

**Metalex  
Manufacturing  
Inc.**



**Metalex**

Certified ISO 9001 Quality Management  
Veteran Owned Business 30 Plus Years

#1-- INSIDE Pkg - Cust Copy

**Ship To:** UC LAWRENCE BERKELEY LAB  
FOR THE US DEPT OF ENERGY  
ONE CYCLOTRON ROAD  
BLDG 69  
BERKELEY CA 94720

**Packing List#** 55548 **Rel#** 1 **PAGE** 1  
**Metalex Job#** 2016-1167

**Date:** 6/20/17  
**Ship Via:** GROUND  
**PTA#** \_\_\_\_\_

(prepaid shipments only)

**Attn:** MIKE SOLIS  
**Customer PO:** 7325827

**BOL/Air Bill#**  
**PPD:** XXXXXXX **Coll:** **3rd Party:**  
**Weight:** **Ctns:** **Zone:**  
**Dimensions:**

P.O. Item No.	Qty Ordered	Qty Shipped	Qty Back Ordered	Description
1	2	2		27H638C: MQXFA SHELL SEGMENT, END S/N: 001, 002  -CERTIFICATE OF CONFORMANCE, INSPECTION DATA, AND CERTIFICATIONS ENCLOSED.  "SHIPMENT PACKED BY: _____  "SHIPMENT CHECKED BY: _____  FOR METALEX USE ONLY:  SHOCKWATCH S/N: _____  TILTWATCH S/N: _____

Received By:

Printed Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

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



**CERTIFICATE OF CONFORMANCE**

Date:	<u>06/22/2017</u>	Metalex Job#	<u>2016-1167</u>
Customer:	<u>UC Lawrence Berkeley Lab</u>	Purchase Order #	<u>7325827</u>
	<u>One Cyclotron Road</u>	MX Packing List #	<u>55548</u>
	<u>Bldg 69</u>		
	<u>Berkeley, CA 94720</u>		
Attention:	<u>Kendra Levy</u>		

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.

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>REV</u>	<u>PART NAME</u>	<u>ID # *</u>
1	2	27H638	C	Short Magnet Shell	001 & 002

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

COMMENTS:

- Material was purchased by Metalex. HT#372642 = S/N 001 and HT#371551 = S/N 002. Certifications enclosed.
- MX NCR#10520 applies. Copy enclosed with disposition.

Katrina Schnee  
 Metalex Representative Signature

Katrina Schnee  
 Print Name

06/22/17  
 Date

**Quality Certification**

**Heat Code: 372642**

Steel Industries Inc.

An AFGlobal Company

12600 Beech Daly Rd. Redford, MI 48239-2455

Phone: (313) 535-8505 Fax: (313) 534-2165

METALEX MANUFACTUR 5750 CORNELL RD CINCINNATI, OH 45242-2010	ME5500	PO: 20492-BL-1167	Sales Order: 150385	Line: 1
		Item Code: Rolled Ring	Qty Shipped: 1	
		Item Desc: SHORT MAGNET SHELL		
		Supplier Heat: 372642		
Spec: *AMS 4310E, Grade 7075, Condition T652				

Element	(%wt)	Ladle	Product	EPCRA	CAS#	Element	(%wt)	Ladle	Product	EPCRA	CAS#
Mn	Manganese	0.009		✓	7439-96-5	Al	Aluminum				
Si	Silicon	0.05				Fe	Iron	0.11			
Cu	Copper	1.7		✓	7440-50-8	Zn	Zinc	5.6			
Cr	Chromium	0.19		✓	7440-47-3	Mg	Magnesium	2.5			
Ti	Titanium	0.02		✓	7440-02-0						

Mechanical Testing			Other		
from a		prolong	Millsource (melt)		Arconic   Pimalco
Location		1/2T	Stock used		19" Ingot
Tensile test #1 (KSI)		80.9			
Yield Strength test #1 (KSI)		69.3			
Elongation test #1		11.5			
ROA test #1		22			
Tensile test #2 (KSI)		81.5			
Yield Strength test #2 (KSI)		66.8			
Elongation test #2		15.0			
ROA test #2		31			
Tensile test #3 (KSI)		81.6			
Yield Strength test #3 (KSI)		68.5			
Elongation test #3		9.6			
ROA test #3		16			

*LBL Job#16-1167*  
*P/N 27H638*  
*S/N 001*

**LBL Job#16-1167**  
**P/N 27H638**  
**S/N 001**  
**PO#20492 Item#1**

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/02/17  
 BY KKS

The recording of false, fictitious, or fraudulent statement or entries on this document may be punishable as a felony under federal statute.

EPCRA Supplier Notification: This product may contain one or more toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) and 40 C.F.R. Part 372. Potentially reportable chemicals are indicated with a checkmark in the "EPCRA" column and a Chemical Abstract Services (CAS) registry number is provided for each such chemical in addition to the percent by weight of the chemical present in this product. It is your responsibility alone to determine whether your facility is required to submit a Toxic Release Inventory Report under EPCRA Section 313.

