Certificate of Inspection

HI-TECH
Manufacturing
ISO 9001:2000
certified

This certificate is presented to

Argonne National Laboratory

Per PO # 7A-08189, part ##
L1430401-100101 (PF-381-000-13) quantity of 114pcs
L1430401-100201 (PF-381-000-23) quantity of 38pcs
Have been inspected and met all drawing requirements.

Q.C. Supervisor Muelazo

09-07-07
Date

Certificate of Inspection

HI-TECH
Manufacturing, Inc.
ISO 9001:2000
certified

This certificate is presented to

Argonne National Laboratory

Per PO # 7A-08189, part ##
L1430401-100103 (PF-381-000-15) quantity of 136pcs
L1430401-100303 (PF-381-002-15) quantity of 34pcs
Have been inspected and met all drawing requirements.

Q.C. Supervisor _____ 09-07-07
Date

NTI

Zerust® Material Safety Data Sheet

Z-Maxx Lube – Heavy Duty Grease

SECTION 1

MSDS# 4-4.3-12-1-180 Rev A

Technical Phone: 651-784-1250 Date Prepared 6 July 2004

SECTION 2 - INGREDIENTS

Complex Mixture – Petroleum Hydrocarbons Plus Additives. This material is not known to contain greater than 0.1% of any carcinogen required to be listed under the OSHA Hazard Communication Standard (29CRF 1910.1200).

This product is considered non-hazardous when handled properly and used for intended purpose.

*This product does not contain any chemical subject to the reporting requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III, Section 313 and 40 CFR Part 372.

SECTION 3 – PHYSICAL DATA

Appearance and Odor:	Amber grease, mild mineral odor
Boiling Point:	N/A
Specific Gravity:	.945
Vapor Pressure (mm Hg):	N/A
Vapor Density (air = 1)	N/A
Water Solubility:	Nil

SECTION 4 – FIRE AND EXPLOSION DATA

Flash Point	Method used	LEL%	UEL%
>200°C (392°F)	Cleveland open cup	Unknown	Unknown

Extinguisher Media:	CO^2 Dry chemical, Foam or Sand/Earth
Fire Fighting:	NIOSH/MSHA approved, self-contained, pressure demand respirator recommended: water may spread fire.
Fire and Explosion Hazards:	Containers not on fire may be cooled with water.

SECTION 5 – REACTIVITY DATA

Material is:	Stable
Hazardous polymerization:	Will not occur.
Conditions to avoid:	Strong acids and direct open flames.
Incompatibility:	Excessive heat. Avoid conditions that could generate an oil mist.
Hazardous decomposition product:	Oxides of Carbon, Sulphur, Nitrogen

SECTION 6 – HEALTH HAZARDS

Acute:	Unknown.
Chronic:	May cause eye or skin irritation.
Signs and symptoms of exposure:	Eye, skin irritation.
Medical conditions generally aggravated by exposure:	Unknown

Carcinogenic status: **OSHA:** N/A **I.A.R.C.** N/A **N.T.P.** N/A

Emergency and first aid procedures:

Inhalation:	Move to fresh air.
Eyes:	Flush with water for 15 minutes, if film or irritation persists, seek medical attention.
Skin:	Wipe off excess and wash with soap and water.
Ingestion:	Do not induce vomiting. Consult physician.

SECTION 7 – SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Handling and storage:	Store in a dry, cool environment.
Other precautions:	Keep away from open flames.
Spill or release:	Scoop up and place in metal container. Use inert absorbent to clean residue and place in metal container. U.S. Coast Guard 1-800-424-8802.
Disposal methods:	Dispose of in accordance with all applicable federal, state and local regulations.
Emergency Phone:	Chemtrec 1-800-424-9300

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection:	Not required at normal use termperatures.
Ventilation Procedures:	Local exhaust: recommended to maintain oil mist below TLV limit. Mechanical: to maintain below TLV limits. Special: N/A Other: N/A
Protective gloves:	Oil resistant gloves.
Eye protection:	Safety glasses (goggles).
Other protective equipment:	N/A
Work/hygienic practices:	Practice good housekeeping.

N/A = Not Applicable

(May be used to comply with OSHA's Hazard Communications Standard, 29CFR 1910.1200. Standard must be consulted for specific requirements.)

NORTHERN TECHNOLOGIES INTERNATIONAL CORPORATION

6680 North Highway 49 * Lino Lakes MN 55014

Toll Free: 800-328-2433 * Phone: 651-784-1250 * Fax: 651-784-2902

URL: www.ntic.com * American Stock Exchange Symbol: NTI

AMERICAN GRINDING & MACHINE CO.

