Approved for public release;
distribution is unlimited.

RECEIVED
FFR 0 8 1999

OST

*Mechanical Design of Hybrid Densitometer
for Laboratory Application*

Los Alamos
NATIONAL LABORATORY

*Los Alamos National Laboratory is operated by the University of California
for the United States Department of Energy under contract W-7405-ENG-36.*

*Edited by Jeff Skiby, Group CIC-1
Prepared by Rita Romero, Group NIS-5*

*This work was supported by the US Department of Energy,
Office of Nonproliferation and National Security, Office of
Safeguards and Security.*

An Affirmative Action/Equal Opportunity Employer

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither The Regents of the University of California, the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by The Regents of the University of California, the United States Government, or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of The Regents of the University of California, the United States Government, or any agency thereof. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

*Mechanical Design of Hybrid Densitometer
for Laboratory Application*

S.-T. Hsue

P. J. Polk

G. Walton

MECHANICAL DESIGN OF HYBRID DENSITOMETER FOR LABORATORY APPLICATION

by

S. -T. Hsue, P. J. Polk, and G. Walton

ABSTRACT

The hybrid K-edge densitometry (KED) and x-ray fluorescence (XRF) densitometer is a unique nondestructive assay (NDA) technique to determine the concentrations of special nuclear material (SNM) in solutions. The technique is ideally suited to assay the dissolver solutions as well as the uranium and plutonium product solutions from reprocessing plants. It is an important instrument for safeguarding reprocessing; it is also a useful tool in analytical laboratories because of its capability of analyzing mixed solutions of SNM without chemical separation. Figure 1 shows the hardware of an hybrid system developed at Los Alamos.

The hybrid densitometer employs a combination of two complimentary assay techniques: absorption KED and XRF. The KED technique measures the transmission of a tightly collimated photon beam through the sample; it is therefore quite insensitive to the radiation emitted by the sample material. Fission product level of ~ 1 Ci/mL can be tolerated. The technique is insensitive to matrix variation. XRF measures the fluorescent x-rays from the same sample and can be used to determine the ratios of SNM. The technique¹ can be applied to thorium, uranium, neptunium, plutonium, and americium concentration determination. The technique can also be applied to mixed solutions found in nuclear fuel cycle without separation: thorium-uranium, uranium-plutonium, and neptunium-plutonium-americium.

The design of the hybrid densitometer is shown schematically in Figs. 1 and 2; Fig. 1 shows the top view; Fig. 2 shows the side view. The heart of the design is the sample changer. The sample changer can accommodate a sample tray, which holds up to six samples. The samples can be a 2-cm path length cell, 4-cm path length cell, or a mixture of both sizes. The sample tray is controlled by a "Compumotor" which in turn is controlled by a computer. The absolute position of the sample cell can be reproduced to a standard deviation of 0.02 mm. The sample changer is housed inside square stainless steel tubing which is bolted onto the glove box. The sample cells can be observed during the movement or assay through a leaded glass viewport, as shown in Fig. 3.

Fig. 1. Top view of schematic design of the hybrid hardware system.

Fig. 2. Side view of schematic design of the hybrid hardware system.

Fig. 3. Photograph of sample and sample tray in the x-ray beam. The vertical cylinder on the left is the housing for the x-ray tube. The horizontal tubing on the right is the KED detector.

REFERENCE

1. H. Ottmar and H. Eberle, "The Hybrid K-Edge/K-XRF Densitometer: Principles - Design - Performance," Kernforschungszentrum Karlsruhe report KfK 4590 (February 1991).

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION	
			ASSEMBLY	D1.D2
			SUB-ASSEMBLY 100	D3.D4
			SUB-ASSEMBLY 200	D5
			SUB-ASSEMBLY 300	D19
			SUB-ASSEMBLY 400	D20
			SUB-ASSEMBLY 500	D28

NOTE.

① SEE SHEET D2 FOR ASSEMBLY ENLARGEMENT AND PARTS LIST.

31.50
800

A	REV	ADDED SHEETS D24 THRU D30	0-22-91	WALTON	Heine	Heine
—	—	ORIGINAL ISSUE	—	—	—	—
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF DRAWING: UNCLASSIFIED PART: UNCLASSIFIED TITLE BLOCK: UNCLASSIFIED			
ASSEMBLY			TITLE <h2>JAERI HYBRID SYSTEM</h2>			
ORIGINATED	G. WALTON	10-31-91	N-1	TOLERANCE - UNLESS OTHERWISE NOTED:		
DRAWN	G. WALTON	10-31-91	N-1	X=± 0.XX± ANGULAR±		
CHECKED	L. POLLAT	12-13-91	N-1	O.K.=± 0.XXX± FINISH=		
PROJ. ENGR.	S. THSUE	12-13-91	N-1	SCALE	TOTAL SHEETS	DRAWING NO.
APPROVED	S. THSUE	12-13-91	N-1	1/8	30	68Y-155787
RELEASED	L. POLLAT	12-13-91	N-1	SHEET NO. 1

PART NUMBER		PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION
	1	4	SCR. SOC HD CAP. STL. M10 X 1.5 X 25MM LONG
	2	3	SCR. SOC HD CAP. STL. M10 X 1.5 X 15MM LONG
	3	3	SCR. SOC HD CAP. STL. M6 X 1 X 20MM LONG

REVISION LETTER		CLASS REVIEW	ORIGINAL ISSUE		DATE	CHANGED BY	CHECKED BY	APPROVED BY
			REVISIONS					
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF		DRAWING UNCLASSIFIED			
			PART UNCLASSIFIED		TITLE BLOCK UNCLASSIFIED			
ASSEMBLY			TITLE JAERI HYBRID SYSTEM					
SIGNATURE			DATE		TOLERANCE-UNLESS OTHERWISE NOTED			
ORIGINATED			10-31-91		X=±			
DRAWN			10-31-91		O.XX=±			
CHECKED			12-13-93		ANGULAR=±			
PROJ. ENGR.			12-13-93		O.XX=±			
APPROVED			12-13-93		FRESH=±			
RELEASED			12-13-93		SCALE			
					TOTAL SHEETS			
					DRAWING NO			
					68Y-155787			
					SHEET NO			
					2

SECTION C-C
TAKEN FROM SHEET D4
ROTATED TO UPRIGHT POSITION

PART NUMBER		PARTS LIST	
PREFX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION
	101	1	POWERSLIDE HOUSING
	102	1	LARGE VIAL TRAY
	103	1	SMALL VIAL TRAY
	104	1	VIAL TRAY SUPPORT
	105	1	X-RAY SHIELD
	106	1	SLIDE HOUSING
	107	1	END CAP
	108	2	VIEWPORT GASKET
	109	1	VIEWPORT LEAD GLASS
	110	1	VIEWPORT RETAINER
	111	1	COLLIMATOR HOUSING
	112	1	TUNGSTEN SHIELDING
	113	1	COLLIMATOR HOUSING SUPPORT CLAMP
	114	1	MEASUREMENT CONTROL VIAL SEAT
	115	1	MEASUREMENT CONTROL VIAL COVER
	116	1	TUNGSTEN/IRON COLLIMATOR
	117	1	TUNGSTEN COLLIMATOR
	118	1	TUNGSTEN SLIDE
	119	1	POWERSLIDE (MODIFICATION)

SECTION A-A
TAKEN FROM SHEET D2

NOTE:

① SEE SHEET D4 FOR CONTINUATION OF SUB-ASSY 100 AND PARTS LIST.