Certification No.: 1279453-REV01

Certification Date: 6/22/2017

Issued By: Laura Master

This report is issued in compliance with the requirements of EN10204 3.1

# Quality Certification

Heat Code: 372642

Steel Industries Inc.

An AFGlobal Company

12600 Beech Daly Rd. Redford, MI 48239-2455

Phone: (313) 535-8505 Fax: (313) 534-2165

METALEX MANUFACTUR 5750 CORNELL RD CINCINNATI, OH 45242-2010	ME5500	PO: 20492-BL-1167	Sales Order: 150385	Line: 1
		Item Code: Rolled Ring	Qty Shipped: 1	
		Item Desc: SHORT MAGNET SHELL		
		Supplier Heat: 372642		
Spec: *AMS 4310E, Grade 7075, Condition T652				

Part No. 27H638

The heat treated lot certified on SII SO# 150385 consists of heats 372642 and 381551, which were heat treated together and mechanical properties qualified under heat# 372642 on Westmoreland test report 7-59013 dated 04/06/2017

24.17 x 21.89 ID x 21.89 (finish sizes)  
24.60 x 21.39 ID x 13.20 (approx. supplied sizes)

Forged

Heat treated in accordance with AMS 2772G to the T652 temper

Solution treated 890F, 3:08 hours, cold water quenched

Stress relieved by compression to a permanent set of 1%-5%

Aged 250F, 24:04 hours, air cooled

Hardness achieved (10mm/500kg): 158 HBW ✓

Rough machined

Ultrasonic inspected: See XRI certification 11054 dated 04/07/2017 ✓

Test #1 is in Tangential dir.

Test #2 is in Axial dir.

Test #3 is in Radial dir.

P.O. Line item 1

No welding was performed on this material.  
Material is free from mercury contamination.

We hereby certify that the above item(s) has been inspected and tested in accordance with the listed specifications and is in conformance with all requirements as modified by the Purchase Order and/or Steel Industries, Inc. Quote.

Steel Industries, Inc. operates a quality management system in accordance with Quality Manual, Revision 08 dated January 17, 2017, which conforms to the following quality programs and directives for the manufacture of open die forgings and seamless rolled rings:

- 1) ISO 9001:2008 and AS9100C - certified by Performance Review Institute (PRI)
- 2) NADCAP (National Aerospace Accreditation Program) for heat treating - certified by Performance Review Institute (PRI)
- 3) PED (Pressure Equipment Directive) 2014/68/EU Annex 1 Para 4.3 - certified by Bureau Veritas
- 4) CFR Part 21 - Unauthorized Shipment of Defective Material applies

LBL Job#16-1167

P/N 27H638

S/N 001

PO#20492 Item#1



METALEX  
Q.A. DEPT  
ACCEPTED

DATE 06/02/17

BY KKS

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EPCRA Supplier Notification: This product may contain one or more toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) and 40 C.F.R. Part 372. Potentially reportable chemicals are indicated with a checkmark in the "EPCRA" column and a Chemical Abstract Services (CAS) registry number is provided for each such chemical in addition to the percent by weight of the chemical present in this product. It is your responsibility alone to determine whether your facility is required to submit a Toxic Release Inventory Report under EPCRA Section 313.

Certification No.: 1279453-REV01

Certification Date: 6/22/2017

Issued By: Laura Master

This report is issued in compliance with the requirements of EN10204 3.1

Laura Master - Q.C. Certification Specialist

# Certified Inspection Report

ARCONIC FORGING AND EXTRUSIONS  
 Pinalco Inc  
 6833 West Willis Road  
 Chandler, AZ  
 85226

Pinalco, Inc., a subsidiary of Alcoa Inc.

Invoice To Customer  
 STEEL INDUSTRIES INC  
 12607 BEECH DALY RD  
 REDFORD, MI - 48239

Ship To Customer  
 STEEL INDUSTRIES INC  
 12600 NORBORNE  
 REDFORD, MI - 48239-2553

Sales Order Number		Customer P/O	
1000834420	Line No. 1.1	22742-001	
Quantity Shipped	LB	Date Shipped	Item Description
25486		04-AUG-16	SCALPED ALUMINUM INGOT
B/L		Item No.	19.5 IN DIA
2308503		G03343621	7175 W/F 361.962
Delivery ID		Item No. Rev	AMS-A-22711 REV C
11003787			AMS-QQ-A-367 REV D
Customer Part No			AMS4149 REV D
			AMS4179 REV C
			BMS7186 REV M
			BMS7-214 REV U
			AMS4148 REV E
			ASTMB247 REV 15
			AMS4126 REV C
			AMS4131 REV D
			AMS4147 REV D
			AMS4310 REV E
			AMS4311 REV E
			AMS4323 REV C
			F7.4.1.1 REV

Cert Number  
 AEP1721735

Page  
 1/2

Cert Print Date  
 04-AUG-16

### Notes

CLARIFICATION: When forged, extruded or rolled mill products, produced from Alcoa ingot by Alcoa customers, are ultrasonically inspected before being placed into service and indications are found which exceed the applicable USI limits, Alcoa will provide replacement ingot. Alcoa will accept no incidental or consequential damage claims arising from the fabrication or use of products from such ingots, the customer's exclusive remedy being the above stated replacement ingot. Unless the product fabricated from Alcoa ingot is ultrasonically inspected prior to being placed into service, Alcoa does not make the warranty stated herein.

