W. W. Hansen Experimental Physics Laboratory

STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-4085
GRAVITY PROBE B RELATIVITY MISSION

GMA BASEPLATE PULL DATA

S0849 Rev –

April 03, 2003

4/3/03
Prepared and Approved by: C. Gray **Date**
GMA Responsible Engineer

9/3/03
Approved by: Robert Brumley **Date**
Payload Technical Manager

4/3/03
Approved by: J. Mester **Date**
GMA Technical Manager

4/3/03
Approved by: A. Logan **Date**
System Engineering

4/9/03
Approved by: D. Ross **Date**
Program Quality Assurance Manager

ITAR Assessment Performed **ITAR Control Req'd?** ☐ **Yes**
☒ **No** 4/5/03
Tom Langenstein

REVISION RECORD

Rev	Date	Comments

Purpose:

Documented data taken at Composite optics, Inc. for the GMA Pallet threaded inserts. The data evaluates the "pull" forces required for failure. The data indicates that the inserts meet the PLSE-12 Requirements shown below. (Test requirements – 450psi minimum / test results confirm ~1210psi average for 3 tests) This exceeds the required safety factor of 2.0 ultimate for the baseplate.

Requirement:

PLSE-12 Requirement

Para	Title	Requirement	Method
3.7.8.12.1	Structural Safety Factors	The inertial safety factors for the GMA shall be 1.25 for yield and 1.5 for ultimate for all structure except the base plate; the safety factor for the base plate shall be 2.0 for ultimate.	A

COMPOSITE OPTICS, INC.

Laboratory Request

Lab No. 24955

1 OF 1

PROJECT No. 1736R | WORK ORDER No. NA

PROG. NAME	Moog	PART NAME	NA		
PART No.	NA	REV. NA	S/N NA	CURE No.	NA
MATERIAL	Alum Skin/Alum Core	OPT NA	LOT No. NA	ROLL No.	NA
P.O. No.	NA	LAY-UP	NA	LAM. THICKNESS	NA
PROG. MGR.	BB Cohen				

SPECIAL INSTRUCTIONS: FWT TEST 3 of 4 Coupons. per ASTM C297

COUPON ID

DATE REC'D. 12/12/01

TEST REQUIREMENTS:	TEST RESULTS:
450 psi min.	1209.7 PSI avg

LAB TECH. [signature] DATE 01/09/02 LAB MGR. [signature] DATE 1/30/02

Q.E. [signature] DATE 1/1

J. MUNOZ

ORIGINAL TO Q.A., COPY TO TEST LAB, COPY TO PROGRAM MANAGER

Report Date: Jan 3, 2002

Composite Optics Inc.
Mechanical Test Lab
9617 Distribution Ave.
San Diego, CA 92121 USA

Lab Number: 24966 FWT
Method: Flatwise/Pi Tensile(ASTM C297)
Data path: H:\TWDATA25

Test Date: Jan 3, 2002
Operator ID: BILL

Sample Inputs:

Work Order/Step	N/A
Temp. (deg F)	73° F
Panel Thickness	1.550
Material	AL SKIN/AL CORE
Program No/Name	1730R

	Specimen Area Sq.In	Peak Load Lb	Ftu PSI	Ftu MPa
1	3.960	5019.3	1267.5	8.739
2	3.976	4781.4	1202.6	8.291
3	3.968	4598.8	1159.0	7.991
Mean	3.968	4799.8	1209.7	8.340
Stdv	0.008	210.8	54.6	0.376
%Cov	0.200	4.4	4.5	4.513

Specimen Comments:
1 : SKIN TO CORE
2 : SIN TO CORE
3 : SKIN TO CORE

Test Inputs:

Load Limit HI	22000	Lb

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Manufacturing Work Instructions

Part No.	C71034	Part Rev.	E	Part Name	MOOG PALLET ASSY			Quantity	1 EA	S/N	001
WO #	C71034-W	WO Rev.	N/C	Ship To	SHIP	Need Date	12/12/01	S/N	001 & On	WO #	25290	Prog	1711R

LABORATORY REQUEST

ManFact Lot No.	Raw Material Part No.	Material Description	Cut-up Orientation	CPT	Date Rec'd.	Lab No.
	m	Alum skin/alum core sandwich	na	na	1/8/02	25038

Special Instructions:

Pull the (3) each supplied 6" x 6" coupons to failure using a cross head speed of 0.05 in/minute and a test fixture with a 3.5" dia hole to pull through.

Record failure force and a plot of load versus cross head motion.

Forward failed coupons to PM. Ben Bowen B. Bowen

Step #	Work Center	Hrs.	Test Requirements	Test Results
4	440*10	6	NO REQUIREMENT, 1000 lbf Target. Insert Pull-out u	1291.0 lb avg.

Lab Technician	Date	Lab Supervisor	Date	Quality Engineer	Date
[illegible]	1-21-02	Dan Long	1/22/02	JMunoz	

Sophia Rev -