A	LP	ADDED DETAILS 146,147,148,149,150 151,152,153,154,155,156,157	7-9-93	WALTON	LP	LP
-	LP	ORIGINAL ISSUE	-	-	-	-
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545		CLASSIFICATION OF DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED TITLE <h2 style="text-align: center;">JAERI HYBRID SYSTEM</h2>				
SUB-ASSEMBLY 100		TOLERANCE-UNLESS OTHERWISE NOTED X=1 O.XX=2 ANGULAR=1 O.X=2 O.XXX=2 FINISH=				
ORIGINATED	SIGNATURE	DATE	GROUP	SCALE		
DRAWN	G.WALTON	10-31-91	N-1	1/2	TOTAL SHEETS	DRAWING NO.
CHECKED	L.POLLAT	12-13-91	N-1			SHEET NO.
PROJ. ENGR.	S.T.HSUE	12-13-91	N-1			3
APPROVED	S.T.HSUE	12-13-91	N-1			
RELEASED	L.POLLAT	12-13-91	N-1

SECTION
TAKEN FROM

PART NUMBER		PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	RECD	DESCRIPTION
	120	1	POWERSLIDE SUPPORT BRACKET
	121	2	SWITCHBOARD MOUNTING BRACKET
	122	1	SWITCHBOARD MOUNTING BRACKET
	123	1	TRIP FLAG SUPPORT BRACKET
	124	1	SWITCHBOARD TRIP FLAG
	125	1	SWITCHBOARD TRIP FLAG
	126	1	FOIL RETAINER
	127	1	FOIL RETAINER PLUG
	128	2	BRACKET STANDOFF
	129	2	BRACKET STANDOFF
	130	19	SCR. SOC HD CAP. SST. M10 X 1.5 X 25MM LONG
	131	36	SCR. SOC HD CAP. SST. M6 X 1 X 20MM LONG
	132	6	SCR. SOC HD CAP. SST. M5 X 8 X 10MM LONG
	133	2	SCR. SOC HD CAP. SST. M5 X 8 X 40MM LONG
	134	2	SCR. SOC HD CAP. SST. M5 X 8 X 20MM LONG
	135	2	SCR. SOC HD CAP. SST. M6 X 1 X 5MM LONG
	136	2	SCR. SOC HD CAP. SST. M4 X 7 X 10MM LONG
	137	14	SCR. SOC HD CAP. SST. M3 X 5 X 10MM LONG
	138	8	SCR. SOC HD CAP. SST. M3 X 5 X 5MM LONG
	139	4	SCR. SOC HD CAP. SST. 10-32 X .50 LONG
	140	1	O-RING, NEOPRENE, 5.859 ID X .139 WALL, PARKER NO 2-257
	141	1	O-RING, NEOPRENE, 9.234 ID X .139 WALL, PARKER NO 2-271
	142	3	CONNECTOR
	143	3	SWITCHBOARD
	144	12	STANDOFF
	145	1	COMBINATION VIAL TRAY
	146	1	TRIP FLAG
	147	1	SHIELDING
	148	1	
	149	2	
	150	1	
	151	1	
	152	1	SHIELDING
	153	1	TUNGSTEN RING
	154	1	SHIELDING
	155	1	SHIELDING
	156	2	SHIELDING
	157	2	SHIELDING
	158	2	SHIELDING
	159	1	SHIELD (RIGHT HAND)
	160	1	SHIELD (LEFT HAND)
	161	1	SHROUD SUPPORT BRACKET
	162	1	SHROUD HINGE BRACKET
	163	1	SHROUD HINGE
	164	1	LEXAN SHROUD
	165	1	PIVOT STOP
	166	1	SHROUD HANDLE
	167	17	SCR. SOC HD CAP. SST. M6 X 1 X 15MM LONG
	168	1	SCR. SOC SET. STL. M5 X 8 X 10 MM LONG

N B-B
SHEET D3

ORIGINAL ISSUE				DATE				CHANGED BY		CHECKED BY		APPROVED BY	
REVISION LETTER	CLASS REVIEW	REVISIONS		CLASSIFICATION OF		DRAWING UNCLASSIFIED							
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEW MEXICO 87545				PART: UNCLASSIFIED TITLE BLOCK: UNCLASSIFIED TITLE <h2 style="text-align: center;">JAERI HYBRID SYSTEM</h2>									
SUB-ASSEMBLY 100				TOLERANCE - UNLESS OTHERWISE NOTED: X ± .005 O .XX ± .005 ANGULAR ± .005 O .X ± .005 O .XXX ± .005 FINISH:									
ORIGINATED	G WALTON	DATE	10-31-91	GROUP	N-1	SCALE		TOTAL SHEETS		DRAWING NO.		SHEET NO.	
DRAWN	G WALTON	DATE	10-31-91	GROUP	N-1	1/2		68Y-155787		D		4	
CHECKED	L POLLAT	DATE	12-13-91	GROUP	N-1								
PROJ ENGR	S THSUE	DATE	12-13-91	GROUP	N-1								
APPROVED	S THSUE	DATE	12-13-91	GROUP	N-1								
RELEASED	L POLLAT	DATE	12-13-91	GROUP	N-1

SECTION A-A

211
PL

207
D18

215
D25

217
D18
A

214
D25
A

216
PL

211
PL

18.36
618.9 REF

PART NUMBER		PARTS LIST	
PREFX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION
	201	1	TUNGSTEN HOUSING
	202	1	WEDGE
	203	1	BASE SUPPORT
	204	1	X-RAY GENERATOR SHIELD (BOTTOM)
	205	1	TIE BARS
	206	2	X-RAY GENERATOR SHIELD (MIDDLE)
	207	2	CABLE AND HOSE RETAINER
	208	1	COLLIMATOR (FRONT)
	209	1	COLLIMATOR (REAR)
	210	3	SCR. SOC HD CAP. STL. M10 X 15 X 15MM LONG
	211	14	SCR. SOC HD CAP. STL. M6 X 1 X 10MM LONG
	212	1	SCR. SOC HD CAP. STL. M3 X .5 X 10MM LONG
	213	1	CADMIUM SHT. .030 THK X .35 DIA
	214	1	X-RAY GENERATOR SHIELD (TOP)
	215	1	X-RAY GENERATOR SHIELD (TOP)
	216	2	SCR. SOC HD CAP. STL. M6 X 1 X 20MM LONG
	217	1	CABLE AND HOSE RETAINER

A	SP	ADDED DETAILS 214, 215 AND 217	7-9-92	WALTON	SP	SP
-	SP	ORIGINAL ISSUE	-	-	-	-
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF: DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
SUB-ASSEMBLY 200			TITLE JAERI HYBRID SYSTEM			
ORIGINATED	G. WALTON	10-31-91	N-1	TOLERANCE-UNLESS OTHERWISE NOTED:		
DRAWN	G. WALTON	10-31-91	N-1	X=± O.XX=± ANGULAR=±		
CHECKED	L. POLLAT	12-13-91	N-1	O.XX=± O.XXX=± FINISH=		
PROJ. ENGR	S. THSUE	12-13-91	N-1	SCALE	TOTAL SHEETS	DRAWING NO.
APPROVED	S. THSUE	12-13-91	N-1	1/2		68Y-155787
RELEASED	L. POLLAT	12-13-91	N-1			SHEET NO. 5

2.00 X 2.00 X .25 WALL ANGLE
STAINLESS STL TYPE 304

#16 FINISH REED FOR SPOTFACES
3 PLACES

3X Ø THRU .875^{+.010}_{-.000}
SPOTFACE Ø 1.375 ± .015 X .020 ± .005 FARSIDE
Ø .030 (4)

NOTES:

- (1) UNLESS OTHERWISE NOTED ALL MACHINING IS TO AFTER ALL WELDING HAS BEEN COMPLETED.
- (2) 6.00 X 6.00 X .25 WALL SEAMLESS SQUARE SST ACCEPTABLE FOR FABRICATION.
- (3) THE GROOVE NOTED CAN BE MACHINED BEFORE IS WELDED INTO PLACE.
- (4) UNTOLERANCED DIMENSIONS LOCATING TRUE POS
- (5) DETAIL 101 IS TO BE HELIUM LEAK CHECKED 1 X

PART NUMBER			PARTS LIST		
PREF NUMBER	ITEM NUMBER	RECD	DESCRIPTION

PERFORMED

TUBING IS

THE END FLANGE

ON ARE BASIC.