CLARIFICATION: Specifications apply for chemical composition only.  
 Current version of APE Quality Manual is June 15, 2012. This material was not welded while being processed. The material is free of radioactive contamination.  
**CERT NOTE: MEETS THE CHEMISTRY REQUIREMENTS OF BOTH 7175 AND 7075 ALLOYS.** ✓  
**COMPOSITION NOTE: The values for 'Others Each' and 'Others Total' have met the limits as shown on this certified inspection report. Remainder is Aluminum.** ✓

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/02/17  
 BY KKS

### Legal Statement

We hereby certify that, unless otherwise indicated, the material covered by this report has been manufactured, inspected, and tested in accordance with, and has been found to meet, the applicable requirements described herein, including any specifications forming a part of the description and that samples representative of the material met the composition. Also, note that mercury is not a normal contaminant in aluminum alloys and neither it nor any of its compounds are used in the manufacture of our product. This certification is not to be reproduced in partial form without prior written approval of our Quality Assurance Dept.

Signature And Title

*Cornelia P. Platten*

Cornelia Watson  
 Quality Assurance Manager  
 04-AUG-16

LBL Job#16-1167  
 P/N 27H638  
 S/N 001  
 PO#20492 Item#1

### Quantities per Lot / Packages

Package Number	Lot Number	Quantity	UOM	Weight	
				Gross	Net
G16-PKG606872	23890066	1	PCS	4272	4242
G16-PKG606873	23890066	1	PCS	4158	4128
G16-PKG606874	23890066	1	PCS	4394	4364
G16-PKG606875	23890066	1	PCS	4276	4246
G16-PKG606876	23890066	1	PCS	4312	4282
G16-PKG606877	23890066	1	PCS	4254	4224

SII Appvd/A 8-17-16

# Certified Inspection Report

ARCONIC FORGING AND EXTRUSIONS  
 Pinalco Inc  
 6833 West Willis Road  
 Chandler, AZ  
 85226

Sales Order Number 1000834420	Line No. 1.1	Customer P/O 22742-001	Cert Number AEP121735	Page 2/2
			04-AUG-16	Cert Print Date 04-AUG-16

Alloy	Wt %		Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti
	Min	Max								
7175	Min				1.2		2.1	0.18	5.1	
	Max	0.15	0.20	2.0	0.10	2.9	0.28	6.1	0.10	

Alloy	Wt %		Others Each
	Min	Max	
7175	Min		
	Max	0.05	0.15

**Composition Results**

Heat / Cast / Lot Number	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti
372641	0.05	0.11	1.7	0.007	2.6	0.20	5.9	0.02
372642	0.04 ✓	0.12 ✓	1.6 ✓	0.009 ✓	2.5 ✓	0.19 ✓	5.6 ✓	0.02 ✓

**Composition Results**

Heat / Cast / Lot Number	Others Each
372641	--
372642	--

**Cert Notes**

Alcoa - Pinalco Inc. manufactured the item described above in a plant whose quality management system is certified/registered as being in conformity with ISO9001:2008 & AS9100 Rev C by BSI Management Systems under Certificate # FM78752. Made in USA

The test report shall not be reproduced except in full, without the written approval of the Quality Department. No alteration, addition or other change is authorized to be made to this certificate.

The recording of false, fictitious, or otherwise fraudulent statements or entries on this certificate by any recipient may be punished as a felony under applicable law.

BY KKS  
 DATE 06/02/17  
 ACCEPTED  
 Q.A. DEPT  
 METALEX

LBL Job#16-1167  
 P/N 27H638  
 S/N 001  
 PO#20492 Item#1

LBL Job#16-1167  
 P/N 27H638  
 S/N 001  
 PO#20492 Item#1

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/02/17  
 BY KKS

M 1 X  
 0322



STEEL  
 INDUSTRIES  
 INC.®

SO# 150385 / 151237

GRADE 7075

HEAT# 372642 381551

CUSTOMER:  
METALEX

PO# 20492-06-1167

PIN \_\_\_\_\_

THERMAL TREATMENT:

