



MATERIALS TEST REPORT

Ref. 411104

Date November 14, 2023

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Purchase Order #: 10052023-BPG1

Test Procedure

Shear

☐

Load

☒

Impact

☐

Density

☐

Bend

☐

Fatigue

☐

Fracture Toughness

☐

Sample: QTY (1) – Inconel 718 Tiedown

Test Method: One tiedown sample was subjected to tensile load testing utilizing three different hooks. The sample was affixed in the test frame and was first loaded axially to 25,000 lbf asymmetrically and held for one minute. The procedure was repeated with a hold for five minutes. A second configuration used symmetrical loading with two hooks was affixed to the test frame, loaded to 32,000 lbf, held for one minute, then repeated with a hold for three minutes.

The test specimen was dimensionally inspected after each load test to ensure the failure criteria was not met. Failure would be indicated through a permanent deformation of 0.030" or greater to the tiedown crossbars. The sample passed if the tiedown successfully held the specified load for three minutes.

Table I lists the results from tensile testing. Figures 1-2 show the testing configuration, Figure 3 shows the strain gauge locations, Figure 4 shows a fixturing failure that occurred, and Figures 5-8 show the strain data acquisition. Testing was performed in ambient temperature and humidity conditions.

Test Frame: Samples were tested on 55-kip fatigue frame ATS-06742 with load cell ATS-05660.

ISO 9001

Prepared by:

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Materials Testing

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Table I – Tensile Testing Results

Configuration	Load (lbf)	One Minute Hold	Three Minute Hold	Remarks
Asymmetrical	25,000	PASS	PASS*	*The asymmetrical secondary loading was set to a 5-minute hold and a fixture hook failed at 4.5 minutes. Test article showed no sign of damage.
Symmetrical	32,000	PASS	PASS	

