

# JIS

**JAPANESE INDUSTRIAL STANDARD**

**Visual examination and  
classification of surface  
quality for steel castings**

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**In the event of any doubt arising,  
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## JAPANESE INDUSTRIAL STANDARD

J I S

Visual examination and classification  
of surface quality for steel castings

G 0588-1995

1. Scope This Japanese Industrial Standard specifies the method for visual examination and classification of surface quality for steel castings teemed into sand moulds excluding those for machined surface.

Remarks: The standard cited in this Standard is as given in the following:  
JIS G 0307 Steel castings – General technical requirements

2. Definitions The definitions of main terms used in this Standard are as follows:

- (1) sand inclusions and slag inclusions A defect of which sand, slag, etc. are taken in due to the lack of strength of sand mould for foundry, insufficient cleaning of moulds, inappropriate casting operation, or the like.
- (2) gas porosity (pinhole, or blowhole) A concavity caused by evolution of gases contained in the molten metal, moisture in the mould, or the like.  
A concavity less than 3 mm in diameter is referred to as the "pinhole", while 3 mm or more thereof the "blowhole".
- (3) surface folding A wrinkle which is appreciable its base produced by too low casting temperature, too slow casting speed, or the like.
- (4) chaplets areas A defect of which metallic devices used to maintain the cores are remained because of insufficient fusion.
- (5) metal removal marks A mark like grooves produced by finishing the section where a feeder head, gate, or the like is cut off.
- (6) gas cutting marks A mark produced in the cut-off area where a feeder head, gate, or the like is removed with gas.
- (7) casting fin A projection produced in the steel casting by flushing molten metal along the boundary between moulds (such as between a cope and drag, core and cope or drag).
- (8) sand burning A sintered state of which foundry sand is stucked on the surface of the steel casting because of too high casting temperature, too low refractoriness of the sand, or the like.
- (9) weld repair areas The state of ground surface where the beads in welded area is rectified by grinding.
- (10) wart, dent Unevenness such as depression produced on the casting surface due to partial peeling-off of foundry sand, sticking of slag, or the like.

- (11) blow The state of holes produced by evolution of gases at an area where some substance likely to generate gases such as moisture in the mould contacts with the molten metal. The shape of the hole is roundish, and some of holes are remarkably large.
- (12) internal chills areas A portion where the internal chilling block, internal chill, supporting leg, or the like is revealed on the casting surface.
- (13) metal penetration A mixture of metal and foundry sand produced at an area where the mould contacts with molten metal of high temperature or stamping of sand is imperfect, or unevenness of the casting surface caused by penetration of molten metal into foundry sand.
- (14) reference photographs Pictures 100 mm × 60 mm in size categorized by the type of defect and expressed as 5 classes for each type according to their significance levels (see Attached Figures 1 to 9).

3. Type of defect The type of defects on the casting surface of the steel casting visually observed and corresponding reference photographs thereto shall be classified into 9 types as given in Table 1.

Table 1 Type of defect

| Type of defect                                        | Reference photograph |
|-------------------------------------------------------|----------------------|
| Sand inclusions and slag inclusions (wart and dent) * | Attached Figure 1    |
| Gas porosity (blow) *                                 | Attached Figure 2    |
| Surface folding                                       | Attached Figure 3    |
| Chaplets area (internal chills areas) *               | Attached Figure 4    |
| Metal removal marks                                   | Attached Figure 5    |
| Gas cutting marks                                     | Attached Figure 6    |
| Casting fin                                           | Attached Figure 7    |
| Sand burning (metal penetration) *                    | Attached Figure 8    |
| Weld repair areas                                     | Attached Figure 9    |

Note \* The defects in parentheses are similar ones in appearance and shape.

Remarks: In the case where other defects than those listed in Table 1 are used, it shall be agreed between the purchaser and supplier taking into consideration the service condition and functions.

4. Method for examination and classification The methods for examination and classification of the casting surface shall be as given in the following:

- (1) General requirements for the examination method shall be in accordance with (1) of 3.4 (Appearance test) in JIS G 0307. In the case of this Standard, however, the examination shall be carried out visually, but not with a magnifying glass.