SOLUTION ANNEAL 890

3 HR @ m/n

WATER QUENCH

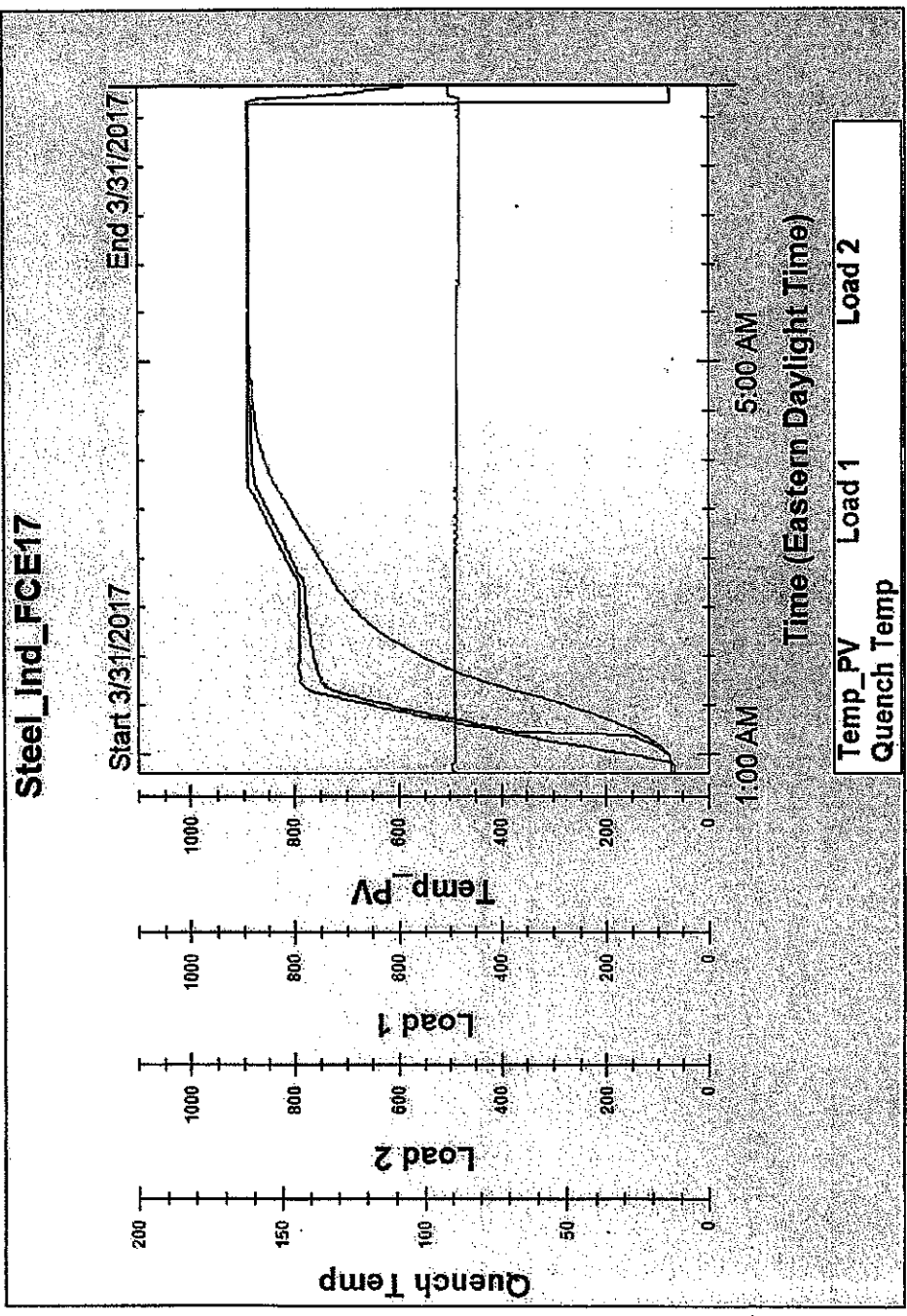
Leo

Beverley

Steel Industries Inc. Quality Control Department  
 10000 Steel Industry Blvd. Birmingham, AL 35222  
 Phone: (205) 988-1167 Fax: (205) 988-1168  
 Date: 03/17/17 04:15:00