2000 N. MANGO AVE. CHICAGO, IL 60639
773-889-4343 toll free: 877-988-4343
FAX 773-889-3781

CERTIFICATE OF COMPLIANCE

Customer: Hi-Tech Mfg PHONE: (847) 678-1616

4637 N. 25th Ave. FAX: (847) 678-1716

Schiller Park, IL

60176

RE: PURCHASE ORDER 16845

PRINT NUMBER(S) (if applicable) L143 0802-200030

This is to certify that the services and /or material furnished by American Grinding & Machine Company on this order meets the requirements of listed purchase order and any prints furnished to us for that purchase order.

Signature of American Grinding Representative

7/19/07
Date

LCLS Linac Coherent Light Source Stanford Synchrotron Radiation Laboratory Stanford Linear Accelerator Center

Procedure Number: L143-00093
Revision: 01
Issue Date: February 13, 2007

INSPECTION / ACCEPTANCE REPORT OF COMPONENTS FOR AS-BUILT DRAWINGS

VENDOR: **METALEX, INC.**

PART NAME: **UNDULATOR GIRDER ASSY**

DRAWING #: **L1430401-100400 (05)**

SERIAL #: 13

P.O. #: **7A-08189**

DATE: 10-29-07

ACCEPTANCE CRITERIA

1. Visually inspect for damage.	Accept/Reject

CRITICAL DIMENSIONS (mm)

FEATURE	TARGET	TOLERANCE	MEASURED VALUE	
Perpendicularity of Datum B to C	</=.025	</=.025	<=.02	Accept/Reject
Perpendicularity of Datum A to C	</=.025	</=.025	<=.02	Accept/Reject
True position of 2 D2 hole to 2 D3 holes	</=.03	</=.03	<=.02	Accept/Reject
Parallelism of support pad surface to Datum C	</=.07	</=.07	#1 <=.07 #2 <=.07 #3 <=.07 #4 <=.07	Accept/Reject
Distance from Datum C to support pad surface	109.50	+.2/-.2	#1 109.5 #2 109.5 #3 109.5 #4 109.5	Accept/Reject

INSPECTOR: Simon

QA Supervisor: Murlaze

TEST EQUIPMENT USED: feeler gage, dial indicator, micrometer, precision square.

COMMENTS:

Metalex Manufacturing Inc.
5750 Cornell Road · Cincinnati, OH 45242
Phone (513) 489-0507 · Fax (513) 489-1020
EMAIL: metalex@metalexmfg.com

Metalex
Customized Machinery and Parts
ISO 9001:2000 and AS9100 CERTIFIED
Veteran Owned Business 30 Plus Years

CERTIFICATE OF CONFORMANCE

Date: 10/26/2007

Customer: Hi-Tech Manufacturing, Inc.
4637 N. 25th Ave.
Schiller Park, IL 60176

Attention: Simon Sorsher

Metalex Job# 2007-7558
Purchase Order # 16185
MX Packing List # 41293

Metalex certifies that all material, processes, procedures, and dimensions are as called for on the purchase order, drawings, and/or amendments supplied by you.
All information concerning this part or parts, units and/or assemblies are on file at Metalex Manufacturing, Inc.

ITEM	QTY	PART NUMBER	REV	PART NAME	ID # *
001	7	L1430401-100400	6	Support Girder	See Below

*IDENTIFICATION NUMBER INCLUDES SERIAL #, HEAT #, AND/OR LOT #.

COMMENTS: "FIRST ARTICLE" submitted on Metalex Shipper # 408586, dated 08/13/07 (S/N: 7A-08198-01).

Applicable serial numbers of this shipment are 7A-08198-10 thru 7A-08198-13, 7A-08198-14, and 7A-08198-15.

Some internal documents in this quality package may contain documents certfiying to revision level "5" or "5V". Metalex certifies these documents and processes conform to the rev 6 revision level and the parts conform to revision level "6".

Metalex is in compliance with Statement of Workscope Document No. L143-00093, Revision New, dated 12/12/06.

Manufactured from Metalex purchased material. Reference heat numbers: T7257, T7232, T7130, T7141, U9728, 0129862, X25899, J62810, JF6843, J70358, and 478765.

Metalex Representative Signature	Print Name	Date
	Thomas Clark	10/26/07

MX1011 (05/05)

METALEX
Q. A. DEPT
ACCEPTED
DATE 6/29/07
BY TC
MTX QC 28

Job 7558

The Sherwin–Williams Co.
3143 EAST KEMPER RD
CINCINNATI,OHIO 45241

CERTIFICATE OF COMPLIANCE
STATEMENT OF QUALITY

METALEX

PURCHASE ORDER 71261-JG
DATE OF MFG
SHELF LIFE
PART

QUANTITY
BATCH

IT IS HEREBY CERTIFIED THAT ALL MATERIAL USED IN THE MANUFACTURE OF PARTS IN THE QUALITY CALLED FOR ON THE SUBJECT PURCHASE ORDER, CONFORM TO THE MATERIALS AND/OR MANUFACTURING SPECIFICATIONS INDICATED IN DRAWINGS OF SPECIFICATIONS AS CALLED FOR ON SAID PURCHASE ORDER.

