

For Restricted Circulation only

 SHAKAMBHARI GROUP #SteelWithin		SHAKAMBHARI ISPAT & POWER LTD. (Formerly known as Ess Dee Aluminium Ltd.)	
STANDARD TEST METHOD			
Title: Determination of Pin Holes			Page No. 1 of 3
STM No.	Version No.	Effective Date	Next review date
SIPL/STM/016	00	06.07, 2026	05.07, 2028

1.0 PURPOSE

- 1.1 To establish a standard method for detecting and counting pinholes in aluminium foil used for Pharma & Food packaging.

2.0 SCOPE

- 2.1 This procedure applies to all incoming aluminium foil (e.g. blister foil, strip foil).

3.0 REFERENCE(S) & ATTACHMENTS**3.1 References**

- 3.1.1 In-house

3.2 Attachments

- 3.2.1 Nil

4.0 RESPONSIBILITY**4.1 Quality Control Analyst:**

- 4.1.1 Responsible for performing the test and recording data.

4.2 Supervisor / Manager:

- 4.2.1 Responsible for reviewing and approving the test results.

4.3 QA Head / Plant Head:

- 4.3.1 To approve the new or revised STM, and to ensure the implementation of the defined system.

5.0 DISTRIBUTION

- 5.1 Quality Assurance

- 5.2 Quality Control

6.0 DEFINITION(S) & ABBREVIATION(S)**6.1 Definitions**

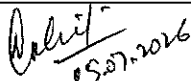
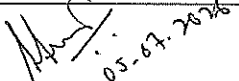
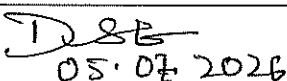
- 6.1.1 **Pinhole Light Box:** An enclosed box equipped with a light source delivering an illumination of at least 1000 lux at the inspection surface.

- 6.1.2 **Magnifying Glass:** With 5x to 10x magnification power.

- 6.1.3 **Darkened Room:** A room with minimal ambient light to optimize visibility.

6.2 Abbreviations

- 6.2.1 Nil

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7.0 PROCEDURE

7.1 Sampling

- 7.1.1 Cut three representative samples from the foil roll.
- 7.1.2 Sample Templates: Prepared frames of specified dimensions (e.g. 100 mm, 200 mm, 250 mm).
- 7.1.3 Avoid using the outermost layers of the roll.
- 7.1.4 Ensure each sample matches the size of the test frame template.
- 7.1.5 Keep samples flat and free of artificial wrinkles or creases.

7.2 Testing Environment

- 7.2.1 Turn off the main overhead lights in the testing room.
- 7.2.2 Ensure the room is sufficiently dark.
- 7.2.3 Turn on the pinhole light box.

7.3 Examination

- 7.3.1 Place the test specimen flat over the viewing window of the light box.
- 7.3.2 Ensure no light escapes from the edges around the sample.
- 7.3.3 Look directly down onto the sample surface from a distance of approximately 30 cm.
- 7.3.4 Count every pinpoint of light that penetrates through the foil.
- 7.3.5 Use a magnifying glass to verify doubtful or microscopic points.
- 7.3.6 Mark each detected pinhole with the fine marker pen.
- 7.3.7 Repeat the process for the remaining two samples.

7.4 Calculations

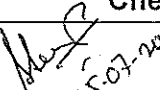
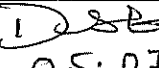
- 7.4.1 Record the total number of pinholes found in each tested sample area.
- 7.4.2 Calculate the average number of pinholes per square meter using the formula below:
- 7.4.3 $\text{Pinholes/m}^2 = \text{Total number of pinholes counted} / \text{Total area of tested samples (in m}^2\text{)}$

7.5 Acceptance Criteria

- 7.5.1 **Thickness < 20 microns:** No pinholes allowed in the tested area.
- 7.5.2 **Thickness ≥ 20 microns:** Must meet specification limits (typically less than 10 to 20 pinholes per square meter).
- 7.5.3 **Pinhole Size:** No individual pinhole must exceed the maximum allowable diameter specified in the raw material specification.

7.6 Documentation

- 7.6.1 Record the Batch Number, Date of Testing, and Analyst Name.
- 7.6.2 Log the total pinhole count and calculated value per square meter in the raw material analytical report.

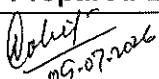
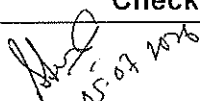
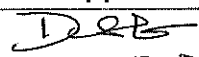
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8.0 REVISION HISTORY

Revision No.	00	Effective Date	06.07.2026	CC No.	NA
Details of revision: New SOP					

Prepared By:	Checked By:	Approved By:
 09.07.2026	 05.07.2026	 05.07.2026