R7.5.1.4

05/04

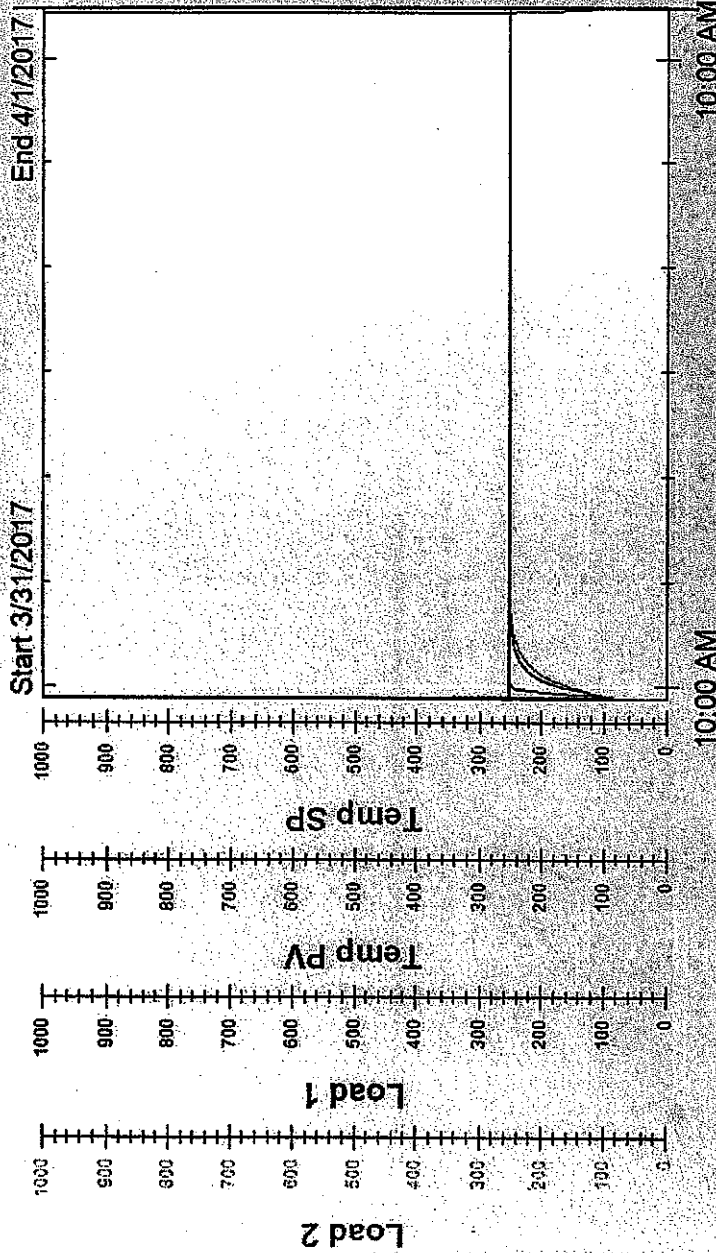


LBL Job#16-1167  
 P/N 27H638  
 S/N 001  
 PO#20492 Item#1

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/02/17  
 BY KKS



**Steel\_Ind\_FCE18**



Time (Eastern Daylight Time)

Temp SP Temp PV Load 1 Load 2

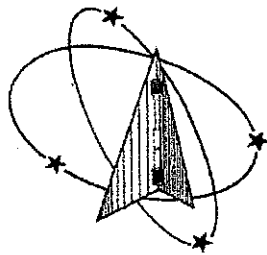


**STEEL INDUSTRIES INC.**

SO# 150305 151237  
 GRADE 7075  
 HEAT# 37264A 301551  
 CUSTOMER: METALEX  
 PO# 20492-86-1167  
 P/N \_\_\_\_\_  
 THERMAL TREATMENT:  
AGE 3.50  
24 Hrs 4 min  
Air cool  
 Leo  
 Beverley

THIS INFORMATION IS UNCLASSIFIED  
 DATE 06/02/17 BY KKS





**Westmoreland Mechanical Testing & Research, Inc.**  
 P.O. Box 388; 221 Westmoreland Drive  
 Youngstown, PA 15696-0388 U.S.A.  
 Telephone: 724-537-3131 Fax: 724-537-3151  
 Website: www.wmtr.com E-Mail: admin@wmtr.com  
 WMTR is a technical leader in the material testing industry.



TESTING CERT 821-01 & 821-02



Section 1 of 2  
 WMT&R Report No. 7-59013  
 P.O. No. 150385 T-4  
 WMT&R Quote No. QN140118  
 Condition T652  
 Heat No. 372642

**CERTIFICATION**

April 6, 2017  
 Steel Industries Inc.  
 12600 Beech Daly Road  
 Redford Twp., MI 48239

Attention: Laura Master  
 Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 11, dated 12/03/2008.  
 The following tests were performed on this order: TENSILE

TENSILE RESULTS: AMS 4310E, ASTM E8-16a, ASTM B557-15  
 REQUIREMENTS: UTS ksi (Min 73Max →) 0.2% YS ksi (Min 61Max →) 4D Elong. % (Min 9Max →)

SPEED OF TESTING: 0.005 in./in./min., 0.05 in./min./in.

MATERIAL: 7075-T652

Heat No.	Direction	TestLog Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AIUR
372642	Tang.	93857H	Room	80.9	69.3	11.5	22	10.0	16170	13860	0.5046	0.4452	2.00	2.23	0.19997899	M26	A

DISPOSITION: Acceptable  
 AIUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

TENSILE RESULTS: AMS 4310E, ASTM E8-16a, ASTM B557-15  
 REQUIREMENTS: UTS ksi (Min 71Max →) 0.2% YS ksi (Min 59Max →) 4D Elong. % (Min 4Max →)

SPEED OF TESTING: 0.005 in./in./min., 0.05 in./min./in.

