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CONICAL ISOGRID ADAPTER STRUCTURAL TEST RESULTS

GENERAL DYNAMICS
Convair Aerospace Division

REPORT NO. PD 73-0123

CONICAL ISOGRID ADAPTER STRUCTURAL TEST RESULTS

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1. INTRODUCTION

1.1 Background

Isogrid is an efficient integrally stiffened waffle type construction in which the stiffeners are arranged in an isosceles triangular pattern rather that the rectangular grid pattern of conventional waffle structures. Analysis and test data indicate isogrid structures generally tend to be somewhat lighter than equivalent strength waffle or skin/stringer structures. However, to utilize isogrid to its maximum efficiency, accurate prediction of failure loads is required. Local and general instability compression failure modes are of primary interest. Isogrid element crippling and buckling loads can be accurately predicted with current analytical techniques. However, as for other compression critical structures, a wide disparity may exist between general instability failure loads as predicted by theory and measured by test. It is thus necessary to test full scale structural elements to determine and evaluate empirical correction or "knock down" factors which can be applied to theory to accurately predict general instability failure.

Most of the early isogrid work was performed by McDonnell Douglas Astronautics Company on blade stiffened stable skin designs applied to cylindrical structures. To improve the structural efficiency of isogrid, the Convair Aerospace Division of General Dynamics has developed isogrid designs with flanged stiffeners which permit skin buckling in compression at low load levels in a manner similar to conventional skin-stringer designs. Many applications of isogrid to structures other than cylindrical shells have been identified.

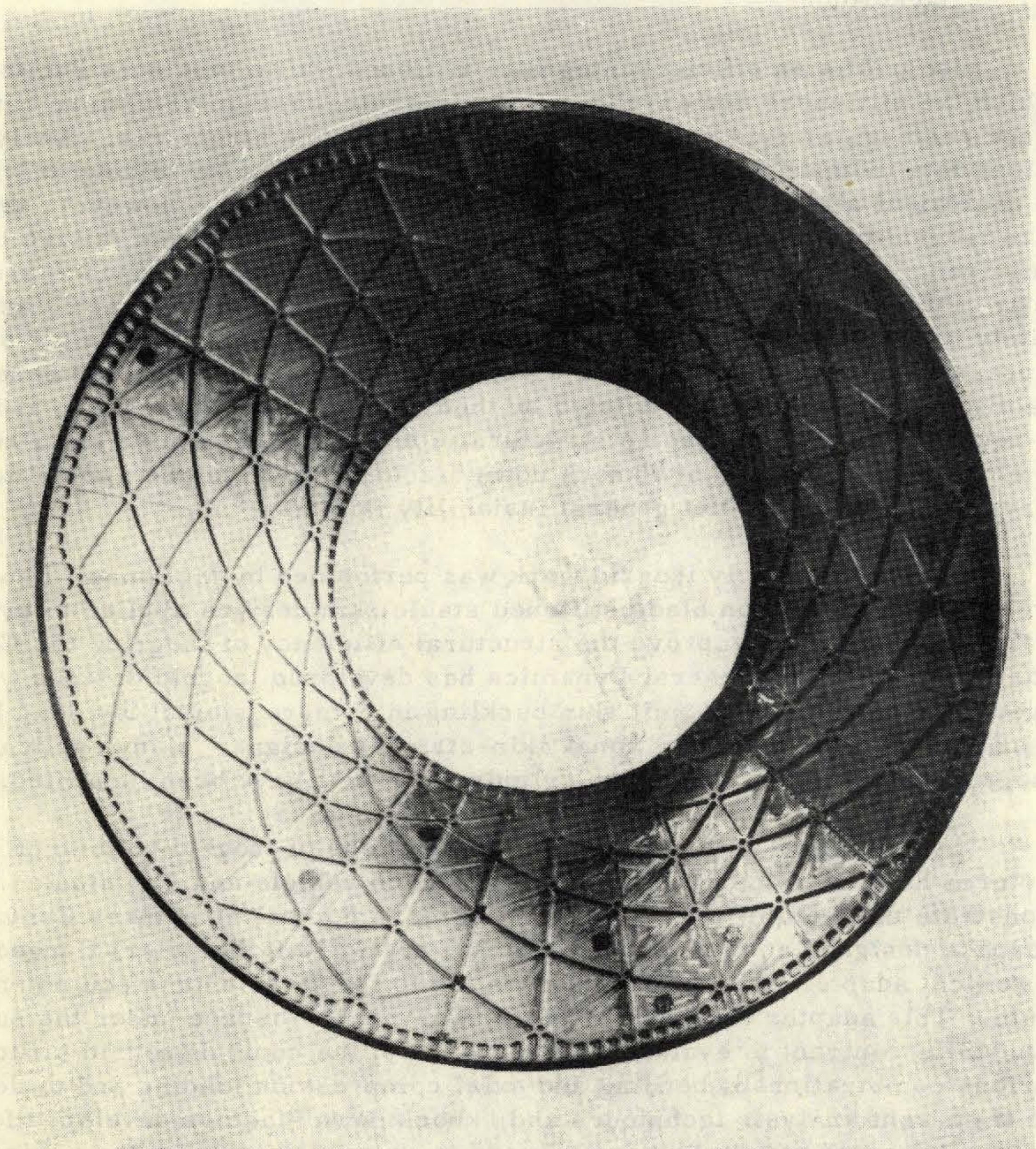
Specifically, several potential applications of isogrid to conical structures have been identified in current launch vehicle and Tug studies. To demonstrate the feasibility of applying isogrid to conical structures Convair Aerospace designed and manufactured a full scale (10 ft diameter) flanged isogrid conical adapter similar in configuration to the D-1 Centaur equipment module. This adapter was then tested by Convair Aerospace under the subject NASA MSFC contract to evaluate the response of the conical isogrid structure to various combinations of bending and axial compression loading and to determine if current analysis techniques and "knock down" factors developed for cylindrical isogrid structures can be used to accurately predict the conical isogrid structural capability.

1.2 Purpose and Scope

The conical isogrid test program was designed to (a) evaluate the response of the conical isogrid structure to various combinations of bending

FIGURE 1. 3-1

CONICAL ISOGRID ADAPTER



and axial compression loading, and (b) establish the ultimate capability of the structure in compression for comparison with analytical predictions.

The test program was divided into two phases. The first phase consisted of a series of survey tests using five different combinations of axial and bending loads. Survey test loads were selected so that stresses in the structure remained in the elastic region. The Centaur D-1 equipment module design loads, which are representative of typical current launch vehicle and Tug requirements, were used as the basis for these survey test loads.

After completion of the survey tests the isogrid adapter was tested to failure in compression.

1.3 Description of Test Article

The test article (Figure 1.3-1) was a flanged isogrid 45° conical frustum 30 inches high with a 120 in diameter base. The structure was fabricated from six gore segments machined in the flat from 2024-T351 aluminum plate, brake formed to the proper contour and then aged to the T851 temper.

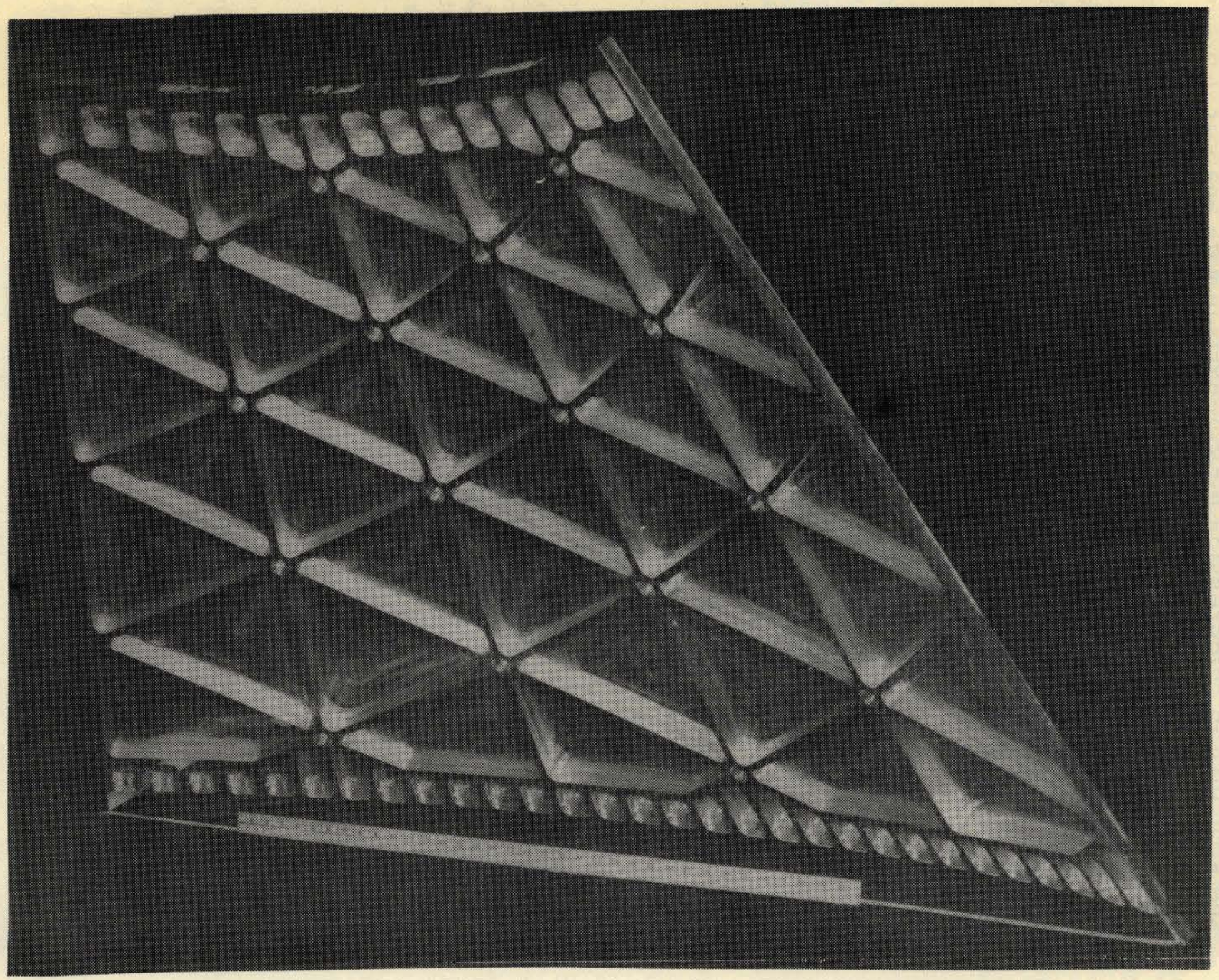
A typical gore segment is shown in Figure 1.3-2. The gore segments were joined along their longitudinal edges by inside and outside splice plates which maintain panel-to-panel structural continuity between grid members. The splices were segmented to avoid hard points at the longitudinal joints. Flanged pocketed transition sections at the fore and aft adapter interfaces were designed to redistribute flange loads into the basic isogrid structure. One pocket was machined at each of the flange bolt locations. The conical adapter design details are shown in Figure 1.3-3.

To accurately correlate test results with analysis it was necessary to measure and record the actual detail dimensions of the test specimen after fabrication. Inspection records are tabulated in Figure 1.3-4. Due to machining difficulties several of the panels had undersize and damaged areas which required repairs. These repaired areas are also indicated in Figure 1.3-4. The center of the best panel was selected as the point of maximum compressive test loading (0° point in Figure 1.3-4).

1.4 Test Set-Up

Tests were conducted at the Convair Aerospace Structures Test Facilities (Building 52) in San Diego, California. The overall test set-up is shown in Figure 1.4-1.

FIGURE 1. 3-2 TYPICAL GORE SEGMENT



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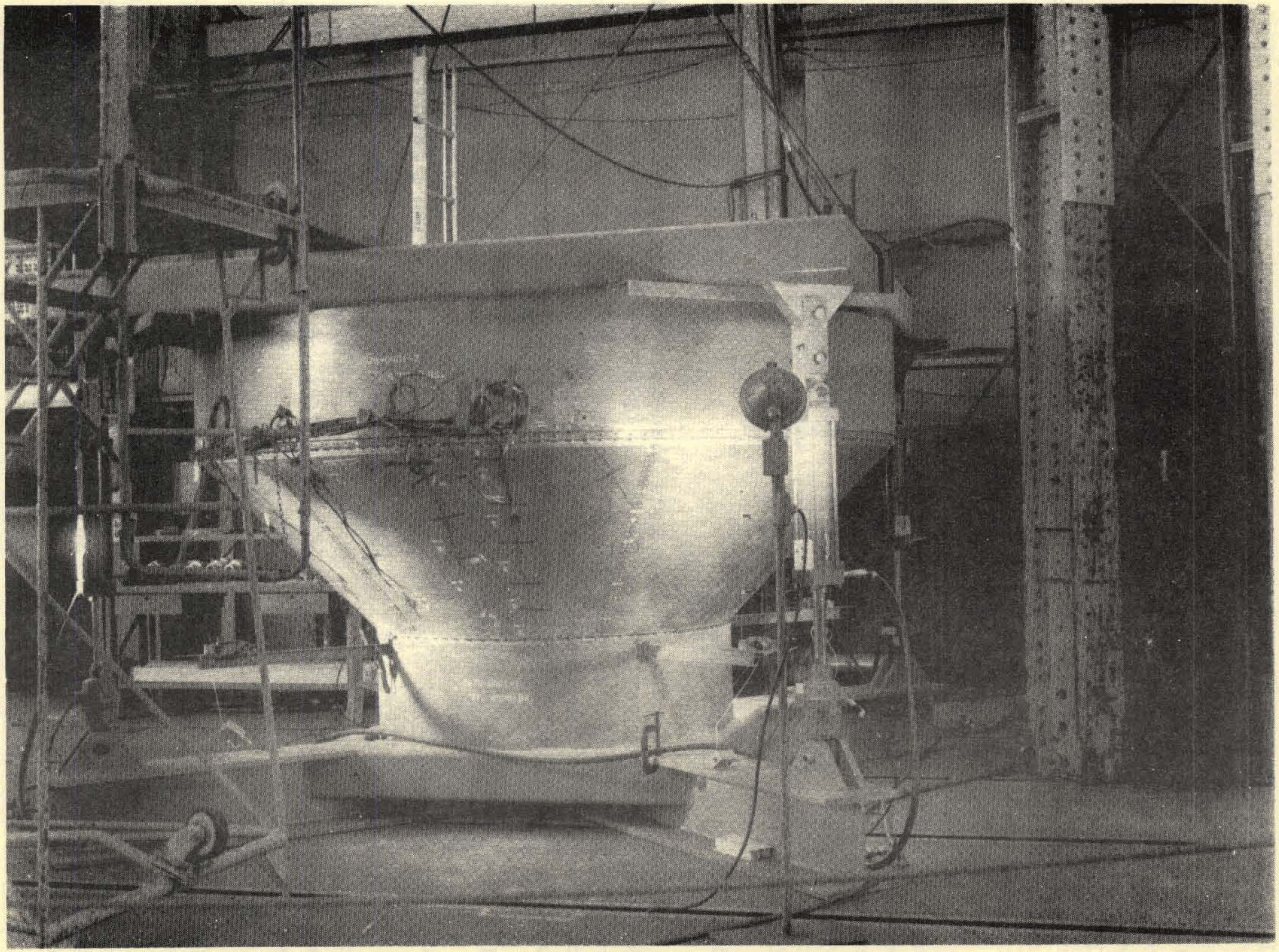

FIGURE 1.4-1 TEST SET-UP GENERAL VIEW

1.4.1 Load Application Fixtures

Two steel load application fixtures were fabricated to apply test loads to the conical isogrid adapter. Since the adapter was tested in an inverted position, the lower loading fixture, which consists of a 60-inch diameter by 1 inch thick by 18 inch high steel cylinder welded to two 12 WF 106 steel beams, was bolted to the 60 inch diameter adapter interface. A ring frame was provided at the adapter to test fixture interface to react the radial kick loads from the 45 degree conical adapter to cylindrical fixture transition.

The upper loading fixture consisted of a 120 inch diameter by 1 inch thick by 20 inch high steel cylinder welded to a 124 inch square loading frame made of 8 inch by 3/8 inch wall square tubing. Loading cylinder clevis attachments were provided at the four corners of the loading frame. A ring frame was provided at the adapter interface to react the radial kick loads from the conical adapter to cylindrical fixture transition. Design details of the loading fixtures are shown in Figure 1.4-2.

1.4.2 Loading Subsystem

Four hydraulic cylinders and load cells were installed to provide test loads and load measuring capability. An additional load cylinder was used to relieve the 1g dead weight of the 120 inch diameter test fixture and the associated hydraulic cylinders and load cells. An Edison Load Maintainer was used to control the loading and dead weight hydraulic cylinders.

1.5 Instrumentation

1.5.1 Strain Gages

Forty axial strain gages were installed at the locations shown in Figure 1.5-1. Gages S-1 thru S-38 were mounted in pairs on the isogrid stiffeners and were oriented along the stiffener axis. Gages S-39 and S-40 were applied to two skin panel repair patches. These two gages were oriented in the loading direction.

1.5.2 Deflection Transducers

Ten electrical deflection transducers (D-1 thru D-10) capable of .001 in resolution were mounted normal to the conical adapter surface at the locations shown in Figure 1.5-1. Four deflection transducers (D-11 thru D-14) were mounted inboard of the four load points to measure axial deflections.

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1.5.3 Load Cells

Four load cells were used to measure loads applied to the test specimen by the four hydraulic load cylinders. Locations of the four load cells, designated LD1 thru LD4, are shown in Figure 1.5-1.

1.5.4 Test Data Recording and Print Out

All data were recorded on magnetic tape using a high-speed recording system. Data were printed out in digital form and corrected to engineering units on a high speed printer. Data were printed out in the following units: deflections in 10^{-3} inches, loads in pounds and strains in micro-inches per inch. Plus indicates hydraulic ram tension load, specimen tension strain, specimen outward radial movement and lengthening in the axial direction.

1.6 Test Loads

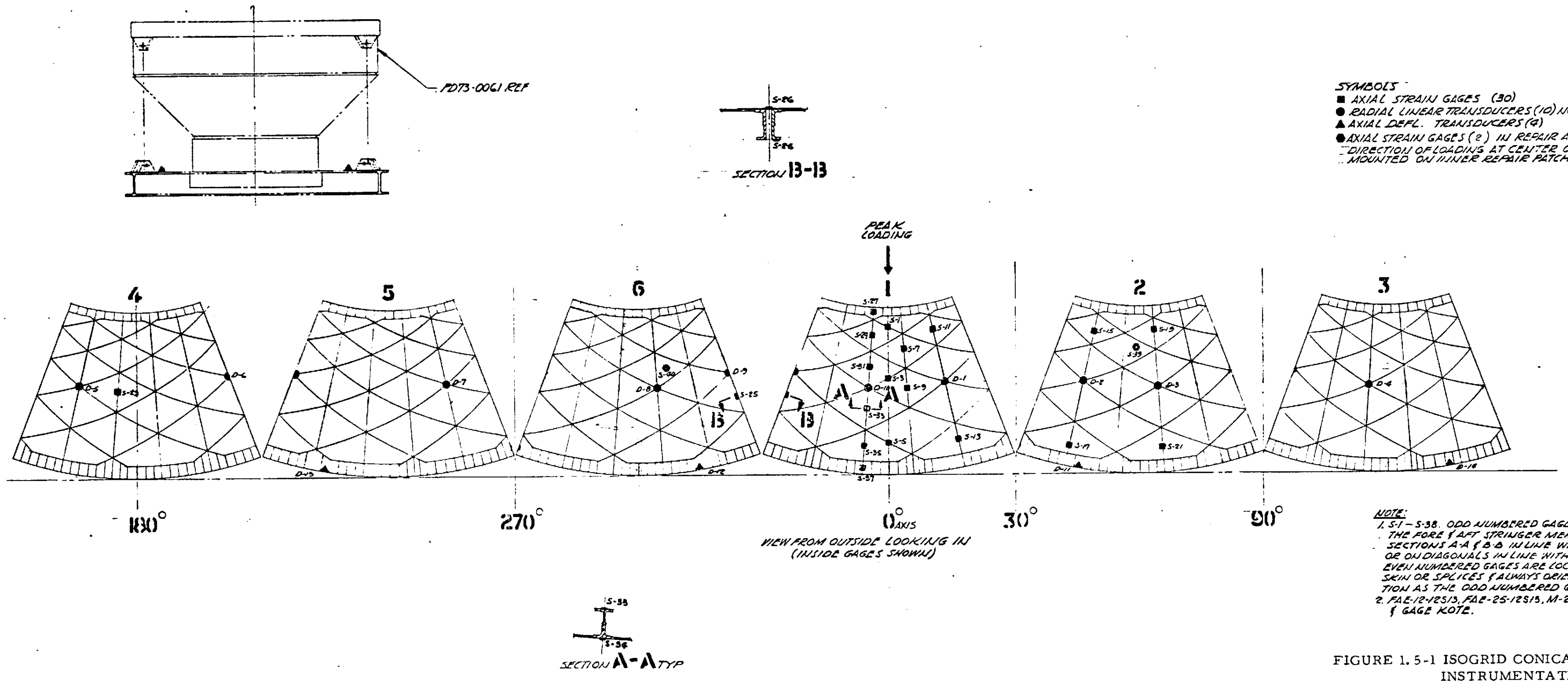
The first phase of testing consisted of a series of survey tests using five different combinations of axial and bending loads.

Survey test loads were based on the maximum design loads applied to the D-1 Centaur equipment module by a 4000 lb payload mounted on the equipment module. For the five survey test conditions maximum loading was limited to the equipment module design loads shown in Table 1.6-1. Since the test bending moments were not shear induced the test loading along the adapter for a given loading condition did not match the design load variation exactly. This was not considered significant since the total test loads envelope closely matched the design loading distribution.

A full range of combined loading conditions, from pure bending to pure compression, was desired. However, test set-up limitations precluded running of a pure bending case. The five conditions shown in Table 1.6-2 were therefore selected for the survey tests. Maximum survey test loads applied to the conical isogrid adapter by the four hydraulic loading cylinders are shown in Table 1.6-3. Load cylinder orientation is shown in Figure 1.6-1.

After completion of the survey tests, the adapter was loaded to failure. A combined axial and bending loading condition based on survey test condition C2 was selected for the ultimate test for the following reasons:

(a) Several of the panels making up the isogrid adapter had undersize areas and repairs due to machining errors. To ensure failure did not occur in one of these panels it was desirable to concentrate maximum compression loading at the center of the best panel.



SYMBOLS
■ AXIAL STRAIN GAGES (30)
● RADIAL LINEAR TRANSDUCERS (10) NORMAL TO SURFACE
▲ AXIAL DEFL. TRANSDUCERS (4)
● AXIAL STRAIN GAGES (2) IN REPAIR AREAS. (ORIENTED IN DIRECTION OF LOADING AT CENTER OF REPAIR) GAGES TO BE MOUNTED ON INNER REPAIR PATCH.

NOTE:
1. S-1 – S-38. ODD NUMBERED GAGES ARE LOCATED INSIDE ON THE FORE & AFT STRINGER MEMBERS AS SHOWN IN SECTIONS A-A & B-B IN LINE WITH THE LOAD DIRECTION, OR ON DIAGONALS IN LINE WITH THE STRINGER MEMBER. EVEN NUMBERED GAGES ARE LOCATED ON THE OUTSIDE SKIN OR SPLICES & ALWAYS ORIENTED IN THE SAME DIRECTION AS THE ODD NUMBERED GAGES.
2. FAE-12-12S13, FAE-25-12S13, M-200/E910 INSTALLATIONS & GAGE KOTE.

FIGURE 1.5-1 ISOGRID CONICAL ADAPTER INSTRUMENTATION REFERENCE

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TABLE 1.6-1 D-1 EQUIPMENT MODULE DESIGN LIMIT LOADING

	Compression Case			Tension Case		
	Top	Middle	Bottom	Top	Middle	Bottom
M (in lb)	.442x10^6	.520x10^6	.598x10^6	.68x10^6	.80x10^6	.92x10^6
P (lb)	24,000	24,000	24,000	0	0	0
Nx (lb/in)	284.0	166.7	116.5	-240.0	-126.0	-81.4

NOTE: Loads shown are for a 4000 lb payload mounted on the equipment module. Loads do not include the effects of fairing helper springs or equipment mounted on the module.

TABLE 1.6-2 ISOGRID CONICAL ADAPTER TEST LOADS

Load Cond	Applied Loading			Maximum Line Loading (lb/in)					
	Description	Axial (lb)	Bending (in lb)	Comp Side (0°)			Tension Side (180°)		
				Top	Middle	Bottom	Top	Middle	Bottom
C1	Max Bending (max tension)	11,350	.63x10^6	283.0	139.2	85.8	-162.6	-58.9	-25.6
C2	75% bending	15,500	.51x10^6	262.6	135.0	86.2	-98.1	-25.3	-4.0
C3	50% bending	31,000	.34x10^6	284.7	163.1	112.3	44.2	56.2	52.2
C4	25% bending	38,000	.17x10^6	261.7	161.1	115.8	141.5	107.7	85.8
C5	Max axial	44,000	0	233.4	155.6	116.7	233.4	155.6	116.7

TABLE 1.6-3 ISOGRID CONICAL ADAPTER TEST CYLINDER LOADS

Load Cond	Description	Applied Loading		Max. Cylinder Loads (lbs) *			
		Axial (lb)	Bending (in lb)	#1	#2	#3	#4
C1	Max bending	11,350	.63x10^6	5,675(T)	5,675(T)	0	0
C2	75% bending	15,500	.51x10^6	6,172(T)	6,172(T)	1,578(T)	1,578(T)
C3	50% bending	31,000	.34x10^6	9,282(T)	9,282(T)	6,218(T)	6,218(T)
C4	25% bending	38,000	.17x10^6	10,266(T)	10,266(T)	8,734(T)	8,734(T)
C5	Max axial	44,000	0	11,000(T)	11,000(T)	11,000(T)	11,000(T)

Notes: * (T) = Tension cylinder load, (C) = Compression cylinder load
Tension cylinder load produces compression in isogrid adapter.

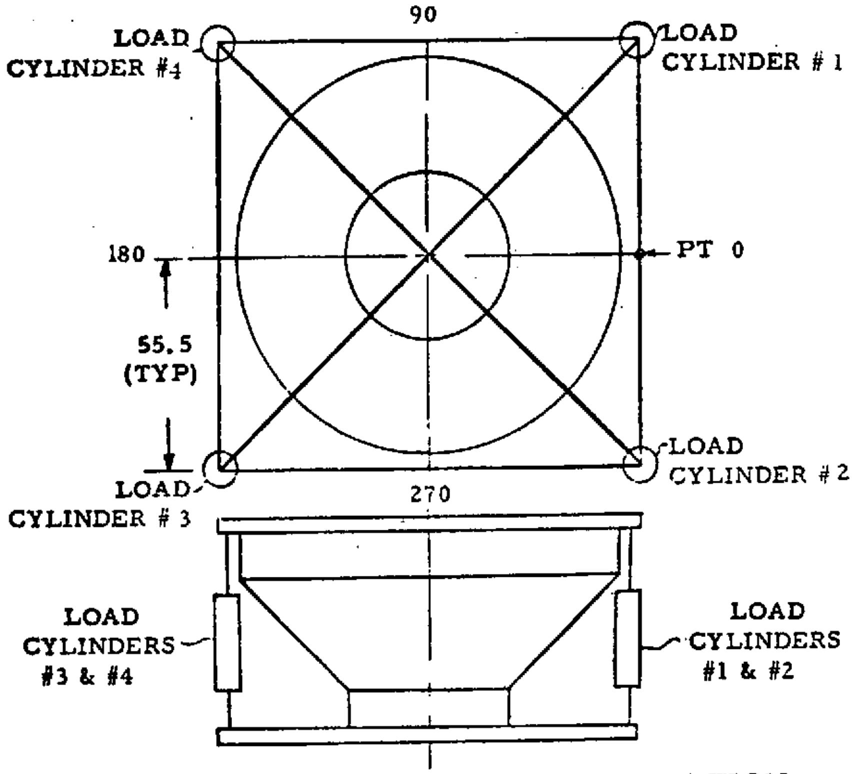


FIGURE 1.6-1 LOAD CYLINDER ORIENTATION

(b) For a pure bending condition the 60 inch diameter adapter to test fixture interface joint tension capability would be exceeded prior to failing the adapter in compression.

(c) The combined loading condition is more representative of actual loading experienced by typical launch vehicle and Tug structures.

By analysis of the isogrid adapter, the ultimate failure load was predicted to be 400% of the survey test condition C2 loading.

1.7 Test Procedure

Following a shakedown run to 25% of the Condition 1 maximum loading, the 60 inch diameter flange on the test fixture (Figure 1.4-1) was filled with "toolstone", a hard tooling cement, to evaluate the effects of increased edge fixity on stresses and deflections. Three runs were made with the toolstone in place. The toolstone was then removed for the remainder of the testing.

A total of 14 test runs, summarized in Table 1.7-1, were made. For each run loading was varied from zero to maximum in 10% increments. All instrumentation output was recorded at each loading increment. Except as noted, the maximum compressive loading was applied along the "0^{o}" axis as denoted in Figure 1.5-1.

For the ultimate condition C-2F (runs 13 and 13A), loading was periodically reduced to 40% and data recorded to evaluate residual strain as a measure of yielding of the structure.

TABLE 1.7-1

CONICAL ISOGRID ADAPTER TEST SEQUENCE

RUN NO.	TEST COND.	TYPE TEST	LOAD - % MAX COND.	DESIG.	REMARKS
1	C 1	SURVEY	100	C1	
2	C 5		80	C5	
3	C 3		100	C3	
4	C 1			C1	Toolstone removed for run 4 and on.
5	C 5			C5-2	Axial deflection gages relocated for run 5 and on.
6	C 2			C2-1	
7	C 4			C4-1	
8	C 3			C3-2	
9	C 1			C1-3	
10	C 1			C1-90	Max compression load at 90° (Figure 1.5-1).
11	C 1		100	C1-180	Max compression load at 180° (Figure 1.5-1).
12	C 1	SURVEY	70	C1-270	Max compression load at 270° (Figure 1.5-1).
13	C 2	ULT.	338	C2-F	Stopped to adjust Edison Load Maintainer.
13A	C 2	ULT.	555	C2-F	Specimen failed at 555% of Cond C2.

NOTE: SEE TABLES 1.6-2 AND 1.6-3 FOR DEFINITION OF LOADING CONDITIONS.

2. TEST RESULTS AND ANALYSIS

2.1 Survey Test Results

Strain and deflection data recorded during the 12 survey test runs are presented in Appendix A-1. Table 1.7-1 defines the applicable loading condition for each run. Instrumentation locations are defined in Figure 1.5-1.

To help evaluate response of the structure to various types of loading, strains from a representative run for each of the five loading conditions were plotted versus percent load in Figures 2.1-1 thru 2.1-5. Strain gages are grouped at angular locations of 0°, 6°, 18°, 42°, 66°, 174°, 330° and 354° around the circumference of the adapter (Figure 1.5-1). Each graph plots data from 4 or 6 strain gages grouped at the specified angular locations.

Axial deflections measured at the four loading points are plotted versus percent load in Figures 2.1-6 thru 2.1-12 for each of the five survey loading conditions (C1 thru C5) and conditions C1-90 and C1-180.

Polar plots of deflections measured normal to the conical adapter surface at approximate mid height of the adapter are presented in Figures 2.1-13 thru 2.1-19. Deflections are plotted at 50% and 100% load for each of the five survey loading conditions, (C1 thru C5) and conditions C1-90 and C1-180.

2.2 Ultimate Test Results

Strain and deflection data recorded during the ultimate test are presented in Appendix A-2. Test condition C2 as defined in Tables 1.6-2 and 1.6-3 was selected as the basis for the ultimate test loads. Instrumentation locations are defined in Figure 1.5-1. The initial ultimate test run (run 13) was terminated at 338% of condition C2 loading to adjust the capacity of the Edison Load Maintainer system. After adjusting the system the test was rerun to failure (Run 13A). The test specimen failed at 555% of the condition 2 loading. Calculated loads at failure are summarized below:

Applied Moment = 2.83×10^6 in lb
Applied Axial Load = 86025 lb
Equivalent Nx max (60 in dia) = 1457 lb/in
Equivalent Nx max (120 in dia) = 478 lb/in

Strains measured during run 13A are plotted versus percent load in Figure 2.2-1. Strain gages are grouped at angular locations of 0°, 6°,

18°, 42°, 66°, 174°, 330° and 354° around the circumference of the adapter (Figure 1.5-1). Each graph plots data from four or six strain gages grouped at the specified angular locations.

To help evaluate yielding of the specimen, loads were periodically reduced to 40% of condition C2 during test runs 13 and 13A and data recorded. Residual strain as a measure of permanent set was then calculated by comparing the strains at these 40% increments with the initial condition C2 40% load increment. Residual strain data are plotted in Figure 2.2-2.

Axial deflections measured at the four loading points are plotted versus percent load in Figure 2.2-3. Polar plots of deflections measured normal to the conical adapter surface at approximate mid height of the adapter are presented in Figure 2.2-4. Normal deflections are plotted at 100% and 150% of condition C2 loading. (Normal deflection pots were disconnected at 160% loading).

FIGURE 2.1-1 STRAIN MEASUREMENTS -CONDITION C1 (RUN 9)

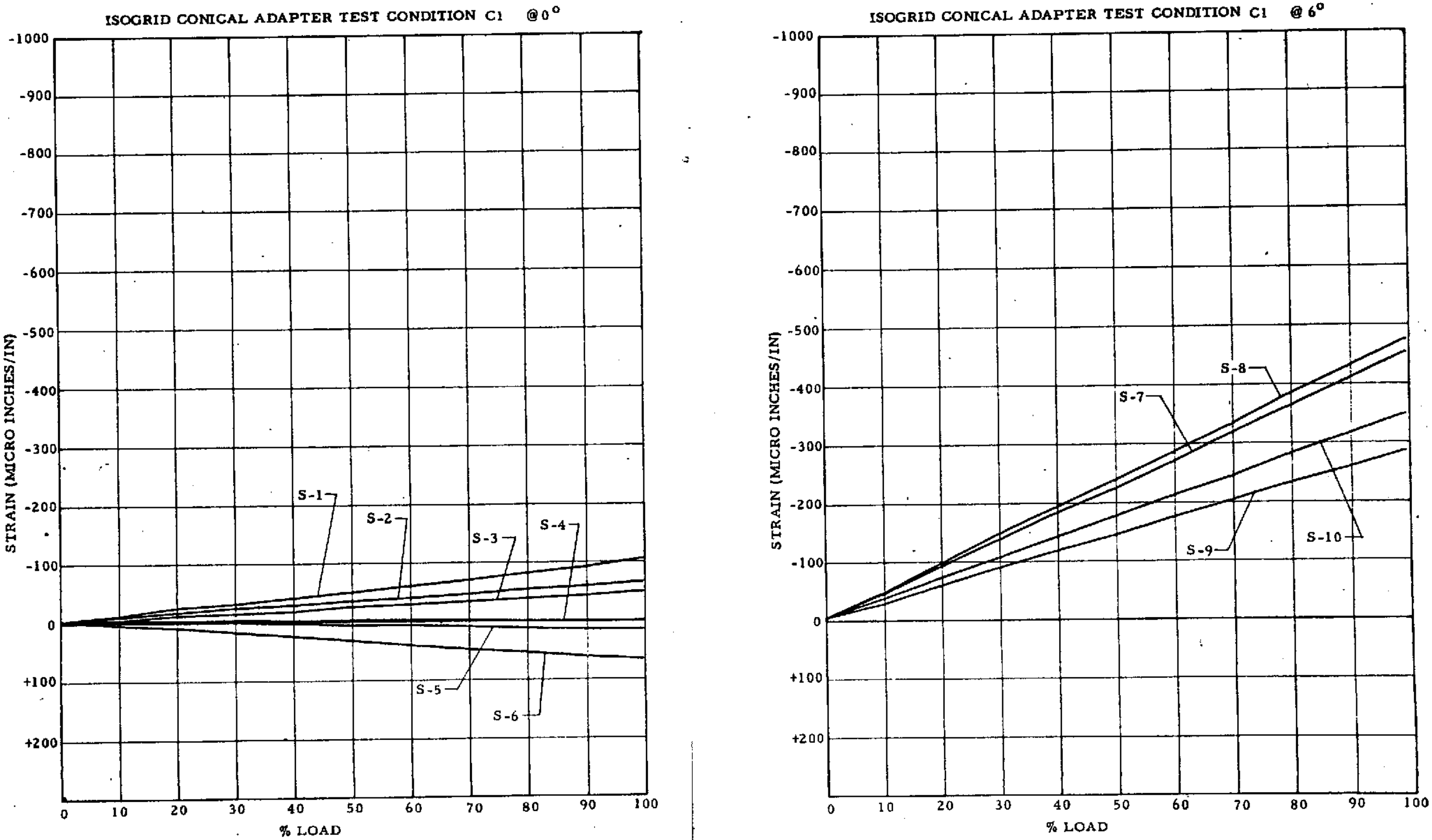
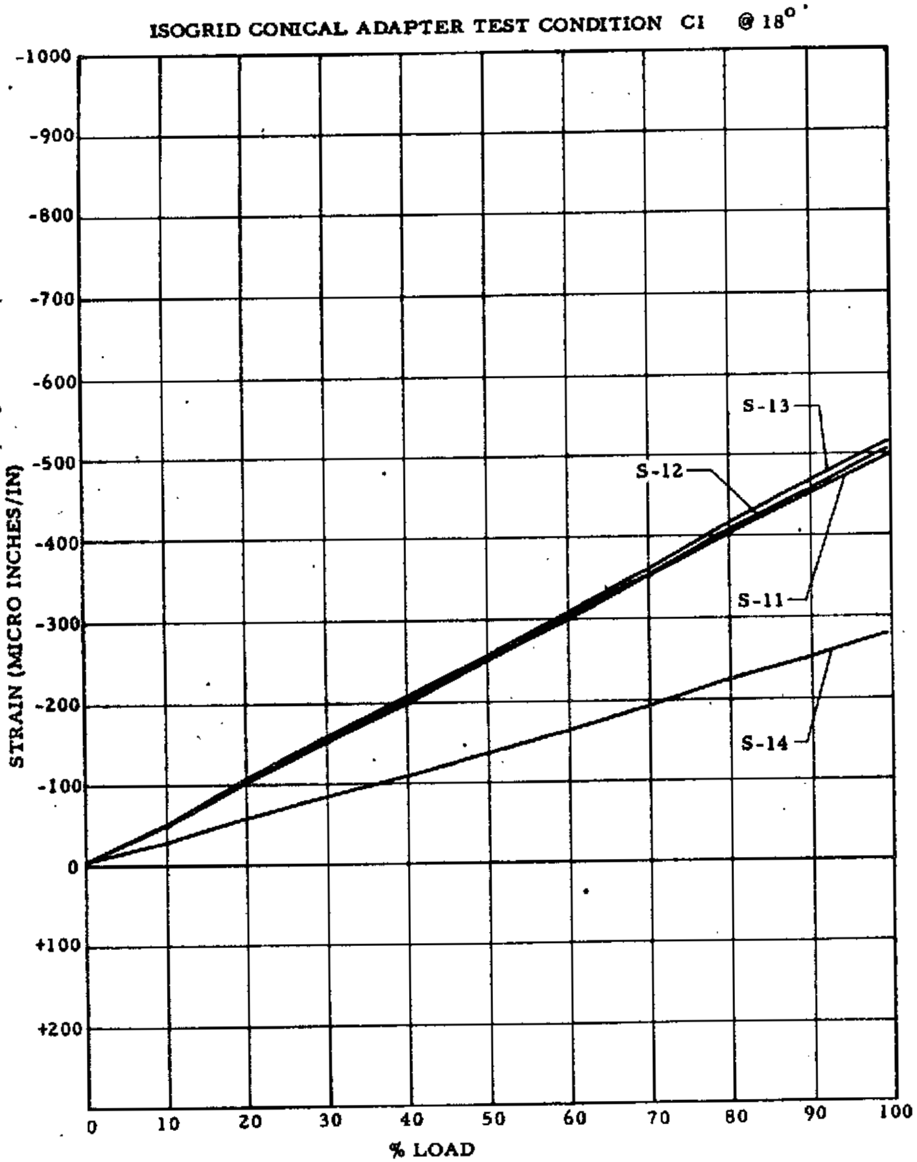


FIGURE 2.1-1 STRAIN MEASUREMENTS -CONDITION C1 (RUN 9)



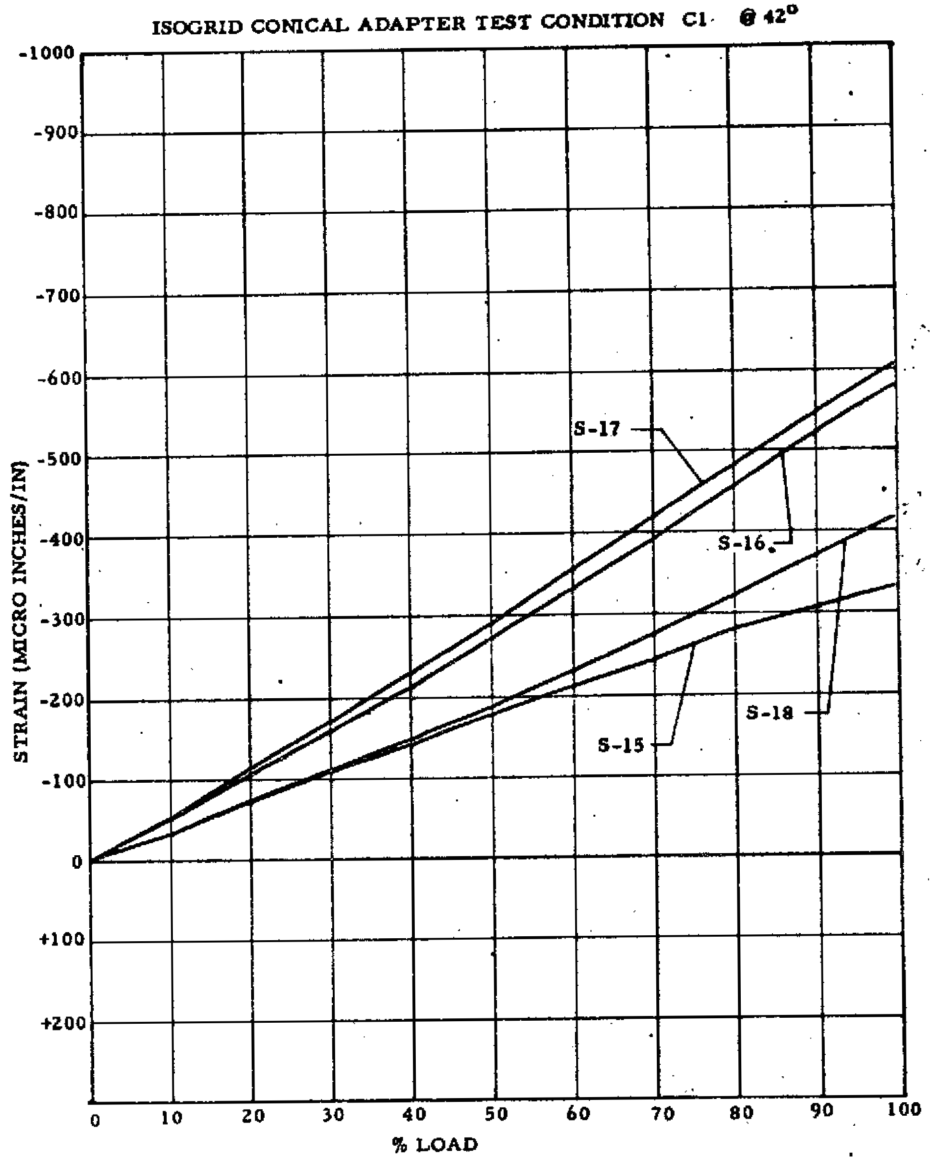


FIGURE 2.1-1 STRAIN MEASUREMENTS - CONDITION C1(RUN 9)

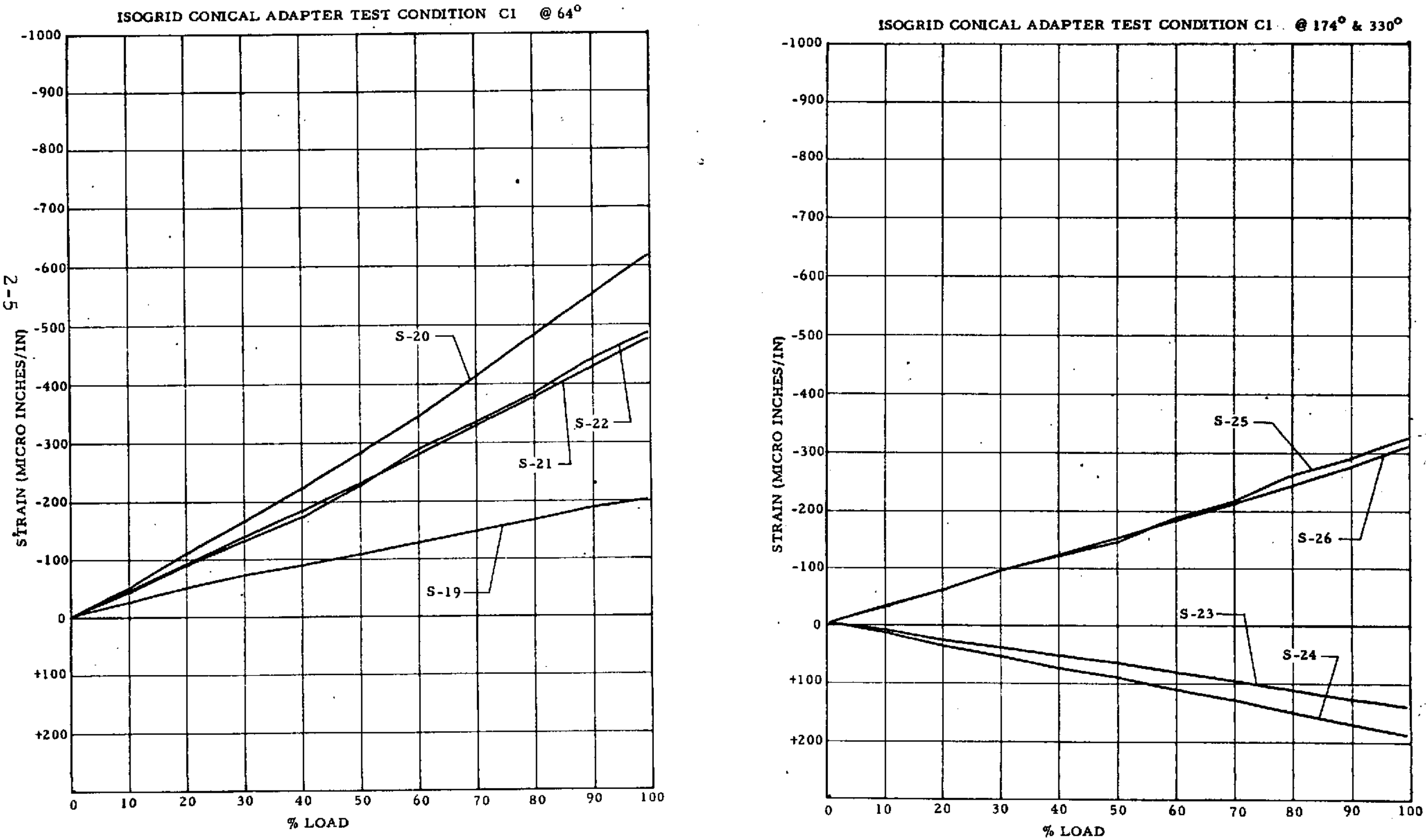
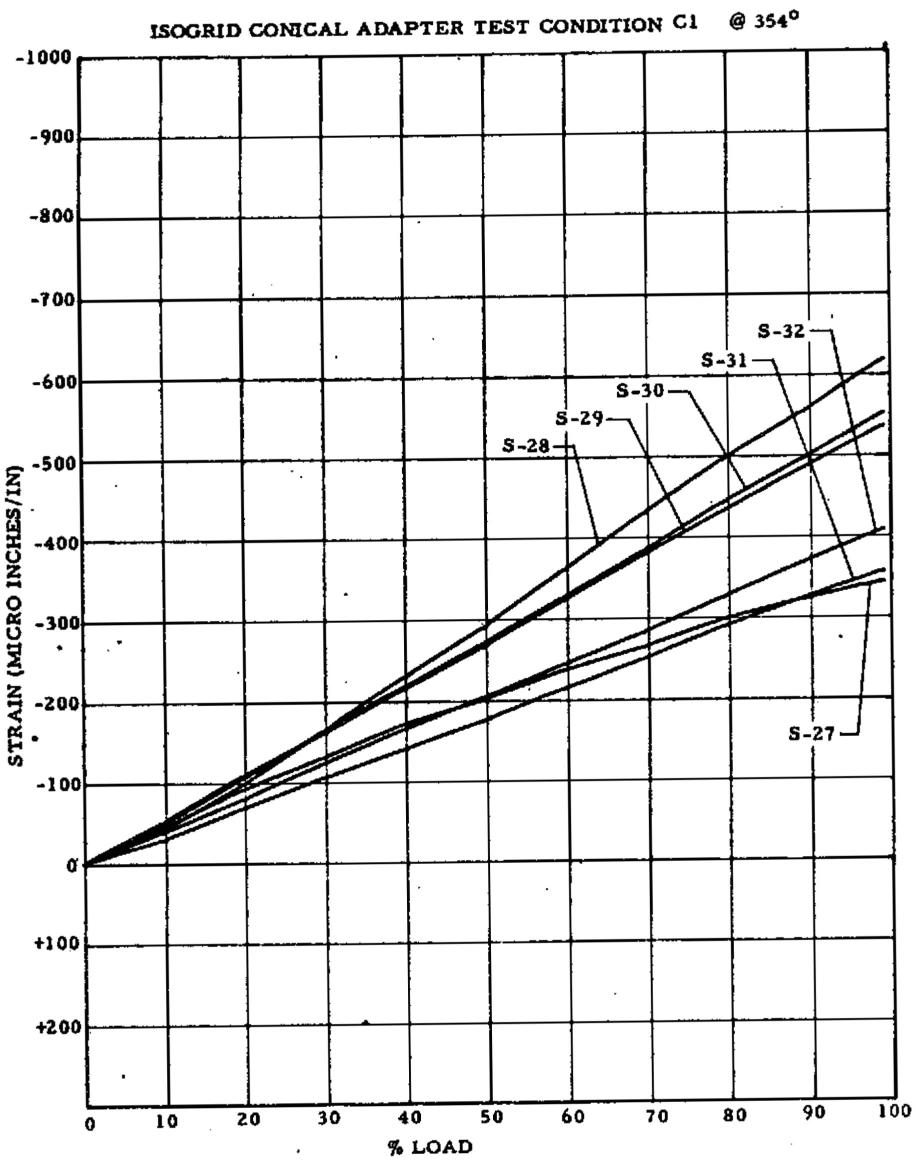


FIGURE 2.1-1 STRAIN MEASUREMENTS - CONDITION C1 (RUN9)



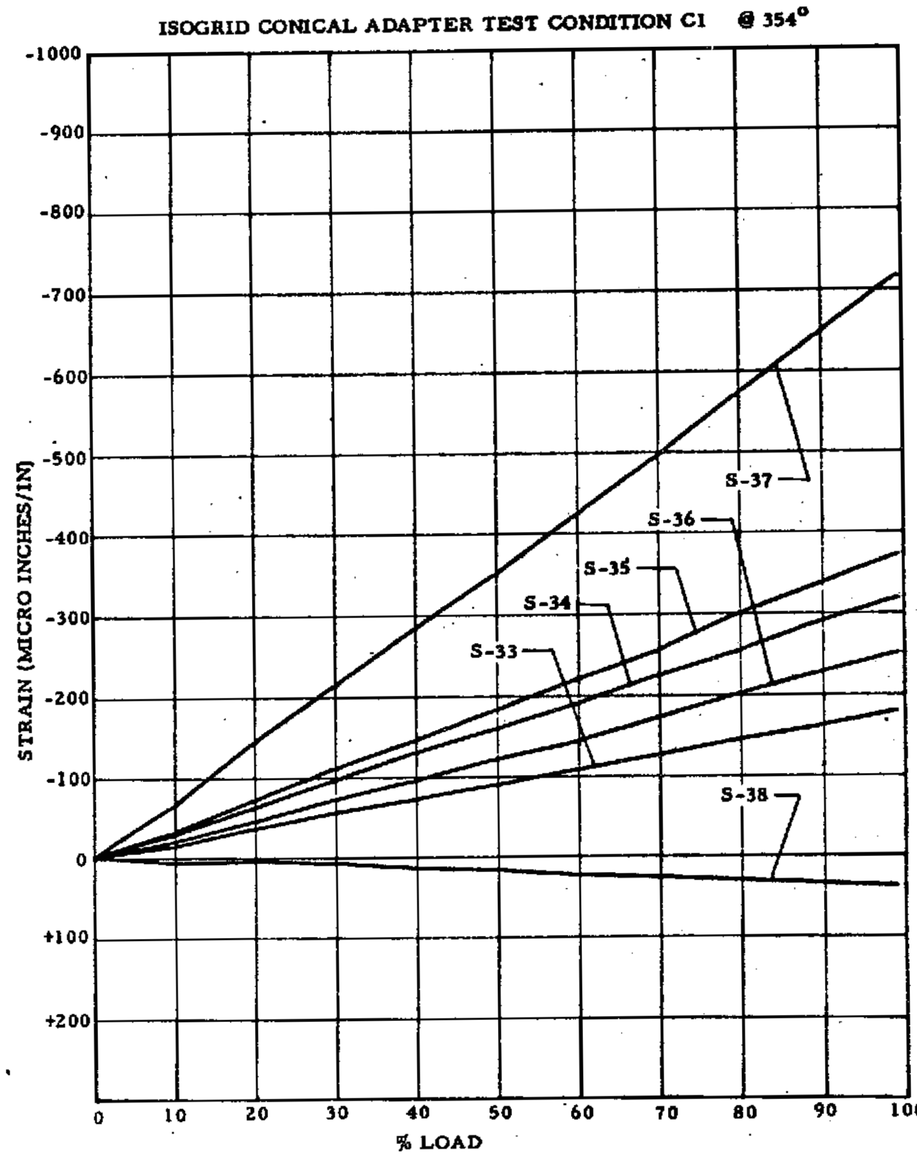
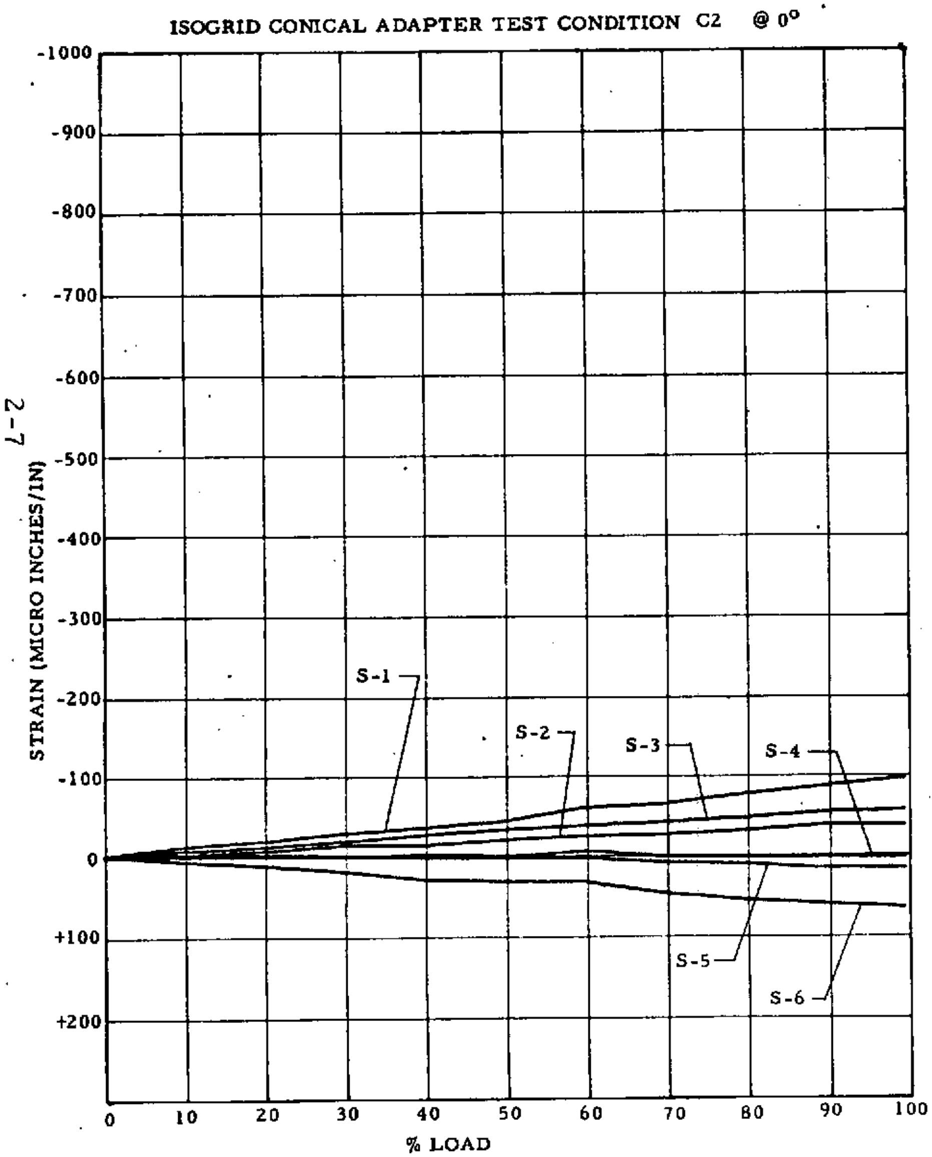


FIGURE 2.1-2 STRAIN MEASUREMENTS -CONDITION C2(RUN 6)



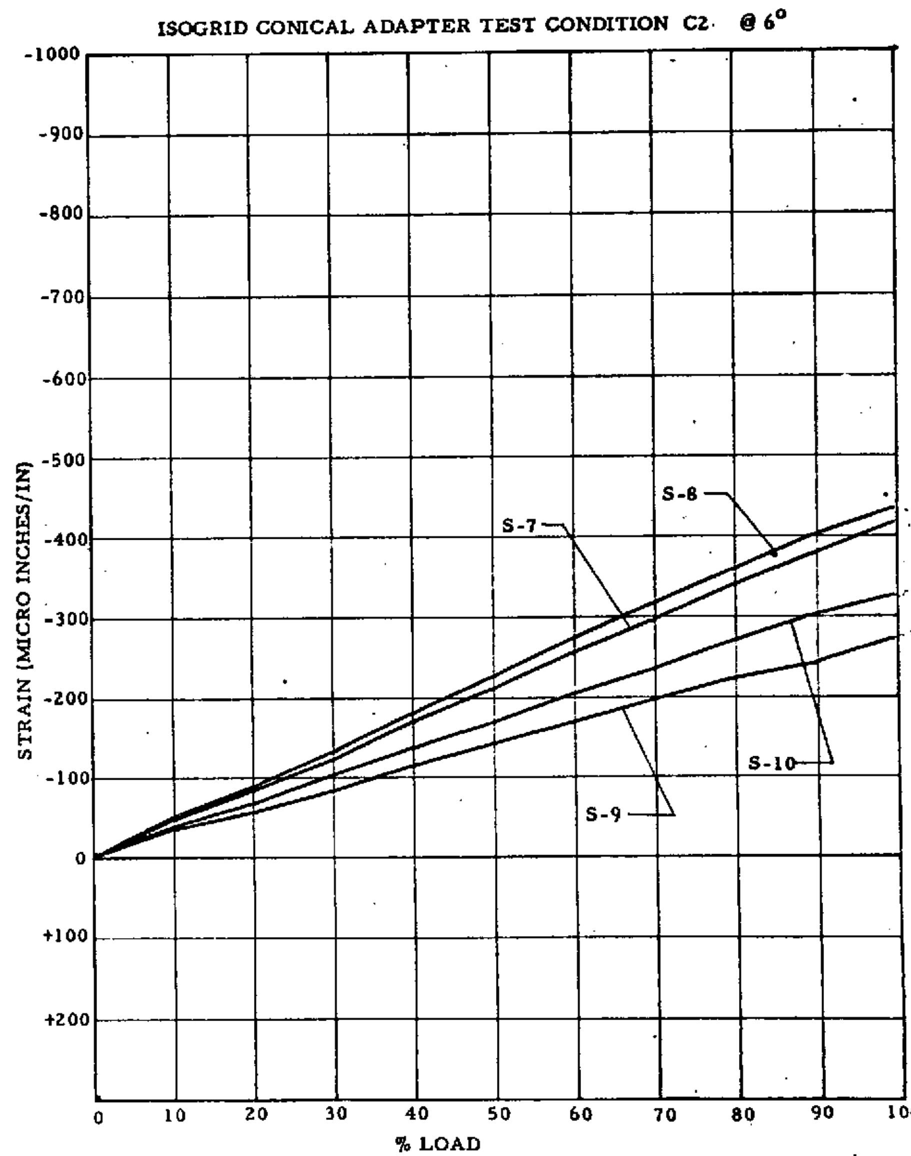
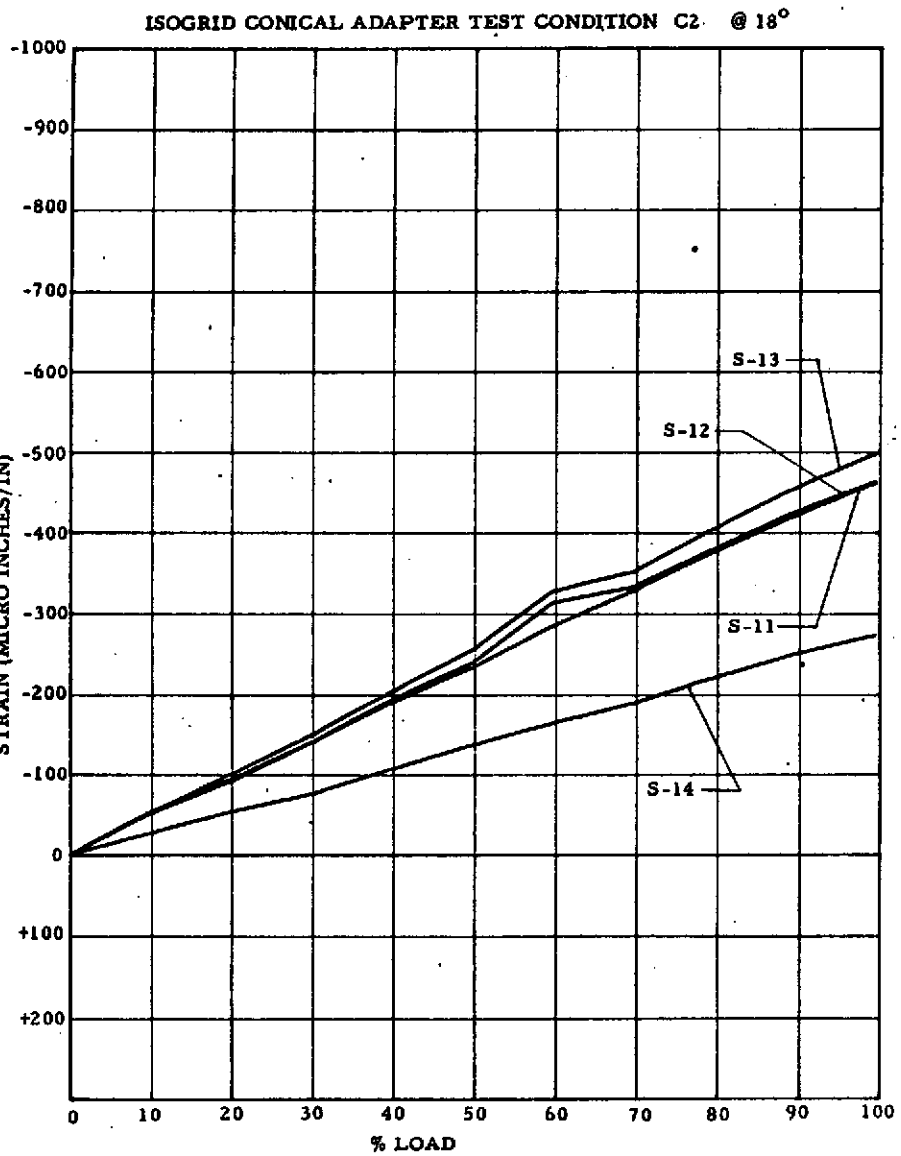


FIGURE 2.1-2 STRAIN MEASUREMENTS -CONDITION C2(RUN6)



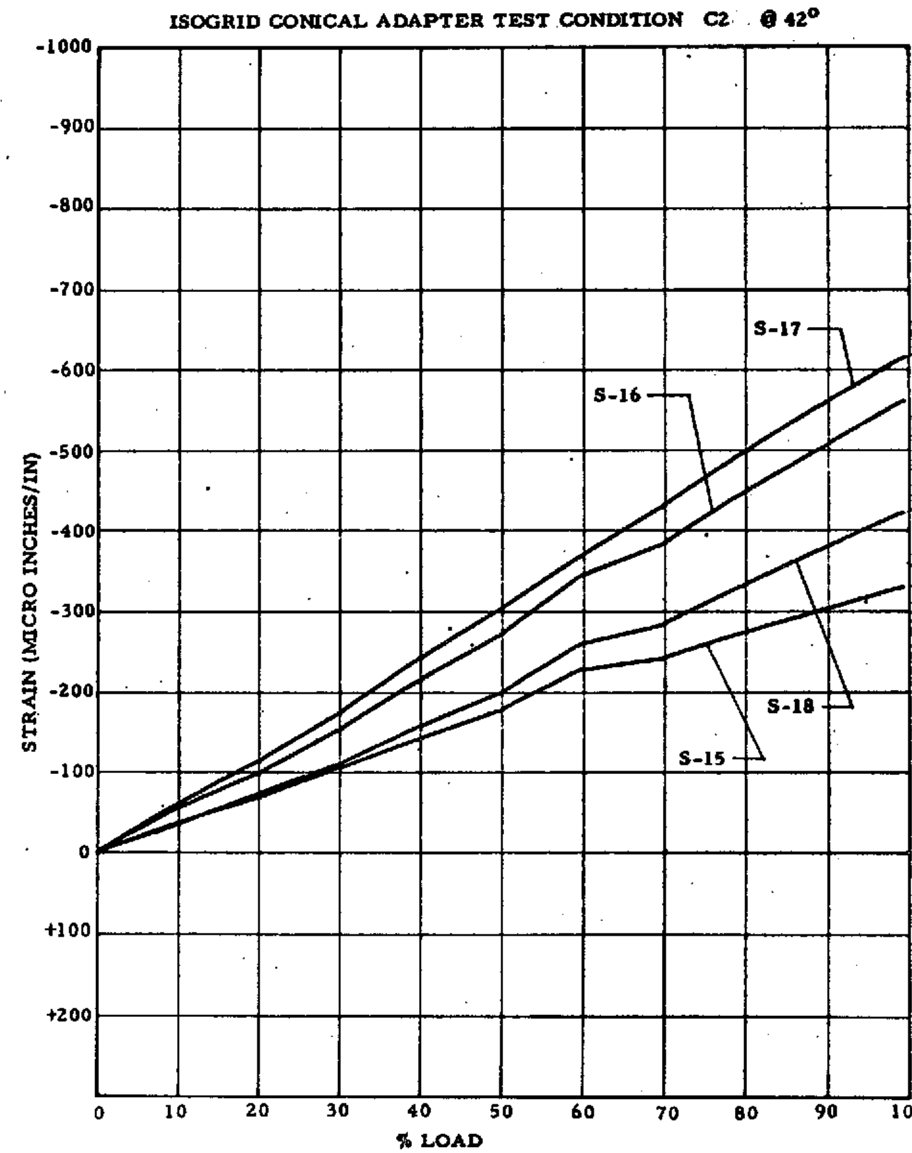
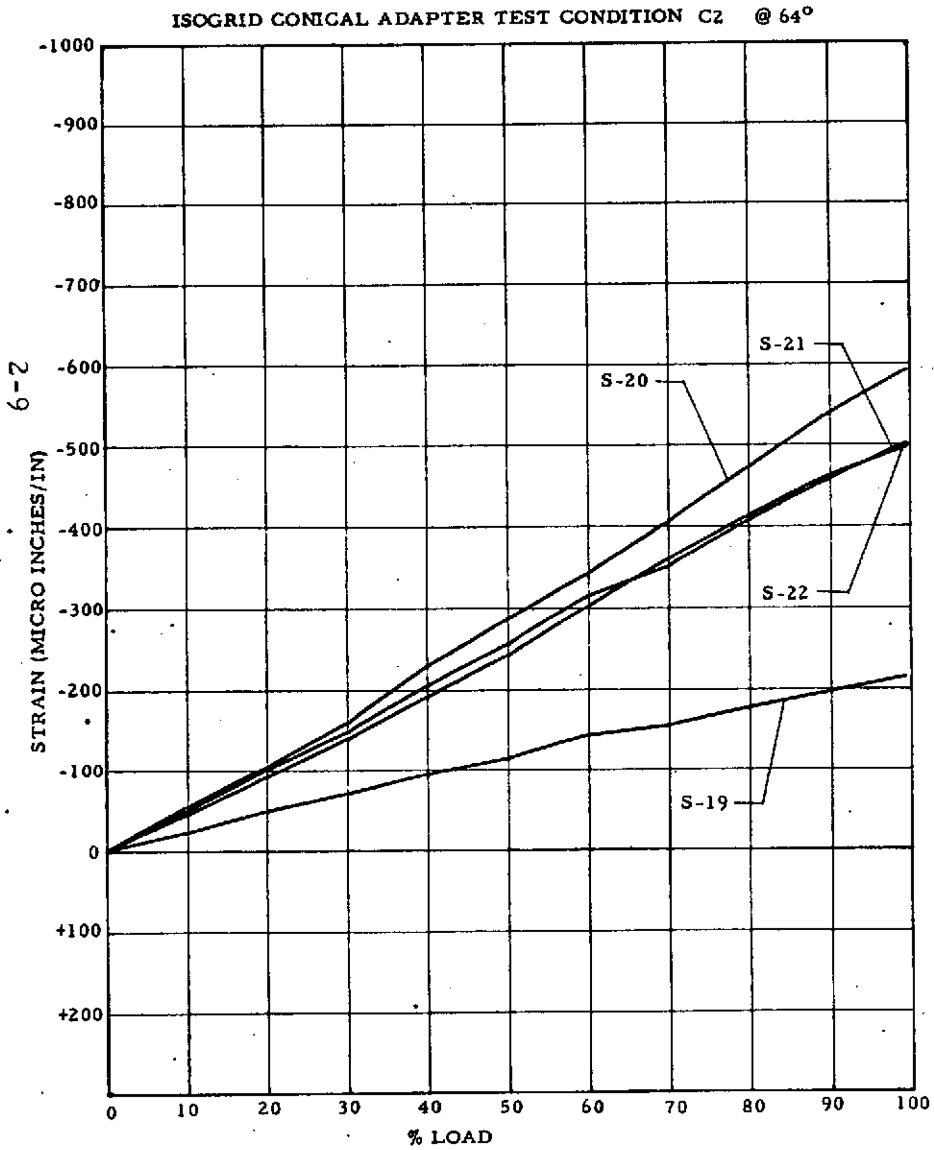


FIGURE 2.1-2 STRAIN MEASUREMENTS -CONDITION C2(RUN 6)



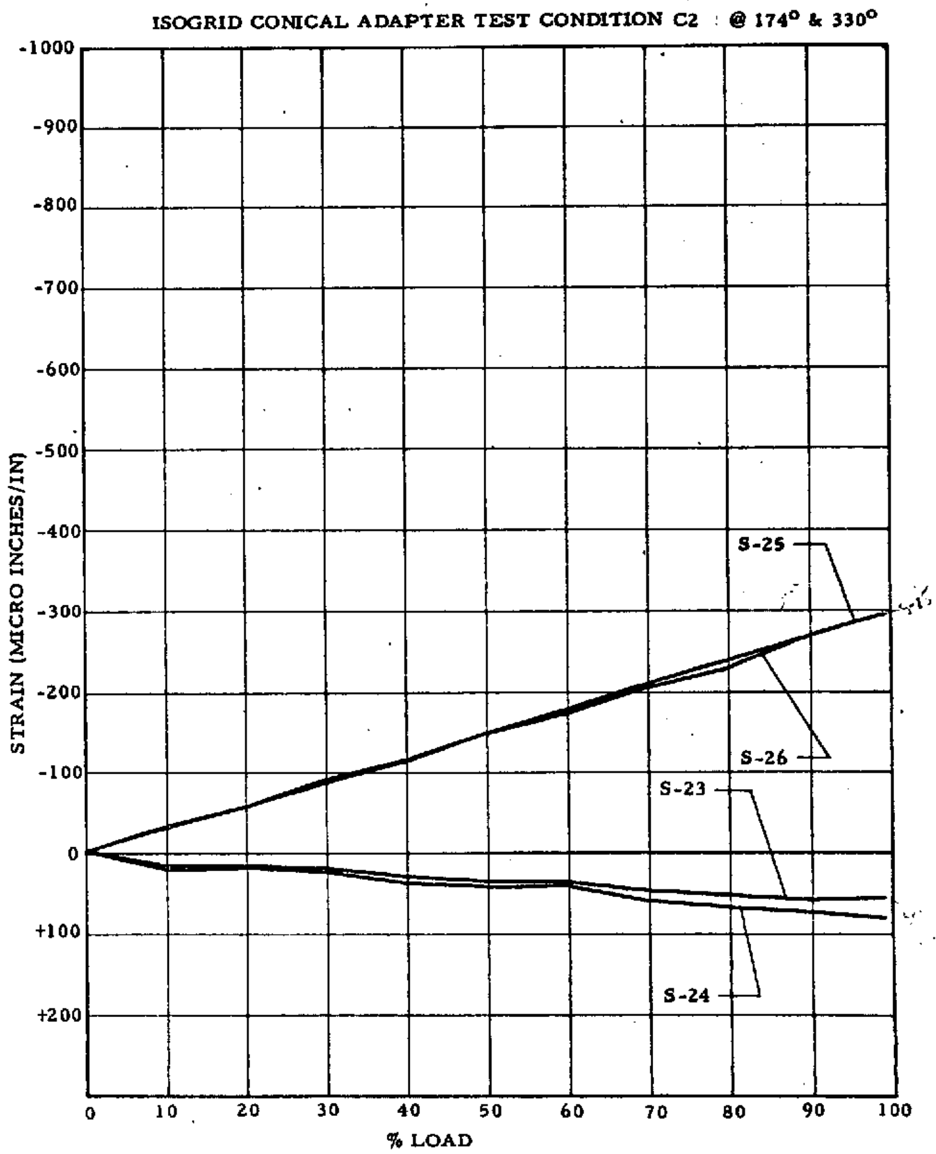
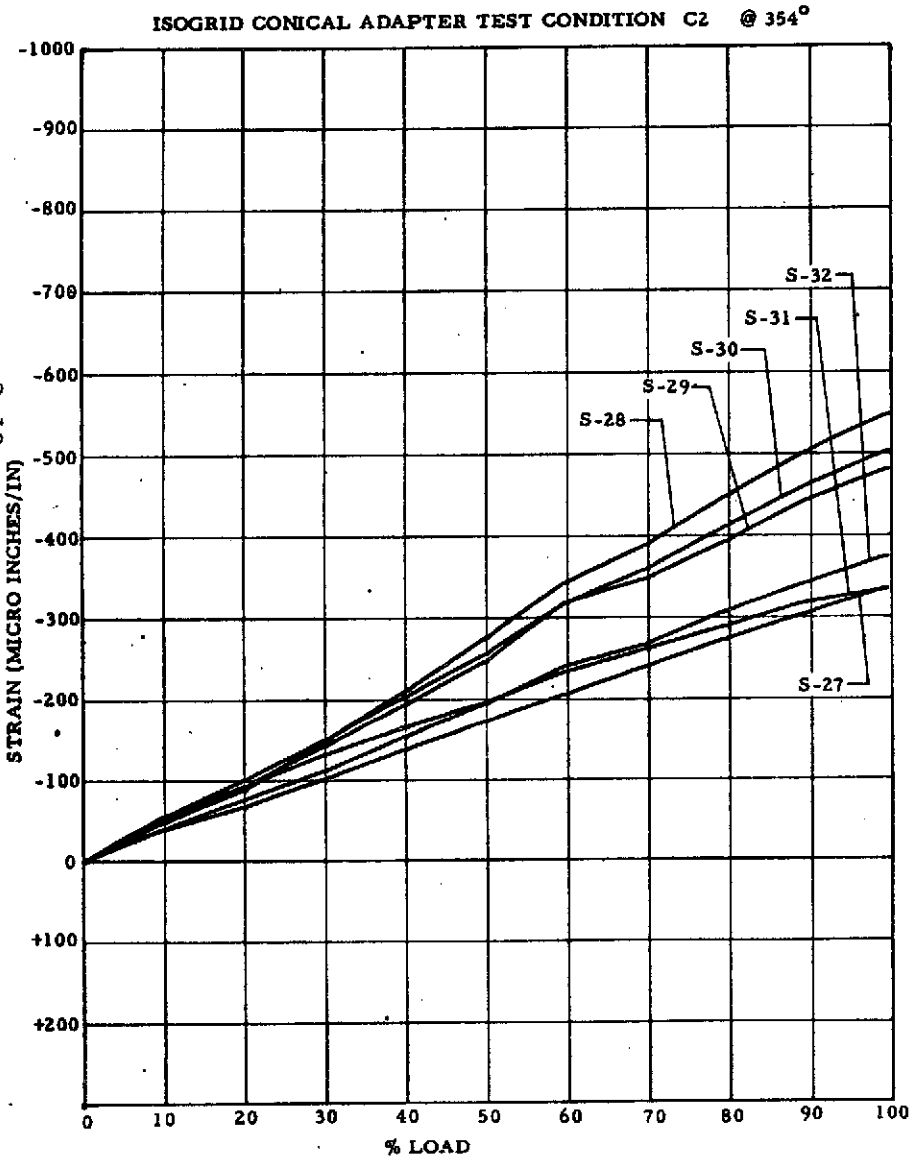


FIGURE 2.1-2 STRAIN MEASUREMENTS -CONDITION C2(RUN 6)



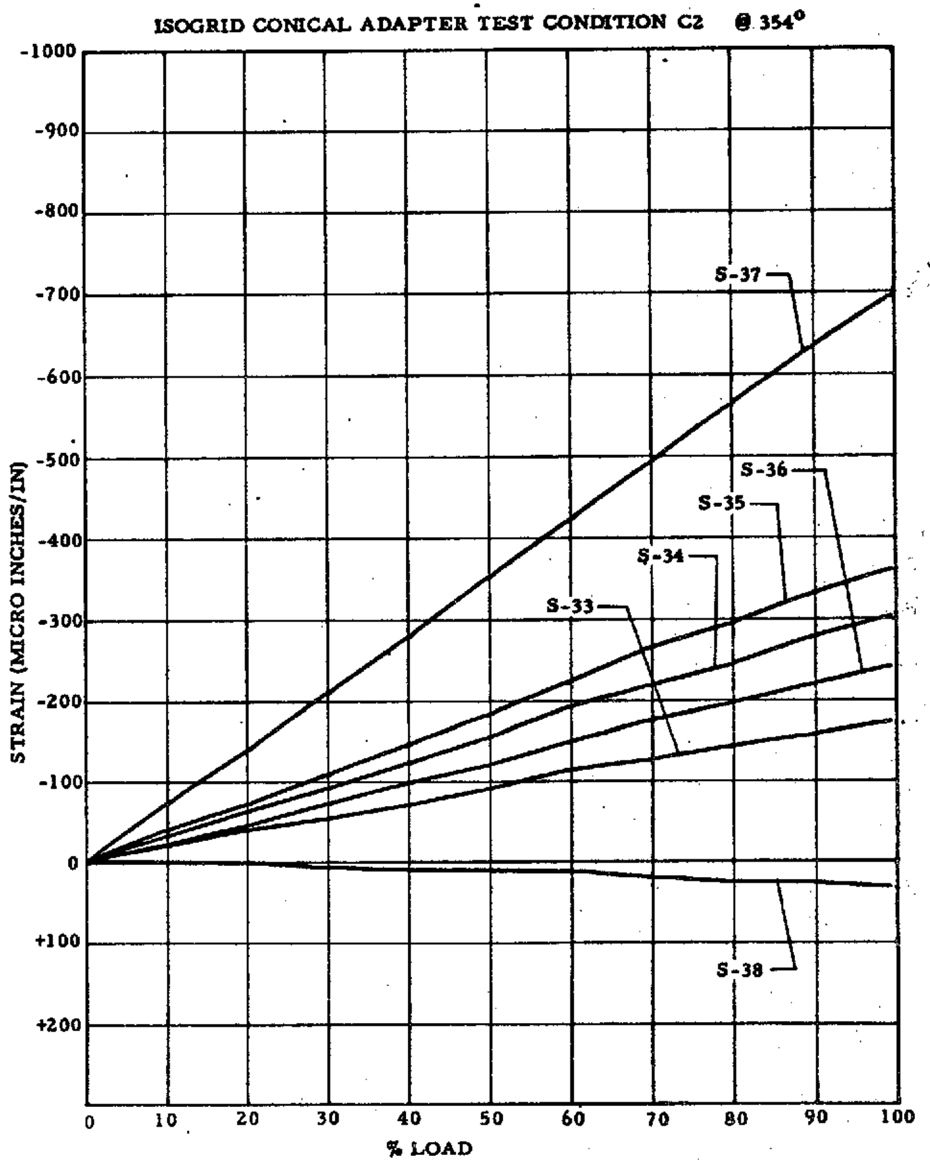
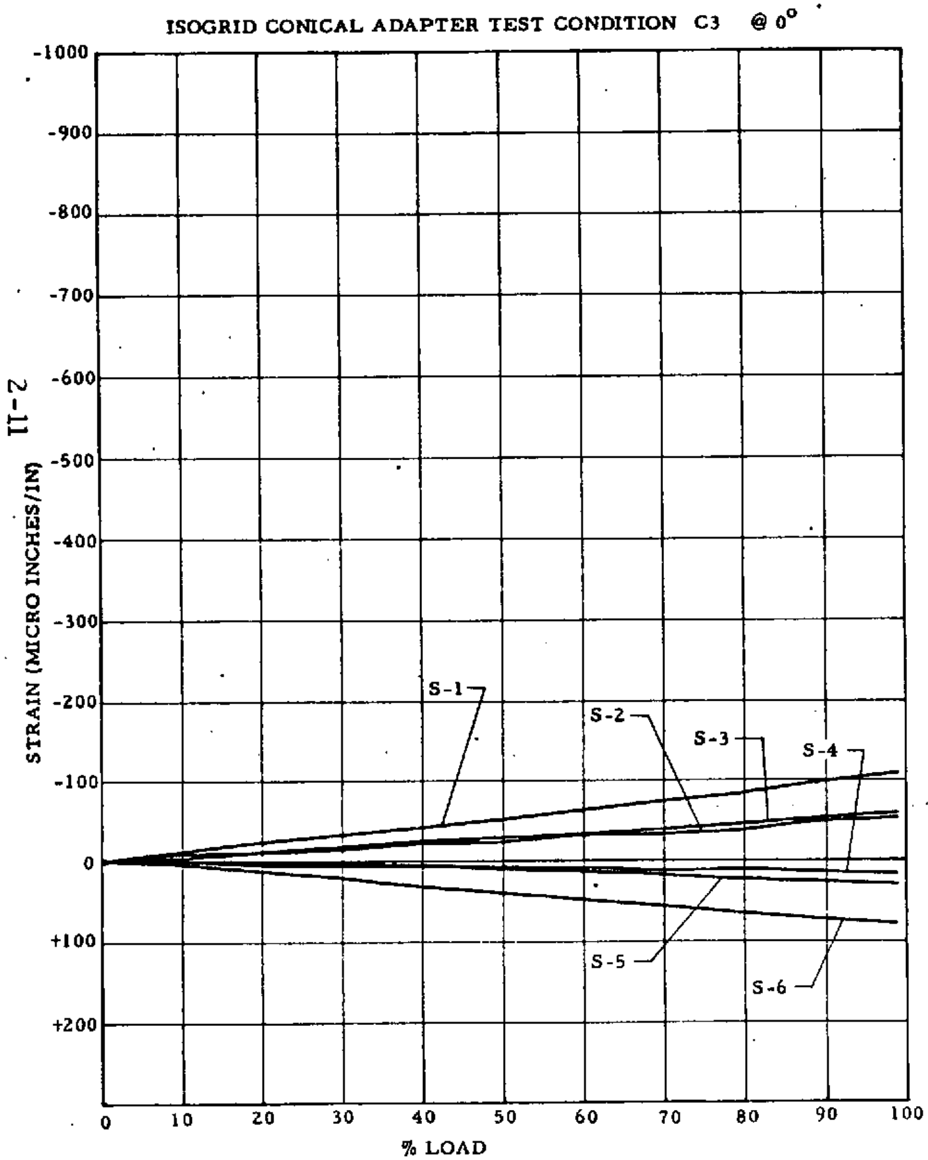