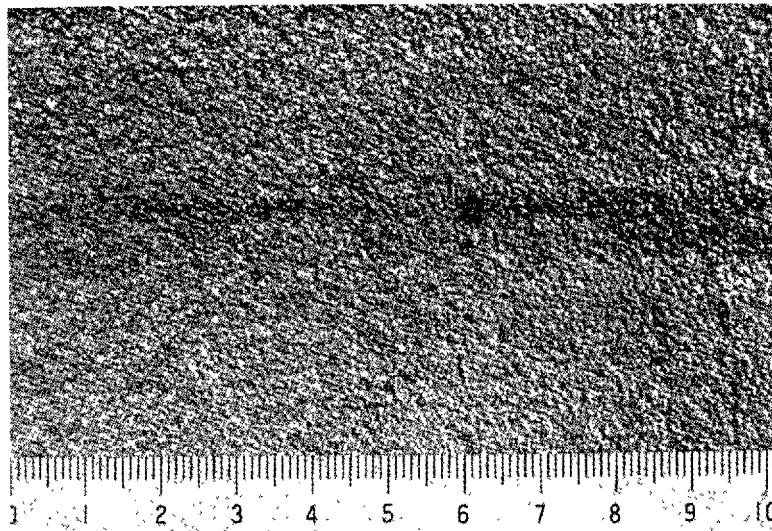
- (2) As to the time of examination, it shall be, as a rule, carried out prior to shipment.
- (3) The location subject to the examination shall be agreed between the purchaser and supplier. In examination, the area of one visual field shall be, as a rule, 100 mm × 60 mm.
- (4) The appearance of casting surface in the visual field to be examined shall be compared with the reference photographs, and graded into classes 1 to 5.
- (5) Classifying shall be applied to the visual field of the worst degree of defect in each area to be examined.
- (6) In the case where two or more types of defects lie in one visual field, the classifying shall be carried out for each type of defect.

5. Report The manufacturer shall report the results of examination as necessary. In this case, the following items shall be reported unless otherwise specified.

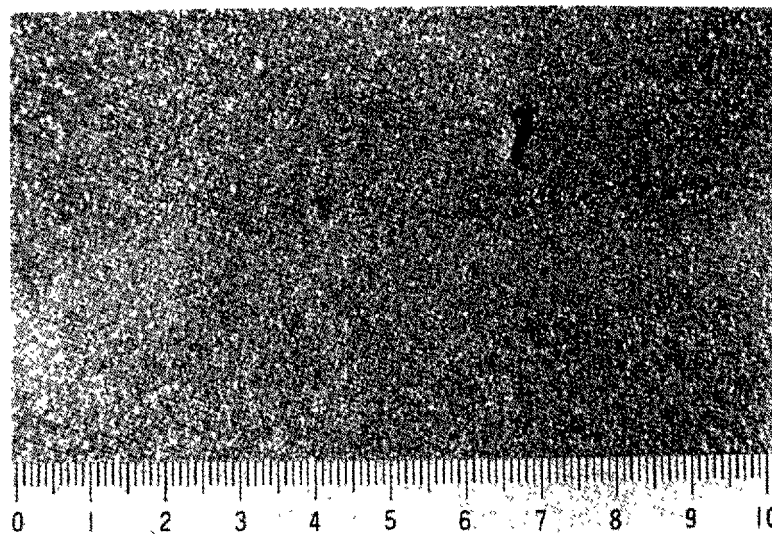
- (1) Date of examination
- (2) Examined commodity
  - (2.1) Commodity name
  - (2.2) Quality of material
  - (2.3) State of finish of casting surface
- (3) Environments of examination
  - (3.1) Auxiliary device(s) (mirror) used at the time of examination
- (4) Results of examination
  - (4.1) Area subject to examination
  - (4.2) Classification for each type of defects

