APPLIED TECHNICAL SERVICES

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MATERIALS TEST REPORT

Ref. 411100 Rev. 1 **Date** December 5, 2023 **Page** 1 **of** 7

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Burchell Professional Group, Inc.
820 W. Calle Ocarina
Sahuarita, AZ 85629

Purchase Order #: 10052023-BPG2

Test Procedure

Shear	☐
Load	☐
Impact	☐
Density	☐
Bend	☐
Fatigue	☒
Fracture Toughness	☐

Sample: QTY (1) – Inconel 718 Tiedown

Test Method: The test specimen was installed in the test fixture with two hooks gripping the central tiedown beams symmetrically. The specimen was then subjected to cyclic loading using a sinusoidal waveform with a maximum load of 5400lbf and load ratio R = 0 at 6Hz for 1 million cycles.

Dimensional inspection was conducted after testing to check for permanent deformation. The specimen was considered to pass the inspection if no visible damage was present and permanent deformation after testing was less than 0.030".*

Table I below lists the minimum and maximum force and deflection recorded during the test. Figure 1 shows the force and displacement data per cycle throughout the test. Table II Figures 2–4 show the test setup before and after testing.

Testing was performed at room temperature and in ambient humidity conditions.

Test Frame: Testing was performed on 55-kip fatigue frame ATS-06742 with load cell ATS-05660.

ISO 9001

Prepared by: Tyler Moore 2023.12.07 09:32:17 -05'00' Tyler Moore
Materials Testing

Reviewed by: Date: 2023.12.07 09:03:40 -05'00' Daniel Pate
Materials Testing

*Included post-test dimensional inspection in method and results

Table I – Fatigue Test Results

Force (lbf)		System Displacement (in)		Remarks
Maximum	*Minimum*	*Maximum*	*Minimum*	
5437	-6	0.0216	0.0	System displacement accounts for the deflection of the full test fixturing in addition to the test specimen.

Table II – Fatigue Test Pass/Fail

Visible Damage?	Permanent deformation ≥ 0.030”?	Pass/Fail	Remarks
No	No	Pass	Visible damage was not present after conclusion of 1,000,000 loading cycles. Permanent deformation was not observed during post-test dimensional inspection.