FIGURE 2.1-3 STRAIN MEASUREMENTS -CONDITION C3 (RUN 8)



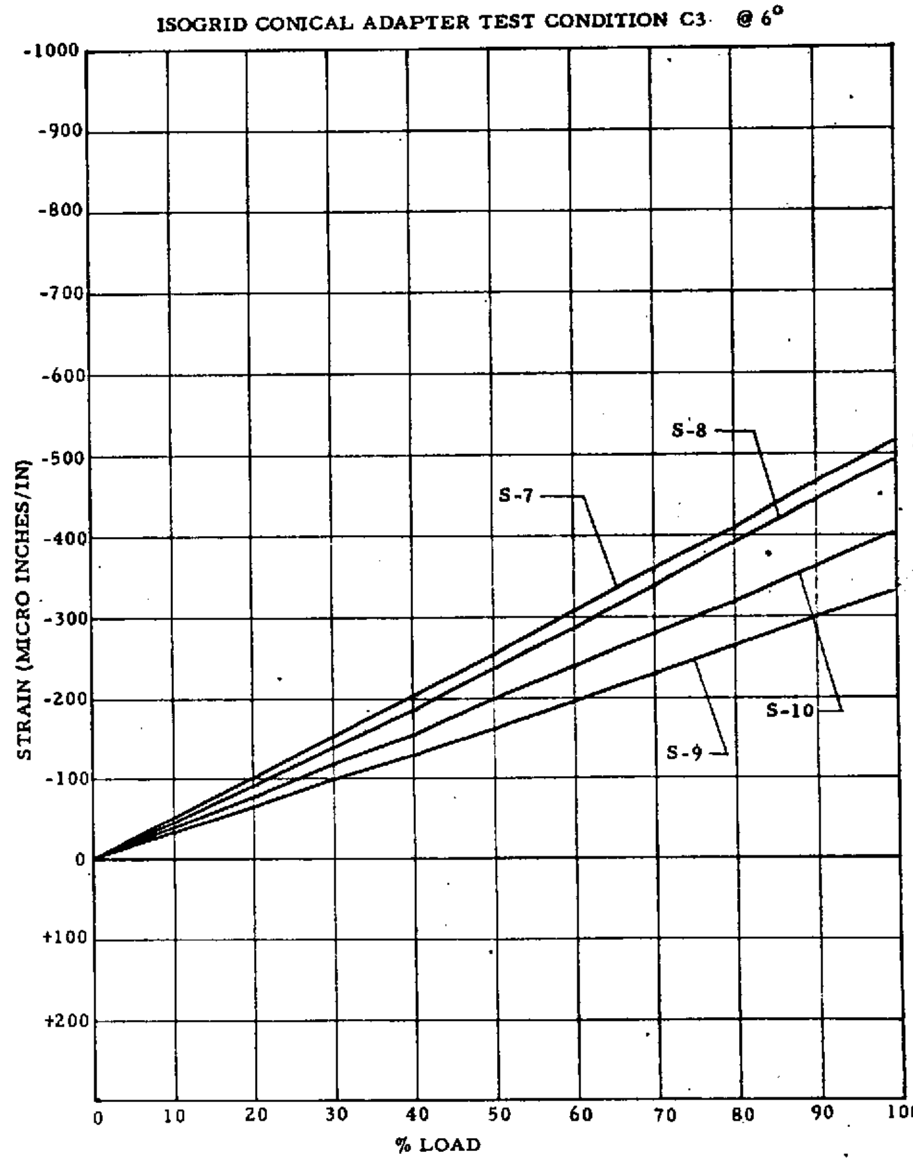
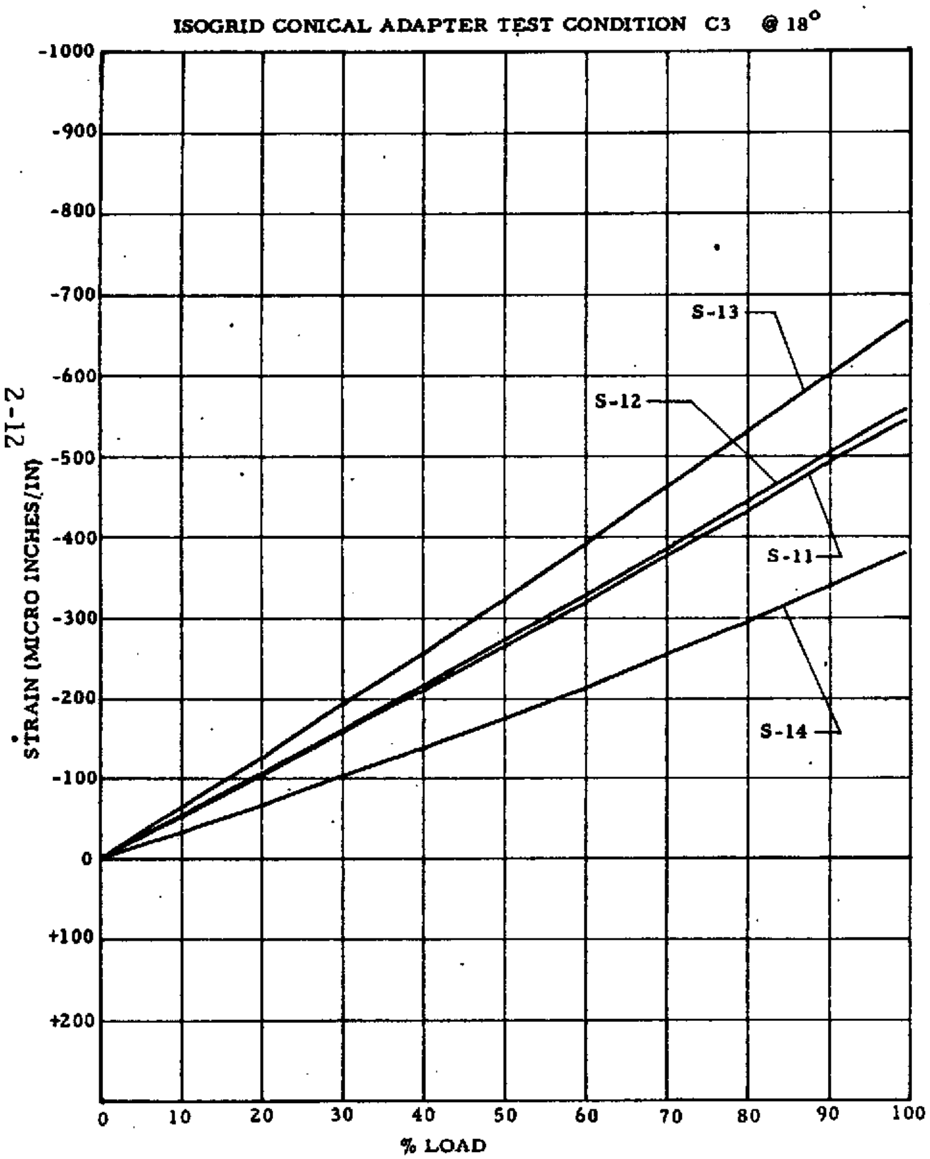


FIGURE 2.1-3 STRAIN MEASUREMENTS -CONDITION C3 (RUN 8)



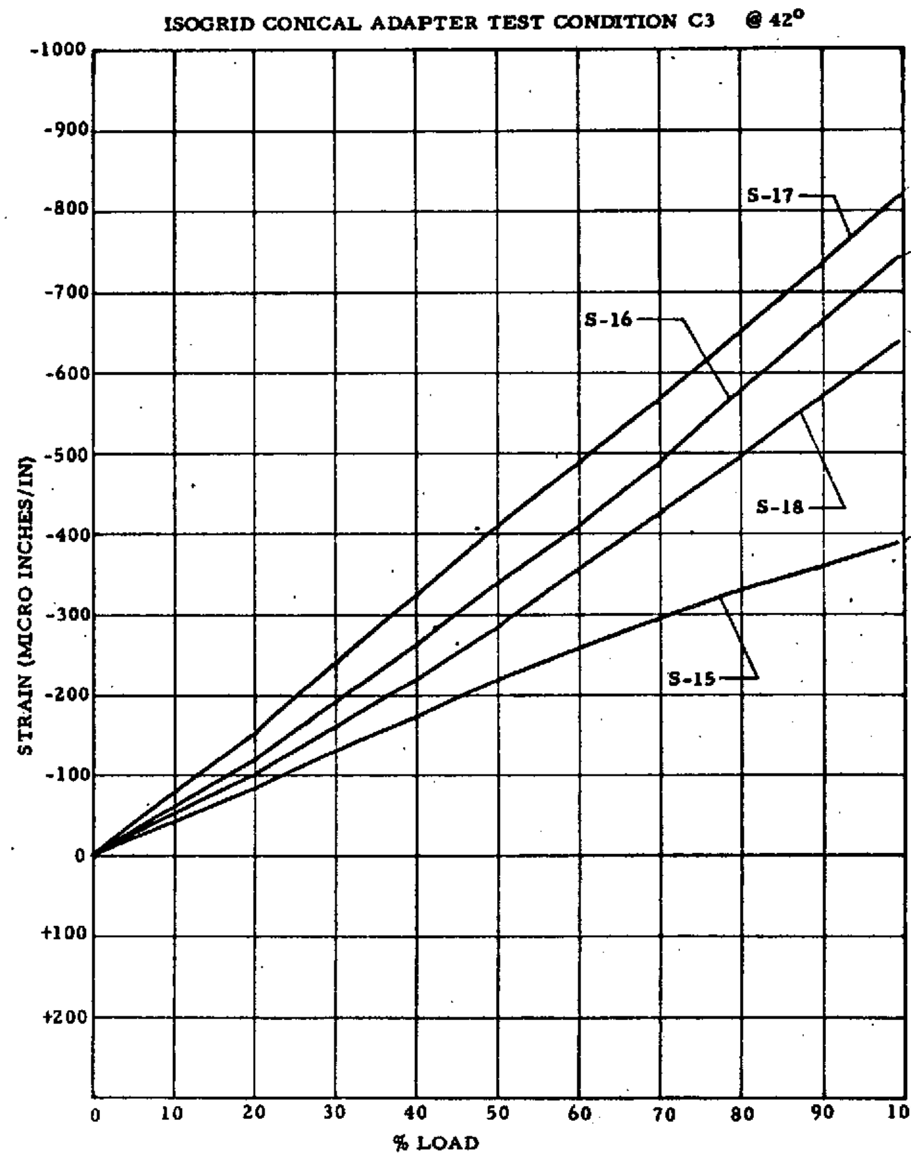


FIGURE 2.1-3 STRAIN MEASUREMENTS -CONDITION C3 (RUN 8)

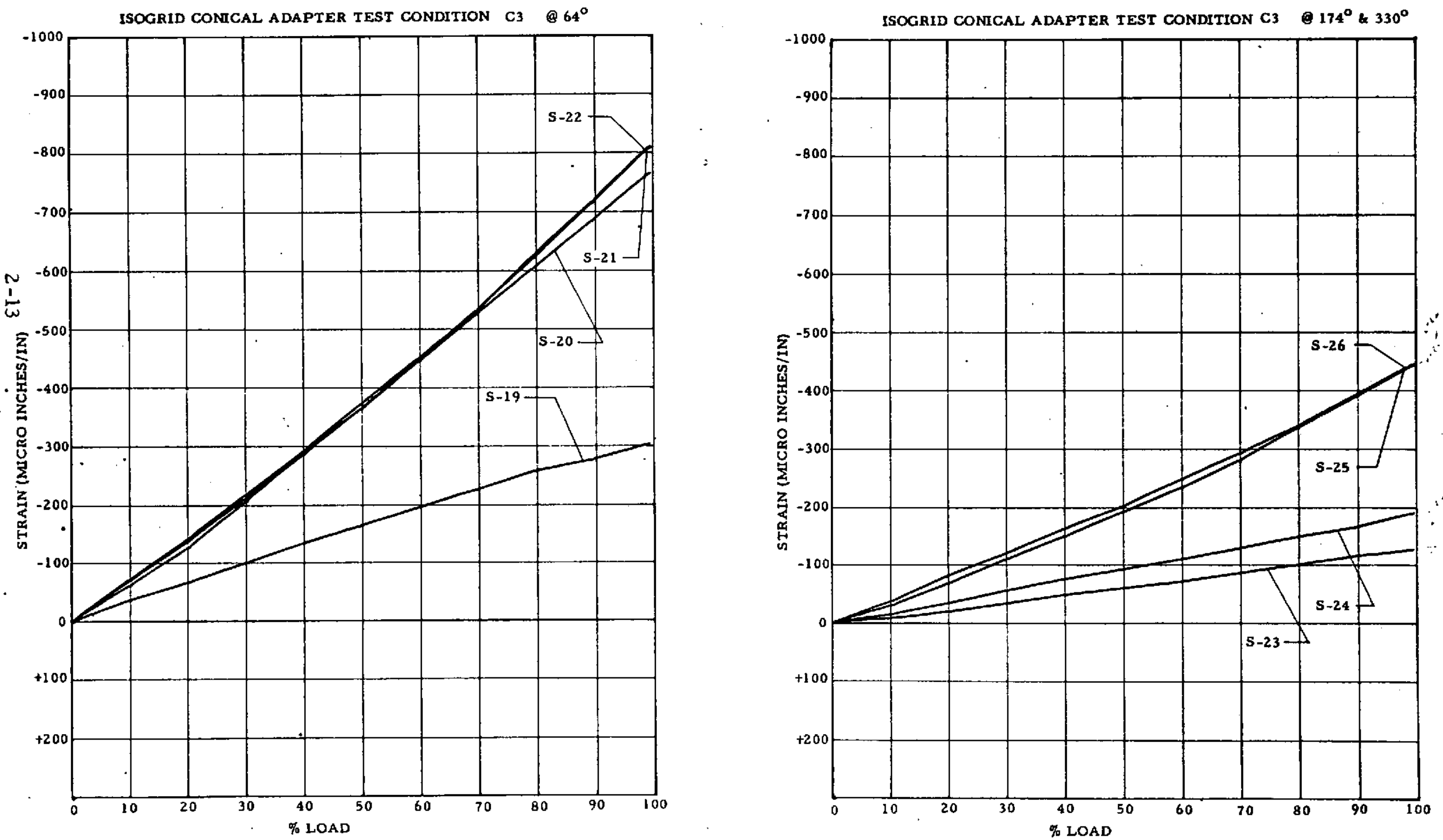
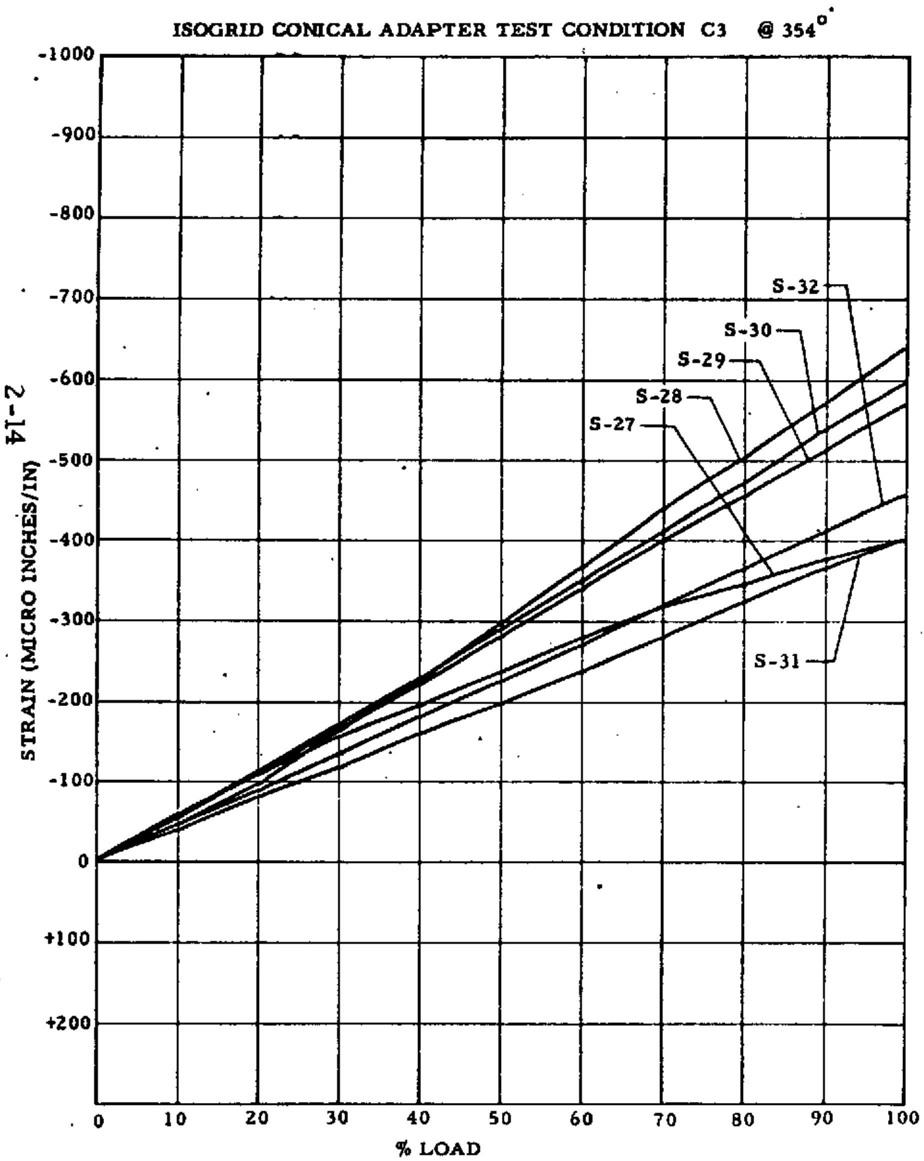


FIGURE 2.1-3 STRAIN MEASUREMENTS -CONDITION C3 (RUN 8)



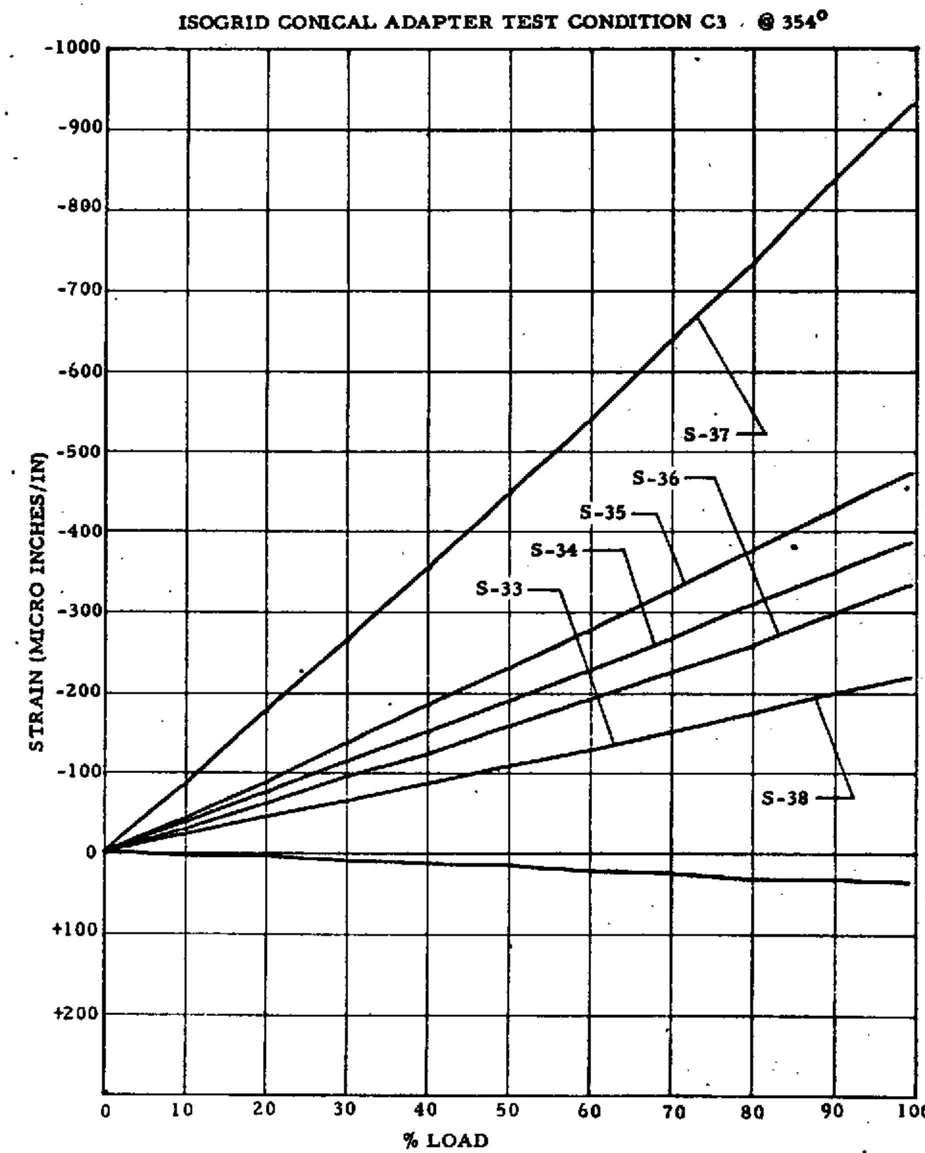
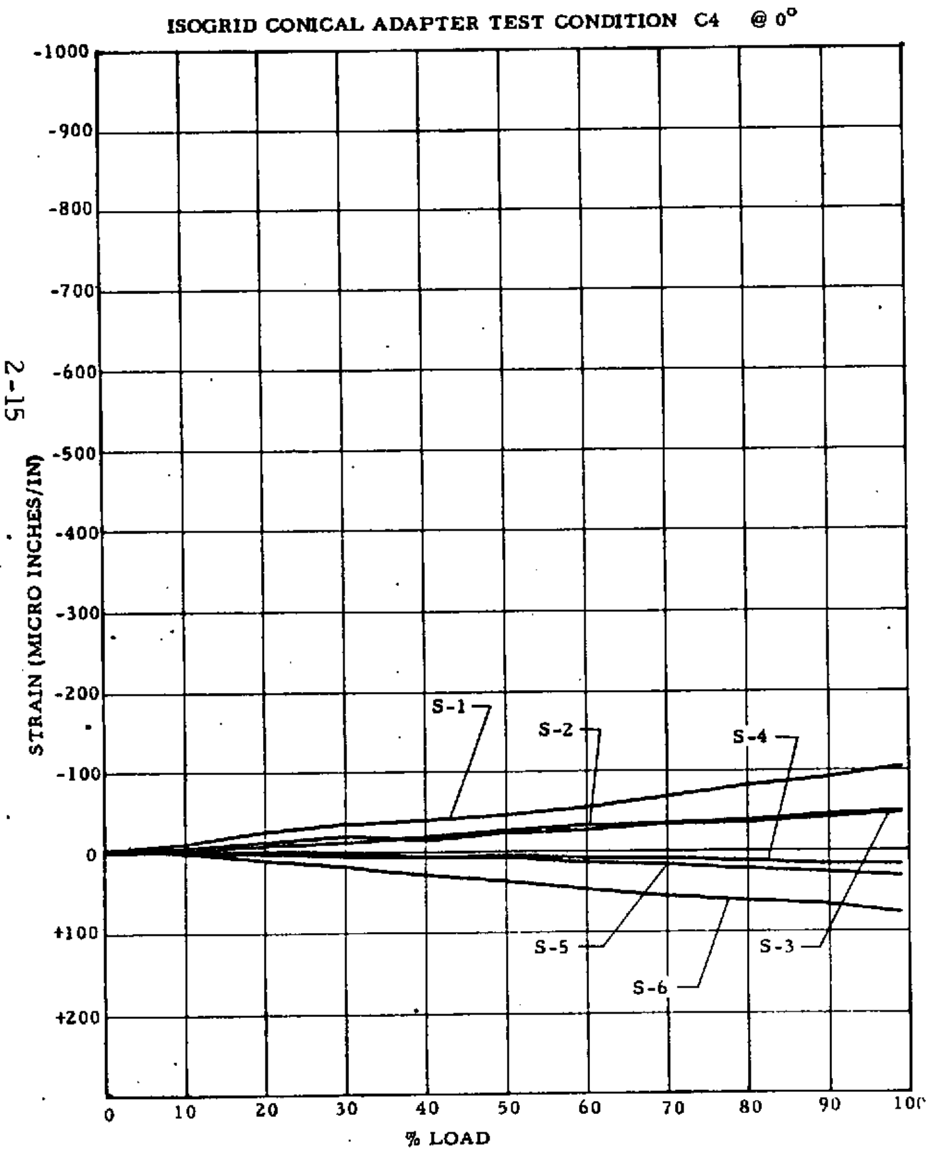


FIGURE 2.1-4 STRAIN MEASUREMENTS -CONDITION C4 (RUN 7)



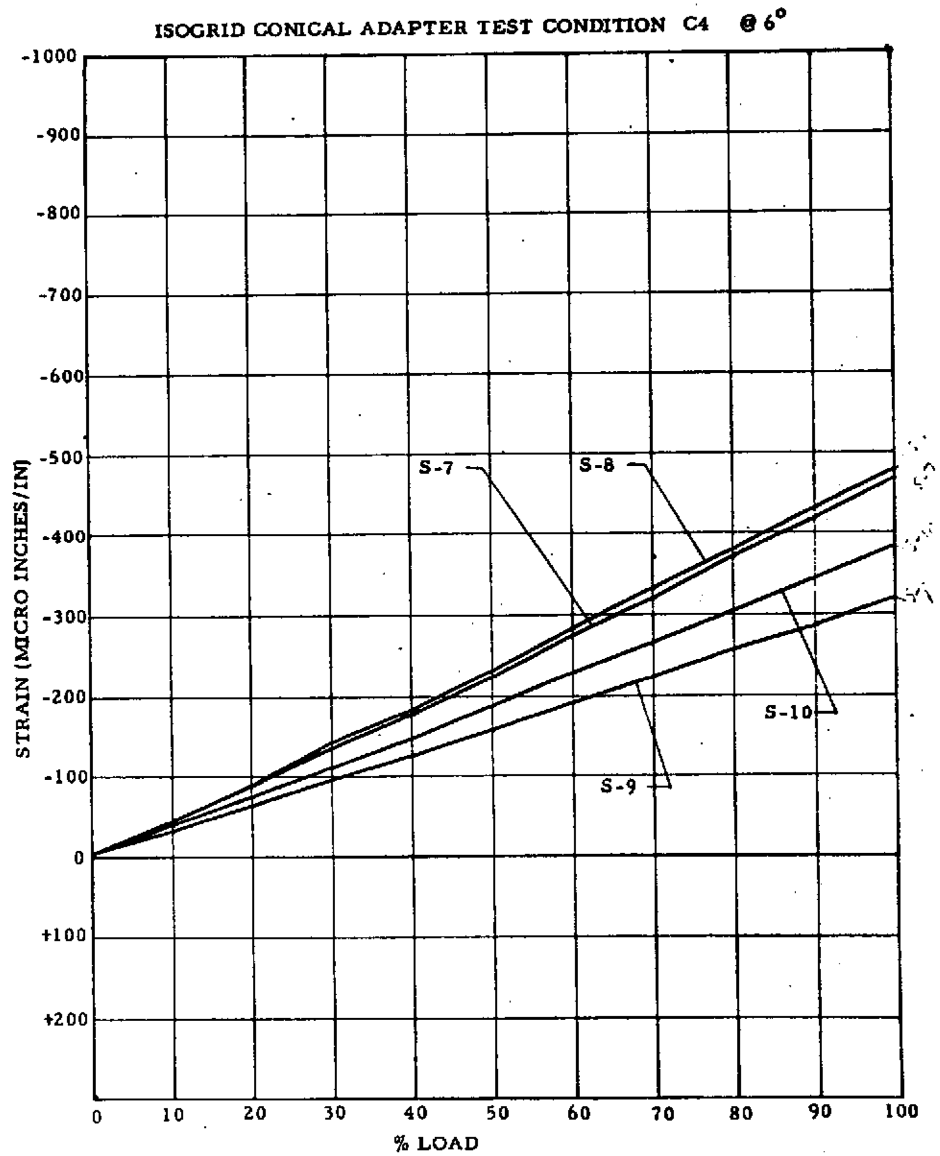
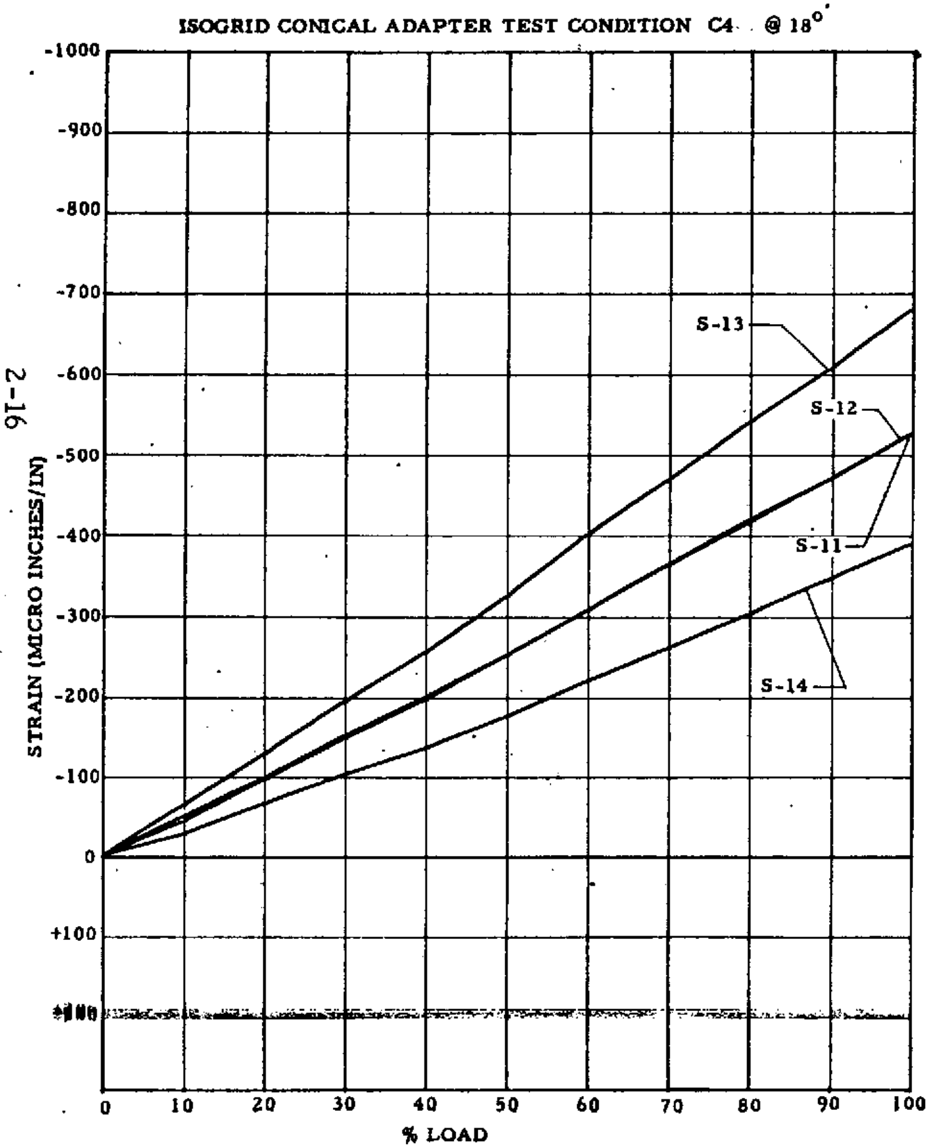


FIGURE 2.1-4 STRAIN MEASUREMENTS -CONDITION C4 (RUN 7)



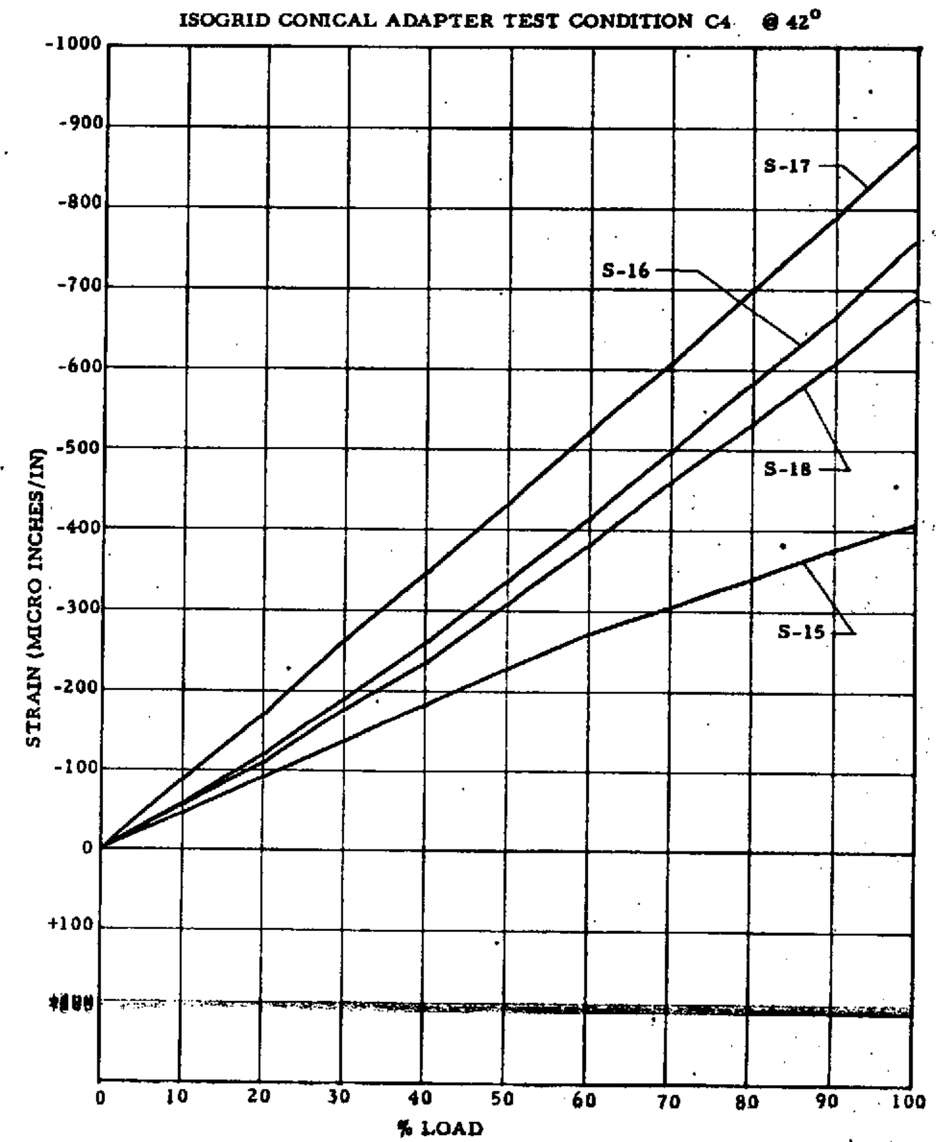
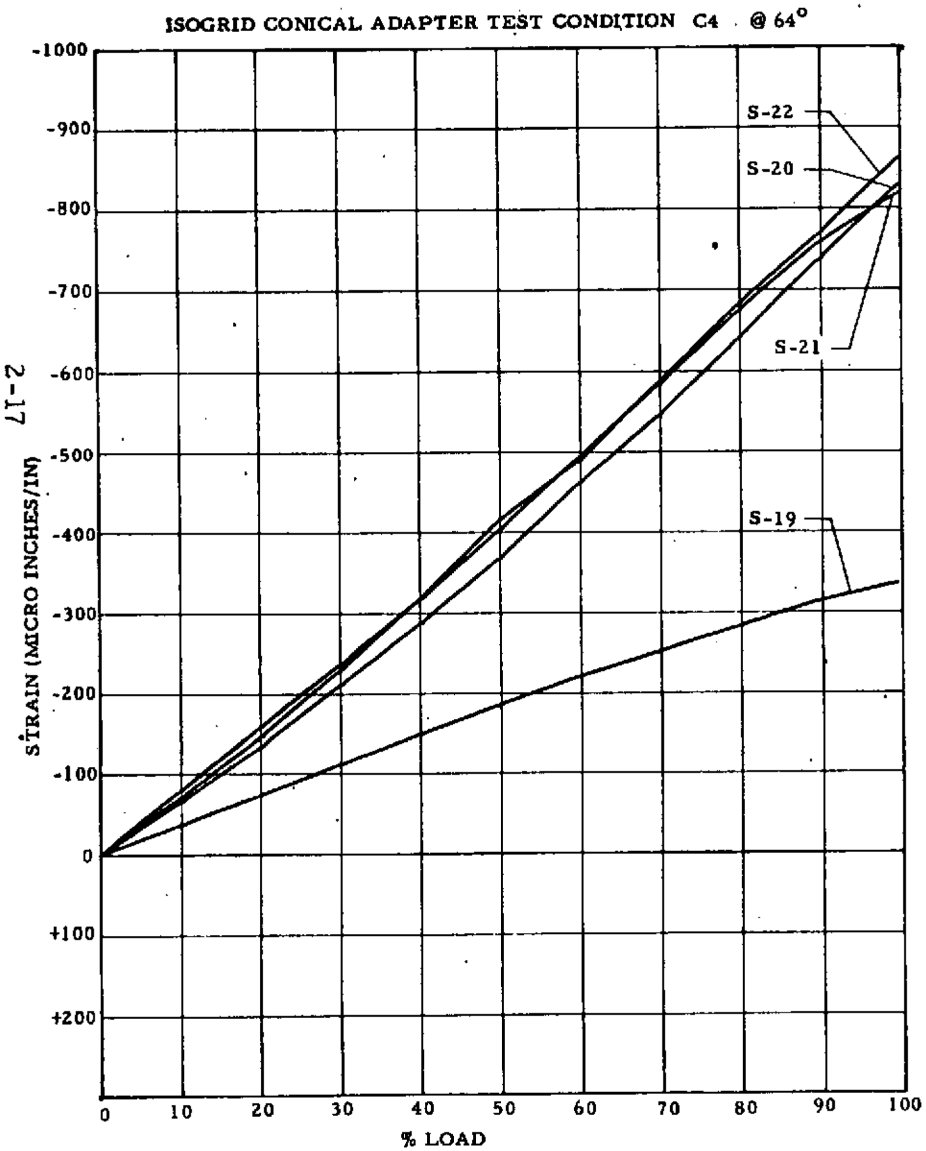


FIGURE 2.1-4 STRAIN MEASUREMENTS - CONDITION C4 (RUN7)



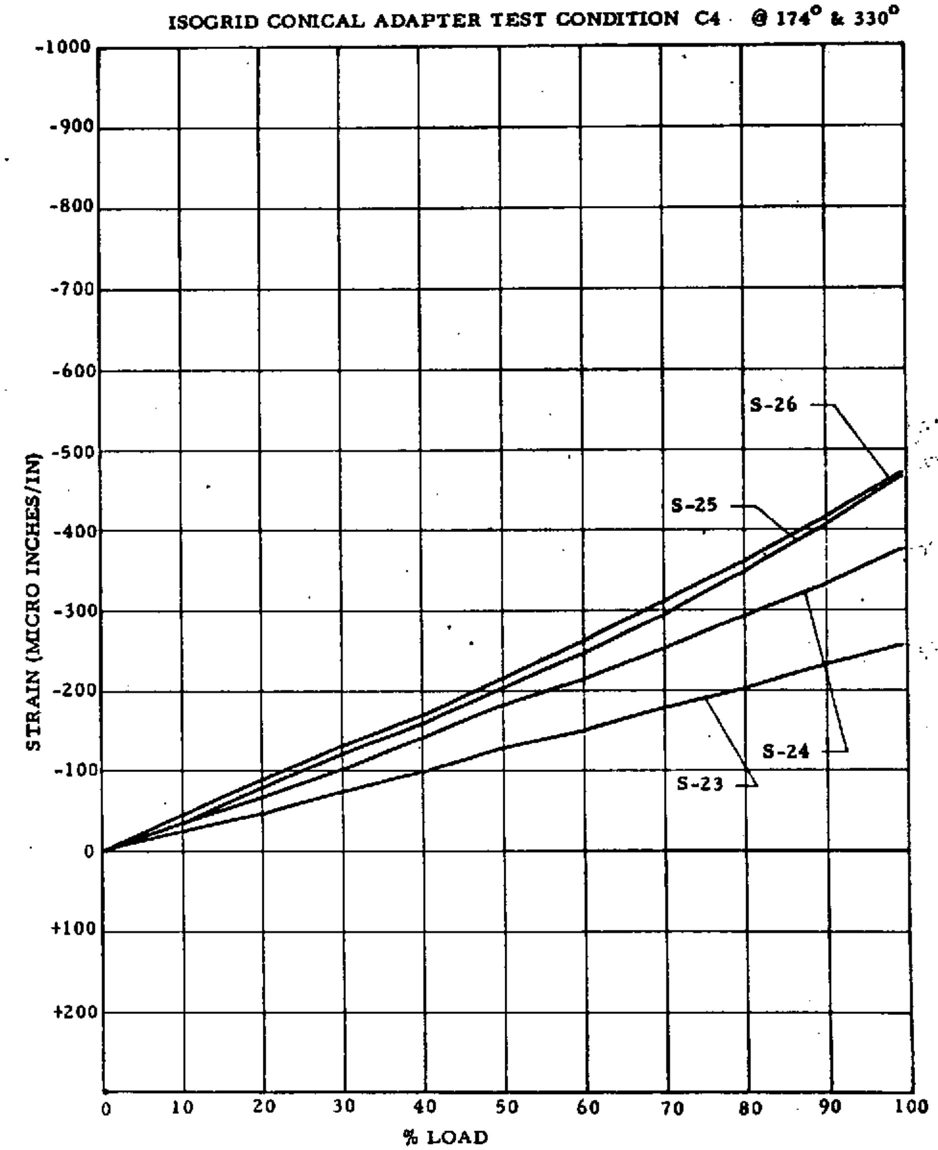


FIGURE 2.1-4 STRAIN MEASUREMENTS -CONDITION C4 (RUN 7)

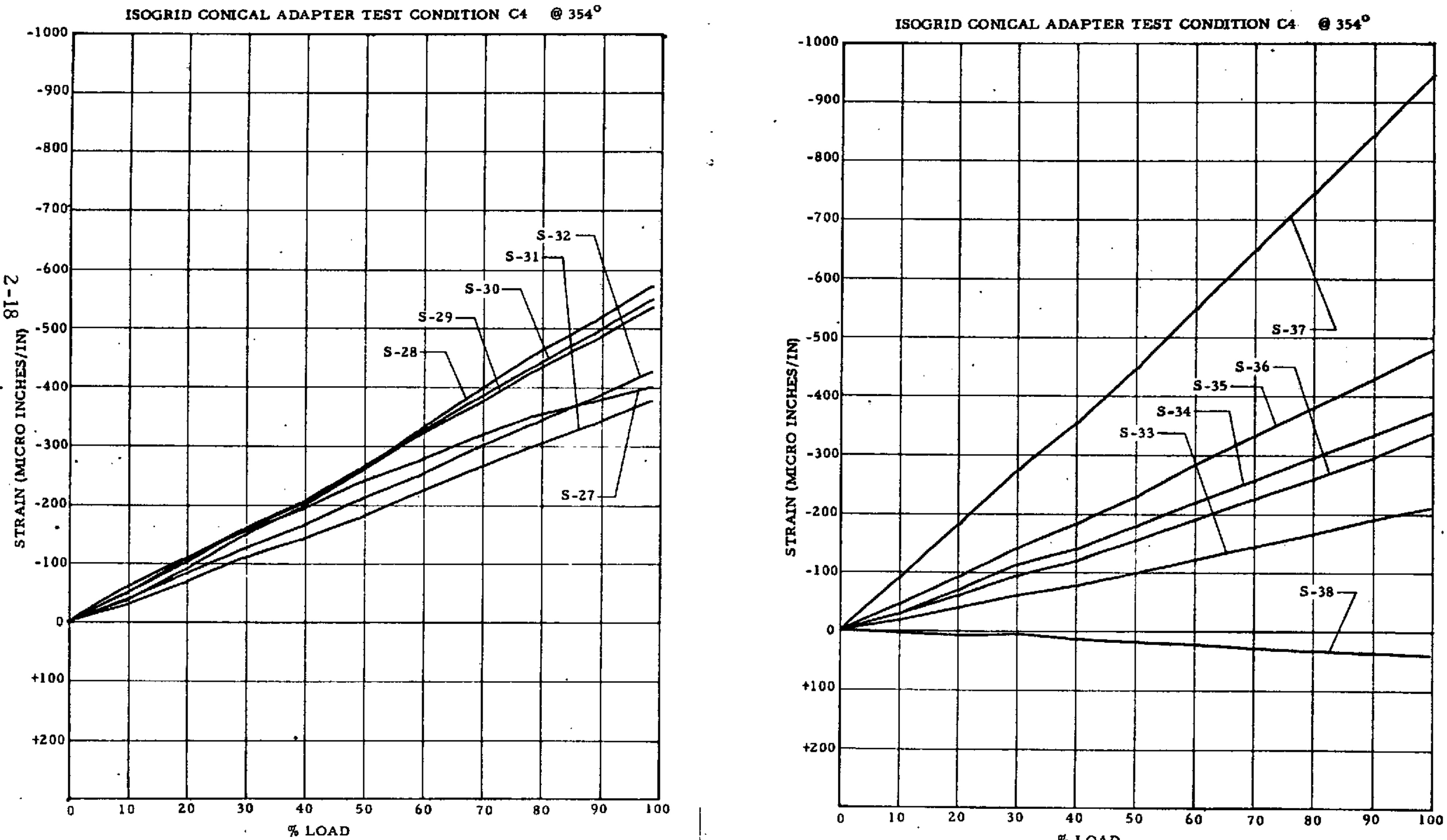


FIGURE 2.1-5 STRAIN MEASUREMENTS -CONDITION C5 (RUN 5)

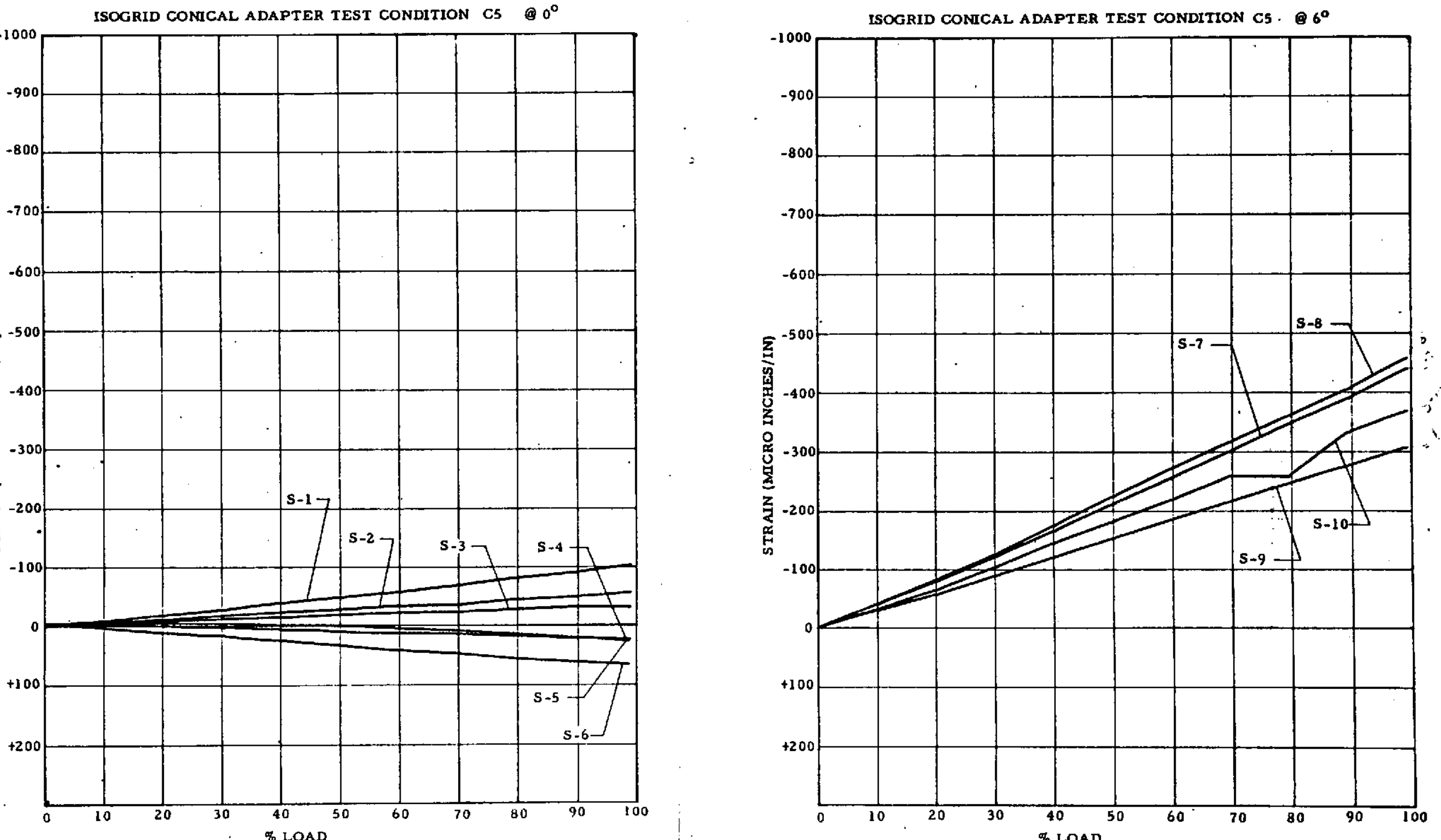
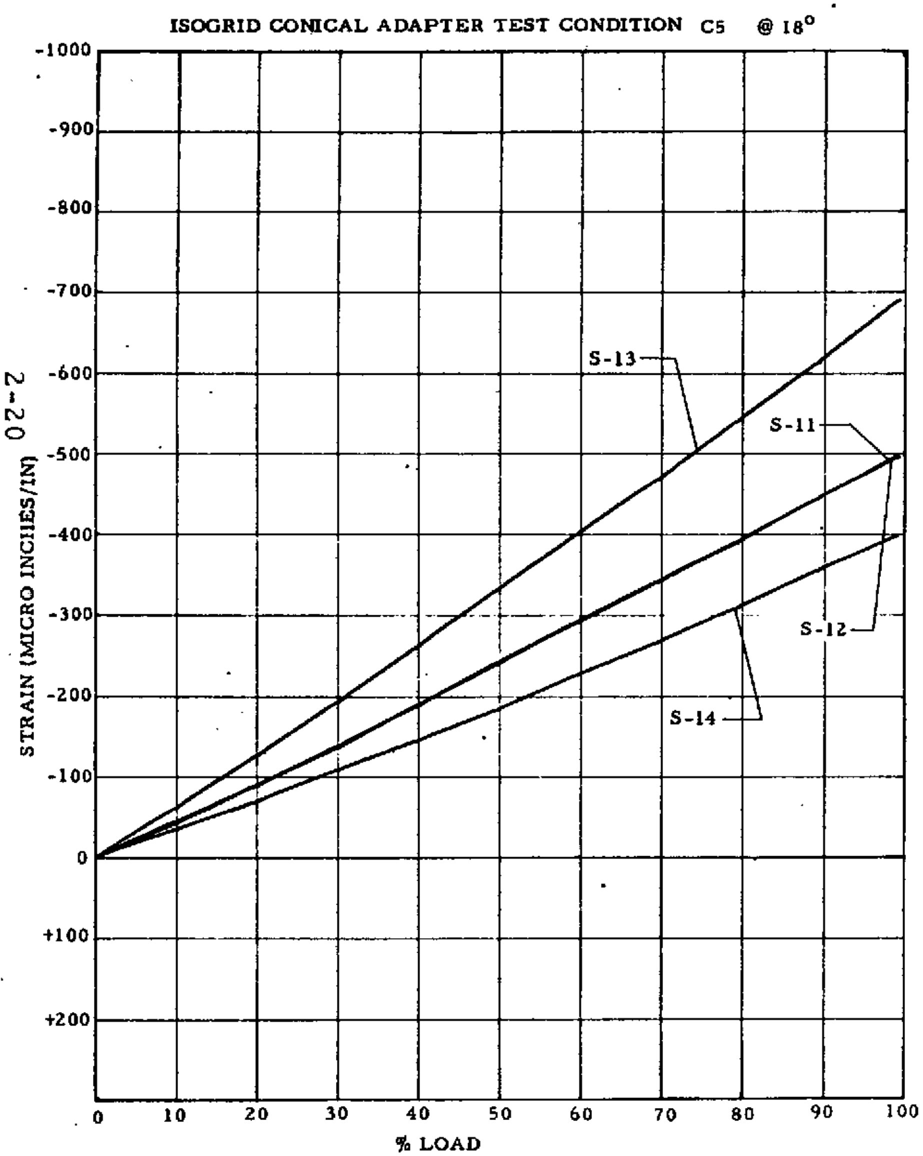


FIGURE 2.1-5 STRAIN MEASUREMENTS -CONDITION C5 (RUN 5)



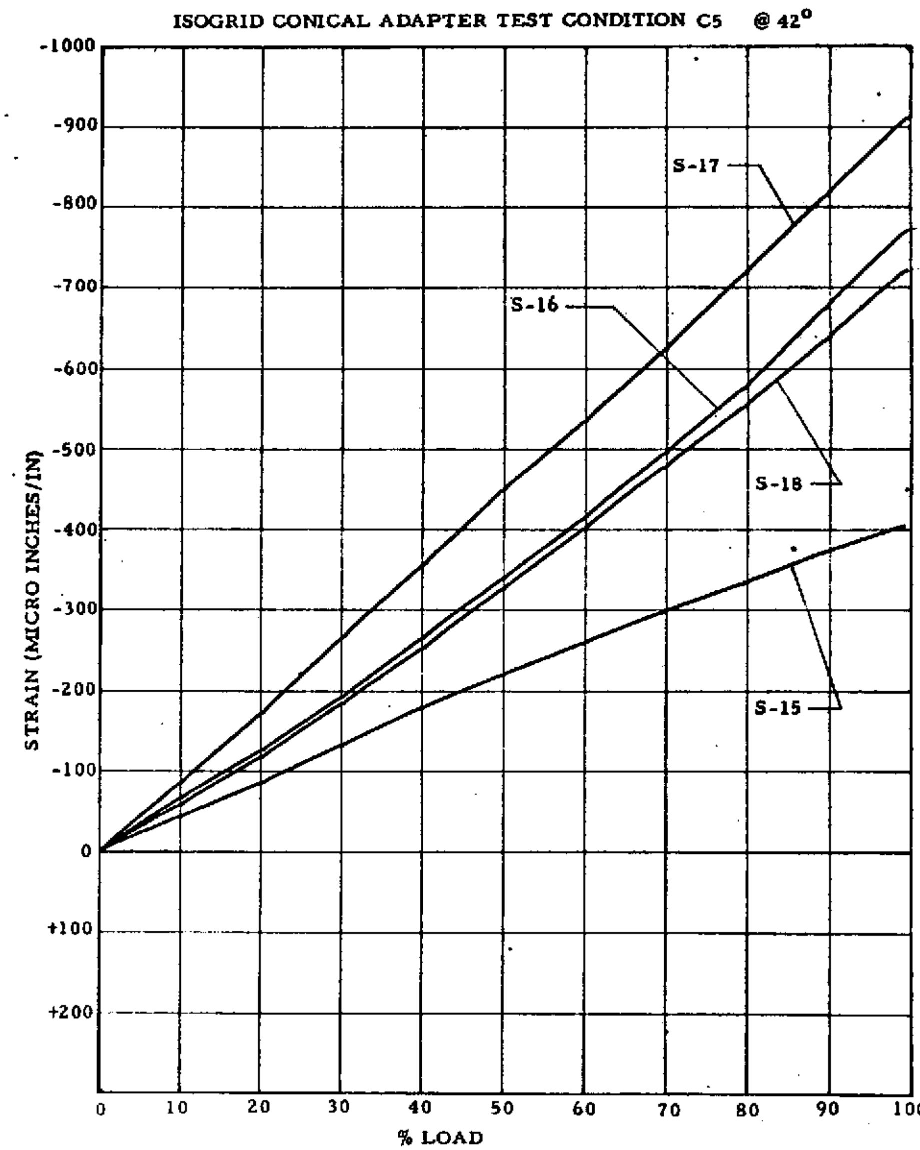
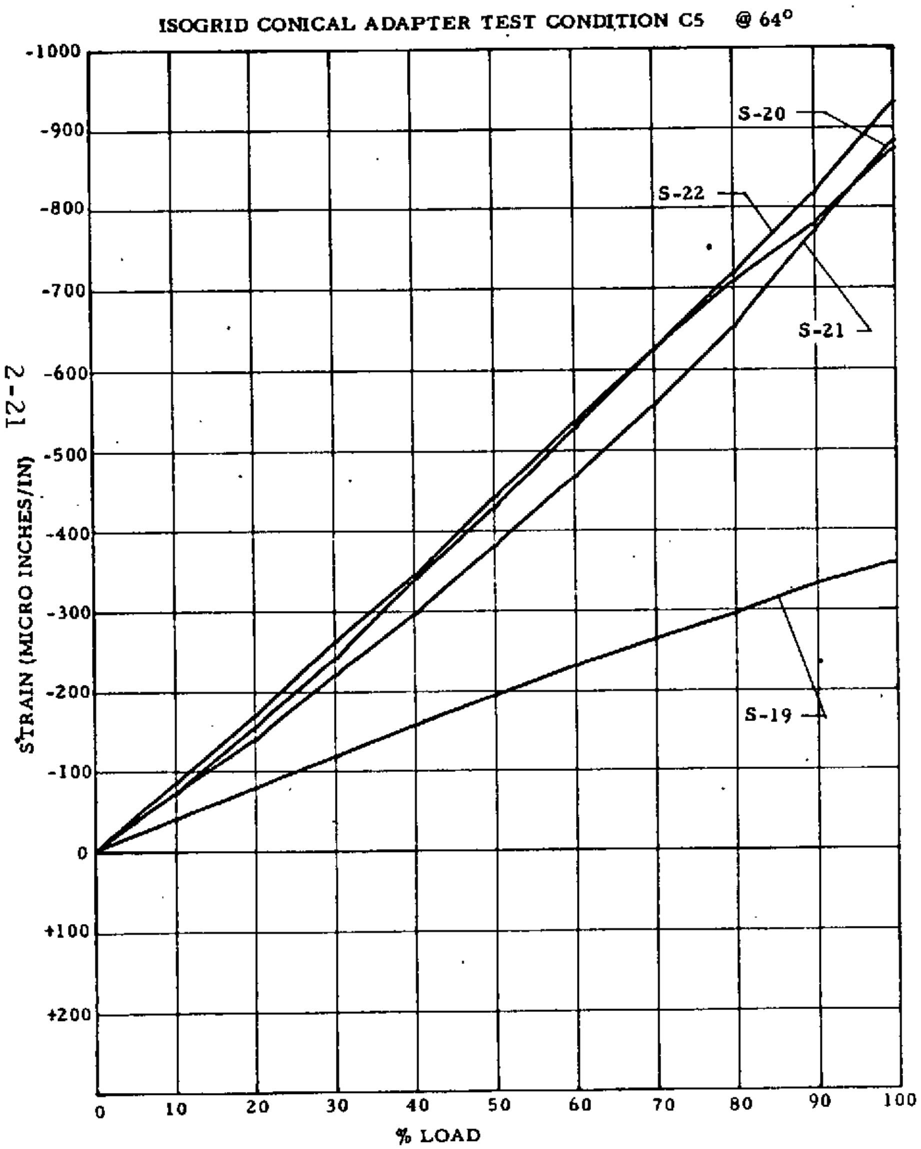


FIGURE 2.1-5 STRAIN MEASUREMENTS - CONDITION C5 (RUN 5)



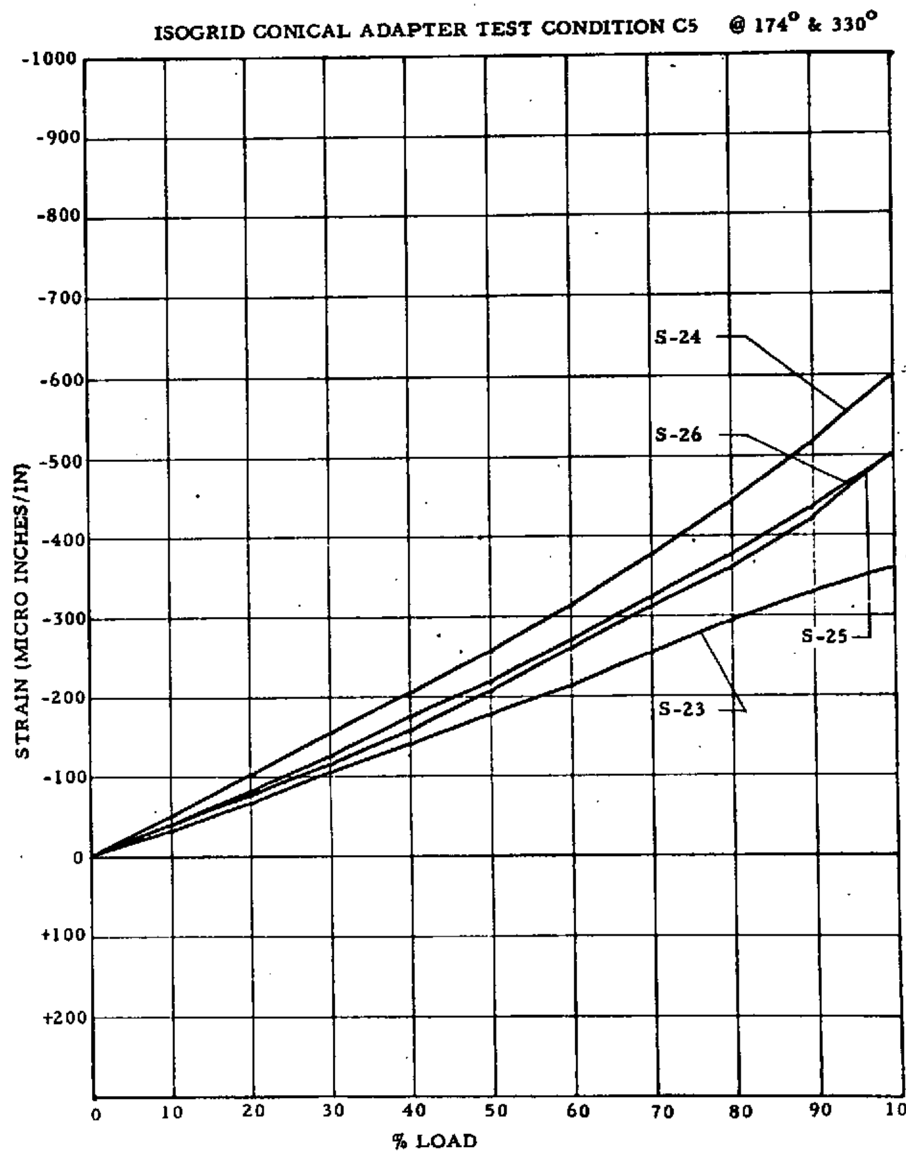
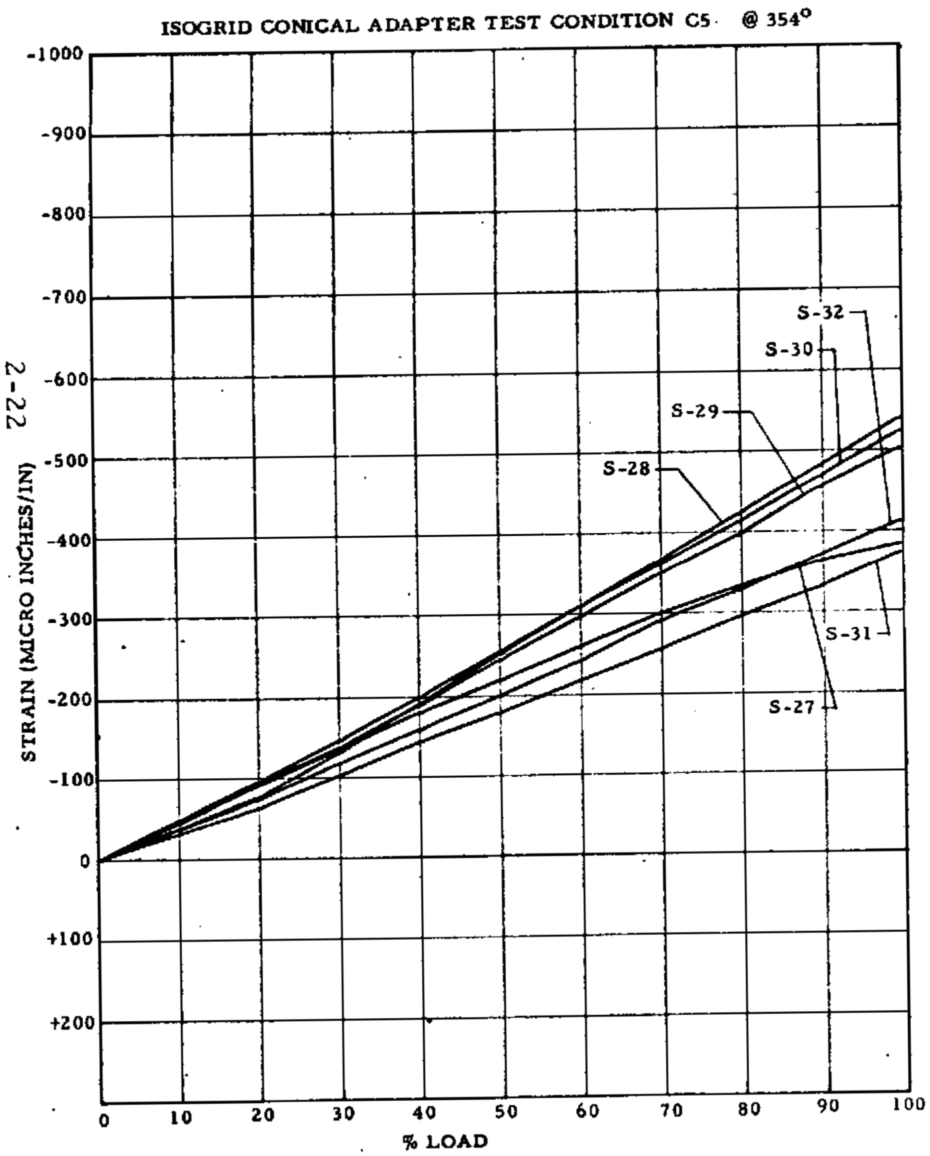


FIGURE 2.1-5 STRAIN MEASUREMENTS -CONDITION C5 (RUN 5)



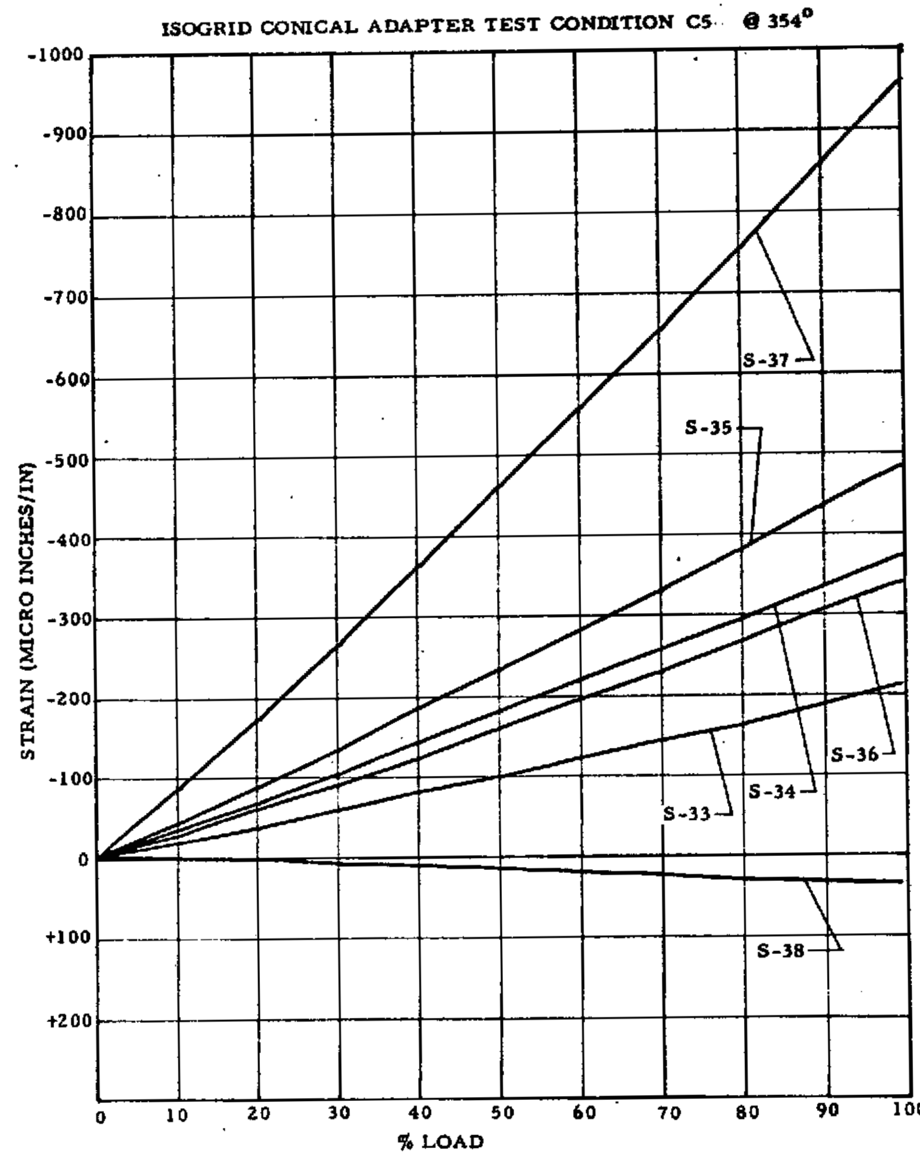


FIGURE 2.1-6 AXIAL DEFLECTION-CONDITION C1 (RUN 9)

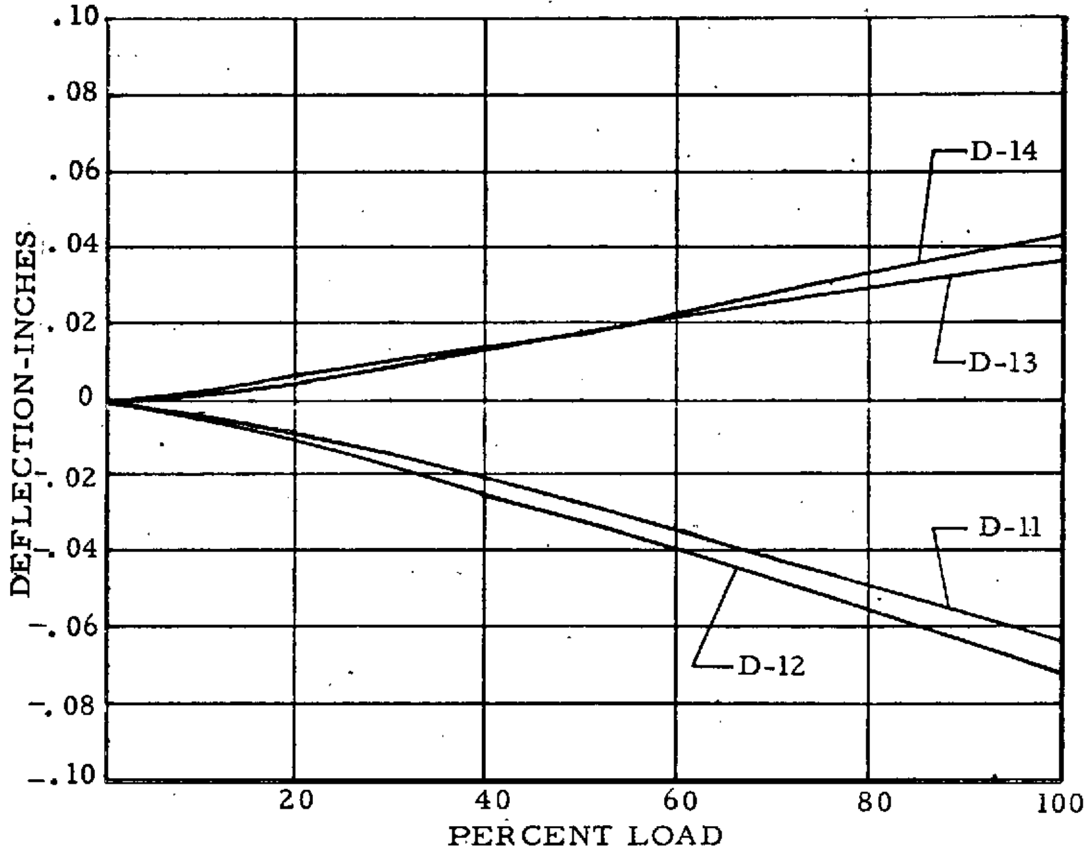


FIGURE 2.1-7 AXIAL DEFLECTION=CONDITION C1-90(RUN 10)

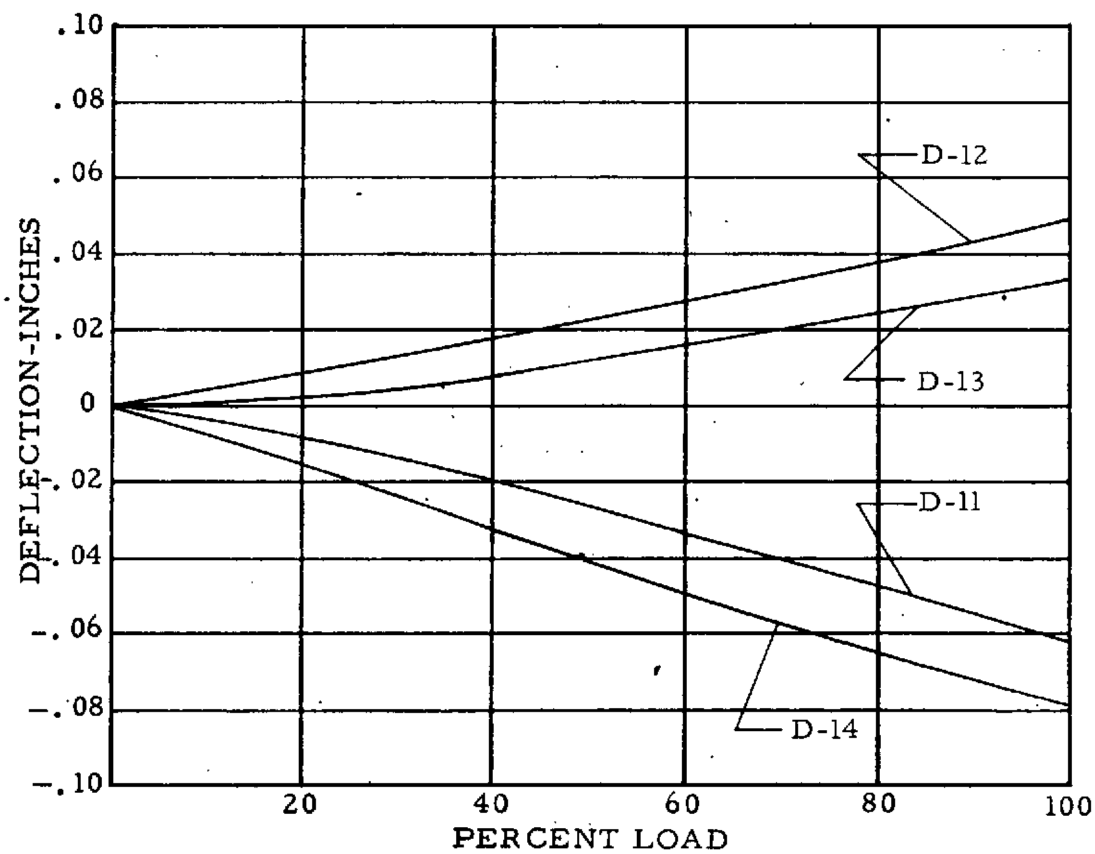


FIGURE 2.1-8 AXIAL DEFLECTION-CONDITIONC C1-180(RUN 11)

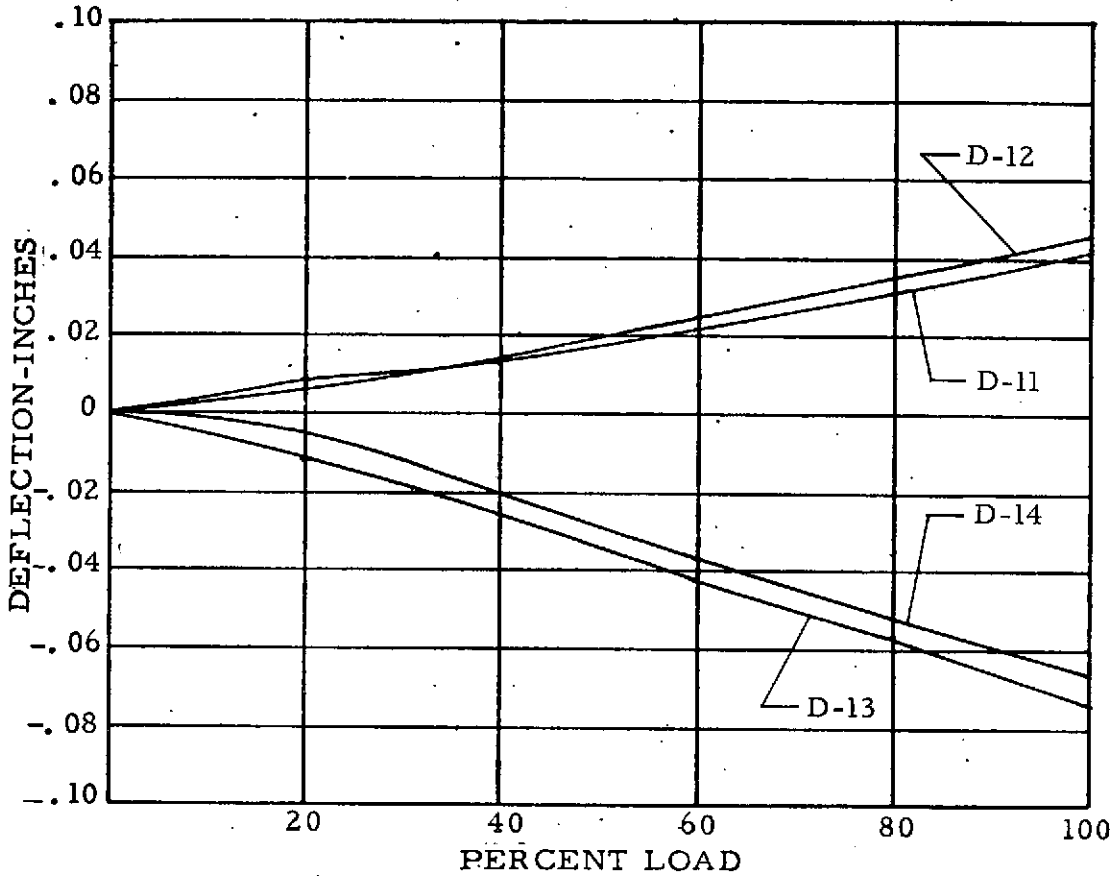


FIGURE 2.1-9 AXIAL DEFLECTION-CONDITION - C2(RUN 6)

