

	<b>Doc. No:</b>	<b>D99110M-C-XXX</b>	  <b>Qingdao Wuchuan Heavy Industry Co., Ltd</b>	
	<b>Doc. Title:</b>	Thermal Sprayer Qualification Test		
	<b>Project:</b>	<b>GUARA and LULA-NE Projects</b>		
	<b>Subject:</b>	<b>BUOYS SUPPLY</b>	<b>Sheets:</b>	<b>1 / 6</b>

**. Thermal Sprayer Qualification Test:**

The thermal sprayer shall be tested in two ways. Firstly he shall complete a job knowledge test to determine his knowledge of the process, and secondly he shall undergo a practical test to demonstrate his skill in the appropriate area.

1. Practical test

The thermal sprayer shall be tested to determine whether he has the practical skills necessary for the thermal spraying procedure, as detailed in the specific acceptance criteria.


The equipment, of whatever type, shall always be set up by the thermal sprayer and used in accordance with the manufacturer’s instructions.

Particular points to note is that the spray gun is used at a range according to manufacturer’s recommendations, as near normal to the surface as possible and that the coating produced is free from lumps, dust inclusions and coarse textured areas and is of a uniform thickness.

1.1. Test piece production

1) Test pieces for visual , roughness, thickness test

Test piece of low carbon steel according to Figure 1 of rolled 150 mm equal angle section, 4 mm thick at minimum and 500 mm length shall be prepared by grit blasting and the thermal sprayer shall not spray without first accepting the quality of the preparation and the suitability of the environment. The thermal sprayer shall then spray a coating of aluminium to a minimum thickness of 0.225 mm and a maximum thickness of 0.4 mm over both internal faces of the plate.

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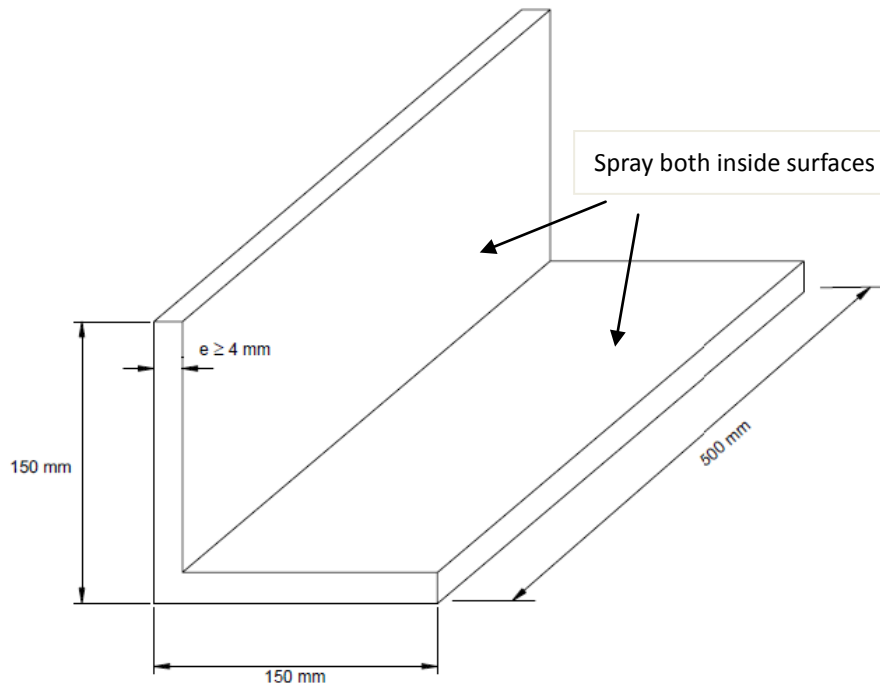
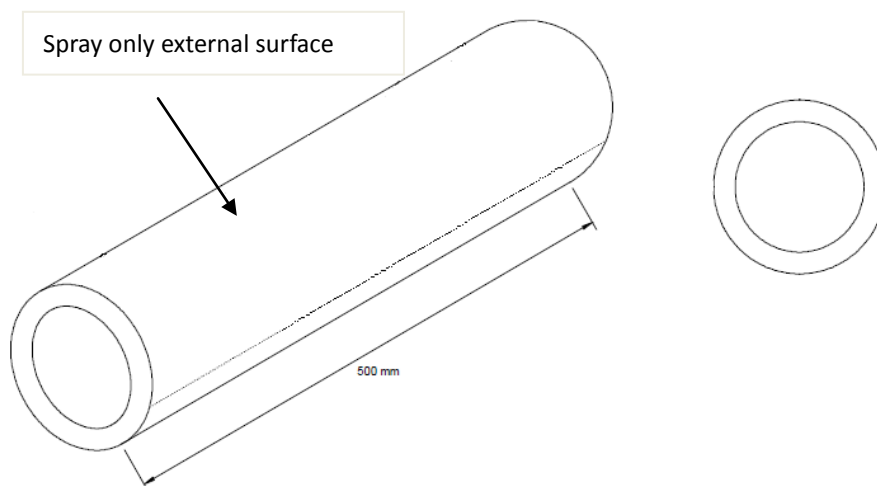


