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NATIONAL STANDARD OF THE
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ICS 19.100

J 04

GB/T 20967-2007

Non-destructive testing - Visual testing - General principles

Issued on: July 02, 2007

Implemented on: December 01, 2007

**Issued by: General Administration of Quality Supervision, Testing and
Quarantine;**

Standardization Administration of PRC.

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Non-destructive testing - Visual testing - General principles

1 Scope

This standard specifies the general principles for direct visual testing and remote visual testing when using the visual testing to determine whether the product complies with the specified requirements (e.g., surface condition of the workpiece, alignment of the mating surface, shape of the workpiece).

This standard does not apply to the use of any other destructive or non-destructive testing methods to carry out testing activities.

The basic rules applicable to the application of non-destructive testing as specified in GB/T 5616 apply to this standard.

2 Normative references

The provisions in following documents become the provisions of this standard through reference in this standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this standard; however, parties who reach an agreement based on this standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 5616 Non-destructive testing - Guidelines for application

GB/T 9445 Non-destructive testing - Qualification and certification of NDT personnel (GB/T 9445-2005, ISO 9712:1999, IDT)

GB 11533 Standard for logarithmic visual acuity charts

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1

Direct visual testing

Direct visual testing refers to the availability of a continuous, uninterrupted

k) Post-testing documents (see clause 9).

4.5 It shall use the actual test piece, to verify the process procedure. The test piece shall, from the aspect of relative light reflectivity, surface structure, contrast ratio and accessibility, be as close as possible to the workpiece to be tested. It should verify the process procedures in the test area where it is most difficult to distinguish. The actual test piece may be replaced by the workpiece being tested or replaced by an approved reference system.

4.6 Changes in equipment and testing device details that do not adversely affect the sensitivity level shall not require retesting of the verification procedure.

4.7 Image records shall be in accordance with the standards as specified in the testing process procedures.

5 Direct visual testing

5.1 Direct visual testing is usually used for local testing. When the eye can be placed within 600 mm from the surface of the workpiece to be tested and the visual angle between the eye and the surface of the workpiece to be tested is not less than 30°, it is suitable for visual testing. It may use mirror to improve the viewing angle, it may also use magnifying glass, endoscope, optical fiber, and the like to assist testing.

5.2 Direct visual testing can also be used at distances greater than 600 mm for general visual testing. It shall use a suitable visual distance for testing.

5.3 The specific workpiece, part, container or its area to be tested shall, if required, be illuminated by auxiliary lighting equipment. Generally, the minimum illumination of general visual testing shall reach 160 lx, the minimum illumination of local visual testing shall reach 500 lx.

5.4 In order to maximize the effectiveness of the testing, it shall consider the following lighting requirements:

- a) Use the best light direction relative to the observation point;
- b) Avoid dazzling light;
- c) Optimize the color temperature of the light source;
- d) Use an illumination level that is compatible with the surface light reflectivity.

6 Remote visual testing

6.1 When it cannot use the direct visual testing, it may use the remote visual

testing. Remote visual testing uses visual aids, such as endoscopes and optical fibers, to connect to a camera or other suitable instruments.

6.2 Whether the remote visual testing system is suitable for the completion of the specified tasks shall be verified.

7 Personnel

Personnel which performs testing operations in accordance with this standard shall meet the following requirements:

- a) Be familiar with relevant standards, regulations, procedures, equipment and procedure instructions;
- b) Be familiar with the relevant manufacturing process and working conditions of the workpiece being tested;
- c) Has good eyesight and meet the requirements of GB/T 9445. In addition, when performing general visual testing, it shall check the distance vision. The distance vision of at least one eye shall reach the visual level of 1.0 of GB 11533, regardless of whether it is corrected or not. Vision shall be checked at least every 12 months.

8 Assessment

Visual testing shall be assessed in accordance with the terms specified in the acceptance criteria (e.g., product standards, contracts).

9 Post-testing documents

When required (such as product standards, contracts), it shall provide a written test report that meets the following details:

- a) Date and place of testing;
- b) The method in clause 5 or clause 6 used;
- c) Acceptance criteria and / or written process procedures/operation instructions;
- d) The equipment and / or system used, including parameter settings;
- e) The contract or agreement referred to;
- f) The name of the testing organization;

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