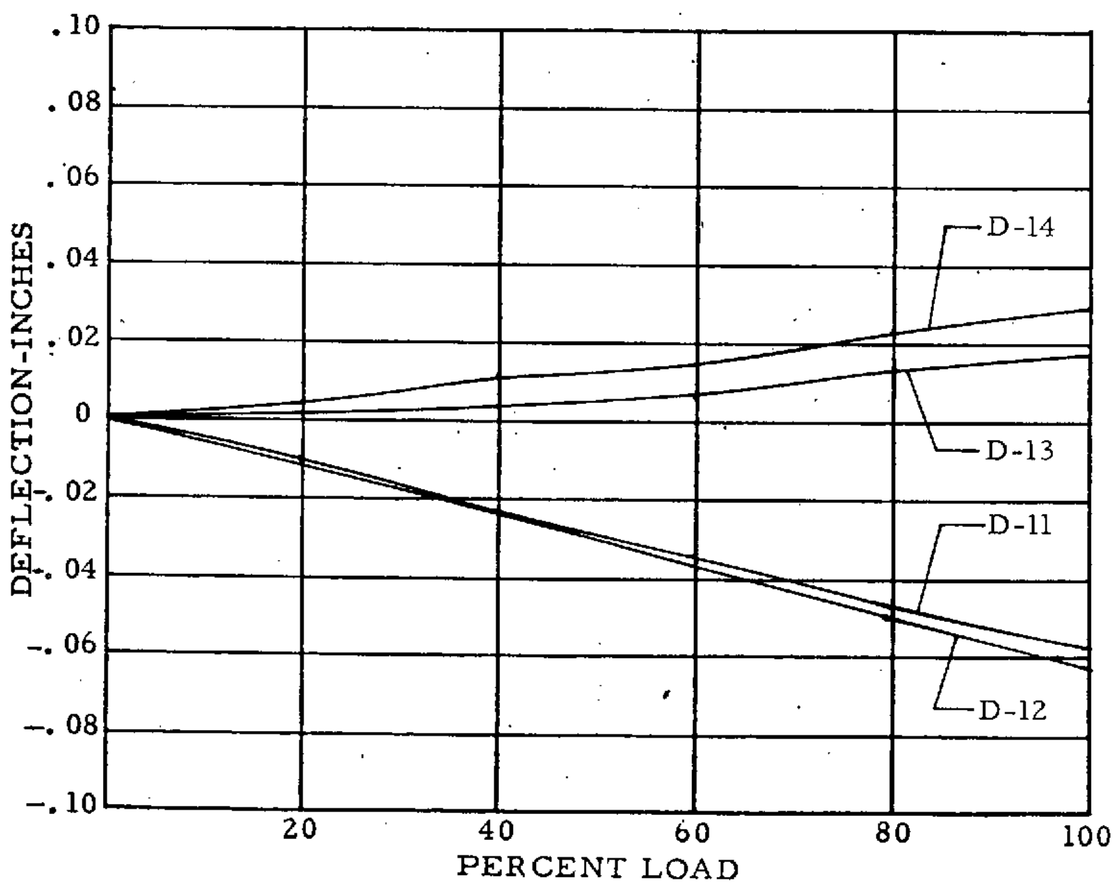


FIGURE 2.1-10 AXIAL DEFLECTION-CONDITION C3(RUN 8)

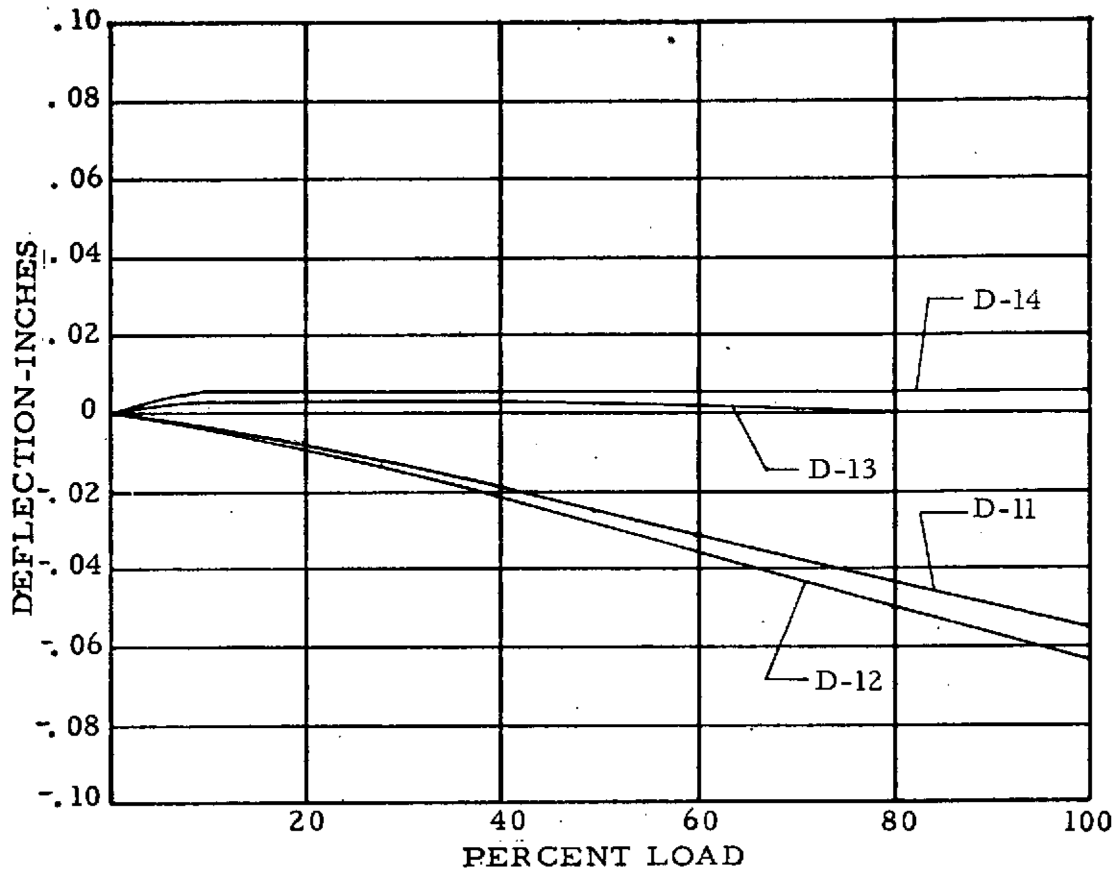


FIGURE 2.1-11 AXIAL DEFLECTION-CONDITION C4(RUN 7)

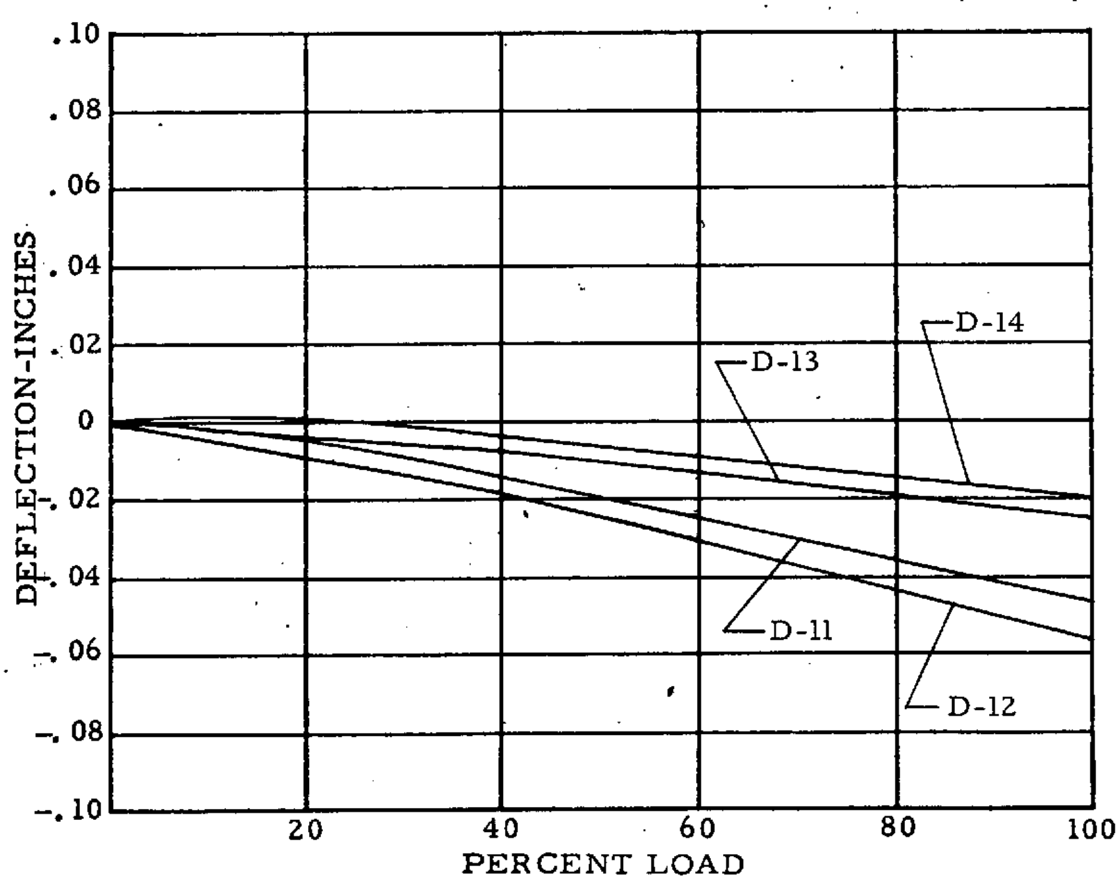


FIGURE 2.1-12 AXIAL DEFLECTION -CONDITION C5(RUN 5)

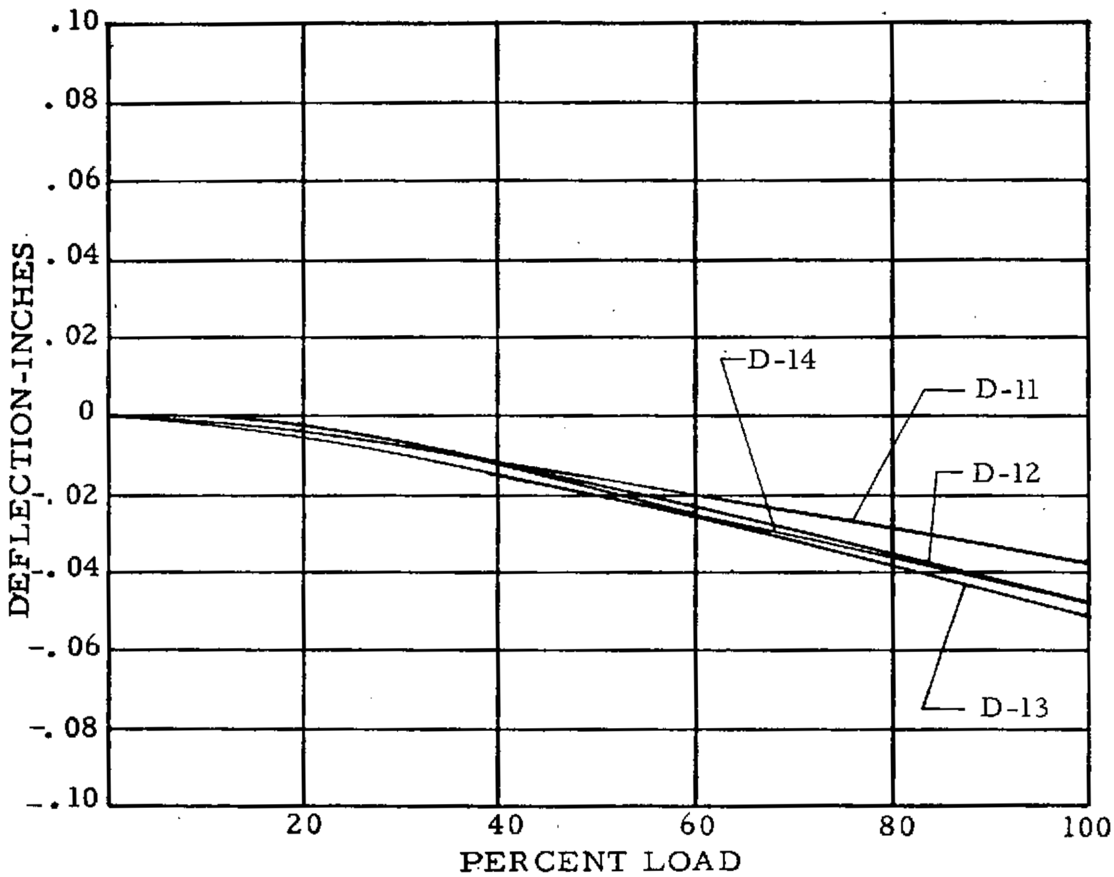
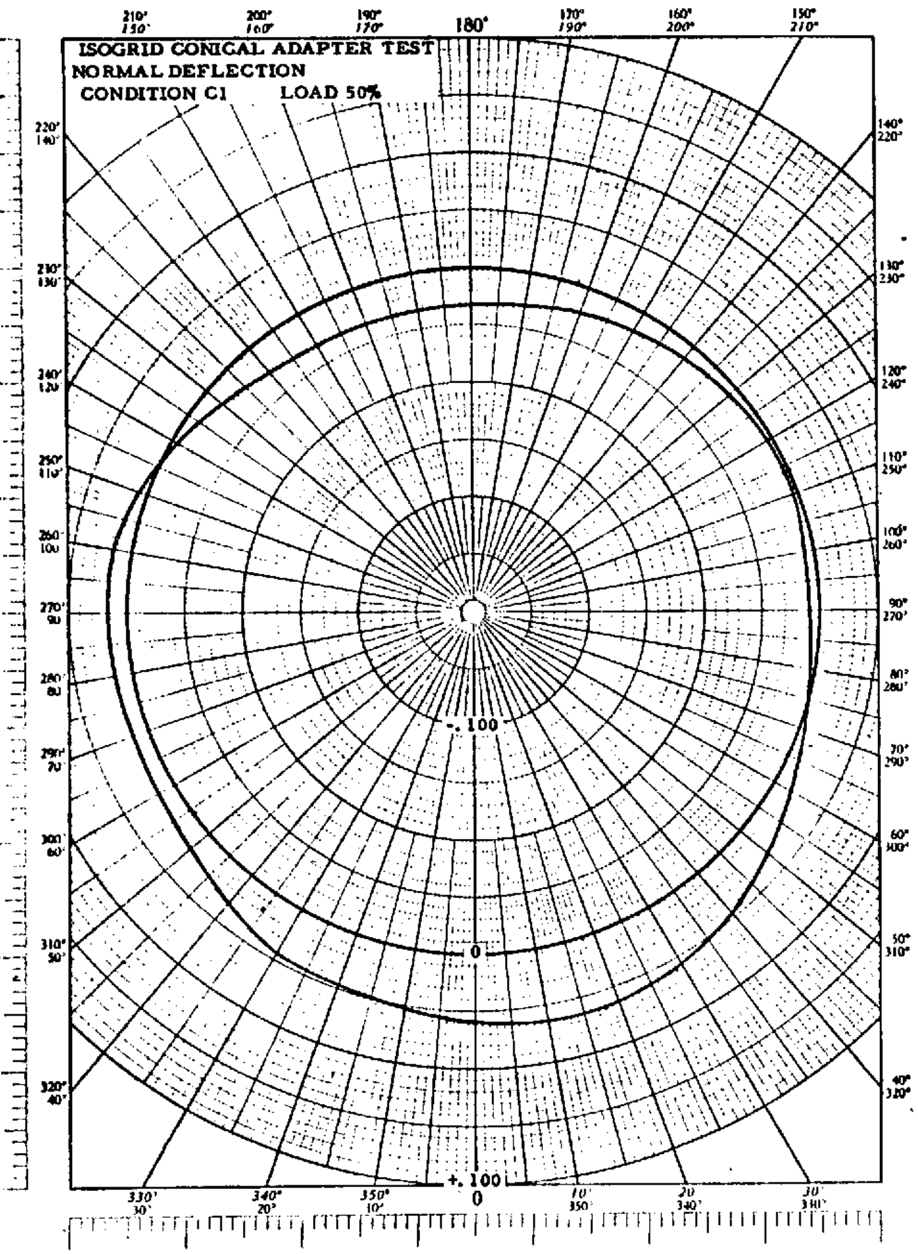


FIGURE 2.1-13 DEFLECTIONS NORMAL TO SURFACE-CONDITION C1(RUN 9)



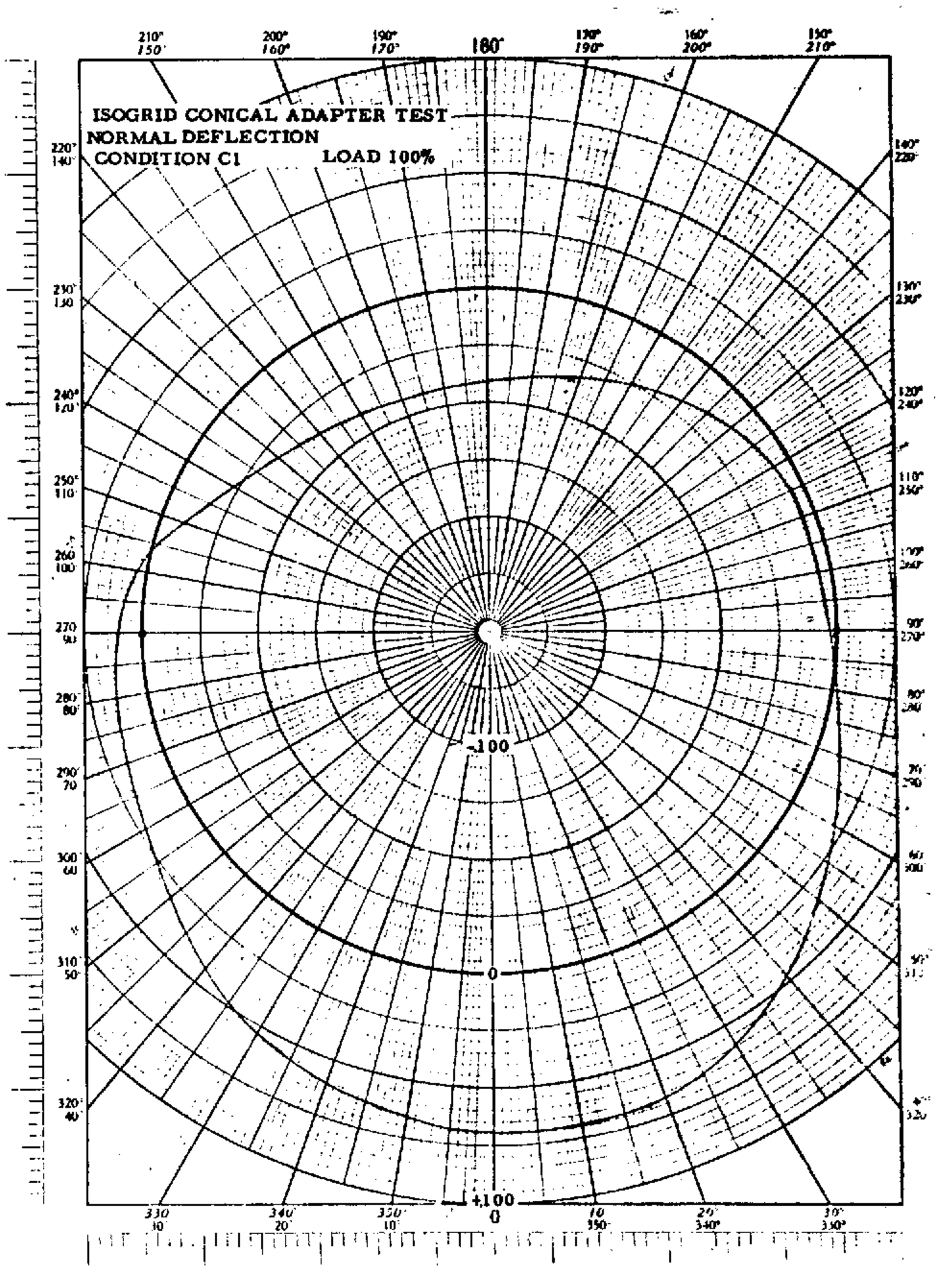
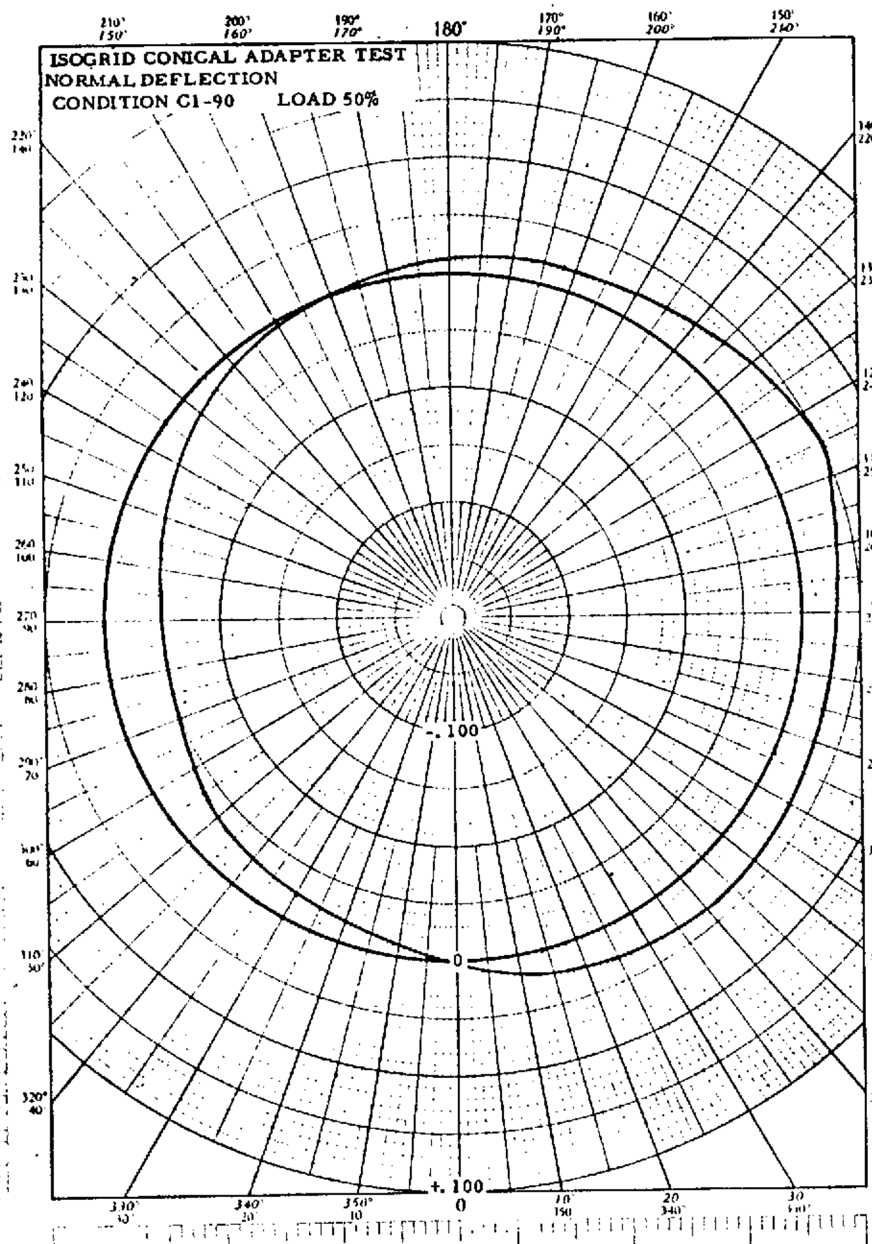


FIGURE 2.1-14 DEFLECTIONS NORMAL TO SURFACE-CONDITION C1-90(RUN 10)



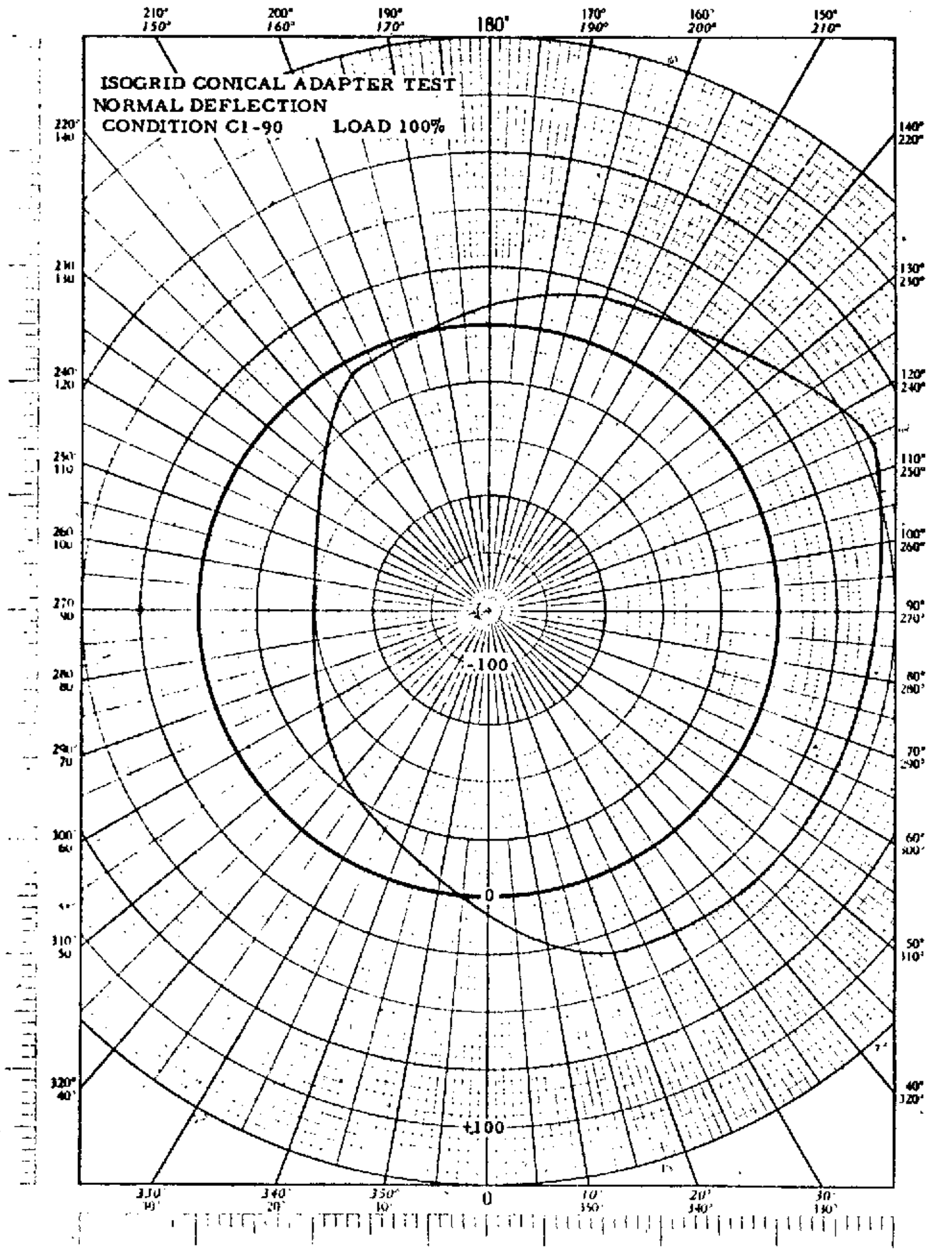
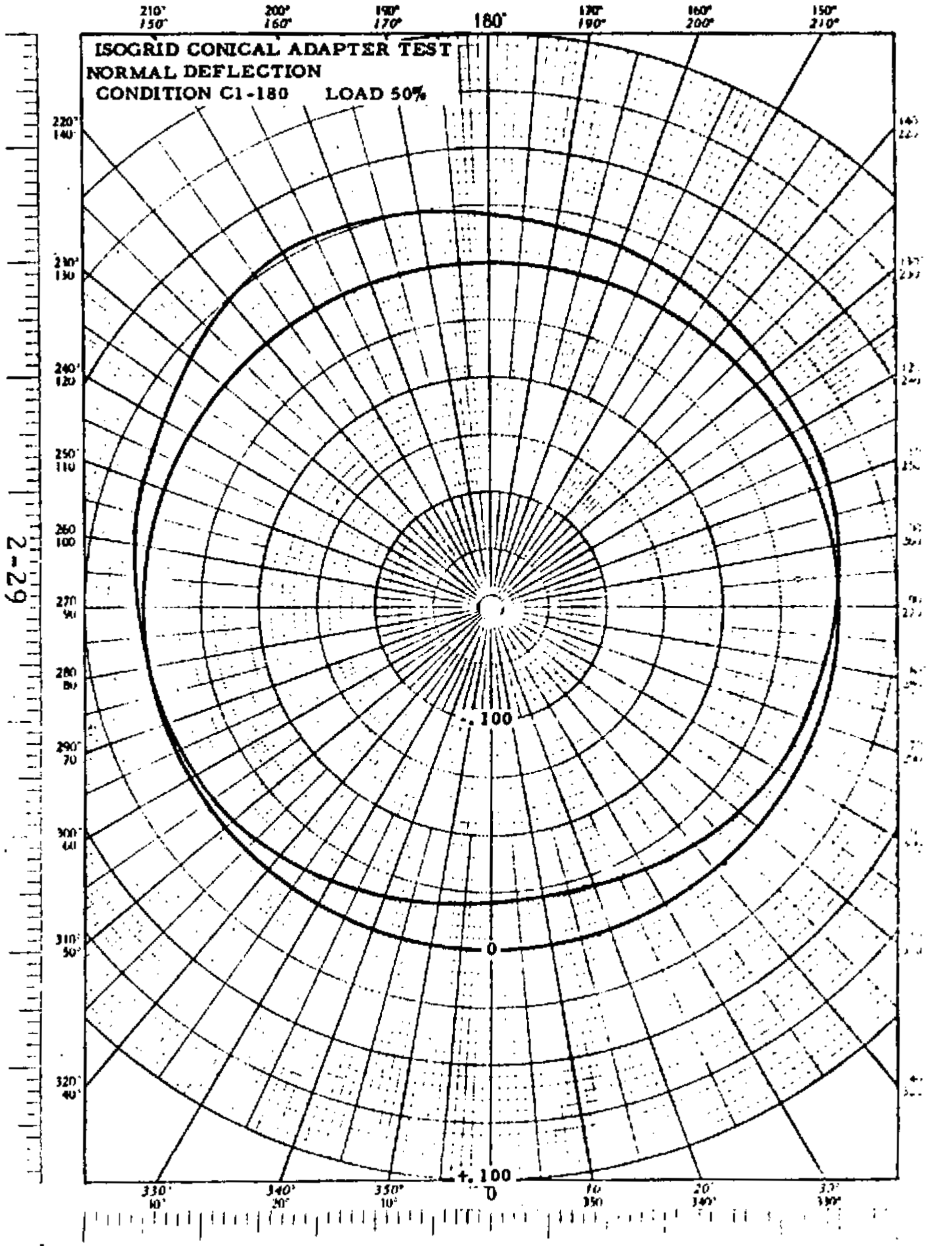


FIGURE 2.1-15 DEFLECTIONS NORMAL TO SURFACE-CONDITION C1-180(RUN 11)



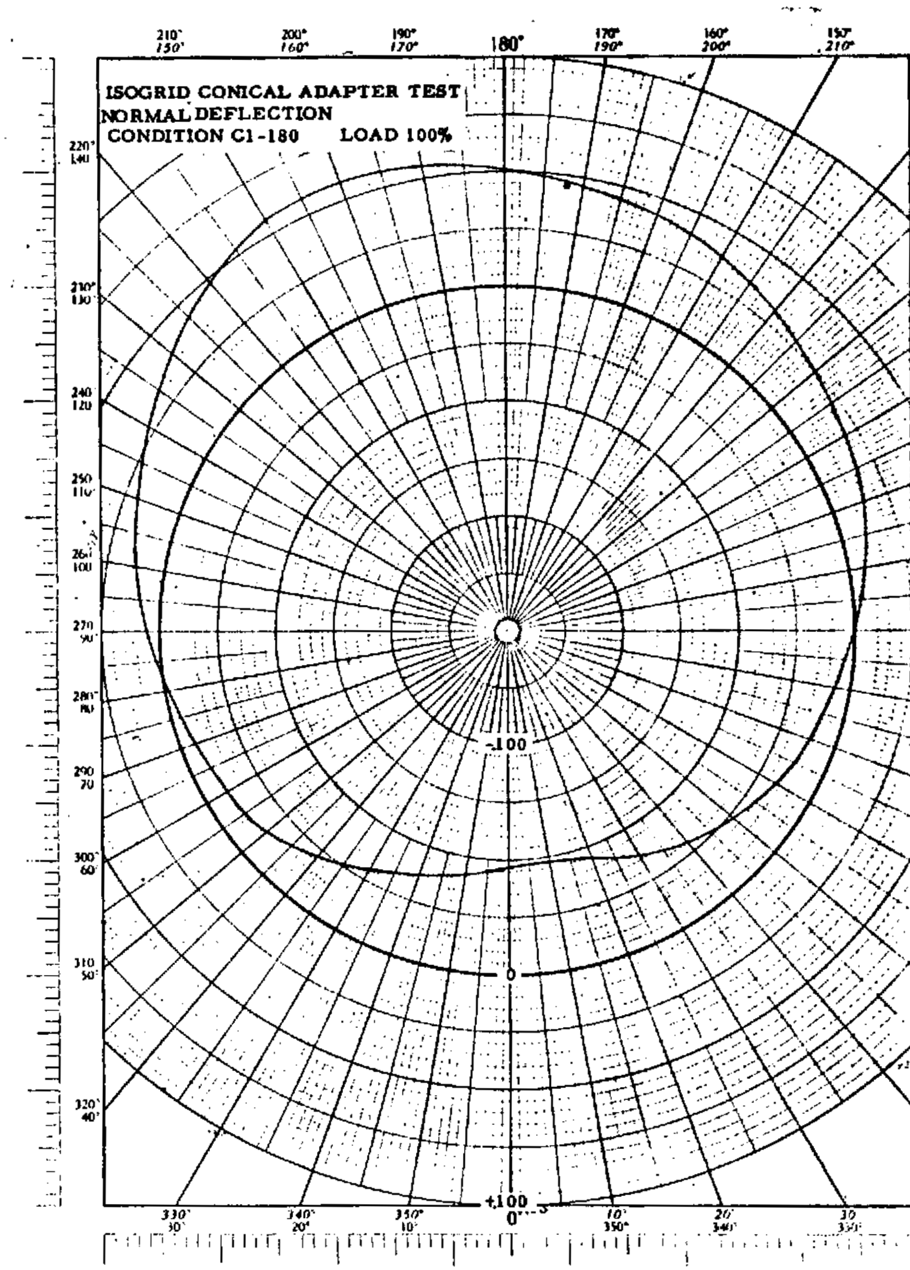
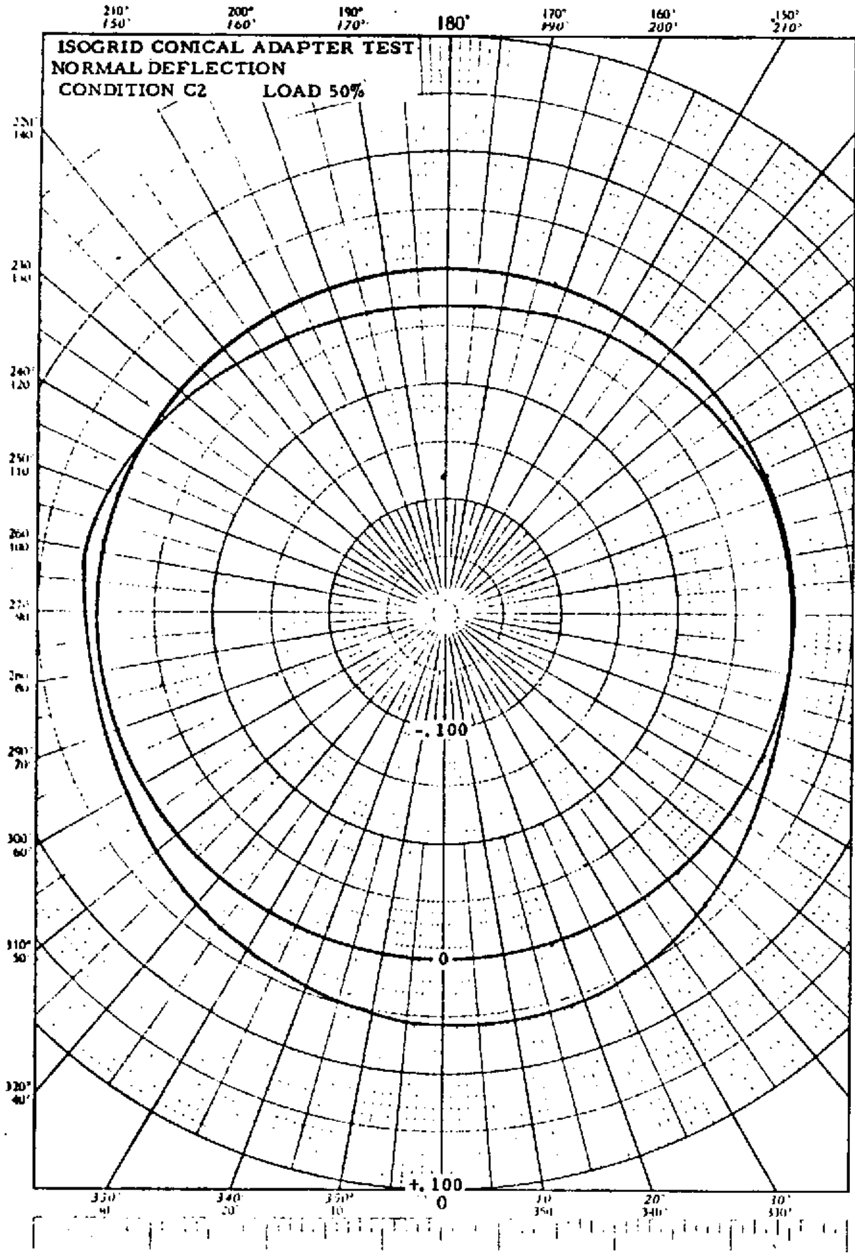


FIGURE 2.1-16 DEFLECTIONS NORMAL TO SURFACE-CONDITION C2(RUN 6)



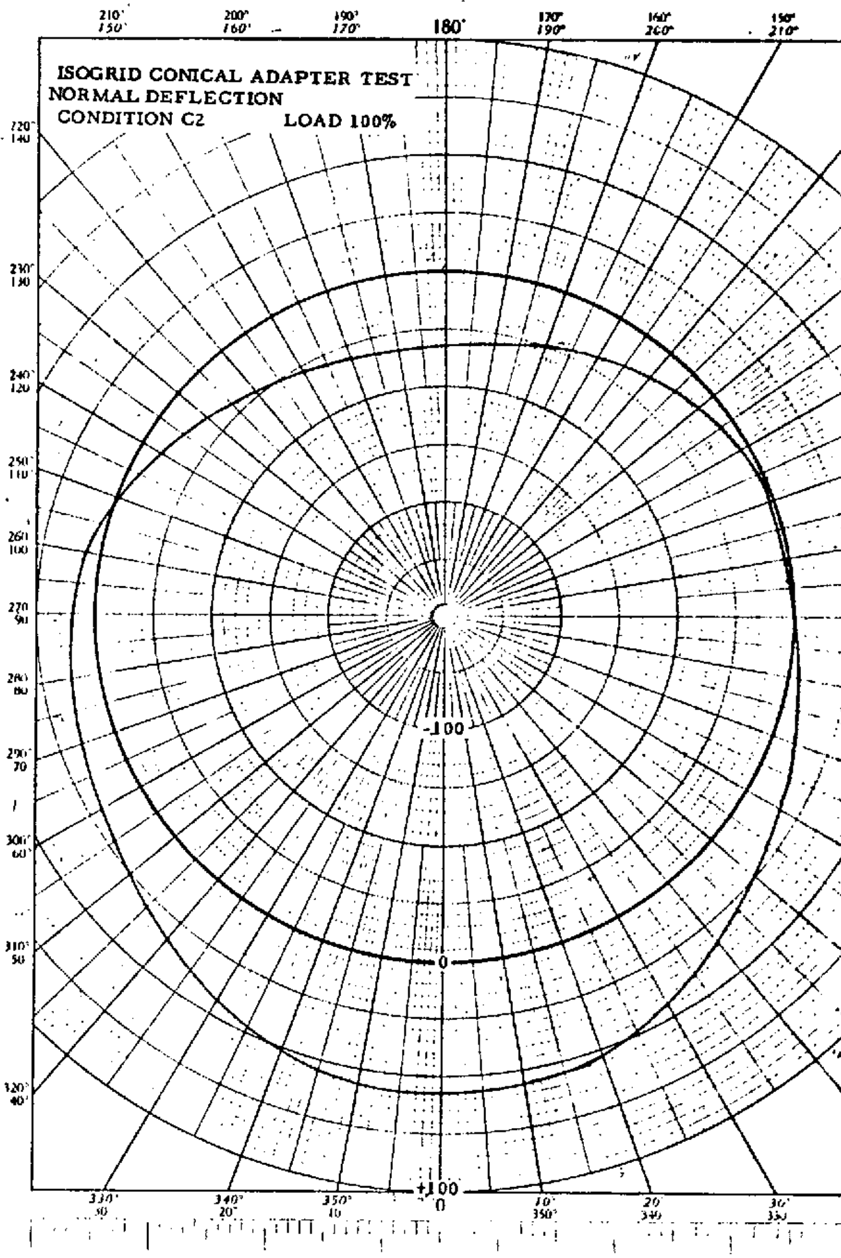
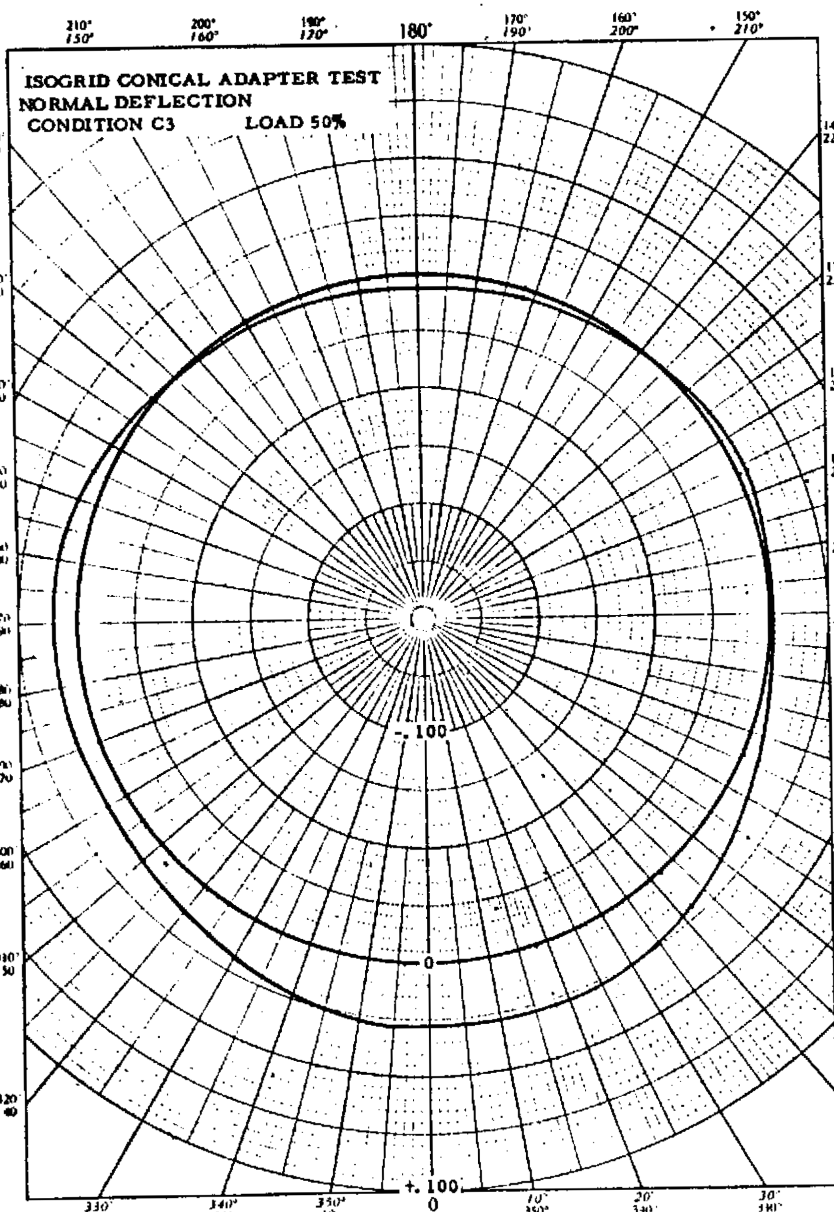


FIGURE 2.1-17 DEFLECTIONS NORMAL TO SURFACE-CONDITION C3(RUN 8)



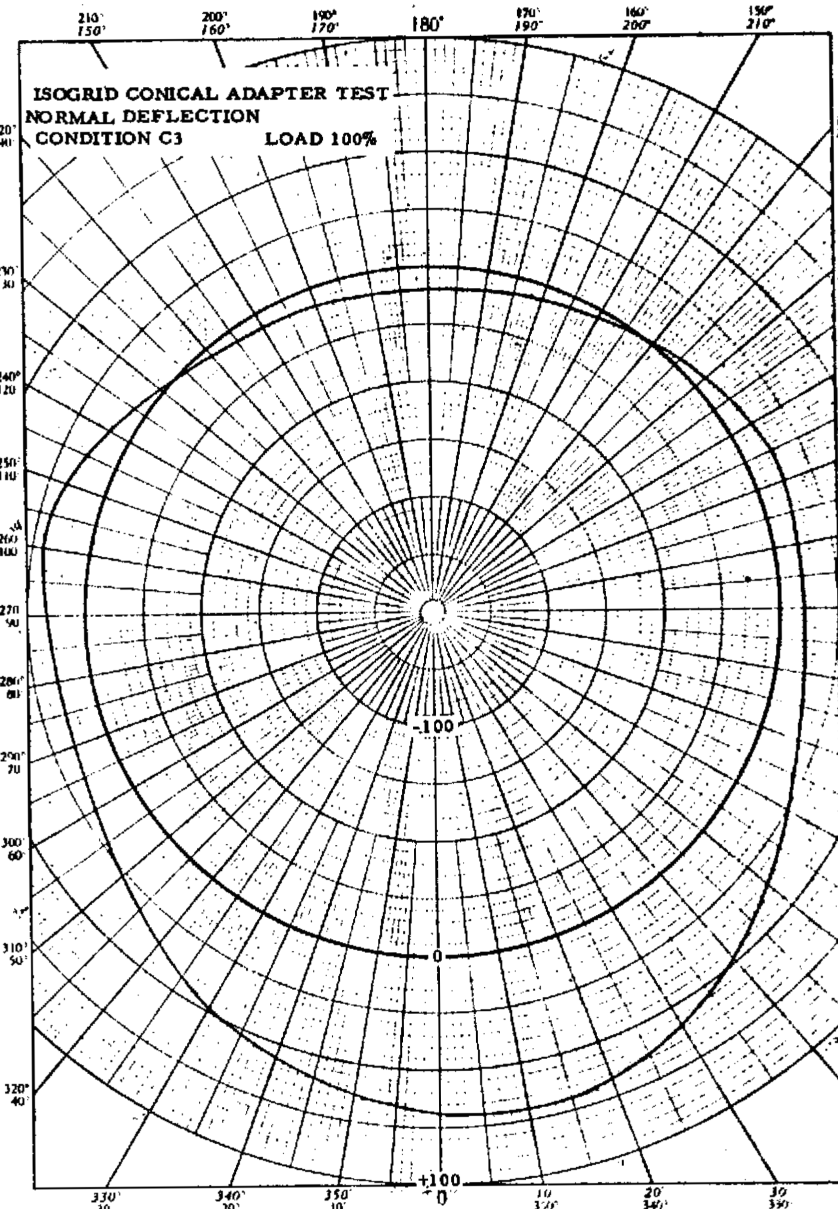


FIGURE 2.1-18 DEFLECTIONS NORMAL TO SURFACE-CONDITION C4(RUN 7)

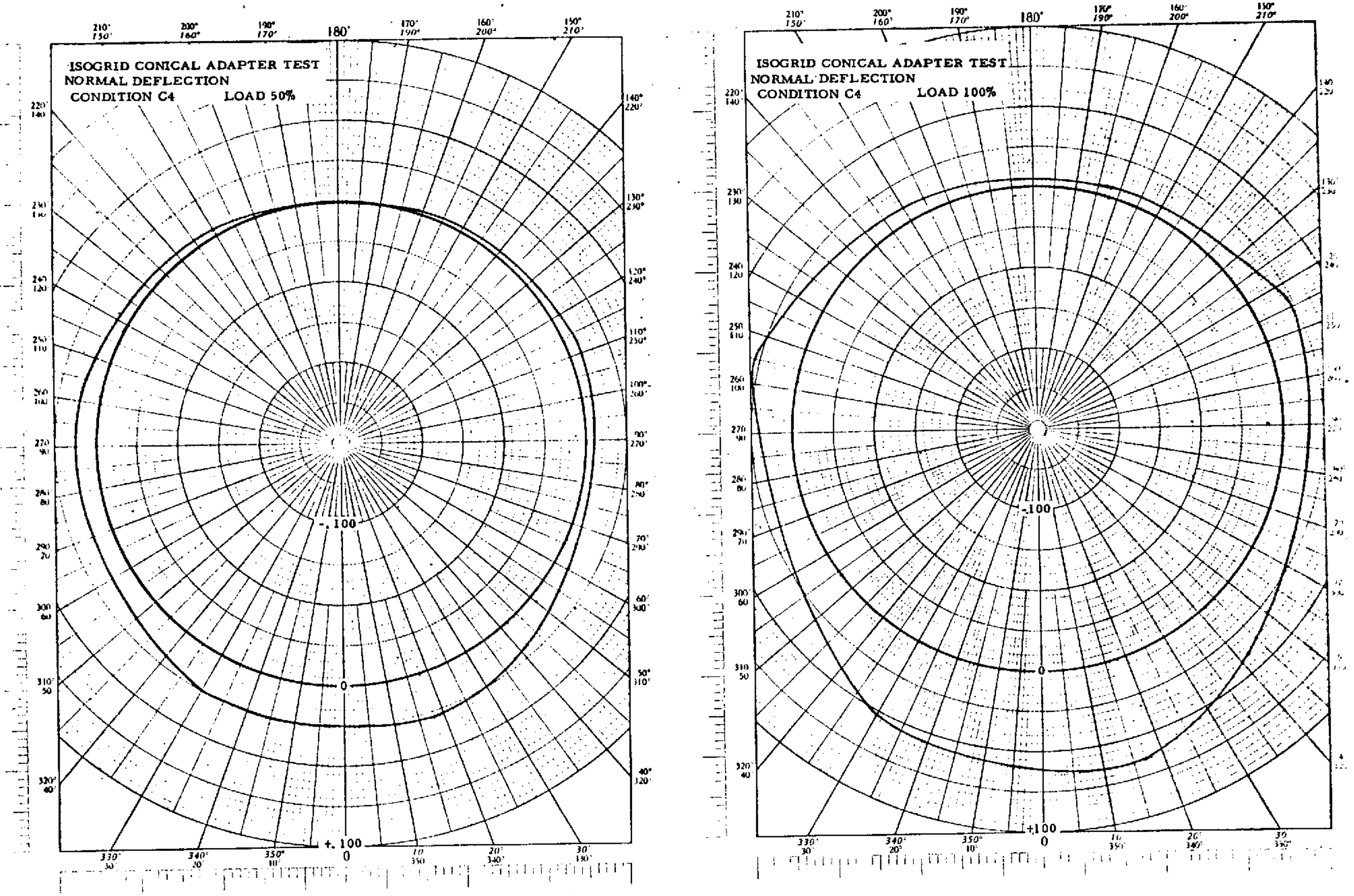
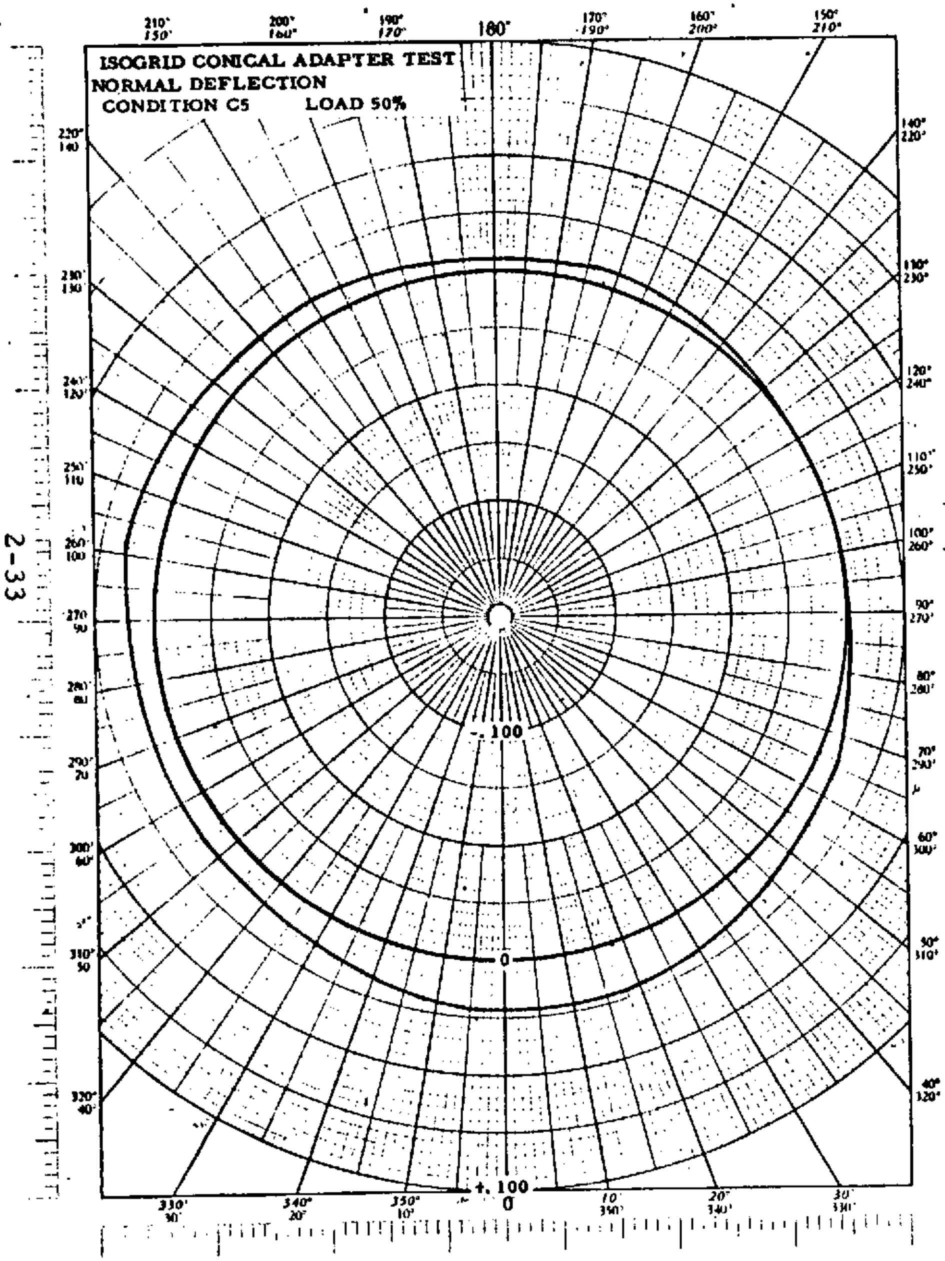


FIGURE 2.1-19 DEFLECTIONS NORMAL TO SURFACE-CONDITION C5(RUN 5)



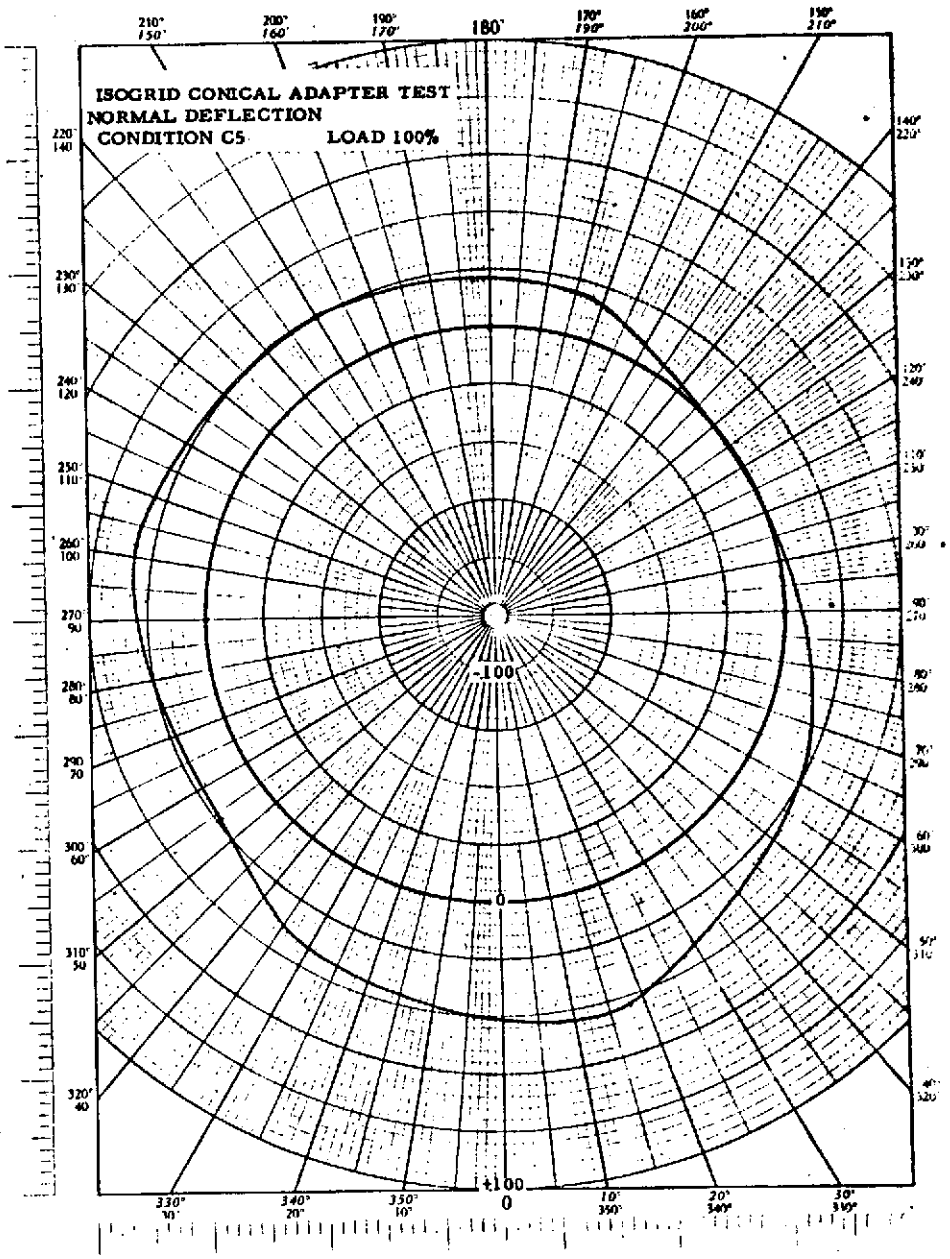


FIGURE 2.2-1 STRAIN MEASUREMENTS-CONDITION C2-F(RUN 13A)

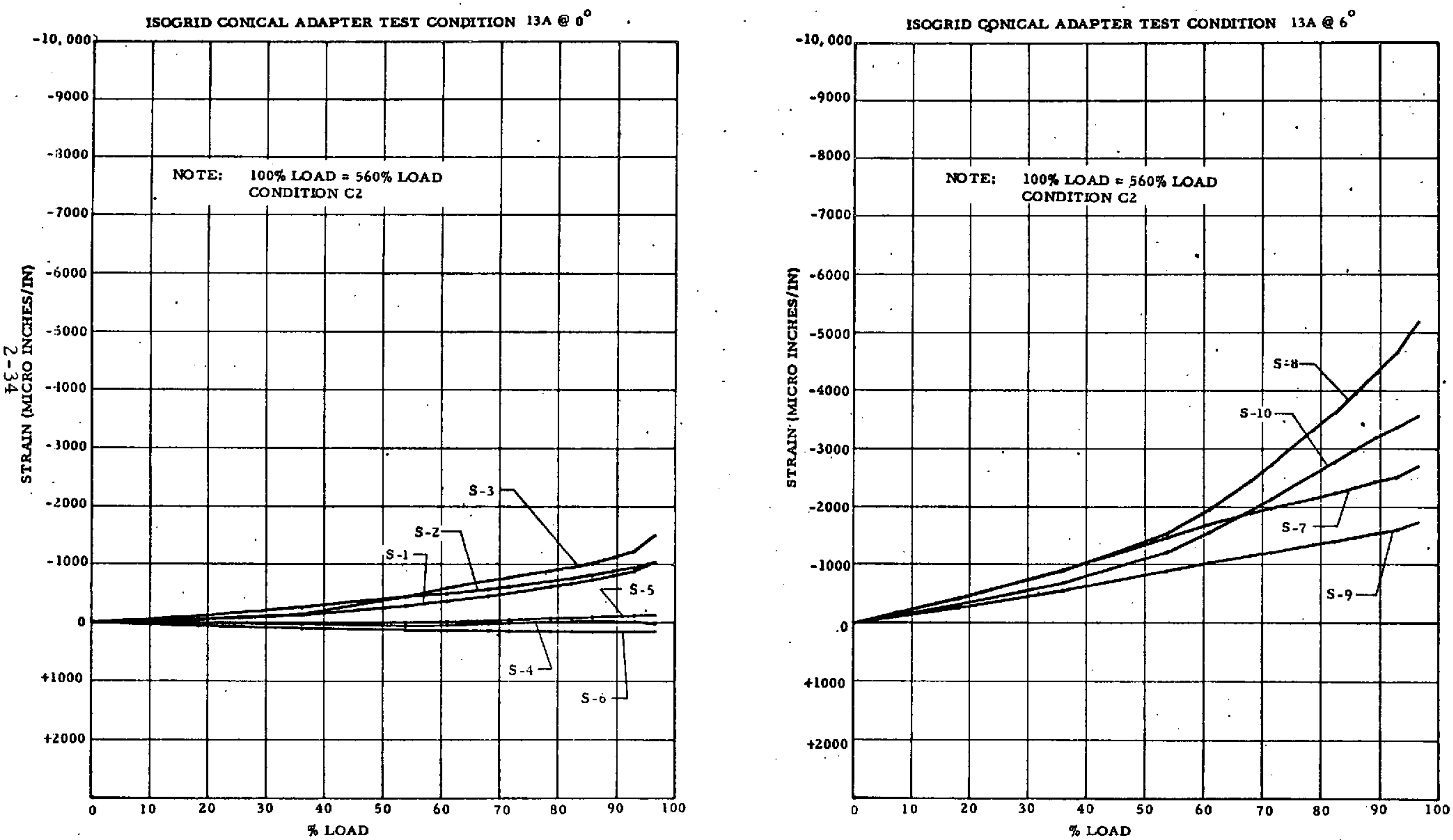
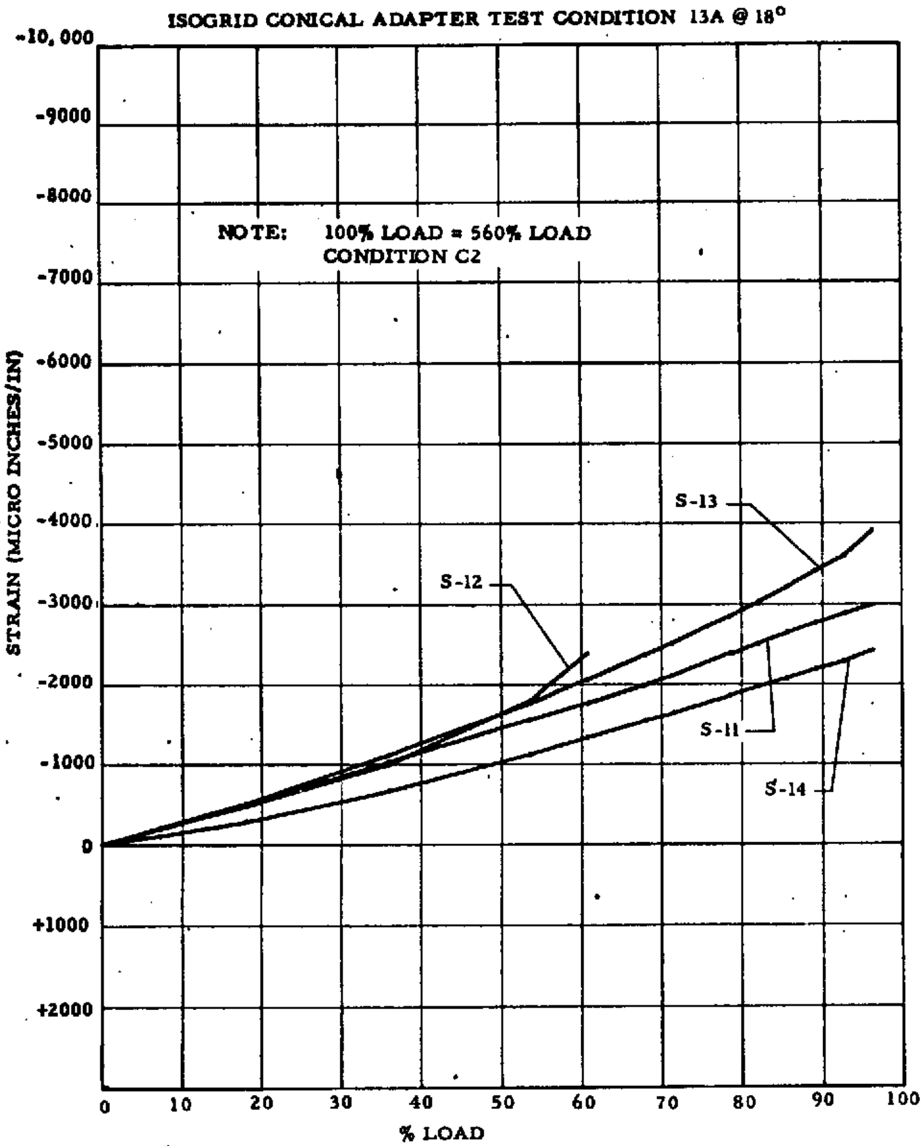


FIGURE 2.2-1 STRAIN MEASUREMENTS-CONDITION C2-F(RUN 13A)



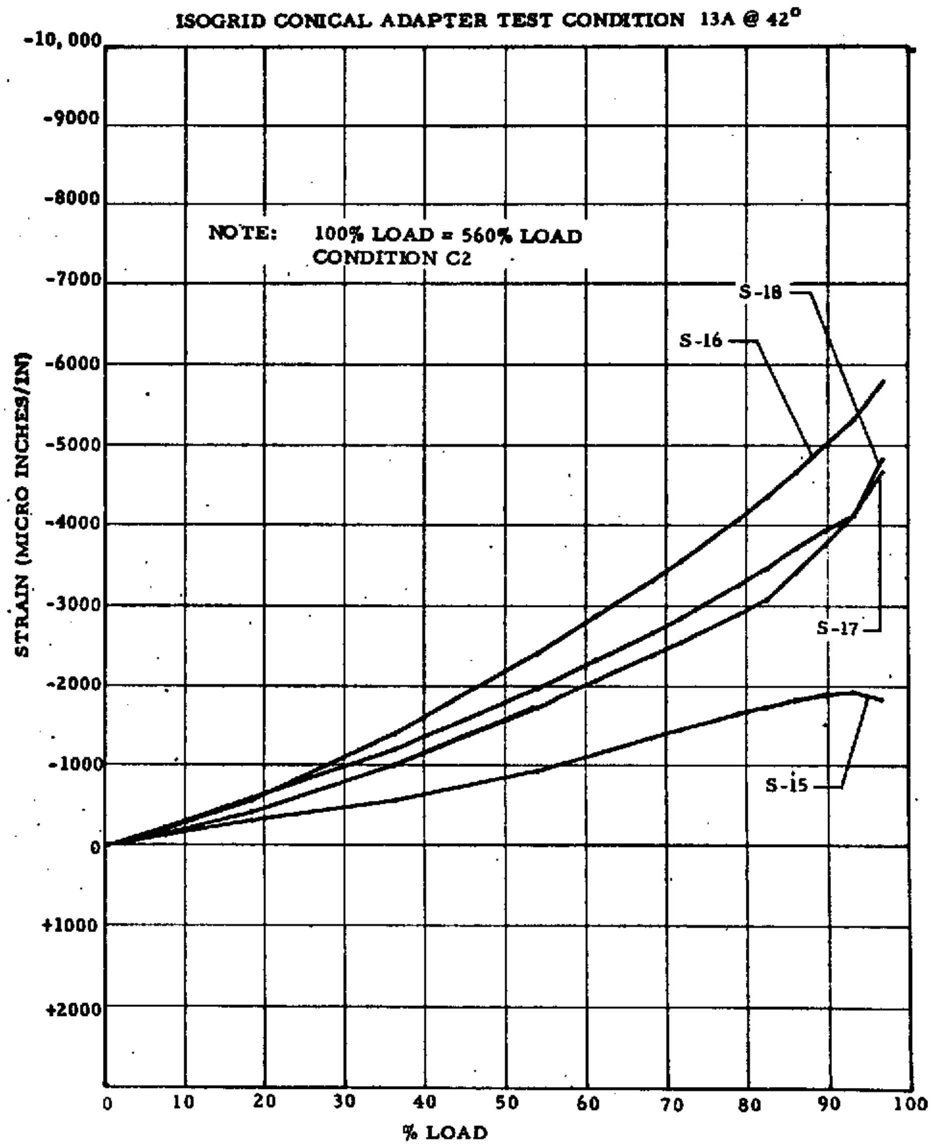
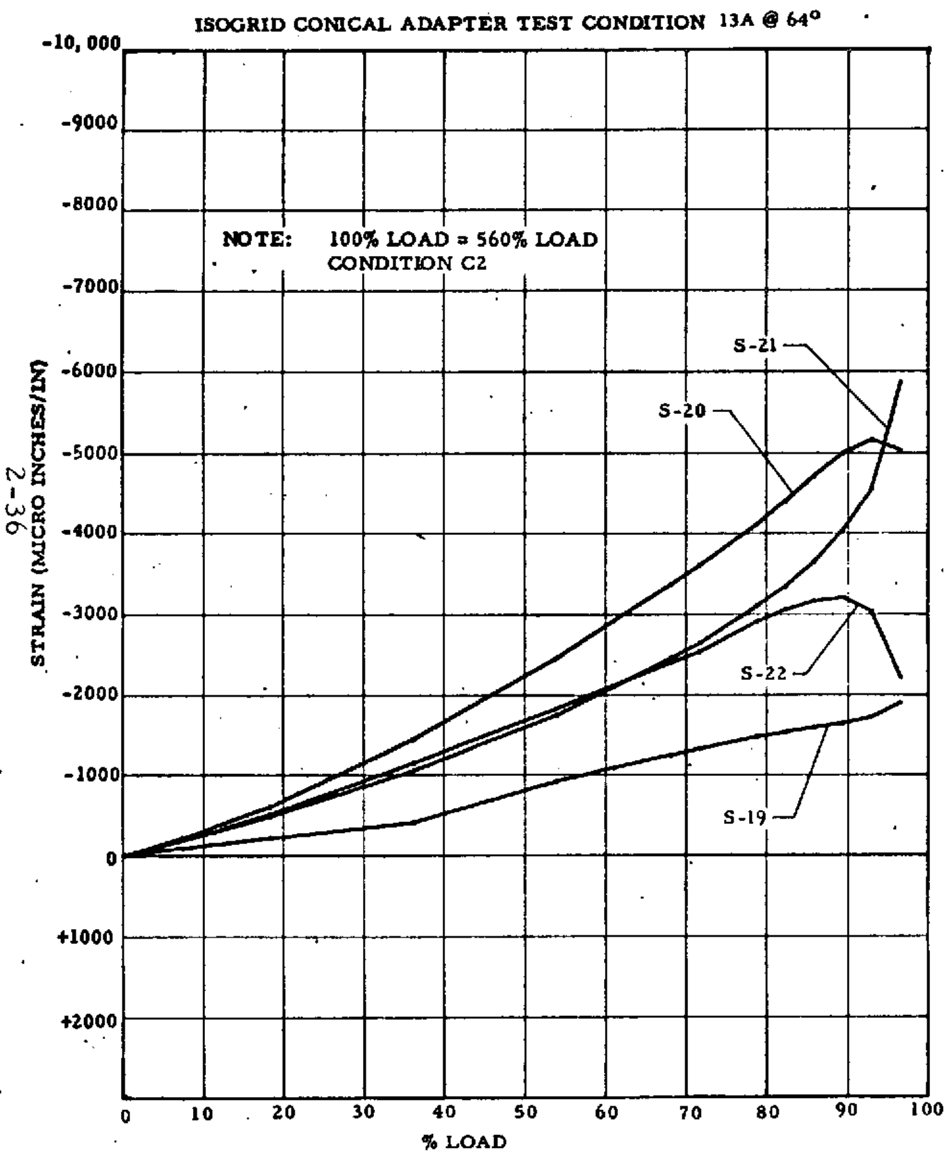


FIGURE 2.2-1 STRAIN MEASUREMENTS-CONDITION C2-F(RUN13A)



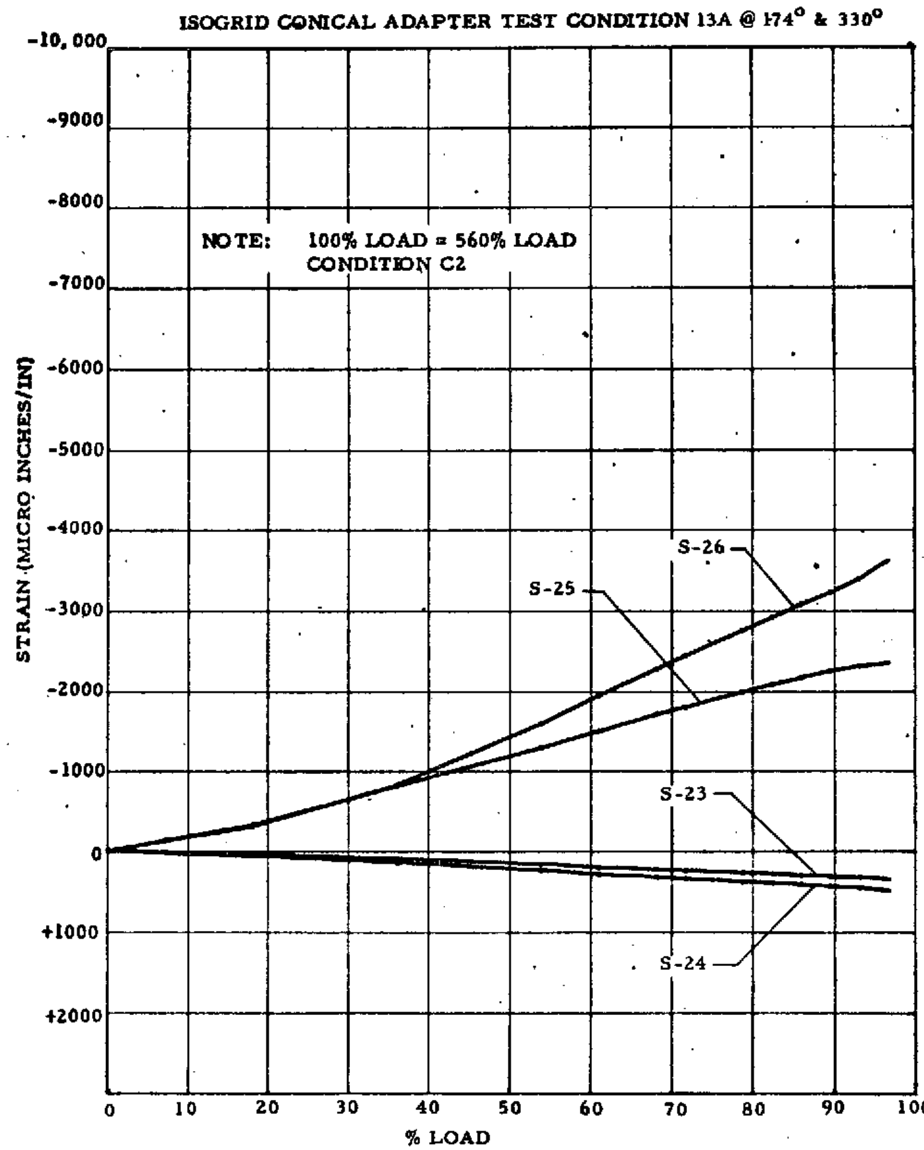
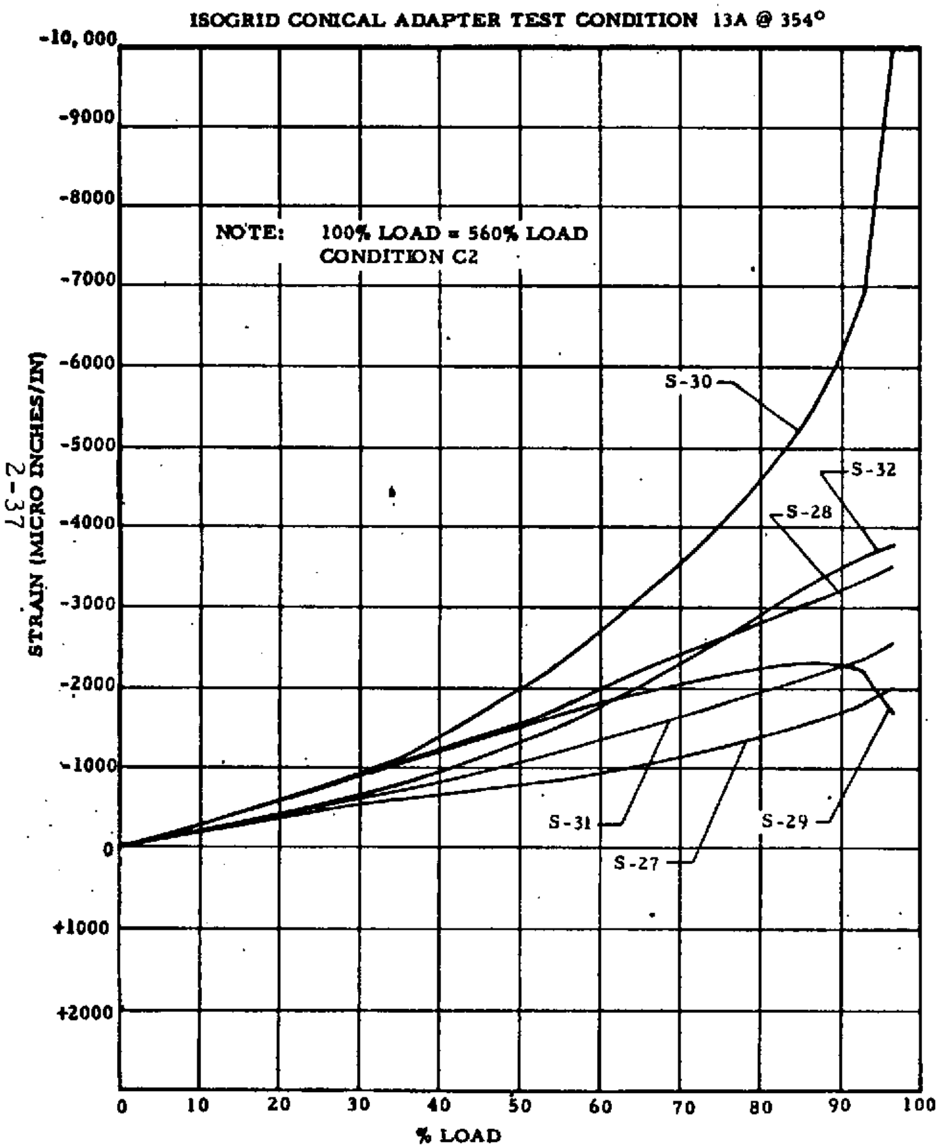


FIGURE 2.2-1 STRAIN MEASUREMENTS-CONDITION C2-F(RUN 13A)



