



Testing Methods for Hot-Dipped Zinc Coating

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1. Scope of Application

This standard shall specify the test method of molten zinc plating (Referred as plating from now on) on steel product. It can also be applied to electric plating instead of molten zinc plating.

2. General Information

2.1 Relation to Product Standard

Each product is specified about plating test method, sampling method, evaluation method and standard and re-test.

2.2 Classification of Steel Product

Steel product is classified to 7 depending on shape and size for the convenience of plating test.

(1) Pipes

Steel pipes for water works, pipes for wiring, steel pipes for plumbing, steel pipes for structure, steel pipes for footing, etc.

(2) Thin Plates

Zinc steel plate

(3) Wires

Iron wire, steel wire, wire rope, iron twisted wire, steel twisted wire, iron net, barbwire, sheathing wire, etc.

(4) Rolled steel

Steel plate, section steel, flat steel, steel rod, etc.

(5) Processed Products

Steel tower, bridge, steel skeleton, ship building decoration, tank, etc.

(6) Bolts and nuts

Bolts, nuts, washer, etc.

(7) Casting and Forged Products

Casting steel product, casting iron product, forged steel product, pipe joint, insulation, etc.

2.3 Classification of Test Method

There are four test methods. Application of each test method is standardized in product specification

Table 1, Classification of Test Method

Test Method Classi- fication of product speci- fication of steel	Adhesion Test		Copper Sulfate Test	Contact Test					Alkali Test
	Direct Method	Mollified Antimony Method		Naked Eye	Bending Test	Hammer Test	Ericson Test	Rolling Test	
Pipes	-	3.2	4	5.1	5.2	-	-	-	6
Thin Plates	3.1	3.2	-	-	5.2	-	5.3	-	-
Wires	-	3.2	4	-	5.2	-	-	5.4	-
Rolled Steels	3.1	3.2	4	5.1	-	5.5	-	-	-
Processed Products	3.1	3.2	4	5.1	-	5.5	-	-	-
Bolts and nuts	3.1	3.2	4	5.1	-	5.5	-	-	-
Casting and Forged Products	3.1	3.2	4	5.1	-	5.5	-	-	-

Note : The number in the table represents test item applied.

Reference : Copper Sulfate Test is also called Consistency Test.

3. Adhesion Test Method

3.1 Direct Method

3.1.1 Test Piece

Use material under process, or consult with a person concerned. Test piece is sampled with the following method.

- (1) If the material is too being, too heavy or inconvenient for handling, cut off from suitable place.
- (2) If the material is hard to measure surface area, make one that is similar to the real product.

3.1.2 Operation

The test piece should be treated equally in acid washing, water washing and dry and weighed as representing material. Weighed again after plating. Plating Adhesion amount is calculated by dividing the increase in weight after plating by surface area of the test sample (Surface area of one side in case of zinc steel plate).

3.2 Mollified Antimony Method

3.2.1 Test Piece

(1) Test Piece Sampling Method

After consulting with a person concerned, sampling is done with the following method.

- (a) Make test piece of the product as is.
- (b) Cut of the test piece from plated product.
- (c) Cut the material representing the product to suitable size. Make the test piece after plating as same as the real product.

(2) Sample location and size of the test piece

(a) Pipes

Sample at length of 60 mm from each ends by (1)-(b). If the test piece is too big, it can be cut to suitable size.

(b) Thin plates

After consultation with a person concerned, use method illustrated in Figure 1 or Figure 2 to the size of 57.2 x 57.2 mm or diameter of 64.5 mm by (1)-(b).