THE SHERWIN–WILLIAMS CO
3143 EAST KEMPER RD
CINCINNATI OHIO 45241

AUTHORIZED SIGNATURE
CUSTOMER SERVICE ADM

Shelf life 36 months
0X26965
0X27165
batch date 0X27855 B67US
0X0275C B67HS
0X29057

Metalex Manufacturing Inc.
5750 Cornell Road • Cincinnati, OH 45242
Phone (513) 489-0507 • Fax (513) 489-1020
EMAIL: metalex@metalexmfg.com

Metalex
Customized Machinery and Parts
ISO 9001:2000 and AS9100 CERTIFIED
Veteran Owned Business 30 Plus Years

METALEX WELD CERTIFICATION

MX JOB #: 07-7558 QTY 4 CUSTOMER: Hi-Tech Manufacturing, Inc.

PART NAME: Support Girder

PART NUMBER: L1430401-100400 REVISION: 6

S/N: (if applicable) 7A-08198-10,
7A-08198-13 thru -12

METALEX PROCEDURE # WPS 146 (K. Ballard), WPS 194-1 (G. Black)

CUST. SPECIFICATION # AWS D1.1

WELD WIRE SPEC AWS A5.20

TYPE E71T-1

HEAT 81869, 81192

DIAMETER 1/16"

SERIAL NUMBER	WELDER
7A-08198-10	Ken Ballard
7A-08198-13	Ken Ballard
7A-08198-14	Ken Ballard
7A-08198-15	Ken Ballard

THE ABOVE PARTS LISTED WERE WELDED IN ACCORDANCE WITH THE REFERENCED WELDING SPECIFICATION.

Metalex Quality Control

10/26/07
Date

MX1025 (9/98)

Metalex Customized Machinery and Parts CERTIFIED ISO 9001 QUALITY MANAGEMENT	INSPECTION PLANNING & REPORT FORM Metalex Mfg. 5750 Cornell Rd ! Cincinnati, OH 45242 ! (513) 489-0507	Job No. 2007-7558	Qty 1

Inspection Origin	Vendor (Sub-Tier Source) Identification		Customer Identification		
☐ Receiving ☐ In-Process x Final ☐ Rework/Repair ☐ First Article	Vendor Name N/A		Part No. L1430401-100400	REV 6	P.O. Number 16185
	Date Rec'd N/A	P.O. No. N/A	Part Name Undulator Support Girder		
At Oper. 170	Serial Numbers: 13		Customer Name Hi-Tech Manufacturing		

SPECIFICATION	B/P ZONE	INSPECTION METHOD / GAGE NO.	ACTUAL DIMENSION / GAGE VERIFICATION (Range of Readings or Accept Status)	QTY ACC	QTY REJ
**** ALL DIMENSIONS TO BE RECORDED IN MILLIMETERS ** ** ALL TEMPERATURES TO BE RECORDED IN CELSIUS ****					
ALL DIMENSIONS APPLY AT A TEMPERATURE OF 20 DEGREES CELSIUS. PART MUST BE IN THERMAL EQUILIBRIUM DURING MEASUREMENTS AND AT THE SAME TEMPERATURE AT THE BEGINNING AND CONCLUSION OF THE MEASUREMENTS WITHIN +/-2 DEG. CELSIUS.					
PART TEMPERATURE ***BEFORE*** INSPECTION (Record in Celsius)	SOW 4.5.4	CONTACT THERMOMETER MX1794	20.28°C	MTX QC 8	
PART TEMPERATURE ***DURING*** INSPECTION (Record in Celsius)	SOW 4.5.4	CONTACT THERMOMETER MX1794	20.30°C	MTX QC 8	
PART TEMPERATURE ***AFTER*** INSPECTION (Record in Celsius)	SOW 4.5.4	CONTACT THERMOMETER MX1794	20.31°C	MTX QC 8	
CRITICAL DIMENSIONS PER SECTION 4.5.2.2 OF DOC. # L143-00093					
SHEET 2 – TOP VIEW					
A) Flatness of Datum B of .030 [.001]	N/A	CMM MX1269	.014	MTX QC 8	
B) *Perpendicularity of Datum B to Datum C* ⊥ | .25 [.010]|A|C	E8	CMM MX1269	.026	MTX QC 8	
C) Flatness of datum A of .030 [.001]	N/A	CMM MX1269	.011	MTX QC 8	
D) *Perpendicularity of Datum A to Datum C* ⊥ | .25 [.010]|C	D8	CMM MX1269	.022	MTX QC 8	
E) 9X ∅ 6.338 – 6.350 *marked "D1", "D2" & "D3"*	E7 E6 E3	CMM MX1269	6.341 - 6.350	MTX QC 8	
F) *True position of "D3" holes* 2X ⌖ | .1 [.004]|A|B|C ⌖ | .03 [.0012]B|C	E3	CMM MX1269	.013 AND .036 .013	MTX QC 8	
F) *True position of "D2" holes* 2X ⌖ | .1 [.004]|A|B|C ⌖ | .03 [.0012]B|C	E6	CMM MX1269	.037 AND .010 .008	MTX QC 8	
F) *Locations of "D1" holes* 444.50 [17.500]	E7	CMM MX1269	444.505	MTX QC 8	