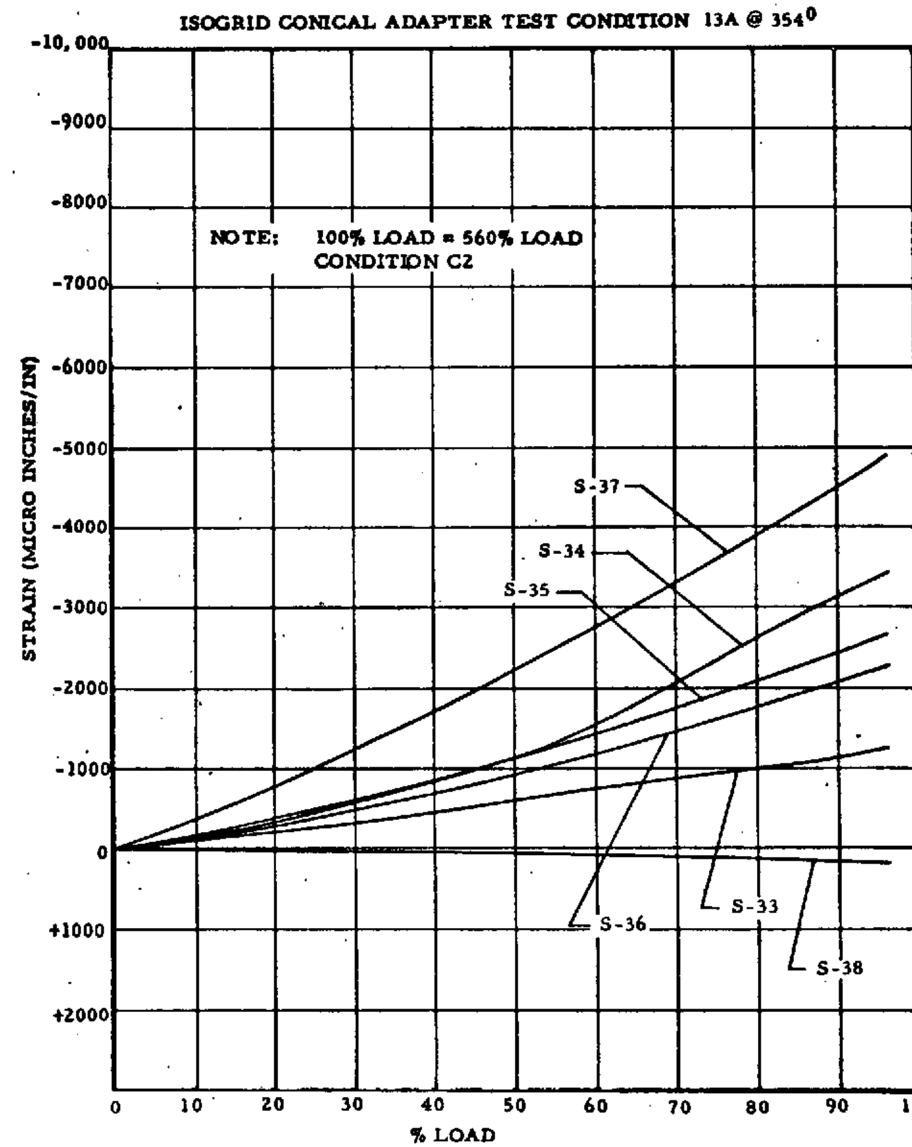
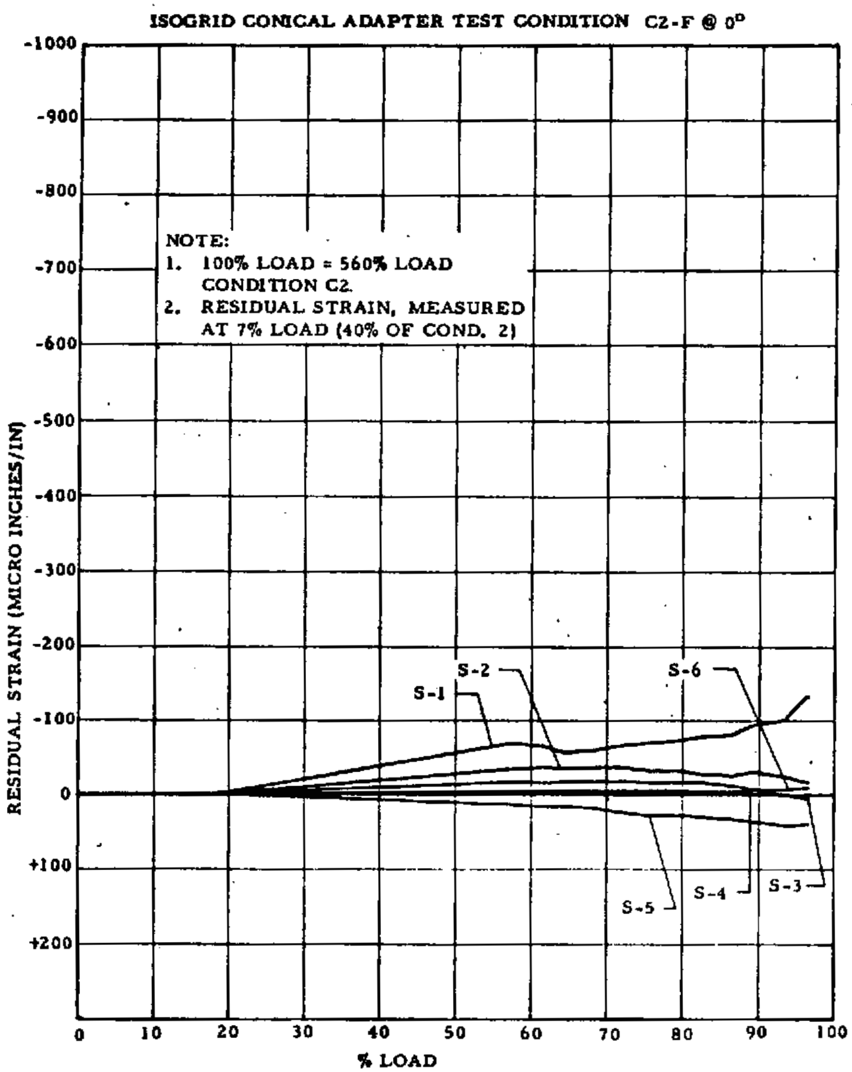


FIGURE 2.2-2 RESIDUAL STRAIN ULTIMATE TEST CONDITION C2-F(RUN 13 & 13A)



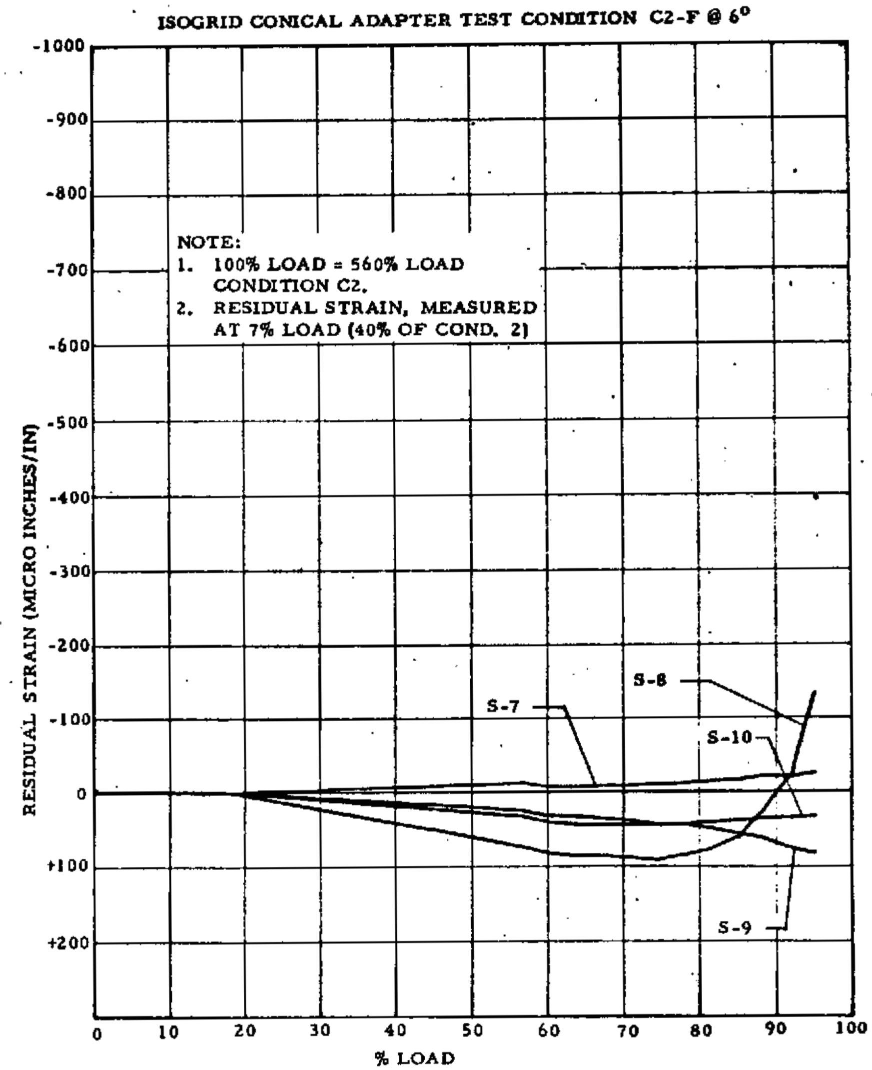
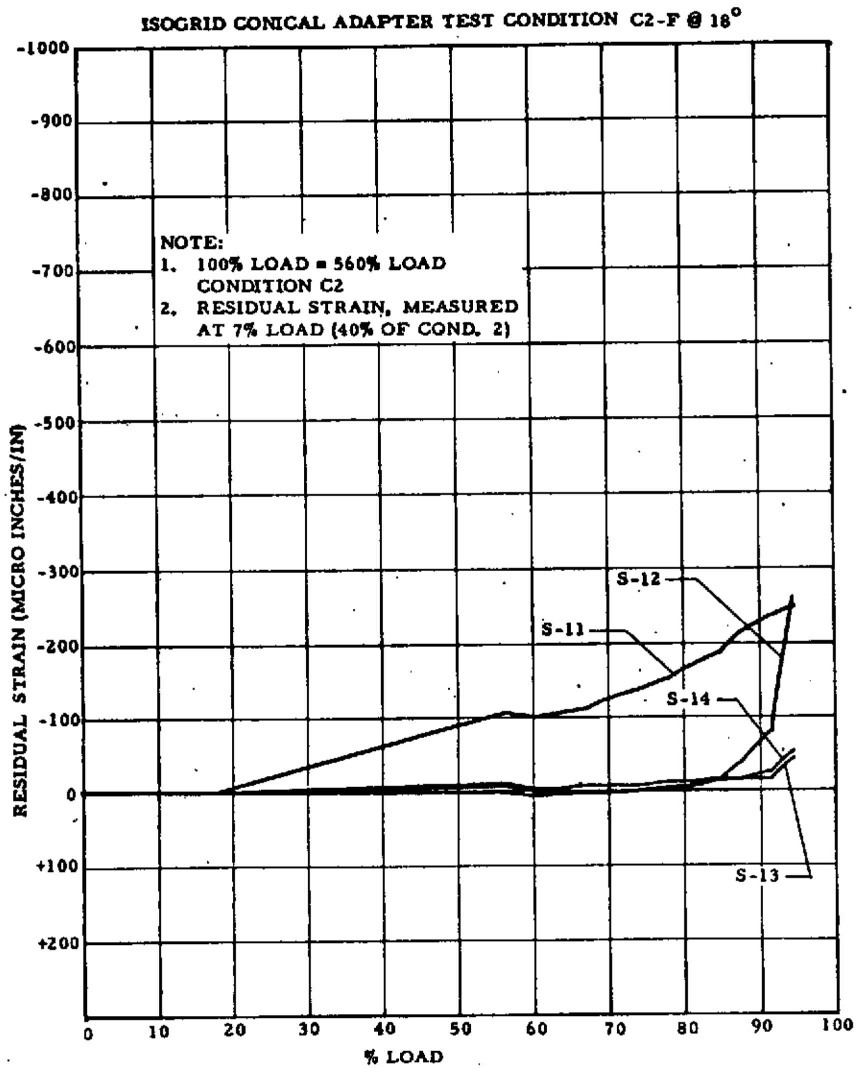


FIGURE 2.2-2 RESIDUAL STRAIN ULTIMATE TEST CONDITION C2-F(RUN 13 & 13A)



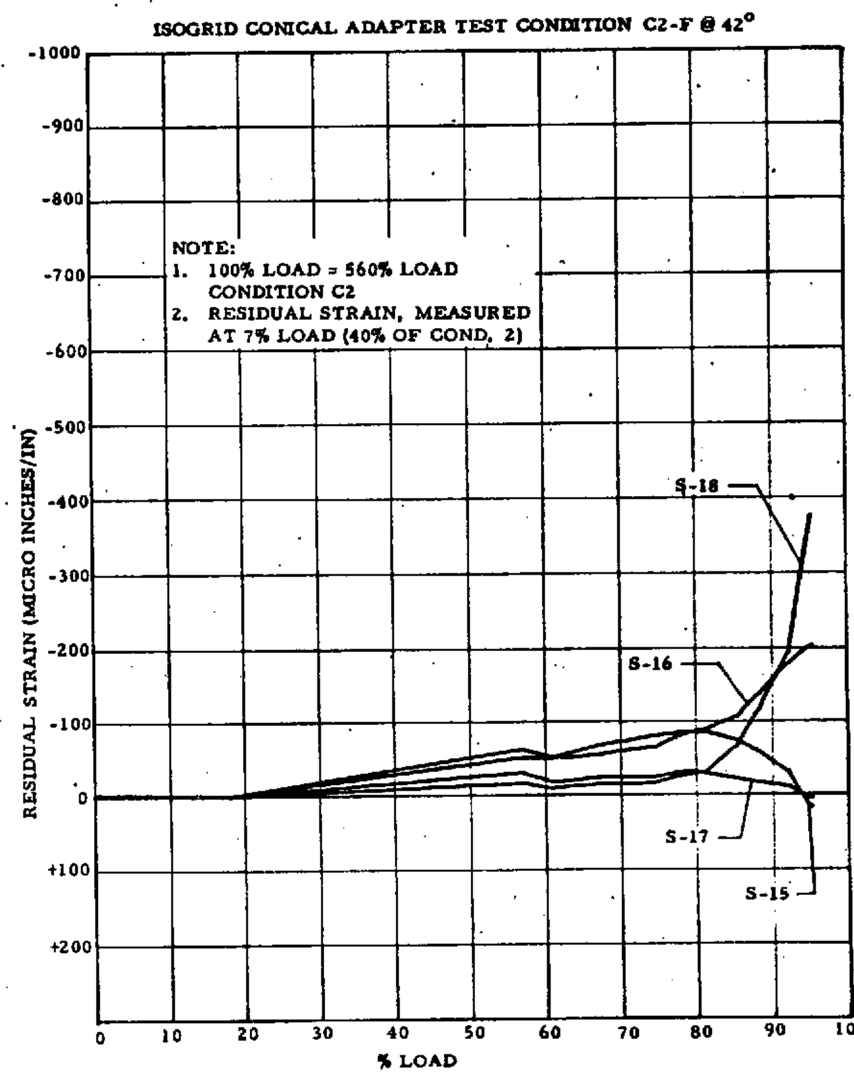


FIGURE 2.2-2 RESIDUAL STRAIN ULTIMATE TEST CONDITION C2-F(RUN 13 & 13A)

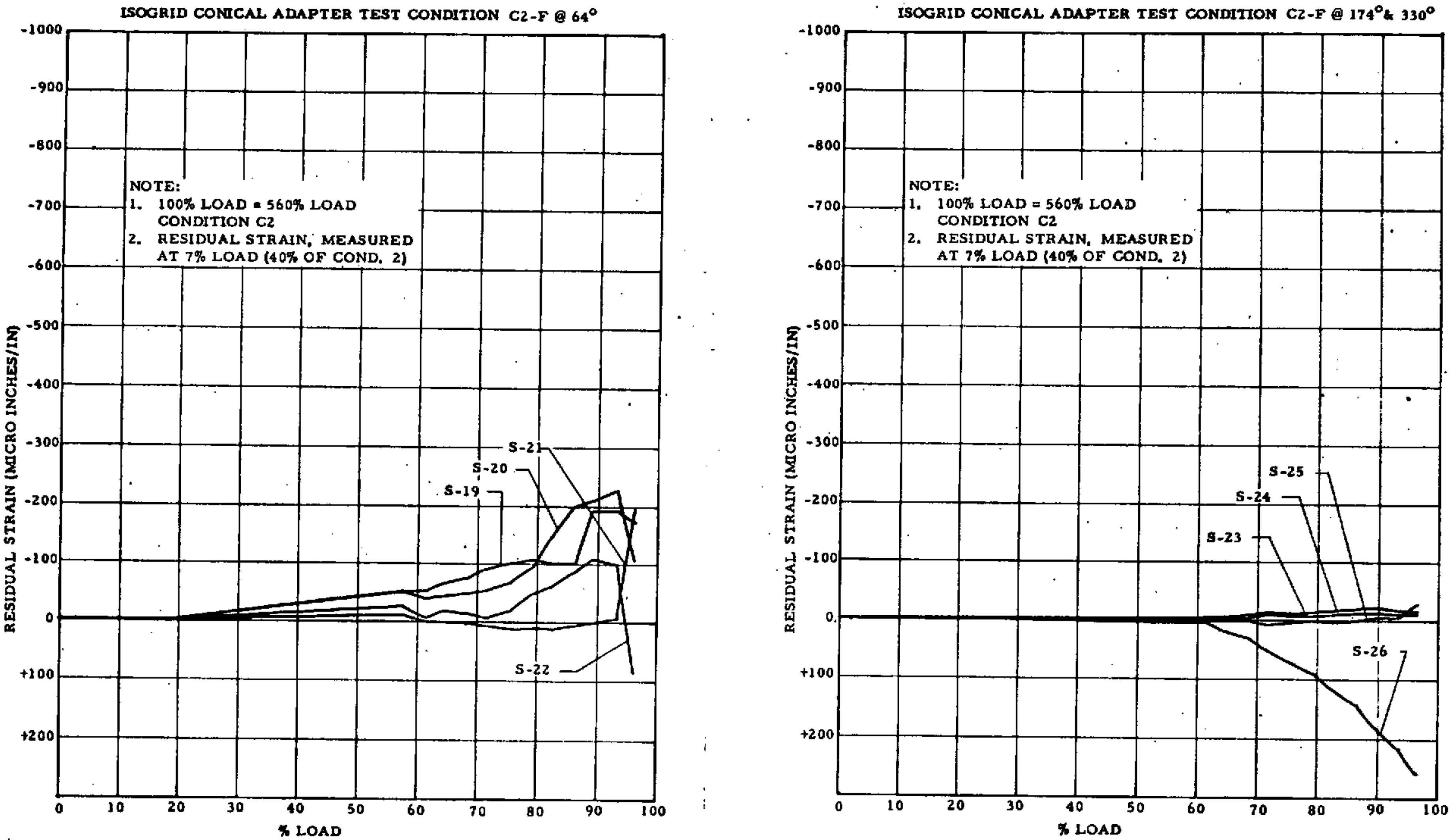
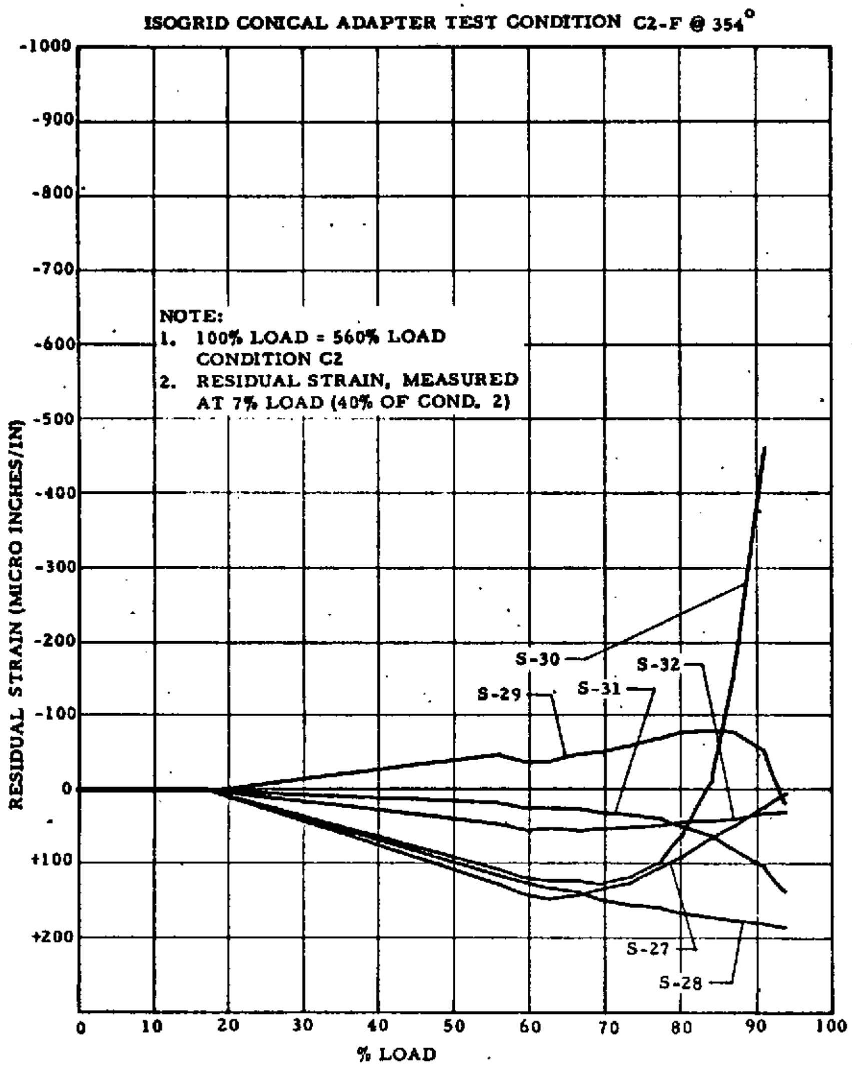


FIGURE 2.2-2 RESIDUAL STRAIN ULTIMATE TEST CONDITION C2-F(RUN 13 & 13A)



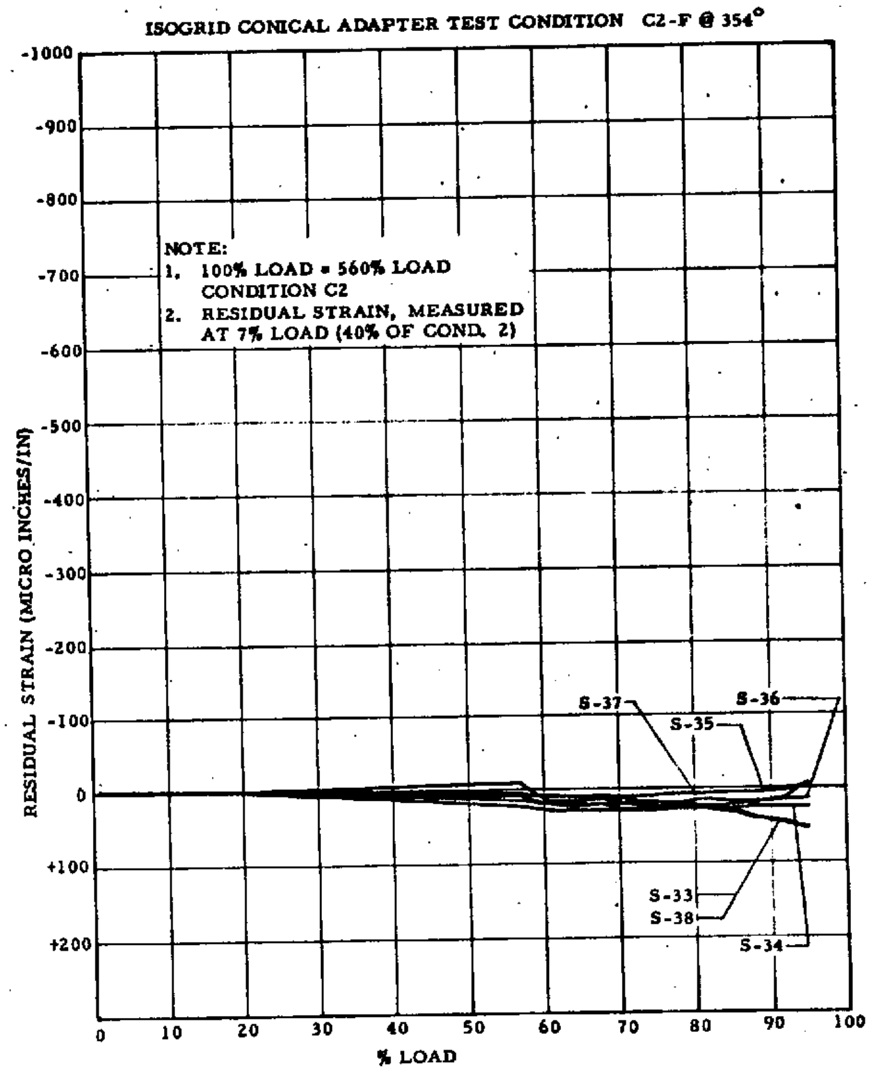


FIGURE 2.2-3
CONICAL ISOGRID ADAPTER TEST
AXIAL DEFLECTION CONDITION C2-F (RUN 13A)

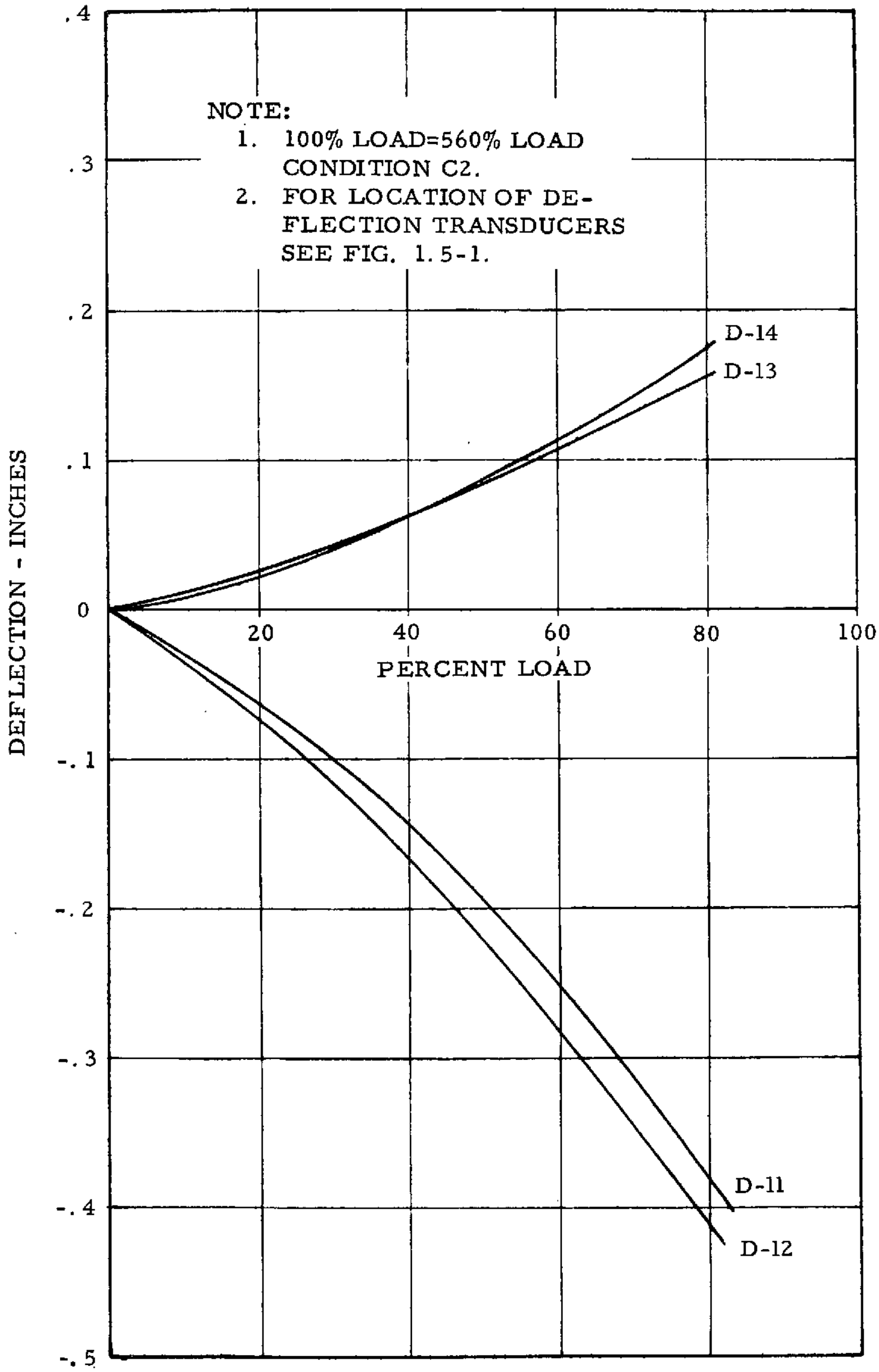
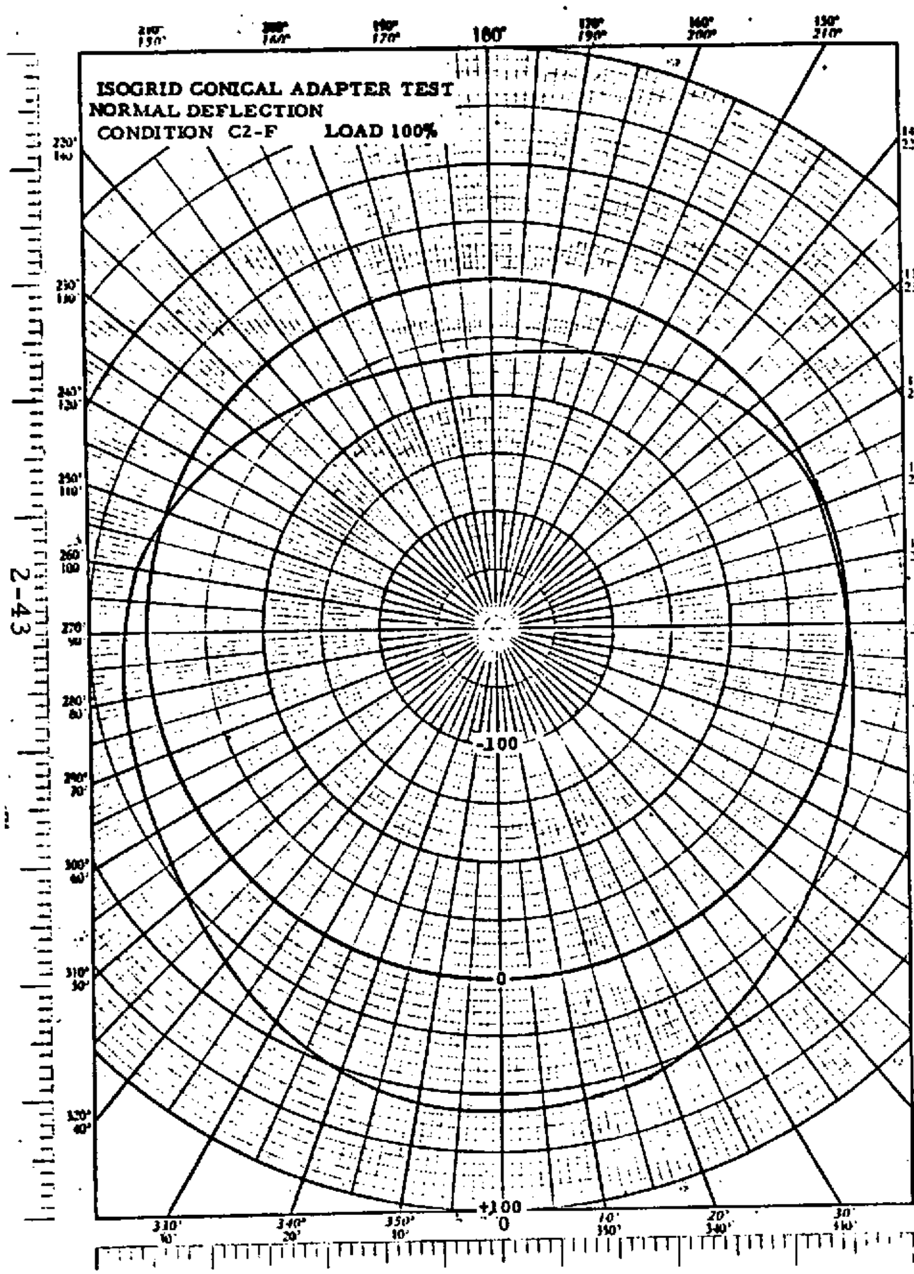
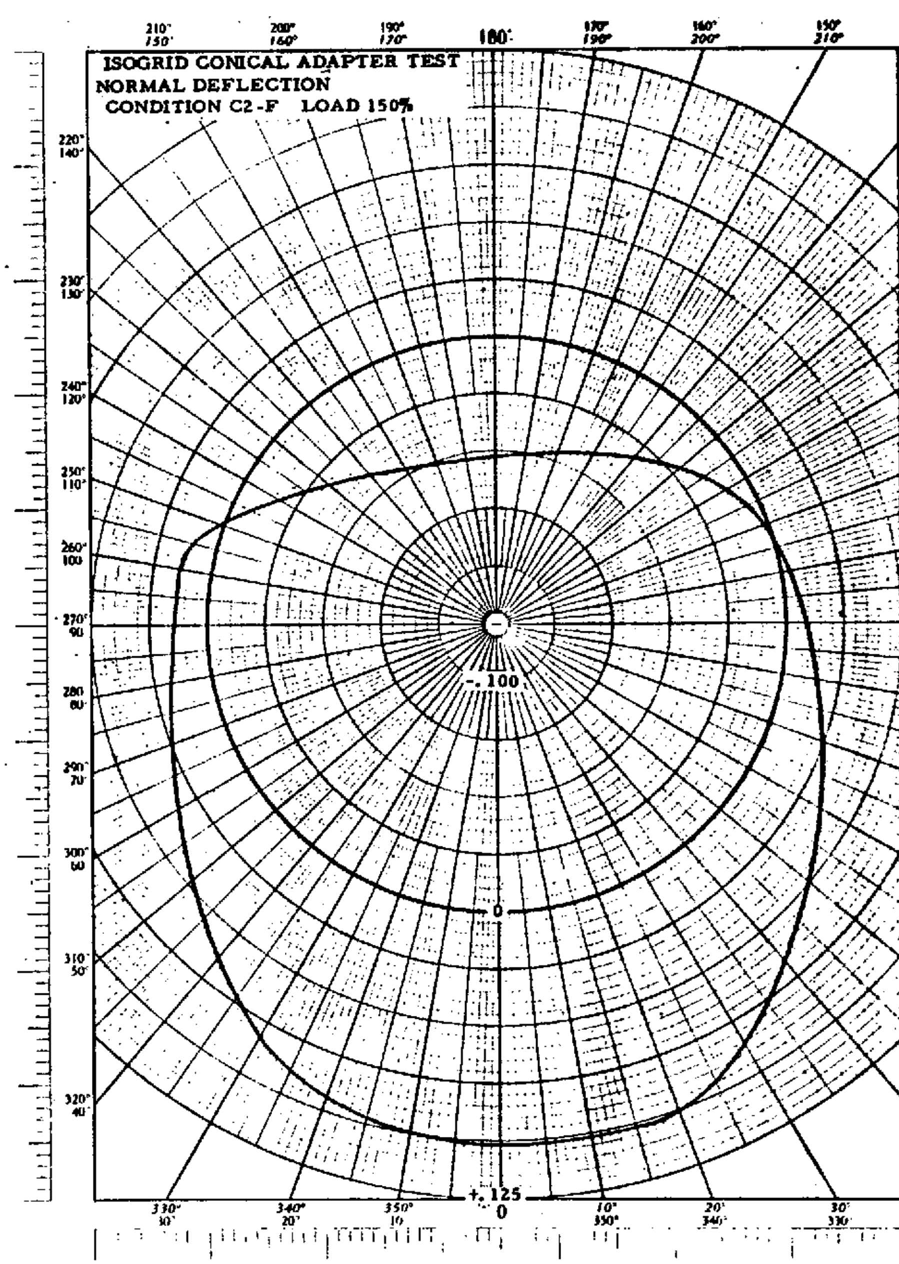


FIGURE 2.2-4 DEFLECTIONS NORMAL TO SURFACE ULTIMATE CONDITION C2-F (RUN 13)





3.0 ANALYSIS OF TEST RESULTS

3.1 Comparison of Measured and Theoretical Loading Distribution

For valid comparison of test and analysis results it was necessary to verify that the test loading distribution in the structure matched the theoretical distribution used for analytical prediction of failure loads. This was accomplished by converting strain gage data to equivalent loading intensities in pounds/inch at several points around the circumference and comparing these results with the corresponding theoretical line loading given by :

$$N_x = \frac{P}{2\pi r} + \frac{M\cos\Theta}{\pi r^2}$$

Where

Nx = Load intensity in direction of loading, lb/in
P = applied axial load, lb
M = applied bending moment, in lb
r = local radius of curvature perpendicular to direction of loading, in.
Θ = circumferential angle from point of maximum loading, degrees

A major task in evaluating the measured loading distribution was establishing the effective stiffener cross-section, including effective skin, at the points strains were measured. Inspection data from Figure 1.3-4 was used to establish the basic stiffener cross-section dimensions. Since the skins buckled at relatively low loads several methods were evaluated for calculating an "effective" skin width to be included in the stiffener cross sectional area. Best results were obtained using an effective width given by:

$$W = 3.0\, t_s \sqrt{\frac{E}{F_c}}$$

where W = effective width of skin on each side of the stiffener, in
t_s = skin thickness, in
E = Youngs modulus, psi
F_c = compression stress measured by strain gage on skin side of stiffener, psi

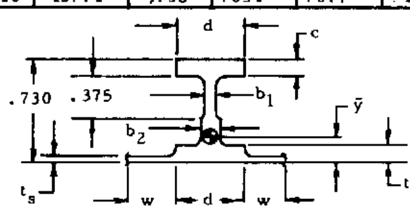
Data from the ultimate test condition C2-F (Run 13A) was used to evaluate the loading distribution. Results of this comparison at several points on the structure are summarized in Table 3.1-1.

In general the measured and theoretical loading distributions agreed reasonably well (the average of N_x meas/N_x theory ratios in Table 3.1-1 is 1.04). At higher load levels the peak load intensity (near 0°) was somewhat lower than the theoretical prediction. This suggests that there may have been some load redistribution into adjacent panels of the structure as the structure neared failure.

This premise is further substantiated by a comparison of the data at 100% and 540% loading for gages 5-23/5-24 which are near the point of maximum tension (174^o). At 100% loading the measured and theoretical loading were in close agreement. However, at 540% the measured tension loading is almost 30% higher than theoretical suggesting a redistribution of loading away from the point of peak compression stress. The individual strain plots in Figure 2.2-1 also indicate a general "softening" of the structure and redistribution of load near failure.

TABLE 3.1-1
COMPARISON OF MEASURED AND THEORETICAL LOADING DISTRIBUTION

Gages	Radius	Stiff. Spacing	Section Properties b1	b2	d	c	t	t_s	w	Area	$\bar{Y}$	Loading Percent Load	M	P	N_x Theory	σ_{FLG}	σ_{Skin}	$P_{Stiff.}$	N_x Meas.	$\frac{N_x \text{ Meas.}}{N_x \text{ Theory}}$
	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN^2)	(IN)	(%)	10^6 in lb	LB	(LB/IN)	(LB/IN^2)	(LB/IN^2)	(LB)	(LB/IN)	
S-35/S-36	53.33	11.17	.102	.111	459	.087	.056	.041	2.61	.3413	.1575	540	2.766	84566	560.2	-27594	-23362	-8285	524.5	.936
S-13/S-14	53.33	11.17	.056	.078	.410	.078	.061	.045	2.76	.3434	.1195	540	2.766	84566	546.7	-40845	-25074	-9497	601.2	1.099
S-17/S-18	53.33	11.17	.040	.065	.405	.046	.053	.032	1.37	.1596	.1605	540	2.766	84566	482.4	-49623	-51366	-8491	537.5	1.114
S-21/S-22	53.33	11.17	.041	.064	.411	.055	.064	.031	1.98	.2024	.1426	540	2.766	84566	378.2	-61750	-23037	-6193	392.0	1.036
S-29/S-30	36.33	7.61	.055	.080	.435	.087	.059	.037	1.83	.2361	.1749	400	2.043	62348	763.1	-21588	-38692	-8167	759.0	.995
S-15/S-16	36.33	7.61	.038	.059	.406	.055	.053	.034	1.70	.1883	.1475	400	2.043	62348	683.2	-15508	-37653	-6248	580.6	.850
S-19/S-20	36.33	7.61	.040	.063	.408	.055	.054	.034	1.70	.1906	.1489	400	2.043	62348	473.5	-13681	-37653	-6244	580.2	1.225
S-33/S-34	49.39	10.34	.102	.111	.459	.087	.056	.041	2.11	.3003	.1762	540	2.766	84566	631.4	-12736	-35574	-9027	617.4	.978
S-31/S-32	42.36	8.87	.071	.092	.441	.089	.061	.045	2.20	.3096	.1529	540	2.766	84566	805.7	-26617	-39532	-11401	908.9	1.128
S-23/S-24	45.74	9.58	.040	.063	.412	.062	.051	.037	4.58	.4157	.0830	540	2.766	84566	-124.3	3916	5418	2181	161.0	1.295
S-9/S-10	45.74	9.58	.054	.077	.416	.077	.060	.043	2.16	.2798	.1399	540	2.766	84566	712.7	-18249	-37516	-9464	698.5	.980
S-23/S-24	45.74	9.58	.040	.063	.412	.062	.051	.037	4.58	.4157	.0830	100	.510	15500	23.7	536	798	319	23.6	.996
S-9/S-10	45.74	9.58	.054	.077	.416	077	.060	.043	4.58	.4879	.0894	100	.510	15500	131.1	-2761	-3350	-1599	118.0	.900



CROSS-SECTION

NOTES:

1. $N_x \text{ Theory} = \frac{P}{2\pi r} + \frac{M \cos \Theta}{\pi r^2}$

2. $N_x \text{ Measured} = \frac{P_{Stiff.} \cos 45^\circ}{\text{Spacing}}$

3.2 Comparison of Measured and Predicted Failure Loads

3.2.1 Damaged Area Inspection Data

A post test analysis was performed to determine if the measured failure loads could be accurately predicted using actual section properties in the failed areas of the adapter and current analysis methods developed for cylindrical isogrid structures. For purposes of this evaluation only the failed areas in panels 1, 2 and 6 were considered. The damaged areas resulting from test specimen failure at ultimate load are shown in Figures 3.2-1 thru 3.2-5. Figure 3.2-6 summarizes the average cross-sectional dimensions of the structure in the damaged areas of panels 1, 2 and 6. This data was selected from the Isogrid Conical Adapter Inspection Reference (Figure 1.3-4).

3.2.2 Theoretical Failure Loads Analysis

The load carrying capability of the test specimen was evaluated on the basis of general instability, skin buckling, web crippling, flange crippling, column buckling and material (F_{cy}) yield properties. Two methods for predicting isogrid general instability failure loads were used. These were the McDonnell Douglas analysis from Reference 3-1 and the analogy with a skin stringer analysis (by Becker) from Reference 3-2 developed at Convair Aerospace (Appendix B). Analytical techniques for the other failure modes are also described in References Appendix B.

The above general instability analyses are for cylindrical shells of revolution and must be modified for application to a conical shell of revolution. The model assumed for this modification is shown in Figure 3.2-7. The allowable general instability edge load intensity, N_{cr}, in the plane of the conical structure at a point 0 is computed on the basis of an equivalent cylindrical shell radius of R sin Θ as defined in Figure 3.2-7.

3.2.3 Actual Failure Loads Analysis

At the time structural failure occurred in the test specimen it was not possible to determine the point at which the initial failure occurred. It can only be concluded with reasonable certainty that the failure started somewhere in the damaged areas of panels 1, 2 or 6.

The applied edge load intensities in the damaged areas at the time of failure were computed using the known overall axial and bending loads applied to the specimen at failure (Moment = 2.83×10^6 in. lb; Axial Load = 86025 lb) and the equation:

$$N_{cr} = \frac{86025}{2\pi R \cos 45^\circ} + \frac{2.83 \times 10^6 \cos \phi}{\pi R^2 \cos 45^\circ}$$

where
- N_{cr} = Critical load intensity in plane of isogrid, lb/in.
- R = Local radius of curvature, in (See Fig. 3.2-7)
- ϕ = Circumferential angle from point of max loading, degrees

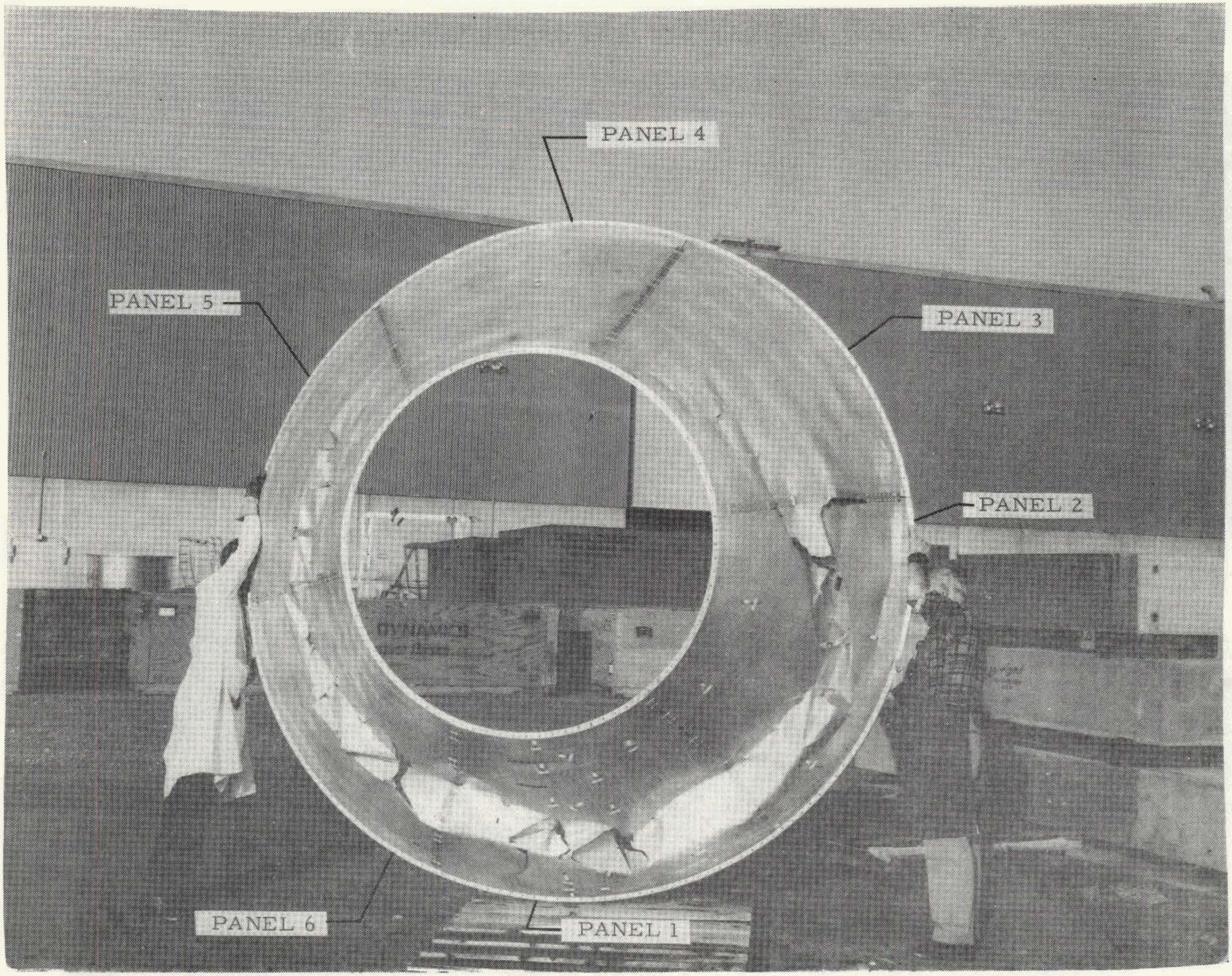


FIGURE 3.2-1 FAILED TEST SPECIMEN- EXTERNAL VIEW

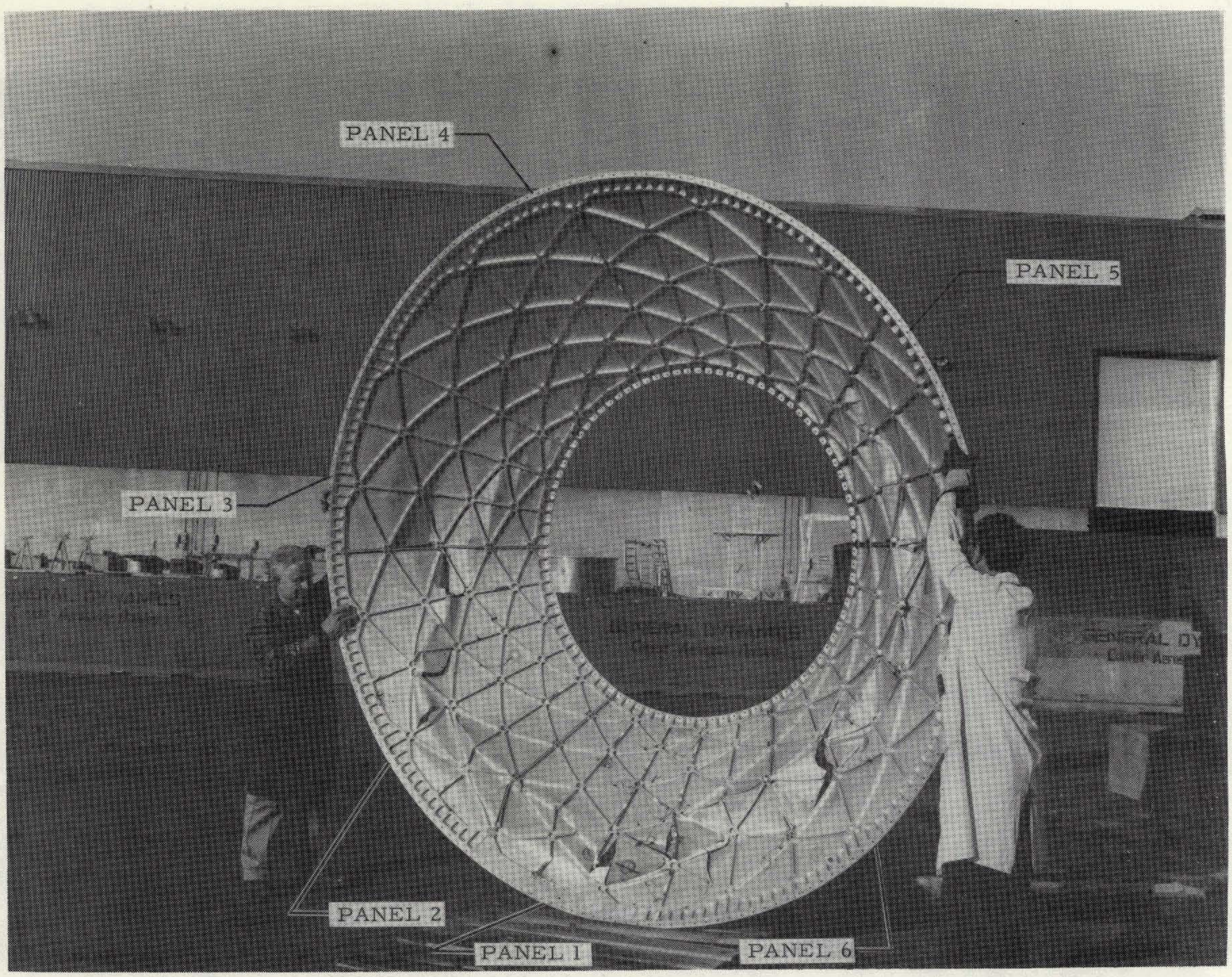


FIGURE 3.2-2 FAILED TEST SPECIMEN- INTERNAL VIEW

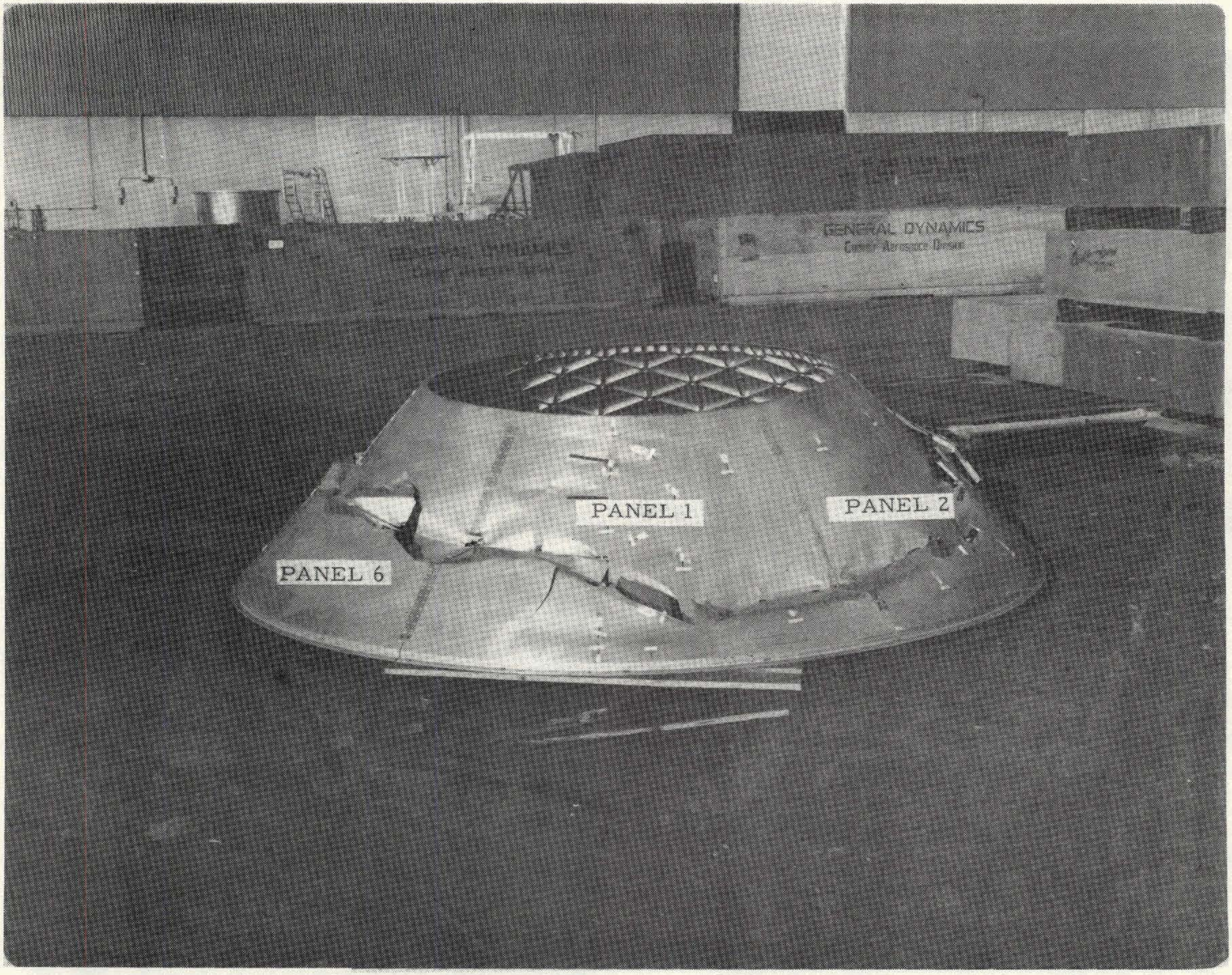


FIGURE 3.2-3 FAILED TEST SPECIMEN- PANEL 1

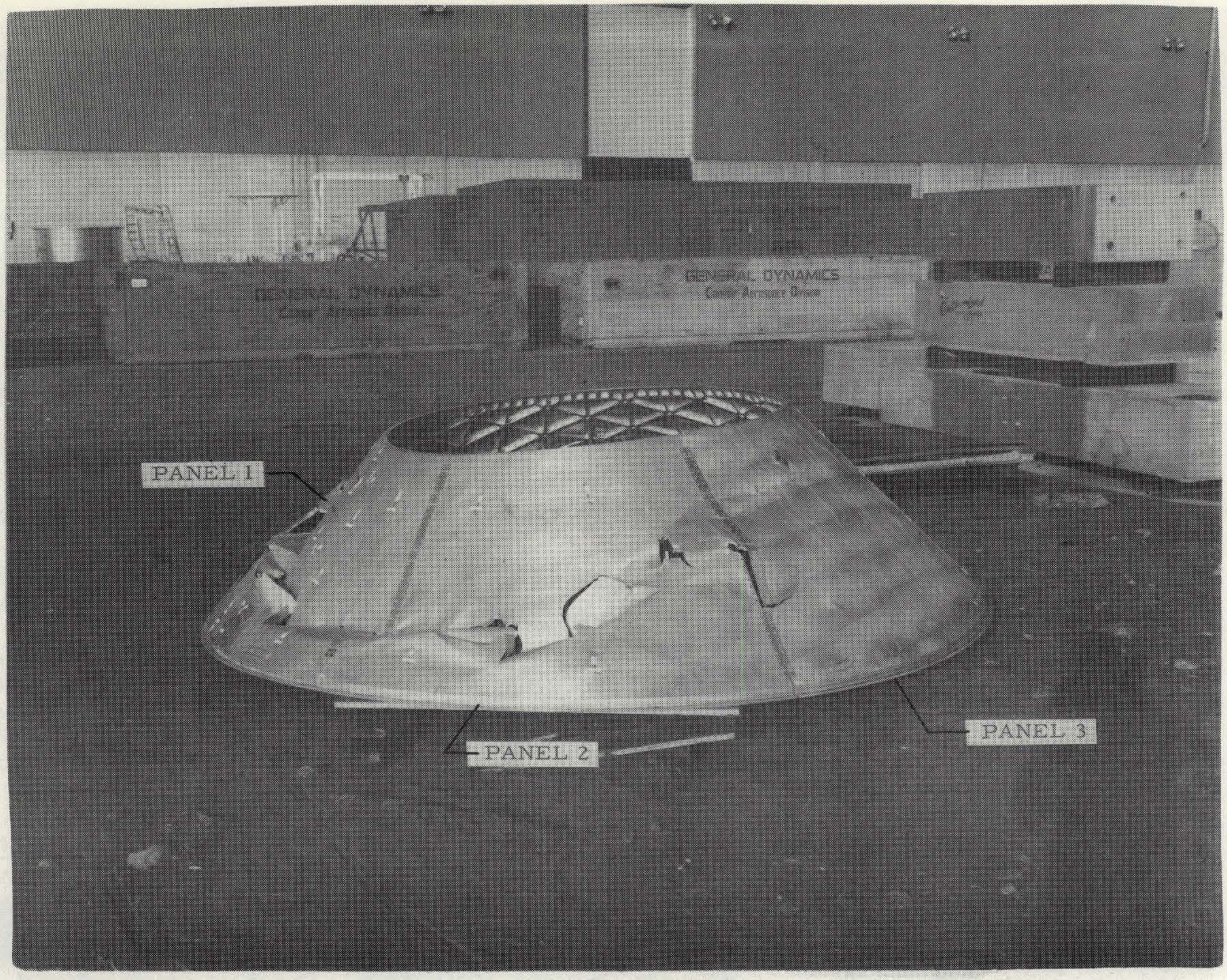


FIGURE 3.2-4 FAILED TEST SPECIMEN- PANEL 2

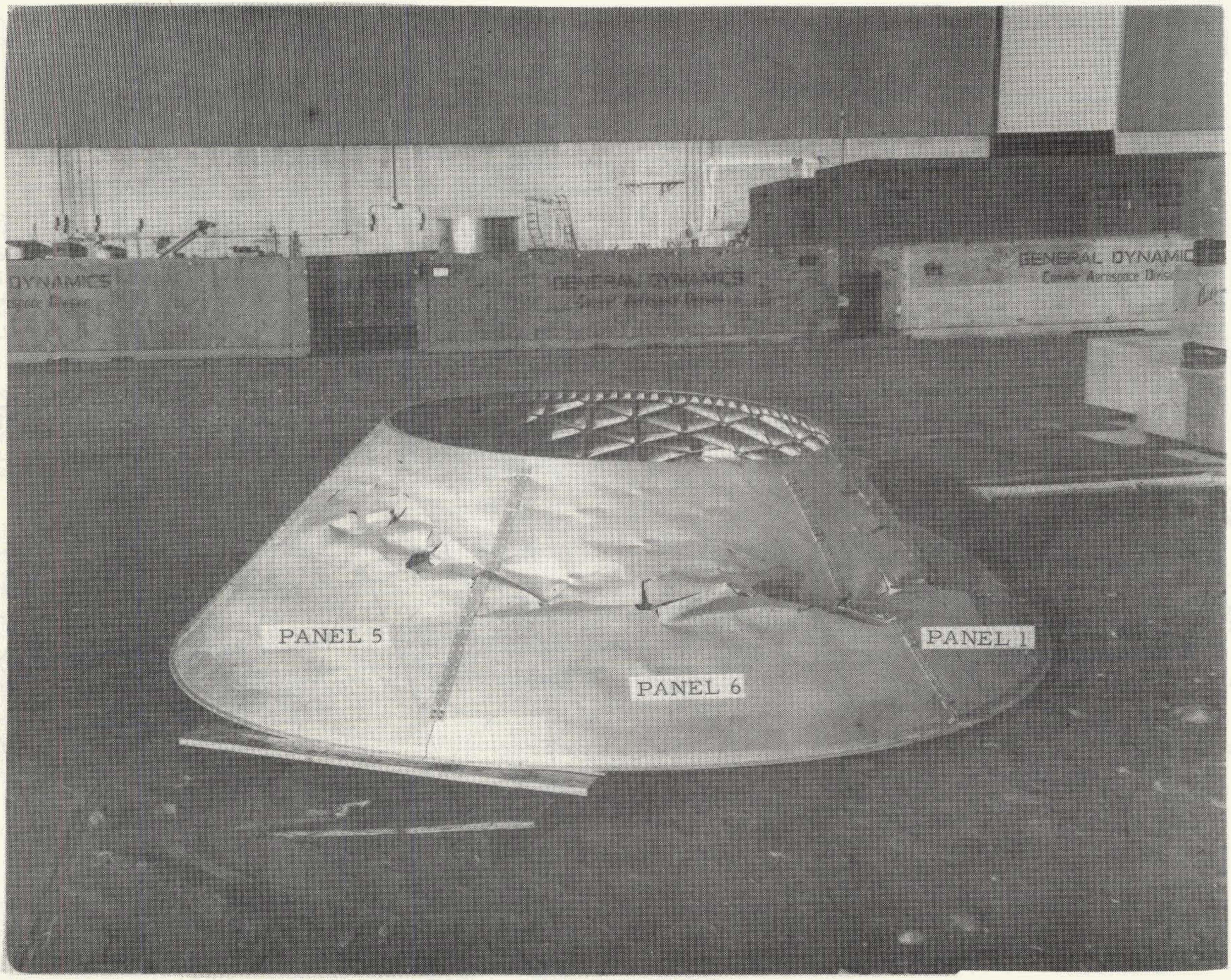
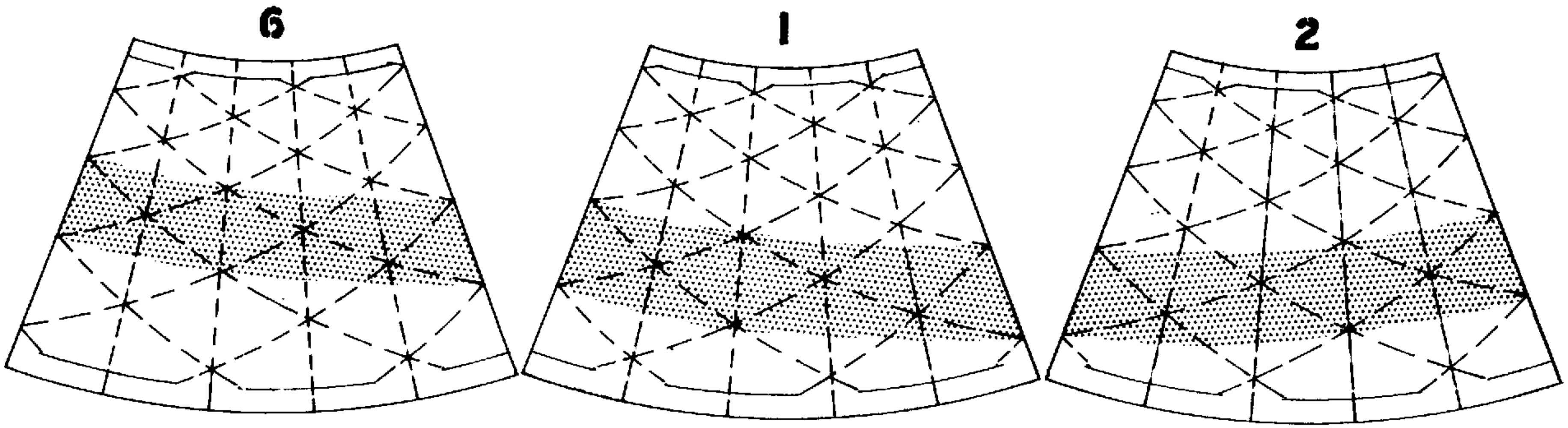
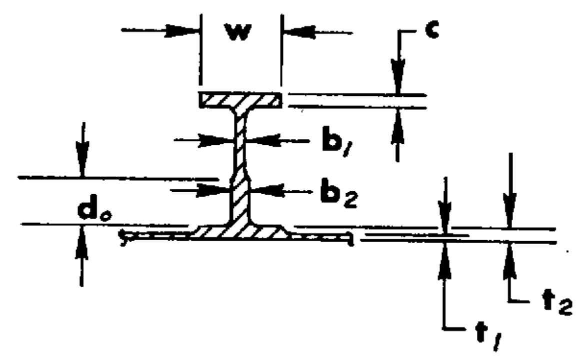


FIGURE 3.2-5 FAILED TEST SPECIMEN- PANEL 6



PANEL	1	2	6	AVERAGE FOR PANELS 1, 2 &6
w	.424	.408	.415	.4248
c	.083	.044	.052	.0690
b_1	.058	.054	.047	.0558
b_2	.079	.078	.077	.0648
t_1	.043	.033	.031	.0364
t_2	.055	.052	.050	.0575
d_0	.237	.237	.237	.237



DAMAGED AREA

FIGURE 3.2-6 SUMMARY OF INSPECTION DATA IN DAMAGED AREAS OF CONICAL ISOGRID ADAPTER

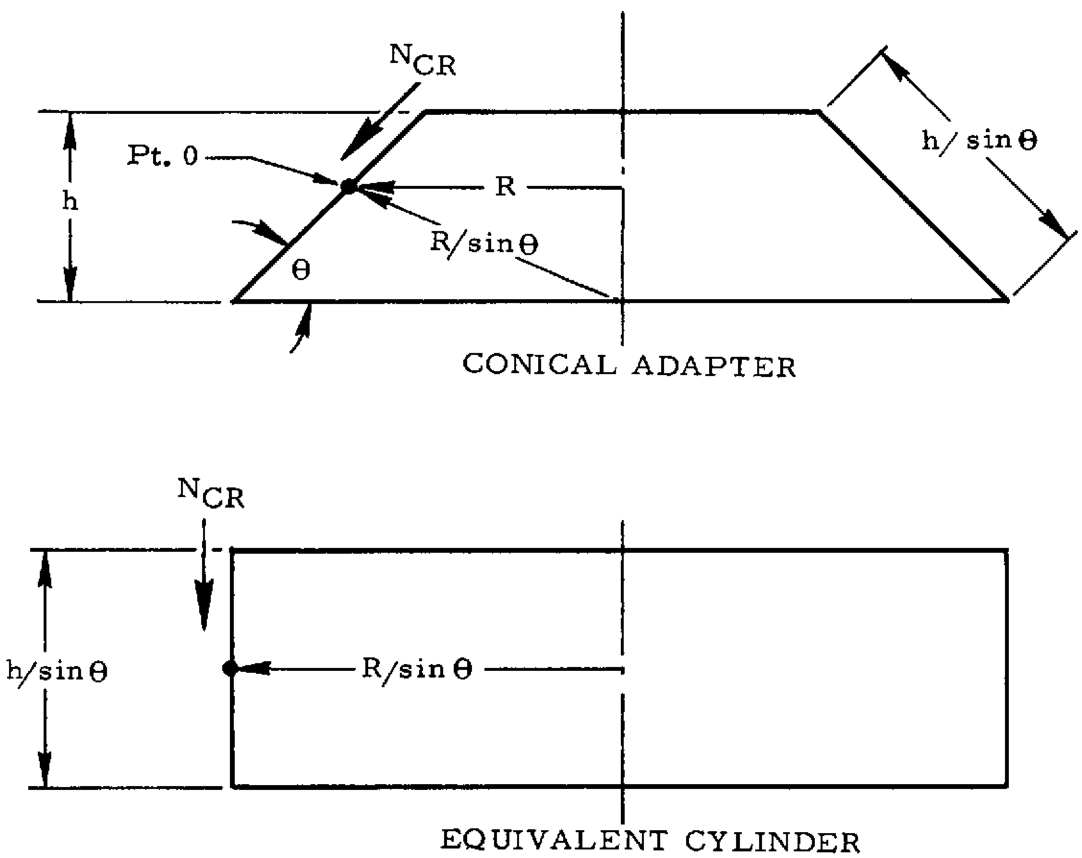


FIGURE 3.2-7 EQUIVALENT CYLINDER GEOMETRY

This analysis is based on the assumption of uniform adapter stiffness which may be in error by up to 15% due to apparent variations in panel quality (see Figure 1.3-4). Unequal axial deflection measurements (Figures 2.1-6 thru 2.1-12 and 2.2-3) and unequal strain gage readings on symmetrical grid members at constant station planes tend to confirm the premise of nonuniform stiffness. The detailed analysis of section 3.1, however, shows good agreement between the theoretical loading distribution and the actual measured loading distribution within the test specimen.

3.2.4 Theoretical and Actual Failure Loads Data Presentation

Figures 3.2-8 thru 3.2-17 present the theoretical and calculated actual failure loads data for damaged areas in panels 1, 2 and 6 as described in Figure 3.2-6. The theoretical general instability allowables in Figures 3.2-8 thru 3.2-12 are based on the McDonnell Douglas method of analysis of Reference 3-1. The curves of critical load intensity, N_{cr}, are all plotted as a function of A, the node- to-node spacing in the plane of the isogrid.

Figures 3.2-13 thru 3.2-17 present similar data except the general instability allowables are based on the Becker analysis methodology of Appendix B and column buckling allowables are presented in place of the material (F_{cy}) allowables.

In most cases critical loads due to flange and web crippling fall at levels beyond the chosen ordinant scales and therefore do not appear in the plots.

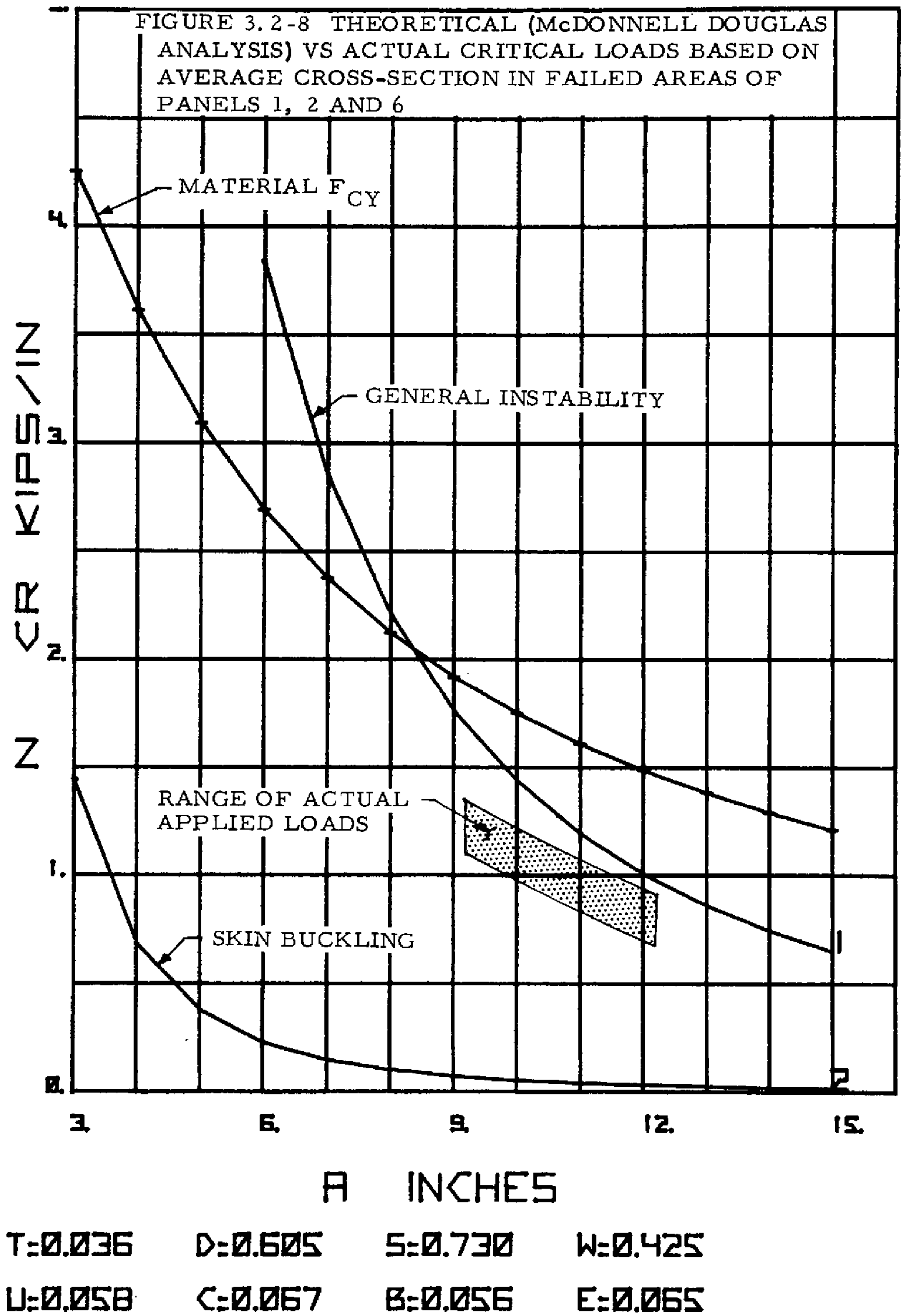


FIGURE 3.2-8 THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANELS 1, 2 AND 6
MATERIAL F_{CY}
GENERAL INSTABILITY
RANGE OF ACTUAL APPLIED LOADS
SKIN BUCKLING
N CR KIPS/IN
4.
3.
2.
1.
0.
3.
6.
9.
12.
15.
A INCHES
1
2
T:0.036 D:0.605 S:0.730 W:0.425
U:0.058 C:0.067 B:0.056 E:0.065

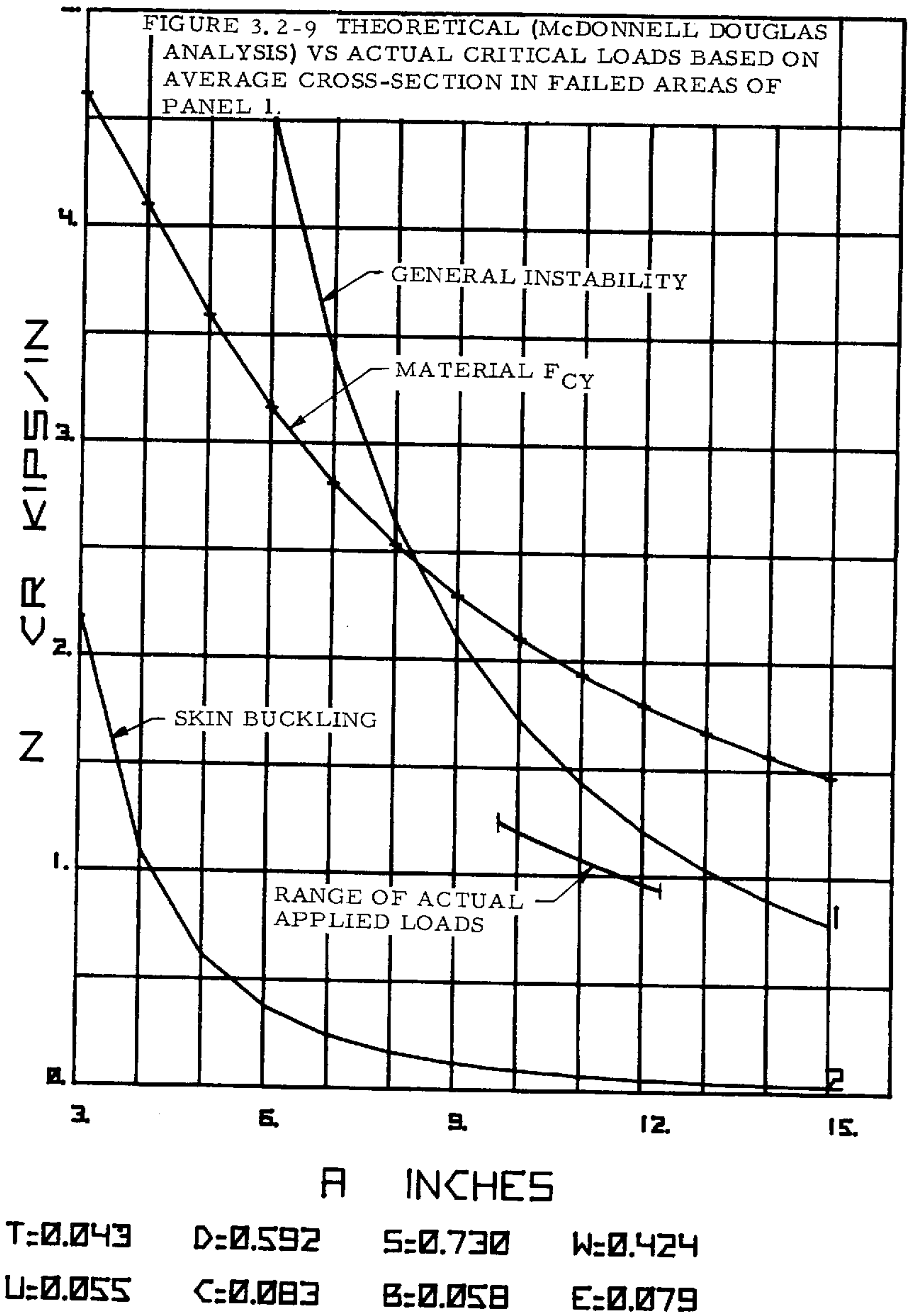
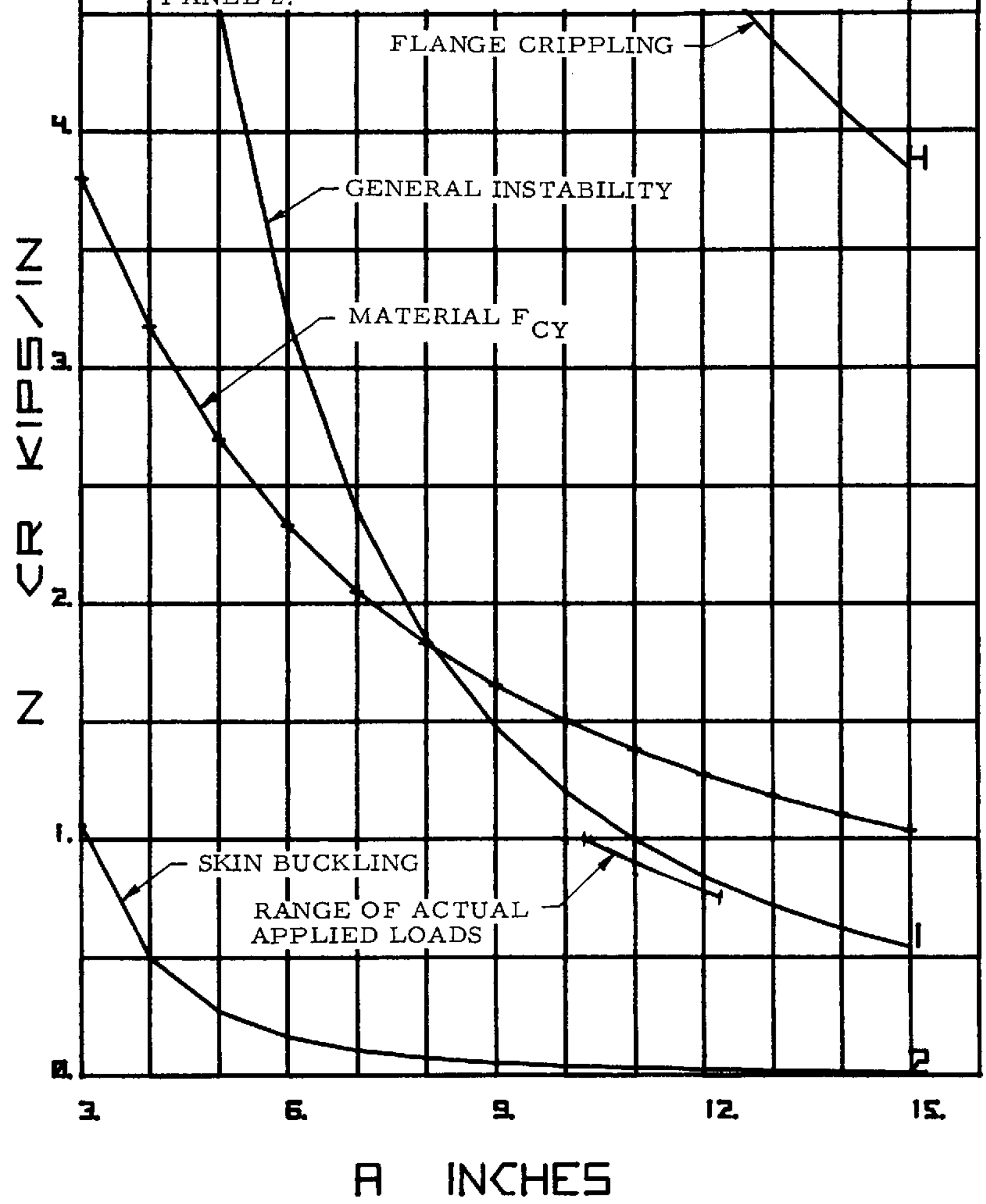


FIGURE 3.2-9 THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 1.

FIGURE 3.2-10 THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 2.



T:0.033 D:0.634 S:0.730 W:0.408

U:0.052 C:0.044 B:0.054 E:0.078

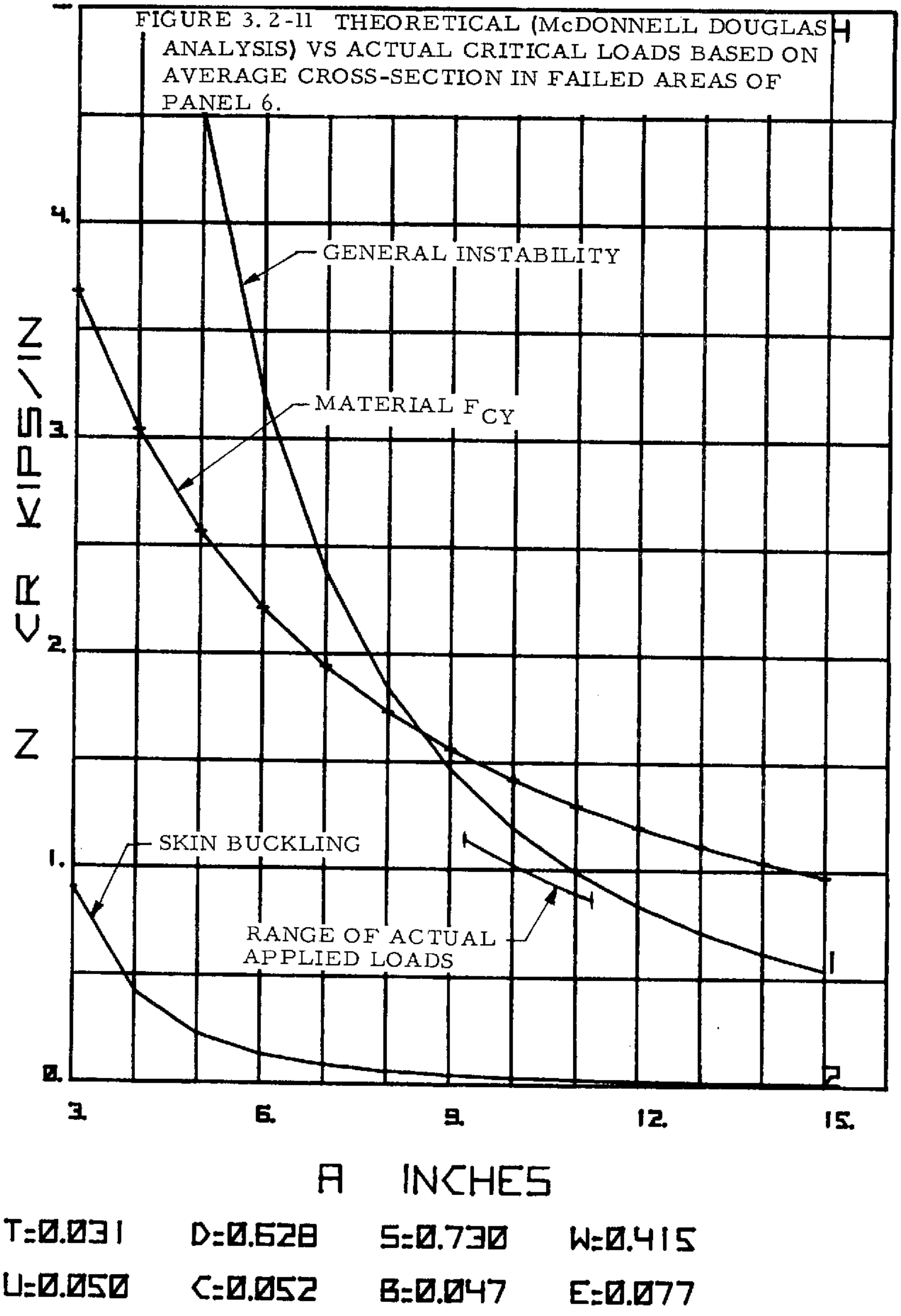


FIGURE 3.2-11 THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 6.