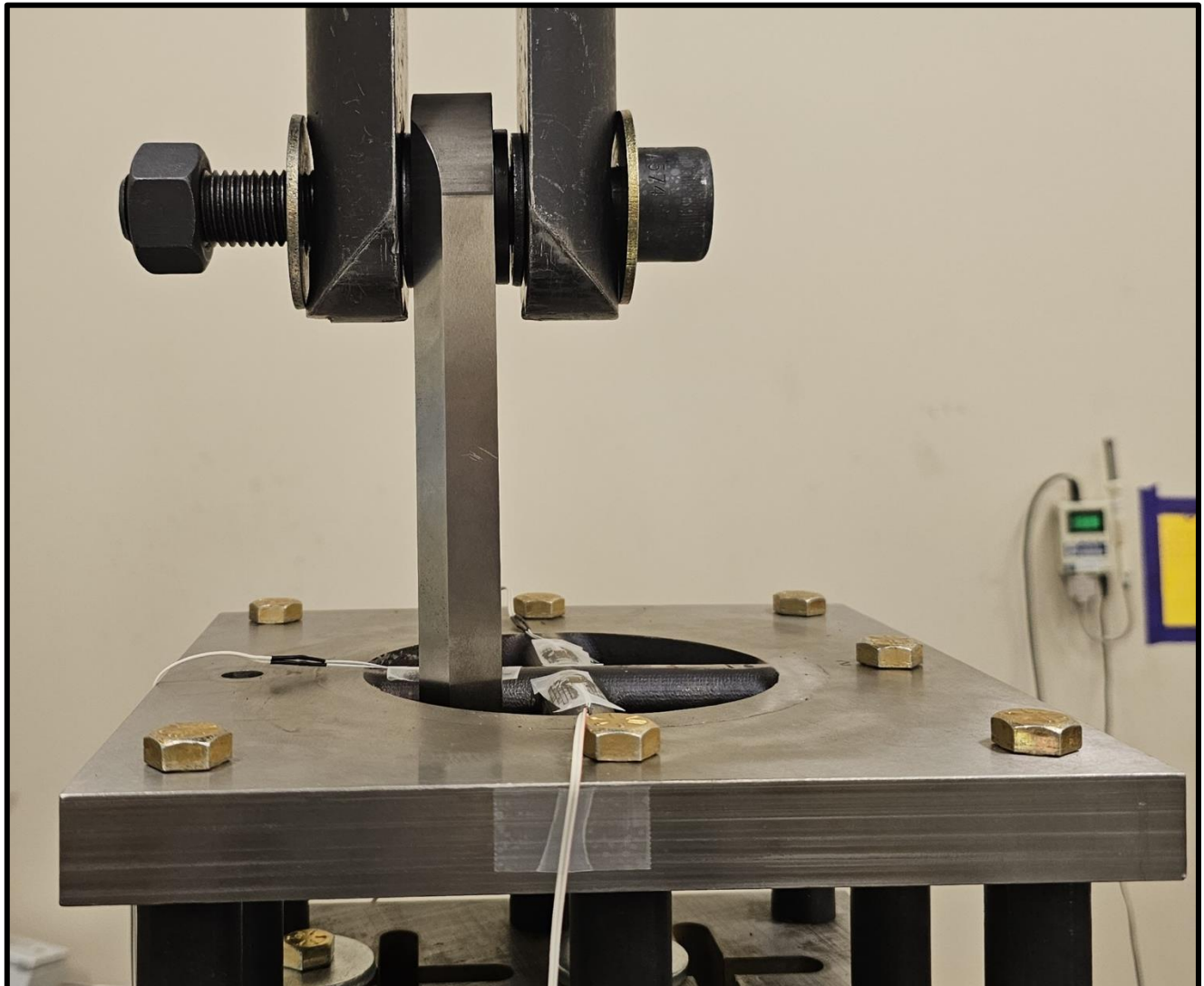


Figure 1: Asymmetrical load testing configuration



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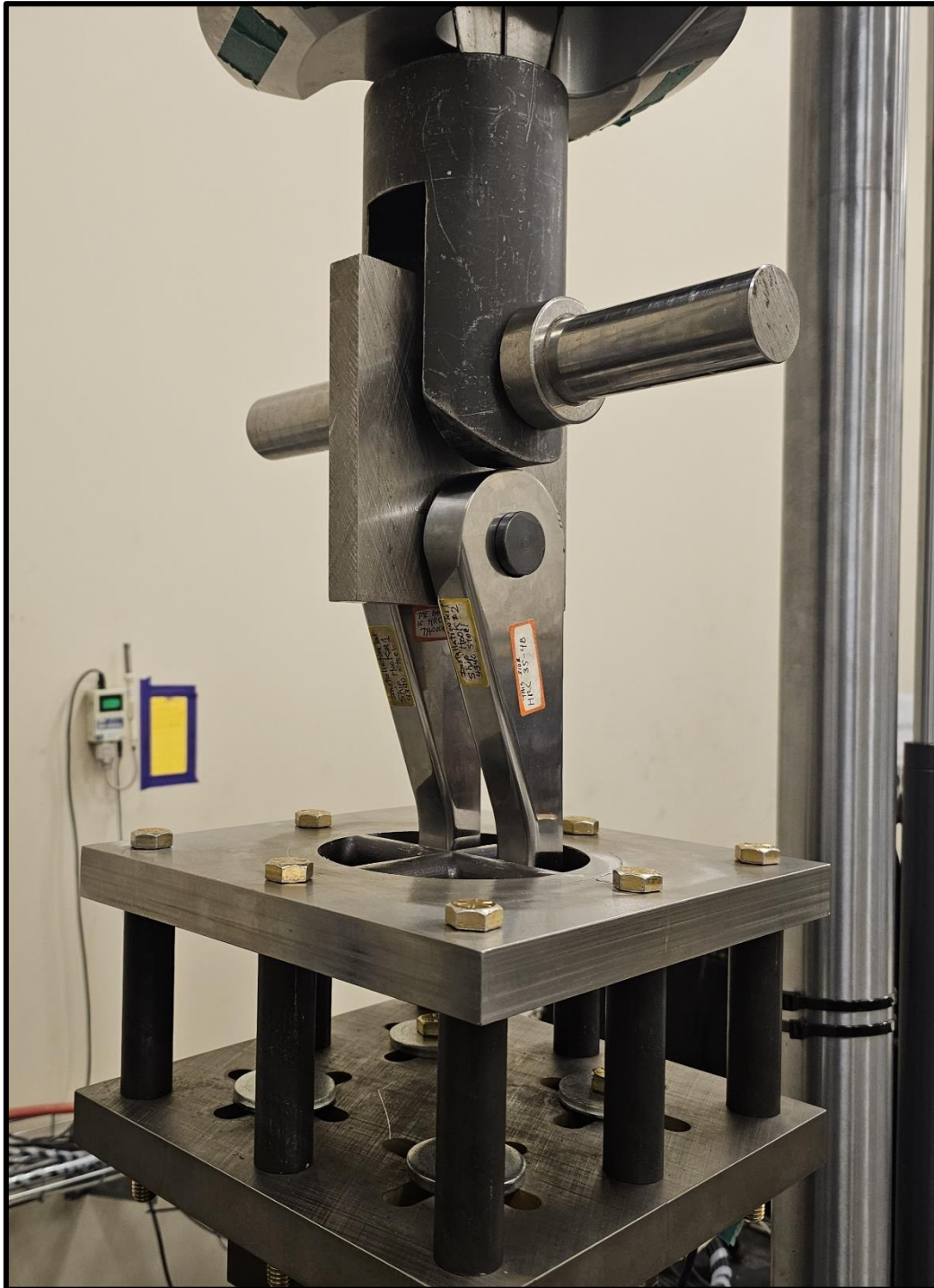


