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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 23.060.00

J 16

GB/T 12228-2006

Replacing GB/T 12228-1989

**General purpose industrial valves - Specification of
carbon steel forgings**

通用阀门 碳素钢锻件技术条件

Issued on: December 25, 2006

Implemented on: May 01, 2007

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine;
Standardization Administration of the People's Republic of
China.**

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General purpose industrial valves - Specification of carbon steel forgings

1 Scope

This Standard specifies the requirements, test methods, inspection rules, order requirements, markings and quality certificates of compression carbon steel forgings, such as general purpose industrial valves, flanges, and pipe fittings.

This Standard applies to compression carbon steel forgings, such as general purpose industrial valves, flanges, and pipe fittings (hereinafter referred to as forgings). It can be implemented by reference for non-compression forgings.

2 Normative references

The terms in the following documents become the terms of this Standard by reference to this Standard. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this standard. However, parties to agreements that are based on this Standard are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Standard.

GB 150, Steel pressure vessels

GB/T 228, Metallic Materials - Tensile Testing at Ambient Temperature (GB/T 228-2002, eqv ISO 6892:1998)

GB/T 229, Metallic materials - Charpy pendulum impact test method

GB/T 231.1, Metallic materials - Brinell hardness test - Part 1: Test method (GB/T 231.1-2002, eqv ISO 6506-1:1999)

GB/T 699, Quality carbon structural steels

GB/T 2975, Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (GB/T 2975-1998, eqv ISO 377:1997)

GB/T 13927, Industrial Valves - Pressure Testing (GB/T 13927-1992, neq ISO 5208,1982)

JB 4726, Carbon and Low-alloy Steel Forgings for Pressure Vessels

JB 4730, Nondestructive Testing for Pressure Equipment

3.5.3 The preparation method of the test piece of mechanical properties shall be in accordance with the provisions of GB/T 2975; the following methods can be selected:

- a) directly on the part;
- b) on the extension of the forging;
- c) the same blank for manufacturing the cross section.

3.6 Quality requirements

3.6.1 The surface quality of the forgings shall be good and free of harmful defects.

3.6.2 When the depth of the forging defect reaches the limit size of the forging, it is a harmful defect and shall be scrapped.

3.6.3 If the defect depth of the forging does not reach the limit size of the forging, and it can be removed by machining or grinding, it is a non-hazardous defect, and can be treated as follows:

- a) If the folding depth does not exceed 5% of the limit size or 1.5 mm (whichever is the smaller value), it does not need to be removed. If the defect needs to be removed, mechanical processing or grinding shall be used;
- b) For defects such as pits, or damage caused by marking, if the depth does not exceed the stipulation of 3.6.3a), it does not need to be removed;
- c) When the defect exceeds 3.6.3a), the defect shall be removed by machining or grinding, but the limit size of the forging must be guaranteed.

3.6.4 Welding repair

3.6.4.1 Welding repair is allowed for forgings, or as specified in the order contract.

3.6.4.2 The welding process, post-weld heat treatment, non-destructive inspection of welding repair and the requirements for welders shall meet the requirements of GB 150.

3.6.4.3 The welding repair area shall not exceed 10% of the surface area of the forging; the depth shall not exceed one third of the limit size of the forging or 10 mm (whichever is less). Otherwise, the consent of the buyer shall be obtained.

3.6.4.4 Before the welding repair, all defects must be removed, and magnetic powder inspection or other effective inspection methods must be carried out as required.

3.6.4.5 After the welding repair, the welding area shall be polished and flattened, and inspected and eliminated according to 4.4.

3.6.4.6 All forgings that have undergone the welding repair shall be subjected to stress relief treatment.

3.6.4.7 The number of welding repairs for the same defect shall not exceed twice.

3.7 Forging grade

3.7.1 The grade and technical requirements of forgings (including rolled forgings) shall meet the requirements of JB 4726.

3.7.2 Forgings whose nominal pressure is PN2.5 ~ PN10 are allowed to use forgings of grade-1.

3.7.3 In addition to the provisions of 3.7.4, forgings whose nominal pressure is PN16 ~ PN63 shall meet the requirements for forgings of grade-II or above.

3.7.4 Forgings whose nominal pressure is not less than PN100 shall meet the requirements for forgings of grade-III.

4 Test methods

4.1 Tensile testing

4.1.1 Each batch of heat-treated forgings shall be subjected to a tensile testing. If the same batch of heat-treated forgings includes more than two rolling heat numbers, each rolling heat number shall be subjected to a tensile testing.

4.1.2 Under the same heat treatment conditions, if the temperature error is within $\pm 14^{\circ}\text{C}$, and there is a high temperature recording device, the unified rolling heat number is required to have only one tensile testing.

4.1.3 The tensile testing method shall be carried out in accordance with the provisions of GB/T 228.

4.1.4 If the forging is too small to make the smallest test piece used for tensile testing on the forging, or the test piece parallel to the main deformation direction cannot be cut, and the test piece cannot be forged on the device, 1% of the batch or 10 pieces (whichever is the minimum) can be taken for the hardness test.

5.2 If the mechanical testing results do not meet the requirements of Table 4, the heat treatment shall be performed again in accordance with the provisions of 3.3, and the preparation of test pieces shall be carried out in accordance with the provisions of 3.5, and the test shall be carried out in accordance with the provisions of 5.1. However, the number of reheat treatments shall not exceed twice.

5.3 The pressure testing shall be carried out after the non-destructive test, and shall be carried out piece by piece. The forging department shall be responsible for the quality of the test forgings.

6 Ordering requirements

6.1 The order contract or inquiry sheet shall include the following:

- a) Product forging drawings, including requirements for surface roughness, tolerance, material grade number;
- b) Supplier's forging process and drawing (if required, the buyer's approval shall be required);
- c) The heat treatment and other requirements can be negotiated by both parties;
- d) Acceptance requirements and contents that need to be supplemented.

6.2 If the buyer finds scrapped products during product analysis or mechanical processing, it shall notify the forging department within the time that is specified in the contract; if there is no specification, it shall not exceed 30 days.

6.3 The scrapped forging samples shall be kept for 30 days from the date of sending the test report. The forging department may request re-examination during this period.

7 Marking and quality certificate

7.1 After passing the inspection, the forging shall be attached with a conformity mark, which shall include:

- a) Factory name or logo;
- b) Material code;
- c) Heat treatment code;
- d) Date of manufacture;

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