FIGURE 3.2-12 THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON ONE OF THE MINIMUM CROSS-SECTION GRID MEMBERS IN PANEL 6.

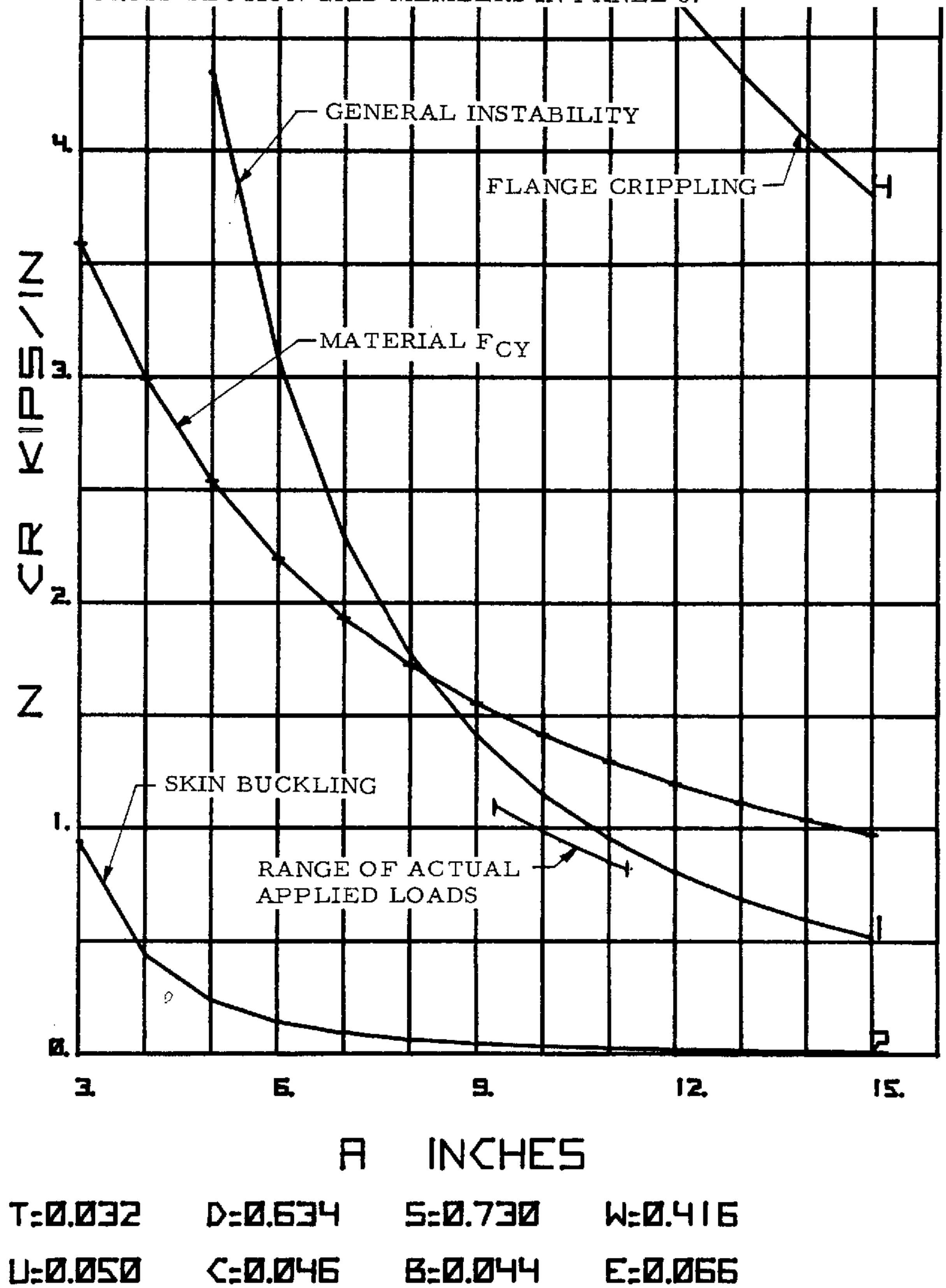
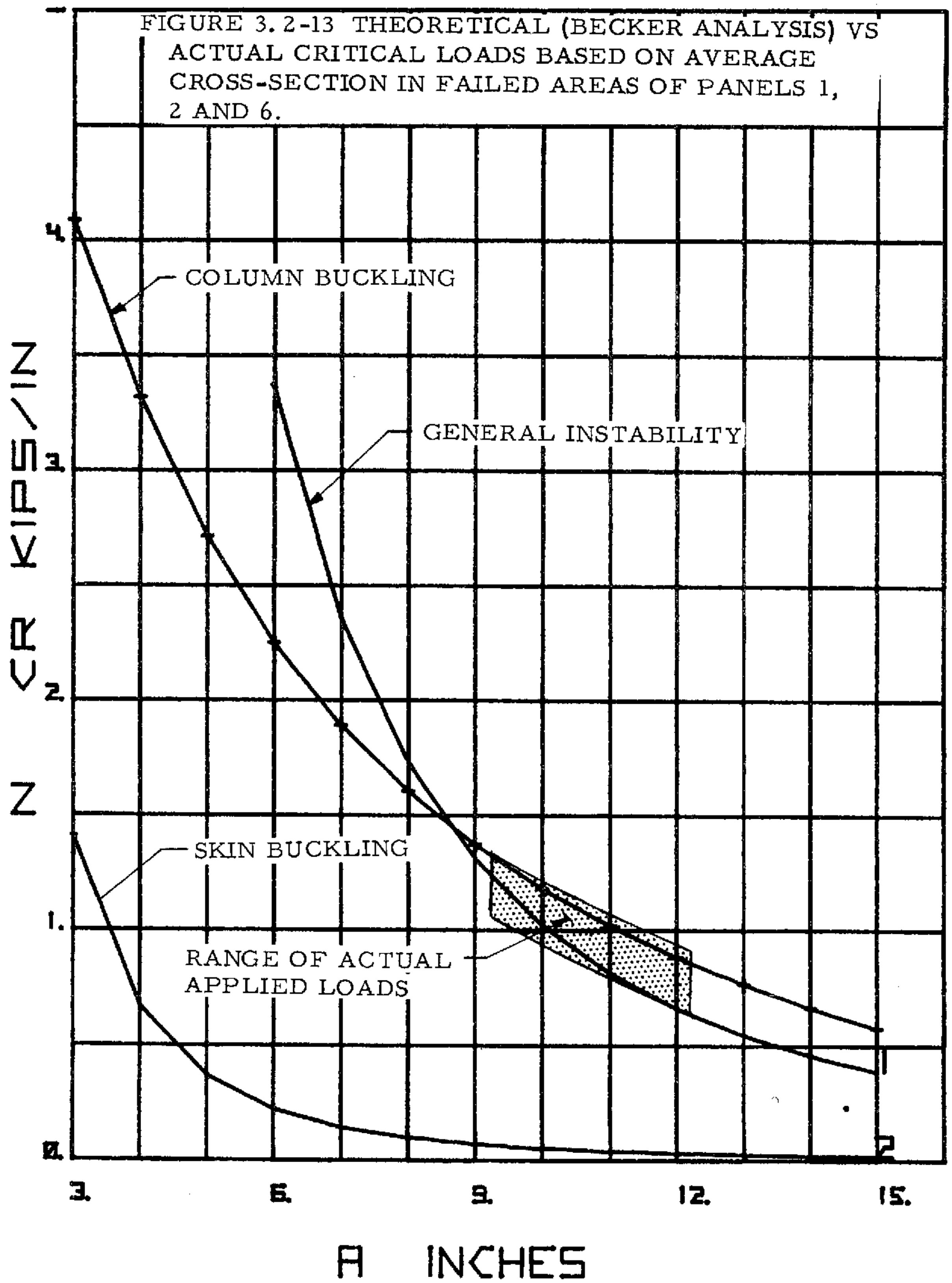


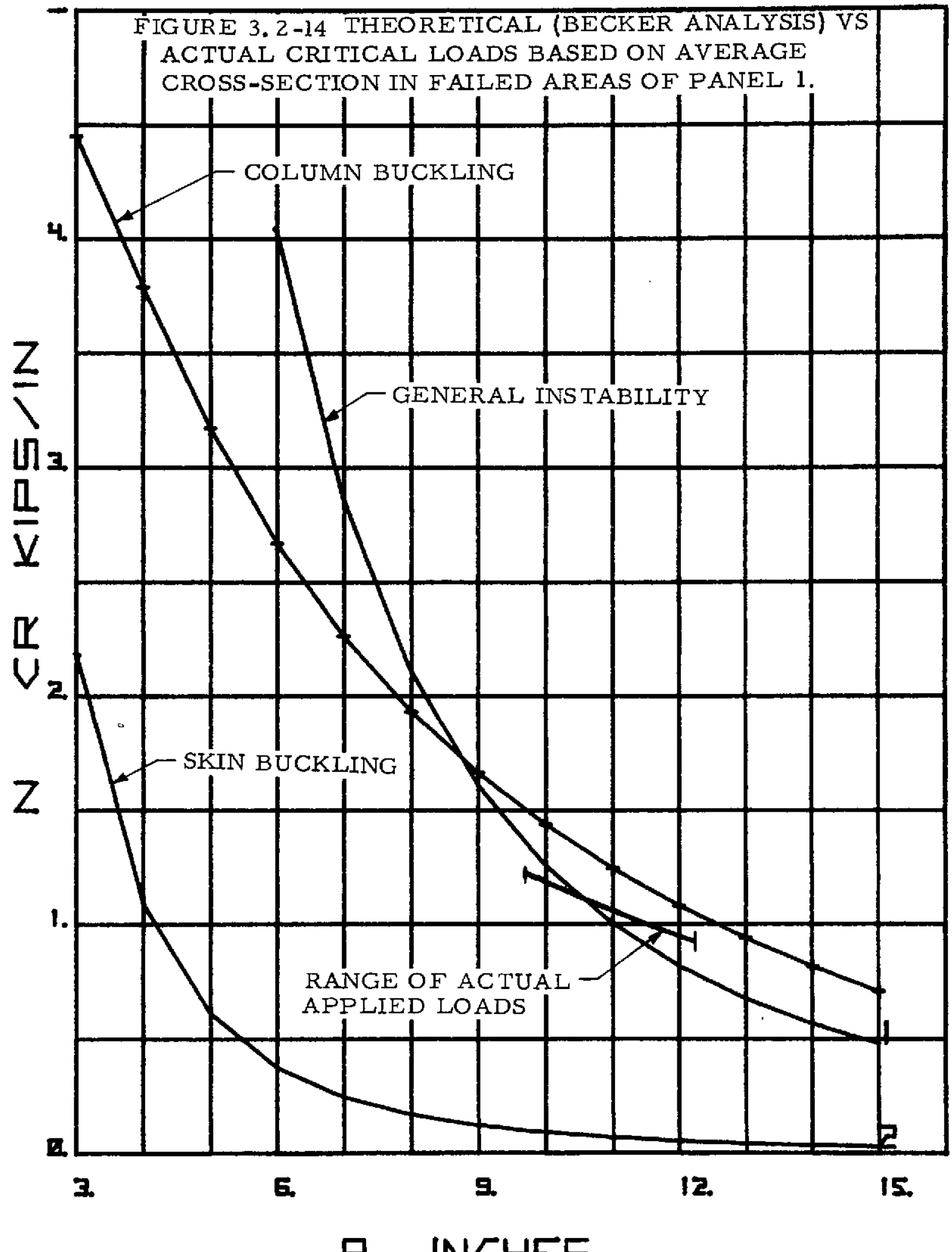
FIGURE 3.2-13 THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANELS 1, 2 AND 6.



T:0.036 D:0.605 S:0.730 W:0.425

U:0.058 C:0.067 B:0.056 E:0.065

FIGURE 3.2-14 THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 1.



T=0.043 D=0.592 S=0.730 W=0.424

U=0.055 C=0.083 B=0.058 E=0.079

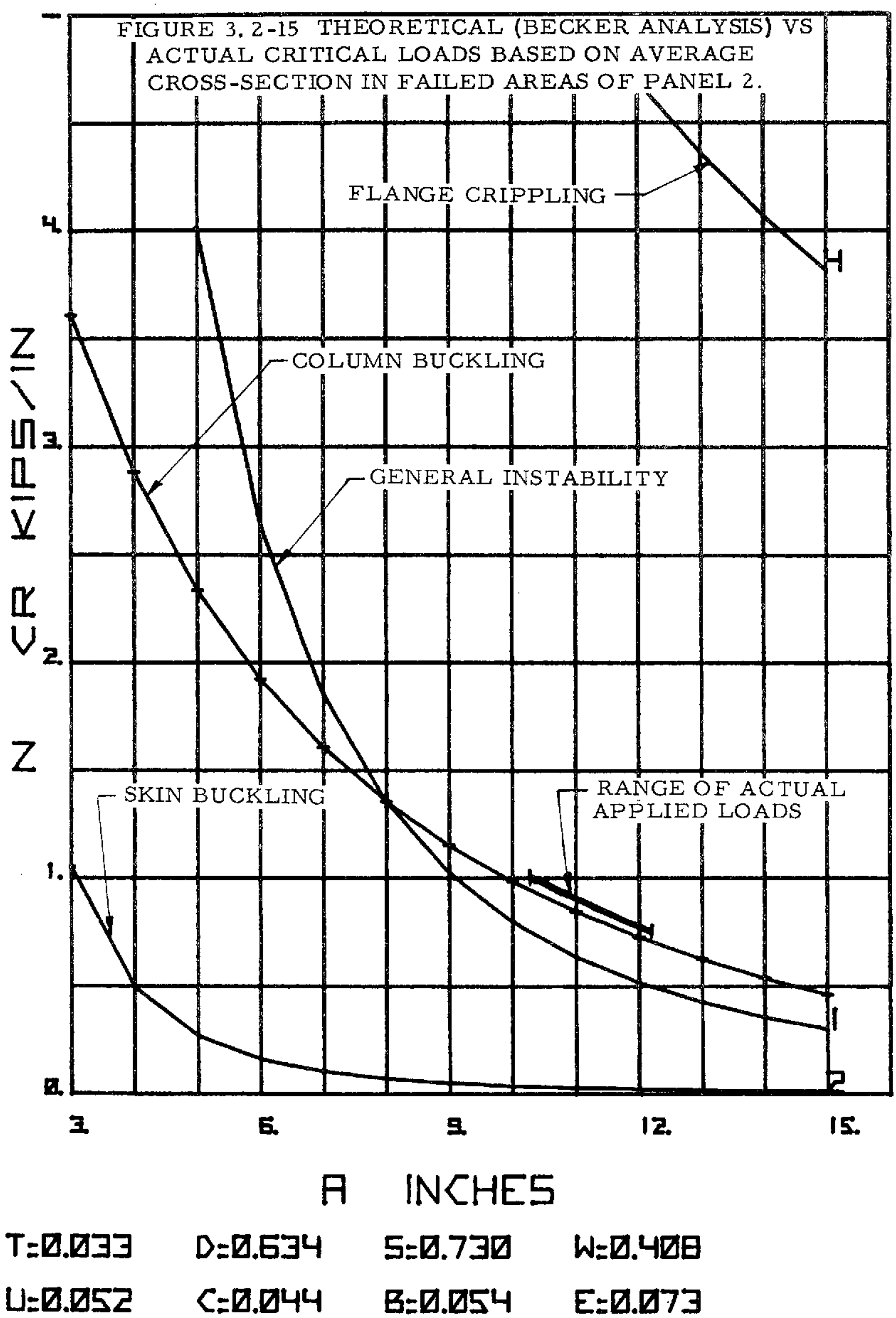


FIGURE 3.2-15 THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 2.
FLANGE CRIPPLING
COLUMN BUCKLING
GENERAL INSTABILITY
SKIN BUCKLING
RANGE OF ACTUAL APPLIED LOADS
N CR KIPS/IN
A INCHES
0.
1.
2.
3.
4.
3.
6.
9.
12.
15.
T:0.033 D:0.634 S:0.730 W:0.408
U:0.052 C:0.044 B:0.054 E:0.073

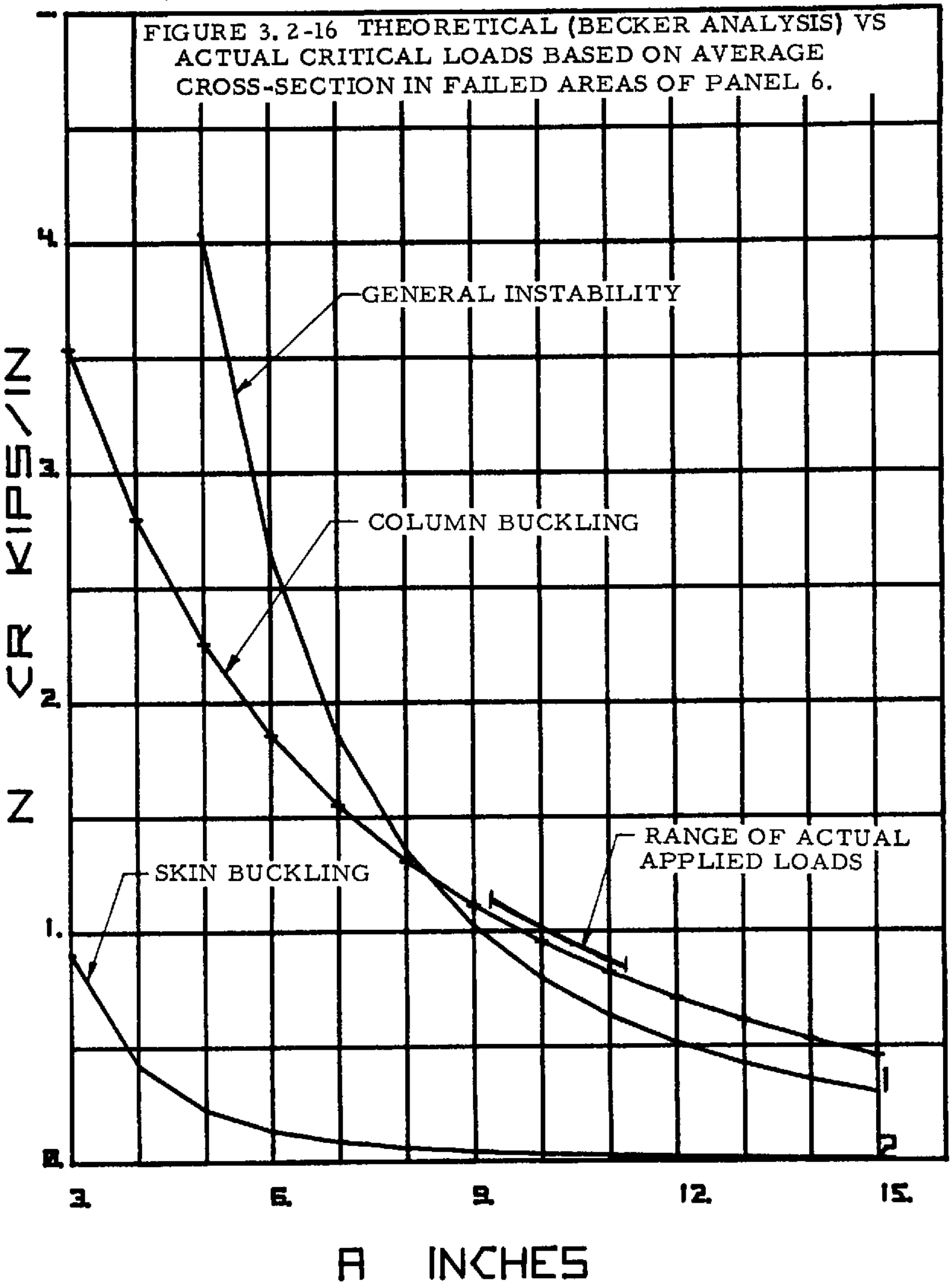


FIGURE 3.2-16 THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 6.

T:0.031 D:0.628 S:0.730 W:0.415

U:0.050 C:0.052 B:0.047 E:0.077

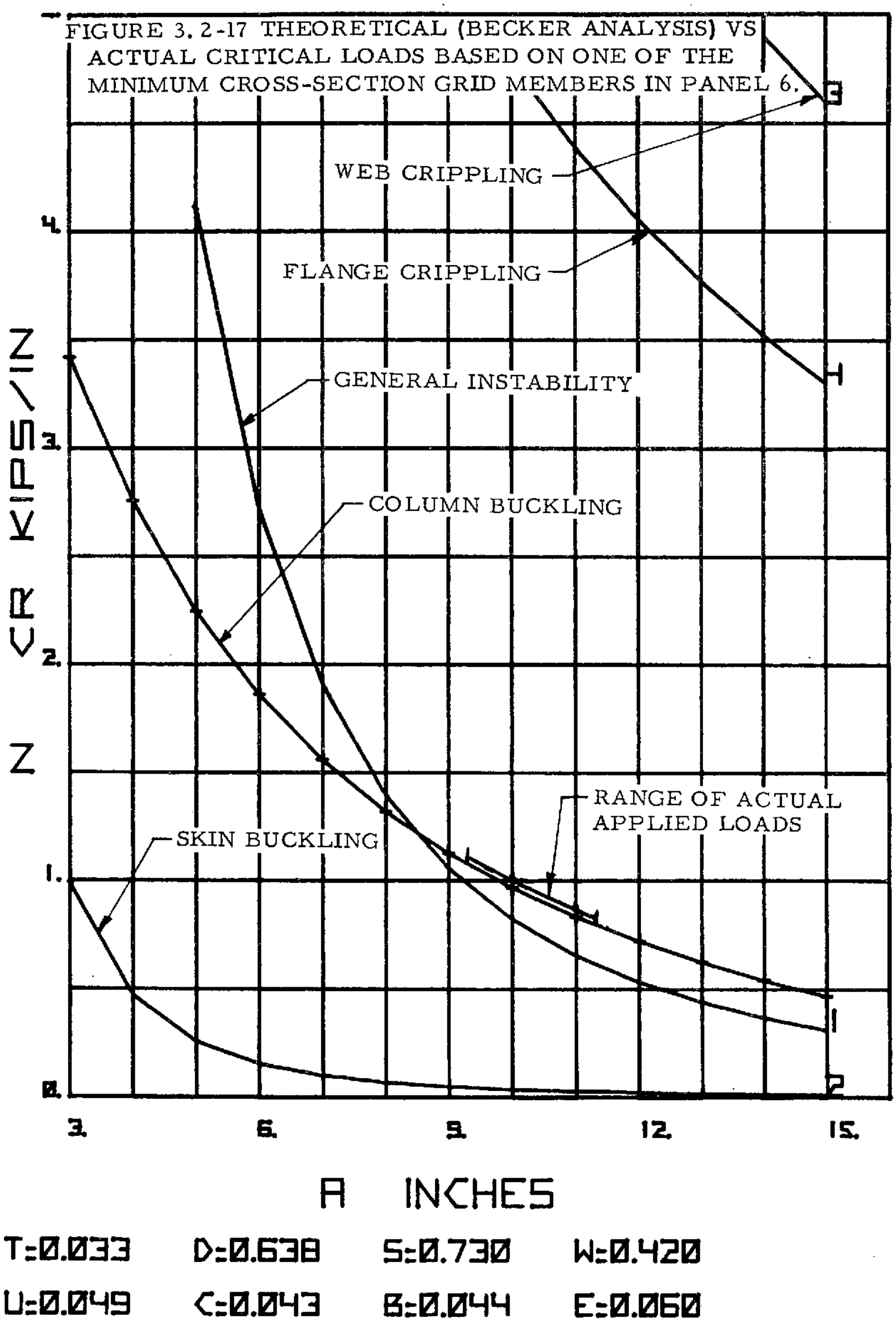


FIGURE 3. 2-17 THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON ONE OF THE MINIMUM CROSS-SECTION GRID MEMBERS IN PANEL 6.
WEB CRIPPLING
FLANGE CRIPPLING
GENERAL INSTABILITY
COLUMN BUCKLING
RANGE OF ACTUAL APPLIED LOADS
SKIN BUCKLING
N CR KIPS/IN
4.
3.
2.
1.
0.
3.
6.
9.
12.
15.
A INCHES
T=0.033
D=0.638
S=0.730
W=0.420
U=0.049
C=0.043
B=0.044
E=0.060

4. CONCLUSIONS

Six potential failure modes were considered in the analysis of Section 3.2; skin buckling, material f_{cy}, stiffener flange crippling, stiffener web crippling, column buckling and general instability. Comparing the theoretical critical loading for each of these failure modes with the actual loading in Figures 3.2-8 thru 3.2-17 the most likely failure mode for the adapter can be selected.

4.1 Skin Panel Buckling

The flanged isogrid test specimen was designed to react loads and maintain stability primarily as a result of the load carrying capabilities of the integrally machined I-beam cross-section grid members. Compression buckling of the triangular skin panels is permitted. As seen in Figures 3.2-8 thru 3.2-17 skin buckling occurs at load intensities significantly lower than the other theoretical and actual loads. This does not constitute structural failure since grid members can react load independent of the buckled state of the skins. Since some load is obviously carried by the skins, an effective width of skin is included in the stiffener cross section when calculating critical loads for other modes of failure.

4.2 Material F_{cy}

Although inelastic buckling of the structure is possible, all of the analysis methods used assumed elastic behavior. Critical loading based on the material F_{cy} was thus selected as a convenient upper limit cut-off for the theoretical capability of the structure. Comparing the material F_{cy} allowables with the actual failure loads in Figures 3.2-8 thru 3.2-17, it is obvious that failure due to gross yielding of the structure can be ruled out.

4.3 Stiffener Flange and Web Crippling

Critical loads for stiffener flange and web crippling are so large they fall near or outside the limits of the plots in Figures 3.2-8 - 3.2-17. It can thus be concluded that failure was not precipitated by local crippling of the stiffener cross-section.

4.4 Column Buckling and General Instability

Column buckling and general instability are the two most difficult failure modes to accurately predict. Because of this and the closeness of the column buckling and general instability curves in Figures 3.2-13 thru 3.2-17 possible ambiguities exist as to whether failure of the test specimen was attributable to general instability or column buckling. Table 4.3-1 summarizes the possible conclusions obtained from the comparisons of data in Figures 3.2-8 thru 3.2-17 with reference to these failure modes.

The McDonnell Douglas general instability analysis predicts critical loads approximately 25% higher than the calculated actual loads whereas the Becker analysis predicts critical loads approximately 20% lower than actual. The theoretical column buckling and actual calculated failure loads are in close agreement. From this comparison it is obvious that, due to the many variables such as anticlastic curvature, eccentric loading, section warping, and column fixity which cannot be accurately accounted for in the analyses, either column buckling or overall general instability could have precipitated failure of the test specimen.

The approximate analytical methods developed in this report are adequate for initial sizing of conical flanged isogrid structures. However, based on the results of the single test performed, the general instability knock down factor should be reduced by 25% for the McDonnell Douglas method and increased 20% for the Becker method (Appendix B).

TABLE 4.3-1 SUMMARY OF THEORETICAL AND ACTUAL CRITICAL LOADS COMPARISON

Damaged Area	Figure	Actual Calculated Failure Load N_{cr} (Avg) -lb/in	THEORETICAL FAILURE LOADS					
			GENERAL INSTABILITY				COLUMN BUCKLING	
			MDAC		BECKER			
			N_{cr} (Avg) -lb/in	$\frac{N_{cr}\ Theory}{N_{cr}\ Actual}$	N_{cr} (Avg) -lb/in	$\frac{N_{cr}\ Theory}{N_{cr}\ Actual}$	N_{cr} (Avg) -lb/in	$\frac{N_{cr}\ Theory}{N_{cr}\ Actual}$
Avg. Panels 1, 2 and 6	3.2-8 3.2-13	1000	1260	1.26	870	.87	1070	1.07
Avg. Panel 1	3.2-9 3.2-14	1070	1420	1.33	1000	.93	1230	1.15
Avg. Panel 2	3.2-10 3.2-15	870	1130	1.30	610	.70	810	.93
Avg. Panel 6	3.2-11 3.2-16	1000	1130	1.13	770	.77	910	.91
Weakest Member Panel 6	3.2-12 3.2-17	930	1080	1.16	750	.81	900	.97

5. RECOMMENDATIONS

The limited analysis and testing completed to date have successfully demonstrated the feasibility of using flanged isogrid for conical structures. However, additional work should be accomplished to provide a better understanding of the capabilities of conical isogrid structures. The following are recommendations for future work relating to conical isogrid structures.

1. Perform a detailed stability analysis utilizing finite element computer programs to predict failure loads and verify design equations.

2. Verify general instability failure loads by modifying the test specimen design to eliminate column buckling as a possible failure mode and retesting. Existing manufacturing tooling, N/C tapes and test fixtures could be reused. Some of the less badly damaged panels from the existing test specimen might also be used in lightly loaded parts of the structure.

3. Develop a stability theory for conical isogrid shells of revolution. This theory could be used to evaluate errors in applying cylindrical shell theory to a conical structure.

4. Develop, analyze and test alternate conical adapter isogrid patterns, In particular, look at patterns that have all straight diagonal grid members between nodes.

5. Develop open isogrid for conical adapters.

6. Build and test photoelastic models of conical isogrid structures.

7. Evaluate the application of advanced composites to conical isogrid structures.

6. REFERENCES

1-1 Adapter - Isogrid - Conical Static and Ultimate Load Tests, General Dynamics/Convair Aerospace, 12A6621, 28 November 1973.

3-1 Isogrid Handbook, McDonnell Douglas Astronautics Company, MDCG4295A, February 1973.

3-2 Becker, H., Handbook of Structural Stability, Part VI, Strength of Stiffened Curved Plates and Shells, NACA T.N. 3786.

APPENDIX A-1

SURVEY TEST DATA

CONICAL ISOGRID ADAPTER TEST RUN 1

ADPTR C1 1Ø% DATE: 11 / 9 / 73 TIME: 9 : 6 : 37

FILE: 3 RECORD: 5 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+596.	LD1	+544.	LD2	-16.	LD3	-1Ø.	LD4
7	+13.	D1	+4.	D2	+.	D3	+1.	D4
11	-.	D5	-.	D6	+.	D7	+.	D8
15	+1.	D9	+4.	D1Ø	-4.	D11	-5.	D12
19	+.	D13	+.	D14	-9.	S1	-12.	S2
23	-7.	S3	-2.	S4	+9.	S5	+2.	S6
27	-46.	S7	-45.	S8	-34.	S9	-36.	S1Ø
31	-44.	S11	-5Ø.	S12	-51.	S13	-27.	S14
35	-31.	S15	-51.	S16	-61.	S17	-39.	S18
39	-22.	S19	-54.	S2Ø	-46.	S21	-49.	S22
43	+14.	S23	+19.	S24	-24.	S25	-27.	S26
47	-2.	S27	-65.	S28	-51.	S29	-52.	S3Ø
51	-34.	S31	-38.	S32	-14.	S33	-31.	S34
55	+4.	S35	-16.	S36	-78.	S37	+4.	S38
59	+2.	S39	+.	S4Ø				

ADPTR C1 2Ø% DATE: 11 / 9 / 73 TIME: 9 : 11 : 4

FILE: 3 RECORD: 6 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+1211.	LD1	+1198.	LD2	-8.	LD3	+.	LD4
7	+11.	D1	+9.	D2	+1.	D3	+1.	D4
11	-1.	D5	-4.	D6	+.	D7	+1.	D8
15	+7.	D9	+12.	D1Ø	-11.	D11	-12.	D12
19	+3.	D13	+2.	D14	-22.	S1	-24.	S2
23	-12.	S3	-2.	S4	+19.	S5	+9.	S6
27	-93.	S7	-73.	S8	-66.	S9	-72.	S1Ø
31	-95.	S11	-1Ø1.	S12	-11Ø.	S13	-56.	S14
35	-68.	S15	-1Ø5.	S16	-12Ø.	S17	-76.	S18
39	-39.	S19	-1Ø4.	S2Ø	-95.	S21	-91.	S22
43	+29.	S23	+37.	S24	-59.	S25	-59.	S26
47	-17.	S27	-143.	S28	-1Ø8.	S29	-11Ø.	S3Ø
51	-76.	S31	-82.	S32	-36.	S33	-67.	S34
55	+2.	S35	-48.	S36	-162.	S37	+7.	S38
59	+14.	S39	+.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 1

ADPTR C1 3Ø% DATE: 11 / 9 / 73 TIME: 9 : 24 : 1[illegible]

FILE: 3 RECORD: 7 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+1772.	LD1	+1815.	LD2	+.	LD3	+.	LD4
7	+18.	D1	+12.	D2	+3.	D3	+1.	D4
11	-5.	D5	-8.	D6	+.	D7	+4.	D8
15	+12.	D9	+16.	D1Ø	-17.	D11	-2Ø.	D12
19	+8.	D13	+5.	D14	-34.	S1	-33.	S2
23	-17.	S3	-2.	S4	+27.	S5	+14.	S6
27	-142.	S7	-141.	S8	-98.	S9	-1Ø5.	S1Ø
31	-137.	S11	-152.	S12	-156.	S13	-84.	S14
35	-98.	S15	-155.	S16	-177.	S17	-115.	S18
39	-58.	S19	-156.	S2Ø	-137.	S21	-128.	S22
43	+46.	S23	+54.	S24	-9Ø.	S25	-88.	S26
47	-29.	S27	-2Ø8.	S28	-157.	S29	-163.	S3Ø
51	-115.	S31	-123.	S32	-54.	S33	-98.	S34
55	-31.	S35	-69.	S36	-24Ø.	S37	+14.	S38
59	+24.	S39	+2.	S4Ø				

ADPTR C1 4Ø% DATE: 11 / 9 / 73 TIME: [illegible] : 35 : 52

FILE: 3 RECORD: 8 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2386.	LD1	+2397.	LD2	+.	LD3	+5.	LD4
7	+24.	D1	+17.	D2	+6.	D3	+1.	D4
11	-9.	D5	-14.	D6	-.	D7	+8.	D8
15	+2Ø.	D9	+24.	D1Ø	-23.	D11	-25.	D12
19	+1Ø.	D13	+9.	D14	-49.	S1	-43.	S2
23	-14.	S3	-2.	S4	+39.	S5	+19.	S6
27	-186.	S7	-185.	S8	-125.	S9	-137.	S1Ø
31	-184.	S11	-2ØØ.	S12	-2Ø8.	S13	-113.	S14
35	-13Ø.	S15	-2Ø9.	S16	-241.	S17	-157.	S18
39	-78.	S19	-215.	S2Ø	-181.	S21	-19Ø.	S22
43	+61.	S23	+71.	S24	-137.	S25	-122.	S26
47	-37.	S27	-276.	S28	-2Ø8.	S29	-216.	S3Ø
51	-147.	S31	-159.	S32	-71.	S33	-13Ø.	S34
55	-36.	S35	-91.	S36	-314.	S37	+16.	S38
59	+37.	S39	+9.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 1

ADPTR C1 50% DATE: 11 / 9 / 73 TIME: 9 : 52 : 47

FILE: 3 RECORD: 9 CHANNELS 3 THROUGH 60

CHAN								
3	+2947.	LD1	+2960.	LD2	+.	LD3	+.	LD4
7	+32.	D1	+23.	D2	+7.	D3	+1.	D4
11	-11.	D5	-17.	D6	+.	D7	+10.	D8
15	+25.	D9	+31.	D10	-30.	D11	-34.	D12
19	+13.	D13	+12.	D14	-61.	S1	-48.	S2
23	-24.	S3	-2.	S4	+41.	S5	+29.	S6
27	-233.	S7	-228.	S8	-155.	S9	-168.	S10
31	-236.	S11	-251.	S12	-262.	S13	-140.	S14
35	-159.	S15	-263.	S16	-305.	S17	-193.	S18
39	-5.	S19	-277.	S20	-236.	S21	-232.	S22
43	+61.	S23	+81.	S24	-147.	S25	-149.	S26
47	-54.	S27	-337.	S28	-257.	S29	-267.	S30
51	-184.	S31	-200.	S32	-88.	S33	-161.	S34
55	-105.	S35	-122.	S36	-395.	S37	+21.	S38
59	+54.	S39	+14.	S40				

ADPTR C1 60% DATE: 11 / 9 / 73 TIME: 10 : 8 : 55

FILE: 3 RECORD: 10 CHANNELS 3 THROUGH 60

CHAN								
3	+3490.	LD1	+3523.	LD2	-8.	LD3	+.	LD4
7	+40.	D1	+26.	D2	+10.	D3	+1.	D4
11	-15.	D5	-23.	D6	+.	D7	+12.	D8
15	+32.	D9	+38.	D10	-37.	D11	-41.	D12
19	+17.	D13	+16.	D14	-73.	S1	-60.	S2
23	-34.	S3	+.	S4	+49.	S5	+36.	S6
27	-287.	S7	-283.	S8	-192.	S9	-204.	S10
31	-287.	S11	-302.	S12	-316.	S13	-168.	S14
35	-189.	S15	-317.	S16	-364.	S17	-233.	S18
39	-112.	S19	-332.	S20	-265.	S21	-271.	S22
43	+73.	S23	+96.	S24	-159.	S25	-177.	S26
47	-56.	S27	-397.	S28	-316.	S29	-317.	S30
51	-223.	S31	-238.	S32	-108.	S33	-192.	S34
55	-145.	S35	-142.	S36	-471.	S37	+26.	S38
59	+69.	S39	+22.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 1

ADPTR C1 7Ø%   DATE: 11 / 9 / 73   TIME: 1Ø : 15 : 25

FILE: 3   RECORD: 11   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4Ø68.	LD1	+4Ø49.	LD2	+.	LD3	+.	LD4
7	+46.	D1	+3Ø.	D2	+11.	D3	+.	D4
11	-19.	D5	-27.	D6	+2.	D7	+15.	D8
15	+38.	D9	+46.	D1Ø	-44.	D11	-47.	D12
19	+22.	D13	+2Ø.	D14	-86.	S1	-69.	S2
23	-41.	S3	-2.	S4	+56.	S5	+41.	S6
27	-333.	S7	-331.	S8	-221.	S9	-238.	S1Ø
31	-334.	S11	-353.	S12	-367.	S13	-2ØØ.	S14
35	-221.	S15	-374.	S16	-433.	S17	-279.	S18
39	-129.	S19	-394.	S2Ø	-314.	S21	-328.	S22
43	+86.	S23	+113.	S24	-2Ø1.	S25	-2Ø6.	S26
47	-64.	S27	-463.	S28	-368.	S29	-373.	S3Ø
51	-262.	S31	-28Ø.	S32	-125.	S33	-226.	S34
55	-216.	S35	-171.	S36	-547.	S37	+31.	S38
59	+83.	S39	+29.	S4Ø				

ADPTR C1 8Ø%   DATE: 11 / 9 / 73   TIME: 1Ø : 38 : 51

FILE: 3   RECORD: 12   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4611.	LD1	+463Ø.	LD2	-8.	LD3	-1Ø.	LD4
7	+53.	D1	+34.	D2	+12.	D3	+.	D4
11	-24.	D5	-33.	D6	+3.	D7	+19.	D8
15	+44.	D9	+53.	D1Ø	-51.	D11	-56.	D12
19	+25.	D13	+23.	D14	-1Ø5.	S1	-79.	S2
23	-49.	S3	-4.	S4	+61.	S5	+45.	S6
27	-387.	S7	-379.	S8	-253.	S9	-276.	S1Ø
31	-393.	S11	-4Ø6.	S12	-421.	S13	-234.	S14
35	-258.	S15	-44Ø.	S16	-497.	S17	-328.	S18
39	-151.	S19	-466.	S2Ø	-361.	S21	-38Ø.	S22
43	+95.	S23	+128.	S24	-231.	S25	-238.	S26
47	-66.	S27	-519.	S28	-427.	S29	-428.	S3Ø
51	-3Ø2.	S31	-323.	S32	-145.	S33	-265.	S34
55	-273.	S35	-2Ø4.	S36	-63Ø.	S37	+33.	S38
59	+1Ø1.	S39	+39.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 1

ADPTR C1 90%   DATE: 11 / 9 / 73   TIME: 10 : 50 : 39

FILE: 3   RECORD: 13   CHANNELS 3 THROUGH 60

CHAN								
3	+5207.	LD1	+5139.	LD2	+.	LD3	-5.	LD4
7	+61.	D1	+40.	D2	+15.	D3	+.	D4
11	-28.	D5	-36.	D6	+3.	D7	+22.	D8
15	+52.	D9	+60.	D10	-59.	D11	-62.	D12
19	+28.	D13	+28.	D14	-115.	S1	-84.	S2
23	-51.	S3	-4.	S4	+71.	S5	+50.	S6
27	-431.	S7	-422.	S8	-278.	S9	-305.	S10
31	-438.	S11	-452.	S12	-468.	S13	-262.	S14
35	-282.	S15	-499.	S16	-559.	S17	-378.	S18
39	-166.	S19	-528.	S20	-405.	S21	-429.	S22
43	+113.	S23	+148.	S24	-263.	S25	-265.	S26
47	-66.	S27	-570.	S28	-476.	S29	-474.	S30
51	-334.	S31	-359.	S32	-160.	S33	-294.	S34
55	-258.	S35	-226.	S36	-699.	S37	+38.	S38
59	+120.	S39	+53.	S40				

ADPTR C1 100%   DATE: 11 / 9 / 73   TIME: 10 : 57 : 40

FILE: 3   RECORD: 14   CHANNELS 3 THROUGH 60

CHAN								
3	+5678.	LD1	+5629.	LD2	+.	LD3	-5.	LD4
7	+68.	D1	+44.	D2	+18.	D3	+.	D4
11	-33.	D5	-39.	D6	+3.	D7	+25.	D8
15	+56.	D9	+67.	D10	-65.	D11	-69.	D12
19	+31.	D13	+32.	D14	-125.	S1	-91.	S2
23	-56.	S3	-7.	S4	+83.	S5	+55.	S6
27	-470.	S7	-461.	S8	-302.	S9	-336.	S10
31	-482.	S11	-496.	S12	-510.	S13	-291.	S14
35	-304.	S15	-556.	S16	-615.	S17	-419.	S18
39	-178.	S19	-592.	S20	-442.	S21	-474.	S22
43	+130.	S23	+170.	S24	-299.	S25	-295.	S26
47	-69.	S27	-621.	S28	-520.	S29	-520.	S30
51	-366.	S31	-395.	S32	-172.	S33	-325.	S34
55	-285.	S35	-250.	S36	-768.	S37	+41.	S38
59	+148.	S39	+63.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 2

ADPTR C5 10% DATE: 11 / 9 / 73 TIME: 14 : 9 : 45

FILE: 3 RECORD: 20 CHANNELS 3 THROUGH 60

CHAN								
3	+1048.	LD1	+1180.	LD2	+1120.	LD3	+1023.	LD4
7	< -.	D1	+3.	D2	-.	D3	+.	D4
11	-.	D5	-.	D6	+3.	D7	+2.	D8
15	+.	D9	+4.	D10	-3.	D11	-3.	D12
19	-.	D13	-.	D14	-17.	S1	-7.	S2
23	-2.	S3	+4.	S4	+9.	S5	+2.	S6
27	-44.	S7	-38.	S8	-27.	S9	-33.	S10
31	-44.	S11	-43.	S12	-68.	S13	-32.	S14
35	-39.	S15	-56.	S16	-81.	S17	-54.	S18
39	-31.	S19	-59.	S20	-78.	S21	-76.	S22
43	-34.	S23	-46.	S24	-44.	S25	-44.	S26
47	-29.	S27	-46.	S28	-41.	S29	-52.	S30
51	-36.	S31	-43.	S32	-22.	S33	-38.	S34
55	-66.	S35	-43.	S36	-103.	S37	+7.	S38
59	-2.	S39	+9.	S40				

ADPTR C5 20% DATE: 11 / 9 / 73 TIME: 14 : 11 : 27

FILE: 3 RECORD: 21 CHANNELS 3 THROUGH 60

CHAN								
3	+2115.	LD1	+2197.	LD2	+2158.	LD3	+2093.	LD4
7	<+3.	D1	+6.	D2	+1.	D3	+2.	D4
11	+.	D5	-.	D6	+5.	D7	+3.	D8
15	+2.	D9	+7.	D10	-5.	D11	-7.	D12
19	-4.	D13	-1.	D14	-24.	S1	-12.	S2
23	-9.	S3	+4.	S4	+19.	S5	+7.	S6
27	-80.	S7	-79.	S8	-56.	S9	-64.	S10
31	-86.	S11	-89.	S12	-134.	S13	-69.	S14
35	-83.	S15	-115.	S16	-169.	S17	-110.	S18
39	-68.	S19	-128.	S20	-162.	S21	-145.	S22
43	-68.	S23	-96.	S24	-76.	S25	-83.	S26
47	-49.	S27	-94.	S28	-83.	S29	-38.	S30
51	-71.	S31	-79.	S32	-41.	S33	-72.	S34
55	-118.	S35	-72.	S36	-196.	S37	+9.	S38
59	-2.	S39	+17.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 2

ADPTR C5 30% DATE: 11 / 9 / 73 TIME: 14 : 13 : 11

FILE: 3 RECORD: 22 CHANNELS 3 THROUGH 60

CHAN								
3	+3200.	LD1	+3232.	LD2	+3270.	LD3	+3239.	LD4
7	+10.	D1	+10.	D2	+4.	D3	+7.	D4
11	+.	D5	+.	D6	+7.	D7	+5.	D8
15	+6.	D9	+12.	D10	-9.	D11	-10.	D12
19	-9.	D13	-5.	D14	-32.	S1	-16.	S2
23	-14.	S3	+4.	S4	+32.	S5	+14.	S6
27	-122.	S7	-117.	S8	-83.	S9	-98.	S10
31	-127.	S11	-133.	S12	-198.	S13	-101.	S14
35	-127.	S15	-182.	S16	-261.	S17	-174.	S18
39	-107.	S19	-200.	S20	-248.	S21	-229.	S22
43	-108.	S23	-148.	S24	-110.	S25	-122.	S26
47	-74.	S27	-147.	S28	-127.	S29	-142.	S30

ADPTR C5 40% DATE: 11 / 9 / 73 TIME: 14 : 14 : 57

FILE: 3 RECORD: 23 CHANNELS 3 THROUGH 60

CHAN								
3	+4339.	LD1	+4394.	LD2	+4425.	LD3	+4416.	LD4
7	+13.	D1	+14.	D2	+6.	D3	+10.	D4
11	+3.	D5	+3.	D6	+11.	D7	+7.	D8
15	+10.	D9	+17.	D10	-14.	D11	-16.	D12
19	-15.	D13	-11.	D14	-41.	S1	-24.	S2
23	-19.	S3	+4.	S4	+41.	S5	+21.	S6
27	-166.	S7	-161.	S8	-115.	S9	-134.	S10
31	-177.	S11	-181.	S12	-272.	S13	-143.	S14
35	-174.	S15	-253.	S16	-359.	S17	-247.	S18
39	-147.	S19	-277.	S20	-336.	S21	-338.	S22
43	-145.	S23	-204.	S24	-154.	S25	-169.	S26
47	-83.	S27	-208.	S28	-176.	S29	-195.	S30
51	-144.	S31	-161.	S32	-78.	S33	-144.	S34
55	-228.	S35	-137.	S36	-397.	S37	+19.	S38
59	+7.	S39	+46.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 2

ADPTR C5 50% DATE: 11 / 9 / 73 TIME: 14 : 19 : 3

FILE: 3 RECORD: 24 CHANNELS 3 THROUGH 60

CHAN								
3	+5424.	LD1	+5429.	LD2	+5512.	LD3	+5460.	LD4
[illegible]	+21.	D1	+16.	D2	+10.	D3	+14.	D4
11	+6.	D5	+6.	D6	+14.	D7	+8.	D8
15	+15.	D9	+23.	D10	-20.	D11	-22.	D12
19	-21.	D13	-15.	D14	-54.	S1	-31.	S2
23	-22.	S3	+7.	S4	+51.	S5	+29.	S6
27	-210.	S7	-199.	S8	-145.	S9	-168.	S10
31	-223.	S11	-229.	S12	-340.	S13	-183.	S14
35	-223.	S15	-325.	S16	-450.	S17	-319.	S18
39	-176.	S19	-349.	S20	-422.	S21	-412.	S22
43	-184.	S23	-256.	S24	-206.	S25	-216.	S26
47	-103.	S27	-274.	S28	-223.	S29	-245.	S30
51	-181.	S31	-200.	S32	-103.	S33	-160.	S34
55	-280.	S35	-180.	S36	-500.	S37	+21.	S38
59	+19.	S39	+66.	S40				

ADPTR C5 60% DATE: 11 / 9 / 73 TIME: 14 : 21 : 21

'ILE: 3 RECORD: 25 CHANNELS 3 THROUGH 60

CHAN								
3	+6672.	LD1	+6646.	LD2	+6733.	LD3	+6642.	LD4
[illegible]	+28.	D1	+21.	D2	+12.	D3	+18.	D4
11	+8.	D5	+8.	D6	+21.	D7	+12.	D8
15	+21.	D9	+28.	D10	-26.	D11	-29.	D12
19	-28.	D13	-20.	D14	-66.	S1	-40.	S2
23	-24.	S3	+9.	S4	+64.	S5	+33.	S6
27	-264.	S7	-254.	S8	-184.	S9	-211.	S10
31	-280.	S11	-290.	S12	-424.	S13	-232.	S14
35	-272.	S15	-411.	S16	-551.	S17	-407.	S18
39	-215.	S19	-441.	S20	-526.	S21	-523.	S22
43	-226.	S23	-313.	S24	-255.	S25	-270.	S26
47	-123.	S27	-351.	S28	-277.	S29	-308.	S30
51	-226.	S31	-248.	S32	-125.	S33	-224.	S34
55	-342.	S35	-221.	S36	-621.	S37	+28.	S38
59	+32.	S39	+93.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 2

ADPTR C5 7Ø% DATE: 11 / 9 / 73 TIME: 14 : 24 : 56

FILE: 3 RECORD: 26 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+7739.	LD1	+7699.	LD2	+78Ø4.	LD3	+77Ø7.	LD4
7	+32.	D1	+24.	D2	+14.	D3	+23.	D4
11	+1Ø.	D5	+11.	D6	+25.	D7	+14.	D8
15	+26.	D9	+34.	D1Ø	-31.	D11	-35.	D12
19	-32.	D13	-24.	D14	-78.	S1	-48.	S2
23	-27.	S3	+9.	S4	+74.	S5	+38.	S6
27	-311.	S7	-295.	S8	-216.	S9	-247.	S1Ø
31	-329.	S11	-338.	S12	-495.	S13	-281.	S14
35	-312.	S15	-487.	S16	-642.	S17	-483.	S18
39	-247.	S19	-523.	S2Ø	-6Ø4.	S21	-624.	S22
43	-265.	S23	-37Ø.	S24	-3Ø7.	S25	-322.	S26
47	-145.	S27	-412.	S28	-329.	S29	-358.	S3Ø
51	-265.	S31	-289.	S32	-15Ø.	S33	-262.	S34
55	-398.	S35	-26Ø.	S36	-724.	S37	+36.	S38
59	+49.	S39	+115.	S4Ø				

ADPTR C5 8Ø% DATE: 11 / 9 / 73 TIME: 14 : 29 : 38

FILE: 3 RECORD: 27 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+8842.	LD1	+8825.	LD2	+8875.	LD3	+8822.	LD4
Ø	+39.	D1	+28.	D2	+17.	D3	+27.	D4
11	+12.	D5	+15.	D6	+29.	D7	+18.	D8
15	+31.	D9	+39.	D1Ø	-37.	D11	-41.	D12
19	-38.	D13	-3Ø.	D14	-91.	S1	-57.	S2
23	-34.	S3	+12.	S4	+83.	S5	+43.	S6
27	-363.	S7	-348.	S8	-251.	S9	-283.	S1Ø
31	-383.	S11	-394.	S12	-569.	S13	-323.	S14
35	-359.	S15	-571.	S16	-743.	S17	-569.	S18
39	-279.	S19	-617.	S2Ø	-688.	S21	-733.	S22
43	-3Ø9.	S23	-437.	S24	-373.	S25	-381.	S26
47	-155.	S27	-477.	S28	-375.	S29	-416.	S3Ø
51	-3Ø7.	S31	-337.	S32	-169.	S33	-3Ø6.	S34
55	-452.	S35	-3Ø1.	S36	-839.	S37	+38.	S38
59	+71.	S39	+144.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 3

ADPTR C3 10%   DATE: 11 / 9 / 73   TIME: 14 : 54 : 25

FILE: 3   RECORD: 30   CHANNELS 3 THROUGH 60

CHAN								
3	+867.	LD1	+962.	LD2	+552.	LD3	+529.	LD4
7	+3.	D1	+3.	D2	+.	D3	-1.	D4
11	-3.	D5	-3.	D6	+3.	D7	+3.	D8
15	+4.	D9	+5.	D10	-3.	D11	-5.	D12
19	+4.	D13	+4.	D14	-14.	S1	-9.	S2
23	-7.	S3	+2.	S4	+9.	S5	+4.	S6
27	-49.	S7	-52.	S8	-34.	S9	-40.	S10
31	-51.	S11	-53.	S12	-66.	S13	-29.	S14
35	-36.	S15	-59.	S16	-76.	S17	-51.	S18
39	-29.	S19	-59.	S20	-63.	S21	-54.	S22
43	-9.	S23	-9.	S24	-34.	S25	-41.	S26
47	-32.	S27	-55.	S28	-51.	S29	-52.	S30
51	-39.	S31	-41.	S32	-19.	S33	-36.	S34
55	-54.	S35	-31.	S36	-98.	S37	+7.	S38
59	+7.	S39	+2.	S40				

ADPTR C3 20%   DATE: 11 / 9 / 73   TIME: 14 : 56 : 50

FILE: 3   RECORD: 31   CHANNELS 3 THROUGH 60

CHAN								
3	+1844.	LD1	+1888.	LD2	+1246.	LD3	+1222.	LD4
7	+6.	D1	+6.	D2	+.	D3	-.	D4
11	-3.	D5	-3.	D6	+3.	D7	+3.	D8
15	+4.	D9	+7.	D10	-7.	D11	-7.	D12
19	+4.	D13	+4.	D14	-22.	S1	-14.	S2
23	-12.	S3	+2.	S4	+19.	S5	+12.	S6
27	-95.	S7	-100.	S8	-64.	S9	-76.	S10
31	-103.	S11	-106.	S12	-134.	S13	-69.	S14
35	-83.	S15	-123.	S16	-165.	S17	-105.	S18
39	-63.	S19	-133.	S20	-142.	S21	-118.	S22
43	-24.	S23	-34.	S24	-71.	S25	-81.	S26
47	-51.	S27	-118.	S28	-103.	S29	-110.	S30
51	-76.	S31	-82.	S32	-41.	S33	-72.	S34
55	-105.	S35	-60.	S36	-193.	S37	+9.	S38
59	+7.	S39	+7.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 3

ADPTR C3 30% DATE: 11 / 9 / 73 TIME: 14 : 58 : 25

FILE: 3 RECORD: 32 CHANNELS 3 THROUGH 60

CHAN								
3	+2730.	LD1	+2796.	LD2	+1857.	LD3	+1844.	LD4
7	+14.	D1	+11.	D2	+1.	D3	+.	D4
11	-3.	D5	-3.	D6	+5.	D7	+6.	D8
15	+10.	D9	+14.	D10	-12.	D11	-13.	D12
19	+3.	D13	+4.	D14	-36.	S1	-24.	S2
23	-19.	S3	+.	S4	+27.	S5	+19.	S6
27	-142.	S7	-148.	S8	-96.	S9	-113.	S10
31	-150.	S11	-157.	S12	-198.	S13	-98.	S14
35	-125.	S15	-187.	S16	-248.	S17	-162.	S18
39	-95.	S19	-200.	S20	-211.	S21	-197.	S22
43	-36.	S23	-54.	S24	-105.	S25	-120.	S26
47	-69.	S27	-189.	S28	-149.	S29	-163.	S30
51	-115.	S31	-130.	S32	-64.	S33	-113.	S34
55	-150.	S35	-94.	S36	-292.	S37	+12.	S38
59	+14.	S39	+14.	S40				

ADPTR C3 40% DATE: 11 / 9 / 73 TIME: 14 : 59 : 45

FILE: 3 RECORD: 33 CHANNELS 3 THROUGH 60

CHAN								
3	+3688.	LD1	+3777.	LD2	+2509.	LD3	+2496.	LD4
7	+20.	D1	+15.	D2	+3.	D3	+2.	D4
11	-3.	D5	-4.	D6	+6.	D7	+7.	D8
15	+15.	D9	+21.	D10	-18.	D11	-21.	D12
19	+2.	D13	+4.	D14	-49.	S1	-36.	S2
23	-24.	S3	+2.	S4	+37.	S5	+21.	S6
27	-196.	S7	-204.	S8	-135.	S9	-156.	S10
31	-209.	S11	-217.	S12	-272.	S13	-140.	S14
35	-172.	S15	-261.	S16	-342.	S17	-228.	S18
39	-127.	S19	-282.	S20	-285.	S21	-271.	S22
43	-54.	S23	-74.	S24	-145.	S25	-164.	S26
47	-81.	S27	-274.	S28	-213.	S29	-228.	S30
51	-162.	S31	-178.	S32	-91.	S33	-154.	S34
55	-211.	S35	-130.	S36	-400.	S37	+16.	S38
59	+24.	S39	+24.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 3

ADPTR C3 5Ø%   DATE: 11 / 9 / 73   TIME: 15 : 1 : 39

FILE: 3   RECORD: 34   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4647.	LD1	+4757.	LD2	+3153.	LD3	+3122.	LD4
[illegible]	+27.	D1	+18.	D2	+6.	D3	+4.	D4
11	-3.	D5	-4.	D6	+1Ø.	D7	+12.	D8
15	+21.	D9	+27.	D1Ø	-25.	D11	-29.	D12
19	+.	D13	+3.	D14	-66.	S1	-45.	S2
23	-34.	S3	+.	S4	+44.	S5	+26.	S6
27	-255.	S7	-264.	S8	-172.	S9	-199.	S1Ø
31	-27Ø.	S11	-278.	S12	-345.	S13	-18Ø.	S14
35	-218.	S15	-339.	S16	-438.	S17	-294.	S18
39	-161.	S19	-359.	S2Ø	-361.	S21	-36Ø.	S22
43	-71.	S23	-93.	S24	-196.	S25	-216.	S26
47	-1Ø3.	S27	-359.	S28	-275.	S29	-293.	S3Ø
51	-2Ø8.	S31	-226.	S32	-115.	S33	-197.	S34
55	-268.	S35	-166.	S36	-51Ø.	S37	+16.	S38
59	+37.	S39	+36.	S4Ø				

ADPTR C3 6Ø%   DATE: 11 / 9 / 73   TIME: 15 : 7 : 4

FILE: 3   RECORD: 36   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+5533.	LD1	+5611.	LD2	+3755.	LD3	+3693.	LD4
7	+34.	D1	+21.	D2	+8.	D3	+5.	D4
11	-4.	D5	-4.	D6	+13.	D7	+15.	D8
15	+28.	D9	+34.	D1Ø	-33.	D11	-37.	D12
19	+.	D13	+3.	D14	-83.	S1	-6Ø.	S2
23	-46.	S3	-7.	S4	+49.	S5	+26.	S6
27	-316.	S7	-322.	S8	-216.	S9	-25Ø.	S1Ø
31	-334.	S11	-343.	S12	-424.	S13	-232.	S14
35	-265.	S15	-423.	S16	-529.	S17	-382.	S18
39	-198.	S19	-446.	S2Ø	-449.	S21	-451.	S22
43	-93.	S23	-12Ø.	S24	-233.	S25	-265.	S26
47	-133.	S27	-436.	S28	-341.	S29	-363.	S3Ø
51	-26Ø.	S31	-284.	S32	-145.	S33	-248.	S34
55	-332.	S35	-214.	S36	-623.	S37	+16.	S38
59	+44.	S39	+46.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 3

ADPTR C3 70%   DATE: 11 / 9 / 73   TIME: 15 : 8 : 23

ILE: 3   RECORD: 37   CHANNELS 3 THROUGH 60

CHAN								
3	+6491.	LD1	+6247.	LD2	+4416.	LD3	+4345.	LD4
7	+41.	D1	+27.	D2	+11.	D3	+9.	D4
11	-4.	D5	-5.	D6	+12.	D7	+16.	D8
15	+32.	D9	+39.	D10	-39.	D11	-39.	D12
19	-.	D13	+1.	D14	-88.	S1	-64.	S2
23	-54.	S3	-9.	S4	+59.	S5	+38.	S6
27	-358.	S7	-358.	S8	-241.	S9	-269.	S10
31	-376.	S11	-389.	S12	-483.	S13	-267.	S14
35	-297.	S15	-497.	S16	-603.	S17	-449.	S18
39	-230.	S19	-530.	S20	-533.	S21	-535.	S22
43	-113.	S23	-145.	S24	-268.	S25	-297.	S26
47	-135.	S27	-487.	S28	-378.	S29	-404.	S30
51	-292.	S31	-321.	S32	-164.	S33	-279.	S34
55	-364.	S35	-238.	S36	-699.	S37	+21.	S38
59	+54.	S39	+58.	S40				

ADPTR C3 80%   DATE: 11 / 9 / 73   TIME: 15 : 11 : 16

FILE: 3   RECORD: 38   CHANNELS 3 THROUGH 60

CHAN								
3	+7432.	LD1	+7354.	LD2	+5052.	LD3	+4941.	LD4
7	+49.	D1	+32.	D2	+13.	D3	+10.	D4
11	-5.	D5	-5.	D6	+16.	D7	+20.	D8
15	+39.	D9	+49.	D10	-47.	D11	-49.	D12
19	-1.	D13	+1.	D14	-115.	S1	-86.	S2
23	-59.	S3	-12.	S4	+66.	S5	+36.	S6
27	-426.	S7	-425.	S8	-288.	S9	-327.	S10
31	-442.	S11	-455.	S12	-566.	S13	-314.	S14
35	-331.	S15	-583.	S16	-694.	S17	-532.	S18
39	-259.	S19	-612.	S20	-649.	S21	-622.	S22
43	-120.	S23	-162.	S24	-336.	S25	-361.	S26
47	-143.	S27	-577.	S28	-447.	S29	-484.	S30
51	-346.	S31	-378.	S32	-194.	S33	-330.	S34
55	-440.	S35	-289.	S36	-834.	S37	+19.	S38
59	+64.	S39	+73.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 3

ADPTR C3 9Ø% DATE: 11 / 9 / 73 TIME: 15 : 14 : 7

FILE: 3 RECORD: 39 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+8426.	LD1	+8389.	LD2	+5721.	LD3	+5644.	LD4
7	+55.	D1	+37.	D2	+16.	D3	+11.	D4
11	-6.	D5	-6.	D6	+19.	D7	+23.	D8
15	+47.	D9	+55.	D1Ø	-55.	D11	-59.	D12
19	-2.	D13	+1.	D14	-13Ø.	S1	-96.	S2
23	-66.	S3	-7.	S4	+78.	S5	+43.	S6
27	-483.	S7	-483.	S8	-322.	S9	-367.	S1Ø
31	-499.	S11	-518.	S12	-642.	S13	-358.	S14
35	-368.	S15	-669.	S16	-788.	S17	-611.	S18
39	-281.	S19	-7Ø1.	S2Ø	-688.	S21	-716.	S22
43	-135.	S23	-18Ø.	S24	-4Ø3.	S25	-418.	S26
47	-153.	S27	-655.	S28	-5Ø6.	S29	-549.	S3Ø
51	-393.	S31	-429.	S32	-221.	S33	-375.	S34
55	-489.	S35	-337.	S36	-95Ø.	S37	+24.	S38
59	+83.	S39	+97.	S4Ø				

ADPTR C3 1ØØ% DATE: 11 / 9 / 73 TIME: 15 : 16 : 8

FILE: 3 RECORD: 4Ø CHANNELS 3 THROUGH 6Ø

CHAN								
3	+9294.	LD1	+9188.	LD2	+6332.	LD3	+6224.	LD4
7	+62.	D1	+42.	D2	+17.	D3	+13.	D4
11	-7.	D5	-8.	D6	+19.	D7	+26.	D8
15	+52.	D9	+62.	D1Ø	-62.	D11	-65.	D12
19	-3.	D13	+.	D14	-145.	S1	-1Ø8.	S2
23	-71.	S3	-7.	S4	+86.	S5	+43.	S6
27	-534.	S7	-538.	S8	-357.	S9	-411.	S1Ø
31	-556.	S11	-576.	S12	-7Ø8.	S13	-4Ø3.	S14
35	-4Ø5.	S15	-756.	S16	-879.	S17	-694.	S18
39	-311.	S19	-791.	S2Ø	-767.	S21	-8Ø4.	S22
43	-157.	S23	-2Ø7.	S24	-462.	S25	-474.	S26
47	-157.	S27	-722.	S28	-565.	S29	-611.	S3Ø
51	-437.	S31	-477.	S32	-246.	S33	-416.	S34
55	-548.	S35	-373.	S36	-1Ø45.	S37	+26.	S38
59	+1Ø1.	S39	+117.	S4Ø				

ADPTR C1 10%   DATE: 11 / 12 / 73   TIME: 9 : 19 : 41

FILE: 3   RECORD: 46   CHANNELS 3 THROUGH 60

CHAN								
3	+578.	LD1	+581.	LD2	+16.	LD3	+5.	LD4
7	+4.	D1	+3.	D2	+4.	D3	-.	D4
11	+.	D5	-3.	D6	-.	D7	+3.	D8
15	+6.	D9	+7.	D10	-2.	D11	-6.	D12
19	+2.	D13	+1.	D14	-9.	S1	-7.	S2
23	-4.	S3	+.	S4	+.	S5	+7.	S6
27	-44.	S7	-43.	S8	-27.	S9	-31.	S10
31	-46.	S11	-45.	S12	-46.	S13	-22.	S14
35	-31.	S15	-49.	S16	-54.	S17	-31.	S18
39	-22.	S19	-47.	S20	-44.	S21	-37.	S22
43	+7.	S23	+12.	S24	-24.	S25	-29.	S26
47	-41.	S27	-46.	S28	-49.	S29	-55.	S30
51	-34.	S31	-38.	S32	-17.	S33	-33.	S34
55	-36.	S35	-19.	S36	-68.	S37	+2.	S38
59	+9.	S39	+.	S40				

ADPTR C1 20%   DATE: 11 / 12 / 73   TIME: 9 : 21 : 11

FILE: 3   RECORD: 47   CHANNELS 3 THROUGH 60

CHAN								
3	+1175.	LD1	+1198.	LD2	+41.	LD3	+5.	LD4
[illegible]	+11.	D1	+7.	D2	+6.	D3	+.	D4
11	+.	D5	-3.	D6	+.	D7	+7.	D8
15	+10.	D9	+10.	D10	-8.	D11	-10.	D12
19	+5.	D13	+2.	D14	-22.	S1	-14.	S2
23	-9.	S3	+.	S4	+2.	S5	+14.	S6
27	-90.	S7	-96.	S8	-56.	S9	-67.	S10
31	-98.	S11	-99.	S12	-98.	S13	-51.	S14
35	-68.	S15	-100.	S16	-110.	S17	-68.	S18
39	-46.	S19	-104.	S20	-90.	S21	-81.	S22
43	+19.	S23	+29.	S24	-44.	S25	-63.	S26
47	-88.	S27	-106.	S28	-103.	S29	-110.	S30
51	-71.	S31	-82.	S32	-36.	S33	-65.	S34
55	-73.	S35	-43.	S36	-142.	S37	+4.	S38
59	+22.	S39	+2.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 4

ADPTR C1 3Ø%   DATE: 11 / 12 / 73   TIME: 9 : 22 : 33

FILE: 3   RECORD: 48   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+179Ø.	LD1	+1797.	LD2	+66.	LD3	+5.	LD4
7	+17.	D1	+13.	D2	+7.	D3	+.	D4
11	-2.	D5	-7.	D6	-.	D7	+7.	D8
15	+16.	D9	+18.	D1Ø	-14.	D11	-17.	D12
19	+8.	D13	+5.	D14	-32.	S1	-19.	S2
23	-17.	S3	+.	S4	+2.	S5	+19.	S6
27	-134.	S7	-141.	S8	-86.	S9	-1Ø3.	S1Ø
31	-15Ø.	S11	-15Ø.	S12	-149.	S13	-81.	S14
35	-1Ø5.	S15	-155.	S16	-169.	S17	-1Ø8.	S18
39	-68.	S19	-158.	S2Ø	-137.	S21	-128.	S22
43	+36.	S23	+49.	S24	-78.	S25	-93.	S26
47	-13Ø.	S27	-169.	S28	-157.	S29	-168.	S3Ø
51	-1Ø8.	S31	-125.	S32	-56.	S33	-98.	S34
55	-113.	S35	-69.	S36	-213.	S37	+4.	S38
59	+34.	S39	+4.	S4Ø				

ADPTR C1 4Ø%   DATE: 11 / 12 / 73   TIME: 9 : 24 : 18

FILE: 3   RECORD: 49   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+235Ø.	LD1	+2397.	LD2	+58.	LD3	+5.	LD4
[illegible]	+25.	D1	+17.	D2	+11.	D3	+.	D4
11	-7.	D5	-11.	D6	-.	D7	+12.	D8
15	+22.	D9	+26.	D1Ø	-21.	D11	-24.	D12
19	+12.	D13	+8.	D14	-41.	S1	-21.	S2
23	-22.	S3	+.	S4	+2.	S5	+29.	S6
27	-181.	S7	-192.	S8	-118.	S9	-139.	S1Ø
31	-199.	S11	-2ØØ.	S12	-2Ø1.	S13	-1Ø6.	S14
35	-14Ø.	S15	-214.	S16	-231.	S17	-147.	S18
39	-9Ø.	S19	-218.	S2Ø	-184.	S21	-172.	S22
43	+49.	S23	+69.	S24	-1Ø8.	S25	-122.	S26
47	-167.	S27	-24Ø.	S28	-213.	S29	-221.	S3Ø
51	-142.	S31	-166.	S32	-76.	S33	-13Ø.	S34
55	-152.	S35	-96.	S36	-284.	S37	+9.	S38
59	+51.	S39	+9.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 4

ADPTR C1 50%   DATE: 11 / 12 / 73   TIME: 9 : 27 : 42

FILE: 3   RECORD: 50   CHANNELS 3 THROUGH 60

CHAN								
3	+2911.	LD1	+3014.	LD2	+66.	LD3	+10.	LD4
7	+32.	D1	+21.	D2	+13.	D3	+.	D4
11	-11.	D5	-19.	D6	+3.	D7	+16.	D8
15	+29.	D9	+33.	D10	-27.	D11	-31.	D12
19	+14.	D13	+12.	D14	-54.	S1	-31.	S2
23	-29.	S3	+.	S4	+4.	S5	+33.	S6
27	-225.	S7	-242.	S8	-145.	S9	-173.	S10
31	-251.	S11	-251.	S12	-252.	S13	-136.	S14
35	-172.	S15	-270.	S16	-293.	S17	-189.	S18
39	-110.	S19	-277.	S20	-228.	S21	-219.	S22
43	+63.	S23	+86.	S24	-137.	S25	-154.	S26
47	-209.	S27	-305.	S28	-270.	S29	-281.	S30
51	-176.	S31	-207.	S32	-93.	S33	-163.	S34
55	-189.	S35	-122.	S36	-358.	S37	+12.	S38
59	+71.	S39	+14.	S40				

ADPTR C1 60%   DATE: 11 / 12 / 73   TIME: [illegible] : 2[illegible] : 5[illegible]

FILE: 3   RECORD: 51   CHANNELS 3 THROUGH 60

CHAN								
3	+3526.	LD1	+3595.	LD2	+58.	LD3	+5.	LD4
7	+39.	D1	+25.	D2	+15.	D3	+.	D4
11	-15.	D5	-21.	D6	+3.	D7	+18.	D8
15	+36.	D9	+40.	D10	-35.	D11	-39.	D12
19	+19.	D13	+16.	D14	-69.	S1	-36.	S2
23	-34.	S3	+.	S4	+7.	S5	+41.	S6
27	-274.	S7	-293.	S8	-174.	S9	-211.	S10
31	-305.	S11	-305.	S12	-304.	S13	-163.	S14
35	-209.	S15	-337.	S16	-359.	S17	-230.	S18
39	-132.	S19	-342.	S20	-275.	S21	-274.	S22
43	+81.	S23	+103.	S24	-167.	S25	-186.	S26
47	-244.	S27	-368.	S28	-326.	S29	-337.	S30
51	-216.	S31	-248.	S32	-113.	S33	-195.	S34
55	-223.	S35	-147.	S36	-434.	S37	+16.	S38
59	+[illegible]8.	S39	+22.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 4

ADPTR C1 7Ø%   DATE: 11 / 12 / 73   TIME: 9 : 33 : 48

FILE: 3   RECORD: 52   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4Ø32.	LD1	+4158.	LD2	+66.	LD3	+5.	LD4
7	+47.	D1	+29.	D2	+17.	D3	+.	D4
11	-2Ø.	D5	-25.	D6	+3.	D7	+21.	D8
15	+42.	D9	+48.	D1Ø	-41.	D11	-47.	D12
19	+22.	D13	+2Ø.	D14	-81.	S1	-4Ø.	S2
23	-39.	S3	+2.	S4	+9.	S5	+45.	S6
27	-316.	S7	-336.	S8	-2Ø1.	S9	-242.	S1Ø
31	-351.	S11	-351.	S12	-35Ø.	S13	-187.	S14
35	-236.	S15	-389.	S16	-418.	S17	-272.	S18
39	-147.	S19	-396.	S2Ø	-317.	S21	-32Ø.	S22
43	+93.	S23	+12Ø.	S24	-2Ø4.	S25	-213.	S26
47	-271.	S27	-426.	S28	-38Ø.	S29	-392.	S3Ø
51	-248.	S31	-289.	S32	-13Ø.	S33	-228.	S34
55	-265.	S35	-173.	S36	-5Ø3.	S37	+21.	S38
59	+1Ø6.	S39	+31.	S4Ø				

ADPTR C1 8Ø%   DATE: 11 / 12 / 73   TIME: 9 : 36 : 58

FILE: 3   RECORD: 53   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4629.	LD1	+4757.	LD2	+58.	LD3	+1Ø.	LD4
7	+54.	D1	+35.	D2	+18.	D3	+.	D4
11	24.	D5	-3Ø.	D6	+3.	D7	+25.	D8
15	+48.	D9	+55.	D1Ø	-49.	D11	-55.	D12
19	+26.	D13	+25.	D14	-93.	S1	-48.	S2
23	-46.	S3	+2.	S4	+9.	S5	+53.	S6
27	-367.	S7	-384.	S8	-231.	S9	-278.	S1Ø
31	-4Ø6.	S11	-4Ø4.	S12	-4Ø7.	S13	-22Ø.	S14
35	-27Ø.	S15	-453.	S16	-482.	S17	-316.	S18
39	-169.	S19	-468.	S2Ø	-368.	S21	-37Ø.	S22
43	+1Ø8.	S23	+138.	S24	-236.	S25	-248.	S26
47	-3Ø1.	S27	-492.	S28	-439.	S29	-452.	S3Ø
51	-287.	S31	-333.	S32	-15Ø.	S33	-26Ø.	S34
55	-3Ø5.	S35	-2ØØ.	S36	-584.	S37	+24.	S38
59	+123.	S39	+41.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 4

ADPTR C1 90%   DATE: 11 / 12 / 73   TIME: 9 : 39 : 30

FILE: 3   RECORD: 54   CHANNELS 3 THROUGH 60

CHAN								
3	+5207.	LD1	+5320.	LD2	+66.	LD3	+10.	LD4
[illegible]	+62.	D1	+39.	D2	+20.	D3	+.	D4
11	-28.	D5	-35.	D6	+3.	D7	+29.	D8
15	+54.	D9	+63.	D10	-56.	D11	-63.	D12
19	+29.	D13	+28.	D14	-108.	S1	-52.	S2
23	-54.	S3	+4.	S4	+12.	S5	+60.	S6
27	-414.	S7	-434.	S8	-258.	S9	-315.	S10
31	-457.	S11	-455.	S12	-456.	S13	-247.	S14
35	-299.	S15	-519.	S16	-546.	S17	-363.	S18
39	-188.	S19	-535.	S20	-420.	S21	-429.	S22
43	+120.	S23	+160.	S24	-272.	S25	-280.	S26
47	-323.	S27	-555.	S28	-493.	S29	-505.	S30
51	-324.	S31	-371.	S32	-167.	S33	-294.	S34
55	-344.	S35	-226.	S36	-655.	S37	+26.	S38
59	+148.	S39	+56.	S40				

ADPTR C1 100%   DATE: 11 / 12 / 73   TIME: 9 : 41 : 1

FILE: 3   RECORD: 55   CHANNELS 3 THROUGH 60

CHAN								
3	+5750.	LD1	+5865.	LD2	+58.	LD3	+10.	LD4
7	+72.	D1	+43.	D2	+22.	D3	+.	D4
11	-33.	D5	-40.	D6	+3.	D7	+32.	D8
15	+61.	D9	+71.	D10	-64.	D11	-71.	D12
19	+33.	D13	+32.	D14	-118.	S1	-60.	S2
23	-56.	S3	+4.	S4	+14.	S5	+67.	S6
27	-461.	S7	-483.	S8	-288.	S9	-351.	S10
31	-509.	S11	-505.	S12	-510.	S13	-276.	S14
35	-324.	S15	-581.	S16	-608.	S17	-412.	S18
39	-208.	S19	-605.	S20	-467.	S21	-474.	S22
43	+135.	S23	+177.	S24	-309.	S25	-312.	S26
47	-347.	S27	-613.	S28	-545.	S29	-561.	S30
51	-358.	S31	-412.	S32	-187.	S33	-325.	S34
55	-381.	S35	-255.	S36	-726.	S37	+31.	S38
59	+175.	S39	+68.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 5

ADPTR C5-2 1Ø% DATE: 11 / 12 / 73 TIME: 13 : 58 : 1

FILE: 4 RECORD: 5 CHANNELS 3 THROUGH 6Ø

CHAN				
3	+1Ø66. LD1	+1Ø35. LD2	+1Ø53. LD3	+1Ø39. LD4
7	+3. D1	+1. D2	+. D3	+. D4
11	-1. D5	+. D6	+. D7	+2. D8
15	+1. D9	+2. D1Ø	-1. D11	-1. D12
19	+. D13	-. D14	-9. S1	-7. S2
23	-4. S3	-2. S4	-2. S5	+7. S6
27	-39. S7	-4Ø. S8	-29. S9	-31. S1Ø
31	-44. S11	-41. S12	-61. S13	-34. S14
35	-41. S15	-64. S16	-83. S17	-56. S18
39	-39. S19	-71. S2Ø	-83. S21	-71. S22
43	-31. S23	-49. S24	-39. S25	-39. S26
47	-46. S27	-38. S28	-44. S29	-48. S3Ø
51	-31. S31	-36. S32	-17. S33	-33. S34
55	-41. S35	-26. S36	-83. S37	+2. S38
59	-2. S39	+4. S4Ø		

ADPTR C5-2 2Ø% DATE: 11 / 12 / 73 TIME: 13 : 59 : 1Ø

FILE: 4 RECORD: 6 CHANNELS 3 THROUGH 6Ø

CHAN				
3	+2169. LD1	+2142. LD2	+2149. LD3	+2154. LD4
7	+6. D1	+4. D2	+1. D3	+. D4
11	-. D5	+. D6	+3. D7	+3. D8
15	+1. D9	+3. D1Ø	-3. D11	-5. D12
19	-2. D13	-3. D14	-19. S1	-12. S2
23	-9. S3	+. S4	-2. S5	+14. S6
27	-78. S7	-81. S8	-56. S9	-64. S1Ø
31	-38. S11	-89. S12	-125. S13	-69. S14
35	-83. S15	-123. S16	-169. S17	-115. S18
39	-78. S19	-138. S2Ø	-167. S21	-153. S22
43	-66. S23	-1Ø1. S24	-76. S25	-81. S26
47	-91. S27	-77. S28	-93. S29	-96. S3Ø
51	-63. S31	-74. S32	-36. S33	-67. S34
55	-86. S35	-6Ø. S36	-169. S37	+2. S38
59	+2. S39	+14. S4Ø		