STAMP	INSPECTED BY	DATE	PAGE	QTY ACC	QTY REJ
MTX QC 8	THOMAS G COOK	10/18/07	1 OF 2	1	0

MX1010 (7/98)

Metalex Customized Machinery and Parts CERTIFIED ISO 9001 QUALITY MANAGEMENT	INSPECTION PLANNING & REPORT FORM Metalex Mfg. 5750 Cornell Rd ! Cincinnati, OH 45242 ! (513) 489-0507	Job No. 2007-7558	Qty 1

Inspection Origin	Vendor (Sub-Tier Source) Identification		Customer Identification		
☐ Receiving ☐ In-Process x Final ☐ Rework/Repair ☐ First Article	Vendor Name N/A		Part No. L1430401-100400	REV 6	P.O. Number 16185
	Date Rec'd N/A	P.O. No. N/A	Part Name Undulator Support Girder		
At Oper. 170	Serial Numbers: 13		Customer Name Hi-Tech Manufacturing		

SPECIFICATION	B/P ZONE	INSPECTION METHOD / GAGE NO.	ACTUAL DIMENSION / GAGE VERIFICATION (Range of Readings or Accept Status)	QTY ACC	QTY REJ
1968.50 [77.500]	E4	CMM MX1269	1968.473	MTX QC 8	
3492.50 [137.500]	E2	CMM MX1269	3492.458	MTX QC 8	
2X 523.6 [20.61]	E1	CMM MX1269	523.571 523.573 523.548	MTX QC 8	
3185.26 [125.404]	D2	CMM MX1269	3185.199	MTX QC 8	
845.29 [33.179]	D6	CMM MX1269	845.272	MTX QC 8	
2X 95.10 [3.744]	D8	CMM MX1269	95.092 95.099	MTX QC 8	
SHEET 2 – SIDE VIEW					
A) -C- / /| .030 [.0012] 2X Surface "J"	C8	CMM MX1269	.014	MTX QC 8	
B) -C- / /| .05 [.002]	C8	CMM MX1269	.022	MTX QC 8	
SHEET 2 – BOTTOM VIEW					
A) 2X 749.78 ± .15	C7	CMM MX1269	749.767 749.771	MTX QC 8	
B) 2X 2340.00 ± .15	C5	CMM MX1269	2340.035 2340.030	MTX QC 8	
C) 4X //| .05 [.002]|B	B2	CMM MX1269	.006 .004 .003 .004	MTX QC 8	
D) 4X //| .030 [.0012]|A	B7	CMM MX1269	.002 .004 .008 .006	MTX QC 8	
SHEET 3 – SECTION B-B					
E) //| .07 [.003]|C	C2	CMM MX1269	.026	MTX QC 8	
F) 4X 109.47 ± .08	C2	CMM MX1269	109.494 - 109.520	MTX QC 8	
ALL OTHER FEATURES ARE ACCEPTED PER METALEX OPERATOR ACCEPTANCE PROGRAM (OAP) MXWI17001 & OPERATOR SIGNOFF OF ROUTER OPERATIONS FOR COMPLIANCE TO ALL DRAWING FEATURES GENERATED WITHIN THAT DEFINED OPERATION.		ROUTER SIGNOFF MX5009	CONFORMS	MTX QC 8	

STAMP	INSPECTED BY	DATE	PAGE 2 OF 2	QTY ACC	QTY REJ
MTX QC 8	THOMAS G COOK	10/18/07		1	0

The Cincinnati Steel Treating Co
5701 Mariemont Ave.
Cincinnati, Ohio 45227 (513) 271-3173

Certification ID
36538

Order ID
96993

CERTIFICATION OF COMPLIANCE

CUSTOMER

Metalex Mfg., Inc.
5750 Cornell Road

Cincinnati OH
Blkt Ord # 45242

Purchase Order 71679 **Customer Cust**

Qty	Part No / Description	Material
4	L1430401-100400 SUPPORT GIRDER	A36

REV.#5 S/N 7A-08198-13, 7A-08198-14, 7A-08198-15, 7A-08198-16

METALEX Q. A. DEPT ACCEPTED DATE 8/1/07 BY TC MTX QC 20

STRESS RELIEVE PER AWS D1.1 REV. 2004.
NOTE: SUPPORT TO PREVENT DISTORTION.
HEAT TREAT CHARTS REQUIRED.
CERTIFICATIONS REQUIRED.