Figure 2: Symmetrical load testing configuration



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Figure 3: Strain gauge locations



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Figure 4: Asymmetrical loading fixture hook failure



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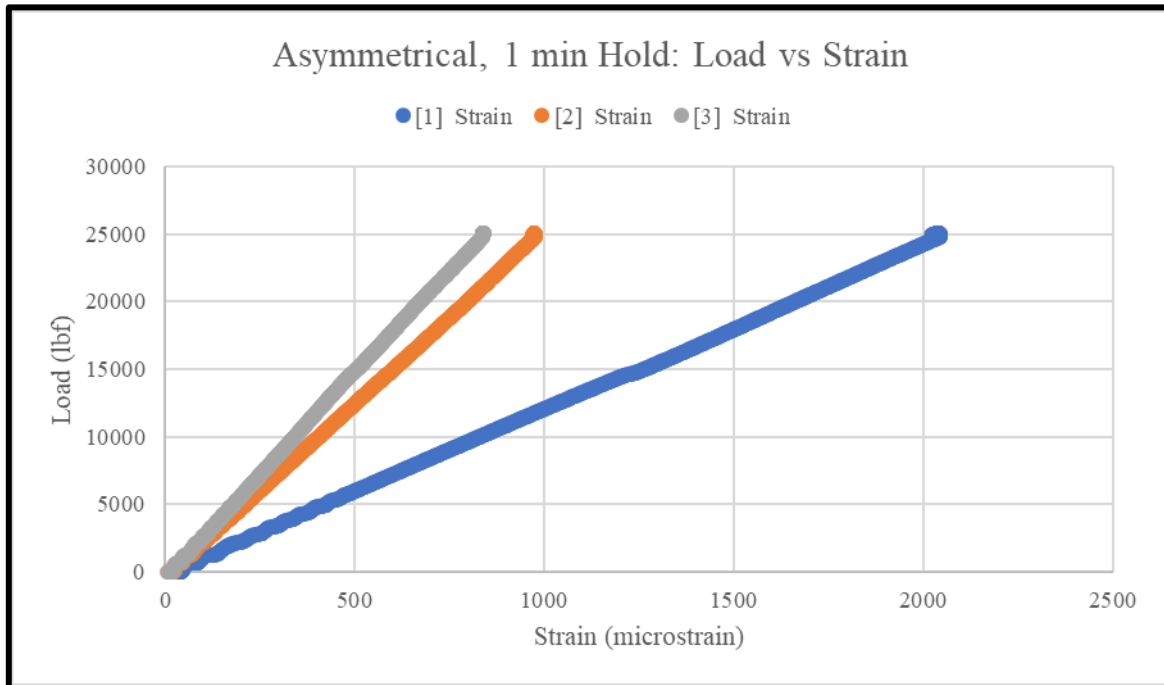