CONICAL ISOGRID ADAPTER TEST RUN 5

ADPTR C5-2 3Ø%   DATE: 11 / 12 / 73   TIME: 14 : Ø : 45

FILE: 4   RECORD: 7   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+33Ø9.	LD1	+3232.	LD2	+3295.	LD3	+327Ø.	LD4
7	+1Ø.	D1	+8.	D2	+3.	D3	-.	D4
11	+1.	D5	+3.	D6	+7.	D7	+3.	D8
15	+4.	D9	+1Ø.	D1Ø	-7.	D11	-9.	D12
19	-7.	D13	-8.	D14	-29.	S1	-19.	S2
23	-14.	S3	+2.	S4	-2.	S5	+19.	S6
27	-12Ø.	S7	-124.	S8	-88.	S9	-1Ø3.	S1Ø
31	-137.	S11	-135.	S12	-191.	S13	-1Ø8.	S14
35	-13Ø.	S15	-189.	S16	-263.	S17	-181.	S18
39	-117.	S19	-218.	S2Ø	-26Ø.	S21	-239.	S22
43	-1Ø5.	S23	-153.	S24	-115.	S25	-125.	S26
47	-135.	S27	-131.	S28	-137.	S29	-146.	S3Ø
51	-1Ø3.	S31	-118.	S32	-59.	S33	-1Ø3.	S34
55	-132.	S35	-89.	S36	-262.	S37	+7.	S38
59	+7.	S39	+26.	S4Ø				

ADPTR C5-2 4Ø%   DATE: 11 / 12 / 73   TIME: 14 : 3 : 15

FILE: 4   RECORD: 8   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4394.	LD1	+4431.	LD2	+4416.	LD3	+4365.	LD4
7	+17.	D1	+1Ø.	D2	+6.	D3	-.	D4
11	+4.	D5	+7.	D6	+11.	D7	+7.	D8
15	+9.	D9	+14.	D1Ø	-11.	D11	-15.	D12
19	-12.	D13	-12.	D14	-41.	S1	-26.	S2
23	-17.	S3	+4.	S4	+.	S5	+26.	S6
27	-164.	S7	-173.	S8	-12Ø.	S9	-144.	S1Ø
31	-187.	S11	-188.	S12	-26Ø.	S13	-145.	S14
35	-177.	S15	-263.	S16	-354.	S17	-25Ø.	S18
39	-156.	S19	-295.	S2Ø	-344.	S21	-338.	S22
43	-14Ø.	S23	-2Ø4.	S24	-157.	S25	-174.	S26
47	-18Ø.	S27	-191.	S28	-189.	S29	-199.	S3Ø
51	-144.	S31	-159.	S32	-81.	S33	-142.	S34
55	-184.	S35	-122.	S36	-36Ø.	S37	+9.	S38
59	+17.	S39	+44.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 5

ADPTR CS-2 50% DATE: 11 / 12 / 73 TIME: 14 : 5 : 26

FILE: 4 RECORD: 9 CHANNELS 3 THROUGH 60

CHAN								
3	+5497.	LD1	+5520.	LD2	+5529.	LD3	+5455.	LD4
7	+21.	D1	+15.	D2	+9.	D3	+.	D4
11	+7.	D5	+10.	D6	+15.	D7	+11.	D8
15	+13.	D9	+21.	D10	-15.	D11	-20.	D12
19	-18.	D13	-17.	D14	-51.	S1	-31.	S2
23	-22.	S3	+7.	S4	+.	S5	+33.	S6
27	-210.	S7	-223.	S8	-152.	S9	-180.	S10
31	-241.	S11	-239:	S12	-331:	S13	-183:	S14
35	-218.	S15	-337.	S16	-448.	S17	-324.	S18
39	-1[illegible]3.	S19	-381.	S20	-442.	S21	-429.	S22
43	-177.	S23	-256.	S24	-206.	S25	-218.	S26
47	-219.	S27	-252.	S28	-245.	S29	-255.	S30
51	-179.	S31	-200.	S32	-100.	S33	-180.	S34
55	-231.	S35	-159.	S36	-459.	S37	+12.	S38
59	+32.	S39	+63.	S40				

ADPTR CS-2 60% DATE: 11 / 12 / 73 TIME: 14 : 7 : 3

FILE: 4 RECORD: 10 CHANNELS 3 THROUGH 60

CHAN								
3	+6618.	LD1	+6628.	LD2	+6658.	LD3	+6571.	LD4
7	+28.	D1	+19.	D2	+10.	D3	-.	D4
11	+9.	D5	+11.	D6	+19.	D7	+13.	D8
15	+20.	D9	+26.	D10	-20.	D11	-25.	D12
19	-24.	D13	-22.	D14	-61.	S1	-38.	S2
23	-27.	S3	+9.	S4	+4.	S5	+41.	S6
27	-255.	S7	-271.	S8	-184.	S9	-218.	S10
31	-290.	S11	-292.	S12	-402.	S13	-227.	S14
35	-268.	S15	-413.	S16	-534.	S17	-400.	S18
39	-230.	S19	-468.	S20	-536.	S21	-528.	S22
43	-213.	S23	-313.	S24	-260.	S25	-270.	S26
47	-261.	S27	-310.	S28	-297.	S29	-310.	S30
51	-218.	S31	-243.	S32	-123.	S33	-219.	S34
55	-280.	S35	-195.	S36	-557.	S37	+16.	S38
59	+49.	S39	+85.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 5

ADPTR C5-2 70%   DATE: 11 / 12 / 73   TIME: 14 : 9 : 12

FILE: 4   RECORD: 11   CHANNELS 3 THROUGH 60

CHAN								
3	+7721.	LD1	+7699.	LD2	+7771.	LD3	+7691.	LD4
7	+35.	D1	+22.	D2	+13.	D3	+.	D4
11	+11.	D5	+14.	D6	+23.	D7	+15.	D8
15	+25.	D9	+32.	D10	-24.	D11	-30.	D12
19	-29.	D13	-28.	D14	-73.	S1	-40.	S2
23	-29.	S3	+9.	S4	+7.	S5	+45.	S6
27	-301.	S7	-317.	S8	-216.	S9	-259.	S10
31	-342.	S11	-343.	S12	-470.	S13	-267.	S14
35	-297.	S15	-495.	S16	-625.	S17	-478.	S18
39	-264.	S19	-557.	S20	-627.	S21	-627.	S22
43	-255.	S23	-377.	S24	-312.	S25	-324.	S26
47	-301.	S27	-368.	S28	-351.	S29	-363.	S30
51	-257.	S31	-292.	S32	-145.	S33	-257.	S34
55	-329.	S35	-229.	S36	-653.	S37	+19.	S38
59	+74.	S39	+115.	S40				

ADPTR C5-2 80%   DATE: 11 / 12 / 73   TIME: 14 : 13 : 14

FILE: 4   RECORD: 12   CHANNELS 3 THROUGH 60

CHAN								
3	+8824.	LD1	+8789.	LD2	+8908.	LD3	+8807.	LD4
7	+43.	D1	+26.	D2	+15.	D3	-.	D4
11	+14.	D5	+19.	D6	+26.	D7	+18.	D8
15	+29.	D9	+37.	D10	-28.	D11	-35.	D12
19	-37.	D13	-35.	D14	-86.	S1	-50.	S2
23	-34.	S3	+12.	S4	+12.	S5	+53.	S6
27	-348.	S7	-362.	S8	-248.	S9	-295.	S10
31	-393.	S11	-394.	S12	-544.	S13	-311.	S14
35	-334.	S15	-578.	S16	-719.	S17	-554.	S18
39	-296.	S19	-654.	S20	-710.	S21	-720.	S22
43	-295.	S23	-444.	S24	-361.	S25	-378.	S26
47	-335.	S27	-426.	S28	-400.	S29	-416.	S30
51	-297.	S31	-330.	S32	-164.	S33	-294.	S34
55	-381.	S35	-267.	S36	-753.	S37	+24.	S38
59	+98.	S39	+144.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 5

ADPTR C5-2 90%   DATE: 11 / 12 / 73   TIME: 14 : 16 : 4

FILE: 4   RECORD: 13   CHANNELS 3 THROUGH 60

CHAN								
3	+9927.	LD1	+9879.	LD2	+10021.	LD3	+9882.	LD4
7	+48.	D1	+30.	D2	+17.	D3	+.	D4
11	+16.	D5	+22.	D6	+30.	D7	+20.	D8
15	+35.	D9	+44.	D10	-32.	D11	-41.	D12
19	-43.	D13	-42.	D14	-96.	S1	-55.	S2
23	-39.	S3	+14.	S4	+17.	S5	+58.	S6
27	-392.	S7	-408.	S8	-278.	S9	-334.	S10
31	-447.	S11	-447.	S12	-618.	S13	-358.	S14
35	-373.	S15	-677.	S16	-815.	S17	-638.	S18
39	-333.	S19	-771.	S20	-781.	S21	-819.	S22
43	-331.	S23	-518.	S24	-422.	S25	-437.	S26
47	-367.	S27	-485.	S28	-459.	S29	-472.	S30
51	-334.	S31	-374.	S32	-189.	S33	-334.	S34
55	-435.	S35	-306.	S36	-856.	S37	+26.	S38
59	+123.	S39	+173.	S40				

ADPTR C5-2 100%   DATE: 11 / 12 / 73   TIME: 14 : 19 : 37

FILE: 4   RECORD: 14   CHANNELS 3 THROUGH 60

CHAN								
3	+11048.	LD1	+10968.	LD2	+11133.	LD3	+10962.	LD4
7	+54.	D1	+33.	D2	+22.	D3	-.	D4
11	+19.	D5	+26.	D6	+33.	D7	+23.	D8
15	+41.	D9	+50.	D10	-37.	D11	-47.	D12
19	-50.	D13	-47.	D14	-110.	S1	-64.	S2
23	-39.	S3	+16.	S4	+22.	S5	+62.	S6
27	-443.	S7	-461.	S8	-310.	S9	-372.	S10
31	-502.	S11	-501.	S12	-694.	S13	-403.	S14
35	-408.	S15	-773.	S16	-913.	S17	-724.	S18
39	-362.	S19	-885.	S20	-875.	S21	-933.	S22
43	-363.	S23	-602.	S24	-506.	S25	-504.	S26
47	-389.	S27	-545.	S28	-508.	S29	-529.	S30
51	-378.	S31	-417.	S32	-216.	S33	-375.	S34
55	-487.	S35	-342.	S36	-959.	S37	+28.	S38
59	+145.	S39	+195.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 6

ADPTR C2-1 10% DATE: 11 / 12 / 73 TIME: 14 : 52 : 43

FILE: 5 RECORD: 5 CHANNELS 3 THROUGH 60

CHAN								
3	+596.	LD1	+617.	LD2	+8.	LD3	+25.	LD4
7	+3.	D1	+3.	D2	+.	D3	-1.	D4
11	-5.	D5	-1.	D6	+1.	D7	+2.	D8
15	+2.	D9	+7.	D10	-5.	D11	-7.	D12
19	+.	D13	+4.	D14	-12.	S1	-2.	S2
23	-7.	S3	-2.	S4	+.	S5	+7.	S6
27	-46.	S7	-50.	S8	-34.	S9	-38.	S10
31	-51.	S11	-53.	S12	-51.	S13	-27.	S14
35	-36.	S15	-54.	S16	-59.	S17	-34.	S18
39	-22.	S19	-54.	S20	-49.	S21	-44.	S22
43	+17.	S23	+22.	S24	-31.	S25	-29.	S26
47	-56.	S27	-48.	S28	-51.	S29	-55.	S30
51	-39.	S31	-41.	S32	-19.	S33	-31.	S34
55	-39.	S35	-21.	S36	-71.	S37	+2.	S38
59	+4.	S39	+.	S40				

ADPTR C2-1 20% DATE: 11 / 12 / 73 TIME: 14 : 54 : 11

FILE: 5 RECORD: 6 CHANNELS 3 THROUGH 60

CHAN								
3	+1211.	LD1	+1253.	LD2	+309.	LD3	+320.	LD4
7	+7.	D1	+4.	D2	+1.	D3	-1.	D4
11	-5.	D5	-4.	D6	+.	D7	+2.	D8
15	+3.	D9	+10.	D10	-9.	D11	-10.	D12
19	+1.	D13	+4.	D14	-19.	S1	-7.	S2
23	-12.	S3	-2.	S4	+.	S5	+12.	S6
27	-83.	S7	-88.	S8	-56.	S9	-67.	S10
31	-91.	S11	-94.	S12	-100.	S13	-54.	S14
35	-68.	S15	-98.	S16	-113.	S17	-73.	S18
39	-49.	S19	-104.	S20	-100.	S21	-91.	S22
43	+17.	S23	+19.	S24	-56.	S25	-56.	S26
47	-93.	S27	-89.	S28	-93.	S29	-101.	S30
51	-68.	S31	-77.	S32	-39.	S33	-62.	S34
55	-71.	S35	-45.	S36	-137.	S37	+2.	S38
59	+9.	S39	+2.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 6

ADPTR C2-1 30%   DATE: 11 / 12 / 73   TIME: 14 : 55 : 19

FILE: 5   RECORD: 7   CHANNELS 3 THROUGH 60

CHAN								
3	+1844.	LD1	+1906.	LD2	+501.	LD3	+494.	LD4
7	+14.	D1	+9.	D2	+2.	D3	-1.	D4
11	-8.	D5	-6.	D6	+.	D7	+3.	D8
15	+9.	D9	+17.	D10	-14.	D11	-16.	D12
19	+1.	D13	+8.	D14	-29.	S1	-14.	S2
23	-19.	S3	+.	S4	+.	S5	+19.	S6
27	-122.	S7	-132.	S8	-83.	S9	-103.	S10
31	-140.	S11	-140.	S12	-149.	S13	-76.	S14
35	-105.	S15	-152.	S16	-172.	S17	-110.	S18
39	-71.	S19	-158.	S20	-147.	S21	-138.	S22
43	+19.	S23	+24.	S24	-86.	S25	-90.	S26
47	-133.	S27	-150.	S28	-144.	S29	-151.	S30
51	-103.	S31	-113.	S32	-54.	S33	-91.	S34
55	-108.	S35	-72.	S36	-208.	S37	+7.	S38
59	+19.	S39	+4.	S40				

ADPTR C2-1 40%   DATE: 11 / 12 / 73   TIME: 14 : 57 : 40

FILE: 5   RECORD: 8   CHANNELS 3 THROUGH 60

CHAN								
3	+2567.	LD1	+2487.	LD2	+669.	LD3	+646.	LD4
7	+21.	D1	+14.	D2	+2.	D3	-1.	D4
11	-11.	D5	-10.	D6	+.	D7	+7.	D8
15	+15.	D9	+24.	D10	-22.	D11	-22.	D12
19	+4.	D13	+11.	D14	-36.	S1	-14.	S2
23	-27.	S3	-2.	S4	+2.	S5	+29.	S6
27	-169.	S7	-180.	S8	-115.	S9	-137.	S10
31	-189.	S11	-193.	S12	-203.	S13	-108.	S14
35	-142.	S15	-214.	S16	-241.	S17	-157.	S18
39	-95.	S19	-228.	S20	-204.	S21	-190.	S22
43	+29.	S23	+37.	S24	-113.	S25	-115.	S26
47	-167.	S27	-211.	S28	-194.	S29	-204.	S30
51	-140.	S31	-156.	S32	-71.	S33	-122.	S34
55	-145.	S35	-98.	S36	-277.	S37	+9.	S38
59	+34.	S39	+9.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 6

ADPTR C2-1 5Ø% DATE: 11 / 12 / 73 TIME: 14 : 59 : 36

ILE: 5 RECORD: 9 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+3182.	LD1	+3141.	LD2	+844.	LD3	+835.	LD4
7	+28.	D1	+18.	D2	+4.	D3	-1.	D4
11	-14.	D5	-12.	D6	+.	D7	+1Ø.	D8
15	+19.	D9	+29.	D1Ø	-28.	D11	-29.	D12
19	+6.	D13	+14.	D14	-44.	S1	-21.	S2
23	-34.	S3	+.	S4	+2.	S5	+31.	S6
27	-21Ø.	S7	-225.	S8	-142.	S9	-168.	S1Ø
31	-233.	S11	-239.	S12	-255.	S13	-138.	S14
35	-177.	S15	-27Ø.	S16	-3Ø2.	S17	-198.	S18
39	-115.	S19	-285.	S2Ø	-255.	S21	-241.	S22
43	+34.	S23	+41.	S24	-147.	S25	-147.	S26
47	-197.	S27	-276.	S28	-248.	S29	-257.	S3Ø
51	-174.	S31	-195.	S32	-91.	S33	-154.	S34
55	-182.	S35	-12Ø.	S36	-351.	S37	+9.	S38
59	+46.	S39	+14.	S4Ø				

ADPTR C2-1 6Ø% DATE: 11 / 12 / 73 TIME: 15 : Ø : 58

FILE: 5 RECORD: 1Ø CHANNELS 3 THROUGH 6Ø

CHAN								
3	+3725.	LD1	+37Ø4.	LD2	+961.	LD3	+983.	LD4
7	+31.	D1	+18.	D2	+4.	D3	-1.	D4
11	-18.	D5	-16.	D6	+4.	D7	+1Ø.	D8
15	+23.	D9	+32.	D1Ø	-34.	D11	-36.	D12
19	+7.	D13	+16.	D14	-61.	S1	-26.	S2
23	-39.	S3	-7.	S4	+2.	S5	+31.	S6
27	-255.	S7	-273.	S8	-169.	S9	-2Ø4.	S1Ø
31	-285.	S11	-314.	S12	-328.	S13	-165.	S14
35	-228.	S15	-344.	S16	-369.	S17	-26Ø.	S18
39	-144.	S19	-342.	S2Ø	-314.	S21	-3Ø1.	S22
43	+34.	S23	+39.	S24	-172.	S25	-177.	S26
47	-236.	S27	-346.	S28	-321.	S29	-32Ø.	S3Ø
51	-2Ø8.	S31	-243.	S32	-115.	S33	-192.	S34
55	-223.	S35	-149.	S36	-422.	S37	+9.	S38
59	+54.	S39	+19.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 6

ADPTR C2-1 7Ø%   DATE: 11 / 12 / 73   TIME: 15 : 2 : 27

FILE: 5   RECORD: 11   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4412.	LD1	+4358.	LD2	+1187.	LD3	+1161.	LD4
7	+39.	D1	+24.	D2	+8.	D3	-1.	D4
11	-21.	D5	-19.	D6	+4.	D7	+14.	D8
15	+3Ø.	D9	+43.	D1Ø	-4Ø.	D11	-42.	D12
19	+11.	D13	+2Ø.	D14	-66.	S1	-28.	S2
23	-44.	S3	+.	S4	+7.	S5	+45.	S6
27	-296.	S7	-317.	S8	-197.	S9	-235.	S1Ø
31	-329.	S11	-334.	S12	-353.	S13	-19Ø.	S14
35	-243.	S15	-384.	S16	-431.	S17	-284.	S18
39	-156.	S19	-4Ø6.	S2Ø	-351.	S21	-36Ø.	S22
43	+44.	S23	+56.	S24	-2Ø4.	S25	-2Ø9.	S26
47	-264.	S27	-393.	S28	-351.	S29	-363.	S3Ø
51	-243.	S31	-27Ø.	S32	-128.	S33	-219.	S34
55	-255.	S35	-176.	S36	-493.	S37	+16.	S38
59	+76.	S39	+34.	S4Ø				

ADPTR C2-1 8Ø%   DATE: 11 / 12 / 73   TIME: 15 : 3 : 46

FILE: 5   RECORD: 12   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+5Ø63.	LD1	+4939.	LD2	+1371.	LD3	+1334.	LD4
7	+46.	D1	+28.	D2	+9.	D3	-1.	D4
11	-24.	D5	-23.	D6	+4.	D7	+18.	D8
15	+37.	D9	+51.	D1Ø	-46.	D11	-49.	D12
19	+13.	D13	+23.	D14	-78.	S1	-33.	S2
23	-49.	S3	+.	S4	+9.	S5	+53.	S6
27	-34Ø.	S7	-36Ø.	S8	-224.	S9	-271.	S1Ø
31	-378.	S11	-382.	S12	-4Ø7.	S13	-222.	S14
35	-275.	S15	-448.	S16	-499.	S17	-333.	S18
39	-178.	S19	-473.	S2Ø	-4Ø8.	S21	-414.	S22
43	+49.	S23	+64.	S24	-228.	S25	-238.	S26
47	-293.	S27	-453.	S28	-398.	S29	-416.	S3Ø
51	-277.	S31	-311.	S32	-145.	S33	-245.	S34
55	-295.	S35	-197.	S36	-564.	S37	+21.	S38
59	+91.	S39	+41.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 6

ADPTR C2-1 90%   DATE: 11 / 12 / 73   TIME: 15 : 6 : 28

FILE: 5   RECORD: 13   CHANNELS 3 THROUGH 60

CHAN								
3	+5678.	LD1	+5538.	LD2	+1547.	LD3	+1497.	LD4
7	+54.	D1	+32.	D2	+13.	D3	-1.	D4
11	-26.	D5	-27.	D6	+5.	D7	+22.	D8
15	+43.	D9	+57.	D10	-52.	D11	-56.	D12
19	+15.	D13	+26.	D14	-88.	S1	-40.	S2
23	-56.	S3	+.	S4	+14.	S5	+58.	S6
27	-380.	S7	-403.	S8	-248.	S9	-303.	S10
31	-423.	S11	-428.	S12	-458.	S13	-252.	S14
35	-304.	S15	-507.	S16	-561.	S17	-380.	S18
39	-198.	S19	-540.	S20	-459.	S21	-464.	S22
43	+54.	S23	+69.	S24	-268.	S25	-268.	S26
47	-323.	S27	-509.	S28	-449.	S29	-467.	S30
51	-309.	S31	-347.	S32	-160.	S33	-279.	S34
55	-332.	S35	-221.	S36	-635.	S37	+21.	S38
59	+106.	S39	+53.	S40				

ADPTR C2-1 100%   DATE: 11 / 12 / 73   TIME: 15 : 10 : 9

FILE: 5   RECORD: 14   CHANNELS 3 THROUGH 60

CHAN								
3	+6220.	LD1	+6047.	LD2	+1706.	LD3	+1650.	LD4
7	+61.	D1	+38.	D2	+14.	D3	-1.	D4
11	-28.	D5	-29.	D6	+7.	D7	+23.	D8
15	+46.	D9	+62.	D10	-58.	D11	-62.	D12
19	+18.	D13	+29.	D14	-98.	S1	-40.	S2
23	-59.	S3	+.	S4	+14.	S5	+62.	S6
27	-419.	S7	-437.	S8	-275.	S9	-329.	S10
31	-465.	S11	-467.	S12	-502.	S13	-276.	S14
35	-334.	S15	-566.	S16	-620.	S17	-427.	S18
39	-218.	S19	-597.	S20	-586.	S21	-501.	S22
43	+51.	S23	+76.	S24	-297.	S25	-297.	S26
47	-340.	S27	-555.	S28	-488.	S29	-510.	S30
51	-341.	S31	-381.	S32	-177.	S33	-306.	S34
55	-364.	S35	-245.	S36	-699.	S37	+26.	S38
59	+123.	S39	+66.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 7

ADPTR C4-1 10%   DATE: 11 / 13 / 73   TIME: 8 : 2 : 27

FILE: 6   RECORD: 5   CHANNELS 3 THROUGH 60

CHAN								
3	+976.	LD1	+1071.	LD2	+861.	LD3	+840.	LD4
7	+6.	D1	+3.	D2	-1.	D3	-2.	D4
11	-1.	D5	+1.	D6	+5.	D7	+6.	D8
15	+10.	D9	+5.	D10	-.	D11	-6.	D12
19	-4.	D13	+1.	D14	-9.	S1	-4.	S2
23	+.	S3	+4.	S4	+2.	S5	+4.	S6
27	-41.	S7	-40.	S8	-29.	S9	-36.	S10
31	-49.	S11	-43.	S12	-63.	S13	-27.	S14
35	-44.	S15	-56.	S16	-86.	S17	-54.	S18
39	-36.	S19	-64.	S20	-78.	S21	-69.	S22
43	-24.	S23	-34.	S24	-34.	S25	-44.	S26
47	-59.	S27	-36.	S28	-49.	S29	-48.	S30
51	-29.	S31	-38.	S32	-17.	S33	-28.	S34
55	-44.	S35	-28.	S36	-88.	S37	+4.	S38
59	+4.	S39	+7.	S40				

ADPTR C4-1 20%   DATE: 11 / 13 / 73   TIME: 8 : 29 : 35

FILE: 6   RECORD: 6   CHANNELS 3 THROUGH 60

CHAN								
3	+2025.	LD1	+2124.	LD2	+1756.	LD3	+1691.	LD4
7	+10.	D1	+7.	D2	-1.	D3	-.	D4
11	-1.	D5	+.	D6	+6.	D7	+6.	D8
15	+11.	D9	+8.	D10	-4.	D11	-9.	D12
19	-4.	D13	+1.	D14	-24.	S1	-12.	S2
23	-7.	S3	+4.	S4	+.	S5	+12.	S6
27	-35.	S7	-36.	S8	-61.	S9	-72.	S10
31	-98.	S11	-96.	S12	-127.	S13	-66.	S14
35	-90.	S15	-118.	S16	-167.	S17	-108.	S18
39	-73.	S19	-133.	S20	-157.	S21	-145.	S22
43	-46.	S23	-66.	S24	-78.	S25	-88.	S26
47	-108.	S27	-89.	S28	-100.	S29	-105.	S30
51	-68.	S31	-32.	S32	-39.	S33	-69.	S34
55	-91.	S35	-60.	S36	-179.	S37	+7.	S38
59	+9.	S39	+17.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 7

ADPTR C4-1 3Ø%   DATE: 11 / 13 / 73   TIME: 8 : 3Ø : 53

FILE: 6   RECORD: 7   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+3Ø37.	LD1	+3159.	LD2	+2634.	LD3	+2582.	LD4
7	+17.	D1	+1Ø.	D2	+.	D3	+1.	D4
11	-.	D5	+.	D6	+8.	D7	+7.	D8
15	+14.	D9	+14.	D1Ø	-9.	D11	-15.	D12
19	-6.	D13	-.	D14	-34.	S1	-19.	S2
23	-12.	S3	+7.	S4	+2.	S5	+19.	S6
27	-132.	S7	-139.	S8	-93.	S9	-1Ø8.	S1Ø
31	-15Ø.	S11	-147.	S12	-193.	S13	-1Ø3.	S14
35	-135.	S15	-187.	S16	-261.	S17	-174.	S18
39	-112.	S19	-21Ø.	S2Ø	-236.	S21	-229.	S22
43	-73.	S23	-1Ø1.	S24	-12Ø.	S25	-13Ø.	S26
47	-153.	S27	-147.	S28	-157.	S29	-158.	S3Ø
51	-11Ø.	S31	-125.	S32	-61.	S33	-113.	S34
55	-14Ø.	S35	-94.	S36	-272.	S37	+4.	S38
59	+14.	S39	+29.	S4Ø				

ADPTR C4-1 4Ø%   DATE: 11 / 13 / 73   TIME: [illegible] : 32 : 5

FILE: 6   RECORD: 8   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4Ø68.	LD1	+41Ø4.	LD2	+3513.	LD3	+3514.	LD4
7	+23.	D1	+14.	D2	+3.	D3	+5.	D4
11	+.	D5	+4.	D6	+1Ø.	D7	+1Ø.	D8
15	+19.	D9	+19.	D1Ø	-14.	D11	-18.	D12
19	-7.	D13	-3.	D14	-39.	S1	-14.	S2
23	-19.	S3	+7.	S4	+7.	S5	+29.	S6
27	-174.	S7	-18Ø.	S8	-123.	S9	-144.	S1Ø
31	-199.	S11	-196.	S12	-255.	S13	-136.	S14
35	-181.	S15	-258.	S16	-344.	S17	-233.	S18
39	-149.	S19	-287.	S2Ø	-317.	S21	-318.	S22
43	-78.	S23	-14Ø.	S24	-157.	S25	-167.	S26
47	-192.	S27	-196.	S28	-2Ø1.	S29	-2Ø4.	S3Ø
51	-142.	S31	-164.	S32	-78.	S33	-139.	S34
55	-182.	S35	-12Ø.	S36	-353.	S37	+12.	S38
59	+27.	S39	+39.	S4Ø				

ADPTR C4-1 5Ø%   DATE: 11 / 13 / 73   TIME: 8 : 34 : 34

FILE: 6   RECORD: 9   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+5Ø99.	LD1	+5139.	LD2	+44Ø8.	LD3	+4426.	LD4
7	+28.	D1	+18.	D2	+6.	D3	+7.	D4
11	+1.	D5	+4.	D6	+12.	D7	+14.	D8
15	+25.	D9	+25.	D1Ø	-18.	D11	-24.	D12
19	-11.	D13	-5.	D14	-46.	S1	-24.	S2
23	-27.	S3	+4.	S4	+7.	S5	+36.	S6
27	-22Ø.	S7	-228.	S8	-155.	S9	-185.	S1Ø
31	-251.	S11	-251.	S12	-323.	S13	-175.	S14
35	-226.	S15	-334.	S16	-431.	S17	-3Ø6.	S18
39	-186.	S19	-369.	S2Ø	-4Ø5.	S21	-417.	S22
43	-127.	S23	-18Ø.	S24	-2Ø1.	S25	-213.	S26
47	-239.	S27	-257.	S28	-257.	S29	-262.	S3Ø
51	-179.	S31	-21Ø.	S32	-1ØØ.	S33	-178.	S34
55	-228.	S35	-154.	S36	-446.	S37	+16.	S38
59	+41.	S39	+58.	S4Ø				

ADPTR C4-1 6Ø%   DATE: 11 / 13 / 73   TIME: 8 : 36 : 51

FILE: 6   RECORD: 1Ø   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+6184.	LD1	+6156.	LD2	+5295.	LD3	+5257.	LD4
7	+35.	D1	+23.	D2	+9.	D3	+9.	D4
11	+2.	D5	+4.	D6	+16.	D7	+16.	D8
15	+3Ø.	D9	+33.	D1Ø	-24.	D11	-31.	D12
19	-13.	D13	-8.	D14	-56.	S1	-28.	S2
23	-34.	S3	+7.	S4	+12.	S5	+45.	S6
27	-272.	S7	-281.	S8	-189.	S9	-226.	S1Ø
31	-3Ø7.	S11	-3Ø7.	S12	-4Ø2.	S13	-22Ø.	S14
35	-27Ø.	S15	-413.	S16	-522.	S17	-38Ø.	S18
39	-222.	S19	-463.	S2Ø	-496.	S21	-491.	S22
43	-149.	S23	-212.	S24	-245.	S25	-26Ø.	S26
47	-276.	S27	-327.	S28	-319.	S29	-322.	S3Ø
51	-223.	S31	-251.	S32	-123.	S33	-219.	S34
55	-283.	S35	-19Ø.	S36	-549.	S37	+19.	S38
59	+61.	S39	+75.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 7

ADPTR C4-1 70%   DATE: 11 / 13 / 73   TIME: 8 : 3[illegible] : 12

FILE: 6   RECORD: 11   CHANNELS 3 THROUGH 60

CHAN								
3	+7253.	LD1	+7191.	LD2	+6190.	LD3	+6158.	LD4
Ø	+44.	D1	+28.	D2	+11.	D3	+13.	D4
11	+2.	D5	+5.	D6	+20.	D7	+20.	D8
15	+37.	D9	+38.	D10	-30.	D11	-37.	D12
19	-16.	D13	-10.	D14	-69.	S1	-36.	S2
23	-37.	S3	+7.	S4	+14.	S5	+53.	S6
27	-318.	S7	-331.	S8	-221.	S9	-264.	S10
31	-364.	S11	-365.	S12	-470.	S13	-262.	S14
35	-304.	S15	-497.	S16	-608.	S17	-459.	S18
39	-254.	S19	-548.	S20	-587.	S21	-590.	S22
43	-177.	S23	-251.	S24	-292.	S25	-309.	S26
47	-318.	S27	-395.	S28	-373.	S29	-333.	S30
51	-265.	S31	-299.	S32	-145.	S33	-257.	S34
55	-332.	S35	-226.	S36	-650.	S37	+24.	S38
59	+79.	S39	+100.	S40				

ADPTR C4-1 80%   DATE: 11 / 13 / 73   TIME: 8 : 3[illegible] : 41

FILE: 6   RECORD: 12   CHANNELS 3 THROUGH 60

CHAN								
3	+8282.	LD1	+8171.	LD2	+7093.	LD3	+7029.	LD4
Ø	+49.	D1	+32.	D2	+14.	D3	+16.	D4
11	+4.	D5	+7.	D6	+23.	D7	+21.	D8
15	+42.	D9	+46.	D10	-35.	D11	-[illegible]3.	D12
19	-19.	D13	-14.	D14	-83.	S1	-[illegible]8.	S2
23	-41.	S3	+9.	S4	+19.	S5	+58.	S6
27	-370.	S7	-379.	S8	-256.	S9	-303.	S10
31	-418.	S11	-421.	S12	-542.	S13	-304.	S14
35	-339.	S15	-583.	S16	-699.	S17	-532.	S18
39	-286.	S19	-644.	S20	-678.	S21	-686.	S22
43	-281.	S23	-291.	S24	-346.	S25	-359.	S26
47	-355.	S27	-460.	S28	-432.	S29	-440.	S30
51	-364.	S31	-342.	S32	-167.	S33	-296.	S34
55	-381.	S35	-260.	S36	-746.	S37	+28.	S38
59	+101.	S39	+122.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 7

ADPTR C4-1 9Ø% DATE: 11 / 13 / 73 TIME: 8 : 41 : 1Ø

FILE: 6 RECORD: 13 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+9 58.	LD1	+9152.	LD2	+7938.	LD3	+7895.	LD4
7	+57.	D1	+35.	D2	+16.	D3	+2Ø.	D4
11	+5.	D5	+8.	D6	+28.	D7	+25.	D8
15	+48.	D9	+53.	D1Ø	-4Ø.	D11	-49.	D12
19	-23.	D13	-17.	D14	-93.	S1	-45.	S2
23	-49.	S3	+12.	S4	+22.	S5	+62.	S6
27	-417.	S7	-43Ø.	S8	-285.	S9	-343.	S1Ø
31	-472.	S11	-472.	S12	-61Ø.	S13	-348.	S14
35	-376.	S15	-665.	S16	-788.	S17	-6Ø8.	S18
39	-318.	S19	-741.	S2Ø	-762.	S21	-772.	S22
43	-231.	S23	-33Ø.	S24	-4Ø3.	S25	-413.	S26
47	-38Ø.	S27	-516.	S28	-484.	S29	-496.	S3Ø
51	-341.	S31	-386.	S32	-192.	S33	-334.	S34
55	-43Ø.	S35	-296.	S36	-844.	S37	+31.	S38
59	+125.	S39	+149.	S4Ø				

ADPTR C4-1 1ØØ% DATE: 11 / 13 / 73 TIME: 8 : 43 : 2

FILE: 6 RECORD: 14 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+1Ø289.	LD1	+1Ø151.	LD2	+8816.	LD3	+8776.	LD4
7	+65.	D1	+39.	D2	+2Ø.	D3	+23.	D4
11	+6.	D5	+1Ø.	D6	+29.	D7	+27.	D8
15	+53.	D9	+6Ø.	D1Ø	-46.	D11	-56.	D12
19	-25.	D13	-2Ø.	D14	-1Ø8.	S1	-52.	S2
23	-54.	S3	+12.	S4	+27.	S5	+72.	S6
27	-468.	S7	-48Ø.	S8	-32Ø.	S9	-384.	S1Ø
31	-529.	S11	-53Ø.	S12	-684.	S13	-393.	S14
35	-41Ø.	S15	-761.	S16	-881.	S17	-692.	S18
39	-342.	S19	-833.	S2Ø	-823.	S21	-866.	S22
43	-258.	S23	-377.	S24	-467.	S25	-472.	S26
47	-4Ø7.	S27	-579.	S28	-542.	S29	-556.	S3Ø
51	-383.	S31	-432.	S32	-214.	S33	-375.	S34
55	-482.	S35	-339.	S36	-947.	S37	+33.	S38
59	+153.	S39	+171.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 8

ADPTR C3-2 10%   DATE: 11 / 13 / 73   TIME: 9 : 0 : 58

FILE: 7   RECORD: 5   CHANNELS 3 THROUGH 60

CHAN				
3	+904. LD1	+889. LD2	+577. LD3	+534. LD4
7	<+7. D1	+3. D2	+1. D3	-1. D4
11	-4. D5	-3. D6	+1. D7	+. D8
15	+2. D9	+3. D10	-5. D11	-4. D12
19	+3. D13	+5. D14	-12. S1	-9. S2
23	-4. S3	+. S4	+. S5	+4. S6
27	-44. S7	-50. S8	-32. S9	-38. S10
31	-51. S11	-53. S12	-63. S13	-32. S14
35	-41. S15	-59. S16	-76. S17	-51. S18
39	-36. S19	-69. S20	-71. S21	-61. S22
43	-7. S23	-14. S24	-29. S25	-36. S26
47	-56. S27	-43. S28	-51. S29	-52. S30
51	-36. S31	-43. S32	-22. S33	-36. S34
55	-41. S35	-28. S36	-83. S37	+4. S38
59	+2. S39	+2. S40		

ADPTR C3-2 20%   DATE: 11 / 13 / 73   TIME: 9 : 11 : 3[illegible]

FILE: 7   RECORD: 6   CHANNELS 3 THROUGH 60

CHAN				
3	+1790. LD1	+1888. LD2	+1204. LD3	+1227. LD4
7	+11. D1	+7. D2	+1. D3	-1. D4
11	-4. D5	-3. D6	+3. D7	+1. D8
15	+4. D9	+9. D10	-7. D11	-9. D12
19	+3. D13	+5. D14	-24. S1	-12. S2
23	-12. S3	+4. S4	+. S5	+12. S6
27	-90. S7	-100. S8	-64. S9	-76. S10
31	-103. S11	-106. S12	-125. S13	-66. S14
35	-83. S15	-118. S16	-150. S17	-100. S18
39	-66. S19	-136. S20	-140. S21	-125. S22
43	-19. S23	-34. S24	-68. S25	-81. S26
47	-106. S27	-94. S28	-108. S29	-110. S30
51	-78. S31	-86. S32	-44. S33	-74. S34
55	-86. S35	-60. S36	-174. S37	+4. S38
59	+12. S39	+9. S40		

CONICAL ISOGRID ADAPTER TEST RUN 8

ADPTR C3-2 30%   DATE: 11 / 13 / 73   TIME: 9 : 13 : 3?

FILE: 7   RECORD: 7   CHANNELS 3 THROUGH 60

CHAN								
3	+2784.	LD1	+2832.	LD2	+1890.	LD3	+1869.	LD4
7	+14.	D1	+11.	D2	+3.	D3	+.	D4
11	-4.	D5	-3.	D6	+6.	D7	+4.	D8
15	+8.	D9	+14.	D10	-14.	D11	-15.	D12
19	+3.	D13	+5.	D14	-34.	S1	-16.	S2
23	-19.	S3	+4.	S4	+2.	S5	+19.	S6
27	-137.	S7	-151.	S8	-98.	S9	-117.	S10
31	-157.	S11	-159.	S12	-191.	S13	-103.	S14
35	-130.	S15	-189.	S16	-238.	S17	-159.	S18
39	-100.	S19	-210.	S20	-216.	S21	-204.	S22
43	-34.	S23	-56.	S24	-110.	S25	-120.	S26
47	-153.	S27	-160.	S28	-162.	S29	-168.	S30
51	-115.	S31	-132.	S32	-64.	S33	-113.	S34
55	-135.	S35	-94.	S36	-262.	S37	+9.	S38
59	+19.	S39	+19.	S40				

ADPTR C3-2 40%   DATE: 11 / 13 / 73   TIME: 9 : 14 : 5

FILE: 7   RECORD: 8   CHANNELS 3 THROUGH 60

CHAN								
3	+3725.	LD1	+3759.	LD2	+2517.	LD3	+2511.	LD4
7	+21.	D1	+15.	D2	+4.	D3	+2.	D4
11	-4.	D5	-3.	D6	+7.	D7	+6.	D8
15	+14.	D9	+20.	D10	-19.	D11	-21.	D12
19	+3.	D13	+5.	D14	-44.	S1	-24.	S2
23	-27.	S3	+4.	S4	+2.	S5	+29.	S6
27	-183.	S7	-201.	S8	-128.	S9	-153.	S10
31	-239.	S11	-215.	S12	-255.	S13	-138.	S14
35	-172.	S15	-261.	S16	-322.	S17	-218.	S18
39	-134.	S19	-285.	S20	-290.	S21	-291.	S22
43	-49.	S23	-76.	S24	-149.	S25	-162.	S26
47	-192.	S27	-223.	S28	-218.	S29	-226.	S30
51	-157.	S31	-178.	S32	-86.	S33	-149.	S34
55	-132.	S35	-122.	S36	-351.	S37	+12.	S38
59	+32.	S39	+31.	S40				

ADPTR C3-2 50% DATE: 11 / 13 / 73 TIME: 9 : 16 : 19

FILE: 7 RECORD: 9 CHANNELS 3 THROUGH 60

CHAN								
3	+4629.	LD1	+4685.	LD2	+3136.	LD3	+3132.	LD4
7	+28.	D1	+20.	D2	+7.	D3	+4.	D4
11	-4.	D5	-3.	D6	+10.	D7	+10.	D8
15	+19.	D9	+28.	D10	-25.	D11	-28.	D12
19	+2.	D13	+5.	D14	-54.	S1	-26.	S2
23	-32.	S3	+4.	S4	+7.	S5	+36.	S6
27	-235.	S7	-252.	S8	-160.	S9	-197.	S10
31	-263.	S11	-271.	S12	-321.	S13	-173.	S14
35	-218.	S15	-337.	S16	-408.	S17	-282.	S18
39	-164.	S19	-364.	S20	-363.	S21	-372.	S22
43	-61.	S23	-93.	S24	-191.	S25	-201.	S26
47	-234.	S27	-293.	S28	-277.	S29	-286.	S30
51	-194.	S31	-222.	S32	-108.	S33	-187.	S34
55	-228.	S35	-156.	S36	-444.	S37	+14.	S38
59	+49.	S39	+41.	S40				

ADPTR C3-2 60% DATE: 11 / 13 / 73 TIME: 9 : 17 : 2[illegible]

FILE: 7 RECORD: 10 CHANNELS 3 THROUGH 60

CHAN								
3	+5569.	LD1	+5629.	LD2	+3789.	LD3	+372[illegible].	LD4
7	+36.	D1	+25.	D2	+8.	D3	+5.	D4
11	-4.	D5	-3.	D6	+10.	D7	+12.	D8
15	+25.	D9	+35.	D10	-31.	D11	-35.	D12
19	+2.	D13	+5.	D14	-66.	S1	-36.	S2
23	-37.	S3	+4.	S4	+9.	S5	+43.	S6
27	-284.	S7	-305.	S8	-194.	S9	-238.	S10
31	-317.	S11	-326.	S12	-390.	S13	-212.	S14
35	-258.	S15	-408.	S16	-487.	S17	-355.	S18
39	-196.	S19	-448.	S20	-445.	S21	-451.	S22
43	-73.	S23	-111.	S24	-233.	S25	-248.	S26
47	-276.	S27	-363.	S28	-336.	S29	-346.	S30
51	-235.	S31	-267.	S32	-128.	S33	-226.	S34
55	-275.	S35	-190.	S36	-537.	S37	+19.	S38
59	+66.	S39	+58.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 8

ADPTR C3-2 7Ø%   DATE: 11 / 13 / 73   TIME: 9 : 13 : 53

FILE: 7   RECORD: 11   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+6527·	LD1	+6555·	LD2	+4425·	LD3	+4319·	LD4
1Ø	+46·	D1	+29·	D2	+11·	D3	+7·	D4
11	-4·	D5	-3·	D6	+14·	D7	+16·	D8
15	+32·	D9	+42·	D1Ø	-39·	D11	-43·	D12
19	+1·	D13	+5·	D14	-78·	S1	-38·	S2
23	-44·	S3	+7·	S4	+12·	S5	+5Ø·	S6
27	-336·	S7	-358·	S8	-229·	S9	-278·	S1Ø
31	-376·	S11	-384·	S12	-461·	S13	-254·	S14
35	-295·	S15	-487·	S16	-566·	S17	-424·	S18
39	-227·	S19	-533·	S2Ø	-526·	S21	-53Ø·	S22
43	-38·	S23	-13Ø·	S24	-28Ø·	S25	-292·	S26
47	-315·	S27	-436·	S28	-398·	S29	-4Ø9·	S3
51	-277·	S31	-316·	S32	-15Ø·	S33	-265·	S34
55	-324·	S35	-224·	S36	-638·	S37	+21·	S38
59	+33·	S39	+3Ø·	S4Ø				

ADPTR C3-2 8Ø%   DATE: 11 / 13 / 73   TIME: 9 : 2[illegible] : 57

FILE: 7   RECORD: 12   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+7468·	LD1	+7495·	LD2	+5Ø19·	LD3	+5ØØ7·	LD4
Ø	+54·	D1	+36·	D2	+13·	D3	+9·	D4
11	-6·	D5	-6·	D6	+17·	D7	+19·	D8
15	+37·	D9	+5Ø·	D1Ø	-43·	D11	-5Ø·	D12
19	+·	D13	+5·	D14	-88·	S1	-43·	S2
23	-51·	S3	+4·	S4	+17·	S5	+[illegible]8·	S6
27	-39Ø·	S7	-4Ø8·	S8	-263·	S9	-317·	S1Ø
31	-43Ø·	S11	-443·	S12	-529·	S13	-294·	S14
35	-331·	S15	-576·	S16	-65Ø·	S17	-495·	S18
39	-259·	S19	-624·	S2Ø	-6Ø7·	S21	-629·	S22
43	-153·	S23	-15Ø·	S24	-336·	S25	-339·	S26
47	-343·	S27	-5Ø2·	S28	-452·	S29	-459·	S3Ø
51	-321·	S31	-362·	S32	-174·	S33	-348·	S34
55	-374·	S35	-237·	S36	-731·	S37	+28·	S38
59	+38·	S39	+97·	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 8

ADPTR C3-2 90% DATE: 11 / 13 / 73 TIME: 9 : 22 : 10

FILE: 7 RECORD: 13 CHANNELS 3 THROUGH 60

CHAN								
3	+8390.	LD1	+8408.	LD2	+5663.	LD3	+5639.	LD4
7	+61.	D1	+39.	D2	+18.	D3	+11.	D4
11	-6.	D5	-6.	D6	+18.	D7	+22.	D8
15	+44.	D9	+59.	D10	-49.	D11	-58.	D12
19	+.	D13	+5.	D14	-103.	S1	-55.	S2
23	-59.	S3	+7.	S4	+19.	S5	+65.	S6
27	-441.	S7	-463.	S8	-298.	S9	-360.	S10
31	-492.	S11	-503.	S12	-600.	S13	-338.	S14
35	-361.	S15	-662.	S16	-733.	S17	-569.	S18
39	-279.	S19	-716.	S20	-686.	S21	-718.	S22
43	-118.	S23	-167.	S24	-390.	S25	-393.	S26
47	-375.	S27	-570.	S28	-511.	S29	-537.	S30
51	-363.	S31	-410.	S32	-199.	S33	-347.	S34
55	-425.	S35	-296.	S36	-834.	S37	+28.	S38
59	+133.	S39	+122.	S40				

ADPTR C3-2 100% DATE: 11 / 13 / 73 TIME: 9 : 23 : 31

FILE: 7 RECORD: 14 CHANNELS 3 THROUGH 60

CHAN								
3	+9330.	LD1	+9316.	LD2	+6298.	LD3	+6280.	LD4
7	+68.	D1	+45.	D2	+20.	D3	+13.	D4
11	-6.	D5	-6.	D6	+21.	D7	+24.	D8
15	+49.	D9	+66.	D10	-56.	D11	-64.	D12
19	+.	D13	+5.	D14	-115.	S1	-60.	S2
23	-66.	S3	+9.	S4	+22.	S5	+70.	S6
27	-493.	S7	-516.	S8	-332.	S9	-404.	S10
31	-546.	S11	-561.	S12	-669.	S13	-383.	S14
35	-393.	S15	-746.	S16	-820.	S17	-643.	S18
39	-306.	S19	-810.	S20	-767.	S21	-812.	S22
43	-130.	S23	-192.	S24	-445.	S25	-447.	S26
47	-482.	S27	-640.	S28	-570.	S29	-597.	S30
51	-482.	S31	-456.	S32	-221.	S33	-388.	S34
55	-474.	S35	-335.	S36	-932.	S37	+31.	S38
59	+160.	S39	+144.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 9

ADPTR C1-3 10% DATE: 11 / 13 / 73 TIME: 9 : 44 : 36

FILE: 8 RECORD: 5 CHANNELS 3 THROUGH 60

CHAN								
3	+560.	LD1	+526.	LD2	-8.	LD3	+.	LD4
7	+5.	D1	+3.	D2	+1.	D3	-2.	D4
11	-.	D5	-2.	D6	-.	D7	+.	D8
15	+2.	D9	+3.	D10	-3.	D11	-5.	D12
19	+4.	D13	+1.	D14	-9.	S1	-2.	S2
23	-7/	S3	-2.	S4	+.	S5	+7.	S6
27	-41.	S7	-43.	S8	-24.	S9	-33.	S10
31	-44.	S11	-45.	S12	-46.	S13	-24.	S14
35	-31.	S15	-49.	S16	-51.	S17	-31.	S18
39	-24.	S19	-49.	S20	-44.	S21	-41.	S22
43	+12.	S23	+17.	S24	-31.	S25	-29.	S26
47	-44.	S27	-41.	S28	-51.	S29	-48.	S30
51	-29.	S31	-38.	S32	-14.	S33	-28.	S34
55	-31.	S35	-19.	S36	-63.	S37	+7.	S38
59	+4.	S39	+.	S40				

ADPTR C1-3 20% DATE: 11 / 13 / 73 TIME: 9 : 45 : 36

FILE: 3 RECORD: 6 CHANNELS 3 THROUGH 60

CHAN								
3	+1175.	LD1	+1180.	LD2	-8.	LD3	+5.	LD4
7	+10.	D1	+7.	D2	+.	D3	-1.	D4
11	-.	D5	-3.	D6	+.	D7	+.	D8
15	+4.	D9	+9.	D10	-8.	D11	-10.	D12
19	+7	D13	+3.	D14	-22.	S1	-9.	S2
23	-14.	S3	+.	S4	+.	S5	+12.	S6
27	-88.	S7	-93.	S8	-56.	S9	-69.	S10
31	-98.	S11	-99.	S12	-103.	S13	-54.	S14
35	-71.	S15	-105.	S16	-113.	S17	-73.	S18
39	-49.	S19	-109.	S20	-90.	S21	-88.	S22
43	+29.	S23	+39.	S24	-59.	S25	-59.	S26
47	-91.	S27	-97.	S28	-108.	S29	-105.	S30
51	-68.	S31	-79.	S32	-36.	S33	-52.	S34
55	-71.	S35	-45.	S36	-142.	S37	+4.	S38
59	+14.	S39	+2.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 9

ADPTR C1-3 30%   DATE: 11 / 13 / 73   TIME: 9 : 46 : 45

FILE: 8   RECORD: 7   CHANNELS 3 THROUGH 60

CHAN								
3	+1754.	LD1	+1797.	LD2	-8.	LD3	+.	LD4
7	+17.	D1	+11.	D2	+.	D3	-2.	D4
11	-4.	D5	-7.	D6	-.	D7	+4.	D8
15	+11.	D9	+17.	D10	-14.	D11	-18.	D12
19	+10.	D13	+9.	D14	-29.	S1	-12.	S2
23	-22	S3	-2.	S4	+2.	S5	+19.	S6
27	-134/	S7	-144.	S8	-86.	S9	-103.	S10
31	-147.	S11	-150.	S12	-154.	S13	-81.	S14
35	-108.	S15	-157.	S16	-169.	S17	-110.	S18
39	-71	S19	-163.	S20	-137.	S21	-130.	S22
43	+41.	S23	+56.	S24	-93.	S25	-93.	S26
47	-130.	S27	-162.	S28	-159.	S29	-161.	S30
51	-105	S31	-123.	S32	-56.	S33	-96.	S34
55	-110.	S35	-72.	S36	-211.	S37	+7.	S38
59	+27.	S39	+7.	S40				

ADPTR C1-3 40%   DATE: 11 / 13 / 73   TIME: 9 : 47 : 55

FILE: 8   RECORD: 8   CHANNELS 3 THROUGH 60

CHAN								
3	+2296.	LD1	+2360.	LD2	-8.	LD3	+5.	LD4
7	+25	D1	+18.	D2	+3.	D3	-2.	D4
11	-8.	D5	-10.	D6	+.	D7	+7.	D8
15	+17.	D9	+21.	D10	-20.	D11	-25.	D12
19	+14.	D13	+14.	D14	-39.	S1	-16.	S2
23	-27.	S3	+.	S4	+4.	S5	+26.	S6
27	-179.	S7	-189.	S8	-115.	S9	-139.	S10
31	-194.	S11	-198.	S12	-203.	S13	-106.	S14
35	-140.	S15	-211.	S16	-229.	S17	-147.	S18
39	-88.	S19	-220.	S20	-181.	S21	-170.	S22
43	+54.	S23	+76.	S24	-118.	S25	-120.	S26
47	-170.	S27	-228.	S28	-213.	S29	-216.	S30
51	-140.	S31	-164.	S32	-73.	S33	-130.	S34
55	-145.	S35	-96.	S36	-282.	S37	+12.	S38
59	+44.	S39	+9.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 9

ADPTR C1-3 58%   DATE: 11 / 13 / 73   TIME: 9 : 4[illegible] : 34

FILE: 8   RECORD: 9   CHANNELS 3 THROUGH 60

CHAN								
3	+2893.	LD1	+2887.	LD2	-8.	LD3	+.	LD4
7	+32.	D1	+21.	D2	+4.	D3	-2.	D4
11	-12.	D5	-16.	D6	+.	D7	+9.	D8
15	+22.	D9	+29.	D10	-28.	D11	-32.	D12
19	+19.	D13	+18.	D14	-49.	S1	-24.	S2
23	-34.	S3	-2.	S4	+7.	S5	+33.	S6
27	-220.	S7	-235.	S8	-142.	S9	-173.	S10
31	-246.	S11	-249.	S12	-252.	S13	-133.	S14
35	-177.	S15	-270.	S16	-288.	S17	-186.	S18
39	-107.	S19	-280.	S20	-228.	S21	-224.	S22
43	+66.	S23	+91.	S24	-142.	S25	-149.	S26
47	-199.	S27	-288.	S28	-265.	S29	-269.	S30
51	-174.	S31	-202.	S32	-91.	S33	-159.	S34
55	-182.	S35	-122.	S36	-348.	S37	+14.	S38
59	+61.	S39	+14.	S40				

ADPTR C1-3 60%   DATE: 11 / 13 / 73   TIME: 9 : 50 : 4[illegible]

FILE: 8   RECORD: 10   CHANNELS 3 THROUGH 60

CHAN								
3	+3471.	LD1	+3450.	LD2	-8.	LD3	+.	LD4
7	+39	D1	+24.	D2	+6.	D3	-3.	D4
11	-16.	D5	-22.	D6	+2.	D7	+13.	D8
15	+29.	D9	+36.	D10	-34.	D11	-39.	D12
19	+22.	D13	+23.	D14	-59.	S1	-28.	S2
23	-39.	S3	-2.	S4	+7.	S5	+41.	S6
27	-267.	S7	-283.	S8	-172.	S9	-209.	S10
31	-295.	S11	-300.	S12	-304.	S13	-160.	S14
35	-211.	S15	-330.	S16	-354.	S17	-230.	S18
39	-127.	S19	-342.	S20	-277.	S21	-286.	S22
43	+81.	S23	+111.	S24	-184.	S25	-179.	S26
47	-236.	S27	-359.	S28	-321.	S29	-325.	S30
51	-213.	S31	-243.	S32	-110.	S33	-190.	S34
55	-219.	S35	-144.	S36	-422.	S37	+19.	S38
59	+76.	S39	+22.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 9

ADPTR C1-3 7ø% DATE: 11 / 13 / 73 TIME: 9 : 51 : 54

FILE: 8 RECORD: 11 CHANNELS 3 THROUGH 6ø

CHAN								
3	+4ø5ø.	LD1	+4ø31.	LD2	-8.	LD3	+.	LD4
7	+46.	D1	+3ø.	D2	+7.	D3	-4.	D4
11	-21.	D5	-26.	D6	+3.	D7	+15.	D8
15	+34.	D9	+43.	D1ø	-42.	D11	-47.	D12
19	+26.	D13	+28.	D14	-69.	S1	-33.	S2
23	-46.	S3	-2.	S4	+9.	S5	+48.	S6
27	-316.	S7	-331.	S8	-2ø1.	S9	-242.	S1ø
31	-349.	S11	-351.	S12	-358.	S13	-19ø.	S14
35	-243.	S15	-391.	S16	-418.	S17	-274.	S18
39	-147.	S19	-411.	S2ø	-327.	S21	-333.	S22
43	+95.	S23	+128.	S24	-213.	S25	-2ø9.	S26
47	-264.	S27	-429.	S28	-378.	S29	-383.	S3ø
51	-25ø.	S31	-282.	S32	-128.	S33	-224.	S34
55	-255.	S35	-173.	S36	-495.	S37	+21.	S38
59	+96.	S39	+29.	S4ø				

ADPTR C1-3 8ø% DATE: 11 / 13 / 73 TIME: 9 : 53 : 7

FILE: 8 RECORD: 12 CHANNELS 3 THROUGH 6ø

CHAN								
3	+4665.	LD1	+4612.	LD2	-8.	LD3	+.	LD4
7	+54.	D1	+35.	D2	+9.	D3	-4.	D4
11	-25.	D5	-3ø.	D6	+3.	D7	+18.	D8
15	+42.	D9	+51.	D1ø	-48.	D11	-55.	D12
19	+29.	D13	+33.	D14	-81.	S1	-38.	S2
23	-54.	S3	+.	S4	+12.	S5	+53.	S6
27	-363.	S7	-384.	S8	-231.	S9	-281.	S1ø
31	-4ø1.	S11	-4ø6.	S12	-414.	S13	-222.	S14
35	-28ø	S15	-455.	S16	-482.	S17	-321.	S18
39	-166.	S19	-481.	S2ø	-376.	S21	-382.	S22
43	+11ø.	S23	+148.	S24	-258.	S25	-24ø.	S26
47	-298.	S27	-497.	S28	-432.	S29	-443.	S3ø
51	-289.	S31	-325.	S32	-147.	S33	-255.	S34
55	-3øø.	S35	-2ø2.	S36	-572.	S37	+24.	S38
59	+116.	S39	+41.	S4ø				

CONICAL ISOGRID ADAPTER TEST RUN 9

ADPTR C1-3 90%   DATE: 11 / 13 / 73   TIME: 9 : 54 : 13

FILE: 8   RECORD: 13   CHANNELS 3 THROUGH 60

CHAN								
3	+5225.	LD1	+5157.	LD2	-8.	LD3	+.	LD4
7	+60.	D1	+39.	D2	+11.	D3	-4.	D4
11	-29.	D5	-35.	D6	+3.	D7	+23.	D8
15	+48.	D9	+60.	D10	-56.	D11	-63.	D12
19	+33.	D13	+38.	D14	-91.	S1	-43.	S2
23	-59.	S3	+.	S4	+14.	S5	+60.	S6
27	-409.	S7	-430.	S8	-258.	S9	-315.	S10
31	-450.	S11	-455.	S12	-466.	S13	-249.	S14
35	-307.	S15	-522.	S16	-546.	S17	-370.	S18
39	-188.	S19	-550.	S20	-427.	S21	-441.	S22
43	+125.	S23	+167.	S24	-287.	S25	-272.	S26
47	-323.	S27	-555.	S28	-436.	S29	-478.	S30
51	-324.	S31	-369.	S32	-164.	S33	-291.	S34
55	-337.	S35	-229.	S36	-648.	S37	+28.	S38
59	+135.	S39	+53.	S40				

ADPTR C1-3 100%   DATE: 11 / 13 / 73   TIME: 9 : 55 : 46

FILE: 8   RECORD: 14   CHANNELS 3 THROUGH 60

CHAN								
3	+5786.	LD1	+5702.	LD2	-8.	LD3	+.	LD4
7	+68.	D1	+45.	D2	+15.	D3	-5.	D4
11	-34.	D5	-40.	D6	+3.	D7	+26.	D8
15	+54.	D9	+68.	D10	-62.	D11	-71.	D12
19	+36.	D13	+42.	D14	-105.	S1	-50.	S2
23	-66	S3	+.	S4	+14.	S5	+65.	S6
27	-456.	S7	-478.	S8	-288.	S9	-351.	S10
31	-499.	S11	-508.	S12	-517.	S13	-279.	S14
35	-334.	S15	-583.	S16	-610.	S17	-419.	S18
39	-203.	S19	-619.	S20	-477.	S21	-488.	S22
43	+137.	S23	+185.	S24	-324.	S25	-349.	S26
47	-345.	S27	-621.	S28	-538.	S29	-554.	S30
51	-358.	S31	-410.	S32	-184.	S33	-322.	S34
55	-376.	S35	-255.	S36	-721.	S37	+31.	S38
59	+165.	S39	+66.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 10

ADPTR C1-9Ø 1.% DATE: 11 / 13 / 73 TIME: 1Ø : 18 : 26

FILE: 9 RECORD: 5 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+524.	LD1	-18.	LD2	+8.	LD3	+366.	LD4
7	<+3.	D1	+3.	D2	+.	D3	+7.	D4
11	+4.	D5	+.	D6	-4.	D7	-5.	D8
15	-6.	D9	-1.	D1Ø	-3.	D11	+5.	D12
19	+.	D13	-12.	D14	+17.	S1	+24.	S2
23	-17.	S3	-14.	S4	+12.	S5	+14.	S6
27	-14.	S7	-12.	S8	-12.	S9	-12.	S1Ø
31	-22.	S11	-24.	S12	-29.	S13	-17.	S14
35	-34.	S15	-46.	S16	-49.	S17	-29.	S18
39	-34.	S19	-64.	S2Ø	-56.	S21	-51.	S22
43	-4.	S23	-9.	S24	+7.	S25	+2.	S26
47	-2.	S27	-2.	S28	-12.	S29	-7.	S3Ø
51	-7.	S31	-9.	S32	-2.	S33	-7.	S34
55	-7.	S35	-7.	S36	-14.	S37	+.	S38
59	-2.	S39	-7.	S4Ø				

ADPTR C1-9Ø 2.% DATE: 11 / 13 / 73 TIME: 1Ø : 19 : 46

FILE: 9 RECORD: 6 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+11Ø3.	LD1	-18.	LD2	+.	LD3	+11Ø5.	LD4
7	<+3.	D1	+7.	D2	+2.	D3	+9.	D4
11	+4	D5	+.	D6	-8.	D7	-6.	D8
15	-6.	D9	-1.	D1Ø	-7.	D11	+9.	D12
19	+1.	D13	-15.	D14	+36.	S1	+52.	S2
23	-41.	S3	-36.	S4	+27.	S5	+33.	S6
27	-26.	S7	-21.	S8	-22.	S9	-21.	S1Ø
31	-41.	S11	-43.	S12	-58.	S13	-34.	S14
35	-76.	S15	-1Ø5.	S16	-1Ø5.	S17	-71.	S18
39	-3Ø.	S19	-141.	S2Ø	-122.	S21	-1Ø3.	S22
43	-22.	S23	-32.	S24	+14.	S25	+9.	S26
47	-2.	S27	+2.	S28	-12.	S29	-4.	S3Ø
51	-7.	S31	-12.	S32	-4.	S33	-14.	S34
55	-12.	S35	-9.	S36	-17.	S37	+.	S38
59	-7.	S39	-9.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 10

ADPTR C1-9Ø 3Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 2Ø : 58

FILE: 9   RECORD: 7   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+1663.	LD1	-18.	LD2	+.	LD3	+1681.	LD4
7	+6	D1	+1Ø.	D2	+6.	D3	+15.	D4
11	+6.	D5	+.	D6	-11.	D7	-1Ø.	D8
15	-7	D9	-1.	D1Ø	-13.	D11	+14.	D12
19	+5	D13	-23.	D14	+71.	S1	+81.	S2
23	-61.	S3	-53.	S4	+34.	S5	+45.	S6
27	-41.	S7	-31.	S8	-29.	S9	-31.	S1Ø
31	-63.	S11	-67.	S12	-88.	S13	-51.	S14
35	-115.	S15	-165.	S16	-16Ø.	S17	-1Ø8.	S18
39	-12Ø.	S19	-21Ø.	S2Ø	-186.	S21	-16Ø.	S22
43	-34.	S23	-51.	S24	+14.	S25	+14.	S26
47	-7.	S27	+4.	S28	-19.	S29	-7.	S3Ø
51	-12.	S31	-19.	S32	-9.	S33	-16.	S34
55	-14.	S35	-16.	S36	-31.	S37	+.	S38
59	-7.	S39	-12.	S4Ø				

ADPTR C1-9Ø 4Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 22 : 17

FILE: 9   RECORD: 8   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2242	LD1	-18.	LD2	+.	LD3	+2246.	LD4
7	+1Ø.	D1	+14.	D2	+1Ø.	D3	+2Ø.	D4
11	+8.	D5	-.	D6	-19.	D7	-15.	D8
15	-1Ø.	D9	-2.	D1Ø	-2Ø.	D11	+19.	D12
19	+9.	D13	-32.	D14	+93.	S1	+113.	S2
23	-81.	S3	-69.	S4	+46.	S5	+6Ø.	S6
27	-56.	S7	-4Ø.	S8	-41.	S9	-4Ø.	S1Ø
31	-86.	S11	-89.	S12	-115.	S13	-69.	S14
35	-154.	S15	-224.	S16	-211.	S17	-147.	S18
39	-156.	S19	-29Ø.	S2Ø	-25Ø.	S21	-222.	S22
43	-46.	S23	-69.	S24	+24.	S25	+19.	S26
47	-9.	S27	+7.	S28	-29.	S29	-14.	S3Ø
51	-17.	S31	-26.	S32	-14.	S33	-26.	S34
55	-22.	S35	-19.	S36	-41.	S37	+.	S38
59	-4.	S39	-14.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 10

ADPTR C1-9Ø 5Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 23 : 47

FILE: 9   RECORD: 9   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2784.	LD1	-18.	LD2	+.	LD3	+2811.	LD4
7	+11.	D1	+18.	D2	+15.	D3	+26.	D4
11	+1Ø.	D5	-2.	D6	-22.	D7	-19.	D8
15	-12.	D9	-1.	D1Ø	-27.	D11	+23.	D12
19	+13.	D13	-41.	D14	+115.	S1	+139.	S2
23	-1Ø1.	S3	-89.	S4	+56.	S5	+77.	S6
27	-68.	S7	-5Ø.	S8	-51.	S9	-5Ø.	S1Ø
31	-1Ø8.	S11	-116.	S12	-144.	S13	-86.	S14
35	-191.	S15	-29Ø.	S16	-266.	S17	-186.	S18
39	-193.	S19	-371.	S2Ø	-317.	S21	-281.	S22
43	-61.	S23	-86.	S24	+27.	S25	+22.	S26
47	-9.	S27	+14.	S28	-34.	S29	-19.	S3Ø
51	-24.	S31	-31.	S32	-17.	S33	-28.	S34
55	-27.	S35	-21.	S36	-51.	S37	+.	S38
59	+7.	S39	-12.	S4Ø				

ADPTR C1-9Ø 6Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 25 : 52

FILE: 9   RECORD: 1Ø   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+3381.	LD1	+.	LD2	+.	LD3	+3372.	LD4
7	+14	D1	+21.	D2	+21.	D3	+32.	D4
11	+12.	D5	-3.	D6	-26.	D7	-22.	D8
15	-14.	D9	-1.	D1Ø	-33.	D11	+28.	D12
19	+17.	D13	-49.	D14	+135.	S1	+17Ø.	S2
23	-123.	S3	-1Ø6.	S4	+64.	S5	+94.	S6
27	-85.	S7	-62.	S8	-64.	S9	-62.	S1Ø
31	-132.	S11	-14Ø.	S12	-174.	S13	-1Ø6.	S14
35	-233.	S15	-359.	S16	-322.	S17	-23Ø.	S18
39	-232.	S19	-468.	S2Ø	-388.	S21	-345.	S22
43	-71	S23	-1Ø3.	S24	+39.	S25	+27.	S26
47	-12.	S27	+14.	S28	-49.	S29	-21.	S3Ø
51	-29.	S31	-36.	S32	-22.	S33	-36.	S34
55	-34.	S35	-26.	S36	-63.	S37	+2.	S38
59	+32.	S39	-12.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 10

ADPTR C1-9Ø 7Ø% DATE: 11 / 13 / 73 TIME: 1Ø : 26 : 59

FILE: 9 RECORD: 11 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+3978.	LD1	-36.	LD2	+8.	LD3	+3952.	LD4
7	+2Ø.	D1	+25.	D2	+26.	D3	+37.	D4
11	+14.	D5	-3.	D6	-33.	D7	-27.	D8
15	-15.	D9	+.	D1Ø	-4Ø.	D11	+33.	D12
19	+21.	D13	-56.	D14	+16Ø.	S1	+199.	S2
23	-148.	S3	-125.	S4	+76.	S5	+1Ø8.	S6
27	-1Ø3.	S7	-76.	S8	-73.	S9	-72.	S1Ø
31	-159.	S11	-164.	S12	-2Ø6.	S13	-123.	S14
35	-275.	S15	-426.	S16	-376.	S17	-272.	S18
39	-264.	S19	-582.	S2Ø	-452.	S21	-412.	S22
43	-83.	S23	-125.	S24	+36.	S25	+31.	S26
47	-14.	S27	+16.	S28	-58.	S29	-24.	S3Ø
51	-34.	S31	-43.	S32	-24.	S33	-38.	S34
55	-39.	S35	-33.	S36	-73.	S37	+2.	S38
59	+69.	S39	-12.	S4Ø				

ADPTR C1-9Ø 8Ø% DATE: 11 / 13 / 73 TIME: 1Ø : 28 : 16

FILE: 9 RECORD: 12 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+4556.	LD1	-36.	LD2	+8.	LD3	+4487.	LD4
7	+24.	D1	+28.	D2	+3Ø.	D3	+44.	D4
11	+16.	D5	-3.	D6	-37.	D7	-31.	D8
15	-17.	D9	+.	D1Ø	-47.	D11	+39.	D12
19	+25.	D13	-65.	D14	+179.	S1	+228.	S2
23	-167.	S3	-142.	S4	+86.	S5	+125.	S6
27	-122.	S7	-86.	S8	-86.	S9	-84.	S1Ø
31	-184.	S11	-188.	S12	-235.	S13	-143.	S14
35	-314.	S15	-499.	S16	-431.	S17	-316.	S18
39	-294.	S19	-694.	S2Ø	-516.	S21	-483.	S22
43	-95.	S23	-148.	S24	+44.	S25	+34.	S26
47	-14.	S27	+19.	S28	-68.	S29	-31.	S3Ø
51	-39.	S31	-5Ø.	S32	-27.	S33	-48.	S34
55	-46.	S35	-43.	S36	-88.	S37	+2.	S38
59	+1Ø1.	S39	-12.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 10

WADPTR C1-9Ø 9Ø% DATE: 11 / 13 / 73 TIME: 1Ø : 29 : 21

FILE: 9 RECORD: 13 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+5135.	LD1	-18.	LD2	+8.	LD3	+51Ø4.	LD4
7	+28.	D1	+34.	D2	+34.	D3	+49.	D4
11	+18.	D5	-6.	D6	-42.	D7	-35.	D8
15	-21.	D9	+.	D1Ø	-55.	D11	+43.	D12
19	+29.	D13	-72.	D14	+199.	S1	+255.	S2
23	-187.	S3	-161.	S4	+96.	S5	+14Ø.	S6
27	-139.	S7	-96.	S8	-1Ø3.	S9	-93.	S1Ø
31	-214.	S11	-22Ø.	S12	-267.	S13	-165.	S14
35	-334.	S15	-578.	S16	-485.	S17	-365.	S18
39	-32Ø.	S19	-8Ø8.	S2Ø	-585.	S21	-553.	S22
43	-1Ø8.	S23	-17Ø.	S24	+54.	S25	+39.	S26
47	-14.	S27	+19.	S28	-81.	S29	-36.	S3Ø
51	-46.	S31	-57.	S32	-32.	S33	-57.	S34
55	-51.	S35	-48.	S36	-1ØØ.	S37	+.	S38
59	+14Ø.	S39	-9.	S4Ø				

ADPTR C1-9Ø 1ØØ% DATE: 11 / 13 / 73 TIME: 1Ø : 3Ø : 22

FILE: 9 RECORD: 14 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+5714.	LD1	+.	LD2	+8.	LD3	+5669.	LD4
7	+32.	D1	+39.	D2	+4Ø.	D3	+56.	D4
11	+2Ø.	D5	-6.	D6	-48.	D7	-38.	D8
15	-23.	D9	+1.	D1Ø	-61.	D11	+49.	D12
19	+34.	D13	-79.	D14	+224.	S1	+231.	S2
23	-2Ø7.	S3	-18Ø.	S4	+1Ø3.	S5	+154.	S6
27	-159.	S7	-1Ø8.	S8	-113.	S9	-1Ø3.	S1Ø
31	-243.	S11	-244.	S12	-3Ø1.	S13	-185.	S14
35	-395.	S15	-652.	S16	-539.	S17	-417.	S18
39	-34Ø/	S19	-925.	S2Ø	-644.	S21	-614.	S22
43	-122.	S23	-195.	S24	+51.	S25	+44.	S26
47	-22.	S27	+21.	S28	-95.	S29	-43.	S3Ø
51	-54.	S31	-65.	S32	-34.	S33	-62.	S34
55	-61.	S35	-5Ø.	S36	-112.	S37	+2.	S38
59	+167.	S39	-9.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 11

ADPTRC1-18Ø 1Ø% DATE: 11 / 13 / 73 TIME: 1Ø : 5Ø : 26

FILE: 1Ø RECORD: 5 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+.	LD1	+.	LD2	+526.	LD3	+438.	LD4
7	-3.	D1	-1.	D2	-3.	D3	-.	D4
11	+.	D5	+6.	D6	-.	D7	-.	D8
15	-.	D9	-4.	D1Ø	+4.	D11	+2.	D12
19	-6.	D13	-1.	D14	+2.	S1	-2.	S2
23	+7.	S3	+4.	S4	-2.	S5	-4.	S6
27	+17.	S7	+19.	S8	+9.	S9	+14.	S1Ø
31	+19.	S11	+24.	S12	+14.	S13	+4.	S14
35	+9.	S15	+19.	S16	+9.	S17	+4.	S18
39	+4.	S19	+12.	S2Ø	+2.	S21	+4.	S22
43	-27.	S23	-37.	S24	+2.	S25	+7.	S26
47	+17.	S27	+19.	S28	+19.	S29	+24.	S3Ø
51	+12.	S31	+14.	S32	+4.	S33	+7.	S34
55	+9.	S35	+4.	S36	+17.	S37	+.	S38
59	-7.	S39	+4.	S4Ø				

ADPTR C1-18Ø 2Ø% DATE: 11 / 13 / 73 TIME: 1Ø : 51 : 34

FILE: 1Ø RECORD: 6 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+.	LD1	-13.	LD2	+1146.	LD3	+11ØØ.	LD4
7	<-7.	D1	-4.	D2	-2.	D3	+.	D4
11	+1.	D5	+1Ø.	D6	+3.	D7	+.	D8
15	-.	D9	-7.	D1Ø	+9.	D11	+6.	D12
19	-12.	D13	-4.	D14	+12.	S1	+2.	S2
23	+9.	S3	+4.	S4	-4.	S5	-7.	S6
27	+41.	S7	+43.	S8	+22.	S9	+26.	S1Ø
31	+46.	S11	+55.	S12	+31.	S13	+12.	S14
35	+27.	S15	+36.	S16	+22.	S17	+9.	S18
39	+4.	S19	+27.	S2Ø	+.	S21	+9.	S22
43	-63.	S23	-86.	S24	+12.	S25	+14.	S26
47	+49.	S27	+48.	S28	+51.	S29	+52.	S3Ø
51	+31.	S31	+36.	S32	+12.	S33	+21.	S34
55	+24.	S35	+14.	S36	+41.	S37	-2.	S38
59	-14.	S39	+7.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 11

ADPTRC1-180 38%   DATE: 11 / 13 / 73   TIME: 10 : 52 : 33

FILE: 10   RECORD: 7   CHANNELS 3 THROUGH 60

CHAN								
3	+.	LD1	+.	LD2	+1714.	LD3	+1670.	LD4
2	-10.	D1	-7.	D2	-4.	D3	+1.	D4
11	+7.	D5	+17.	D6	+3.	D7	-.	D8
15	-4.	D9	-11.	D10	+12.	D11	+11.	D12
19	-18.	D13	-12.	D14	+17.	S1	+.	S2
23	+12.	S3	+4.	S4	-4.	S5	-9.	S6
27	+63.	S7	+67.	S8	+36.	S9	+45.	S10
31	+71.	S11	+79.	S12	+46.	S13	+19.	S14
35	+39.	S15	+61.	S16	+29.	S17	+17.	S18
39	+9.	S19	+37.	S20	+2.	S21	+7.	S22
43	-93.	S23	-130.	S24	+22.	S25	+22.	S26
47	+71.	S27	+67.	S28	+81.	S29	+79.	S30
51	+46.	S31	+55.	S32	+22.	S33	+36.	S34
55	+36.	S35	+21.	S36	+66.	S37	-4.	S38
59	-19.	S39	+9.	S40				

ADPTRC1-180 40%   DATE: 11 / 13 / 73   TIME: 10 : 53 : 35

FILE: 10   RECORD: 8   CHANNELS 3 THROUGH 60

CHAN								
3	+18.	LD1	+.	LD2	+2275.	LD3	+2251.	LD4
2	-15.	D1	-10.	D2	-6.	D3	+3.	D4
11	+11.	D5	+22.	D6	+3.	D7	-1.	D8
15	-8.	D9	-16.	D10	+13.	D11	+16.	D12
19	-25.	D13	-20.	D14	+27.	S1	+4.	S2
23	+17.	S3	+4.	S4	-4.	S5	-12.	S6
27	+85.	S7	+88.	S8	+49.	S9	+57.	S10
31	+95.	S11	+104.	S12	+63.	S13	+29.	S14
35	+51.	S15	+78.	S16	+41.	S17	+22.	S18
39	+14.	S19	+49.	S20	+2.	S21	+12.	S22
43	-125.	S23	-177.	S24	+29.	S25	+27.	S26
47	+91.	S27	+89.	S28	+108.	S29	+175.	S30
51	+66.	S31	+72.	S32	+27.	S33	+48.	S34
55	+49.	S35	+31.	S36	+88.	S37	-4.	S38
59	-27.	S39	+14.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 11

ADPTRC1-13Ø 5Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 54 : 42

FILE: 1Ø   RECORD: 9   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+18.	LD1	+.	LD2	+2852.	LD3	+2827.	LD4
2	-21.	D1	-14.	D2	-6.	D3	+6.	D4
11	+17.	D5	+28.	D6	+7.	D7	-3.	D8
15	-11.	D9	-2Ø.	D1Ø	+16.	D11	+2Ø.	D12
19	-32.	D13	-3Ø.	D14	+34.	S1	+4.	S2
23	+19.	S3	+4.	S4	-4.	S5	-14.	S6
27	+112.	S7	+112.	S8	+61.	S9	+74.	S1Ø
31	+125.	S11	+128.	S12	+78.	S13	+34.	S14
35	+63.	S15	+98.	S16	+51.	S17	+27.	S18
39	+17.	S19	+57.	S2Ø	+4.	S21	+17.	S22
43	-157.	S23	-224.	S24	+36.	S25	+34.	S26
47	+12Ø.	S27	+1Ø9.	S28	+14Ø.	S29	+13Ø.	S3Ø
51	+83.	S31	+94.	S32	+36.	S33	+6Ø.	S34
55	+59.	S35	+38.	S36	+11Ø.	S37	-4.	S38
59	-29.	S39	+19.	S4Ø				

ADPTRC1-13Ø 6Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 55 : 45

FILE: 1Ø   RECORD: 1Ø   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+.	LD1	+.	LD2	+3429.	LD3	+3392.	LD4
7	-25.	D1	-18.	D2	-7.	D3	+7.	D4
11	+22.	D5	+35.	D6	+6.	D7	-3.	D8
15	-15.	D9	-26.	D1Ø	+21.	D11	+25.	D12
19	-42.	D13	-37.	D14	+41.	S1	+4.	S2
23	+24.	S3	+7.	S4	-7.	S5	-16.	S6
27	+132.	S7	+136.	S8	+73.	S9	+91.	S1Ø
31	+152.	S11	+15Ø.	S12	+93.	S13	+42.	S14
35	+73.	S15	+12Ø.	S16	+59.	S17	+31.	S18
39	+19.	S19	+66.	S2Ø	+4.	S21	+12.	S22
43	-189.	S23	-274.	S24	+44.	S25	+39.	S26
47	+145.	S27	+126.	S28	+171.	S29	+156.	S3Ø
51	+98.	S31	+111.	S32	+41.	S33	+72.	S34
55	+71.	S35	+45.	S36	+13Ø.	S37	-9.	S38
59	-34.	S39	+22.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 11

ADPTRC1-18Ø 72%   DATE: 11 / 13 / 73   TIME: 1Ø : 57 : 3

FILE: 1Ø   RECORD: 11   CHANNELS 3 THROUGH 6Ø

#CHAN								
3	+.	LD1	+.	LD2	+4Ø15.	LD3	+3968.	LD4
7	-3Ø.	D1	-19.	D2	-9.	D3	+1Ø.	D4
11	+28.	D5	+39.	D6	+1Ø.	D7	-6.	D8
15	-17.	D9	-3Ø.	D1Ø	+26.	D11	+3Ø.	D12
19	-48.	D13	-44.	D14	+46.	S1	+2.	S2
23	+27.	S3	+7.	S4	-7.	S5	-21.	S6
27	+156.	S7	+158.	S8	+86.	S9	+1Ø8.	S1Ø
31	+182.	S11	+176.	S12	+1Ø7.	S13	+49.	S14
35	+86.	S15	+145.	S16	+68.	S17	+36.	S18
39	+24.	S19	+76.	S2Ø	+7.	S21	+17.	S22
43	-223.	S23	-323.	S24	+51.	S25	+49.	S26
47	+165.	S27	+145.	S28	+2Ø3.	S29	+135.	S3Ø
51	+115.	S31	+127.	S32	+51.	S33	+34.	S34
55	+83.	S35	+53.	S36	+152.	S37	-7.	S38
59	-37.	S39	+26.	S4Ø				

