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 SHAKAMBHARI GROUP #SteelWithin	SHAKAMBHARI ISPAT & POWER LTD. (Formerly known as Ess Dee Aluminium Ltd.)		
STANDARD OPERATING PROCEDURE			
Title: Operation of Universal Tensile Machine (UTM)			Page No. 1 of 3
SOP No.	Version No.	Effective Date	Next review date
SIPL/QCI/009	00	06.07.2026	05.07.2028

1.0 PURPOSE

1.1 To define a procedure for operation of the Universal Tensile Machine (UTM).

2.0 SCOPE

2.1 This SOP applies to the Quality Control Department.

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 QC Department Head:

4.1.1 To prepare the SOP.

4.1.2 To confirm the content, correctness, and detailing of the SOP.

4.2 QA Head:

4.2.1 To approve the new or revised SOP.

4.2.2 To ensure implementation of the defined system.

4.3 QC Technician:

4.3.1 Sample preparation, testing, and data recording.

4.4 QC In-Charge:

4.4.1 Ensuring adherence to procedure and result verification.

5.0 DISTRIBUTION

5.1 Quality Assurance.

5.2 Quality Control.

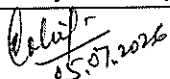
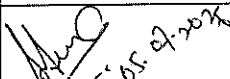
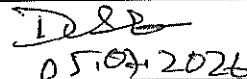
6.0 DEFINITION(S) & ABBREVIATION(S)

6.1 Definitions:

6.1.1 Nil.

6.2 Abbreviations:

6.2.1 Nil.

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

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7.0 PROCEDURE**7.1 Instruments Used**

- 7.1.1 Sample cutter / template (10 cm × 10 cm).
- 7.1.2 Polythene sheet and cutting knife.
- 7.1.3 Steel ruler.
- 7.1.4 Analytical weighing balance.
- 7.1.5 Computer system with UTM software.

7.2 Safety Precautions

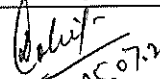
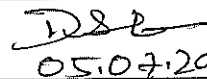
- 7.2.1 Wear safety gloves during cutting operations.
- 7.2.2 Do not place hands between UTM jaws during operation.
- 7.2.3 Ensure UPS power is ON before starting the UTM.
- 7.2.4 Keep the area free from oil and debris.

7.3 Sample Preparation

- 7.3.1 Cut a large sample from the coil in the machine direction.
- 7.3.2 Using the 10 cm × 10 cm template, cut the test piece.
- 7.3.3 Determine the GSM using an analytical balance and record it.
- 7.3.4 Cut the tensile test specimens using the sample cutter, polythene sheet, and knife.
- 7.3.5 Mark the gauge length on each specimen using a steel ruler.
- 7.3.6 Measure the thickness of each specimen using a micrometer.

7.4 UTM Setup & Operation

- 7.4.1 Switch ON the main power supply, the UPS, and the CPU/system, then press the green switch of the UTM.
- 7.4.2 Log in to the system using password: sipl123.
- 7.4.3 Open the UTS Testing folder.
- 7.4.4 Log in to the UTM software using password: FIE.
- 7.4.5 Insert the sample manually between the UTM jaws and tighten properly.
- 7.4.6 Enter the sample details:
 - 7.4.6.1 Sample name.
 - 7.4.6.2 Cross-sectional area = Thickness (mm) × Width (12.5 mm).
- 7.4.7 Press OK to confirm the details.
- 7.4.8 Select Return from Previous and press OK.
- 7.4.9 Open the Test File.
- 7.4.10 Click Tare Weight until the load reading becomes zero.
- 7.4.11 Click TEST to begin the tensile test.
- 7.4.12 Once the sample breaks, remove the broken piece from the jaws.
- 7.4.13 Measure the final gauge length and enter the value in the software.
- 7.4.14 The system will automatically generate the UTS and Elongation (%) results.

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7.5 Calculations

7.5.1 Elongation (%):

$$7.5.1.1 \text{ Elongation (\%)} = \frac{[\text{Final Gauge Length} - \text{Initial Gauge Length}] / \text{Initial Gauge Length} \times 100.}$$

7.5.2 Cross-Sectional Area:

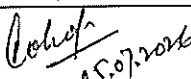
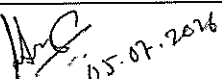
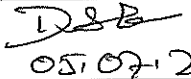
$$7.5.2.1 \text{ Area (mm}^2\text{)} = \text{Thickness (mm)} \times 12.5 \text{ (mm).}$$

7.6 Documentation

7.6.1 Record the UTS and Elongation results in the test log sheet.

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:
 05.07.2026	 05.07.2026	 05.07.2026