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JAPANESE INDUSTRIAL STANDARD

**AC yoke magnet for magnetic
particle testing**

JIS Z 2321—1993

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AC yoke magnet for magnetic particle testing

Z 2321-1993

1. Scope This Japanese Industrial Standard specifies the portable AC yoke magnet for the magnetic particle testing to be used in the magnetic particle testing (hereafter referred to as "yoke magnet").

Remarks 1. The AC yoke magnet means the yoke magnet the number of which magnetic poles is two or four, and whose magnetic pole space is 340 mm or smaller.

2. The standards cited in this Standard are as follows.

JIS C 0911 Vibration testing procedure for electric machines and equipment

JIS C 0920 Tests to prove protection against ingress of water for electrical equipment

JIS C 4003 Classification of materials for insulation of electrical machinery and apparatus

JIS G 3101 Rolled steel for general structure

JIS Z 2300 Glossary of terms used in nondestructive testing

2. Definitions For the main terms used in this Standard the definition in JIS Z 2300 apply, and the rest of the terms shall be as follows.

- (1) magnetic pole space The space between the centers of the magnetic poles of the yoke magnet. In the case of the yoke magnet with four magnetic poles, the space between the opposite two magnetic poles.
- (2) total magnetic flux The magnetic flux generated in the steel plate in the central sectional plane between the magnetic poles when the yoke magnet is placed on the steel plate and excited.
- (3) lifting force The force required to separate the yoke magnet from the steel plate when the yoke magnet is placed on the steel plate and excited.
- (4) central magnetic field between the magnetic poles The magnetic field on the surface of the steel plate at the center between the magnetic poles of the yoke magnet when the yoke magnet is placed on the steel plate and excited. In the case of the yoke magnet having four magnetic poles, the converted value of the magnetic field where the central magnetic fields between the respective sets of the opposite magnetic poles are equal and the phase angle between the two central magnetic fields is 90°.
- (5) phase difference of the central magnetic fields between the magnetic poles The phase difference between the central magnetic fields between the magnetic poles concerning the respective magnetic poles of the yoke magnet having four magnetic poles.

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3. Type The type of the yoke magnet shall conform to the following.

- (1) The yoke magnet shall be of two kinds, i.e., of 2-pole type and 4-pole type according to the number of the magnetic poles.

In the case of the yoke magnet with four magnetic poles, the spaces between the two sets of the opposite magnetic poles are equal, the magnetic characteristics are equivalent, and the lines connecting the opposite magnetic poles are perpendicularly intersecting each other.

- (2) The yoke magnet shall be of two kinds, i.e., of splashproof type and of non-splashproof type.
- (a) Splashproof type A device which is not subject to a harmful effect even when it receives the water splash from every direction.
- (b) Non-splashproof type A device which is not provided with the splashproof treatment specified in (a) above.

4. Rated performance

4.1 Rated voltage The rated voltage of the yoke magnet shall be AC100 V or AC200 V.

4.2 Rated frequency The rated frequency of the yoke magnet shall be 50 Hz and 60 Hz.

4.3 Rated duty factor The rated duty factor shall generally be 70 % (charging for 5 s and pause for 2 s). However, in the case different from this case, the repeated duty factor shall be clearly described.

5. Performance

5.1 Temperature rise of yoke magnet When the yoke magnet is used at the rated duty factor at the ambient temperature of 20°C, the surface temperature of the grip part shall not exceed 50°C.

The temperature of the steel plate to be used shall be similar to the exterior temperature.

5.2 Waterproof performance The waterproof performance of the yoke magnet of the splashproof type shall meet the requirements of JIS C 0920.

5.3 Insulation resistance The test for the insulation resistance shall be carried out between the electric circuit of the yoke magnet and the magnetic pole or the metallic part by applying the voltage of DC500 V. In this case, the insulation resistance shall be 10 MΩ or more. However, the insulation resistance of splashproof type shall be the value after the waterproof performance test has been carried out.

5.4 Withstand voltage AC voltage of 1 kV which is close to the sine wave of the frequency of 50 Hz or 60 Hz shall be applied between the electric circuit of the yoke magnet and the magnetic pole or the exposed metallic part, and the yoke magnet shall withstand this voltage for 1 min.