2. High frequency electromagnetic fields;
- Part 3. 1 Hz to 100 kHz electric and magnetic fields;
- Part 4. Laser radiation;
- Part 5. Microwave radiation;
- Part 6. Ultraviolet radiation;
- Part 7. High temperature;
- Part 8. Noise;
- Part 9. Hand-transmitted vibration;
- Part 10. Grading of physical labor intensity;
- Part 11. Heart rate during physical labor.

This part is the third part of GBZ/T 189.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GBZ/T 189.3-2007 "Workplace physical factors measurement Part 3. Power frequency electric field", and GBZ/T 189.3-2007 the changes in the main technical content are as follows.

- Extend the measurement content to 1 Hz to 100 kHz electric and magnetic fields;
- Make corresponding provisions on the measurement object, height, readings and precautions, see 4.2~4.5;
- Increased use of measurement results, see 5.1 and 5.2;
- Increased the calculation method of the time-weighted average of the power frequency field strength of the 8h workplace, see 6.1 and 6.2.

This section drafted by. Guangdong Provincial Occupational Disease Prevention and Treatment Institute, China Center for Disease Control and Prevention, Occupational Health and Poison Control, State Grid Jilin Provincial Electric Power Co., Ltd. Electric Power Research Institute, Guangzhou Occupational Disease Prevention and Treatment Institute, Foshan Occupational Disease Prevention and Treatment Institute, Peking University, Tianjin Disease Prevention and Control Center, Beijing Municipal Center for Disease Control and Prevention, Beijing Labor Protection Science Research Institute, Guangdong Power Grid Corporation Electric Power Research Institute, Shantou City Occupational Disease Prevention and Control Institute.

Drafters of this section. Chen Qingsong, Huang Hanlin, Li Tao, Xu Guoyong, Sun Chengxun, Chen Tao, Zhang Danying, Zhang Wei, Xiao Bin, Yan Hua, Du Wei Jia, Dong Xuemei, Wang Sheng, Wang Yanrang, Zhao Rong, Tang Shichuan, Yang Xiaotong, Li Li, Chen Suqiang, Zhang Hai, Yan Maosheng, Lin Yusheng, Jin Jia pure.

Workplace physical factors - Part 3. 1 Hz to 100 kHz electric and magnetic fields

1 Scope

This part of GBZ/T 189 specifies the measurement method for electric and magnetic fields from 1 Hz to 100 kHz in the workplace.

This section applies to workplaces and individuals of AC power transmission and transformation systems and other electrical and electronic equipment with a frequency range of 1 Hz to 100 kHz.

Contact electric field and magnetic field measurements.

2 Terms and definitions

The following terms and definitions apply to this document.

Frequency

The number of times the current vibrates in the conductor every second, in Hertz (Hz).

Root mean square function; Frms.

The electric field and/or magnetic field time-varying function $F(t)$ is the square root of the squared mean over the specified time interval t_1 to t_2 . It is by first seeking the square of the function, then determine the average of the square of the obtained function, and finally find the square root of the average, see equation (1).

$F_{rms} = -$

$\sqrt{\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} F^2(t) dt}$

In the formula.

t_2 -- end time in seconds (s);

t_1 -- start time in seconds (s);

$F(t)$ -- time-varying function of electric and magnetic fields, in units of volts per meter, ampere per meter or Tesla (V/m, A/m or T);

Δt -- Total time from t_1 to t_2 in seconds (s).

Peak value

The peaks of the electric field strength, the magnetic field strength, and the magnetic induction are expressed as the maximum value of the field vector. It is based on electric or magnetic field strength or magnetic the instantaneous values of the three mutually perpendicular directions of the pass density are shown in equation (2).

$V_p = \max[|E|, |H|, |B|]$

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In the formula.

V_x -- instantaneous value of x-axis electric field strength, magnetic field strength or magnetic flux density at a certain point in time, in volts per meter, ampere per meter or Tesla (V/m, A/m or T);

V_y -- instantaneous value of y-axis electric field strength, magnetic field strength or magnetic flux density at a certain point in time, in volts per meter, ampere per meter or Tesla (V/m, A/m or T);

V_z -- instantaneous value of z-axis electric field strength, magnetic field strength or magnetic flux density at a certain point in time, in volts per meter, ampere per meter or Tesla (V/m, A/m or T).

3 Measuring instruments

3.1

The frequency of the instrument response should cover the frequency of the device under test. If the power frequency is measured, the measuring instrument should be able to respond to 50 Hz. Instrument range according to the contact limit of the measured frequency shall be at least 0.01 to 10 times the limit.

3.2

The instrument is preferably equipped with a three-phase sensor that responds to the rms value. Single-phase instruments and individual magnetic field meters that meet field measurements Requirements can also be used.

3.3

The instrument should indicate the applicable range of temperature and relative humidity.

3.4

The instrument is required to be calibrated periodically and the calibration results must be in accordance with the relevant calibration requirements.

4.1 Site investigation

Site surveys should be conducted on the workplace prior to measurement. The survey mainly includes. location, volume, frequency, power of the electromagnetic field source, Current, voltage, etc.; production process; contact workmanship system, operation mode (fixed operation or inspection operation), posture Potential (stand-up or sitting), contact (contact time and frequency), protection, etc.

4.2 Selection of measuring points

The measurement points should be placed at representative operating points where electric and magnetic fields are present. The operator selects the specified inspection point for the inspection operation.

The position closest to the electromagnetic field source during the inspection process; the operator selects its fixed operation position for the fixed position operation. Same or similar the measuring points can be sampled according to the electromagnetic field source. The same type, the same protection, the same current and voltage low-frequency electromagnetic field equipment, the number is 1-3 at least one unit shall be measured at the time of the station, at least two units shall be measured at 4 to 10 units, and at least