0.6

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. ALL DIMENSIONS IN INCHES
2. BREAK ALL SHARP EDGES
3. CSK .02" x .030 DEEP ALL MAJOR DIAMETER HOLES
4. CSK .02" x .030 DEEP ALL DRILLED HOLES
5. DIMENSIONING & POSITIONAL TOLERANCING PER AMS Y14.1M107
6. WELDING SYMBOLS PER ANSIS A2.4-76
7. SURFACE TEXTURE PER AMS B40.1-1978

A	PP	ADDED SST STL LOCATOR PIN	2-6-93	WALTON	PP	PP
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
ORIGINAL ISSUE						
CLASSIFICATION OF			DRAWING UNCLASSIFIED			
PART UNCLASSIFIED			TITLE BLOCK UNCLASSIFIED			
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEW MEXICO 87545			TITLE JAERI HYBRID SYSTEM			
PART 101 POWERSLIDE HOUSING MATL SST TYPE 304 REQD ONE						
SIGNATURE	DATE	GROUP				
ORIGINATED	G. WALTON	7-10-91	N-1			
DRAWN	G. WALTON	7-10-91	N-1			
CHECKED	L. POLLAT	12-13-91	N-1			
PROJ ENGR	S. HSUE	12-13-91	N-1			
APPROVED	S. HSUE	12-13-91	N-1			
RELEASED	L. POLLAT	12-13-91	N-1			
TOLERANCE-UNLESS OTHERWISE NOTED						
X=.1			0.XX=.1			ANGULAR=.1
0.X=.1			0.XXX=.1			FINISH=
SCALE	TOTAL SHEETS	DRAWING NO	SHEET NO.			
1/2		68Y-155787	D 7			

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	SUB-ITEM	DESCRIPTION

SECTION A-A

L TRAY
(WHITE)

- GENERAL NOTES UNLESS OTHERWISE NOTED
1. ALL DIMENSIONS IN INCHES
 2. BREAK ALL SHARP EDGES
 3. CSK .82" ALL TAPPED HOLES TO MAJOR DIAMETER
 4. CSK .37" ± .000 DEEP ALL DRILLED HOLES
 5. DIMENSIONING & POSITIONAL TOLERANCING PER ASME Y14.5M-1992
 6. WELDING SYMBOLS PER ANSI AWS A2.4-76
 7. SURF AC. TEXTURE PER AWS B46.1-1978

A	LP	ADDED CHAMFERS	8-4-93	WALTON	LP	LP
ORIGINAL ISSUE						
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos			CLASSIFICATION OF DRAWING UNCLASSIFIED			
LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
PART 102			TITLE JAERI HYBRID SYSTEM			
ORIGINATED	G. WALTON	6-10-91	N-1	TOLERANCE UNLESS OTHERWISE NOTED		
DRAWN	G. WALTON	6-10-91	N-1	X=.1 .0XX=.1 ANGULAR=.1		
CHECKED	L. POLLAT	12-13-91	N-1	O X=.1 .0XXX=.1 FINISH=		
PROD. ENGR.	S.T. HSUE	12-13-91	N-1	SCALE	TOTAL SHEETS	DRAWING NO.
APPROVED	S.T. HSUE	12-13-91	N-1	NOTED	68Y-155787	SHEET NO. 8
RELEASED	L. POLLAT	12-13-91	N-1			

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	HAND RECD	DESCRIPTION

SECTION A-A

TRAY

(WHITE)

A	ADDED CHAMFERS	8-4-93	WALTON	XP	XP
—	ORIGINAL ISSUE	—	—	—	—
REVISION LETTER	CLASS REVIEW	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos		CLASSIFICATION OF DRAWING: UNCLASSIFIED			
LOS ALAMOS NATIONAL LABORATORY		PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
LOS ALAMOS NEW MEXICO 87545		TITLE			
PART 103		JAERI HYBRID SYSTEM			
SIGNATURE		DATE	GROUP		
ORIGINATED	G. WALTON	6-12-91	N-1		
DRAWN	G. WALTON	6-12-91	N-1		
CHECKED	L. POLLAT	12-13-91	N-1		
PROJ. ENGR.	S. THSUE	12-13-91	N-1		
APPROVED	S. THSUE	12-13-91	N-1		
RELEASED	L. POLLAT	12-13-91	N-1		
TOLERANCE-UNLESS OTHERWISE NOTED:		X=.1 ——— O.XX=.1 ——— ANGULAR=.1 ———			
O.X=.1 ——— O.XX=.1 ——— FINISH= ———		SCALE TOTAL SHEETS			
DRAWING NO.		SHEET NO.			
68Y-155787		D 9			

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. ALL DIMENSIONS IN INCHES
2. BREAK ALL SHARP EDGES
3. CSK .07" ALL TAPPED HOLES TO MAJOR DIAMETER
4. CSK .07" x .030 DEEP ALL DRILLED HOLES
5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987
6. WELDING SYMBOLS PER ANSI/AWS A2.4-76
7. SURFACE TEXTURE PER ANSI B46.1-1978

104 VIAL TRAY SUPPORT
MATL. STAINLESS STL TYPE 304
SCALE 1/1
READ ONE

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER	RECD	DESCRIPTION

105 X-RAY SHIELD
MATL TUNGSTEN
SCALE: 1/1
RECD: ONE

106 SLIDE HOUSING
MATL STAINLESS STL TYPE 304
SCALE: 1/1
RECD: ONE

- GENERAL NOTES - UNLESS OTHERWISE NOTED:
1. ALL DIMENSIONS IN INCHES
 2. BREAK ALL SHARP EDGES
 3. CSK .87" ALL TAPPED HOLES TO MAJOR DIAMETER
 4. CSK .87" x .000 DEEP ALL DRILLED HOLES
 5. DIMENSIONING & POSITIONAL TOLERANCING PER AMS 1154-1987
 6. WELDING SYMBOLS PER AWS/AAS 42.76
 7. SURFACE TEXTURE PER AMS 891-1978

A	LP	625 CHAMFER WAS 50	5-3-93	WALTON	LP	LP
—	—	ORIGINAL ISSUE	—	—	—	—
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF DRAWING: UNCLASSIFIED PART: UNCLASSIFIED TITLE BLOCK: UNCLASSIFIED			
PARTS 104, 105, 106			TITLE JAERI HYBRID SYSTEM			
ORIGINATED	G. WALTON	7-19-91	N-1	TOLERANCE - UNLESS OTHERWISE NOTED		
DRAWN	G. WALTON	7-19-91	N-1	X ± — 0.XX ± — ANGULAR ± —		
CHECKED	L. POLLAT	12-13-91	N-1	0.XX ± — 0.XXX ± — FINISH —		
PROJ. ENGR.	S.T. HSUE	12-13-91	N-1	SCALE TOTAL SHEETS		
APPROVED	S.T. HSUE	12-13-91	N-1	DRAWING NO. 68Y-155787 SHEET NO. 10		
RELEASED	L. POLLAT	12-13-91	N-1	NOTED

107 END CAP
MATL. STAINLESS STL TYPE 304
RECD. ONE
SCALE: 1/2

110 VIEWPORT RETAINER
MATL. STAINLESS STL TYPE 304
RECD. ONE
SCALE: 1/2

206

113 COLLIMATOR HOUSING SUPPORT CLAMP
MATL: MACHINABLE TUNGSTEN
REOD: ONE
SCALE: 1/1

116 TUNGSTEN/IRON COLLIMATOR
MATL: MACHINABLE TUNGSTEN AND IRON
REOD: ONE
SCALE: 1/1

114 MEASUREMENT
MATL: DELRIN
REOD: ONE
SCALE: 1/1

117 TUNGSTEN COLLIMATOR
MATL: MACHINABLE TUNGSTEN
REOD: ONE
SCALE: 1/1

115 MEASUREMENT CONTROL VIAL COVER
MATL STAINLESS STL TYPE 304
RECD ONE
SCALE 1/1

118 TUNGSTEN SLIDE
MATL MACHINABLE TUNGSTEN
RECD ONE
SCALE 1/1

A	LP	REMOVED 125 Ø C-BORE IN PART 117 HOLE DIA WAS .030 IN PART 117		11-20-92	G.WALTON	LP	LP
		PART 113 MATERIAL CHANGED FROM .50 THK ALUMINUM TO 25 THK TUNGSTEN					
-	LP	ORIGINAL ISSUE		-	-	-	-
REVISION LETTER	CLASS REVIEW	REVISIONS		DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545				CLASSIFICATION OF DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED TITLE JAERI HYBRID SYSTEM			
PARTS 113, 114, 115, 116, 117, 118							
ORIGINATED	G.WALTON	DATE	8-7-91	GROUP	N-1		
DRAWN	G.WALTON	DATE	8-7-91	GROUP	N-1		
CHECKED	L.POLLAT	DATE	12-13-91	GROUP	N-1		
PROJ. ENGR	S.T.HSUE	DATE	12-13-91	GROUP	N-1		
APPROVED	S.T.HSUE	DATE	12-13-91	GROUP	N-1		
RELEASED	L.POLLAT	DATE	12-13-91	GROUP	N-1		
GENERAL NOTES: UNLESS OTHERWISE NOTED 1. ALL DIMENSIONS IN INCHES 2. BREAK ALL SHARP EDGES 3. CSK .07" ALL TAPPED HOLES TO MAJOR DIAMETER 4. CSK .07" x .030 DEEP ALL DRILLED HOLES 5. DIMENSIONS & POSITIONAL TOLERANCING PER ANSI Y14.5M-1992 6. WELDING SYMBOLS PER ANSI A5.7-76 7. SURFACE TEXTURE PER ANSI B46.1-1978				TOLERANCE UNLESS OTHERWISE NOTED: X.XX ± .001 O.XX ± .001 ANGLE ± .1 FINISH ± .001			
SCALE	TOTAL SHEETS	DRAWING NO.	68Y-155787	SHEET NO.	12