RESULTS

THE ABOVE PARTS HAVE BEEN HEAT TREATED TO THE FOLLOWING:

HEAT TREATMENT CYCLE STRESS RELIEVED PER AWS D1.1 REV 2004

WE HEREBY CERTIFY THAT THE ABOVE PARTS WERE PROCESSED IN ACCORDANCE WITH THE SPECIFICATIONS AND INSTRUCTIONS SPECIFIED ON THE ABOVE PURCHASE ORDER AND THAT THE RESULTS AND REPORT THEREOF ARE AS STATED. ALL TESTING AND INSPECTION PROCEDURES EMPLOYED WERE IN ACCORDANCE WITH THE APPLICABLE SPECIFICATIONS AND THE RESULTS THEREOF ARE ON FILE.

James M Hunt
NAME JAMES M. HUNT
TITLE QA MANAGER
DATE 7/30/2007

07-31-07 A08:48 IN

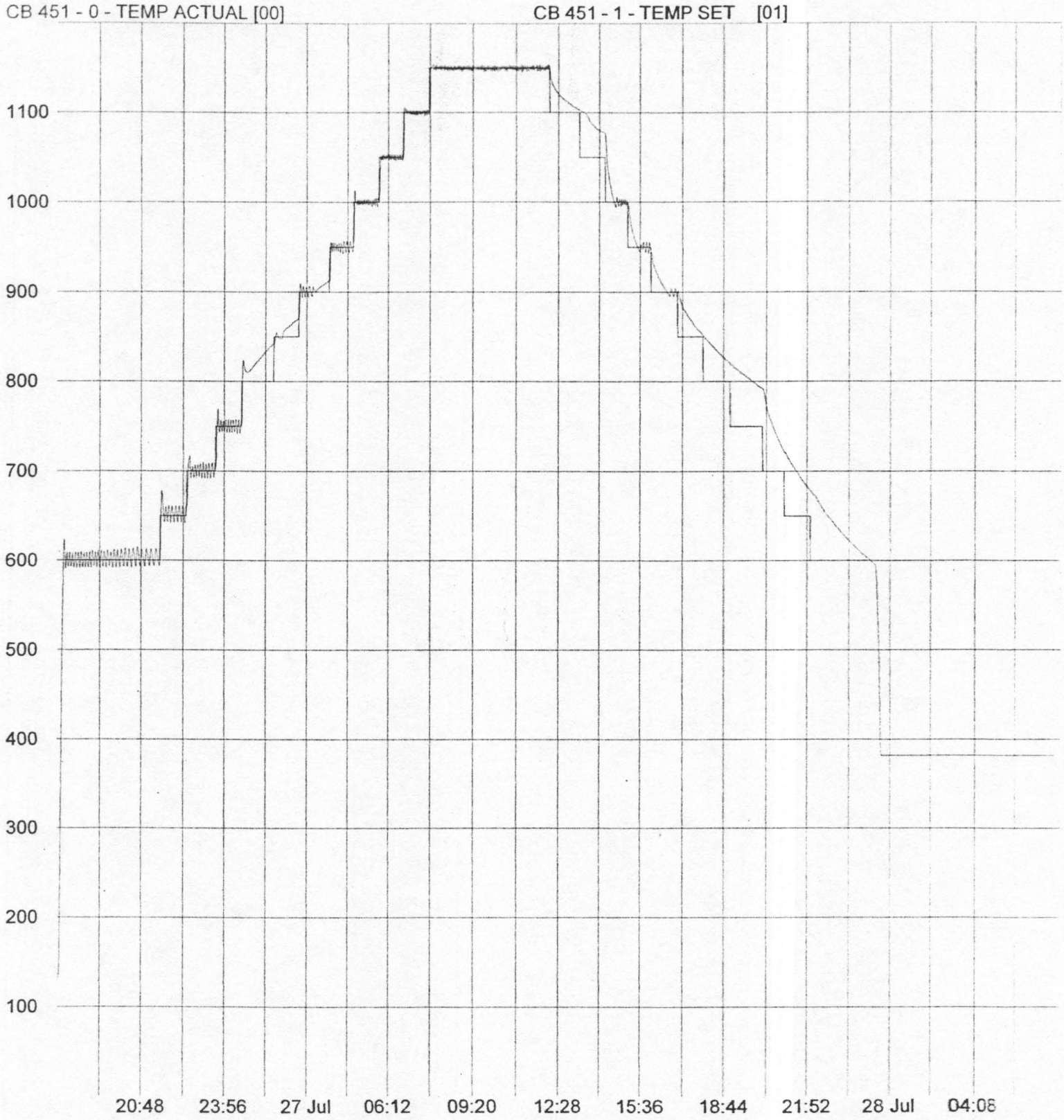
07-31-07 A09:07 OUT

07-31-07

Datalog Report

Start: 7/26/2007 5:40:00 PM
End: 7/28/2007 7:05:00 AM
Sample every 1 minute(s)
Printed 7/30/2007 9:25:49 AM