Figure 1.— Test piece for flame or arc spraying of Al/Zn and their alloys

Test piece of low carbon steel according to Figure .2 of cylindrical tubular test piece 2 or fewer diameters by 500mm length. Thickness (minimum): 5mm. The thermal sprayer shall spray only external surface with a coating of aluminium to a minimum thickness of 0.225 mm and a maximum thickness of 0.4 mm.




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Figure 2.— Test piece for flame or arc spraying of Al/Zn and their alloys

2) Test pieces for adhesion, visual, roughness, thickness evaluation

Test piece of low carbon steel according to Figure.3 of steel sheet by 500 mm length, 500 mm width, and Thickness (minimum): 3mm. Only one sheet face shall be coated with a thermal spray coating thickness Between 0.225mm to 0.4mm.

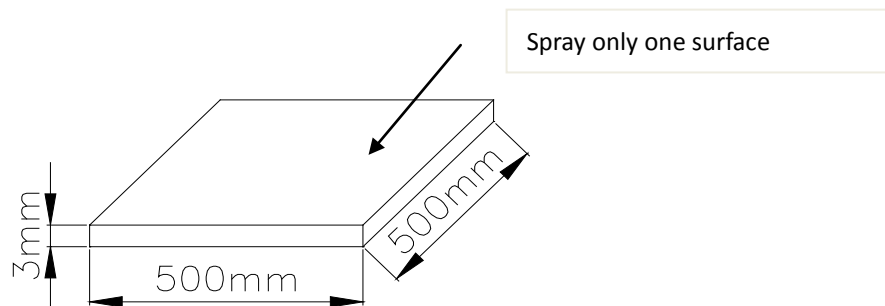


Figure. 3 — Test piece for flame or arc spraying of Al/Zn and their alloys

3) Steel sheets for bending test

Five test pieces of low carbon steel according to Figure.4 of steel sheet by 50 mm width, 100 to 200 mm length, and Thickness (minimum): 1.3mm. Variations in length and width shall be less than 10%. Thickness variation between 1.25mm to 1.35mm . Only one sheet face shall be coated with a thermal spray coating thickness Between 0.225mm to 0.4mm.

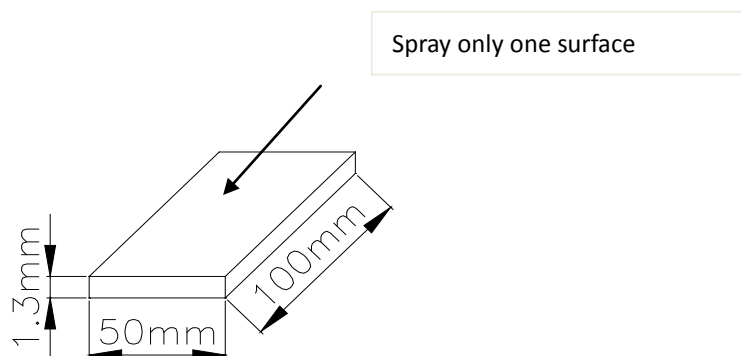


Figure. 4 — Thickness measurements for tubular steel test

1.2 . Testing of the sprayed coating:

Thickness test

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The thermal sprayer shall be provided with type 2 electronic thickness gauge according to SSPC-PA 2 by which he may assess the thickness of the coating on no more than three occasions. Using the same gauge the assessor shall then test the plate as described in figure 5, 6, 7 for general thickness and uniformity of thickness. If the coating thickness lies between 0.225 mm and 0.4 mm at all tested points, then the thermal sprayer shall be deemed to have passed this test.