PART NUMBER			PARTS LIST	
PREF. NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

00)

A	XP	ADDED PART 153	7-21-93	WALTON	XP	LP
REVISION LETTER	CLASS REVIEW	ORIGINAL ISSUE	DATE	CHANGED BY	CHECKED BY	APPROVED BY
REVISIONS			CLASSIFICATION OF DRAWING UNCLASSIFIED			
PART UNCLASSIFIED			TITLE BLOCK UNCLASSIFIED			
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			TITLE JAERI HYBRID SYSTEM			
PARTS 119, 120, 153			TOLERANCE UNLESS OTHERWISE NOTED			
SIGNATURE			DATE			
ORIGINATED			GROUP			
DRAWN			N-1			
CHECKED			N-1			
PROJ. ENGR.			N-1			
APPROVED			N-1			
RELEASED			N-1			
GENERAL NOTES (UNLESS OTHERWISE NOTED)			SCALE			
1. ALL DIMENSIONS IN INCHES			TOTAL SHEETS			
2. BREAK ALL SHARP EDGES			DRAWING NO.			
3. CSK .01" ALL TAPPED HOLES TO MAJOR DIAMETER			68Y-155787			
4. CSK .02" x .030 DEEP ALL DRILLED HOLES			SHEET NO.			
5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987			13			
6. WELDING SYMBOLS PER ANSI AWS A2.4-76						
7. SURFACE TEXTURE PER ANSI B46.1-1978

121

SWITCHBOARD MOUNTING BRACKET (REAR)

MATL: STAINLESS STL TYPE 304
 REOD: 2
 SCALE: 1/1

122

SWITCHBOARD MOUNTING BRACKET (FRONT)

MATL: STAINLESS STL TYPE 304
 REOD: ONE
 SCALE: 1/1

124

SWITCHBOARD TRIP FLAG

MATL: STAINLESS STL SHT, TYPE 316, .031 STK
 REOD: ONE
 SCALE: 1/1

125

SWITCHBOARD TRIP FLAG (DETAIL)

MATL: STAINLESS STL SHT, TYPE 316, .031 STK
 REOD: ONE
 SCALE: 1/1

PART NUMBER			PARTS LIST	
PREFX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

A 123 TRIP FLAG SUPPORT BRACKET
 MATL STAINLESS STL TYPE 304
 RECD: ONE
 SCALE: 1/1

BRACKET (X-RAY)

FLAG
 TYPE 316, 031 STK

A	LP	DETAIL 123 CHANGED FROM A TRIP FLAG TO A TRIP FLAG SUPPORT BRACKET	11-10-92	WALTON	LP	LP
—	LP	ORIGINAL ISSUE	—	—	—	—
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHECKED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED TITLE JAERI HYBRID SYSTEM			
PARTS 121,122,123,124,125						
ORIGINATED	G. WALTON	8-20-91	N-1			
DRAWN	G. WALTON	8-20-91	N-1			
CHECKED	L. POLLAT	12-13-91	N-1			
PROJ. ENGR	S. THSUE	12-13-91	N-1			
APPROVED	S. THSUE	12-13-91	N-1			
RELEASED	L. POLLAT	12-13-91	N-1			
GENERAL NOTES (UNLESS OTHERWISE NOTED) 1. ALL DIMENSIONS IN INCHES 2. BREAK ALL SHARP EDGES 3. CSK .02" ALL TAPPED HOLES TO MAJOR DIAMETER 4. CSK .02" X .030 DEEP ALL DRILLED HOLES 5. DIMENSIONS & POSITIONAL TOLERANCES PER AMS 115-SM-2002 6. WELDING SYMBOLS PER AWS/AWS A7.7-76 7. SURF. FINE TEXTURE PER AMS B60.1-97B				TOLERANCE-UNLESS OTHERWISE NOTED X=. D.XX=. ANGULAR=. O.X=. O.XXX=. FINISH=.		
SCALE NOTED		TOTAL SHEETS	DRAWING NO.	SHEET NO.		
			68Y-155787	14

(A)

ANDOFF
STL TYPE 304

131 CABLE SHROUD SUPPORT
MATL STAINLESS STL TYPE 304
RECD ONE
SCALE: 1/1

(A)

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. ALL DIMENSIONS IN INCHES
2. BREAK ALL SHARP EDGES
3. CSK .031" x .030" DEEP ALL DRILLED HOLES
4. CSK .031" x .030" DEEP ALL DRILLED HOLES
5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1992
6. WELDING SYMBOLS PER ANSI/AWS A2.4-76
7. SURFACE TEXTURE PER ANSI B46.1-1978

PART NUMBER		ITEM NUMBER		PARTS LIST	
PREFIX NUMBER	NUMBER	NUMBER	RECD	DESCRIPTION	
A	XP	ADDED DETAILS 130 AND 131		8-4-92	WALTON
-	XP	ORIGINAL ISSUE		-	-
REVISION LETTER	CLASS REVIEW	REVISIONS		DATE	CHANGED BY
				CHECKED BY	APPROVED BY
				CLASSIFICATION OF DRAWING: UNCLASSIFIED	
				PART: UNCLASSIFIED TITLE BLOCK: UNCLASSIFIED	
				TITLE	
				JAERI HYBRID SYSTEM	
				TOLERANCE-UNLESS OTHERWISE NOTED	
				X=± 0.XX±0 ANGLE AR=±	
				O X=± 0.XXX±0 FINISH=	
				SCALE TOTAL SHEETS DRAWING NO. SHEET NO.	
				NOTED 68Y-155787 15	

ORIGINATED	SIGNATURE	DATE	GROUP
ORIGINATED	G. WALTON	9-11-91	N-1
DRAWN	G. WALTON	9-11-91	N-1
CHECKED	L. POLLAT	12-13-91	N-1
PROJ. ENGR.	S. THSUE	12-13-91	N-1
APPROVED	S. THSUE	12-13-91	N-1
RELEASED	L. POLLAT	12-13-91	N-1

2X Ø .2500 X .75 LONG DOWEL PIN

Ø .001 (S) A

-B-

201 TUNGSTEN HOUSING

MATL. MACHINABLE TUNGSTEN

RECD. ONE

SCALE 1/1

200^{+0.005}

100

203 BASE SUPPORT
MATL ALUMINUM 6061-T6
REOD: ONE
SCALE: 1/1

202 WEDGE
MATL: STAINLESS STL TYPE 304
REOD: ONE
SCALE: 1/1

- GENERAL NOTES (UNLESS OTHERWISE NOTED)
1. ALL DIMENSIONS IN INCHES
 2. BREAK ALL SHARP EDGES
 3. CSK .031" X .030" DEEP ALL DRILLED HOLES
 4. CSK .031" X .030" DEEP ALL DRILLED HOLES
 5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987
 6. WELDING SYMBOLS PER ANSI A3.7-76
 7. SURFACE TEXTURE PER ANSI B46.1-1978

A	LP	375 RADIUS ADDED M4 X .7 TAPPED HOLE ADDED	7-21-93	WALTON	LP	LP
—	—	ORIGINAL ISSUE	—	—	—	—
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
<p>Los Alamos NATIONAL LABORATORY USALANS New Mexico 87545</p>			<p>CLASSIFICATION OF DRAWING UNCLASSIFIED</p> <p>PART: UNCLASSIFIED TITLE BLOCK UNCLASSIFIED</p> <p>TITLE</p> <p>JAERI HYBRID SYSTEM</p>			
PART 201,202,203			TOLERANCE-UNLESS OTHERWISE NOTED			
ORIGINATED	G.WALTON	8-23-91	N-1	X=	0.XX=	ANGULAR=
DRAWN	O.WALTON	8-23-91	N-1	0.XX=	0.XX=	FINISH=
CHECKED	L.POLLAT	12-13-91	N-1	SCALE	TOTAL SHEETS	DRAWING NO
PROJ ENGR	S.T.HSUE	12-13-91	N-1	NOTED	68Y-155787	SHEET NO
APPROVED	S.T.HSUE	12-13-91	N-1			16
RELEASED	L.POLLAT	12-13-91	N-1

② 204 X-RAY GENERATOR SHIELD (BOTTOM)
MATL. ALUMINUM 6061-T6 & LEAD(POURED)
REQD ONE
SCALE: 1/1

PART NUMBER			PARTS LIST			
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

- ② 206 X-RAY GENERATOR SHIELD (MIDDLE)
 MATL ALUMINUM 6061-T6 & LEAD(POURED)
 RECD. 2
 SCALE 1/1

NOTE

- ① ON PART 101 (X-RAY HEAD SUPPORT SHIELD) THE TOLERANCE OF THE DIA'S NOTED APPLY TO A ONE INCH SECTION STARTING FROM THE TOP OF THE PART THE REMAINDER OF THE DIA'S CAN BE STOCK SIZE
- ② PAINT USING #RAL9001 DRYLAC POWDER COATING.