MATERIAL: 7075-T652

Heat No.	Direction	TestLog Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AIUR
372642	Axial	93858H	Room	81.5	66.8	15.0	31	10.3	16320	13360	0.5048	0.4198	2.000	2.300	0.20013755 <td>M26 <td>A</td> </td>	M26 <td>A</td>	A

DISPOSITION: Acceptable  
 AIUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

DATE 06/02/17  
 BY KKS  
 ACCEPTED  
 Q.A. DEPT  
 METALEX

LBL Job#16-1167  
 P/N 27H638  
 S/N 001  
 PO#20492

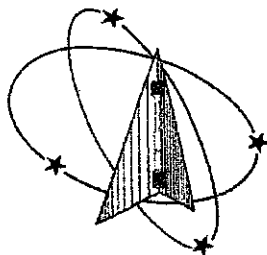
April 6, 2017



Matt Wojton  
 Tensile Supervisor

Testing Specialists for Aerospace, Automotive, and Material Testing Fields  
 Locations in Youngstown, PA U.S.A. - Tel. (734) 537-3131 and  
 Banbury, Oxon U.K. - Tel. +44 (0) 1295 261211

NOTE: THE RECORDING OF FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTE. THIS CERTIFICATE OR REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF WMTR, INC.



*Westmoreland Mechanical Testing & Research, Inc.*  
 P.O. Box 388; 221 Westmoreland Drive  
 Youngstown, PA 15696-0388 U.S.A.  
 Telephone: 724-537-3131 Fax: 724-537-3151  
 Website: [www.wmtr.com](http://www.wmtr.com) E-Mail: [admin@wmtr.com](mailto:admin@wmtr.com)  
 WMT&R is a technical leader in the material testing industry.

April 6, 2017  
 Steel Industries Inc.

**CERTIFICATION**

TENSILE RESULTS: AMS 4310E, ASTM E8-16a, ASTM B557-15  
 REQUIREMENTS: UTS ksi (Min 69Max →) 0.2% YS ksi (Min 57Max →) 4D Elong. % (Min 2Max →)  
 SPEED OF TESTING: 0.005 in./in./min., 0.05 in./in./in.  
 MATERIAL: 7075-T652

Heat No.	Direction	Test Log Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	U.L. Load lbf	0.2% Y.L.D. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	AUIR
372642	Radial	93859H	Room	81.6	68.5	9.6	16	10.9	4094	3437	0.2528	0.2322	1.000	1.097	0.05019310	M26	A

DISPOSITION: Acceptable  
 AUIR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

Requirements provided by Steel Industries Inc.



TESTING CERT 821-01 & 621-02

Section 2 of 2  
 WMT&R Report No. 7-59013  
 P.O. No. 150385 T-4



METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/02/17  
 BY KKS

LBL Job#16-1167  
 P/N 27H638  
 S/N 001  
 PO#20492 Item#1

*Matt Wojton*  
 Matt Wojton  
 Test Supervisor

April 6, 2017



Testing Specialists for Aerospace, Automotive, and Material Testing Fields  
 Locations in Youngstown, PA U.S.A. - Tel. (724) 537-3131 and  
 Banbury, Oxon U.K. - Tel. +44 (0) 1295 261211

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**Ultrasonic Field Service Report**

**Certification #: 11054**

**Bill to Address:**  
**STEEL INDUSTRIES, INC.**  
**12600 BEECH DALY ROAD**  
**REDFORD, MI. 48239**

**Inspection Performed at Address:**  
**STEEL INDUSTRIES, INC.**  
**12600 BEECH DALY ROAD**  
**REDFORD, MI. 48239**

**Customer PO#: 15046**


Part Number/ Description:	27H638 (Rolled Rings)	LBL Job#16-1167 P/N 27H638 S/N 001 PO#20492 Item#1	METALEX Q.A. DEPT ACCEPTED DATE 06/02/17 BY KKS
Job Number:	150385		
Quantity:	01		
Lot / Serial Number(s):	150385-01		
Heat Number(s):	372642		
Tag Number(s):	148491, 148959		
Surface Finish:	250 RMS OR BETTER		

Instrument	Transducer
Make: <b>Olympus</b>	Manufacture: <b>Sonatest</b>
Model: <b>Epoch LTC Serial#: 090122906</b>	Serial Number: <b>125/14</b>
Calibration Due Date: <b>6/13/2017</b>	Lateral Indent: <b>10%</b>
Couplant: <b>ECHO GEL GR14</b>	Frequency: <b>2.25MHz</b>
Method: <b>CONTACT</b>	Size: <b>1.0" Angle: 0°</b>
Cable Length: 6FT <input checked="" type="checkbox"/> Bnc To Bnc/Lemo <input type="checkbox"/> Micro-dot	Set up Db: <b>UTL1- 62dB, UTL2- 67dB</b>
Calibration Standards: <b>FBH- 823F, 7075-3-0175</b>	Range: <b>UTL1- 10.0, UTL2- 5.0</b>
	<input checked="" type="checkbox"/> Inches <input type="checkbox"/> MM
	<input checked="" type="checkbox"/> Straight Beam <input type="checkbox"/> Angle Beam