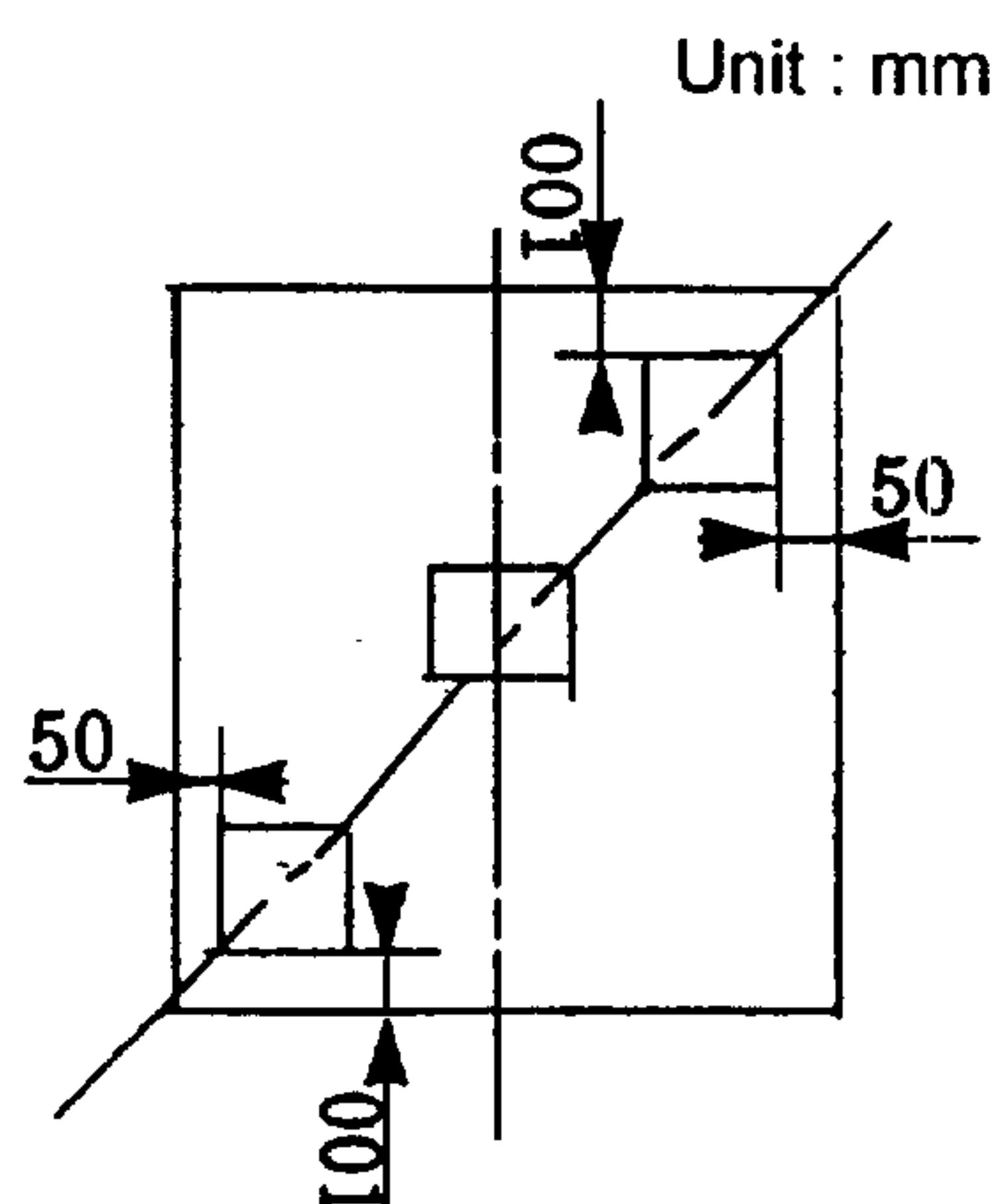


Fig. 1.