ADPTRC1-18Ø [illegible]%   DATE: 11 / 13 / 73   TIME: 1Ø : 58 : 25

FILE: 1Ø   RECORD: 12   CHANNELS 3 THROUGH 6Ø

#CHAN								
3	+.	LD1	+.	LD2	+4592.	LD3	+455[illegible].	LD4
7	-35.	D1	-22.	D2	-11.	D3	+13.	D4
11	+34.	D5	+46.	D6	+1Ø.	D7	-7.	D8
15	-22.	D9	-35.	D1Ø	+31.	D11	+35.	D12
19	-57.	D13	-52.	D14	+59.	S1	+4.	S2
23	+34.	S3	+9.	S4	-9.	S5	-24.	S6
27	+181.	S7	+182.	S8	+98.	S9	+12Ø.	S1Ø
31	+2Ø9.	S11	+2ØØ.	S12	+122.	S13	+59.	S14
35	+1ØØ.	S15	+165.	S16	+78.	S17	+44.	S18
39	+26.	S19	+84.	S2Ø	+4.	S21	+19.	S22
43	-255.	S23	-38Ø.	S24	+59.	S25	+36.	S26
47	+194.	S27	+162.	S28	+235.	S29	+2Ø9.	S3Ø
51	+132.	S31	+149.	S32	+61.	S33	+96.	S34
55	+98.	S35	+6Ø.	S36	+176.	S37	-9.	S38
59	-39.	S39	+31.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 11

ADPTRC1-18Ø 9Ø%   DATE: 11 / 13 / 73   TIME: 1Ø : 59 : 43

FILE: 1Ø   RECORD: 13   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+.	LD1	+.	LD2	+5186.	LD3	+5134.	LD4
2	-39.	D1	-26.	D2	-13.	D3	+14.	D4
11	+39.	D5	+51.	D6	+14.	D7	-9.	D8
15	-25.	D9	-41.	D1Ø	+35.	D11	+4Ø.	D12
19	-65.	D13	-58.	D14	+69.	S1	+.	S2
23	+39.	S3	+9.	S4	-9.	S5	-26.	S6
27	+2Ø3.	S7	+2Ø9.	S8	+11Ø.	S9	+134.	S1Ø
31	+238.	S11	+227.	S12	+139.	S13	+64.	S14
35	+113.	S15	+184.	S16	+86.	S17	+46.	S18
39	+31.	S19	+91.	S2Ø	+4.	S21	+24.	S22
43	-29Ø.	S23	-439.	S24	+71.	S25	+66.	S26
47	+219.	S27	+181.	S28	+265.	S29	+233.	S3Ø
51	+147.	S31	+166.	S32	+68.	S33	+138.	S34
55	+1Ø8.	S35	+69.	S36	+198.	S37	-12.	S38
59	-39.	S39	+39.	S4Ø				

ADPTRC1-18Ø 1ØØ%   DATE: 11 / 13 / 73   TIME: 11 : [illegible] : 1[illegible]

FILE: 1Ø   RECORD: 14   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+.	LD1	+.	LD2	+5771.	LD3	+572[illegible].	LD4
2	-46.	D1	-28.	D2	-13.	D3	+16.	D4
11	+44.	D5	+57.	D6	+14.	D7	-11.	D8
15	-3Ø.	D9	-45.	D1Ø	+41.	D11	+46.	D12
19	-73.	D13	-66.	D14	+76.	S1	+.	S2
23	+41.	S3	+9.	S4	-12.	S5	-29.	S6
27	+23Ø.	S7	+233.	S8	+123.	S9	+151.	S1Ø
31	+265.	S11	+251.	S12	+154.	S13	+74.	S14
35	+125.	S15	+2Ø6.	S16	+98.	S17	+51.	S18
39	+39.	S19	+79.	S2Ø	+7.	S21	+27.	S22
43	-324.	S23	-5Ø3.	S24	+81.	S25	+73.	S26
47	+241.	S27	+2Ø1.	S28	+297.	S29	+25Ø.	S3Ø
51	+162.	S31	+185.	S32	+76.	S33	+12Ø.	S34
55	+123.	S35	+74.	S36	+223.	S37	-12.	S38
59	-39.	S39	+46.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 12

ADPTRC1-27Ø 1Ø%   DATE: 11 / 13 / 73   TIME: 11 : 1Ø : 59

FILE: 11   RECORD: 5   CHANNELS   3 THROUGH   6Ø

CHAN								
3	+.	LD1	+835.	LD2	+518.	LD3	+5.	LD4
7	+.	D1	-2.	D2	-2.	D3	-5.	D4
11	-1.	D5	-.	D6	+3.	D7	+4.	D8
15	+5.	D9	+2.	D1Ø	+.	D11	-9.	D12
19	-1.	D13	+7.	D14	-36.	S1	-38.	S2
23	+17.	S3	+21.	S4	-9.	S5	-7.	S6
27	-17.	S7	-19.	S8	-12.	S9	-16.	S1Ø
31	-12.	S11	-9.	S12	-12.	S13	-7.	S14
35	+14.	S15	+17.	S16	+4.	S17	+2.	S18
39	+19.	S19	+29.	S2Ø	+19.	S21	+14.	S22
43	-2.	S23	-4.	S24	-31.	S25	-39.	S26
47	-34.	S27	-33.	S28	-27.	S29	-33.	S3Ø
51	-22.	S31	-26.	S32	-14.	S33	-21.	S34
55	-27.	S35	-12.	S36	-54.	S37	+.	S38
59	+9.	S39	+12.	S4Ø				

ADPTRC1-27Ø 2Ø%   DATE: 11 / 13 / 73   TIME: 11 : 12 : 16

FILE: 11   RECORD: 6   CHANNELS   3 THROUGH   6Ø

CHAN								
3	+18.	LD1	+1162.	LD2	+1154.	LD3	+5.	LD4
7	< -.	D1	-3.	D2	-1.	D3	-8.	D4
11	-1.	D5	+.	D6	+9.	D7	+3.	D8
15	+8.	D9	+4.	D1Ø	+4.	D11	-14.	D12
19	-7.	D13	+1Ø.	D14	-56.	S1	-47.	S2
23	+37.	S3	+38.	S4	-19.	S5	-21.	S6
27	-14.	S7	-21.	S8	-12.	S9	-16.	S1Ø
31	-7.	S11	+.	S12	-9.	S13	-2.	S14
35	+34.	S15	+39.	S16	+17.	S17	+9.	S18
39	+39.	S19	+66.	S2Ø	+36.	S21	+24.	S22
43	-12.	S23	-17.	S24	-51.	S25	-51.	S26
47	-44.	S27	-41.	S28	-34.	S29	-43.	S3Ø
51	-27.	S31	-31.	S32	-17.	S33	-24.	S34
55	-34.	S35	-19.	S36	-58.	S37	+4.	S38
59	+14.	S39	+19.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 12

ADPTRC1-270 32%   DATE: 11 / 13 / 73   TIME: 11 : 15 : 17

FILE: 11   RECORD: 7   CHANNELS 3 THROUGH 60

CHAN								
3	+.	LD1	+1761.	LD2	+1714.	LD3	+5.	LD4
7	-	D1	-6.	D2	-5.	D3	-12.	D4
11	-2.	D5	+3.	D6	+15.	D7	+13.	D8
15	+12.	D9	+5.	D10	+8.	D11	-21.	D12
19	-14.	D13	+16.	D14	-86.	S1	-98.	S2
23	+54.	S3	+60.	S4	-29.	S5	-31.	S6
27	-24.	S7	-36.	S8	-17.	S9	-28.	S10
31	-12.	S11	-4.	S12	-14.	S13	-7.	S14
35	+49.	S15	+56.	S16	+27.	S17	+17.	S18
39	+56.	S19	+96.	S20	+51.	S21	+39.	S22
43	-19.	S23	-24.	S24	-76.	S25	-83.	S26
47	-71.	S27	-67.	S28	-58.	S29	-67.	S30
51	-39.	S31	-43.	S32	-24.	S33	-36.	S34
55	-74.	S35	-28.	S36	-105.	S37	+4.	S38
59	+22.	S39	+39.	S40				

ADPTRC1-270 4 %   DATE: 11 / 13 / 73   TIME: 11 : 14 : 2

FILE: 11   RECORD: 8   CHANNELS 3 THROUGH 60

CHAN								
3	+.	LD1	+2342.	LD2	+2275.	LD3	+5.	LD4
7	< +.	D1	-8.	D2	-9.	D3	-16.	D4
11	-2.	D5	+6.	D6	+21.	D7	+19.	D8
15	+17.	D9	+7.	D10	+12.	D11	-28.	D12
19	-21.	D13	+20.	D14	-115.	S1	-129.	S2
23	+74.	S3	+74.	S4	-39.	S5	-43.	S6
27	-34.	S7	-48.	S8	-24.	S9	-36.	S10
31	-17.	S11	-7.	S12	-22.	S13	-9.	S14
35	+63.	S15	+71.	S16	+36.	S17	+24.	S18
39	+78.	S19	+128.	S20	+73.	S21	+59.	S22
43	-24.	S23	-34.	S24	-110.	S25	-113.	S26
47	-98.	S27	-92.	S28	-73.	S29	-89.	S30
51	-54.	S31	-57.	S32	-32.	S33	-58.	S34
55	-71.	S35	-38.	S36	-142.	S37	+4.	S38
59	+27.	S39	+53.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 12

ADPTRC1-270 56% DATE: 11 / 13 / 73 TIME: 11 : 15 : 30

FILE: 11 RECORD: 9 CHANNELS 3 THROUGH 60

CHAN								
3	+.	LD1	+2923.	LD2	+2852.	LD3	+5.	LD4
7	-1.	D1	-10.	D2	-12.	D3	-20.	D4
11	-3.	D5	+7.	D6	+29.	D7	+24.	D8
15	+21.	D9	+9.	D10	+17.	D11	-36.	D12
19	-30.	D13	+25.	D14	-142.	S1	-163.	S2
23	+93.	S3	+94.	S4	-49.	S5	-53.	S6
27	-41.	S7	-62.	S8	-29.	S9	-48.	S10
31	-19.	S11	-9.	S12	-24.	S13	-12.	S14
35	+83.	S15	+88.	S16	+44.	S17	+29.	S18
39	+97.	S19	+161.	S20	+88.	S21	+59.	S22
43	-31.	S23	-44.	S24	-137.	S25	-142.	S26
47	-120.	S27	-123.	S28	-93.	S29	-113.	S30
51	-66.	S31	-72.	S32	-39.	S33	-65.	S34
55	-91.	S35	-50.	S36	-176.	S37	+4.	S38
59	+34.	S39	+75.	S40				

ADPTRC1-270 60% DATE: 11 / 13 / 73 TIME: 11 : 16 : 55

FILE: 11 RECORD: 10 CHANNELS 3 THROUGH 60

CHAN								
3	+.	LD1	+3450.	LD2	+3429.	LD3	+.	LD4
7	-3.	D1	-13.	D2	-16.	D3	-26.	D4
11	-4.	D5	+10.	D6	+35.	D7	+29.	D8
15	+26.	D9	+11.	D10	+21.	D11	-44.	D12
19	-38.	D13	+30.	D14	-175.	S1	-192.	S2
23	+111.	S3	+110.	S4	-61.	S5	-67.	S6
27	-49.	S7	-74.	S8	-34.	S9	-52.	S10
31	-24.	S11	-14.	S12	-34.	S13	-19.	S14
35	+95.	S15	+105.	S16	+49.	S17	+27.	S18
39	+117.	S19	+195.	S20	+108.	S21	+76.	S22
43	-36.	S23	-54.	S24	-159.	S25	-177.	S26
47	-140.	S27	-155.	S28	-115.	S29	-132.	S30
51	-85.	S31	-89.	S32	-46.	S33	-74.	S34
55	-110.	S35	-62.	S36	-208.	S37	+7.	S38
59	+41.	S39	+95.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 12

ADPTRC1-270 DATE: 11 / 13 / 73 TIME: 11 : 18 : 7

FILE: 11 RECORD: 11 CHANNELS 3 THROUGH 60

CHAN								
3	+.	LD1	+4013.	LD2	+4015.	LD3	+5.	LD4
7	<-3.	D1	-16.	D2	-19.	D3	-32.	D4
11	-5.	D5	+15.	D6	+44.	D7	+33.	D8
15	+31.	D9	+14.	D10	+25.	D11	-52.	D12
19	-47.	D13	+36.	D14	-202.	S1	-221.	S2
23	+133.	S3	+132.	S4	-66.	S5	-77.	S6
27	-53.	S7	-84.	S8	-41.	S9	-50.	S10
31	-27.	S11	-16.	S12	-36.	S13	-14.	S14
35	+115.	S15	+120.	S16	+34.	S17	+39.	S18
39	+139.	S19	+228.	S20	+122.	S21	+91.	S22
43	-44.	S23	-64.	S24	-139.	S25	-209.	S26
47	-160.	S27	-177.	S28	-132.	S29	-154.	S30
51	-93.	S31	-101.	S32	-51.	S33	-86.	S34
55	-130.	S35	-74.	S36	-245.	S37	+9.	S38
59	+51.	S39	+129.	S40				

APPENDIX A-2

ULTIMATE TEST DATA

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F DWO DATE: 11 / 13 / 73 TIME: 15 : 18 : 52

FILE: 12 RECORD: 46 CHANNELS 3 THROUGH 60

CHAN								
3	+18.	LD1	+54.	LD2	+16.	LD3	+.	LD4
7	-4521.	D1	-4544.	D2	-1427.	D3	+275.	D4
11	-252.	D5	-996.	D6	-1449.	D7	-4575.	D8
15	-4685.	D9	-4600.	D10	-31.	D11	-51.	D12
19	-4.	D13	+6.	D14	-44.	S1	-4.	S2
23	+27.	S3	+40.	S4	-34.	S5	-19.	S6
27	-12.	S7	+151.	S8	+29.	S9	+72.	S10
31	-147.	S11	+135.	S12	-12.	S13	-17.	S14
35	-204.	S15	-61.	S16	-17.	S17	-4.	S18
39	-29.	S19	-32.	S20	+86.	S21	-29.	S22
43	-14.	S23	+12.	S24	-7.	S25	+4.	S26
47	+269.	S27	+208.	S28	+2.	S29	+120.	S30
51	-4.	S31	+65.	S32	+.	S33	+50.	S34
55	+36.	S35	+2.	S36	+46.	S37	-12.	S38
59	+120.	S39	-2.	S40				

ADAPTR C2-F 20% DATE: 11 / 13 / 73 TIME: 13 : 20 : 45

FILE: 12 RECORD: 5 CHANNELS 3 THROUGH 60

CHAN								
3	+1229.	LD1	+1289.	LD2	+317.	LD3	+305.	LD4
7	+9.	D1	+7.	D2	+2.	D3	-.	D4
11	-6.	D5	-4.	D6	+3.	D7	+3.	D8
15	+7.	D9	+8.	D10	-12.	D11	-11.	D12
19	+6.	D13	+.	D14	-22.	S1	-12.	S2
23	-9.	S3	+2.	S4	+.	S5	+9.	S6
27	-80.	S7	-86.	S8	-54.	S9	-67.	S10
31	-93.	S11	-91.	S12	-95.	S13	-54.	S14
35	-66.	S15	-98.	S16	-113.	S17	-73.	S18
39	-49.	S19	-99.	S20	-95.	S21	-86.	S22
43	+12.	S23	+17.	S24	-51.	S25	-59.	S26
47	-101.	S27	-92.	S28	-100.	S29	-101.	S30
51	-68.	S31	-77.	S32	-36.	S33	-60.	S34
55	-71.	S35	-48.	S36	-135.	S37	+4.	S38
59	+17.	S39	+4.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40% DATE: 11 / 13 / 73 TIME: 13 : 22 : 3

FILE: 12 RECORD: 6 CHANNELS 3 THROUGH 60

CHAN								
3	+2368.	LD1	+2469.	LD2	+619.	LD3	+636.	LD4
7	+20.	D1	+12.	D2	+3.	D3	-.	D4
11	-9.	D5	-6.	D6	+4.	D7	+7.	D8
15	+14.	D9	+20.	D10	-21.	D11	-22.	D12
19	+8.	D13	+2.	D14	-36.	S1	-14.	S2
23	-22.	S3	+.	S4	+2.	S5	+21.	S6
27	-156.	S7	-168.	S8	-105.	S9	-127.	S10
31	-182.	S11	-179.	S12	-183.	S13	-103.	S14
35	-130.	S15	-194.	S16	-219.	S17	-144.	S18
39	-88.	S19	-203.	S20	-184.	S21	-162.	S22
43	+22.	S23	+29.	S24	-108.	S25	-115.	S26
47	-170.	S27	-196.	S28	-191.	S29	-192.	S30
51	-130.	S31	-147.	S32	-68.	S33	-118.	S34
55	-137.	S35	-96.	S36	-267.	S37	+9.	S38
59	+37.	S39	+9.	S40				

ADAPTR C2-F 60% DATE: 11 / 13 / 73 TIME: 13 : 23 : 20

FILE: 12 RECORD: 7 CHANNELS 3 THROUGH 60

CHAN								
3	+3544.	LD1	+3686.	LD2	+953.	LD3	+952.	LD4
7	+34.	D1	+20.	D2	+8.	D3	-.	D4
11	-15.	D5	-14.	D6	+3.	D7	+13.	D8
15	+26.	D9	+33.	D10	-34.	D11	-35.	D12
19	+12.	D13	+7.	D14	-59.	S1	-31.	S2
23	-32.	S3	+.	S4	+4.	S5	+33.	S6
27	-240.	S7	-257.	S8	-157.	S9	-192.	S10
31	-270.	S11	-271.	S12	-287.	S13	-155.	S14
35	-196.	S15	-302.	S16	-342.	S17	-223.	S18
39	-129.	S19	-314.	S20	-277.	S21	-274.	S22
43	+31.	S23	+44.	S24	-162.	S25	-174.	S26
47	-239.	S27	-317.	S28	-292.	S29	-296.	S30
51	-194.	S31	-222.	S32	-103.	S33	-175.	S34
55	-209.	S35	-142.	S36	-402.	S37	+12.	S38
59	+64.	S39	+24.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 80%   DATE: 11 / 13 / 73   TIME: 13 : 24 : 58

FILE: 12   RECORD: 8   CHANNELS 3 THROUGH 60

CHAN								
3	+4864.	LD1	+4921.	LD2	+1296.	LD3	+1288.	LD4
8	+49.	D1	+30.	D2	+12.	D3	-.	D4
11	-21.	D5	-20.	D6	+7.	D7	+21.	D8
15	+38.	D9	+46.	D10	-48.	D11	-50.	D12
19	+18.	D13	+13.	D14	-81.	S1	-38.	S2
23	-44.	S3	+.	S4	+9.	S5	+48.	S6
27	-331.	S7	-350.	S8	-216.	S9	-262.	S10
31	-374.	S11	-372.	S12	-392.	S13	-212.	S14
35	-263.	S15	-426.	S16	-477.	S17	-319.	S18
39	-173.	S19	-451.	S20	-386.	S21	-380.	S22
43	+41.	S23	+61.	S24	-233.	S25	-238.	S26
47	-296.	S27	-443.	S28	-400.	S29	-402.	S30
51	-267.	S31	-301.	S32	-140.	S33	-243.	S34
55	-287.	S35	-197.	S36	-554.	S37	+21.	S38
59	+96.	S39	+44.	S40				

ADAPTR C2-F 100%   DATE: 11 / 13 / 73   TIME: 13 : 26 : 2

FILE: 12   RECORD: 9   CHANNELS 3 THROUGH 60

CHAN								
3	+6057.	LD1	+6119.	LD2	+1656.	LD3	+1649.	LD4
7	+63.	D1	+37.	D2	+16.	D3	-.	D4
11	-28.	D5	-25.	D6	+10.	D7	+27.	D8
15	+51.	D9	+63.	D10	-59.	D11	-56.	D12
19	+23.	D13	+22.	D14	-110.	S1	-52.	S2
23	-54.	S3	+2.	S4	+12.	S5	+58.	S6
27	-424.	S7	-444.	S8	-273.	S9	-334.	S10
31	-472.	S11	-469.	S12	-500.	S13	-274.	S14
35	-327.	S15	-551.	S16	-605.	S17	-414.	S18
39	-213.	S19	-530.	S20	-489.	S21	-498.	S22
43	+54.	S23	+76.	S24	-319.	S25	-312.	S26
47	-345.	S27	-570.	S28	-511.	S29	-517.	S30
51	-341.	S31	-386.	S32	-177.	S33	-310.	S34
55	-371.	S35	-253.	S36	-714.	S37	+28.	S38
59	+130.	S39	+73.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 110%   DATE: 11 / 13 / 73   TIME: 13 : 33 : 6

FILE: 12   RECORD: 10   CHANNELS 3 THROUGH 60

CHAN								
3	+6672.	LD1	+6755.	LD2	+1840.	LD3	+1762.	LD4
7	+70.	D1	+40.	D2	+18.	D3	-.	D4
11	-31.	D5	-30.	D6	+11.	D7	+29.	D8
15	+55.	D9	+68.	D10	-66.	D11	-71.	D12
19	+25.	D13	+24.	D14	-125.	S1	-55.	S2
23	-64.	S3	+4.	S4	+14.	S5	+55.	S6
27	-468.	S7	-483.	S8	-298.	S9	-360.	S10
31	-521.	S11	-518.	S12	-551.	S13	-304.	S14
35	-346.	S15	-620.	S16	-667.	S17	-465.	S18
39	-235.	S19	-652.	S20	-543.	S21	-555.	S22
43	+63.	S23	+81.	S24	-344.	S25	-336.	S26
47	-345.	S27	-604.	S28	-552.	S29	-556.	S30
51	-373.	S31	-415.	S32	-196.	S33	-334.	S34
55	-401.	S35	-274.	S36	-773.	S37	+28.	S38
59	+148.	S39	+85.	S40				

ADAPTR C2-F 120%   DATE: 11 / 13 / 73   TIME: 13 : 34 : 52

FILE: 12   RECORD: 11   CHANNELS 3 THROUGH 60

CHAN								
3	+7395.	LD1	+7354.	LD2	+1949.	LD3	+1935.	LD4
7	+77.	D1	+48.	D2	+22.	D3	-.	D4
11	-35.	D5	-35.	D6	+11.	D7	+33.	D8
15	+62.	D9	+76.	D10	-75.	D11	-77.	D12
19	+29.	D13	+27.	D14	-133.	S1	-60.	S2
23	-74.	S3	+4.	S4	+19.	S5	+75.	S6
27	-517.	S7	-533.	S8	-332.	S9	-399.	S10
31	-575.	S11	-576.	S12	-615.	S13	-341.	S14
35	-376.	S15	-701.	S16	-748.	S17	-530.	S18
39	-249.	S19	-743.	S20	-684.	S21	-627.	S22
43	+66.	S23	+93.	S24	-386.	S25	-373.	S26
47	-370.	S27	-669.	S28	-609.	S29	-614.	S30
51	-415.	S31	-458.	S32	-214.	S33	-373.	S34
55	-445.	S35	-308.	S36	-856.	S37	+53.	S38
59	+185.	S39	+100.	S40				

ADAPTR C2-F 4Ø%   DATE: 11 / 13 / 73   TIME: 13 : 37 : 8

FILE: 12   RECORD: 12   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2441.	LD1	+2378.	LD2	+56Ø.	LD3	+595.	LD4
Ø	+27.	D1	+15.	D2	+12.	D3	-.	D4
11	-2Ø.	D5	-17.	D6	+5.	D7	+15.	D8
15	+23.	D9	+27.	D1Ø	-31.	D11	-25.	D12
19	+18.	D13	+12.	D14	-56.	S1	-12.	S2
23	-29.	S3	-4.	S4	+9.	S5	+26.	S6
27	-174.	S7	-175.	S8	-113.	S9	-129.	S1Ø
31	-199.	S11	-188.	S12	-2Ø3.	S13	-1Ø6.	S14
35	-13Ø.	S15	-214.	S16	-231.	S17	-149.	S18
39	-97.	S19	-225.	S2Ø	-194.	S21	-182.	S22
43	+24.	S23	+32.	S24	-1Ø5.	S25	-1Ø5.	S26
47	-162.	S27	-169.	S28	-216.	S29	-187.	S3Ø
51	-142.	S31	-144.	S32	-68.	S33	-113.	S34
55	-142.	S35	-94.	S36	-267.	S37	+12.	S38
59	+32.	S39	+14.	S4Ø				

ADAPTR C2-F 13Ø%   DATE: 11 / 13 / 73   TIME: 13 : 44 : 32

FILE: 12   RECORD: 13   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+8Ø28.	LD1	+7935.	LD2	+2Ø91.	LD3	+21Ø8.	LD4
Ø	+85.	D1	+51.	D2	+24.	D3	-1.	D4
11	-38.	D5	-4Ø.	D6	+14.	D7	+36.	D8
15	+36.	D9	+85.	D1Ø	-83.	D11	-84.	D12
19	+33.	D13	+3Ø.	D14	-142.	S1	-64.	S2
23	-79.	S3	+7.	S4	+19.	S5	+82.	S6
27	-561.	S7	-576.	S8	-371.	S9	-432.	S1Ø
31	-622.	S11	-627.	S12	-674.	S13	-373.	S14
35	-413.	S15	-783.	S16	-8Ø7.	S17	-586.	S18
39	-262.	S19	-813.	S2Ø	-656.	S21	-683.	S22
43	+78.	S23	+1Ø3.	S24	-422.	S25	-415.	S26
47	-339.	S27	-725.	S28	-658.	S29	-669.	S3Ø
51	-479.	S31	-497.	S32	-233.	S33	-482.	S34
55	-477.	S35	-332.	S36	-925.	S37	+33.	S38
59	+2Ø4.	S39	+119.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 140%   DATE: 11 / 13 / 73   TIME: 13 : 46 : 39

FILE: 12   RECORD: 14   CHANNELS 3 THROUGH 60

CHAN								
3	+8643.	LD1	+8625.	LD2	+2250.	LD3	+2246.	LD4
7	+95.	D1	+57.	D2	+25.	D3	-.	D4
11	-42.	D5	-43.	D6	+15.	D7	+40.	D8
15	+75.	D9	+94.	D10	-90.	D11	-94.	D12
19	+35.	D13	+34.	D14	-157.	S1	-67.	S2
23	-36.	S3	+12.	S4	+22.	S5	+84.	S6
27	-613.	S7	-627.	S8	-403.	S9	-471.	S10
31	-631.	S11	-680.	S12	-735.	S13	-412.	S14
35	-442.	S15	-854.	S16	-827.	S17	-653.	S18
39	-279.	S19	-887.	S20	-718.	S21	-743.	S22
43	+83.	S23	+116.	S24	-479.	S25	-464.	S26
47	-412.	S27	-786.	S28	-719.	S29	-732.	S30
51	-515.	S31	-540.	S32	-253.	S33	-441.	S34
55	-521.	S35	-368.	S36	-1011.	S37	+38.	S38
59	+239.	S39	+146.	S40				

ADAPTR C2-F 40%   DATE: 11 / 13 / 73   TIME: 13 : 50 : 35

FILE: 12   RECORD: 15   CHANNELS 3 THROUGH 60

CHAN								
3	+2423.	LD1	+2469.	LD2	+577.	LD3	+601.	LD4
7	+51.	D1	+16.	D2	+13.	D3	-.	D4
11	-20.	D5	-20.	D6	+6.	D7	+15.	D8
15	+23.	D9	+27.	D10	-32.	D11	-26.	D12
19	+19.	D13	+11.	D14	-64.	S1	-9.	S2
23	-27.	S3	+2.	S4	+9.	S5	+26.	S6
27	-171.	S7	-165.	S8	-120.	S9	-127.	S10
31	-211.	S11	-188.	S12	-210.	S13	-106.	S14
35	-134.	S15	-224.	S16	-231.	S17	-147.	S18
39	-33.	S19	-225.	S20	-189.	S21	-170.	S22
43	+29.	S23	+39.	S24	-108.	S25	-110.	S26
47	-160.	S27	-150.	S28	-218.	S29	-183.	S30
51	-164.	S31	-142.	S32	-68.	S33	-110.	S34
55	-140.	S35	-91.	S36	-267.	S37	+9.	S38
59	+34.	S39	+14.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 15Ø%   DATE: 11 / 13 / 73   TIME: 13 : 52 : 35

FILE: 12   RECORD: 16   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+9294.	LD1	+9243.	LD2	+24Ø9.	LD3	+2414.	LD4
7	+1Ø2.	D1	+62.	D2	+29.	D3	-.	D4
11	-46.	D5	-48.	D6	+14.	D7	+42.	D8
15	+81.	D9	+1Ø1.	D1Ø	-98.	D11	-1Ø2.	D12
19	+38.	D13	+38.	D14	-17Ø.	S1	-72.	S2
23	-91.	S3	+12.	S4	+22.	S5	+89.	S6
27	-659.	S7	-668.	S8	-426.	S9	-5Ø5.	S1Ø
31	-733.	S11	-731.	S12	-794.	S13	-452.	S14
35	-486.	S15	-945.	S16	-894.	S17	-716.	S18
39	-296.	S19	-964.	S2Ø	-772.	S21	-8Ø7.	S22
43	+88.	S23	+123.	S24	-518.	S25	-5Ø9.	S26
47	-424.	S27	-834.	S28	-771.	S29	-794.	S3Ø
51	-552.	S31	-581.	S32	-275.	S33	-472.	S34
55	-558.	S35	-395.	S36	-1Ø9Ø.	S37	+38.	S38
59	+276.	S39	+173.	S4Ø				

ADAPTR C2-F 16Ø%   DATE: 11 / 13 / 73   TIME: 13 : 53 : 55

FILE: 12   RECORD: 17   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+9873.	LD1	+98Ø6.	LD2	+2551.	LD3	+2562.	LD4
6	+11Ø.	D1	+66.	D2	+31.	D3	-.	D4
11	-49.	D5	-51.	D6	+18.	D7	+47.	D8
15	+86.	D9	+111.	D1Ø	-1Ø5.	D11	-11Ø.	D12
19	+41.	D13	+42.	D14	-182.	S1	-74.	S2
23	-93.	S3	+14.	S4	+24.	S5	+94.	S6
27	-736.	S7	-713.	S8	-455.	S9	-543.	S1Ø
31	-785.	S11	-779.	S12	-853.	S13	-492.	S14
35	-521.	S15	-1Ø36.	S16	-963.	S17	-775.	S18
39	-313.	S19	-1Ø46.	S2Ø	-826.	S21	-864.	S22
43	+95.	S23	+133.	S24	-577.	S25	-553.	S26
47	-441.	S27	-88Ø.	S28	-823.	S29	-855.	S3Ø
51	-587.	S31	-62Ø.	S32	-292.	S33	-5Ø8.	S34
55	-598.	S35	-426.	S36	-1161.	S37	+41.	S38
59	+328.	S39	+195.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR S2F 40% DATE: 11 / 13 / 73 TIME: 14 : 2 : 26

FILE: 12 RECORD: 19 CHANNELS 3 THROUGH 60

CHAN								
3	+2567.	LD1	+2560.	LD2	+577.	LD3	+621.	LD4
7	-1523.	D1	-1661.	D2	-1428.	D3	+275.	D4
11	-252.	D5	-997.	D6	-1450.	D7	-1605.	D8
15	-2109.	D9	-1504.	D10	-36.	D11	-62.	D12
19	+3.	D13	+12.	D14	-71.	S1	+.	S2
23	-24.	S3	+7.	S4	+4.	S5	+26.	S6
27	-188.	S7	-168.	S8	-125.	S9	-129.	S10
31	-238.	S11	-196.	S12	-225.	S13	-116.	S14
35	-223.	S15	-251.	S16	-248.	S17	-134.	S18
39	-83.	S19	-243.	S20	-194.	S21	-199.	S22
43	+31.	S23	+44.	S24	-110.	S25	-115.	S26
47	-133.	S27	-138.	S28	-228.	S29	-185.	S30
51	-174.	S31	-144.	S32	-76.	S33	-118.	S34
55	-142.	S35	-94.	S36	-279.	S37	+4.	S38
59	+37.	S39	+14.	S40				

ADAPTR C2-F 170% DATE: 11 / 13 / 73 TIME: 14 : 5 : 22

FILE: 12 RECORD: 20 CHANNELS 3 THROUGH 60

CHAN								
3	+10524.	LD1	+10478.	LD2	+2718.	LD3	+2735.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-114.	D11	-153.	D12
19	+29.	D13	+45.	D14	-202.	S1	-77.	S2
23	-103.	S3	+21.	S4	+24.	S5	+94.	S6
27	-757.	S7	-759.	S8	-482.	S9	-562.	S10
31	-853.	S11	-830.	S12	-917.	S13	-531.	S14
35	-590.	S15	-1135.	S16	-1031.	S17	-844.	S18
39	-328.	S19	-1130.	S20	-875.	S21	-945.	S22
43	+103.	S23	+143.	S24	-629.	S25	-617.	S26
47	-436.	S27	-921.	S28	-882.	S29	-925.	S30
51	-626.	S31	-663.	S32	-320.	S33	-539.	S34
55	-637.	S35	-455.	S36	-1242.	S37	+38.	S38
59	+399.	S39	+215.	S40				

Note: Deflection Transducers D1 thru D10 were disconnected prior to 170% loading increment. They were inoperative for the remainder of the test.

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40%   DATE: 11 / 13 / 73   TIME: 14 : 7 : 7

FILE: 12   RECORD: 21   CHANNELS 3 THROUGH 60

CHAN								
3	+2549.	LD1	+2560.	LD2	+568.	LD3	+611.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-37.	D11	-65.	D12
19	+6.	D13	+13.	D14	-78.	S1	+2.	S2
23	-27.	S3	+7.	S4	+4.	S5	+26.	S6
27	-188.	S7	-163.	S8	-120.	S9	-129.	S10
31	-246.	S11	-191.	S12	-225.	S13	-111.	S14
35	-228.	S15	-253.	S16	-248.	S17	-154.	S18
39	-83.	S19	-243.	S20	-186.	S21	-202.	S22
43	+29.	S23	+46.	S24	-115.	S25	-115.	S26
47	-120.	S27	-116.	S28	-230.	S29	-180.	S30
51	-169.	S31	-140.	S32	-76.	S33	-113.	S34
55	-140.	S35	-89.	S36	-274.	S37	+4.	S38
59	+41.	S39	+17.	S40				

ADAPTR C2-F 100%   DATE: 11 / 13 / 73   TIME: 14 : 10 : 5

FILE: 12   RECORD: 22   CHANNELS 3 THROUGH 60

CHAN								
3	+11139.	LD1	+11059.	LD2	+2869.	LD3	+2903.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-122.	D11	-162.	D12
19	+32.	D13	+49.	D14	-209.	S1	-81.	S2
23	-111.	S3	+26.	S4	+22.	S5	+96.	S6
27	-807.	S7	-802.	S8	-507.	S9	-618.	S10
31	-910.	S11	-878.	S12	-978.	S13	-571.	S14
35	-619.	S15	-1236.	S16	-1105.	S17	-903.	S18
39	-347.	S19	-1225.	S20	-931.	S21	-1017.	S22
43	+105.	S23	+153.	S24	-688.	S25	-676.	S26
47	-439.	S27	-965.	S28	-931.	S29	-994.	S30
51	-663.	S31	-702.	S32	-339.	S33	-575.	S34
55	-676.	S35	-489.	S36	-1315.	S37	+41.	S38
59	+481.	S39	+242.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 4Ø%   DATE: 11 / 13 / 73   TIME: 14 : 12 : 32

FILE: 12   RECORD: 23   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2477.	LD1	+2487.	LD2	+56Ø.	LD3	+616.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-37.	D11	-65.	D12
19	+5.	D13	+12.	D14	-81.	S1	+7.	S2
23	-24.	S3	+9.	S4	+7.	S5	+21.	S6
27	-186.	S7	-151.	S8	-115.	S9	-12Ø.	S1Ø
31	-251.	S11	-181.	S12	-218.	S13	-1Ø6.	S14
35	-226.	S15	-251.	S16	-246.	S17	-149.	S18
39	-78.	S19	-24Ø.	S2Ø	-174.	S21	-192.	S22
43	+27.	S23	+46.	S24	-113.	S25	-11Ø.	S26
47	-98.	S27	-89.	S28	-226.	S29	-163.	S3Ø
51	-162.	S31	-13Ø.	S32	-73.	S33	-1Ø6.	S34
55	-132.	S35	-84.	S36	-262.	S37	+2.	S38
59	+41.	S39	+14.	S4Ø				

ADAPTR C2-F 19Ø%   DATE: 11 / 13 / 73   TIME: 14 : 15 : 36

FILE: 12   RECORD: 24   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+1179Ø.	LD1	+11658.	LD2	+3Ø28.	LD3	+3Ø41.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-13Ø.	D11	-17Ø.	D12
19	+35.	D13	+53.	D14	-221.	S1	-93.	S2
23	-123.	S3	+31.	S4	+19.	S5	+96.	S6
27	-856.	S7	-855.	S8	-536.	S9	-656.	S1Ø
31	-969.	S11	-929.	S12	-1Ø44.	S13	-615.	S14
35	-641.	S15	-1339.	S16	-1162.	S17	-957.	S18
39	-365.	S19	-1334.	S2Ø	-993.	S21	-1Ø74.	S22
43	+11Ø.	S23	+165.	S24	-727.	S25	-74Ø.	S26
47	-444.	S27	-1ØØ9.	S28	-982.	S29	-1Ø72.	S3Ø
51	-76Ø.	S31	-743.	S32	-351.	S33	-614.	S34
55	-716.	S35	-523.	S36	-14Ø1.	S37	+43.	S38
59	+612.	S39	+271.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40% DATE: 11 / 13 / 73 TIME: 14 : 18 : 2

FILE: 12 RECORD: 25 CHANNELS 3 THROUGH 60

CHAN								
3	+2495.	LD1	+2542.	LD2	+560.	LD3	+595.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-38.	D11	-67.	D12
19	+5.	D13	+13.	D14	-86.	S1	+7.	S2
23	-22.	S3	+14.	S4	+.	S5	+21.	S6
27	-188.	S7	-146.	S8	-115.	S9	-120.	S10
31	-260.	S11	-179.	S12	-218.	S13	-106.	S14
35	-231.	S15	-258.	S16	-248.	S17	-149.	S18
39	-78.	S19	-245.	S20	-169.	S21	-187.	S22
43	+24.	S23	+49.	S24	-115.	S25	-113.	S26
47	-83.	S27	-77.	S28	-230.	S29	-161.	S30
51	-167.	S31	-127.	S32	-73.	S33	-106.	S34
55	-132.	S35	-86.	S36	-265.	S37	+4.	S38
59	+49.	S39	+17.	S40				

ADAPTR C2-F 200% DATE: 11 / 13 / 73 TIME: 14 : 20 : 30

FILE: 12 RECORD: 26 CHANNELS 3 THROUGH 60

CHAN								
3	+12350.	LD1	+12330.	LD2	+3187.	LD3	+3193.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-138.	D11	-180.	D12
19	+37.	D13	+58.	D14	-236.	S1	-105.	S2
23	-133.	S3	+38.	S4	+14.	S5	+101.	S6
27	-910.	S7	-908.	S8	-568.	S9	-697.	S10
31	-1028.	S11	-982.	S12	-1103.	S13	-655.	S14
35	-671.	S15	-1438.	S16	-1229.	S17	-1018.	S18
39	-384.	S19	-1423.	S20	-1045.	S21	-1138.	S22
43	+115.	S23	+175.	S24	-779.	S25	-811.	S26
47	-444.	S27	-1052.	S28	-1031.	S29	-1156.	S30
51	-739.	S31	-791.	S32	-386.	S33	-657.	S34
55	-760.	S35	-566.	S36	-1487.	S37	+45.	S38
59	+691.	S39	+298.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 4Ø%   DATE: 11 / 13 / 73   TIME: 14 : 22 : 12

FILE: 12   RECORD: 27   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2495.	LD1	+2542.	LD2	+56Ø.	LD3	+6Ø6.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-39.	D11	-67.	D12
19	+6.	D13	+14.	D14	-93.	S1	+9.	S2
23	-22.	S3	+14.	S4	+.	S5	+21.	S6
27	-191.	S7	-139.	S8	-11Ø.	S9	-113.	S1Ø
31	-268.	S11	-174.	S12	-218.	S13	-1Ø6.	S14
35	-233.	S15	-261.	S16	-243.	S17	-149.	S18
39	-78.	S19	-245.	S2Ø	-159.	S21	-18Ø.	S22
43	+22.	S23	+49.	S24	-115.	S25	-115.	S26
47	-71.	S27	-6Ø.	S28	-23Ø.	S29	-151.	S3Ø
51	-164.	S31	-123.	S32	-73.	S33	-1Ø3.	S34
55	-13Ø.	S35	-89.	S36	-262.	S37	+4.	S38
59	+54.	S39	+17.	S4Ø				

ADAPTR C2-F 21Ø%   DATE: 11 / 13 / 73   TIME: 14 : 26 : 11

FILE: 12   RECORD: 28   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+13ØØ1.	LD1	+12948.	LD2	+3354.	LD3	+3356.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-147.	D11	-189.	D12
19	+41.	D13	+62.	D14	-246.	S1	-125.	S2
23	-145.	S3	+43.	S4	+12.	S5	+1Ø1.	S6
27	-961.	S7	-958.	S8	-598.	S9	-738.	S1Ø
31	-1Ø85.	S11	-1Ø38.	S12	-117Ø.	S13	-699.	S14
35	-7Ø8.	S15	-1541.	S16	-13Ø2.	S17	-1Ø87.	S18
39	-4Ø6.	S19	-1525.	S2Ø	-11Ø6.	S21	-1197.	S22
43	+12Ø.	S23	+187.	S24	-823.	S25	-882.	S26
47	-456.	S27	-1Ø94.	S28	-1Ø93.	S29	-124Ø.	S3Ø
51	-781.	S31	-849.	S32	-413.	S33	-7Ø1.	S34
55	-799.	S35	-619.	S36	-1568.	S37	+48.	S38
59	+765.	S39	+323.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40% DATE: 11 / 13 / 73 TIME: 14 : 32 : 6

FILE: 12 RECORD: 31 CHANNELS 3 THROUGH 60

CHAN								
3	+2495.	LD1	+2506.	LD2	+560.	LD3	+601.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-41.	D11	-69.	D12
19	+6.	D13	+14.	D14	-105.	S1	+7.	S2
23	-24.	S3	+16.	S4	-2.	S5	+16.	S6
27	-198.	S7	-127.	S8	-108.	S9	-105.	S10
31	-290.	S11	-159.	S12	-220.	S13	-111.	S14
35	-248.	S15	-273.	S16	-251.	S17	-149.	S18
39	-85.	S19	-255.	S20	-149.	S21	-187.	S22
43	+17.	S23	+49.	S24	-120.	S25	-118.	S26
47	-27.	S27	-33.	S28	-235.	S29	-130.	S30
51	-164.	S31	-115.	S32	-73.	S33	-96.	S34
55	-125.	S35	-106.	S36	-255.	S37	+2.	S38
59	+61.	S39	+17.	S40				

ADAPTR C2-F 230% DATE: 11 / 13 / 73 TIME: 14 : 34 : 58

FILE: 12 RECORD: 32 CHANNELS 3 THROUGH 60

CHAN								
3	+14231.	LD1	+14201.	LD2	+3672.	LD3	+3672.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-167.	D11	-210.	D12
19	+41.	D13	+71.	D14	-290.	S1	-180.	S2
23	-180.	S3	+45.	S4	+2.	S5	+104.	S6
27	-1071.	S7	-1090.	S8	-667.	S9	-832.	S10
31	-1200.	S11	-1181.	S12	-1300.	S13	-788.	S14
35	-786.	S15	-1751.	S16	-1460.	S17	-1232.	S18
39	-465.	S19	-1733.	S20	-1236.	S21	-1350.	S22
43	+127.	S23	+202.	S24	-922.	S25	-1035.	S26
47	-463.	S27	-1183.	S28	-1203.	S29	-1423.	S30
51	-862.	S31	-965.	S32	-467.	S33	-797.	S34
55	-883.	S35	-704.	S36	-1743.	S37	+50.	S38
59	+906.	S39	+372.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40%   DATE: 11 / 13 / 73   TIME: 14 : 36 : 40

FILE: 12   RECORD: 33   CHANNELS 3 THROUGH 60

CHAN								
3	+2495.	LD1	+2524.	LD2	+568.	LD3	+590.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-43.	D11	-70.	D12
19	+6.	D13	+15.	D14	-115.	S1	+2.	S2
23	-24.	S3	+16.	S4	-4.	S5	+14.	S6
27	-201.	S7	-122.	S8	-105.	S9	-101.	S10
31	-305.	S11	-154.	S12	-220.	S13	-111.	S14
35	-258.	S15	-280.	S16	-253.	S17	-152.	S18
39	-85.	S19	-257.	S20	-145.	S21	-190.	S22
43	+14.	S23	+46.	S24	-118.	S25	-118.	S26
47	-14.	S27	-19.	S28	-240.	S29	-120.	S30
51	-162.	S31	-113.	S32	-73.	S33	-91.	S34
55	-123.	S35	-101.	S36	-250.	S37	+.	S38
59	+69.	S39	+17.	S40				

ADAPTR C2-F 240%   DATE: 11 / 13 / 73   TIME: 14 : 39 : 13

FILE: 12   RECORD: 34   CHANNELS 3 THROUGH 60

CHAN								
3	+14882.	LD1	+14818.	LD2	+3839.	LD3	+3835.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-177.	D11	-221.	D12
19	+41.	D13	+75.	D14	-315.	S1	-204.	S2
23	-195.	S3	+53.	S4	+.	S5	+106.	S6
27	-1128.	S7	-1146.	S8	-701.	S9	-877.	S10
31	-1262.	S11	-1254.	S12	-1361.	S13	-838.	S14
35	-831.	S15	-1857.	S16	-1541.	S17	-1308.	S18
39	-494.	S19	-1847.	S20	-1303.	S21	-1429.	S22
43	+135.	S23	+212.	S24	-959.	S25	-1113.	S26
47	-471.	S27	-1227.	S28	-1257.	S29	-1508.	S30
51	-901.	S31	-1023.	S32	-492.	S33	-845.	S34
55	-927.	S35	-749.	S36	-1828.	S37	+55.	S38
59	+975.	S39	+391.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40% DATE: 11 / 13 / 73 TIME: 14 : 43 : 30

FILE: 12 RECORD: 35 CHANNELS 3 THROUGH 60

CHAN								
3	+2495.	LD1	+2524.	LD2	+560.	LD3	+590.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-46.	D11	-72.	D12
19	+7.	D13	+16.	D14	-130.	S1	-9.	S2
23	-22.	S3	+21.	S4	-7.	S5	+16.	S6
27	-201.	S7	-91.	S8	-96.	S9	-88.	S10
31	-329.	S11	-135.	S12	-218.	S13	-111.	S14
35	-272.	S15	-288.	S16	-258.	S17	-152.	S18
39	-90.	S19	-265.	S20	-140.	S21	-185.	S22
43	+19.	S23	+54.	S24	-115.	S25	-118.	S26
47	+24.	S27	+4.	S28	-245.	S29	-93.	S30
51	-152.	S31	-96.	S32	-68.	S33	-81.	S34
55	-115.	S35	-96.	S36	-243.	S37	+.	S38
59	+76.	S39	+17.	S40				

ADAPTR C2-F 260% DATE: 11 / 13 / 73 TIME: 14 : 48 : 13

FILE: 12 RECORD: 36 CHANNELS 3 THROUGH 60

CHAN								
3	+16148.	LD1	+16071.	LD2	+4174.	LD3	+4151.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-198.	D11	-242.	D12
19	+41.	D13	+85.	D14	-374.	S1	-269.	S2
23	-224.	S3	+62.	S4	-9.	S5	+111.	S6
27	-1246.	S7	-1249.	S8	-763.	S9	-978.	S10
31	-1385.	S11	-1401.	S12	-1493.	S13	-934.	S14
35	-922.	S15	-2066.	S16	-1699.	S17	-1458.	S18
39	-543.	S19	-2073.	S20	-1443.	S21	-1592.	S22
43	+152.	S23	+239.	S24	-1054.	S25	-1268.	S26
47	-498.	S27	-1322.	S28	-1380.	S29	-1698.	S30
51	-987.	S31	-1146.	S32	-541.	S33	-954.	S34
55	-1013.	S35	-867.	S36	-2003.	S37	+60.	S38
59	+1113.	S39	+435.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40%   DATE: 11 / 13 / 73   TIME: 14 : 49 : 50

FILE: 12   RECORD: 37   CHANNELS 3 THROUGH 60

CHAN								
3	+2513.	LD1	+2542.	LD2	+560.	LD3	+601.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-49.	D11	-75.	D12
19	+6.	D13	+17.	D14	-133.	S1	-14.	S2
23	-22.	S3	+26.	S4	-9.	S5	+14.	S6
27	-201.	S7	-69.	S8	-93.	S9	-79.	S10
31	-347.	S11	-123.	S12	-218.	S13	-116.	S14
35	-290.	S15	-300.	S16	-258.	S17	-154.	S18
39	-90.	S19	-272.	S20	-135.	S21	-197.	S22
43	+19.	S23	+56.	S24	-113.	S25	-120.	S26
47	+64.	S27	+26.	S28	-245.	S29	-79.	S30
51	-149.	S31	-89.	S32	-68.	S33	-77.	S34
55	-113.	S35	-118.	S36	-238.	S37	+.	S38
59	+86.	S39	+17.	S40				

ADAPTR C2-F 280%   DATE: 11 / 13 / 73   TIME: 14 : 53 : 57

FILE: 12   RECORD: 38   CHANNELS 3 THROUGH 60

CHAN								
3	+17432.	LD1	+17306.	LD2	+4492.	LD3	+4482.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-220.	D11	-264.	D12
19	+41.	D13	+95.	D14	-426.	S1	-336.	S2
23	-259.	S3	+67.	S4	-19.	S5	+113.	S6
27	-1371.	S7	-1372.	S8	-830.	S9	-1094.	S10
31	-1501.	S11	-1576.	S12	-1628.	S13	-1033.	S14
35	-1015.	S15	-2275.	S16	-1869.	S17	-1615.	S18
39	-583.	S19	-2311.	S20	-1581.	S21	-1708.	S22
43	+167.	S23	+261.	S24	-1153.	S25	-1431.	S26
47	-525.	S27	-1416.	S28	-1496.	S29	-1910.	S30
51	-1073.	S31	-1281.	S32	-590.	S33	-1077.	S34
55	-1100.	S35	-966.	S36	-2172.	S37	+65.	S38
59	+1264.	S39	+465.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 4Ø%   DATE: 11 / 13 / 73   TIME: 14 : 57 : 23

FILE: 12   RECORD: 39   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2495.	LD1	+2524.	LD2	+552.	LD3	+59Ø.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-54.	D11	-79.	D12
19	+7.	D13	+18.	D14	-142.	S1	-31.	S2
23	-19.	S3	+28.	S4	-14.	S5	+12.	S6
27	-198.	S7	-28.	S8	-83.	S9	-6Ø.	S1Ø
31	-374.	S11	-1Ø1.	S12	-215.	S13	-121.	S14
35	-319.	S15	-31Ø.	S16	-266.	S17	-162.	S18
39	-1Ø2.	S19	-275.	S2Ø	-125.	S21	-2Ø9.	S22
43	+17.	S23	+54.	S24	-115.	S25	-125.	S26
47	+12Ø.	S27	+63.	S28	-24Ø.	S29	-43.	S3Ø
51	-14Ø.	S31	-72.	S32	-64.	S33	-67.	S34
55	-1Ø5.	S35	-144.	S36	-223.	S37	+.	S38
59	+1Ø1.	S39	+19.	S4Ø				

ADAPTR C2-F 3ØØ%   DATE: 11 / 13 / 73   TIME: 15 : Ø : 21

FILE: 12   RECORD: 4Ø   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+18643.	LD1	+18541.	LD2	+4793.	LD3	+4778.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-242.	D11	-286.	D12
19	+41.	D13	+1Ø4.	D14	-465.	S1	-426.	S2
23	-286.	S3	+69.	S4	-32.	S5	+113.	S6
27	-1486.	S7	-1477.	S8	-894.	S9	-12Ø9.	S1Ø
31	-1624.	S11	-1723.	S12	-1761.	S13	-1127.	S14
35	-1118.	S15	-2497.	S16	-2Ø36.	S17	-1772.	S18
39	-666.	S19	-2544.	S2Ø	-1723.	S21	-1859.	S22
43	+177.	S23	+276.	S24	-1259.	S25	-1593.	S26
47	-575.	S27	-1555.	S28	-1597.	S29	-2139.	S3Ø
51	-1162.	S31	-1419.	S32	-64Ø.	S33	-12Ø9.	S34
55	-1186.	S35	-1Ø19.	S36	-2344.	S37	+67.	S38
59	+1432.	S39	+499.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 4Ø% DATE: 11 / 13 / 73 TIME: 15 : 2 : 5

FILE: 12 RECORD: 41 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2495.	LD1	+2524.	LD2	+552.	LD3	+59Ø.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-56.	D11	-81.	D12
19	+7.	D13	+19.	D14	-142.	S1	-4Ø.	S2
23	-14.	S3	+33.	S4	-17.	S5	+9.	S6
27	-196.	S7	-4.	S8	-76.	S9	-48.	S1Ø
31	-388.	S11	-87.	S12	-213.	S13	-123.	S14
35	-339.	S15	-32Ø.	S16	-268.	S17	-166.	S18
39	-115.	S19	-28Ø.	S2Ø	-12Ø.	S21	-214.	S22
43	+14.	S23	+49.	S24	-118.	S25	-122.	S26
47	+138.	S27	+77.	S28	-238.	S29	-31.	S3Ø
51	-137.	S31	-65.	S32	-64.	S33	-6Ø.	S34
55	-1Ø3.	S35	-113.	S36	-218.	S37	+.	S38
59	+12Ø.	S39	+22.	S4Ø				

ADAPTR C2-F 32Ø% DATE: 11 / 13 / 73 TIME: 15 : 5 : 28

FILE: 12 RECORD: 42 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+19891.	LD1	+19812.	LD2	+5Ø94.	LD3	+5Ø88.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D1Ø	-264.	D11	-3Ø8.	D12
19	+41.	D13	+113.	D14	-497.	S1	-5Ø5.	S2
23	-321.	S3	+72.	S4	-46.	S5	+116.	S6
27	-1596.	S7	-1634.	S8	-963.	S9	-1344.	S1Ø
31	-173Ø.	S11	-23965.	S12	-1896.	S13	-1229.	S14
35	-1227.	S15	-27Ø6.	S16	-2194.	S17	-1936.	S18
39	-759.	S19	-278Ø.	S2Ø	-1876.	S21	-2ØØ7.	S22
43	+189.	S23	+293.	S24	-1354.	S25	-1755.	S26
47	-646.	S27	-17Ø5.	S28	-1697.	S29	-24Ø8.	S3Ø
51	-1255.	S31	-1571.	S32	-686.	S33	-1356.	S34
55	-1282.	S35	-11Ø6.	S36	-2523.	S37	+77.	S38
59	+1634.	S39	+518.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40%   DATE: 11 / 13 / 73   TIME: 15 : 6 : 59

FILE: 12   RECORD: 43   CHANNELS 3 THROUGH 60

CHAN								
3	+2513.	LD1	+2560.	LD2	+552.	LD3	+595.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-61.	D11	-85.	D12
19	+8.	D13	+21.	D14	-138.	S1	-45.	S2
23	-14.	S3	+36.	S4	-19.	S5	+7.	S6
27	-196.	S7	+12.	S8	-73.	S9	-40.	S10
31	-406.	S11	-75.	S12	-215.	S13	-126.	S14
35	-361.	S15	-327.	S16	-273.	S17	-169.	S18
39	-132.	S19	-290.	S20	-113.	S21	-224.	S22
43	+14.	S23	+51.	S24	-118.	S25	-118.	S26
47	+157.	S27	+94.	S28	-243.	S29	-14.	S30
51	-127.	S31	-57.	S32	-61.	S33	-53.	S34
55	-100.	S35	-120.	S36	-213.	S37	+.	S38
59	+153.	S39	+22.	S40				

ADAPTR C2-F 338%   DATE: 11 / 13 / 73   TIME: 15 : 12 : 11

FILE: 12   RECORD: 44   CHANNELS 3 THROUGH 60

CHAN								
3	+20976.	LD1	+20865.	LD2	+5353.	LD3	+5363.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-282.	D11	-326.	D12
19	+41.	D13	+122.	D14	-522.	S1	-558.	S2
23	-350.	S3	+69.	S4	-51.	S5	+118.	S6
27	-1687.	S7	-1797.	S8	-1014.	S9	-1476.	S10
31	-1821.	S11	-23781.	S12	-2018.	S13	-1318.	S14
35	-1315.	S15	-2906.	S16	-2342.	S17	-2076.	S18
39	-840.	S19	-2990.	S20	-2013.	S21	-2135.	S22
43	+206.	S23	+318.	S24	-1450.	S25	-1888.	S26
47	-695.	S27	-1829.	S28	-1778.	S29	-2637.	S30
51	-1334.	S31	-1711.	S32	-723.	S33	-1494.	S34
55	-1365.	S35	-1171.	S36	-2683.	S37	+84.	S38
59	+1987.	S39	+536.	S40				

Note: Test stopped at 538% to adjust Edison Load Maintainer.

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 4Ø% DATE: 11 / 14 / 73 TIME: 8 : 12 : 29

FILE: 13 RECORD: 5 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+235Ø.	LD1	+256Ø.	LD2	+619.	LD3	+636.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D1Ø	-22.	D11	-28.	D12
19	+7.	D13	+3.	D14	-39.	S1	-16.	S2
23	-19.	S3	+4.	S4	+.	S5	+24.	S6
27	-164.	S7	-173.	S8	-1Ø8.	S9	-129.	S1Ø
31	-187.	S11	-183.	S12	-196.	S13	-1Ø1.	S14
35	-132.	S15	-2Ø1.	S16	-224.	S17	-149.	S18
39	-83.	S19	-21Ø.	S2Ø	-181.	S21	-13Ø.	S22
43	+22.	S23	+34.	S24	-13Ø.	S25	-118.	S26
47	-165.	S27	-167.	S28	-196.	S29	-197.	S3Ø
51	-13Ø.	S31	-147.	S32	-71.	S33	-118.	S34
55	-142.	S35	-94.	S36	-267.	S37	+14.	S38
59	+74.	S39	+9.	S4Ø				

ADPTRC2F 1ØØ% DATE: 11 / 14 / 73 TIME: 8 : 14 : 34

FILE: 13 RECORD: 6 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+5913.	LD1	+61Ø1.	LD2	+16Ø6.	LD3	+16Ø9.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D1Ø	-57.	D11	-67.	D12
19	+22.	D13	+18.	D14	-1Ø5.	S1	-52.	S2
23	-49.	S3	+7.	S4	+12.	S5	+58.	S6
27	-417.	S7	-427.	S8	-263.	S9	-319.	S1Ø
31	-47Ø.	S11	-459.	S12	-493.	S13	-267.	S14
35	-314.	S15	-561.	S16	-593.	S17	-412.	S18
39	-2Ø3.	S19	-592.	S2Ø	-472.	S21	-498.	S22
43	+51.	S23	+76.	S24	-314.	S25	-299.	S26
47	-382.	S27	-477.	S28	-5Ø8.	S29	-5Ø1.	S3Ø
51	-326.	S31	-369.	S32	-172.	S33	-298.	S34
55	-359.	S35	-243.	S36	-677.	S37	+28.	S38
59	+222.	S39	+78.	S4Ø				

Note:Deflection Transducers D1 thru D10 were inoperative for test run 13A

ADPTRC2F 2ØØ%   DATE: 11 / 14 / 73   TIME: 8 : 16 : 24

FILE: 13   RECORD: 7   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+12Ø43.	LD1	+12312.	LD2	+3287.	LD3	+3199.	LD4
7		D1		D2	-.	D3	-.	D4
11	+.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø	-127.	D11	-148.	D12
19	+53.	D13	+56.	D14	-261.	S1	-142.	S2
23	-125.	S3	+31.	S4	+22.	S5	+1Ø1.	S6
27	-9ØØ.	S7	-891.	S8	-554.	S9	-68Ø.	S1Ø
31	-999.	S11	-97Ø.	S12	-1Ø84.	S13	-642.	S14
35	-568.	S15	-14Ø1.	S16	-12Ø4.	S17	-1Ø11.	S18
39	-394.	S19	-1423.	S2Ø	-1Ø37.	S21	-1133.	S22
43	+113.	S23	+158.	S24	-786.	S25	-8Ø1.	S26
47	-6Ø9.	S27	-1Ø69.	S28	-1Ø68.	S29	-1134.	S3Ø
51	-692.	S31	-794.	S32	-376.	S33	-655.	S34
55	-765.	S35	-566.	S36	-1475.	S37	+6Ø.	S38
59	+76Ø.	S39	+3Ø8.	S4Ø				

ADPTRC2F 3ØØ%   DATE: 11 / 14 / 73   TIME: 8 : 18 : 58

FILE: 13   RECORD: 8   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+18263.	LD1	+18486.	LD2	+49Ø1.	LD3	+4798.	LD4
7		D1		D2	+.	D3	+.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D1Ø	-217.	D11	-244.	D12
19	+91.	D13	+98.	D14	-443.	S1	-44Ø.	S2
23	-286.	S3	+55.	S4	-7.	S5	+125.	S6
27	-1461.	S7	-153Ø.	S8	-894.	S9	-1219.	S1Ø
31	-1528.	S11	-176Ø.	S12	-1729.	S13	-1Ø95.	S14
35	-951.	S15	-2423.	S16	-1977.	S17	-1738.	S18
39	-9Ø1.	S19	-2427.	S2Ø	-1723.	S21	-18Ø4.	S22
43	+181.	S23	+256.	S24	-1259.	S25	-1559.	S26
47	-811.	S27	-1676.	S28	-1611.	S29	-2182.	S3Ø
51	-112Ø.	S31	-1429.	S32	-622.	S33	-1214.	S34
55	-12Ø8.	S35	-974.	S36	-2356.	S37	+91.	S38
59	+259.	S39	+511.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 320% DATE: 11 / 14 / 73 TIME: 8 : 20 : 59

FILE: 13 RECORD: 9 CHANNELS 3 THROUGH 60

CHAN								
3	+19620.	LD1	+19794.	LD2	+5186.	LD3	+5119.	LD4
7	.	D1		D2	+.	D3	-.	D4
11	-.	D5	+.	D6	+.	D7		D8
15		D9		D10	-238.	D11	-266.	D12
19	+98.	D13	+107.	D14	-480.	S1	-524.	S2
23	-326.	S3	+50.	S4	-12.	S5	+130.	S6
27	-1582.	S7	-1708.	S8	-965.	S9	-1370.	S10
31	-1629.	S11	-1977.	S12	-1874.	S13	-1201.	S14
35	-1052.	S15	-2652.	S16	-2152.	S17	-1909.	S18
39	-982.	S19	-2661.	S20	-1898.	S21	-1950.	S22
43	+199.	S23	+278.	S24	-1364.	S25	-1731.	S26
47	-881.	S27	-1848.	S28	-1719.	S29	-2459.	S30
51	-1223.	S31	-1595.	S32	-672.	S33	-1376.	S34
55	-1306.	S35	-1065.	S36	-2548.	S37	+101.	S38
59	+269.	S39	+531.	S40				

ADPTRC2F 40% DATE: 11 / 14 / 73 TIME: 8 : 24 : 16

FILE: 13 RECORD: 10 CHANNELS 3 THROUGH 60

CHAN								
3	+2477.	LD1	+2542.	LD2	+627.	LD3	+657.	LD4
7		D1		D2	+.	D3	+.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D10	-40.	D11	-38.	D12
19	+12.	D13	+12.	D14	-105.	S1	-48.	S2
23	-34.	S3	+2.	S4	+17.	S5	+26.	S6
27	-181.	S7	-105.	S8	-88.	S9	-101.	S10
31	-295.	S11	-193.	S12	-210.	S13	-103.	S14
35	-186.	S15	-266.	S16	-258.	S17	-169.	S18
39	-132.	S19	-260.	S20	-191.	S21	-204.	S22
43	+22.	S23	+37.	S24	-122.	S25	-113.	S26
47	-44.	S27	-58.	S28	-248.	S29	-96.	S30
51	-117.	S31	-106.	S32	-59.	S33	-98.	S34
55	-140.	S35	-86.	S36	-260.	S37	+19.	S38
59	+83.	S39	+24.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13

ADAPTR C2-F 40%   DATE: 11 / 13 / 73   TIME: 14 : 27 : 45

FILE: 12   RECORD: 29   CHANNELS 3 THROUGH 60

CHAN								
3	+2477.	LD1	+2506.	LD2	+560.	LD3	+611.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-40.	D11	-68.	D12
19	+6.	D13	+14.	D14	-96.	S1	+12.	S2
23	-22.	S3	+16.	S4	+.	S5	+19.	S6
27	-191.	S7	-129.	S8	-105.	S9	-108.	S10
31	-278.	S11	-167.	S12	-220.	S13	-108.	S14
35	-240.	S15	-266.	S16	-248.	S17	-147.	S18
39	-75.	S19	-247.	S20	-152.	S21	-182.	S22
43	+22.	S23	+49.	S24	-113.	S25	-113.	S26
47	-44.	S27	-46.	S28	-233.	S29	-139.	S30
51	-162.	S31	-118.	S32	-73.	S33	-96.	S34
55	-125.	S35	-133.	S36	-252.	S37	+2.	S38
59	+56.	S39	+17.	S40				

ADAPTR C2-F 220%   DATE: 11 / 13 / 73   TIME: 14 : 33 : 19

FILE: 12   RECORD: 30   CHANNELS 3 THROUGH 60

CHAN								
3	+13616.	LD1	+13565.	LD2	+3564.	LD3	+3514.	LD4
7		D1		D2		D3		D4
11		D5		D6		D7		D8
15		D9		D10	-157.	D11	-199.	D12
19	+41.	D13	+66.	D14	-266.	S1	-146.	S2
23	-163.	S3	+43.	S4	+7.	S5	+101.	S6
27	-1015.	S7	-1028.	S8	-632.	S9	-784.	S10
31	-1146.	S11	-1106.	S12	-1233.	S13	-744.	S14
35	-747.	S15	-1647.	S16	-1381.	S17	-1163.	S18
39	-438.	S19	-1631.	S20	-1170.	S21	-1276.	S22
43	+125.	S23	+195.	S24	-870.	S25	-956.	S26
47	-454.	S27	-1140.	S28	-1147.	S29	-1329.	S30
51	-820.	S31	-902.	S32	-438.	S33	-747.	S34
55	-841.	S35	-675.	S36	-1657.	S37	+53.	S38
59	+836.	S39	+347.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 340%   DATE: 11 / 14 / 73   TIME: 8 : 30 : 17

FILE: 13   RECORD: 11   CHANNELS 3 THROUGH 60

CHAN								
3	+20958.	LD1	+21065.	LD2	+5428.	LD3	+5409.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D10	-261.	D11	-288.	D12
19	+107.	D13	+116.	D14	-497.	S1	-589.	S2
23	-368.	S3	+40.	S4	-19.	S5	+133.	S6
27	-1690.	S7	-1939.	S8	-1034.	S9	-1548.	S10
31	-1725.	S11	-2350.	S12	-2026.	S13	-1303.	S14
35	-1160.	S15	-2891.	S16	-2332.	S17	-2081.	S18
39	-1070.	S19	-2896.	S20	-2072.	S21	-2093.	S22
43	+218.	S23	+306.	S24	-1468.	S25	-1910.	S26
47	-942.	S27	-2013.	S28	-1805.	S29	-2755.	S30
51	-1334.	S31	-1779.	S32	-721.	S33	-1554.	S34
55	-1415.	S35	-1162.	S36	-2747.	S37	+108.	S38
59	+271.	S39	+555.	S40				

ADPTRC2F 40%   DATE: 11 / 14 / 73   TIME: 8 : 31 : 40

FILE: 13   RECORD: 12   CHANNELS 3 THROUGH 60

CHAN								
3	+2368.	LD1	+2487.	LD2	+602.	LD3	+662.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D10	-39.	D11	-36.	D12
19	+14.	D13	+11.	D14	-101.	S1	-50.	S2
23	-32.	S3	+2.	S4	+19.	S5	+24.	S6
27	-176.	S7	-96.	S8	-81.	S9	-93.	S10
31	-290.	S11	-186.	S12	-203.	S13	-98.	S14
35	-186.	S15	-256.	S16	-246.	S17	-162.	S18
39	-134.	S19	-247.	S20	-179.	S21	-185.	S22
43	+22.	S23	+32.	S24	-125.	S25	-110.	S26
47	-29.	S27	-43.	S28	-238.	S29	-34.	S30
51	-110.	S31	-98.	S32	-54.	S33	-93.	S34
55	-135.	S35	-81.	S36	-250.	S37	+19.	S38
59	+76.	S39	+24.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 360% DATE: 11 / 14 / 73 TIME: 8 : 34 : 10

FILE: 13 RECORD: 13 CHANNELS 3 THROUGH 60

CHAN								
3	+22224.	LD1	+22300.	LD2	+5771.	LD3	+5720.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D10	-281.	D11	-310.	D12
19	+116.	D13	+126.	D14	-527.	S1	-654.	S2
23	-410.	S3	+28.	S4	-29.	S5	+135.	S6
27	-1788.	S7	-2177.	S8	-1100.	S9	-1731.	S10
31	-1813.	S11	-25396.	S12	-2173.	S13	-1402.	S14
35	-1261.	S15	-3110.	S16	-2507.	S17	-2243.	S18
39	-1146.	S19	-3107.	S20	-2252.	S21	-2229.	S22
43	+231.	S23	+323.	S24	-1566.	S25	-2075.	S26
47	-999.	S27	-2156.	S28	-1839.	S29	-3052.	S30
51	-1437.	S31	-1960.	S32	-758.	S33	-1727.	S34
55	-1520.	S35	-1256.	S36	-2943.	S37	+118.	S38
59	+274.	S39	+570.	S40				

ADPTRC2F 40% DATE: 11 / 14 / 73 TIME: 8 : 36 : 20

FILE: 13 RECORD: 14 CHANNELS 3 THROUGH 60

CHAN								
3	+2368.	LD1	+2469.	LD2	+585.	LD3	+652.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D10	-40.	D11	-38.	D12
19	+15.	D13	+12.	D14	-93.	S1	-48.	S2
23	-34.	S3	+2.	S4	+19.	S5	+24.	S6
27	-176.	S7	-93.	S8	-31.	S9	-91.	S10
31	-295.	S11	-136.	S12	-203.	S13	-181.	S14
35	-194.	S15	-236.	S16	-248.	S17	-166.	S18
39	-147.	S19	-252.	S20	-179.	S21	-197.	S22
43	+22.	S23	+32.	S24	-125.	S25	-95.	S26
47	-24.	S27	-41.	S28	-240.	S29	-81.	S30
51	-110.	S31	-101.	S32	-54.	S33	-93.	S34
55	-135.	S35	-31.	S36	-247.	S37	+21.	S38
59	+76.	S39	+26.	S40				

ADPTRC2F 38Ø% DATE: 11 / 14 / 73 TIME: 8 : 38 : 36

FILE: 13 RECORD: 15 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+23453.	LD1	+23571.	LD2	+6Ø47.	LD3	+6Ø46.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	+.	D7		D8
15		D9		D1Ø	-3Ø3.	D11	-332.	D12
19	+126.	D13	+135.	D14	-569.	S1	-714.	S2
23	-454.	S3	+14.	S4	-41.	S5	+137.	S6
27	-1886.	S7	-2441.	S8	-1162.	S9	-1928.	S1Ø
31	-1944.	S11	-34697.	S12	-2325.	S13	-15Ø6.	S14
35	-1372.	S15	-3342.	S16	-2684.	S17	-24Ø5.	S18
39	-1227.	S19	-3345.	S2Ø	-2429.	S21	-2372.	S22
43	+245.	S23	+345.	S24	-1674.	S25	-2235.	S26
47	-1Ø73.	S27	-2297.	S28	-1975.	S29	-3362.	S3Ø
51	-1542.	S31	-2158.	S32	-812.	S33	-1915.	S34
55	-1631.	S35	-135Ø.	S36	-3137.	S37	+125.	S38
59	+274.	S39	+587.	S4Ø				

ADPTRC2F 4Ø% DATE: 11 / 14 / 73 TIME: 8 : 4Ø : 16

FILE: 13 RECORD: 16 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2386.	LD1	+25Ø6.	LD2	+577.	LD3	+662.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø	-42.	D11	-39.	D12
19	+16.	D13	+13.	D14	-96.	S1	-5Ø.	S2
23	-34.	S3	+2.	S4	+22.	S5	+26.	S6
27	-179.	S7	-93.	S8	-78.	S9	-91.	S1Ø
31	-3Ø2.	S11	-186.	S12	-2Ø8.	S13	-1Ø3.	S14
35	-2Ø4.	S15	-261.	S16	-253.	S17	-169.	S18
39	-156.	S19	-257.	S2Ø	-177.	S21	-192.	S22
43	+22.	S23	+29.	S24	-125.	S25	-83.	S26
47	-29.	S27	-36.	S28	-25Ø.	S29	-81.	S3Ø
51	-11Ø.	S31	-98.	S32	-54.	S33	-93.	S34
55	-137.	S35	-84.	S36	-25Ø.	S37	+24.	S38
59	+79.	S39	+29.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 400% DATE: 11 / 14 / 73 TIME: 8 : 42 : 34

FILE: 13 RECORD: 17 CHANNELS 3 THROUGH 60

CHAN								
3	+24755.	LD1	+24824.	LD2	+6382.	LD3	+6387.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D10	-325.	D11	-355.	D12
19	+134.	D13	+145.	D14	-611.	S1	-772.	S2
23	-506.	S3	+.	S4	-54.	S5	+140.	S6
27	-1974.	S7	-2722.	S8	-1221.	S9	-2130.	S10
31	-2074.	S11	-5548.	S12	-2482.	S13	-1604.	S14
35	-1477.	S15	-3586.	S16	-2874.	S17	-2572.	S18
39	-1303.	S19	-3586.	S20	-2616.	S21	-2508.	S22
43	+263.	S23	+362.	S24	-1770.	S25	-2397.	S26
47	-1152.	S27	-2438.	S28	-2056.	S29	-3635.	S30
51	-1651.	S31	-2363.	S32	-856.	S33	-2099.	S34
55	-1747.	S35	-1451.	S36	-3341.	S37	+135.	S38
59	+271.	S39	+602.	S40				

ADPTRC2F 40% DATE: 11 / 14 / 73 TIME: 8 : 43 : 55

FILE: 13 RECORD: 18 CHANNELS 3 THROUGH 60

CHAN								
3	+2386.	LD1	+2487.	LD2	+593.	LD3	+682.	LD4
7		D1		D2	-.	D3	-.	D4
11	-.	D5	+.	D6	+.	D7		D8
15		D9		D10	-46.	D11	-41.	D12
19	+18.	D13	+14.	D14	-101.	S1	-50.	S2
23	-34.	S3	+2.	S4	+27.	S5	+26.	S6
27	-179.	S7	-91.	S8	-76.	S9	-91.	S10
31	-315.	S11	-186.	S12	-208.	S13	-103.	S14
35	-209.	S15	-266.	S16	-253.	S17	-169.	S18
39	-171.	S19	-262.	S20	-172.	S21	-185.	S22
43	+17.	S23	+24.	S24	-118.	S25	-63.	S26
47	-37.	S27	-26.	S28	-253.	S29	-77.	S30
51	+105.	S31	-101.	S32	-54.	S33	-93.	S34
55	-135.	S35	-79.	S36	-243.	S37	+24.	S38
59	+79.	S39	+31.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 42Ø% DATE: 11 / 14 / 73 TIME: 8 : 47 : 43

FILE: 13 RECORD: 19 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+25985.	LD1	+26Ø59.	LD2	+67ØØ.	LD3	+6729.	LD4
7		D1		D2	+.	D3	+.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D1Ø	-348.	D11	-377.	D12
19	+142.	D13	+155.	D14	-655.	S1	-823.	S2
23	-553.	S3	-9.	S4	-64.	S5	+14Ø.	S6
27	-2Ø55.	S7	-3ØØ8.	S8	-1283.	S9	-2332.	S1Ø
31	-22Ø5.	S11	-3977Ø.	S12	-2639.	S13	-17Ø6.	S14
35	-1576.	S15	-3839.	S16	-3Ø61.	S17	-2739.	S18
39	-1376.	S19	-3841.	S2Ø	-28Ø8.	S21	-2641.	S22
43	+275.	S23	+38Ø.	S24	-1859.	S25	-2552.	S26
47	-1234.	S27	-2576.	S28	-2127.	S29	-4Ø23.	S3Ø
51	-1759.	S31	-2568.	S32	-898.	S33	-2287.	S34
55	-1858.	S35	-1547.	S36	-354Ø.	S37	+144.	S38
59	+269.	S39	+616.	S4Ø				

3ADPTRC2F 4Ø% DATE: 11 / 14 / 73 TIME: 8 : 49 : Ø

FILE: 13 RECORD: 2Ø CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2386.	LD1	+2469.	LD2	+56Ø.	LD3	+641.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø	-47.	D11	-43.	D12
19	+18.	D13	+15.	D14	-1Ø5.	S1	-45.	S2
23	-32.	S3	+2.	S4	+32.	S5	+26.	S6
27	-181.	S7	-88.	S8	-71.	S9	-91.	S1Ø
31	-327.	S11	-188.	S12	-2Ø8.	S13	-1Ø6.	S14
35	-216.	S15	-27Ø.	S16	-253.	S17	-171.	S18
39	-181.	S19	-275.	S2Ø	-167.	S21	-197.	S22
43	+19.	S23	+27.	S24	-122.	S25	-41.	S26
47	-46.	S27	-19.	S28	-262.	S29	-86.	S3Ø
51	-1Ø3.	S31	-1Ø3.	S32	-51.	S33	-93.	S34
55	-137.	S35	-79.	S36	-243.	S37	+28.	S38
59	+81.	S39	+34.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 440%   DATE: 11 / 14 / 73   TIME: 8 : 51 : 29

FILE: 13   RECORD: 21   CHANNELS 3 THROUGH 60

#CHAN								
3	+27269.	LD1	+27348.	LD2	+7018.	LD3	+7050.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	-.	D6	-.	D7		D8
15		D9		D10	-374.	D11	-400.	D12
19	+151.	D13	+168.	D14	-707.	S1	-885.	S2
23	-612.	S3	-21.	S4	-78.	S5	+142.	S6
27	-2143.	S7	-3328.	S8	-1349.	S9	-2558.	S10
31	-2345.	S11	-39590.	S12	-2816.	S13	-1822.	S14
35	-1674.	S15	-4123.	S16	-3293.	S17	-2926.	S18
39	-1450.	S19	-4101.	S20	-3076.	S21	-2886.	S22
43	+290.	S23	+399.	S24	-1954.	S25	-2717.	S26
47	-1320.	S27	-2726.	S28	-2196.	S29	-4408.	S30
51	-1874.	S31	-2792.	S32	-942.	S33	-2487.	S34
55	-1983.	S35	-1653.	S36	-3756.	S37	+159.	S38
59	+266.	S39	+629.	S40				

ADPTRC2F 40%   DATE: 11 / 14 / 73   TIME: 8 : 53 : 27

FILE: 13   RECORD: 22   CHANNELS 3 THROUGH 60

#CHAN								
3	+2441.	LD1	+2506.	LD2	+585.	LD3	+677.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	-.	D6	+.	D7		D8
15		D9		D10	-50.	D11	-45.	D12
19	+19.	D13	+16.	D14	-108.	S1	-45.	S2
23	-32.	S3	+2.	S4	+32.	S5	+24.	S6
27	-183.	S7	-96.	S8	-71.	S9	-93.	S10
31	-342.	S11	-191.	S12	-213.	S13	-111.	S14
35	-221.	S15	-288.	S16	-231.	S17	-181.	S18
39	-188.	S19	-302.	S20	-169.	S21	-227.	S22
43	+19.	S23	+24.	S24	-125.	S25	-22.	S26
47	-66.	S27	-16.	S28	-272.	S29	-105.	S30
51	-98.	S31	-106.	S32	-51.	S33	-96.	S34
55	-140.	S35	-79.	S36	-245.	S37	+31.	S38
59	+81.	S39	+39.	S40				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 46Ø%   DATE: 11 / 14 / 73   TIME: 8 : 57 : 13

FILE: 13   RECORD: 23   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+28553.	LD1	+2862Ø.	LD2	+7336.	LD3	+7386.	LD4
7		D1		D2	-.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø	-399.	D11	-4Ø7.	D12
19	+161.	D13	+18Ø.	D14	-761.	S1	-945.	S2
23	-666.	S3	-28.	S4	-91.	S5	+145.	S6
27	-2229.	S7	-3642.	S8	-14Ø8.	S9	-2775.	S1Ø
31	-2475.	S11	-39779.	S12	-299Ø.	S13	-1933.	S14
35	-1768.	S15	-4411.	S16	-35Ø7.	S17	-3117.	S18
39	-1511.	S19	-4399.	S2Ø	-3327.	S21	-3Ø39.	S22
43	+3Ø4.	S23	+422.	S24	-2Ø4Ø.	S25	-2879.	S26
47	-1426.	S27	-2874.	S28	-226Ø.	S29	-483Ø.	S3Ø
51	-1985.	S31	-3Ø15.	S32	-934.	S33	-2672.	S34
55	-21Ø4.	S35	-1755.	S36	-3959.	S37	+171.	S38
59	+254.	S39	+641.	S4Ø				

ADPTRC2F 4Ø%   DATE: 11 / 14 / 73   TIME: 8 : 58 : 36

FILE: 13   RECORD: 24   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+24Ø5.	LD1	+2487.	LD2	+585.	LD3	+687.	LD4
7		D1		D2	+.	D3	-.	D4
11	+.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø	-53.	D11	-47.	D12
19	+2Ø.	D13	+18.	D14	-113.	S1	-4Ø.	S2
23	-32.	S3	+4.	S4	+34.	S5	+24.	S6
27	-186.	S7	-1Ø3.	S8	-66.	S9	-96.	S1Ø
31	-359.	S11	-193.	S12	-213.	S13	-113.	S14
35	-221.	S15	-295.	S16	-258.	S17	-186.	S18
39	-181.	S19	-352.	S2Ø	-167.	S21	-239.	S22
43	+17.	S23	+22.	S24	-122.	S25	+4.	S26
47	-81.	S27	-9.	S28	-23Ø.	S29	-142.	S3Ø
51	-88.	S31	-111.	S32	-49.	S33	-96.	S34
55	-14Ø.	S35	-84.	S36	-247.	S37	+33.	S38
59	-22.	S39	+48.	S4Ø				

CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 48Ø%   DATE: 11 / 14 / 73   TIME: 9 : 3 : 11

FILE: 13   RECORD: 25   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+298ØØ.	LD1	+29891.	LD2	+7645.	LD3	+77Ø2.	LD4
7		D1		D2	+1.	D3	-.	D4
11	+.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø	.	D11		D12
19		D13		D14	-818.	S1	-1Ø18.	S2
23	-733.	S3	-38.	S4	-1Ø6.	S5	+147.	S6
27	-233Ø.	S7	-3967.	S8	-1477.	S9	-2989.	S1Ø
31	-26Ø8.	S11	-39779.	S12	-3181.	S13	-2Ø42.	S14
35	-1851.	S15	-4719.	S16	-3761.	S17	-3456.	S18
39	-1568.	S19	-4711.	S2Ø	-3639.	S21	-3147.	S22
43	+322.	S23	+441.	S24	-2127.	S25	-3Ø44.	S26
47	-154Ø.	S27	-3Ø3Ø.	S28	-2299.	S29	-5338.	S3Ø
51	-21ØØ.	S31	-3234.	S32	-1Ø31.	S33	-2865.	S34
55	-2232.	S35	-1858.	S36	-4188.	S37	+183.	S38
59	+266.	S39	+653.	S4Ø				

ADPTRC2F 4Ø%   DATE: 11 / 14 / 73   TIME: 9 : 5 : 58

FILE: 13   RECORD: 26   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+24Ø5.	LD1	+25Ø6.	LD2	+593.	LD3	+697.	LD4
7		D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	+.	D7		D8
15		D9		D1Ø		D11		D12
19		D13		D14	-115.	S1	-38.	S2
23	-27.	S3	+7.	S4	+37.	S5	+24.	S6
27	-188.	S7	-12Ø.	S8	-59.	S9	-98.	S1Ø
31	-378.	S11	-2Ø3.	S12	-218.	S13	-121.	S14
35	-211.	S15	-312.	S16	-251.	S17	-22Ø.	S18
39	-181.	S19	-4Ø6.	S2Ø	-174.	S21	-264.	S22
43	+14.	S23	+19.	S24	-125.	S25	+31.	S26
47	-1Ø6.	S27	-4.	S28	-282.	S29	-214.	S3Ø
51	-76.	S31	-113.	S32	-44.	S33	-96.	S34
55	-142.	S35	-81.	S36	-25Ø.	S37	+38.	S38
59	-41.	S39	+56.	S4Ø				

Note: Deflection Transducers D11 thru D14 were disconnected prior to 480% loading increment. They were inoperative for the remainder of the test

CONICAL ISOGRID ADAPTER TEST RUN 13A

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ADPTRC2F 500%        DATE:   11 /  14 /  73    TIME:    9 :   8 :  40

FILE:   13    RECORD:   27    CHANNELS    3  THROUGH   60

CHAN
  3 +31048.  LD1      +31126.  LD2       +7980.  LD3       +8043.  LD4
  7          D1                D2           +.   D3           +.   D4
 11      +.  D5           +.   D6           +.   D7                D8
 15          D9                D10               D11               D12
 19          D13               D14        -882.  S1        -1116.  S2
 23   -807.  S3          -31.  S4         -118.  S5         +147.  S6
 27  -2428.  S7        -4327.  S8        -1544.  S9        -3201.  S10
 31  -2734.  S11      -39779.  S12       -3385.  S13       -2156.  S14
 35  -1922.  S15       -5059.  S16       -3987.  S17       -3810.  S18
 39  -1624.  S19       -5004.  S20       -4047.  S21       -3187.  S22
 43   +339.  S23        +466.  S24       -2213.  S25       -3194.  S26
 47  -1656.  S27       -3187.  S28       -2297.  S29       -5981.  S30
 51  -2216.  S31       -3449.  S32       -1083.  S33       -3051.  S34
 55  -2360.  S35       -1977.  S36       -4409.  S37        +195.  S38
 59   +269.  S39        +663.  S40

ADPTRC2F 40%         DATE:   11 /  14 /  73    TIME:    9 : [illegible] :  56

FILE:   13    RECORD:   28    CHANNELS    3  THROUGH   60

CHAN
  3  +2405.  LD1       +2506.  LD2        +619.  LD3        +718.  LD4
[illegible]  D1                D2           +.   D3           -.   D4
 11      +.  D5           +.   D6           +.   D7                D8
 15          D9                D10               D11               D12
 19          D13               D14        -128.  S1          -43.  S2
 23    -22.  S3           +7.  S4          +41.  S5          +21.  S6
 27   -193.  S7         -153.  S8          -54.  S9         -101.  S10
 31   -406.  S11        -227.  S12        -218.  S13        -123.  S14
 35   -196.  S15        -342.  S16        -246.  S17        -270.  S18
 39   -271.  S19        -416.  S20        -179.  S21        -286.  S22
 43    +14.  S23         +17.  S24        -130.  S25         +68.  S26
 47   -123.  S27          +.   S28        -280.  S29        -356.  S30
 51    -58.  S31        -115.  S32         -36.  S33         -98.  S34
 55   -142.  S35         -81.  S36        -252.  S37         +48.  S38
 59    -71.  S39         +66.  S40
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CONICAL ISOGRID ADAPTER TEST RUN 13A

ADPTRC2F 52Ø%. DATE: 11 / 14 / 73 TIME: 9 : 13 : 51

FILE: 13 RECORD: 29 CHANNELS 3 THROUGH 6Ø

CHAN								
3	+32ØØ6.	LD1	+32379.	LD2	+8281.	LD3	+8374.	LD4
5	.	D1		D2	+.	D3	-.	D4
11	-.	D5	-.	D6	-.	D7		D8
15		D9		D1Ø		D11		D12
19		D13		D14	-946.	S1	-1227.	S2
23	-876.	S3	-21.	S4	-13Ø.	S5	+145.	S6
27	-2519.	S7	-4685.	S8	-16Ø8.	S9	-3379.	S1Ø
31	-2849.	S11	-39779.	S12	-3569.	S13	-225Ø.	S14
35	-1954.	S15	-5393.	S16	-4184.	S17	-418Ø.	S18
39	-1695.	S19	-5163.	S2Ø	-4546.	S21	-3Ø14.	S22
43	+351.	S23	+483.	S24	-2272.	S25	-3361.	S26
47	-1774.	S27	-3326.	S28	-2196.	S29	-6896.	S3Ø
51	-2326.	S31	-3635.	S32	-1137.	S33	-321Ø.	S34
55	-248Ø.	S35	-2Ø83.	S36	-462Ø.	S37	+2Ø5.	S38
59	+271.	S39	+682.	S4Ø				

ADPTRC2F 4Ø% DATE: 11 / 14 / 73 TIME: 9 : 15 : 19

FILE: 13 RECORD: 3Ø CHANNELS 3 THROUGH 6Ø

CHAN								
3	+24Ø5.	LD1	+25Ø6.	LD2	+593.	LD3	+697.	LD4
5		D1		D2	-.	D3	-.	D4
11	-.	D5	+.	D6	-.	D7		D8
15		D9		D1Ø		D11		D12
19		D13		D14	-135.	S1	-36.	S2
23	-14.	S3	+9.	S4	+46.	S5	+21.	S6
27	-193.	S7	-2Ø4.	S8	-41.	S9	-1Ø3.	S1Ø
31	-428.	S11	-268.	S12	-218.	S13	-133.	S14
35	-169.	S15	-384.	S16	-241.	S17	-346.	S18
39	-271.	S19	-433.	S2Ø	-186.	S21	-276.	S22
43	+17.	S23	+22.	S24	-13Ø.	S25	+1Ø5.	S26
47	-148.	S27	+4.	S28	-257.	S29	-664.	S3Ø
51	-36.	S31	-123.	S32	-32.	S33	-98.	S34
55	-145.	S35	-84.	S36	-26Ø.	S37	+55.	S38
59	-81.	S39	+83.	S4Ø				

ADPTRC2F 54Ø%   DATE: 11 / 14 / 73   TIME: 9 : 18 : 47

FILE: 13   RECORD: 31   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+33634.	LD1	+33559.	LD2	+8632.	LD3	+8731.	LD4
5		D1		D2	+.	D3	-.	D4
11	+.	D5	+.	D6	-.	D7		D8
15		D9		D1Ø		D11		D12
19		D13		D14	-1Ø35.	S1	-15Ø1.	S2
23	-1Ø44.	S3	+12.	S4	-14Ø.	S5	+135.	S6
27	-271Ø.	S7	-5221.	S8	-1738.	S9	-3573.	S1Ø
31	-2965.	S11	-39779.	S12	-389Ø.	S13	-2388.	S14
35	-1871.	S15	-5869.	S16	-4726.	S17	-4892.	S18
39	-1876.	S19	-5Ø31.	S2Ø	-5881.	S21	-2194.	S22
43	+373.	S23	+516.	S24	-2313.	S25	-3587.	S26
47	-1976.	S27	-351Ø.	S28	-1685.	S29	-9978.	S3Ø
51	-2535.	S31	-3765.	S32	-1213.	S33	-3388.	S34
55	-2628.	S35	-2225.	S36	-4887.	S37	+212.	S38
59	+278.	S39	+695.	S4Ø				

ADPTRC2F 4Ø%   DATE: 11 / 14 / 73   TIME: 9 : 21 : 38

FILE: 13   RECORD: 32   CHANNELS 3 THROUGH 6Ø

CHAN								
3	+2459.	LD1	+2524.	LD2	+61Ø.	LD3	+713.	LD4
5		D1		D2	+.	D3	-.	D4
11	+.	D5	+.	D6	+.	D7		D8
15		D9		D1Ø		D11		D12
19		D13		D14	-167.	S1	-28.	S2
23	-9.	S3	+14.	S4	+44.	S5	+19.	S6
27	-198.	S7	-312.	S8	-34.	S9	-1Ø5.	S1Ø
31	-44Ø.	S11	-447.	S12	-245.	S13	-16Ø.	S14
35	-122.	S15	-4Ø8.	S16	-226.	S17	-53Ø.	S18
39	-252.	S19	-314.	S2Ø	-371.	S21	-93.	S22
43	+17.	S23	+24.	S24	-152.	S25	+147.	S26
47	-167.	S27	+9.	S28	-186.	S29	-1939.	S3Ø
51	-2.	S31	-125.	S32	-24.	S33	-98.	S34
55	-152.	S35	-86.	S36	-279.	S37	+62.	S38
59	-66.	S39	+1Ø2.	S4Ø				

APPENDIX B

ISOGRID HANDBOOK SECTION - CONICAL ISOGRID STRUCTURES

APPENDIX B

CONICAL ADAPTER STRUCTURES

B.1 INTRODUCTION

The purpose of the this handbook-section is to present analysis techniques and data for evaluating the load carrying capabilities of conical isogrid structures subjected to axial compression and body bending loads. The critical failure mode is taken to be compression.