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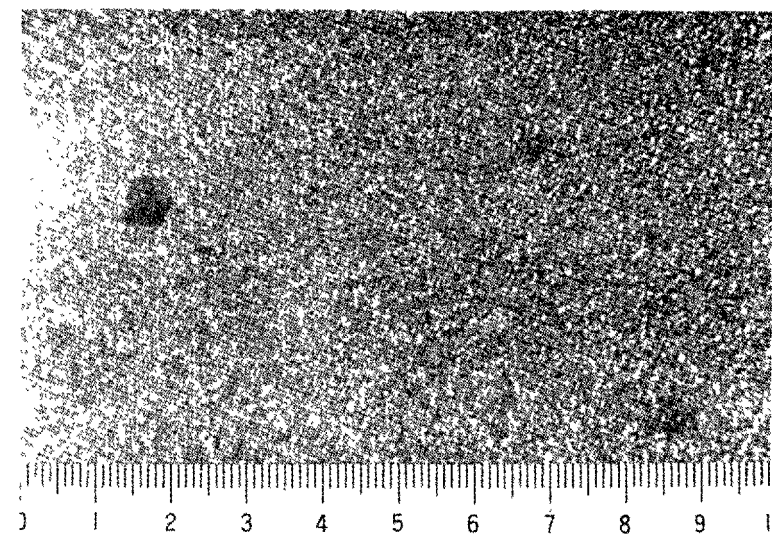
Attached Figure 1 Sand inclusions and slag inclusions



Class 1

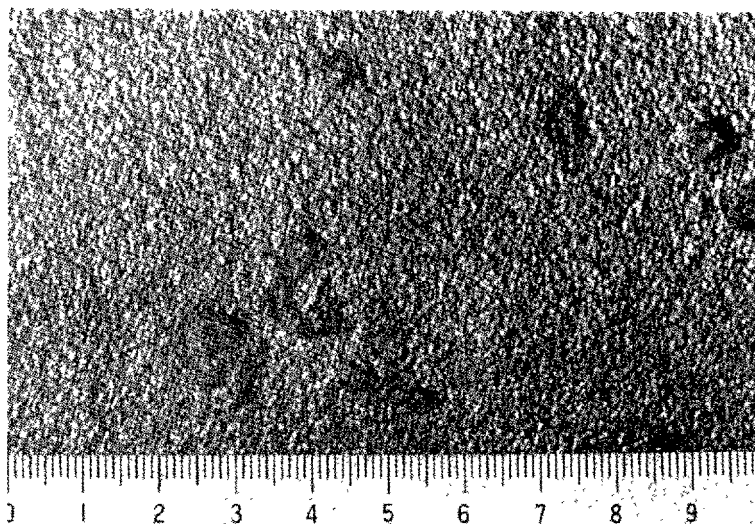


Class 2

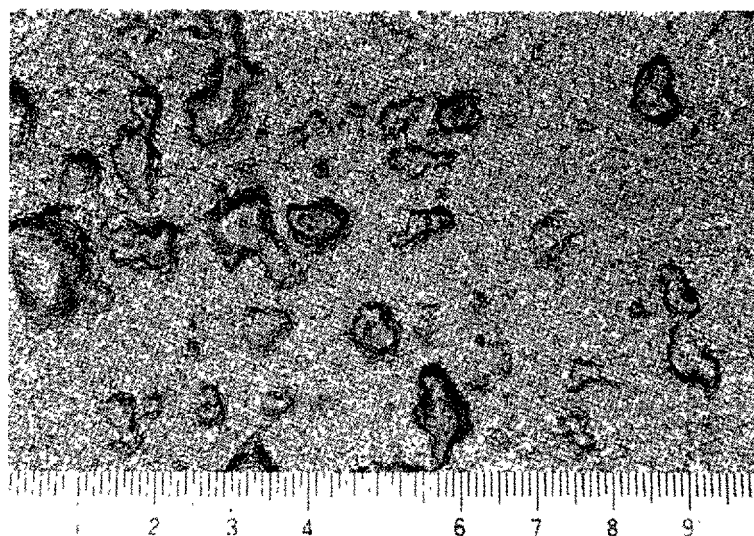


Class 3

Attached Figure 1 (continued)