GENERAL NOTES UNLESS OTHERWISE NOTED

- ALL DIMENSIONS IN INCHES
- BREAK ALL SHARP EDGES
- CSK .87" ALL TAPPED HOLES TO MAJOR DIAMETER
- CSK .87" X .030 DEEP ALL DRILLED HOLES
- OVERSIZING & POSITIONAL TOLERANCING PER AMS Y14.5M-1987
- WELDING SYMBOLS PER AWS A2.4-76
- SURFACE TEXTURE PER AMS 8001-1978

ORIGINAL ISSUE							
REVISION	CLASS	REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
<p>Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545</p>				<p>CLASSIFICATION OF DRAWING: UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED</p>			
<p>PART 204.205.206</p>				<p>TITLE JAERI HYBRID SYSTEM</p>			
<p>GENERAL NOTES UNLESS OTHERWISE NOTED</p>				<p>TOLERANCE UNLESS OTHERWISE NOTED</p>			
<p>1. ALL DIMENSIONS IN INCHES 2. BREAK ALL SHARP EDGES 3. CSK .87" ALL TAPPED HOLES TO MAJOR DIAMETER 4. CSK .87" X .030 DEEP ALL DRILLED HOLES 5. OVERSIZING & POSITIONAL TOLERANCING PER AMS Y14.5M-1987 6. WELDING SYMBOLS PER AWS A2.4-76 7. SURFACE TEXTURE PER AMS 8001-1978</p>				<p>SCALE TOTAL SHEETS DRAWING NO. SHEET NO.</p>			
<p>ORIGINATED: D. WALTON 8-27-91 N-1 DRAWN: G. WALTON 8-27-91 N-1 CHECKED: L. POLLAT 12-13-91 N-1 PROJ. ENGR: S. THSUE 12-13-91 N-1 APPROVED: S. THSUE 12-13-91 N-1 RELEASED: L. POLLAT 12-13-91 N-1</p>				<p>NOTED 68Y-155787 17</p>

207 CABLE AND HOSE RETAINER
MATL. MACHINABLE TUNGSTEN
RECD. ONE
SCALE: 1/1

M10 X 1.5 X .562 ± .030 ∇ BOTTOM TAP

Ø .005 (M) A (M)

Ø THRU .102 ± .005
Ø .005 (M) A (M)

208 COLLIMATOR (FRONT)
MATL. MACHINABLE TUNGSTEN
RECD. ONE
SCALE: 1/1

209 COLLIMATOR (REAR)
MATL. MACHINABLE TUNGSTEN
RECD. ONE
SCALE: 1/1

217 CABLE AND HOSE RETAINER
MATL. MACHINABLE TUNGSTEN
RECD. ONE
SCALE: 1/1

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. ALL DIMENSIONS IN INCHES
2. BREAK ALL SHARP EDGES
3. CSK .02" ALL TAPPED HOLES TO MAJOR DIAMETER
4. CSK .02" x .030 DEEP ALL DRILLED HOLES
5. DIMENSIONING & POSITIONAL TOLERANCING:
PER ANSI Y14.5M-1982
6. WELDING SYMBOLS PER ANSI/AWS A2.4-76
7. SURF AREA TEXTURE PER ANSI B46.1-1978

301 HAND KNOB
MATL. ALUMINUM 6061-T6
REOD. ONE
SCALE: 1/1

302 SUPPORT/ADJUSTMENT ROD
MATL. 500-13 THREADED ROD, SST TYPE 304
REOD. ONE
SCALE: 1/1

303 TUNGSTEN TIP
MATL. MACHINABLE TUNGSTEN
REOD. ONE
SCALE: 1/1

304 SUPPORT DISK
MATL. STAINLESS STL TYPE 304
REOD. ONE
SCALE: 1/1

PART NUMBER		PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION
A	301	1	HAND KNOB
	302	1	SUPPORT/ADJUSTMENT ROD
	303	1	TUNGSTEN TIP
	304	1	SUPPORT DISK
	305	1	SPIROL PIN, SST, .125 DIA X .50 LONG, C.E.M. WEST INC.
	306	1	SPIROL PIN, SST, .125 DIA X 1.00 LONG, C.E.M. WEST INC
	307	3	SCR, SOC HD CAP, STL, M6 X 1.0 X 20MM LONG
	308	1	NUT, HEX, SST, .500-13 UNC

GENERAL NOTES (UNLESS OTHERWISE NOTED)

- 1 ALL DIMENSIONS IN INCHES
- 2 BREAK ALL SHARP EDGES
- 3 CSK 87° ALL TAPPED HOLES TO MAJOR
- 4 DIAMETER
- 5 CSK 87° x .030 DEEP ALL DRILLED
- 6 HOLES
- 7 DIMENSIONING & POSITIONAL TOLERANCING
- 8 PER ANSI Y14.5M-1982
- 9 WELDING SYMBOLS PER ANSI/A2.4-76
- 10 SURFACE TEXTURE PER ANSI B46.1-1978

A		ADDED HEX NUT		2-7-82		WALTON	
—		—		—		—	
ORIGINAL ISSUE							
REVISION LETTER	CLASS REVIEW	REVISIONS		DATE	CHANGED BY	CHECKED BY	APPROVED BY
<p>Los Alamos</p> <p>LOS ALAMOS NATIONAL LABORATORY</p> <p>LOS ALAMOS NEW MEXICO 87545</p>				CLASSIFICATION OF DRAWING UNCLASSIFIED			
				PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
				TITLE			
				<p>JAERI</p> <p>HYBRID SYSTEM</p>			
SUB-ASSEMBLY 300							
PARTS 301.302.303.304.305							
306.307							
SIGNATURE		DATE		GROUP			
ORIGINATED		G. WALTON		10-21-91		N-1	
DRAWN		G. WALTON		10-21-91		N-1	
CHECKED		L. POLLAT		12-13-91		N-1	
PROJ. ENGR.		S. T. HSUE		12-13-91		N-1	
APPROVED		S. T. HSUE		12-13-91		N-1	
RELEASED		L. POLLAT		12-13-91		N-1	
SCALE				TOTAL SHEETS		DRAWING NO.	
NOTED						88Y-155787	
						SHEET NO.	
						19