Figure B-1 shows an end view of the type of isogrid adapter structure to be treated. The grid members are flanged. Effective isogrid triangle sizes increase with distance from the small diameter mounting flange. Rectangularly pocketed transition sections at the small and large diameter mounting flanges provide good edge fixity to resist bending in the plane of the cone and minimize hard point loading in the isogrid structure.

The approch of this handbook-section will be: (1) to review analytical techniques for predicting general and local instabilities in cylindrical isogrid structures, (2) to outline modifications to these techniques for applicability to conical isogrid structures, and (3) to present results of test data in the form of knockdown factor corrections to be used in sizing isogrid conical structures.

B.2 CYLINDRICAL ISOGRID ADAPTER-STRUCTURAL ANALYSIS

Two methods for predicting isogrid general instability are presented. These are: (1) the McDonnell Douglas analysis from Reference B-1 and (2) an analogy with the skin stringer analysis (by Becker) from Reference B-1 developed in this handbook section.

Local structural instabilities considered are flange, web, skin, and grid-member column buckling.

B.2.1 DEFINITIONS OF SYMBOLS

Critical loads analyses are based on the generalized isogrid member cross section shown in Figure B-1. The symbols used in Figure B-2 are defined in the following list. The computer printout symbols are in parentheses. The node and corner machining radii, r_1 and r_2, are common.

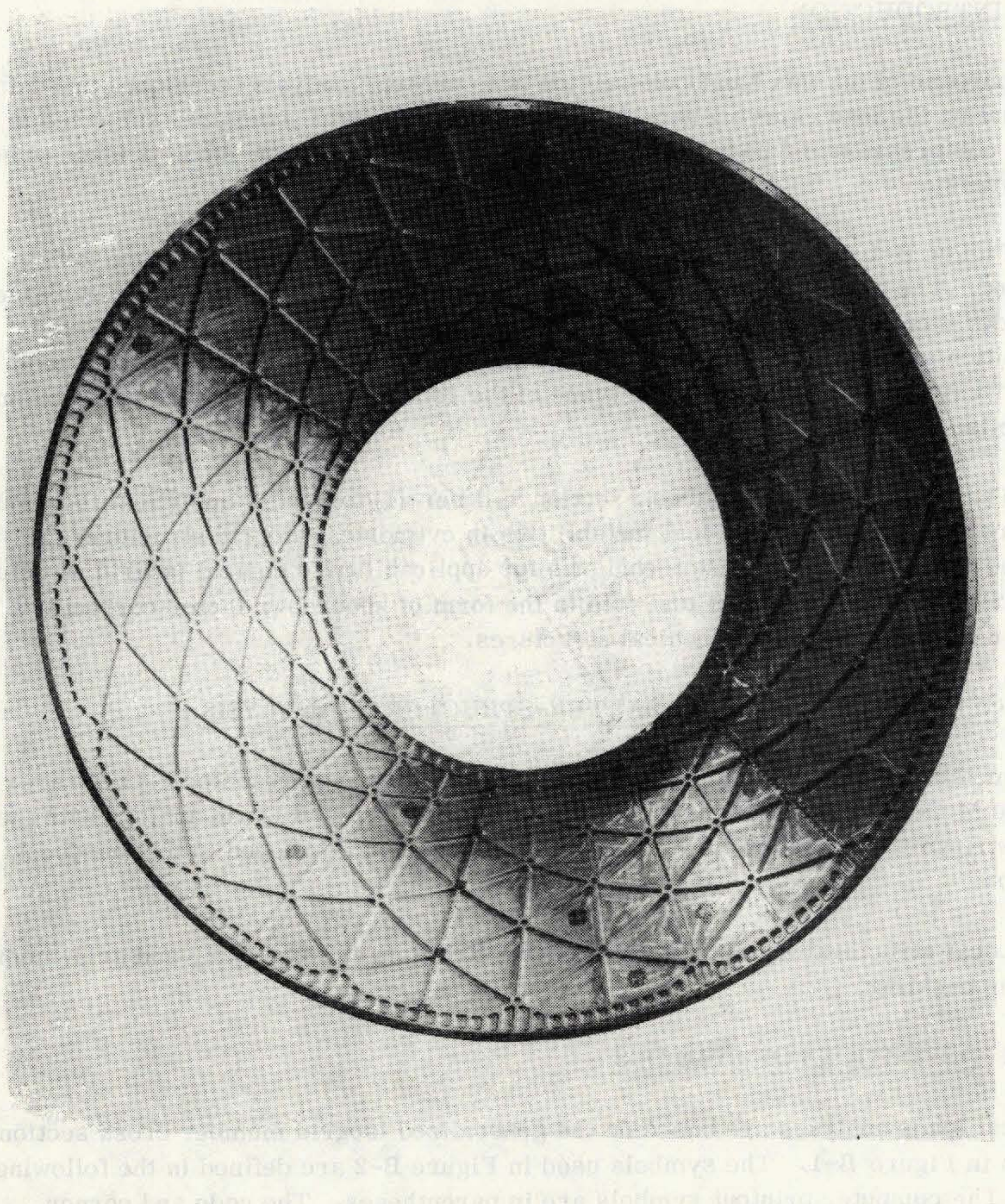


FIGURE B-1. CONICAL ISOGRID ADAPTER.

a(A)	Node-to-node spacing
b_1, b_2 (B, E)	Web width
c (C)	Inner flange thickness
d(D)	Web height
d_0	Web shoulder height
h	Height of isogrid triangle
r_0, r_1, r_2 (R0, R1, R2)	Fillet, corner and undercut machining radii ($r_1 = r_2 - w/2 + b_1/2$)
s (S)	Isogrid cross-section height

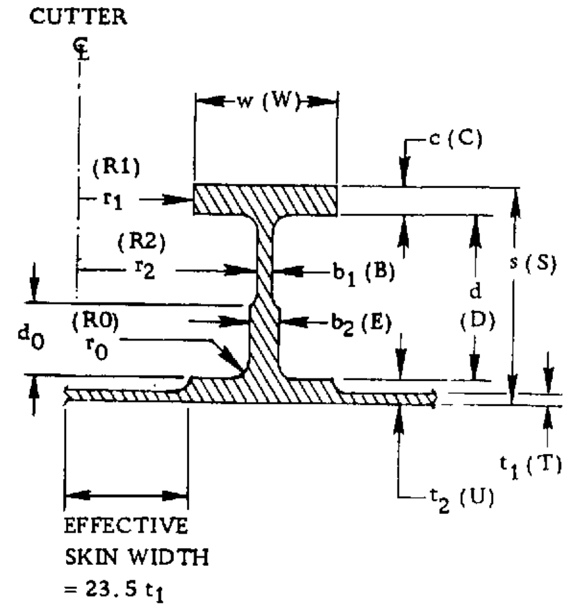


FIGURE B-2. ISOGRID CROSS-SECTION.

t_1(T), t_2 (U)	Skin thickness, outer flange thickness
$\bar{t}$ (T BAR)	Smeared out isogrid thickness
w(W)	Flange width
A′	Area of equivalent isogrid I-beam member cross-section
E	Young's modulus
F_{cy}	Material yield strength
I	Moment of inertia of equivalent isogrid I-beam cross-section
N_{CR}	Critical edge load (subscript 1 for general stability, 2 for skin buckling, 3 for web crippling, 4 for flange buckling, Y for material yield, and X for grid member column instability)

R(R) Cylinder radius (to grid cross-section neutral axis)

ρ Isogrid member radius of gyration based on I and A'

Two grid orientations shown in Figures B-3 and B-4 are considered.

B.2.2 GENERAL INSTABILITY (McDONNELL DOUGLAS METHOD). The edge loading for general instability from the Isogrid Handbook (Reference B-1) with corrections is:

$$N_{CR1} = \frac{\gamma}{\sqrt{3(1-\nu^2)}} \frac{E^* (t^*)^2}{R} \qquad \text{(B-1)}$$

where

γ = knockdown factor (taken as 0.65 per Reference B-1)

ν = Poisson's ratio (taken as 0.3)

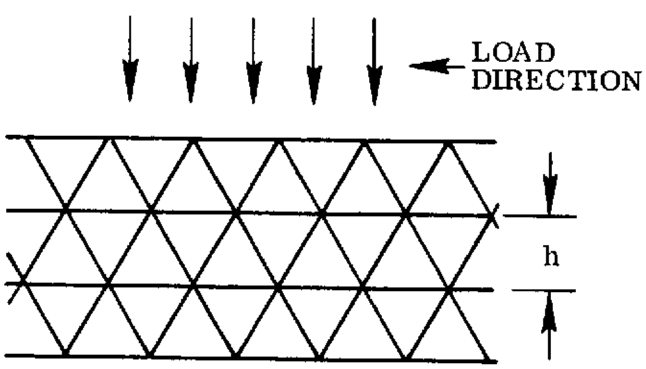


FIGURE B-3. ISOGRID ORIENTATION "a".

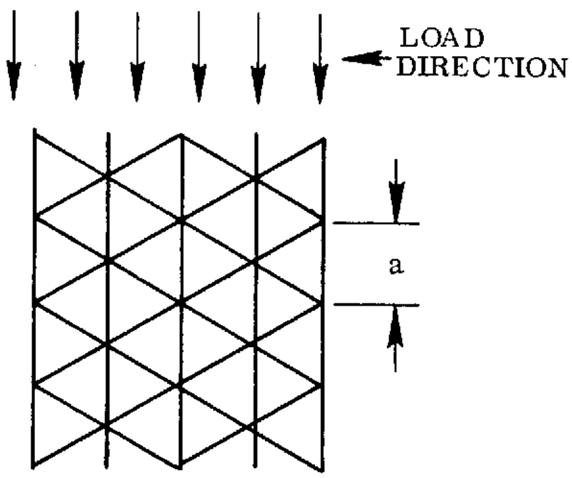


FIGURE B-4. ISOGRID ORIENTATION "b".

$$E^* = E \frac{(1 + \alpha + \mu)^2}{\beta} \qquad \text{(B-2)}$$

$$t^* = \frac{t\beta}{1 + \alpha + \mu} \qquad \text{(B-3)}$$

$$t = \frac{t_1 A_2 + t_2 (A_1 - A_2)}{A_1} \qquad \text{(B-4)}$$

In Eq. B-4, t is the smeared out skin and outer flange thickness, to be referred to as Case A, in which the skin is assumed to be fully effective in reacting compressive edge loading (by developing a tension field or compressive stresses).

or

$$t = \frac{t_1 (A_2 - A_3) + t_2 (A_1 - A_2)}{A_1} \qquad \text{(B-5)}$$

In Eq. B-5, t is the smeared out skin and outer flange thickness, to be referred to as Case B, in which an effective width of 23.5 t_1 parallel to the inner flange edge is assumed effective in reacting edge loading (total effective width = 47 t_1 for each stiffener).

$$A_1 = \frac{1}{2} a h \qquad \text{(B-6)}$$

$$A_2 = \frac{1}{2} (a - \sqrt{3}\ w) (h - 1.5\ w) \qquad \text{(B-7)}$$

$$A_3 = \frac{1}{2} [a - \sqrt{3} (w + 47\ t_1)] [h - 1.5 (w + 47\ t_1)] \qquad \text{(B-8)}$$

$$\beta^2 = (1 + \alpha + \mu) [3 (1 + \delta)^2 + 3\mu (\delta + \lambda)^2 + 1 + \alpha \delta^2 + \mu \lambda^2] - 3 [(1 + \delta) - \mu (\delta + \lambda)]^2 \qquad \text{(B-9)}$$

(Reference B-1 erroneously shows $(1 + \lambda)$ for the $(\delta + \lambda)$ terms in Eq. B-9).

$$\delta = \frac{d}{t} \qquad \text{(B-10)}$$

$$\lambda = \frac{c}{t} \qquad \text{(B-11)}$$

$$\alpha = \frac{b d}{t h} \qquad \text{(B-12)}$$

$$\mu = \frac{w c}{t h} \qquad \text{(B-13)}$$

$$b = \frac{b_1 (d - d_0 - c) + b_2 d_0}{d - c} \qquad \text{(B-14)}$$

The above analysis (as presented in Reference B-1) is independent of orientation "a" or "b" (Figures B-3 and B-4).

B.2.3 GENERAL INSTABILITY (ANALOGY BASED ON REFERENCE B-2). The allowable compressive stress for a frame-skin-stringer cylinder subjected to bending from Reference B-2 is given in Eq. B-15. This is based on the assumption that spacings of longitudinal stiffeners and circumferential frames are uniform and small enough to permit assumption that cylinder acts as orthotropic shell.

$$F_c = gE\left(I_f t\right)^{0.5}/Rt_s \qquad \text{(B-15)}$$

where

$$g = 4.80\ [(b/d)(\rho_s/\rho_f)(t_s/t_f)^2\ (\rho_s/b)^2]^{1/4} \qquad \text{(B-16)}$$

$$N_{cr} = F_c A_s/b \qquad \text{(B-17)}$$

F_c = Compressive stress at bending general instability (psi)

b = Stringer spacing (in.)

d = Frame spacing (in.)

R = Cylinder radius (in.)

t = Skin thickness (in.)

A_s = Stringer area ($in.^2$)

A_f = Frame section area ($in.^2$)

t_s = Distributed stringer area = A_s/b

t_f = Distributed frame area = A_f/d

ρ_s = Stringer section radius of gyration ($in.^4$)

ρ_f = Frame section radius of gyration ($in.^4$)

E = Modulus of Elasticity (psi)

B.2.3.1 ISOGRID ORIENTATION "a" (FIGURE B-3). To obtain an analogy with the general stability criteria in Eq. B-15, the following equivalences between a skin-stringer-structure and the isogrid in orientation "a" are used. The symbols in brackets are the defining parameters in Eq. B-15. Other symbols are as defined in Subsection B.2.1.

a. Frame spacing [d] = h

b. Stringer spacing [b] = h/cos 30°

c. Stringer cross-section area $[A_s] = 2A' \cos^2 30° + 2t_1 h \sin 30°$

This is based on the assumption that the isogrid diagonal members, having a cross-sectional area A', are longer than the skin in line with the applied load by a factor of 1/cos 30°. Consequently they can only develop a force cos 30° as great as if they were in line. In this condition they could develop the same stress as the skin if crippling or buckling does not occur. Since the force in the diagonal members have a cos 30°-component in the direction of external loads and there are two diagonal members per stringer spacing the effective stringer area is $2 A' \cos^2 30°$. The $2 t_1 h \sin 30°$ is the contribution of the skin to the effective stringer cross-sectional area when not limited by buckling or when load reacting tension fields develop in the skin.

d. Frame or stringer section moment of inertia = I. This conservatively neglects the contributions of the diagonal numbers to the available frame-equivalent section moment of inertia available in isogrid.

e. Frame or stringer section radius of gyration $[\rho_s = \rho_f] = \rho$

f. Frame radius [R] = R

g. Skin thickness $[t] = t_1$

Using the above definitions in Eqs. B-15 to B-17.

$$N_{CR1} = 4.7 \, (\rho^{1.5} E t^{0.5}/hR) K^{0.5} \tag{B-18}$$

$$A' = db + 2wc \tag{B-19}$$

$$I = \frac{1}{12} bd^3 + \frac{1}{2} (d + c)^2 wc \tag{B-20}$$

A' and I are, respectively, grid member cross-sectional areas and moments of inertia about an axis parallel to the plane of the isogrid. The I is based on the conservative approximation that the neutral axis passes through the midpoint of a grid cross-section. Chosen grid cross-sections should in effect have this property.

$$K = 1.52 A' + 1.15 t_1 h \tag{B-21}$$

$$\rho = \sqrt{\frac{I}{A'}} \tag{B-22}$$

ρ is the grid member radius of gyration, t is as defined in Eq. B-4 and B-5 for skin effectiveness Cases A and B, and b is as defined in Eq. B-14.

B.2.3.2 ISOGRID ORIENTATION "b" (FIGURE B-4). The following analogies are made in this case.

a. Frame spacing [d] = h/cos 30°

b. Stringer spacing [b] = h

c. Stringer cross-section area $[A_s] = 1.5\ A' + t_1 h$

This is based on the conservative assumption that the webs in line with the applied load develop full stress while the two diagonal webs develop 1/2 maximum stress. Also the diagonal members transmit only 1/2 of their developed load to the direction in-line with the external load. The $t_1 h$ is the contribution of the skin to the stringer cross-section.

d. Frame section moment of inertia = 2I (cos 30°)/h. This is due to two diagonal webs providing frame stiffness at each stringer intersection.

e. Frame or stringer radius of gyration $[\rho = \rho_f] = \rho$

f. Frame radius [R] = 1.54 R

This is because the diagonal rings are elliptical and have a maximum radius of 1.54 times as great as that of the rings for the most critical loading condition.

g. Skin thickness $[t] = t_1$

Using the above definitions in Eqs. B-15 to B-17.

$$N_{CR1} = 3.78 \left[\frac{\rho^{1.5}\ t_2^{0.5}\ E}{h R} \right] \left[1.5\ A' + t_1 h \right]^{0.5} \tag{B-23}$$

Parameters in Eq. B-23 are defined in Eqs. B-19, B-22, and Subsection B.2.1.

Eq. B-18 will be used in numerical analyses. Results from Eqs. B-18 and B-23 are generally comparable.

B.2.4 SKIN BUCKLING

Edge load intensity at which skin buckling occurs (Reference B-1) is

$$N_{CR2} = C_1\ EA \frac{t_1^2}{h^2} \tag{B-24}$$

where

C_1 = knockdown factor (taken as 10.2 per Reference B-1)

$$A = (1 + \mu + \alpha)\ t \tag{B-25}$$

All other terms are as previously defined.

In the case of the Convair Aerospace flanged isogrid structures, skin buckling is allowed to occur at load intensities significantly lower than those inducing general instability or other local crippling. The skin, however, does develop a tension field in which state it may be effective in reacting applied loads and contributing to general stability.

In the case of unflanged isogrid, or when skin buckling, general instability, and other local crippling loads are of the same order of magnitude, the load carrying capability of the structure is nominally determined by the lowest critical load.

B.2.5 WEB CRIPPLING

Edge load intensity at which web crippling occurs (Reference B-1) is

$$N_{CR3} = C_2 \, EA \frac{b^2}{d^2} \qquad \text{(B-26)}$$

where

C_2 = knockdown factor (taken as 4.4 per Reference B-1). Other terms are as previously defined.

B.2.6 FLANGE BUCKLING

$$N_{CR4} = C_3 \, EA \left(\frac{2c}{w}\right)^2 \qquad \text{(B-27)}$$

C_3 = knockdown factor (taken as 0.47 per Reference B-1)

B.2.7 MATERIAL YIELD

The edge-load intensity at which material yield strength is a determining factor is

$$N_{CRY} = F_{cy} A \qquad \text{(B-28)}$$

B.2.8 COLUMN STABILITY

Edge-load intensity for short aluminum (Fcy = 59,000 psi) column instability (i.e., for $\frac{a}{\rho} < 79$) is

$$N_{CRX} = F_c\ A$$

$$F_c = 64,000 \left[1 - \frac{0.385\left(\frac{a}{\rho}\right)}{\pi \sqrt{E/64,000}} \right] \qquad \text{(B-29)}$$

Instability normal to the isogrid plane is assumed in Eq. B-29. Column instability of the grid members in the plane of the isogrid is generally prevented by the skin when present. In the case of open isogrid, it is assumed that an enclosing or meteoroid protecting skin is bonded to the structure and that this skin affords stability to the grid members in the plane of the isogrid. When this is not the case, column instability in the isogrid plane must be considered. (Effective column length in this case is a - $2r_1$.) For long columns ($a/\rho \geq 79$) column instability is predicted by the Euler column equation. Since most isogrid geometry falls in the short column range, only the short column allowable was calculated. When N_{CR5} for column instability is less than N_{CR1} for general instability, it is recommended that a check be made for $a/\rho \leq 79$.

B.3 CONICAL ISOGRID ADAPTER - STRUCTURAL ANALYSIS.

The above general instability analyses are for a cylindrical shell of revolution and are modified for application to a conical shell of revolution. The model assumed for this modification is shown in Figure B-5. The allowable general instability edge load intensity, N_{cr}, in the plane of the conical structure at a point 0 is computed on the basis of an equivalent cylindrical shell radius of R sin θ as defined in Figure B-5.

B.3.1 TEST RESULTS

The isogrid conical adapter (Figure B-1) was tested and failed by a combined body bending moment of 2.83×10^6 in.-lb and axial load of 86,025 pounds. Figure B-6 shows the failed specimen and identifies panel numbers. Strain gage and deflection data indicates that structural failure was initiated in panels 1, 2, or 6.

Figures B-7 through B-16 present the theoretical and calculated actual failure loads data for damaged areas in panels 1, 2, and 6. The theoretical general instability allowables in Figures B-7 through B-11 are based on the McDonnell Douglas method of analysis, see Subsection B.2.2. Case B of this analysis is assumed, in which an effective skin width of $23.5t_1$ parallel to the inner flange edge is effective in

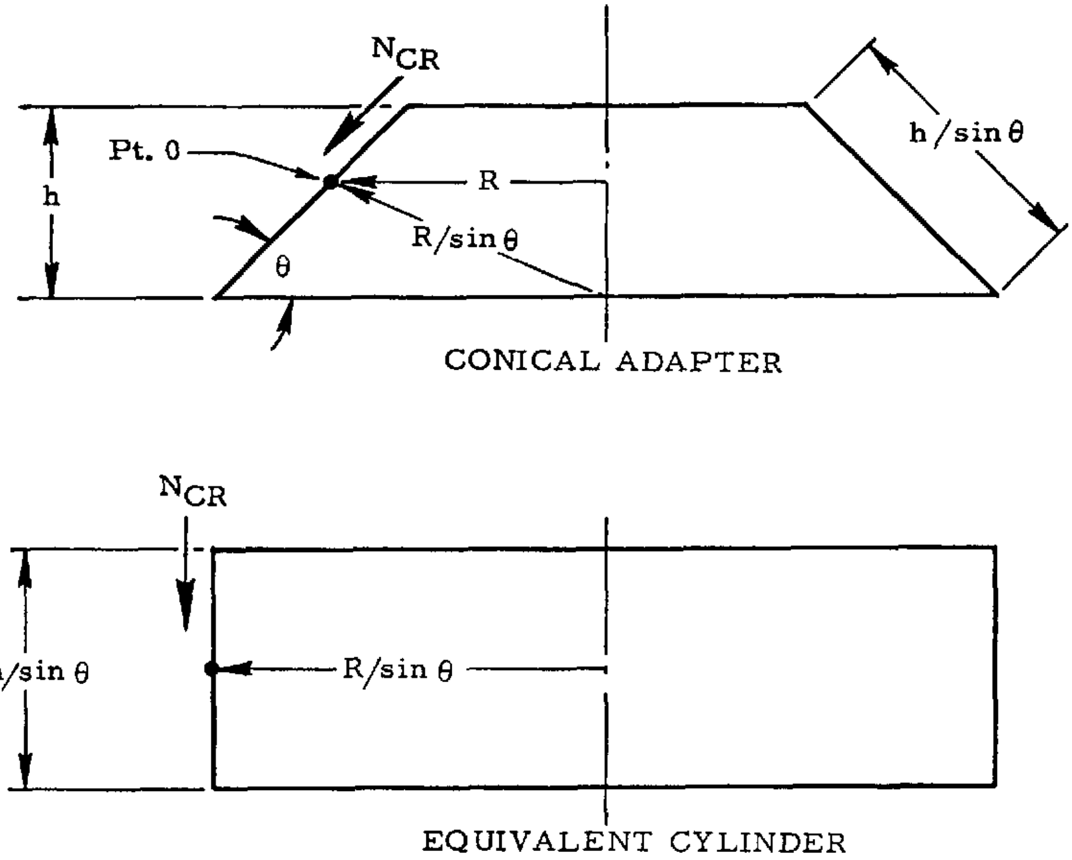


FIGURE B-5. EQUIVALENT CYLINDER GEOMETRY.

reacting edge loading. The curves of critical load intensity, N_{cr} in the plane of the cone, are all plotted as a function of A, the node-to-node spacing in the plane of the isogrid, and the radius to the grid is function of A according to the model in Figure B-5. Figures B-12 through B-16 present similar data except the general instability allowables are based on the methodology of Subsection B.2.3 and column buckling allowables are presented in place of the material (F_{cy}) allowables.

In most cases critical loads due to flange and web crippling fall at levels beyond the chosen ordinant scales and therefore do not appear in the plots.

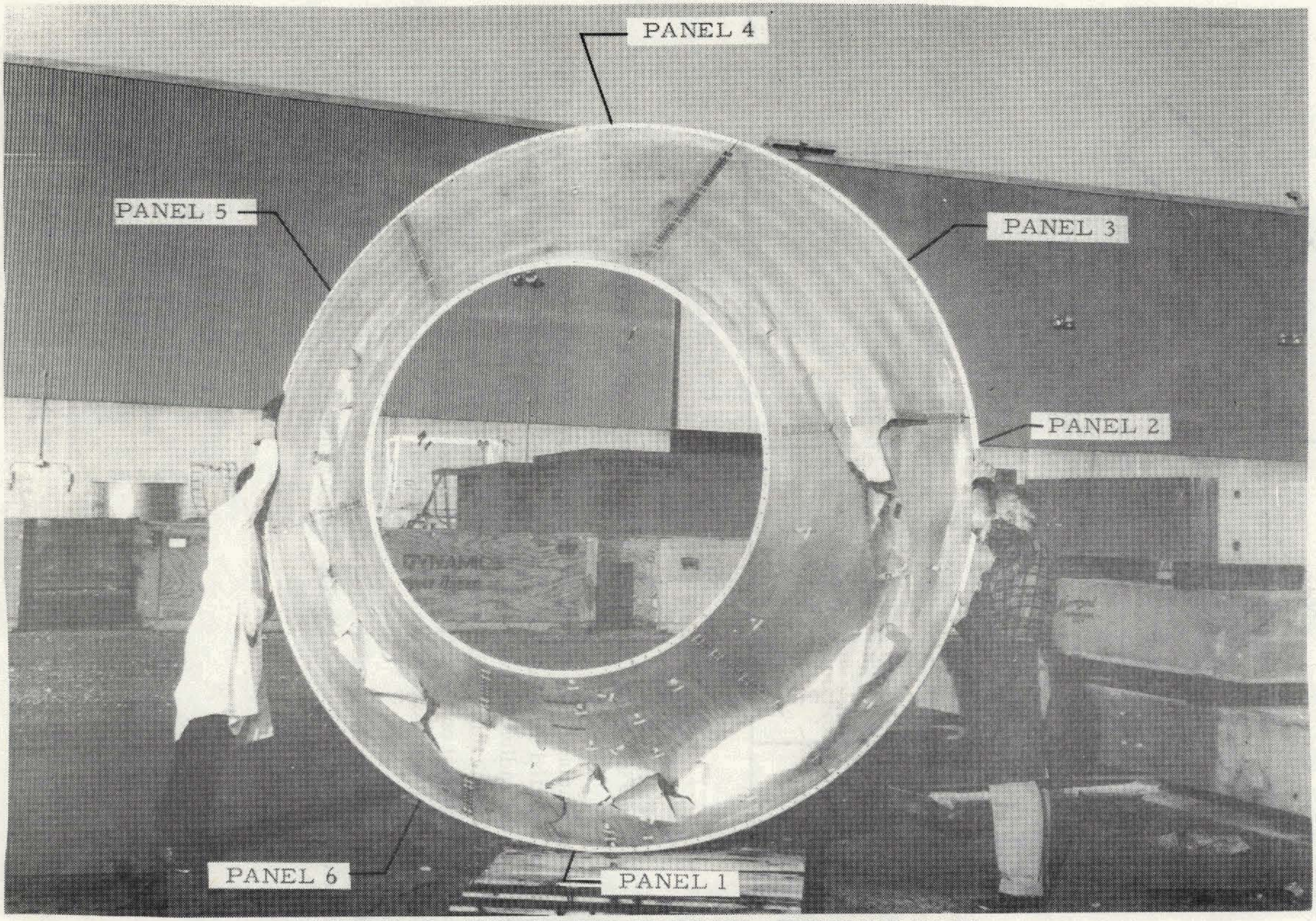
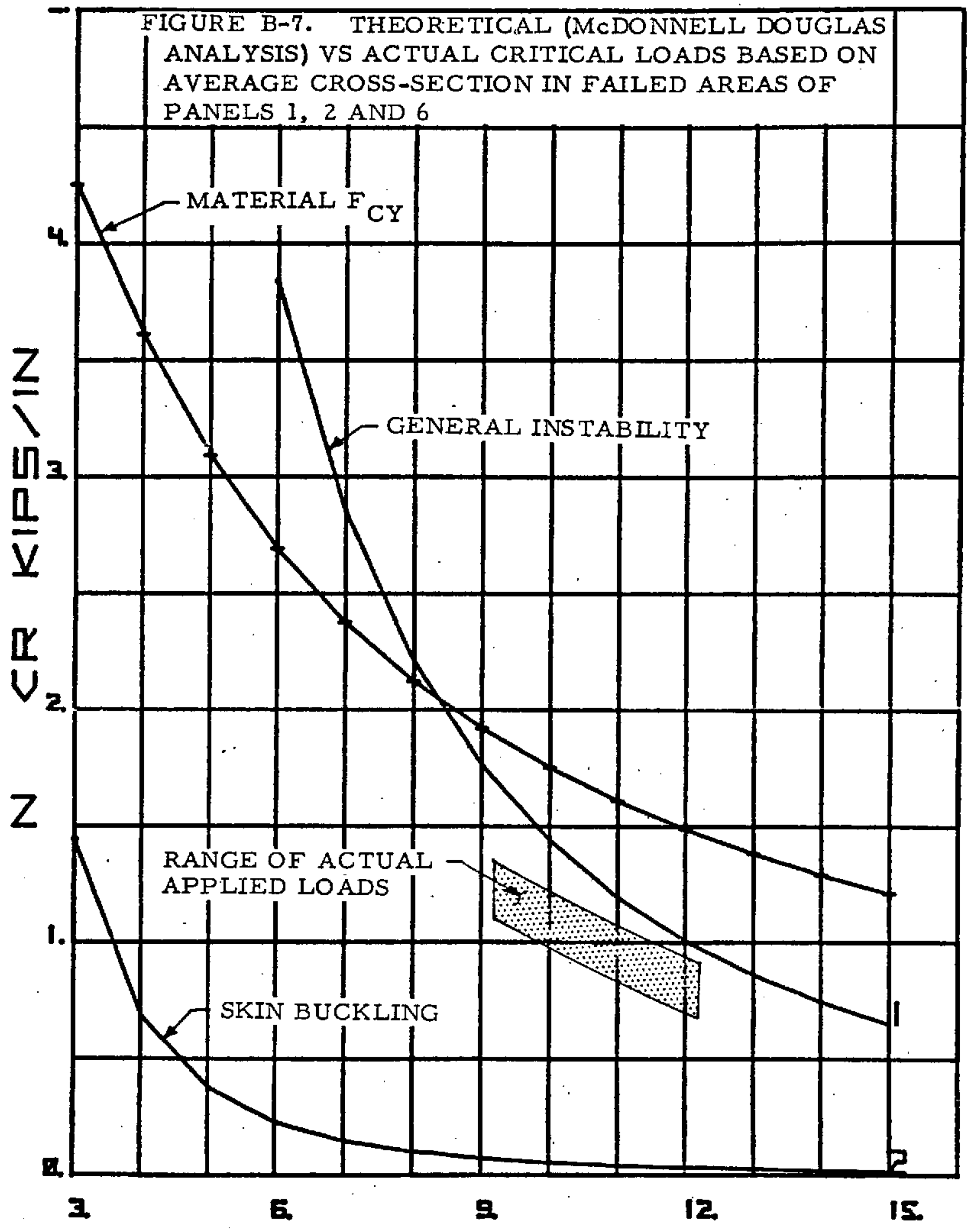


FIGURE B-6. FAILED TEST SPECIMEN - EXTERNAL VIEW.



T=0.036 D=0.605 S=0.730 W=0.425

U=0.058 C=0.067 B=0.056 E=0.065

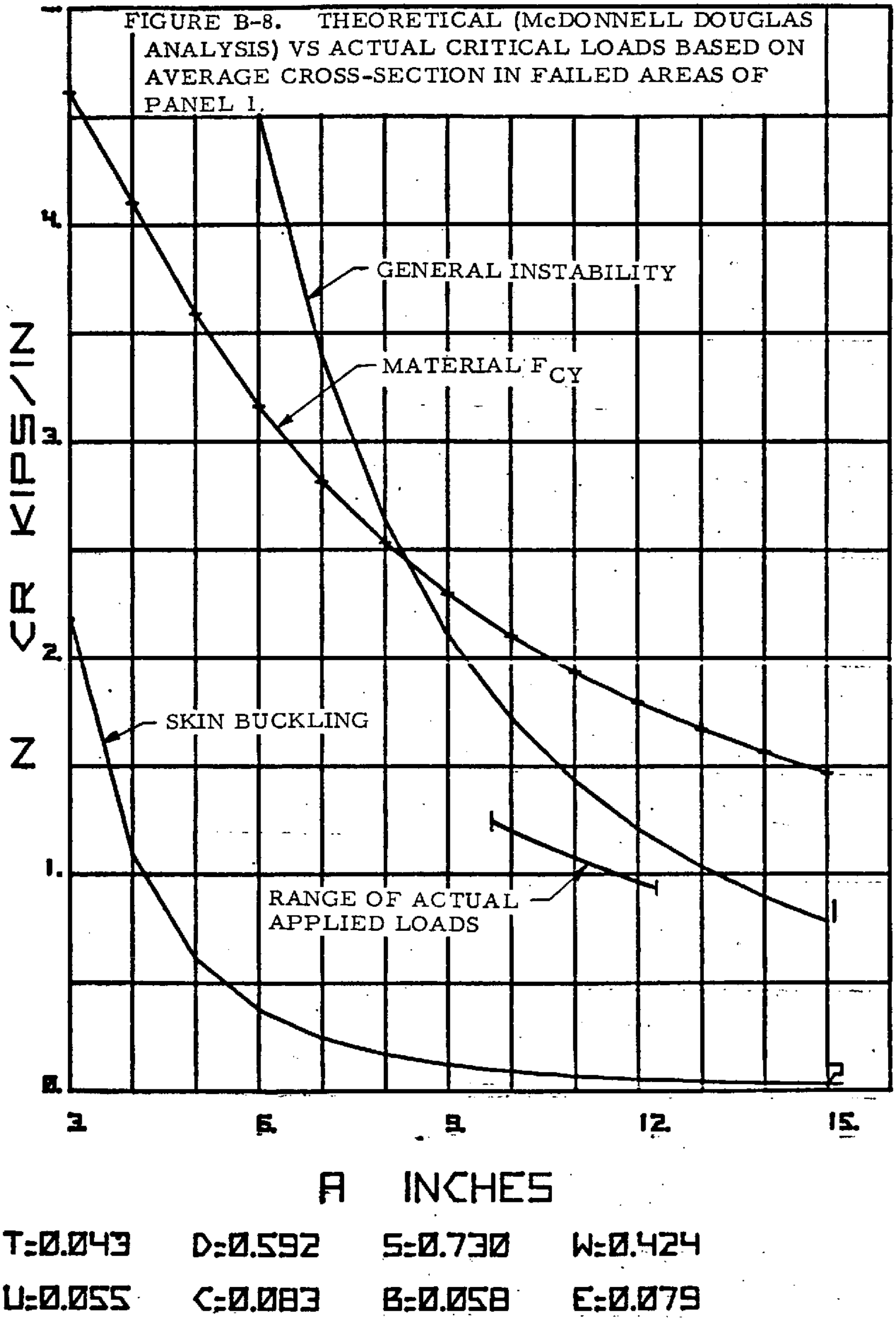
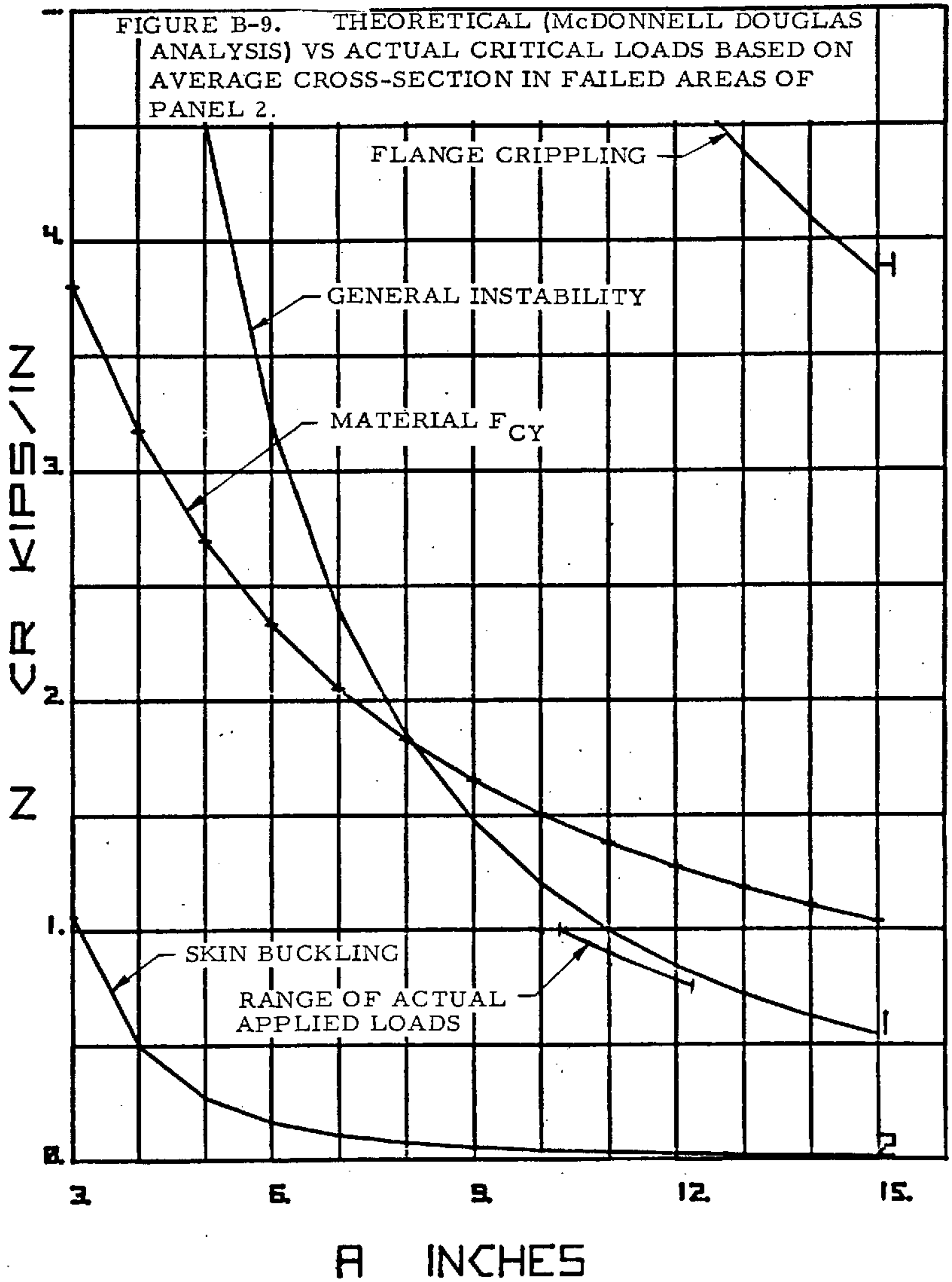


FIGURE B-8. THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 1.

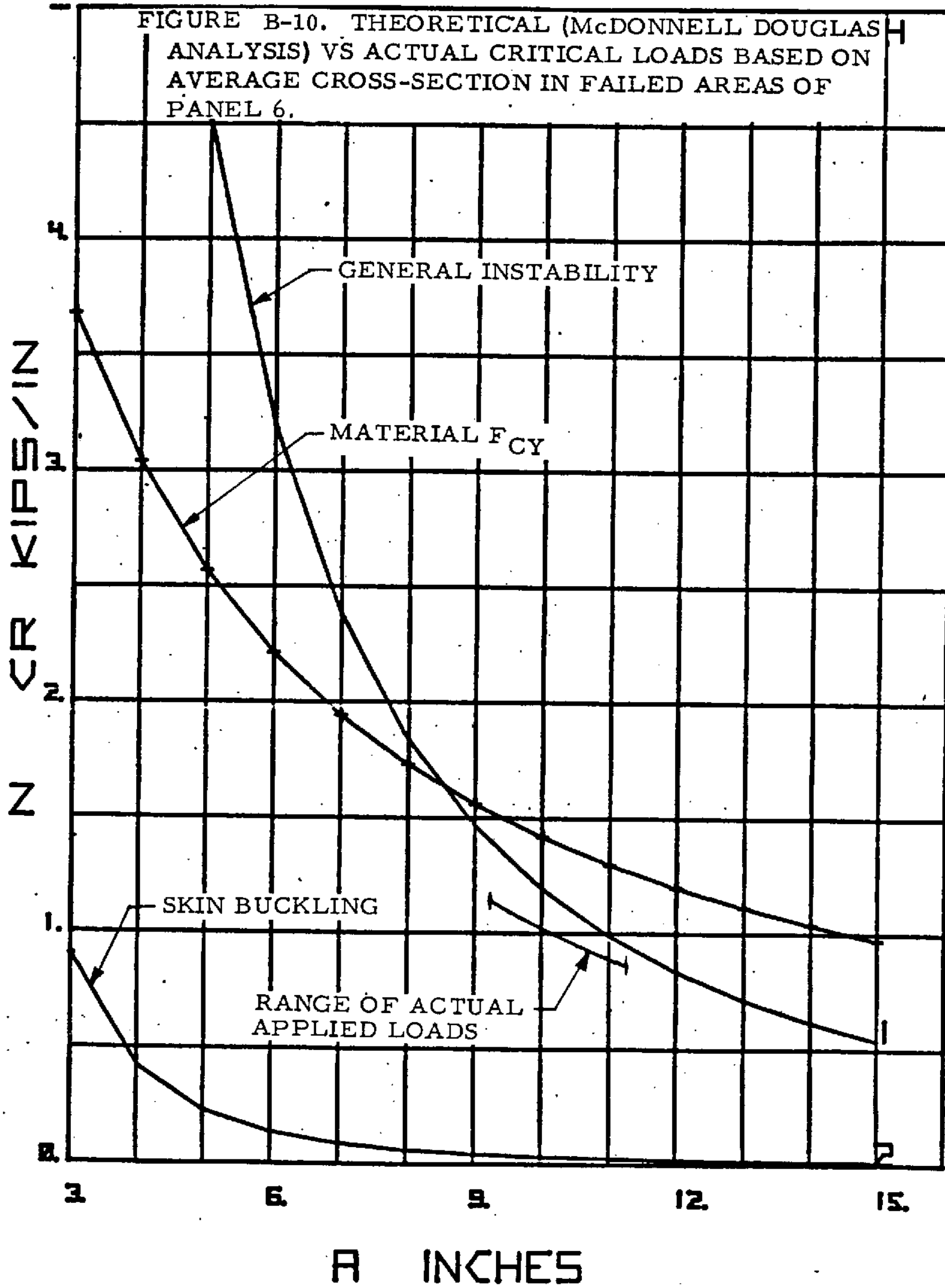
FIGURE B-9. THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 2.



T:0.033 D:0.634 S:0.730 W:0.408

U:0.052 C:0.044 B:0.054 E:0.078

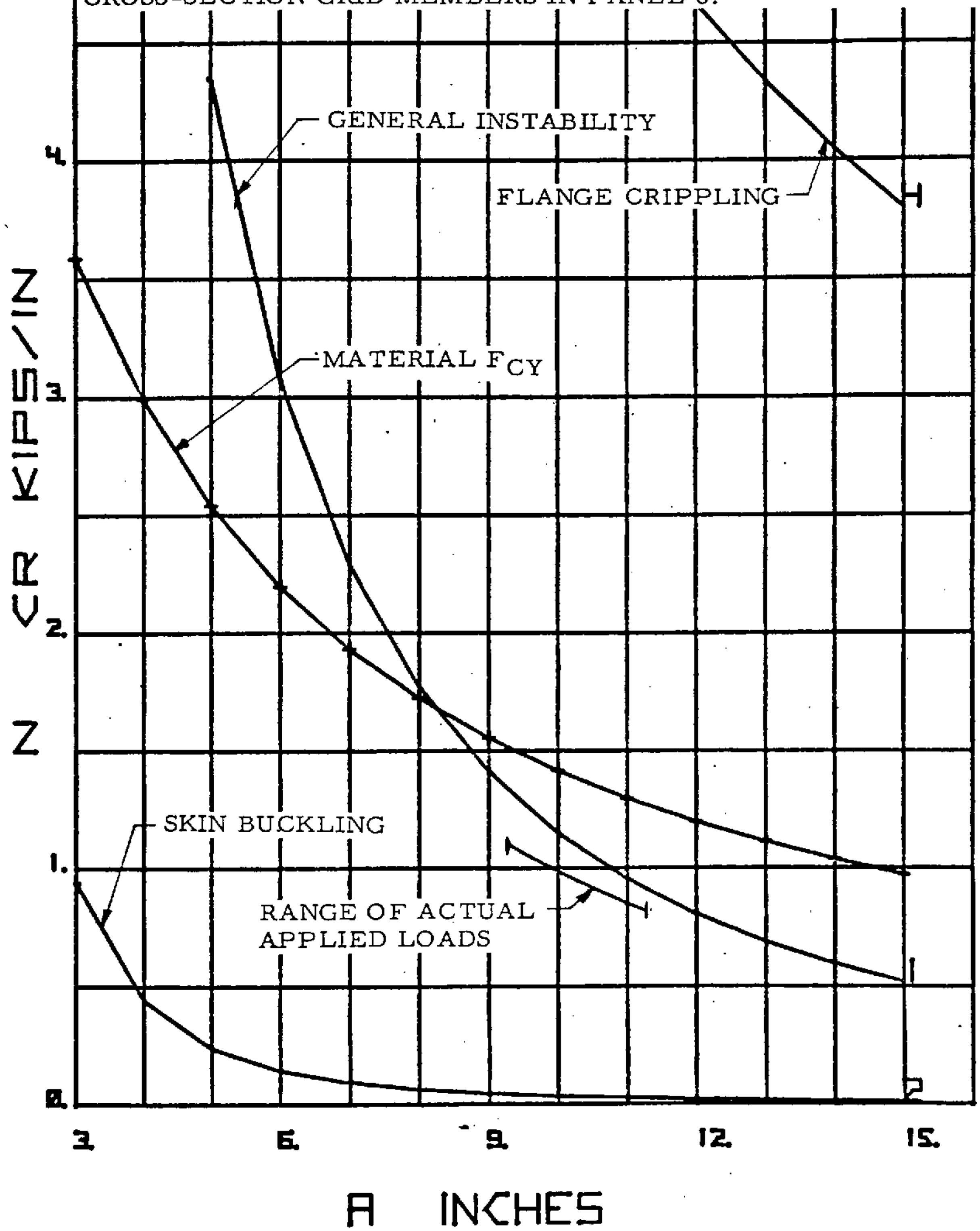
FIGURE B-10. THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 6.



T=0.031 D=0.628 S=0.730 W=0.415

U=0.050 C=0.052 B=0.047 E=0.077

FIGURE B-11. THEORETICAL (McDONNELL DOUGLAS ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON ONE OF THE MINIMUM CROSS-SECTION GRID MEMBERS IN PANEL 6.



T:0.032 D:0.634 S:0.730 W:0.416

U:0.050 C:0.046 B:0.044 E:0.066

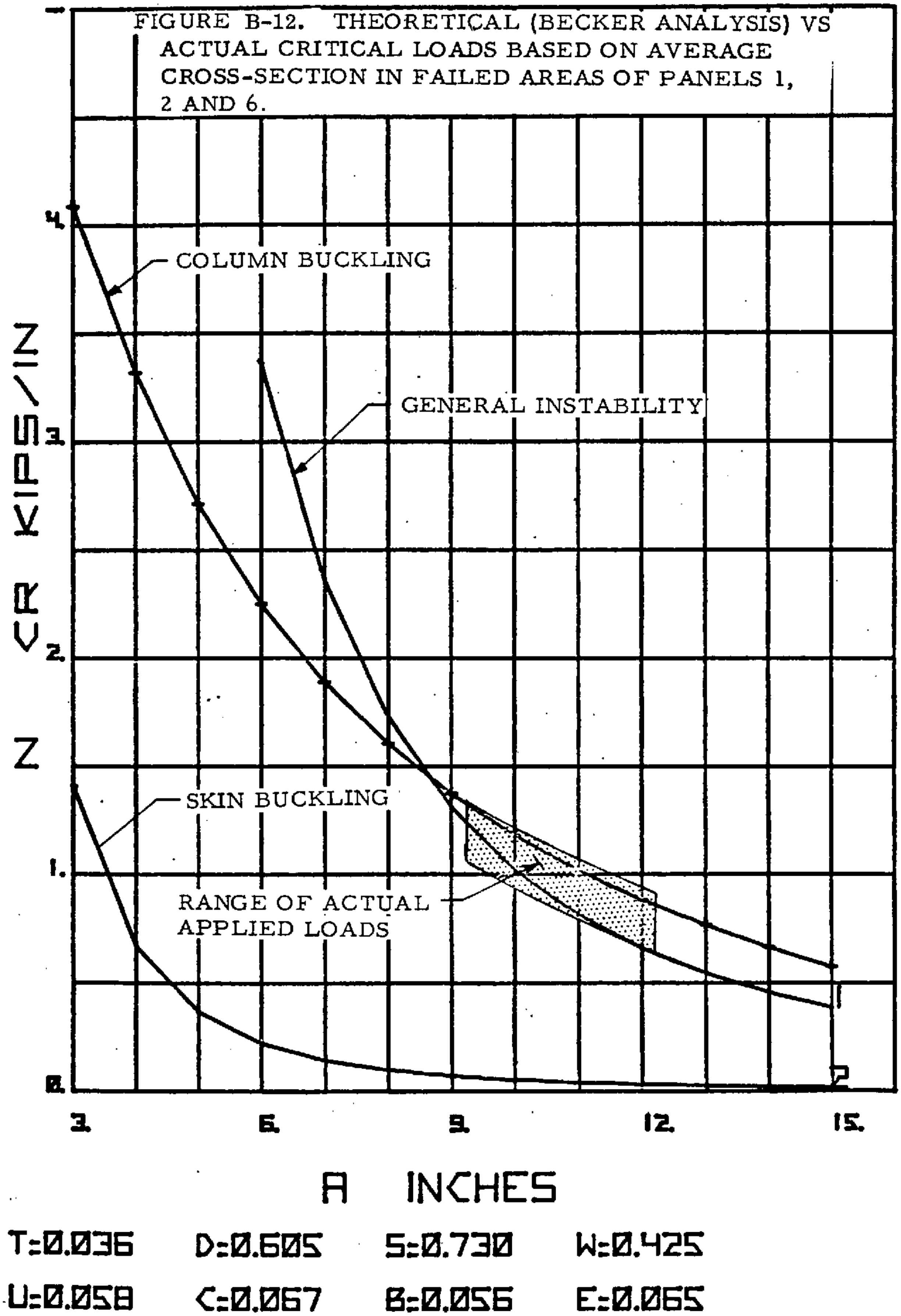


FIGURE B-12. THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANELS 1, 2 AND 6.
COLUMN BUCKLING
GENERAL INSTABILITY
SKIN BUCKLING
RANGE OF ACTUAL APPLIED LOADS
N CR KIPS/IN
4.
3.
2.
1.
0.
3.
6.
9.
12.
15.
A INCHES
1
2
T=0.036 D=0.605 S=0.730 W=0.425
U=0.058 C=0.067 B=0.056 E=0.065

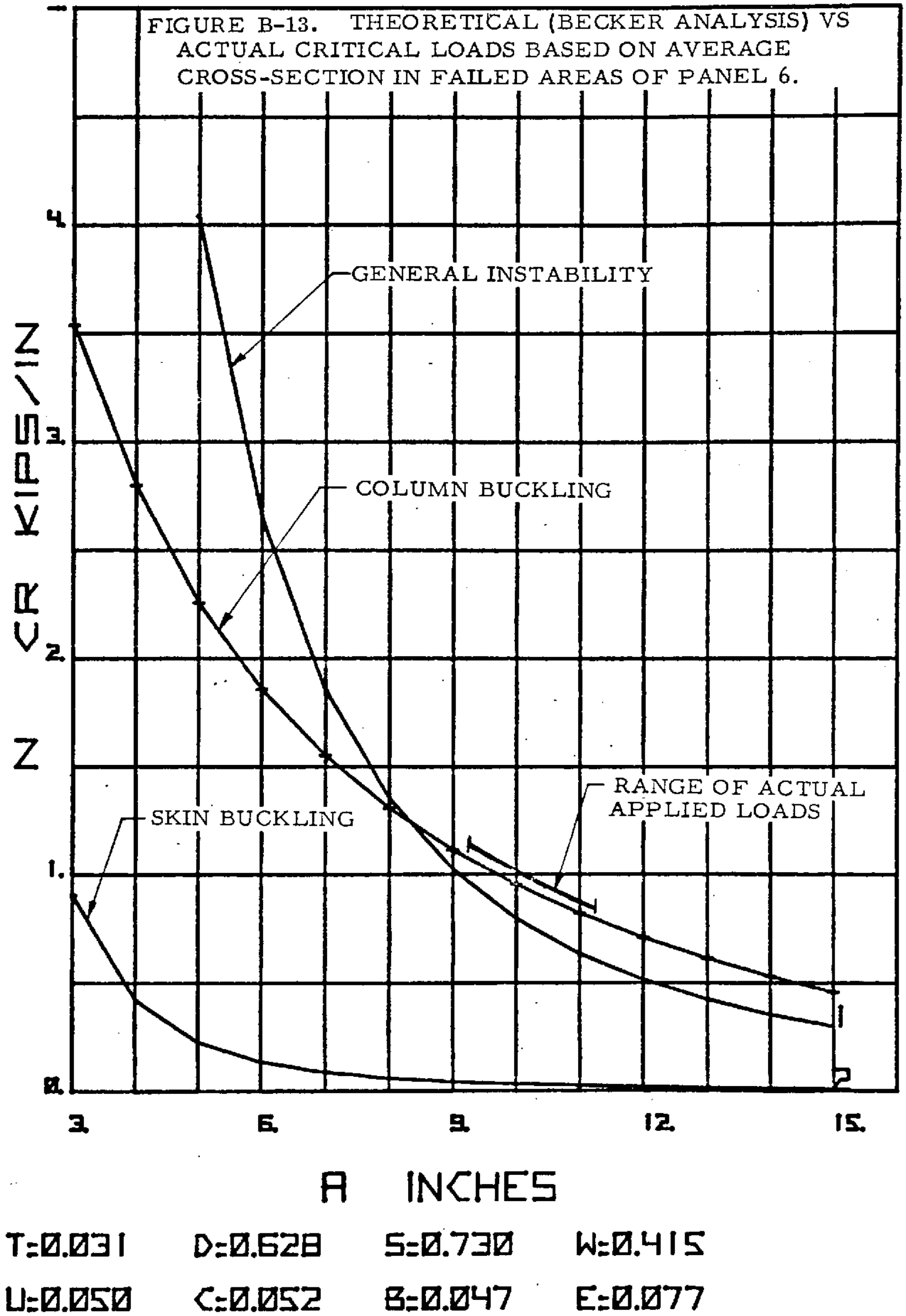
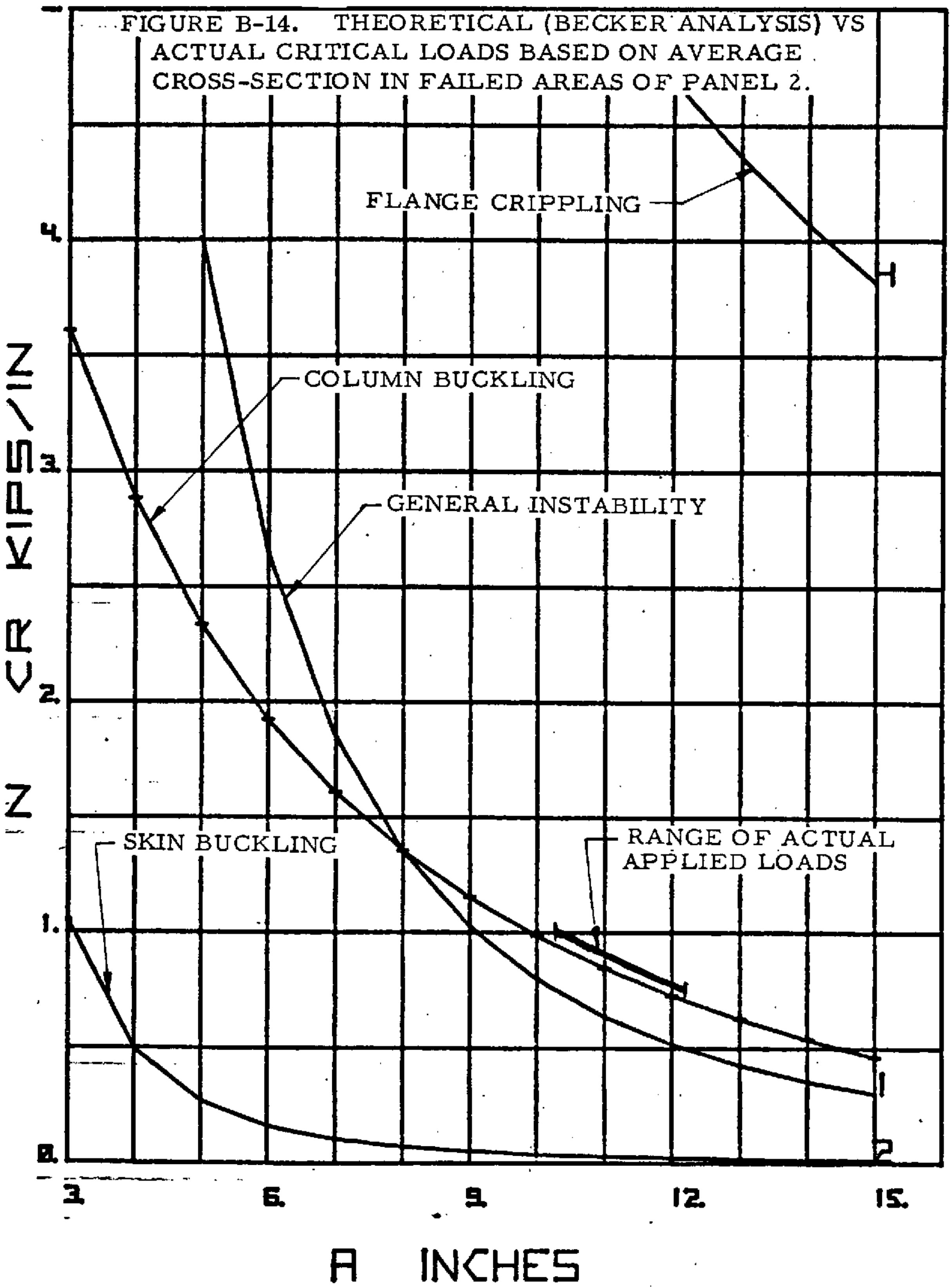


FIGURE B-13. THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 6.



T=0.033 D=0.634 S=0.730 W=0.408
U=0.052 C=0.044 B=0.054 E=0.073

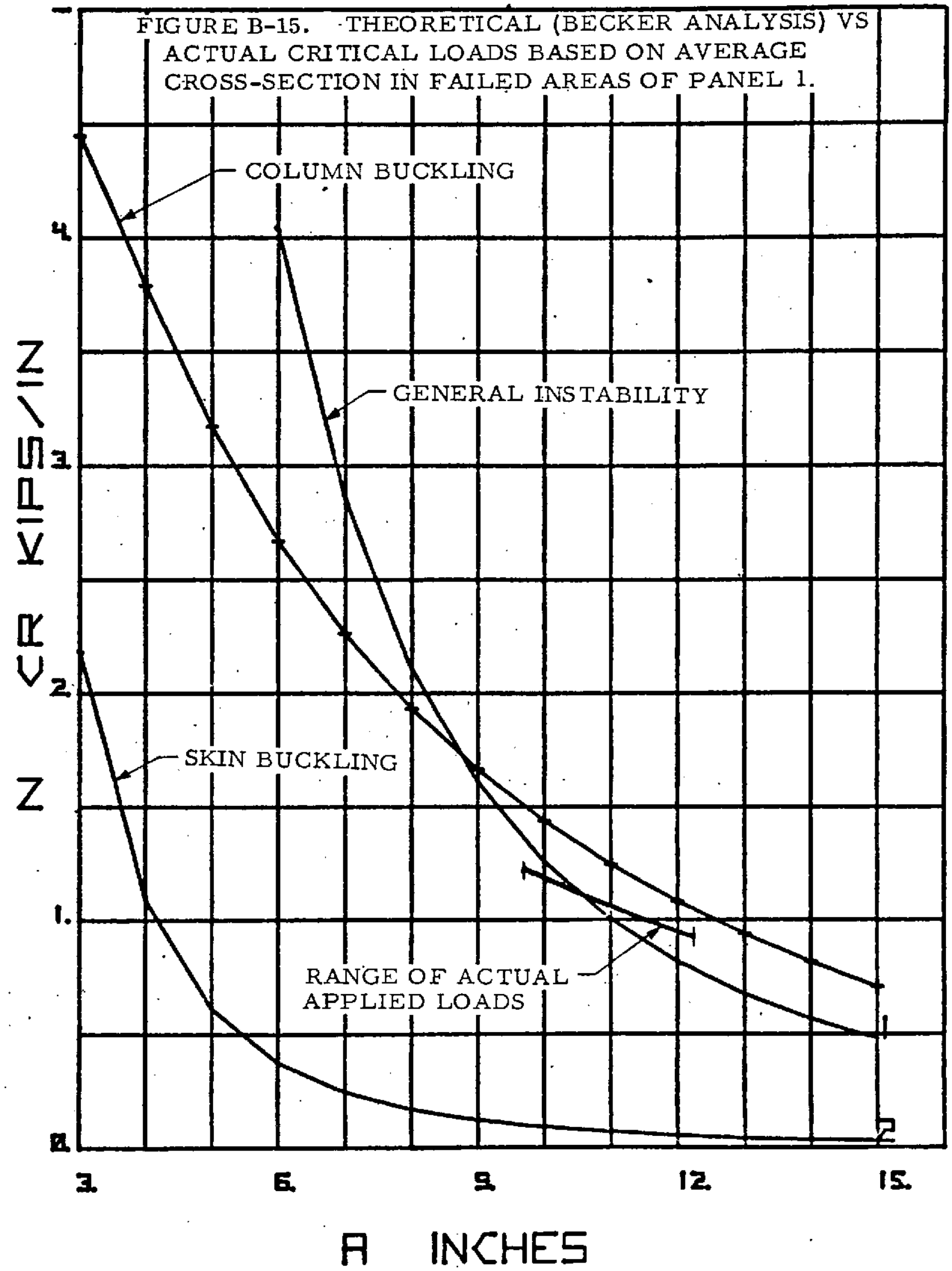
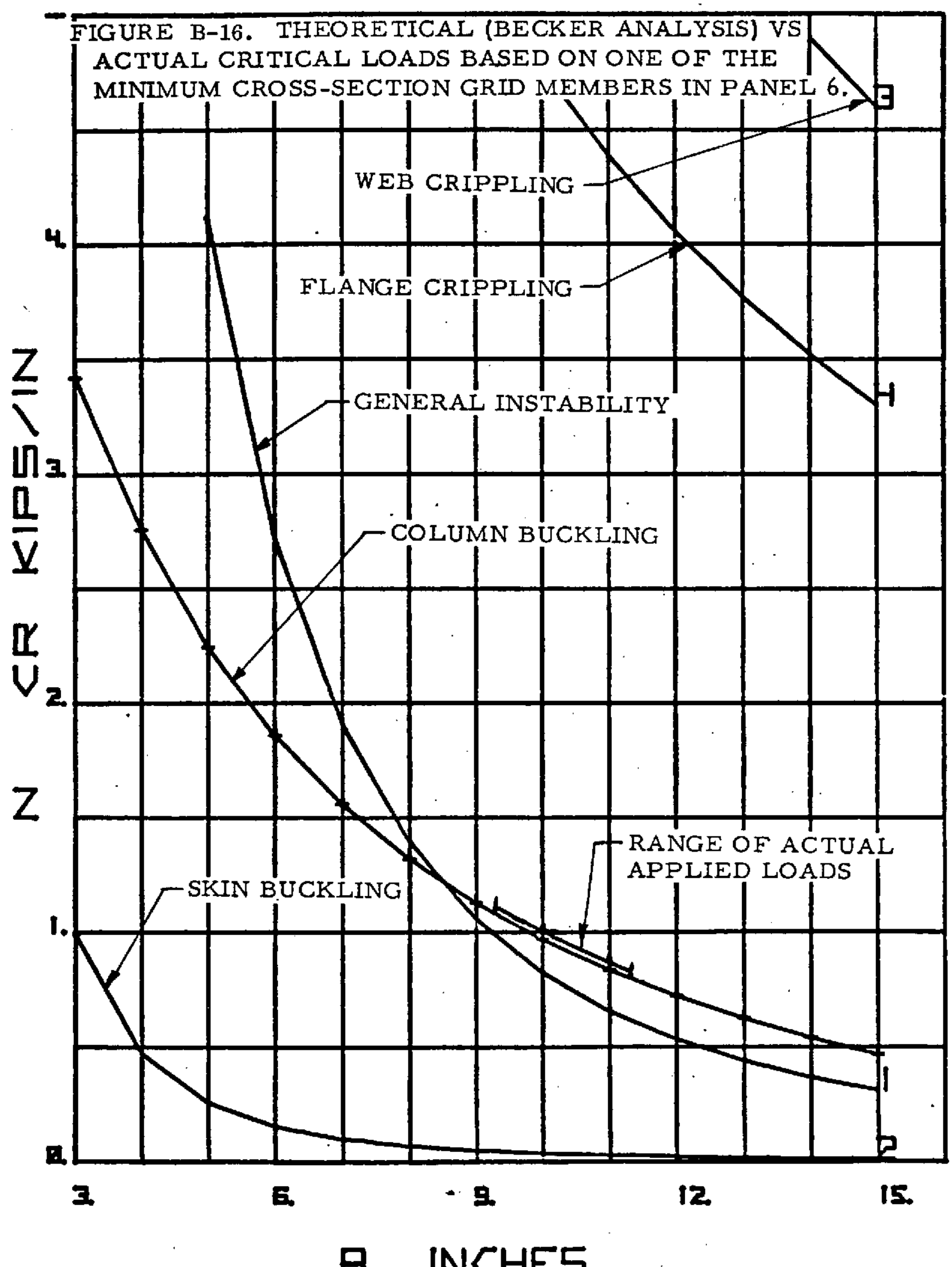


FIGURE B-15. THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON AVERAGE CROSS-SECTION IN FAILED AREAS OF PANEL 1.

T=0.043 D=0.592 S=0.730 W=0.424

U=0.055 C=0.083 B=0.058 E=0.079

FIGURE B-16. THEORETICAL (BECKER ANALYSIS) VS ACTUAL CRITICAL LOADS BASED ON ONE OF THE MINIMUM CROSS-SECTION GRID MEMBERS IN PANEL 6.



T=0.033 D=0.638 S=0.730 W=0.420

U=0.049 C=0.043 B=0.044 E=0.060

B.3.2 CONCLUSIONS FROM TEST RESULTS

Data for six potential failure modes were presented in Subsection B.3.1: skin buckling, material F_{cy}, stiffener flange crippling, stiffener web crippling, column buckling, and general instability. Comparing the theoretical critical loading for each of these failure modes with the actual loading in Figures B-7 through B-16 the most likely failure mode for the adapter can be selected for two different analytical models.

B.3.2.1 SKIN PANEL BUCKLING. The flanged isogrid test specimen was designed to react loads and maintain stability primarily as a result of the load carrying capabilities of the integrally machined I-beam cross-section grid members. Compression buckling of the triangular skin panels is permitted. As seen in Figures B-7 through B-16 skin buckling occurs at load intensities significantly lower than the other theoretical and actual loads. This does not constitute structural failure since grid members can react load independent of the buckled state of the skins. Since some load is obviously carried by the skins, an effective width of skin (i.e., $23.5t_1$) is included in the stiffener cross section when calculating critical loads for other modes of failure.

B.3.2.2 MATERIAL F_{cy}. Although inelastic buckling of the structure is possible, all of the analysis methods used assumed elastic behavior. Critical loading based on the material F_{cy} was thus selected as a convenient upper limit cutoff for the theoretical capability of the structure. Comparing the material F_{cy} allowables with the actual failure loads in Figures B-7 through B-16, it is obvious that failure due to gross yielding of the structure can be ruled out.

B.3.2.3 STIFFENER FLANGE AND WEB CRIPPLING. Critical loads for stiffener flange and web crippling are so large they fall near or outside the limits of the plots in Figures B-7 through B-16. It can thus be concluded that failure was not precipitated by local crippling of the stiffener cross-section.

B.3.2.4 COLUMN BUCKLING AND GENERAL INSTABILITY. Column buckling and general instability are the two most difficult failure modes to accurately predict. Because of this and the closeness of the column buckling and general instability curves in Figures B-12 through B-16 possible ambiguities exist as to whether failure of the test specimen was attributable to general instability or column buckling.

B.3.3 SUMMARY OF TEST RESULTS

Table B-1 summarizes the possible conclusions obtained from the comparisons of data in Figures B-7 through B-16 with reference to column-buckling and general-instability failure modes.

TABLE B-1. SUMMARY OF THEORETICAL AND ACTUAL CRITICAL LOADS COMPARISON.

Damaged Area	Figure	Actual Calculated Failure Load N_{cr} (Avg) -lb/in.	Theoretical Failure Loads					
			General Instability				Column Buckling	
			MDAC*		Becker**			
			N_{cr} (Avg) -lb/in.	$\frac{N_{cr}\text{ Theory}}{N_{cr}\text{ Actual}}$	N_{cr} (Avg) -lb/in.	$\frac{N_{cr}\text{ Theory}}{N_{cr}\text{ Actual}}$	N_{cr} (Avg) -lb/in.	$\frac{N_{cr}\text{ Theory}}{N_{cr}\text{ Actual}}$
Avg Panels 1, 2, and 6	B-7 B-12	1000	1260	1.26	870	0.87	1070	1.07
Avg Panel 1	B-8 B-13	1070	1420	1.33	1000	0.93	1230	1.15
Avg Panel 2	B-9 B-14	870	1130	1.30	610	0.70	810	0.93
Avg Panel 6	B-10 B-15	1000	1130	1.13	770	0.77	910	0.91
Weakest Member Panel 6	B-11 B-16	930	1080	1.16	750	0.81	900	0.97

*Per Subsection B.2.2.
**Per Subsection B.2.3.

The McDonnell Douglas general instability analysis predicts critical loads approximately 25% higher than the calculated actual loads whereas the Becker analysis predicts critical loads approximately 20% lower than actual. The theoretical column buckling and actual calculated failure loads are in close agreement.

From this comparison it is obvious that, due to the many variables such as antielastic curvature, eccentric loading, section warping, and column fixity which cannot be accurately accounted for in the analyses, either column buckling or overall general instability could have precipitated failure of the test specimen.

The approximate analytical methods developed in this report are adequate for initial sizing of conical flanged isogrid structures. However, based on the results of the single test performed, the general instability knockdown factor should be reduced by 25% for the McDonnell Douglas method and increased 20% for the Becker method.

B.4 REFERENCES

B-1 Isogrid Handbook, McDonnell Douglas Astronautics Company, MDCG-4295A, February 1973.

B-2 Becker, M., Handbook of Structural Stability, Part VI, Strength of Stiffened Curved Plates and Shells, NACA T.N. 3786.

APPENDIX C

ISOGRID HANDBOOK SECTION

CYLINDRICAL ISOGRID

STRUCTURE

TO BE SUPPLIED AT A LATER DATE