METALEX Mfg. Inc. STRESS RELIEVE
L1430401-100400 REV#05
SN# 7A-08198-13,14,15,16
PO# 71679
CST ORDER# 96993



LCLS Linac Coherent Light Source Stanford Synchrotron Radiation Laboratory Stanford Linear Accelerator Center

Procedure Number: L143-00093
Revision: 01
Issue Date: February 13, 2007

INSPECTION / ACCEPTANCE REPORT OF COMPONENTS FOR AS-BUILT DRAWINGS

VENDOR: **HI-TECH MANUFACTURING, INC.**

PART NAME: **INTERFACE PLATE (SINGLE CAM)**

DRAWING #: **L1430802-200021 (03)**

SERIAL #: 13

P.O. #: **7A-08189**

DATE: 08-16-07

ACCEPTANCE CRITERIA

1. Visually inspect for damage.	Accept/Reject

CRITICAL DIMENSIONS (mm)

FEATURE	TARGET	TOLERANCE	MEASURED VALUE	
Flatness of Datum A	</=.02	</=.02	<=.01	Accept/Reject
Perpendicularity of Datum B to A	</=.02	</=.02	<=.02	Accept/Reject
Parallelism of upper edge on lower Cam Block C to B	</=.02	</=.02	<=.01	Accept/Reject
Parallelism of lower edge on upper Cam Block C to B	</=.02	</=.02	<=.02	Accept/Reject
Parallelism of upper edge on upper Cam Block C to B	</=.02	</=.02	<=.02	Accept/Reject
Width of mounting surface on lower Cam Block	142.01	+.02/-.0	142.02	Accept/Reject
Width of mounting surface on upper Cam Block	142.01	+.02/-.0	142.02	Accept/Reject
Separation of inner edges of Cam Bocks	457.43	+0.08/-.08	457.51	Accept/Reject

INSPECTOR: Simon

QA Supervisor: Muelage

TEST EQUIPMENT USED: CMM, gage blocks, dial indicator.

COMMENTS:

LCLS Linac Coherent Light Source — Stanford Synchrotron Radiation Laboratory, Stanford Linear Accelerator Center

Procedure Number: L143-00093
Revision: 01
Issue Date: February 13, 2007

INSPECTION / ACCEPTANCE REPORT OF COMPONENTS FOR AS-BUILT DRAWINGS

VENDOR: **HI-TECH MANUFACTURING, INC.**

PART NAME: **INTERFACE PLATE (DOUBLE CAM)**

DRAWING #: **L1430802-200011 (03)**

SERIAL #: 13

P.O. #: **7A-08189**

DATE: 08-16-07

ACCEPTANCE CRITERIA

1. Visually inspect for damage.	Accept/Reject

CRITICAL DIMENSIONS (mm)

FEATURE	TARGET	TOLERANCE	MEASURED VALUE	
Flatness of Datum A	</=.02	</=.02	<=.01	Accept/Reject
Perpendicularity of Datum B to A	</=.02	</=.02	<=.02	Accept/Reject
Parallelism of inner edge on Cam Block A to B	</=.02	</=.02	<=.01	Accept/Reject
Parallelism of inner edge on Cam Block B to B	</=.02	</=.02	<=.01	Accept/Reject
Parallelism of outer edge on Cam Block B to B	</=.02	</=.02	<=.01	Accept/Reject
Width of mounting surface on Cam Block B	142.01	+.02/-.0	142.01	Accept/Reject
Width of mounting surface on Cam Block A	254.00	+.02/-.0	142.01	Accept/Reject
Separation of outer edges of Cam Bocks	685.42	+0.08/-.08	685.45	Accept/Reject

INSPECTOR: Simon

QA Supervisor: Murlaza

TEST EQUIPMENT USED: CMM, gage blocks, dial indicator.

COMMENTS:

LCLS UNDULATOR SUPPORT CAM TEST DATA
ADVANCED PHOTON SOURCE
ARGONNE NATIONAL LAB

13-1
TIME OF TEST: 10/15/2007 9:37:48 AM

POS#1 FWD
CAM ECCEN R (MICRONS) = 2199.19
ROTARY POT GAIN = 344.75
POT OFFSET (DEG) = 60.48
DEVIATION RMS (MICRONS) = 7.18
DEVIATION MAX (MICRONS) = 16.81
DEVIATION MIN (MICRONS) = -19.72

POS#1 BWD
CAM ECCEN R (MICRONS) = 2201.48
ROTARY POT GAIN = 344.75
POT OFFSET (DEG) = 60.48
DEVIATION RMS (MICRONS) = 6.52
DEVIATION MAX (MICRONS) = 20.39
DEVIATION MIN (MICRONS) = -21.85