Figure 5: Strain vs. Load for asymmetrical 1 minute hold

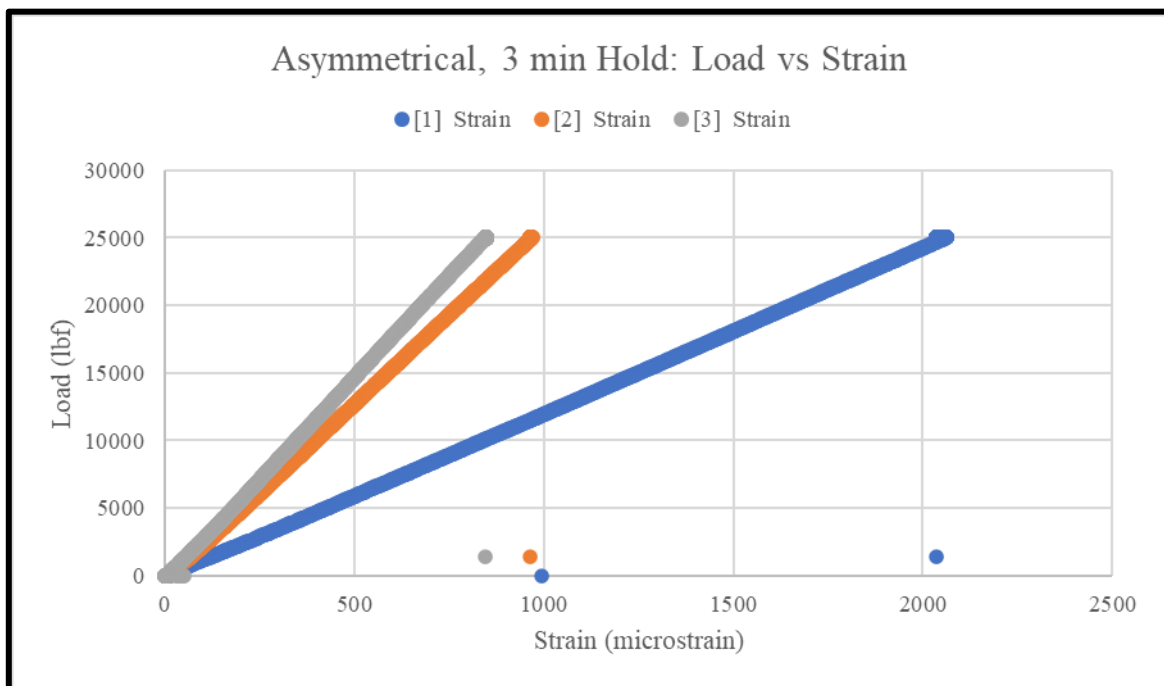


Figure 6: Strain vs. Load for asymmetrical 3 minute hold



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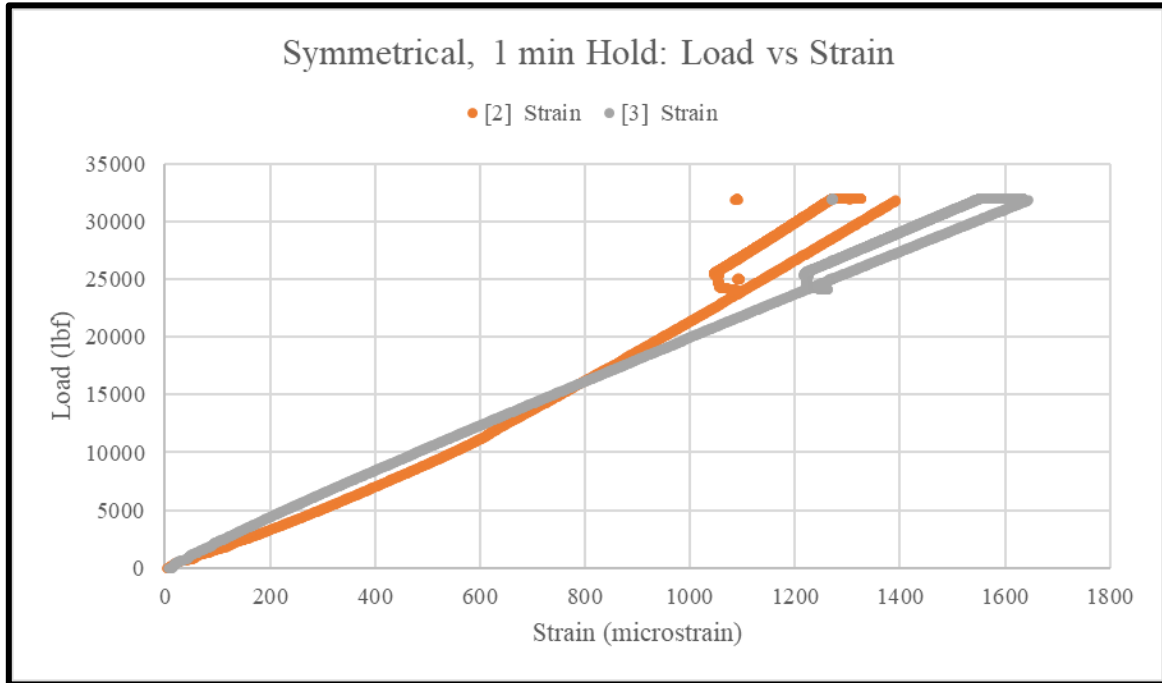