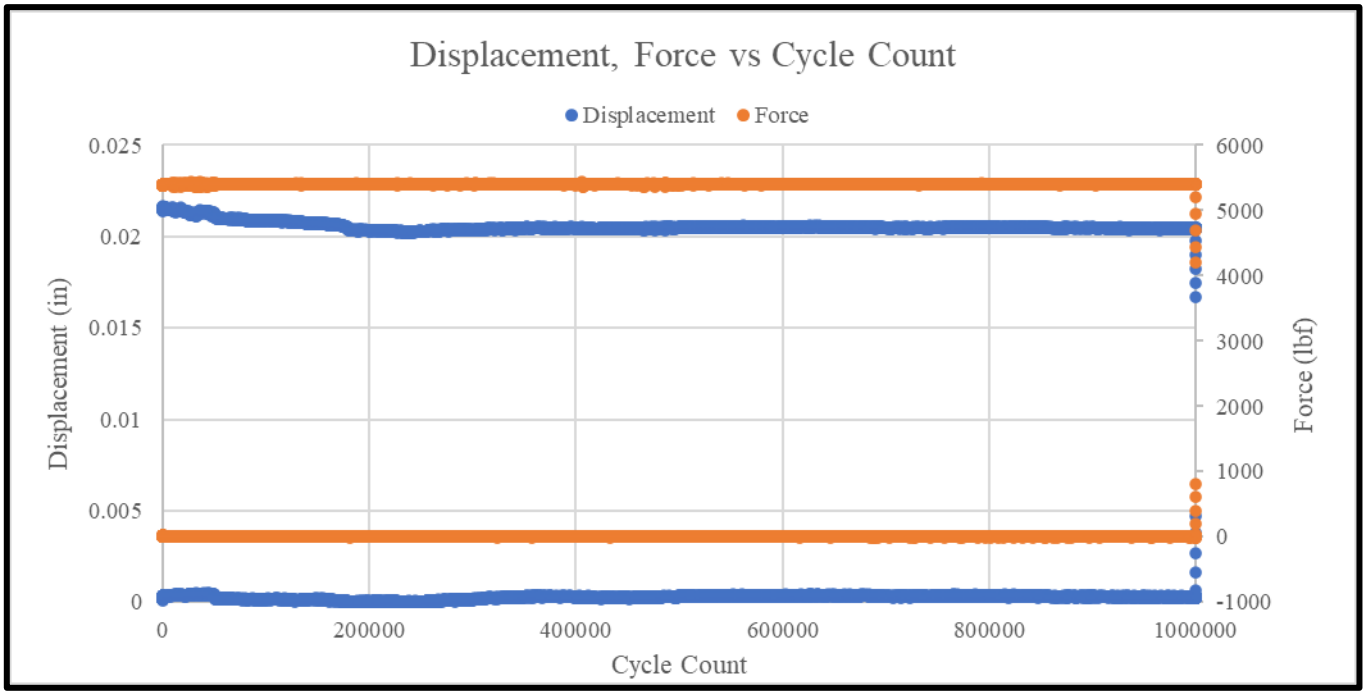

Figure 1: Displacement and Force data plotted versus cycle count

*Changed Table I and added Table II to more accurately reflect failure criteria

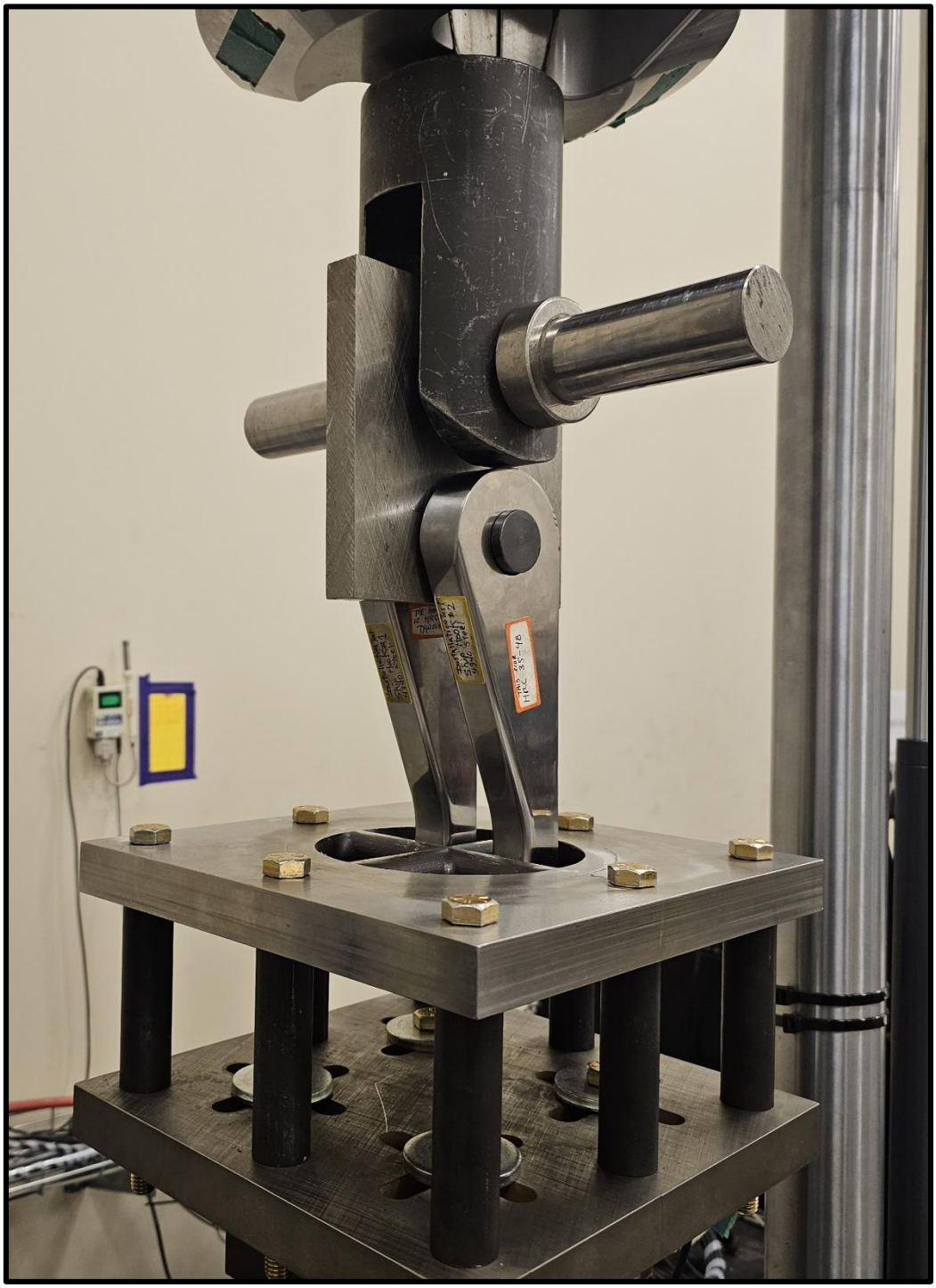

Figure 2: Fatigue test setup

Figure 3: Specimen and hooks post test

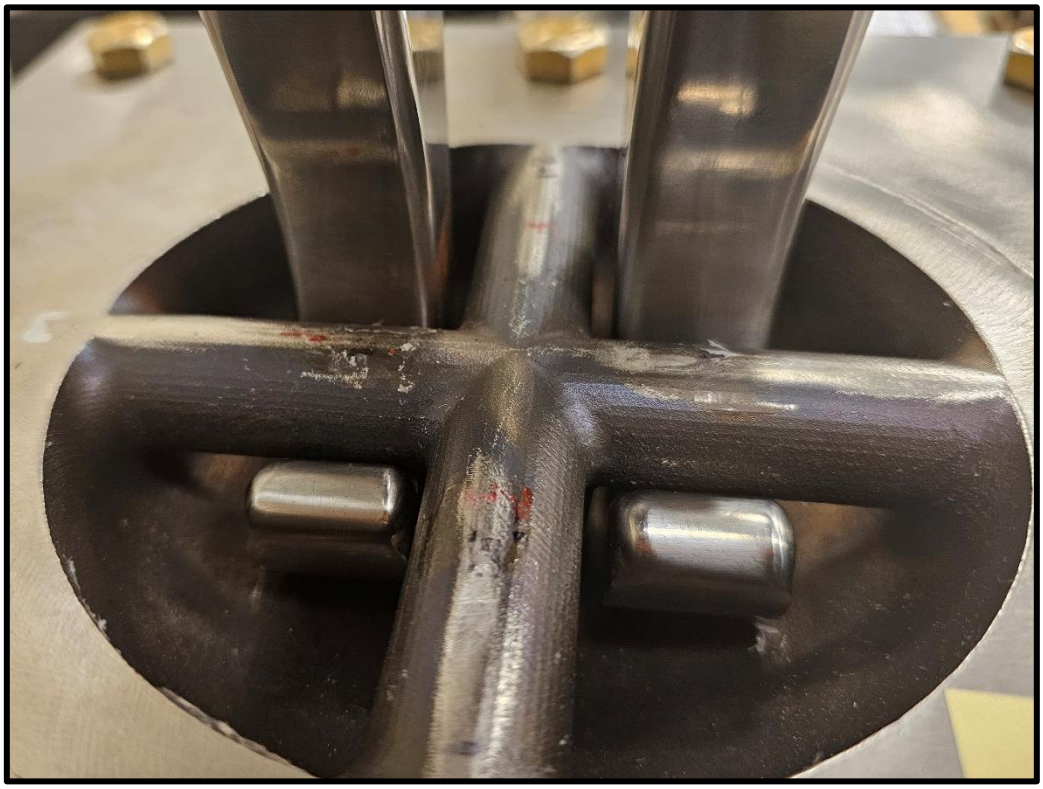

Figure 4: Cross bars post test

Appendix A: Dimensional Inspection Results

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DIMENSIONAL INSPECTION REPORT

Customer	Burchell Professional Group
PO Number	10052023-BPG2
ATS Ref.	411104-2
Part Name	Plate
Part Number	N/A
Date	11/21/2023
# Parts	1
Inspector	Rodger Pinney

Reference Drawing Supplied for location of the following measured features
Dimensions are in Inches

Dimension	Pre-Pull Measured	Post Pull 1 Measured	Post Pull 2 Measured	Post Pull 3 (Fatigue) Measured
Center Point Distance From Plane	0.0111	0.0111	0.0111	0.0111
Point 1-1 Distance From Plane	0.0013	0.0012	0.0013	0.0014
Point 1-2 Distance From Plane	0.0077	0.0091	0.0108	0.0093
Point 2-1 Distance From Plane	0.0047	0.0047	0.0047	0.0047
Point 2-2 Distance From Plane	0.0094	0.0094	0.0094	0.0094
Point 3-1 Distance From Plane	0.0045	0.0044	0.0045	0.0044
Point 3-2 Distance From Plane	0.0097	0.0097	0.0112	0.0098
Point 4-1 Distance From Plane	0.0079	0.0081	0.0081	0.0082
Point 4-2 Distance From Plane	0.0084	0.0085	0.0085	0.0085
Diameter Cylinder 1	0.8650	0.8648	0.8647	0.8651
Diameter Cylinder 2	0.8630	0.8630	0.8630	0.8633