JB

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OF THE PEOPLE'S REPUBLIC OF CHINA

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Engineering Machinery - General Technical Specifications for Weldments

工程机械 焊接件通用技术条件

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Engineering Machinery - General Technical Specifications for Weldments

1 Subject Contents and Applicable Scope

This Standard specifies the technical requirements, test methods, inspection rules, marking, package, transportation and storage of the weldments in the engineering machinery products.

This Standard is applicable to the weldments for manual arc welding, submerged arc welding and gas-shielded welding.

2 Normative References

GB 985 Basic Forms and Sizes of Weld Grooves for Gas Welding，Manual Arc Welding and Gas-Shielded Arc Welding

GB 986 Basic Forms and Sizes of Weld Grooves for Submerged Arc Welding

GB 1804 Tolerance and Fitting

GB 2650 Impact Test Methods on Welded Joints

GB 2651 Methods of Tensile Test for Welded Joints

GB 2652 Tensile Test Methods on Weld and Deposited Metal

GB 2653 Methods of Bend and Compression Tests for Welded Joint

GB 2654 Methods of Hardness Tests for Welded Joint and Surfacing Metal

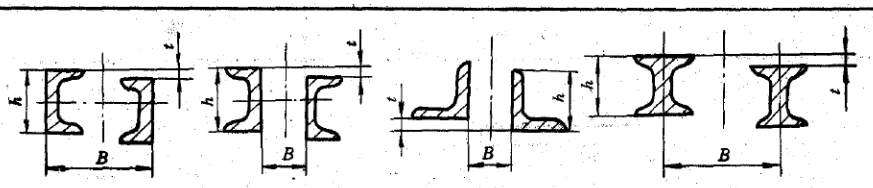
GB 2655 Method of Stain-Age Sensibility Test for Welded Joint

GB 2656 Weld beads metal and welds – Fatigue Tests

GB 2828 Sampling Procedures and Tables for Lot-by-Lot Inspection by Attributes (Apply to Inspection of Successive Lots or Batches)

GB 3323 Methods for Radiographic Inspection and Classification of Radiographs for Fusion Welded Butt Joints in Steel

Table 13 Unit: mm



Section height h	Offset (t) no greater than	
	$B \leqslant 1000$	$B > 1000$
$\leqslant 100$	$0.015h$	$0.020h$
$>100 \sim 240$	$0.010h$	$0.015h$
>240	$0.008h$	$0.010h$

3.4.4 Before welding, the rust, oil, paint, dust and other dirt on the surface of the welded structure shall be removed within a certain range from the edge of the weld-seam (no less than 10mm for manual welding; and no less than 20mm for submerged arc welding); and the moist there shall be removed also.

3.5 Welding requirements

3.5.1 The welding work shall be carried out after the installing inspection is qualified.

3.5.2 The welding rod, welding specification and welder requirements for the positioning welding during the installing period shall be the same as the formal welding.

3.5.3 The welding process for the new steel grade, new welding rod, and welding wire used for the first time must be tested before the formal welding. After assessing qualified, the welding can be carried out.

3.5.4 It is forbidden to start the arc in the non-weld-seam area, nor to start the arc at the end of the weld-seam.

3.5.5 The welding operation shall conform to the provisions of GB 9448.

3.6 Post-weld requirements

3.6.1 The limit deviation of the undeclared tolerance size on the non-machined surface of the weldments shall conform to the provisions of Table 14.

3.6.7 The undeclared tolerance for the perpendicularity and parallelism between the surfaces of the weldments shall not exceed half maximum tolerance of the corresponding dimensions (see Figure 8).

3.6.8 The undeclared tolerance for the symmetry between the surfaces of the weldments shall not exceed the half tolerance for the corresponding reference surface (see Figure 9).

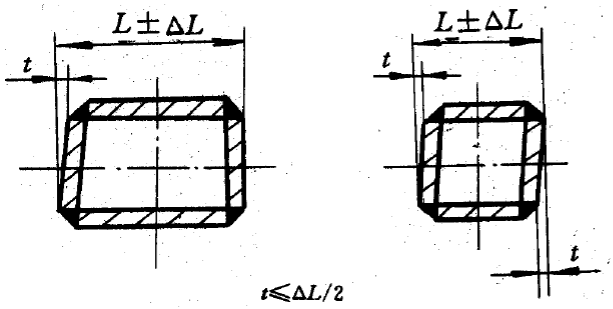


Figure 8

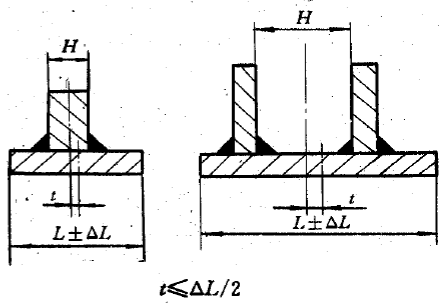


Figure 9

3.6.9 Correction of the welding deformation: correction shall be carried out in the hot state; generally, it is not allowed to be carried out at the blue-brittle temperature (250~500°C) (except for the quenched and tempered steel). The correction in the cold state shall not be carried out at the cold-brittle temperature (-20°C).