POS#2 FWD
CAM ECCEN R (MICRONS) = 2198.42
ROTARY POT GAIN = 344.75
POT OFFSET (DEG) = 60.48
DEVIATION RMS (MICRONS) = 6.67
DEVIATION MAX (MICRONS) = 18.27
DEVIATION MIN (MICRONS) = -15.93

POS#2 BWD
CAM ECCEN R (MICRONS) = 2200.40
ROTARY POT GAIN = 344.75
POT OFFSET (DEG) = 60.48
DEVIATION RMS (MICRONS) = 6.43
DEVIATION MAX (MICRONS) = 20.25
DEVIATION MIN (MICRONS) = -19.09

POS#3 FWD
CAM ECCEN R (MICRONS) = 2198.01
ROTARY POT GAIN = 344.75
POT OFFSET (DEG) = 60.48
DEVIATION RMS (MICRONS) = 7.08
DEVIATION MAX (MICRONS) = 17.55
DEVIATION MIN (MICRONS) = -20.55

POS#3 BWD
CAM ECCEN R (MICRONS) = 2200.28
ROTARY POT GAIN = 344.75
POT OFFSET (DEG) = 60.48
DEVIATION RMS (MICRONS) = 6.90
DEVIATION MAX (MICRONS) = 20.28
DEVIATION MIN (MICRONS) = -18.02

=== TEST PASS! ===
--- END OF TEST ---

LCLS UNDULATOR SUPPORT CAM TEST DATA
ADVANCED PHOTON SOURCE
ARGONNE NATIONAL LAB

13-2
TIME OF TEST: 10/15/2007 8:26:40 AM

POS#1 FWD
CAM ECCEN R (MICRONS) = 1564.28
ROTARY POT GAIN = 345.87
POT OFFSET (DEG) = 59.30
DEVIATION RMS (MICRONS) = 6.60
DEVIATION MAX (MICRONS) = 24.55
DEVIATION MIN (MICRONS) = -17.12

POS#1 BWD
CAM ECCEN R (MICRONS) = 1565.72
ROTARY POT GAIN = 345.87
POT OFFSET (DEG) = 59.30
DEVIATION RMS (MICRONS) = 7.57
DEVIATION MAX (MICRONS) = 20.90
DEVIATION MIN (MICRONS) = -18.87

POS#2 FWD
CAM ECCEN R (MICRONS) = 1566.68
ROTARY POT GAIN = 345.87
POT OFFSET (DEG) = 59.30
DEVIATION RMS (MICRONS) = 6.63
DEVIATION MAX (MICRONS) = 24.07
DEVIATION MIN (MICRONS) = -19.18

POS#2 BWD
CAM ECCEN R (MICRONS) = 1567.35
ROTARY POT GAIN = 345.87
POT OFFSET (DEG) = 59.30
DEVIATION RMS (MICRONS) = 7.38
DEVIATION MAX (MICRONS) = 20.17
DEVIATION MIN (MICRONS) = -17.72

POS#3 FWD
CAM ECCEN R (MICRONS) = 1563.53
ROTARY POT GAIN = 345.87
POT OFFSET (DEG) = 59.30
DEVIATION RMS (MICRONS) = 6.92
DEVIATION MAX (MICRONS) = 25.89
DEVIATION MIN (MICRONS) = -18.48

POS#3 BWD
CAM ECCEN R (MICRONS) = 1565.80
ROTARY POT GAIN = 345.87
POT OFFSET (DEG) = 59.30
DEVIATION RMS (MICRONS) = 7.60
DEVIATION MAX (MICRONS) = 20.72
DEVIATION MIN (MICRONS) = -18.25

=== TEST PASS! ===
--- END OF TEST ---

LCLS UNDULATOR SUPPORT CAM TEST DATA
ADVANCED PHOTON SOURCE
ARGONNE NATIONAL LAB

13-3
TIME OF TEST: 10/15/2007 8:11:15 AM

POS#1 FWD
CAM ECCEN R (MICRONS) = 1571.08
ROTARY POT GAIN = 345.41
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 7.91
DEVIATION MAX (MICRONS) = 24.05
DEVIATION MIN (MICRONS) = -19.28

POS#1 BWD
CAM ECCEN R (MICRONS) = 1571.52
ROTARY POT GAIN = 345.41
POT OFFSET (DEG) = 61.27
DEVIATION RMS (MICRONS) = 7.12
DEVIATION MAX (MICRONS) = 15.84
DEVIATION MIN (MICRONS) = -17.00

POS#2 FWD
CAM ECCEN R (MICRONS) = 1573.10
ROTARY POT GAIN = 345.41
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 7.66
DEVIATION MAX (MICRONS) = 22.57
DEVIATION MIN (MICRONS) = -19.57

POS#2 BWD
CAM ECCEN R (MICRONS) = 1572.60
ROTARY POT GAIN = 345.41
POT OFFSET (DEG) = 61.27
DEVIATION RMS (MICRONS) = 6.77
DEVIATION MAX (MICRONS) = 15.00
DEVIATION MIN (MICRONS) = -17.85