Customer Information Only

Process Specification:	ASTM B594-13, XRI 7013 Rev 2.1, SII-B594 Rev 1.1	
Acceptance Criteria:	ASTM B594-13 Class A	
Marking Requirements:	SEE CUSTOMER REQUIREMENTS	
Material Type:	7075	
Quantity Inspected: 01	Quantity Accepted: 01	Quantity Rejected: 00
Inspect time begin: 10:30 AM	Inspect time end: 11:00 AM	LEFT BLANK INTENTIONALLY

Cause for rejection/comments: 01 PIECE TESTED TO THE ABOVE SPECIFICATIONS. NO REPORTABLE INDICATIONS WERE FOUND AT THE TIME OF INSPECTION. BOTH FACES OF RING WERE UT INSPECTED.

Inspector Matt Beavers Level: II Stamp:  Date Tested: 4/7/2017  
 Printed Name: **Matt Beavers** Employee Certification Exp. Date: 11/30/2019  
 XRI Quality Manual Rev. 3.6 Dated 4/25/2012 (Fixed Process)

**REVIEWED**

By M.Sonntag at 11:38 am, Apr 10, 2017

1006 C ST UT 2.7 Local Level 3 4/20/2015  
 1961 THUNDERBIRD, TROY, MICHIGAN, 48084

**Quality Certification**

**Heat Code: 371551**

Steel Industries Inc.

An AFGlobal Company

12600 Beech Daly Rd. Redford, MI 48239-2455

Phone: (313) 535-8505 Fax: (313) 534-2165

METALEX MANUFACTUR 5750 CORNELL RD CINCINNATI, OH 45242-2010	ME5500	PO: 20492-BL-1167	Sales Order: 151237	Line: 1
		Item Code: Rolled Ring	Qty Shipped: 1	
		Item Desc: Short Magnet Shell		
		Supplier Heat: 371551		
Spec: *AMS 4310E, Grade 7075, Condition T652				

Element	(%wt)	Ladle	Product	EPCRA	CAS#	Element	(%wt)	Ladle	Product	EPCRA	CAS#
Mn	Manganese	0.009		✓	7439-96-5	Al	Aluminum				
Si	silicon	0.05				Fe	Iron	0.11			
Cu	Copper	1.7		✓	7440-50-8	Zn	Zinc	5.6			
Cr	Chromium	0.19		✓	7440-47-3	Mg	Magnesium	2.5			
Ti	Titanium	0.02		✓	7440-02-0						

Mechanical Testing			Other		
from a		prolong	Millsource (melt)		Arconic/Pimalco
Location		1/2T	Stock used		19" Ingot
Tensile test #1 (KSI)		80.9			
Yield Strength test #1 (KSI)		69.3			
Elongation test #1		11.5			
ROA test #1		22			
Tensile test #2 (KSI)		81.5			
Yield Strength test #2 (KSI)		66.8			
Elongation test #2		15.0			
ROA test #2		31			
Tensile test #3 (KSI)		81.6			
Yield Strength test #3 (KSI)		68.5			
Elongation test #3		9.6			
ROA test #3		16			

LBL Job#16-1167  
P/N 27H638  
S/N 002  
PO#20492 Item#1

METALEX  
Q.A. DEPT  
ACCEPTED  
DATE 06/16/17  
BY KKS

*Job#16-1167  
PIN 27H638  
S/N 002*

The recording of false, fictitious, or fraudulent statement or entries on this document may be punishable as a felony under federal statute.

EPCRA Supplier Notification: This product may contain one or more toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) and 40 C.F.R. Part 372. Potentially reportable chemicals are indicated with a checkmark in the "EPCRA" column and a Chemical Abstract Services (CAS) registry number is provided for each such chemical in addition to the percent by weight of the chemical present in this product. It is your responsibility alone to determine whether your facility is required to submit a Toxic Release Inventory Report under EPCRA Section 313.