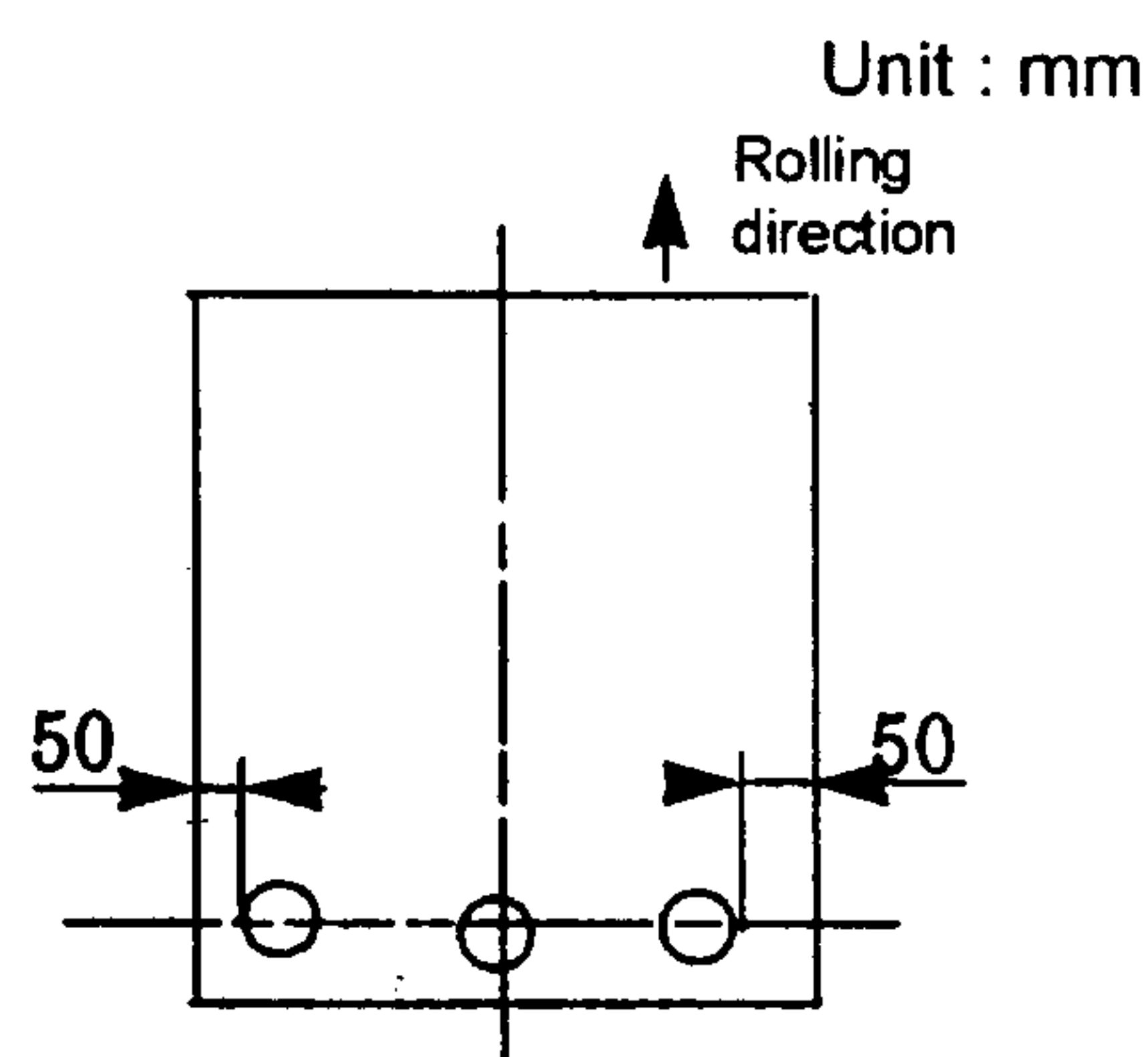


Fig. 2.

(1) 3 point method

As shown in Figure 1, take 1 sheet of sample from the center, 2 sheets of sample from the opposite side of diagonal location in the vertical end from 100 mm and horizontal end from 50 mm.

(2) Minimum point method

As in 3-point method, take sample from the three sheets of test piece with minimum plating. Or sample 1 sheet of test piece from suitable location 100 mm inside from the vertical end and 50 mm from the horizontal end.

(a) Wires

Take sample with length 300~600 mm as in (1)-(b).

(b) Rolled Steel Product, Processed Product

Sampling is done by (1)-(a), (b) or (c). In case of (b) and (c), it is standardized that sample is cut to square shape at plated surface area of 100 cm² if possible.

(c) Bolts, nuts and cast and forged product.

Sampling is done by (1)-(a), (b) or (c). However screw part can not be removed.

3.2.2 Test Solution

SbCl₃ reagent special grade 32 g or Sb₂O₃ reagent first class 20g is mixed with KS M 1206 (HCl (synthesis) areometer 1.18 series 2) 1 ℓ to make undiluted solution.

Test Solution is made of above solutions mixed at HCl 100 mℓ and undiluted solution 5 mℓ ratio.

3.2.3 Washing Test Piece

If there is a bit or contaminant, wash with solutions such as petroleum benzene (Reagent) (Special grade). If necessary, rub with MgO reagent and wash with water and dry.

3.2.4 Operation and Calculation of adhesion amount

Weigh washed test piece to 1% of predicted adhesion amount.

Submerge the test piece in the test solution ⁽¹⁾⁽²⁾ and take out the test piece when