POS#3 FWD
CAM ECCEN R (MICRONS) = 1571.28
ROTARY POT GAIN = 345.41
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 7.43
DEVIATION MAX (MICRONS) = 22.40
DEVIATION MIN (MICRONS) = -18.86

POS#3 BWD
CAM ECCEN R (MICRONS) = 1572.10
ROTARY POT GAIN = 345.41
POT OFFSET (DEG) = 61.27
DEVIATION RMS (MICRONS) = 6.49
DEVIATION MAX (MICRONS) = 14.39
DEVIATION MIN (MICRONS) = -17.02

=== TEST PASS! ===
--- END OF TEST ---

LCLS UNDULATOR SUPPORT CAM TEST DATA
ADVANCED PHOTON SOURCE
ARGONNE NATIONAL LAB

13-4
TIME OF TEST: 10/15/2007 10:29:39 AM

POS#1 FWD
CAM ECCEN R (MICRONS) = 1584.78
ROTARY POT GAIN = 346.39
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 6.31
DEVIATION MAX (MICRONS) = 22.00
DEVIATION MIN (MICRONS) = -19.30

POS#1 BWD
CAM ECCEN R (MICRONS) = 1584.23
ROTARY POT GAIN = 346.39
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 7.14
DEVIATION MAX (MICRONS) = 21.69
DEVIATION MIN (MICRONS) = -18.39

POS#2 FWD
CAM ECCEN R (MICRONS) = 1584.23
ROTARY POT GAIN = 346.39
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 6.38
DEVIATION MAX (MICRONS) = 22.51
DEVIATION MIN (MICRONS) = -17.62

POS#2 BWD
CAM ECCEN R (MICRONS) = 1584.24
ROTARY POT GAIN = 346.39
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 7.37
DEVIATION MAX (MICRONS) = 20.29
DEVIATION MIN (MICRONS) = -22.35

POS#3 FWD
CAM ECCEN R (MICRONS) = 1583.51
ROTARY POT GAIN = 346.39
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 6.50
DEVIATION MAX (MICRONS) = 23.78
DEVIATION MIN (MICRONS) = -18.92

POS#3 BWD
CAM ECCEN R (MICRONS) = 1584.86
ROTARY POT GAIN = 346.39
POT OFFSET (DEG) = 61.26
DEVIATION RMS (MICRONS) = 7.39
DEVIATION MAX (MICRONS) = 24.19
DEVIATION MIN (MICRONS) = -15.82

=== TEST PASS! ===
--- END OF TEST ---

LCLS UNDULATOR SUPPORT CAM TEST DATA
ADVANCED PHOTON SOURCE
ARGONNE NATIONAL LAB

13-5
TIME OF TEST: 10/15/2007 11:26:13 AM

POS#1 FWD
CAM ECCEN R (MICRONS) = 1561.49
ROTARY POT GAIN = 345.93
POT OFFSET (DEG) = 59.10
DEVIATION RMS (MICRONS) = 5.76
DEVIATION MAX (MICRONS) = 21.32
DEVIATION MIN (MICRONS) = -16.89

POS#1 BWD
CAM ECCEN R (MICRONS) = 1561.87
ROTARY POT GAIN = 345.93
POT OFFSET (DEG) = 59.11
DEVIATION RMS (MICRONS) = 6.73
DEVIATION MAX (MICRONS) = 18.66
DEVIATION MIN (MICRONS) = -23.00

POS#2 FWD
CAM ECCEN R (MICRONS) = 1560.26
ROTARY POT GAIN = 345.93
POT OFFSET (DEG) = 59.11
DEVIATION RMS (MICRONS) = 6.38
DEVIATION MAX (MICRONS) = 24.30
DEVIATION MIN (MICRONS) = -18.97

POS#2 BWD
CAM ECCEN R (MICRONS) = 1560.69
ROTARY POT GAIN = 345.93
POT OFFSET (DEG) = 59.10
DEVIATION RMS (MICRONS) = 7.23
DEVIATION MAX (MICRONS) = 20.28
DEVIATION MIN (MICRONS) = -21.69

POS#3 FWD
CAM ECCEN R (MICRONS) = 1559.87
ROTARY POT GAIN = 345.93
POT OFFSET (DEG) = 59.10
DEVIATION RMS (MICRONS) = 6.57
DEVIATION MAX (MICRONS) = 20.32
DEVIATION MIN (MICRONS) = -20.18

POS#3 BWD
CAM ECCEN R (MICRONS) = 1562.20
ROTARY POT GAIN = 345.93
POT OFFSET (DEG) = 59.10
DEVIATION RMS (MICRONS) = 7.37
DEVIATION MAX (MICRONS) = 18.55
DEVIATION MIN (MICRONS) = -23.07

=== TEST PASS! ===
--- END OF TEST ---