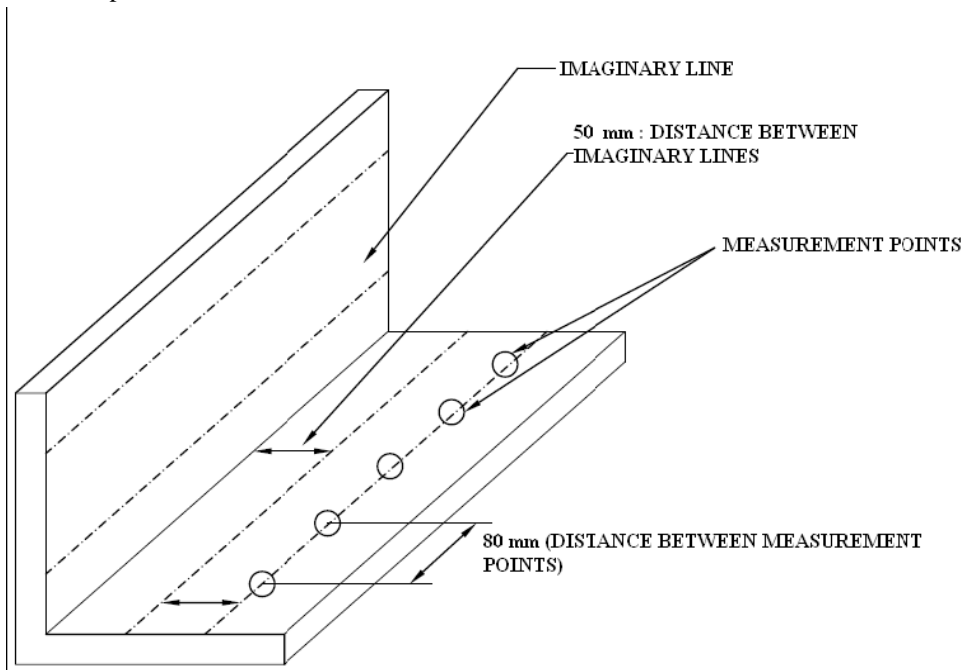


Figure. 5 — Thickness measurements for test panel

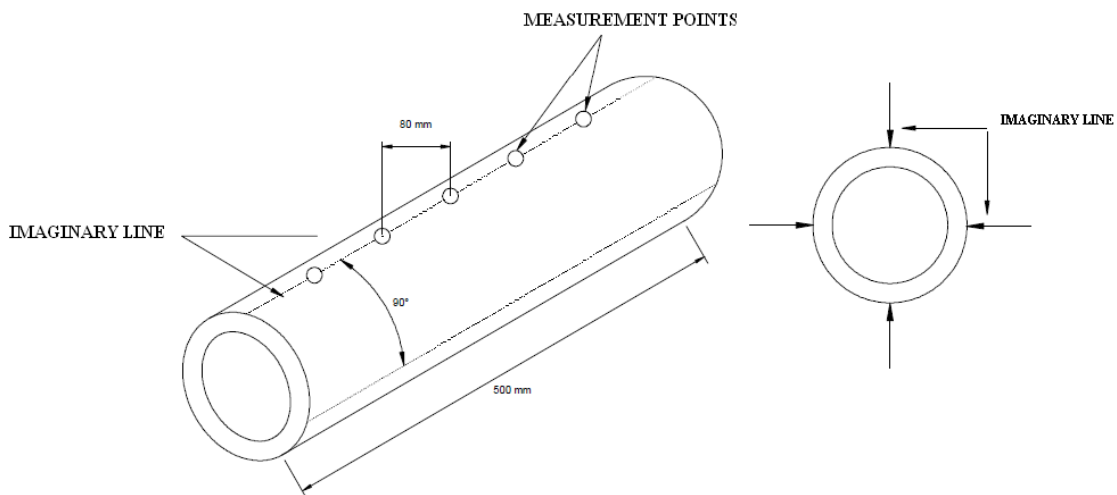



Figure. 6 — Thickness measurements for test panel

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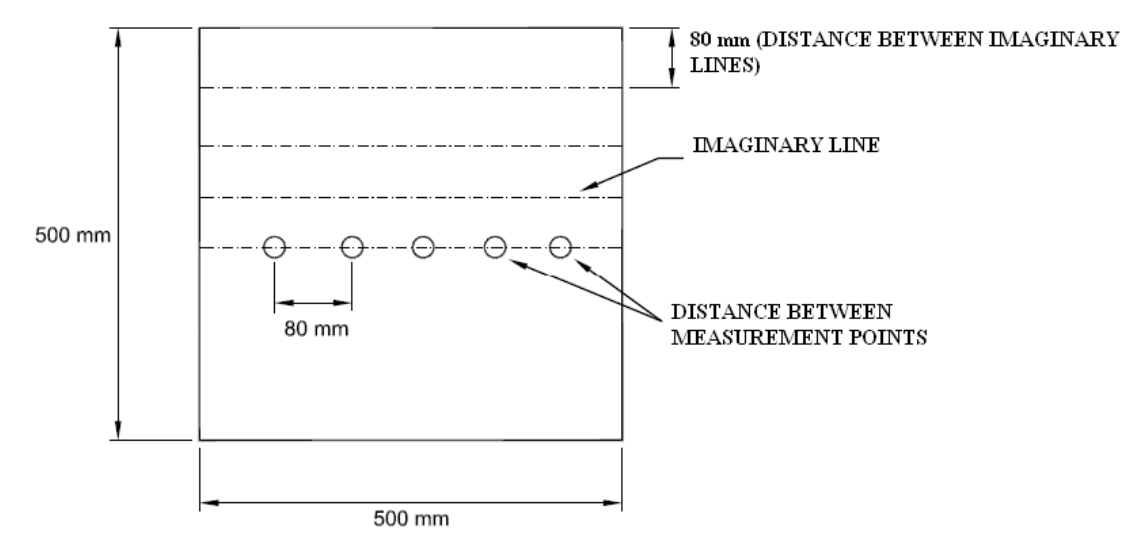


Figure. 7 — Thickness measurements for test panel

**Spray quality**

Using the same sprayed plate the examiner shall inspect the coating for texture and freedom from lumps, dust inclusions and blisters. If no such imperfections are present the thermal sprayer shall be deemed to have passed this test.