Figure 7: Strain vs. Load for the symmetrical configuration. The program ramped down to the asymmetrical load and it was corrected during the test.

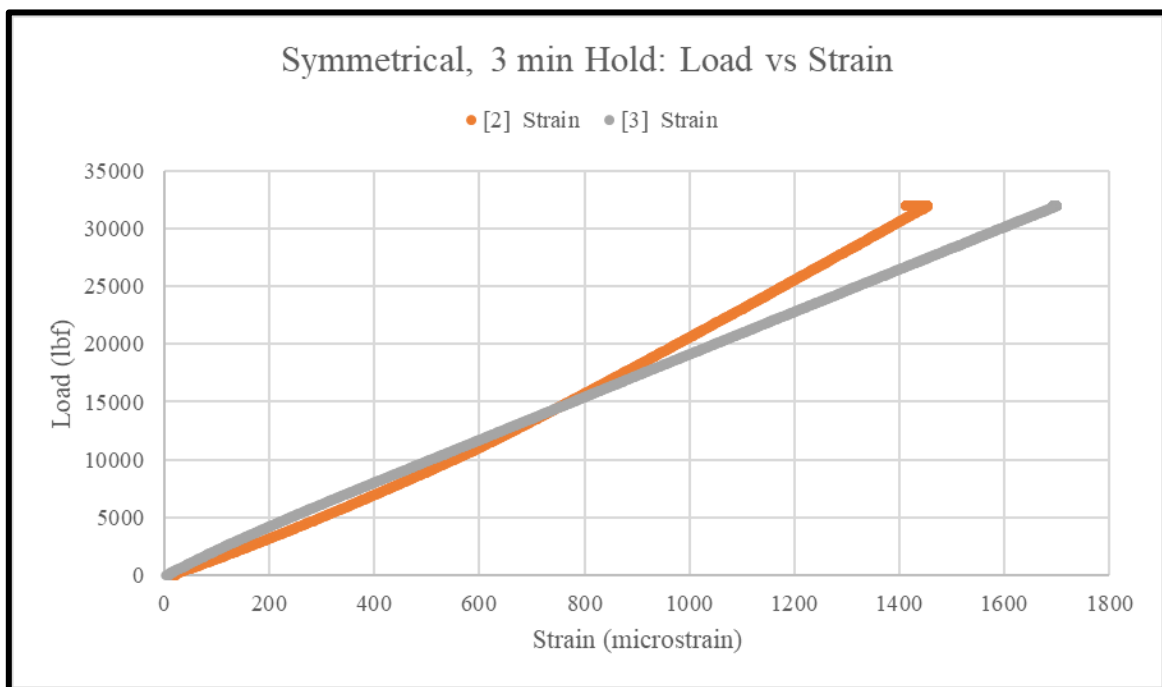


Figure 8: Strain vs. Load for the symmetrical test with a 3 minute hold