418
PL

417
PL

406
PL

401
D21

406
PL

417
PL

405
D23

404
D23

413
PL

407
PL

416
PL

433
PL

417
PL

431
PL

432
PL

402
D22

420
D21

417
PL

418
PL

403
D22

414
PL

416
PL

408
PL

416
PL

409
PL

416
PL

410
PL

418
PL

417
PL

419
D2

420
P

438 PL 437 PL 436 PL

430 PL

418 PL 435 PL 434 PL

418 PL 435 PL 422 PL

A 424 PL 425 PL 417 PL 433 PL

434 PL 422 PL 418 PL

A 418 PL 429 PL 428 PL D23 D23

A 421 PL

416 PL 412 PL

416 PL

411 PL

PART NUMBER		PARTS LIST	
PART NUMBER	ITEM NUMBER	RECD	DESCRIPTION
401	1		X-RAY GENERATOR SUPPORT PLATE
402	1		DEWAR SUPPORT PLATE
403	1		DEWAR SUPPORT PLATE
404	1		DETECTOR SHIELD
405	1		DETECTOR SHIELD
406	4		SCR. SOC HD CAP. STL, M8 X 125 X 25MM LONG
407	4		PROFILE 40 X 40 LIGHT X 21.80 LONG, ITEM PRODUCTS INC.
408	2		PROFILE 40 X 40 LIGHT X 24.64 LONG, ITEM PRODUCTS INC.
409	2		PROFILE 40 X 40 LIGHT X 28.39 LONG, ITEM PRODUCTS INC.
410	6		PROFILE 40 X 40 LIGHT X 13.29 LONG, ITEM PRODUCTS INC.
411	6		PROFILE 40 X 40 LIGHT X 24.86 LONG, ITEM PRODUCTS INC.
412	2		PROFILE 40 X 40 LIGHT X 18.36 LONG, ITEM PRODUCTS INC.
413	2		PROFILE 40 X 40 LIGHT X 15.00 LONG, ITEM PRODUCTS INC.
414	2		PROFILE 40 X 40 LIGHT X 57.75 LONG, ITEM PRODUCTS INC.
415	6		KNUCKLE FOOT 40, M10 X 80, NO. 21-012, ITEM PRODUCTS INC.
416	36		UNIVERSAL FASTENING SET, NO. 20-004, ITEM PRODUCTS INC.
417	23		SCR. SOC HD CAP. STL, M8 X 125 X 15MM LONG
418	29		T-SLOT NUT, M8, NO. 20-058, ITEM PRODUCTS INC.
419	1		FRONT GUARD
420	1		COVER
421	1		PROFILE, 40 X 80 LIGHT X 72.00 LONG, ITEM PRODUCTS INC.
422	8		ANGLE ELEMENT 40, #22-141, ITEM PRODUCTS INC.
423	8		SCR. FLAT HD SOC, STL, M8 X 16MM LONG
424	1		SUPPORT PROFILE 80, 56.00 LONG, #15-081-1, ITEM PRODUCTS INC.
425	1		SUPPORT PROFILE 80, 56.00 LONG, #15-080-1, ITEM PRODUCTS INC.
426	2		CABLE CLAMP (BASE)
427	2		CABLE CLAMP
428	2		SCR. BUTTON HD. SOC, STL, M8 X 125 X 30MM LONG
429	4		SCR. SOC HD CAP. STL, #10-24 UNC X 150 LONG
430	1		PROFILE, 40 X 80 LIGHT X 39.00 LONG, ITEM PRODUCTS INC.
431	2		SUPPORT PROFILE 40, 21.00 LONG, #15-040, ITEM PRODUCTS INC.
432	2		WALL PROFILE 40, 21.00 LONG, #15-042, ITEM PRODUCTS INC.
433	3		WALL PROFILE 80, 56.00 LONG, #15-082-1, ITEM PRODUCTS INC.
434	4		CONNECTION ELEMENT 40, FLAT, #22-140, ITEM PRODUCTS INC.
435	10		SCREW, FLAT HD, M8 X 125 X 16MM LONG
436	1		SUPPORT PROFILE 80, 39.00 LONG, #15-081-1, ITEM PRODUCTS INC.
437	1		SUPPORT PROFILE 80, 39.00 LONG, #15-080-1, ITEM PRODUCTS INC.
438	3		WALL PROFILE 80, 39.00 LONG, #15-082-1, ITEM PRODUCTS INC.

A	LP	ADDED PARTS 419,421,422,424,425 426,427,431,432,433,434	7-21-93	WALTON	LP	LP
-	LP	ORIGINAL ISSUE	-	-	-	-
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
 LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEW MEXICO 87545		CLASSIFICATION OF DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED				
SUB-ASSEMBLY 400		TITLE JAERI HYBRID SYSTEM				
ORIGINATED	G WALTON	DATE	10-31-91	GROUP	N-1	
DRAWN	G WALTON	DATE	10-31-91	GROUP	N-1	
CHECKED	L POLLAT	DATE	12-13-91	GROUP	N-1	
PROJ ENGR	S T HSUE	DATE	12-13-91	GROUP	N-1	
APPROVED	S T HSUE	DATE	12-13-91	GROUP	N-1	
RELEASED	L POLLAT	DATE	12-13-91	GROUP	N-1	
TOLERANCE UNLESS OTHERWISE NOTED:						
X.XX = .005			ANGULAR = .005			
D.XX = .005			FRESH = .005			
SCALE	1/4	TOTAL SHEETS	68Y-155787	DRAWING NO.	SHEET NO. 20

401 X-RAY GENERATOR SUPPORT PLATE
MATL: ALUMINUM TOOLING PLATE
SCALE: 1/2
REOD: ONE

M10 X 15 TAP THRU
 Ø .005 (M) A B C

4X M8 X 125 TAP THRU
 Ø .005 (M) A B C

2.750
 2.750

21.500 ± .030

2X 45° X 2.00

6X 180 ± .010

COVER
 420
 MATL. ALUMINUM 6061-T6
 SCALE: 1/2
 RECD ONE

A		XP		ADDED PART 420		7-6-93		WALTON		XP		XP	
REVISION LETTER		CLASS REVIEW		REVISIONS		DATE		CHANGED BY		CHECKED BY		APPROVED BY	
-		XP		ORIGINAL ISSUE		-		-		-		-	
Los Alamos						CLASSIFICATION OF							
LOS ALAMOS NATIONAL LABORATORY						DRAWING UNCLASSIFIED							
LOS ALAMOS NEW MEXICO 87545						PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED							
PART 401420						TITLE							
						JAERI HYBRID SYSTEM							
GENERAL NOTES - UNLESS OTHERWISE NOTED						TOLERANCE - UNLESS OTHERWISE NOTED							
1. ALL DIMENSIONS IN INCHES						X = ± .005							
2. BREAK ALL SHARP EDGES						O.XX = ± .002							
3. CSK .87" ALL TAPPED HOLES TO MAJOR DIAMETER						ANGULAR = ± .005							
4. CSK .07" x .030 DEEP ALL DRILLED HOLES						O.XX = ± .002							
5. DIMENSIONING & POSITIONAL TOLERANCING PER AMS Y14.5M-1992						FINISH = ± .005							
6. WELDING SYMBOLS PER AWS/AAS A2.4-76						SCALE NOTED							
7. SURFACE TEXTURE PER AMS B46.1-1978						TOTAL SHEETS							
ORIGINATED G. WALTON 10-22-91 N-1						DRAWING NO. 68Y-155787							
DRAWN G. WALTON 10-22-91 N-1						SHEET NO. 21							
CHECKED L. POLLAT 12-13-91 N-1													
PROJ ENGR S. THSUE 12-13-91 N-1													
APPROVED S. THSUE 12-13-91 N-1													
RELEASED L. POLLAT 12-13-91 N-1

402 DEWAR SUPPORT PLATE
MATL ALUMINUM 6061-T6
SCALE: 1/4
REQD ONE

419 FRONT SHIELD
MATL ALUMINUM 6061-T6
SCALE: 1/4
REQD: ONE

5X Ø THRU .343 ± 015
Ø Ø 005 (M) A B C

NOTE: PART 419 IS TO BE PAINTED WITH #RAL9001 DRYL

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

403 DEWAR SUPPORT PLATE
 MATL ALUMINUM 6061-T6
 SCALE 1/4
 RECD ONE

POWDER COATING.

A	ADD	ADDED PART 419	7-6-93	WALTON	Hess	Hess
-	REV	ORIGINAL ISSUE	-	-	-	-
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
PARTS 402.403.419			TITLE JAERI HYBRID SYSTEM			
ORIGINATED	G. WALTON	10-24-91	N-1	TOLERANCE-UNLESS OTHERWISE NOTED		
DRAWN	G. WALTON	10-24-91	N-1	K-2 D.XX-2 ANGULAR-2		
CHECKED	L. POLLAT	12-13-91	N-1	O.XX-2 FINISH-		
PROD. ENGR	S. THSUE	12-13-91	N-1	SCALE TOTAL SHEETS DRAWING NO. SHEET NO.		
APPROVED	S. THSUE	12-13-91	N-1	NOTED 68Y-155787 22		
RELEASED	L. POLLAT	12-13-91	N-1			

- GENERAL NOTES UNLESS OTHERWISE NOTED
1. ALL DIMENSIONS IN INCHES
 2. BREAK ALL SHARP EDGES
 3. CSK .02" ALL TAPPED HOLES TO MAJOR DIAMETER
 4. CSK .02" X .030 DEEP ALL DRILLED HOLES
 5. DIMENSIONING & POSITIONAL TOLERANCING PER AND Y14.5-1987
 6. WELDING SYMBOLS PER ANSI A2.4-76
 7. SURFACE TEXTURE PER ANSI B46.1-1973