**Adhesion test**

An adhesion test shall be performed in accordance with EN 22063. Test equipment shall be according ASTM 4541. The average of the measurements shall be not less than 10MPa. No single measurement shall be less than 7MPa.

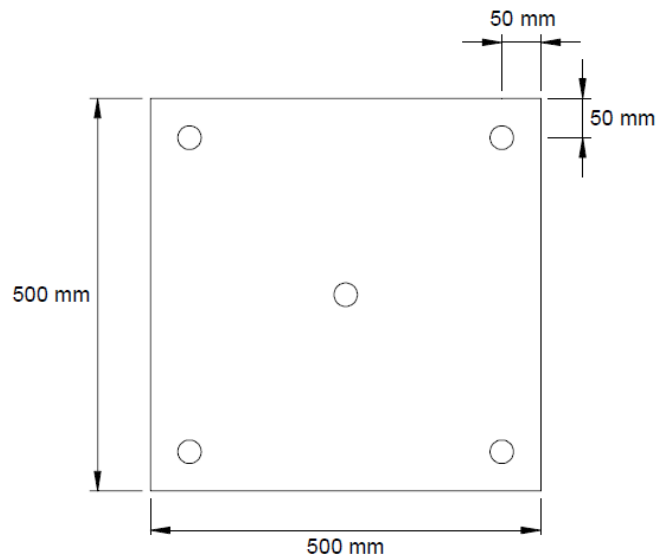




Figure. 8 — Adhesion measurement points location for test panel

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Bend test

Bend test equipment shall have a mandrel with a diameter of 13 mm. Bend test passes if on the bend radius there is no cracking or spalling or there is only minor cracking that cannot be lifted from the substrate with a knife blade.