When using flame for correction, it is strictly forbidden to repeat the heating at the same position to prevent the changes in the fields of metallographic structure and mechanical properties. For the important parts, it is strictly forbidden to use the rapid cooling method such as water cooling, air cooling; it is also not allowed to perform the repeated correction of the tensile and compressive stress in the same position. After correction, the surface of the weldments shall be free of cracks, craters and other defects that affect the strength and appearance of the weldment.

3.6.10 Weld-seam surface quality classification and its shape deviation and external defects

3.6.10.1 The weld-seam surface quality classification shall conform to the provisions of Table 16.

3.6.10.2 The weld-seam shape deviation and external defects shall conform to the provisions of Table 17.

4.5.2.1 During the water pressure test, the temperature of the ambient air and the test water shall be more than +5°C; otherwise, take the anti-freezing measures.

4.5.2.2 The internal shall be cleaned up before water filling. Discharge all the air inside the test piece during the water filling. The condensation on the outer surface of the container shall be removed after water filling.

4.5.2.3 The test pressure for the water pressure test shall be no less than 1.5 times of the working pressure.

4.5.2.4 When the pressure reaches the test pressure, the dwell time shall be no less than 5min; during this time, the fluctuation of the gauge pressure is allowed, but no less than the test pressure. If leakage or moisture is found on the weld-seam, the defective positions shall be removed and re-welded, then carry out the test.

4.5.2.5 During the test, the weld-seam is not allowed to be repaired; nor the weld-seam is allowed to be struck.

4.5.2.6 After the test is completed, the water shall be discharged completely.

4.6 Mechanical properties test of weld-seam

a) The impact test of the welding joint shall be carried out as per the provisions of GB 2650;

b) The tensile test of the welding joint shall be carried out as per the provisions of GB 2651;

c) The tensile test of the weld-seam metal shall be carried out as per the provisions of GB 2652;

d) The bending and flattening test of the welding joint shall be carried out as per the provisions of GB 2653;

e) The hardness test of the welding joint shall be carried out as per the provisions of GB 2654;

f) The strain aging sensitivity test of the welding joint shall be carried out as per the provisions of GB 2655;

g) The fatigue test of the weld-seam metal and welding joint shall be carried out as per the provisions GB 2656.

5 Inspection Rules

5.1 The weldments shall be inspected and accepted by the manufacturer's quality inspection department according to the drawings, relevant technical documents and this Standard.

5.2 The geometry and dimensions of the weldments and external defects of the weld-seam shall be inspected according to the requirements of 3.6.1~3.6.11.

Important weldments shall be checked for geometry and dimensions and external weld-seam defects on a piece-by-piece basis. The ordinary weldments shall be randomly inspected for the external weld-seam defects, geometry and dimension on a piece-by-piece basis; the random inspection method shall be specified by the manufacturer according to the product batch amount and quality level, as well as product technical standard and ordering technical requirements in GB 2828.

5.3 The internal defect test, sealability test, radiographic flaw detection, and mechanical properties of the weld-seams shall be carried out according to the drawing and ordering technical requirements.

5.4 Borehole inspection of the weld-seam

5.4.1 Borehole inspection can be carried out in case one of the following conditions:

a) On one side of the weld-seam, there is undercut; on the other side, there is weld-flash;

b) Multiple air pores and shrinkage holes on the surface of the weld-seam;

c) The weld-seam has a significantly uneven weld-wave;

d) Other abnormal phenomena are found outside the weld-seam; and the quality inspection department considers necessary.

5.4.2 The position and quantity of the boreholes are determined by the quality inspection department.

5.4.3 When the width of the weld-seam is less than or equal to 20mm, the diameter of the drill must be such that the cross-section of the weld-seam is cut; include the base metal on each side of 1~1.5mm. When the width of the weld-seam is greater than 20mm, the hole can be drilled on the weld-seam till to the fusion zone.

5.4.4 When weld-seam quality is found inconsistent with the requirements during

the drilling inspection, re-drill holes to determine the defect boundary; the defect position shall be removed and re-welded; double the drilling inspection after welding. If no defects that do not meet the requirements are found, the drilled holes must be welded completely.

5.5 The length of the weld-seam through the radiographic flaw detection shall be no less than 30% entire length of the weld-seam. When defects are found, the supplementary fluoroscopic-test shall be made around the original defects; the supplementary fluoroscopic length shall be equal to the length of the fluoroscopic-test position of the weld-seam. If defects are found in the supplementary fluoroscopic-test, all weld-seams shall be fluoroscopic-tested.

5.6 Weld-seams that are assess unqualified shall be returned for repair after approval by the quality inspection department. The maximum number of returning for repair shall be no more than twice. It is forbidden to repair with caulking, oxygen block flame blowing and deposit welding.

6 Marking, Package, Transportation and Storage

6.1 The weldments that is inspected qualified shall be attached with the mark of the manufacturer's quality inspection department on the non-machined surface.

6.2 The weldments shall be attached with certificate when leaving the factory, where the following contents shall be indicated:

a) Manufacturer's name and code;

b) Weldment name and drawing number (ordering contract number);

c) Quantity;

d) Inspection and test results.

6.3 The package, transportation and storage of the weldments shall conform to the provisions of relevant standards and ordering agreements.

Additional Information:

This Standard was proposed by and under the jurisdiction of Tianjin Research Institute of Construction Machinery under Ministry of Machine-Building and Electronics Industry.

Drafting organization of this Standard: Tianjin Research Institute of Construction Machinery under Ministry of Machine-Building and Electronics Industry.

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