426 CABLE CLAMP (BASE)
MATL. ALUMINUM 6061-T6
SCALE: 1/2
REOD: 2

427 CABLE CLAMP
MATL: ALUMINUM 6061-T6
SCALE: 1/2
REOD: 2

404 DETECTOR SHIELDING
MATL. ALUMINUM 6061-T6 & LEAD
SCALE: 1/2
REOD: ONE

PART NUMBER			PARTS LIST		
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

405 DETECTOR SHIELDING
MATL ALUMINUM 6061-T6 & LEAD
SCALE 1/2
RECD ONE

NOTE:

- PARTS 404 AND 405 ARE TO BE PAINTED WITH #RAL 9001 DRYLAC POWDER COATING

- GENERAL NOTES - UNLESS OTHERWISE NOTED
- ALL DIMENSIONS IN INCHES
 - BREAK ALL SHARP EDGES
 - CSK .07" ALL TAPPED HOLES TO MAJOR DIAMETER
 - CSK .07" x .030 DEEP ALL DRILLED HOLES
 - DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987
 - WELDING SYMBOLS PER ANSI/AWS A2.4-76
 - SURFACE TEXTURE PER ANSI B46.1-1978

ORIGINAL ISSUE							
REVISION LETTER	CLASS	REVISION	DATE	CHANGED BY	CHECKED BY	APPROVED BY	
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545				CLASSIFICATION OF PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
PARTS 404, 405, 426, 427				TITLE JAERI HYBRID SYSTEM			
ORIGINATED	G. WALTON	10-25-91	N-1	TOLERANCE - UNLESS OTHERWISE NOTED			
DRAWN	G. WALTON	10-25-91	N-1	X=± 0.XX±1 ANGULAR±1			
CHECKED	L. POLLAT	12-13-91	N-1	O X=± 0.XXX±1 FINISH=			
PROJ ENGR	S.T. HSUE	12-13-91	N-1	SCALE NOTED			
APPROVED	S.T. HSUE	12-13-91	N-1	TOTAL SHEETS			
RELEASED	L. POLLAT	12-13-91	N-1	DRAWING NO. 68Y-155787			
				SHEET NO. 23

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

SECTION A-A

ON VIAL TRAY
(WHITE)

A	XP	ADDED CHAMFERS	8-4-93	WALTON	XP	XP
-	XP	ORIGINAL ISSUE	-	-	-	-
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED			
PART 145			TITLE JAERI HYBRID SYSTEM			
GENERAL NOTES (UNLESS OTHERWISE NOTED) 1. ALL DIMENSIONS IN INCHES 2. BREAK ALL SHARP EDGES 3. CSK .07" x .030 DEEP ALL DRILLED HOLES 4. CSK .07" x .030 DEEP ALL DRILLED HOLES 5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987 6. WELDING SYMBOLS PER ANSI A2.4-76 7. SURFACE TEXTURE PER ANSI B46.1-1978			TOLERANCE-UNLESS OTHERWISE NOTED X=.1 O.XX=.2 ANGULAR=.5 O.X=.2 O.XXX=.5 FRACTION=.5			
ORIGINATED	G. WALTON	3-5-92	N-1	SCALE	TOTAL SHEETS	DRAWING NO.
DRAWN	G. WALTON	3-5-92	N-1	NOTED		68Y-155787
CHECKED	L. POLLAT	12-13-91	N-1			
PROJ. ENGR.	S. T. HSUE	12-13-91	N-1			
APPROVED	S. T. HSUE	12-13-91	N-1			
RELEASED	L. POLLAT	12-13-91	N-1			
						SHEET NO. 24

214

X-RAY GENERATOR SHIELD (TOP)

MATL. CARBON STEEL, C1018 AND NOTED
REQD. ONE
SCALE: 1/1

NOTE:

① PARTS 214 AND 215 ARE

215 X-RAY GENERATOR SHIELD (TOP)
MATERIAL CARBON STEEL, C1018 AND NOTED
RECD ONE
SCALE 1/1

E PAINTED WITH PRAL 9001 DRYLAC POWDER COATING

GENERAL NOTES (UNLESS OTHERWISE NOTED)

1. ALL DIMENSIONS IN INCHES
2. BREAK ALL SHARP EDGES
3. CSK 67° ALL TAPPED HOLES TO MAJOR DIAMETER
4. CSK 87° X .030 DEEP ALL DRILLED HOLES
5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1982
6. WELDING SYMBOLS PER ANSI A5.1-1978
7. SURFACE TEXTURE PER ANSI B46.1-1978

ORIGINAL ISSUE				REVISIONS				DATE				CHANGED BY				CHECKED BY				APPROVED BY											
REVISION LETTER				REVIEW																											
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545																CLASSIFICATION OF DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED															
PARTS 214, 215																TITLE JAERI HYBRID SYSTEM															
TOLERANCE-UNLESS OTHERWISE NOTED X ± .005 D.XX ± .005 ANGULAR ± .1 Ø X ± .005 D.XXX ± .005 FINISH ± .005																SCALE TOTAL SHEETS DRAWING NO. 68Y-155787 SHEET NO. 25															
ORIGINATED				G. WALTON				7-9-92				N-1																			
DRAWN				G. WALTON				7-9-92				N-1																			
CHECKED				L. POLLAT				7-9-92				N-1																			
PROJ. ENGR.				S. THSUE				7-9-92				N-1																			
APPROVED				S. THSUE				7-9-92				N-1																			
RELEASED				L. POLLAT				7-9-92				N-1

146

SWITCHBOARD TRIP FLAG

MATL. STAINLESS STL SHT. TYPE 316. 031 STK
REOD. ONE
SCALE. 1/1

015 685

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION	

—		SP	ORIGINAL ISSUE				—	—	—	—										
REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY														
<div>Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEW MEXICO 87545</div> <div>PART 146</div>			CLASSIFICATION OF		DRAWING UNCLASSIFIED															
			PART UNCLASSIFIED		TITLE BLOCK UNCLASSIFIED															
			TITLE																	
			JAERI HYBRID SYSTEM																	
			TOLERANCE-UNLESS OTHERWISE NOTED																	
			X±		D.XX±		ANGULAR±													
			O.X±		D.XXX±		FINISH±													
			SCALE	TOTAL SHEETS	DRAWING NO	SHEET NO.														
			NOTED		68Y-155787	D 26														
			ORIGINATED	G WALTON	11-6-92															
			DRAWN	G WALTON	11-6-92															
			CHECKED	L POLLAT	11-6-92															
			PROJ ENGR	ST HSUE	11-6-92															
			APPROVED	ST HSUE	11-6-92															
			RELEASED	L POLLAT	11-6-92															

- GENERAL NOTES: (UNLESS OTHERWISE NOTED)
1. ALL DIMENSIONS IN INCHES
 2. BREAK ALL SHARP EDGES
 3. CSK .03" ALL TAPPED HOLES TO MAJOR DIAMETER
 4. CSK .03" x .030 DEEP ALL DRILLED HOLES
 5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1992
 6. WELDING SYMBOLS PER AWS/AWS A2.4-76
 7. SURFACE TEXTURE PER ANSI B46.1-1978

147 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .030 THK
REOD: ONE
SCALE: 1/2

148 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .030 THK
REOD: ONE
SCALE: 1/2

150 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .030 THK
REOD: 2
SCALE: 1/2

151 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .030 THK
REOD: ONE
SCALE: 1/2

154 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .030 THK
REOD: 2
SCALE: 1/2

155 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .020 THK
REOD: ONE
SCALE: 1/2

156 SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .020 THK
REOD: ONE
SCALE: 1/2

SHIELDING (TUNGSTEN)
MATL: TUNGSTEN SHEET, .020 THK
REQD. ONE
SCALE: 1/2

GENERAL NOTES: (UNLESS OTHERWISE NOTED)

- 1 ALL DIMENSIONS IN INCHES
- 2 BREAK ALL SHARP EDGES
- 3 CSK 87° ALL TAPPED HOLES TO MAJOR DIAMETER
- 4 CSK 87° x .030 DEEP ALL DRILLED HOLES
- 5 DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987
- 6 WELDING SYMBOLS PER ANSI/ASME A2.4-76
- 7 SURFACE TEXTURE PER ANSI B46.1-1978