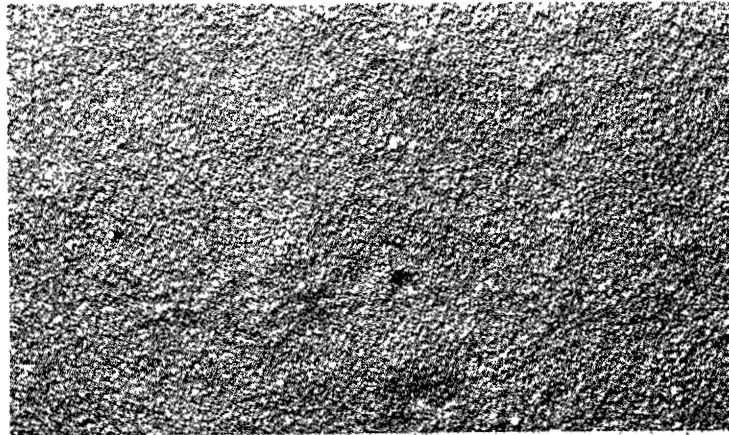
Class 4



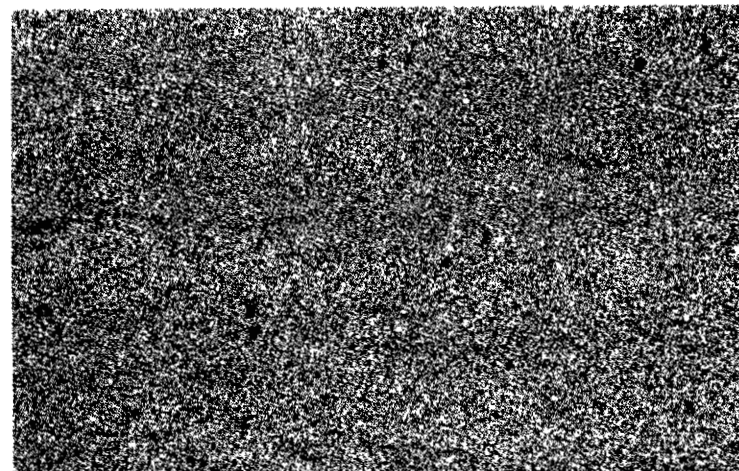
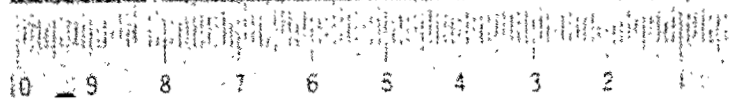
Class 5

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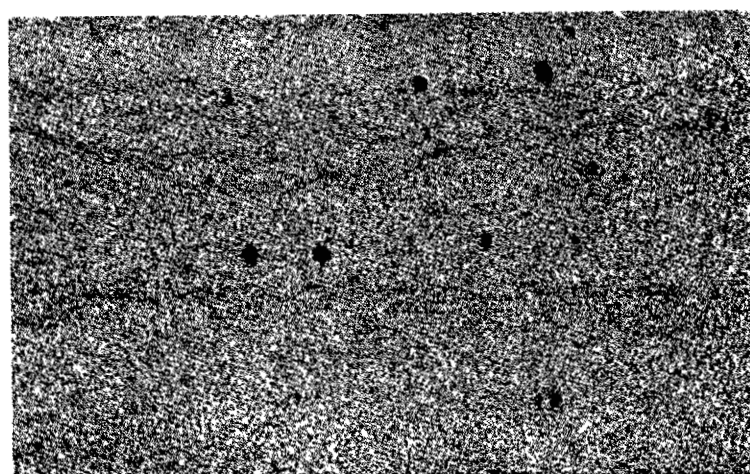
Attached Figure 2 Gas porosity (pinhole or blowhole)



Class 1



Class 2



Class 3