A	PP	ADDED PARTS 153,154,155 AND 156		18-4-93	WALTON	PP	PP		
—	PP	ORIGINAL ISSUE		—	—	—	—		
REVISION LETTER	CLASS REVIEW	REVISIONS		DATE	CHANGED BY	CHECKED BY	APPROVED BY		
<div style="text-align: center;"> <h1>Los Alamos</h1> <p>LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545</p> </div>				CLASSIFICATION OF				DRAWING UNCLASSIFIED	
				PART UNCLASSIFIED				TITLE BLOCK UNCLASSIFIED	
				TITLE					
				<div style="text-align: center;"> <h2>JAERI</h2> <h2>HYBRID SYSTEM</h2> </div>					
PARTS 147,148,149,150,151,152,154 155,156,157,158									
SIGNATURE		DATE		GROUP					
ORIGINATED		G.WALTON 11-18-92		N-1					
DRAWN		G.WALTON 11-18-92		N-1					
CHECKED		L.POLLAT 11-11-		N-1					
PROJ. ENGR		S.T.HSUE 11-18-92		N-1					
APPROVED		S.T.HSUE 11-18-92		N-1					
RELEASED		L.POLLAT 11-18-92		N-1					
				TOLERANCE-UNLESS OTHERWISE NOTED					
				X=2 ——— O.XX=1 ——— ANDA ---1 ———					
				Q.X=2 ——— O.XXX=1 ——— FINISH=					
SCALE		TOTAL SHEETS		DRAWING NO		SHEET NO.			
1/2				68Y-155787		SIZE D 27

501 SUPPORT RING
 MATL: ALUMINUM 6061-T6
 REOD: ONE
 SCALE: 1/1

502 RING SHIELD
 MATL: TUNGSTEN SHEET, .030 THK
 REOD: 2
 SCALE: 1/1

503 RING SHIELD
 MATL: TUNGSTEN SHEET, .030 THK
 REOD: 2
 SCALE: 1/1

PART NUMBER			PARTS LIST		
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION		

L EDGES AND CORNERS

NOTE: LEAD GLASS CAN BE PURCHASED FROM TA-55 STOCK
AND CUT TO SIZE BY NETUSCHIL GLASS COMPANY
LOCATED IN LOS ALAMOS.

6 000 ± .030

504 VIEWPORT LEAD GLASS
MATL LEAD GLASS, 1/4 THK
REQD. ONE
SCALE: 1/1

11000 ± .030

NOTE:

- ① PARTS 502, 503 AND 504 ARE TO BE MOUNTED TO PART 501
WITH EPOXY ADHESIVE OR EQUIVALENT.

—				ORIGINAL ISSUE				—			
REVISION LETTER	CLASS REVIEW	REVISIONS				DATE	CHANGED BY	CHECKED BY	APPROVED BY		
—	—	—				—	—	—	—		
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545						CLASSIFICATION OF					
						DRAWING UNCLASSIFIED					
						PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED					
SUB-ASSEMBLY 500 PARTS 501, 502, 503, 504						TITLE					
						JAERI HYBRID SYSTEM					
GENERAL NOTES - UNLESS OTHERWISE NOTED: 1. ALL DIMENSIONS IN INCHES 2. BREAK ALL SHARP EDGES 3. CSK .02" ALL TAPPED HOLES TO MAJOR DIAMETER 4. CSK .02" x .030 DEEP ALL DRILLED HOLES 5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987 6. WELDING SYMBOLS PER ANSI/AWS A2.4-76 7. SURFACE TEXTURE PER ANSI B46.1-1978						TOLERANCE - UNLESS OTHERWISE NOTED: X = ± 0.XX ± ANGLES ± 0.X ± 0.XXX ± FINISH ±					
ORIGINATED G. WALTON 11-30-92 N-1 DRAWN G. WALTON 11-30-92 N-1 CHECKED L. POLLAT 11-30-92 N-1 PROJ. ENGR. S.T. HSUE 11-30-92 N-1 APPROVED S.T. HSUE 11-30-92 N-1 RELEASED L. POLLAT 11-30-92 N-1						SCALE TOTAL DRAWING NO. SHEET NO. NOTED SHEETS 68Y-155787 D 28

PART NUMBER			PARTS LIST	
PREFIX NUMBER	ITEM NUMBER	NUMBER RECD	DESCRIPTION

163 SHROUD HINGE
MATL HINGE, STAINLESS STL TYPE 304
2.00 WIDE WITH .187 DIA PIN
SCALE: 1/2
RECD: ONE

REVISION LETTER		CLASS REVIEW	ORIGINAL ISSUE		DATE	CHANGED BY	CHECKED BY	APPROVED BY
X/P			REVISIONS					
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545			CLASSIFICATION OF DRAWING: UNCLASSIFIED					
PARTS 159,160,161,162,163			PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED					
TITLE JAERI HYBRID SYSTEM			TOLERANCE-UNLESS OTHERWISE NOTED X=1 O.XX=1 ANGULAR=1 O.X=1 O.XXX=1 FINISH=					
GENERAL NOTES (UNLESS OTHERWISE NOTED)			SCALE TOTAL SHEETS DRAWING NO. SHEET NO.					
1. ALL DIMENSIONS IN INCHES 2. BREAK ALL SHARP EDGES 3. CSK .02" ALL TAPPED HOLES TO MAJOR DIAMETER 4. CSK .02" x .030 DEEP ALL DRILLED HOLES 5. DIMENSIONING & POSITIONAL TOLERANCING PER ANSI Y14.5M-1987 6. WELDING SYMBOLS PER AWS A2.4-76 7. SURFACE TEXTURE PER ANSI B46.1-1978			SIGNATURE		DATE		GROUP	
ORIGINATED		G. WALTON	7-8-93		N-1			
DRAWN		G. WALTON	7-8-93		N-1			
CHECKED		L. POLLAT	7-8-93		N-1			
PROJ. ENGR.		S. HSUE	7-8-93		N-1			
APPROVED		S. HSUE	7-8-93		N-1			
RELEASED		L. POLLAT	7-8-93		N-1			
			NOTED		68Y-155787		D 29

165 PIVOT STOP
 MATL. STAINLESS STL TYPE 304
 SCALE: 1/2
 REDO: ONE

164 LEXAN SHROUD
 MATL LEXAN POLYCARBONATE, .25 THK
 SCALE: 1/2
 REDO: ONE

PART NUMBER			PARTS LIST		
PREFIX NUMBER	ITEM NUMBER	NUMBER REQD	DESCRIPTION

166 SHROUD HANDLE
 MATL STAINLESS STL TYPE 304
 SCALE 1/2
 REDO ONE

125
 13X M3 X 5 X 15mm LONG
 SST SOC HD CAP SCR

REVISION		CLASS		REVIEW		ORIGINAL ISSUE		DATE		CHANGED BY		CHECKED BY		APPROVED BY	
REVISION LETTER		CLASS		REVIEW		DATE		CHANGED BY		CHECKED BY		APPROVED BY			
Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEW MEXICO 87545						CLASSIFICATION OF DRAWING UNCLASSIFIED PART UNCLASSIFIED TITLE BLOCK UNCLASSIFIED									
						TITLE <h2 style="text-align: center;">JAERI HYBRID SYSTEM</h2>									
						PART 164,165,166									
ORIGINATED	G. WATSON	DATE	7-9-93	GROUP	N-1	TOLERANCE - UNLESS OTHERWISE NOTED X=.1 .03X=.3 ANGULAR=.5 D.XX=.5 .03XX=.1 FINISH=									
DRAWN	G. WATSON	DATE	7-9-93	GROUP	N-1										
CHECKED	L. POLLAT	DATE	7-9-93	GROUP	N-1										
PROJ. ENGR	S. T. HSUE	DATE	7-9-93	GROUP	N-1										
APPROVED	S. T. HSUE	DATE	7-9-93	GROUP	N-1	SCALE TOTAL SHEETS NOTED 68Y-155787									
RELEASED	L. POLLAT	DATE	7-9-93	GROUP	N-1										

- GENERAL NOTES - UNLESS OTHERWISE NOTED:
- ALL DIMENSIONS IN INCHES
 - BREAK ALL SHARP EDGES
 - CSK .07" ALL TAPPED HOLES TO MAJOR DIAMETER
 - CSK .07" X .000 DEEP ALL DRILLED HOLES
 - DIMENSIONING & POSITIONAL TOLERANCING PER AND Y14.5M-1997
 - WELDING SYMBOLS PER ANSI/ASME A2.4-76
 - SURFACE TEXTURE PER AND A32.1-1995