Certification No.: 1279454-REV01

Certification Date: 6/22/2017

Issued By: Laura Master

This report is issued in compliance with the requirements of EN10204 3.1

# Quality Certification

Heat Code: 371551

Steel Industries Inc.  
An AFGlobal Company  
12600 Beech Daly Rd. Redford, MI 48239-2455  
Phone: (313) 535-8505 Fax: (313) 534-2165

METALEX MANUFACTUR 5750 CORNELL RD CINCINNATI, OH 45242-2010	ME5500	PO: 20492-BL-1167	Sales Order: 151237	Line: 1
		Item Code: Rolled Ring	Qty Shipped: 1	
		Item Desc: Short Magnet Shell		
		Supplier Heat: 371551		
Spec: *AMS 4310E, Grade 7075, Condition T652				

Part No. 27H638

The heat treated lot certified on SII SO# 151237 consists of heats 372642 and 381551, which were heat treated together and mechanical properties qualified under heat# 372642 on Westmoreland test report 7-59013 dated 04/06/2017

24.17 x 21.89 ID x 21.89 (finish sizes)  
24.60 x 21.39 ID x 13.20 (approx. supplied sizes)

Forged

Heat treated in accordance with AMS 2772G to the T652 temper

Solution treated 890F, 3:08 hours, cold water quenched

Stress relieved by compression to a permanent set of 1%-5%

Aged 250F, 24:04 hours, air cooled

Hardness achieved (10mm/500kg): 150 HBW

Rough machined

Ultrasonic inspected: See XRI certification 11053 dated 04/07/2017

Test #1 is in Tangential dir.

Test #2 is in Axial dir.

Test #3 is in Radial dir.

P.O. Line item 1

No welding was performed on this material.  
Material is free from mercury contamination.

LBL Job#16-1167

P/N 27H638

S/N 002

PO#20492 Item#1



METALEX Q.A. DEPT ACCEPTED DATE 06/16/17 BY KKS
---

We hereby certify that the above item(s) has been inspected and tested in accordance with the listed specifications and is in conformance with all requirements as modified by the Purchase Order and/or Steel Industries, Inc. Quote.

Steel Industries, Inc. operates a quality management system in accordance with Quality Manual, Revision 08 dated January 17, 2017, which conforms to the following quality programs and directives for the manufacture of open die forgings and seamless rolled rings:

- 1) ISO 9001:2008 and AS9100C - certified by Performance Review Institute (PRI)
- 2) NADCAP (National Aerospace Accreditation Program) for heat treating - certified by Performance Review Institute (PRI)
- 3) PED (Pressure Equipment Directive) 2014/68/EU Annex 1 Para 4.3 - certified by Bureau Veritas
- 4) CFR Part 21 - Unauthorized Shipment of Defective Material applies

The recording of false, fictitious, or fraudulent statement or entries on this document may be punishable as a felony under federal statute.

EPCRA Supplier Notification: This product may contain one or more toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) and 40 C.F.R. Part 372. Potentially reportable chemicals are indicated with a checkmark in the "EPCRA" column and a Chemical Abstract Services (CAS) registry number is provided for each such chemical in addition to the percent by weight of the chemical present in this product. It is your responsibility alone to determine whether your facility is required to submit a Toxic Release Inventory Report under EPCRA Section 313.

Certification No.: 1279454-REV01

Certification Date: 6/22/2017

Issued By: Laura Master

This report is issued in compliance with the requirements of EN10204 3.1

Laura Master - Q.C. Certification Specialist



# Certified Inspection Report

Alcoa Forgings and Extrusions / Pinalco Inc  
 6833 West Willis Road  
 Chandler, AZ  
 85226



Sales Order Number 1000812523	Line No. 1.1	Customer P/O 22049-001	Cart Number AEP1715176
			Page 2/2
			Cert Print Date 22-APR-16

Composition Limits									
Alloy	Wt %	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti
7175	Min	0.15	0.20	1.2	0.10	2.1	0.18	5.1	0.10
	Max	0.15	0.20	2.0	0.10	2.9	0.28	6.1	0.10

Alloy		Wt %	Others Each
7175		Min	0.05
		Max	0.15
Others Total			
		Min	0.15
		Max	0.15

Composition Results									
Heat / Cast / Lot Number	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	
371547	0.06	0.12	1.6	0.03	2.5	0.20	5.8	0.03	
371549	0.06	0.11	1.6	0.02	2.5	0.20	5.7	0.03	
371551 ✓	0.06	0.11	1.6	0.01	2.5	0.20	5.7	0.03	
371552	0.06	0.12	1.6	0.01	2.5	0.20	5.8	0.03	
371718	0.06	0.11	1.6	0.01	2.5	0.20	5.7	0.03	

Composition Results		Others Each	Others Total
Heat / Cast / Lot Number	Others Each		
371547	--	--	
371549	--	--	
371551	--	--	
371552	--	--	
371718	--	--	

**Cert Notes**  
 Alcoa - Pinalco Inc, manufactured the item described above in a plant whose quality management system is certified/registered as being in conformity with ISO9001:2008 & AS9100 Rev C by BSI Management Systems under Certificate # FM78752. Made in USA  
 The test report shall not be reproduced except in full, without the written approval of the Quality Department. No alteration, addition or other change is authorized to be made to this certificate. The recording of false, fictitious, or otherwise fraudulent statements or entries on this certificate by any recipient may be punished as a felony under applicable law.

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/16/17  
 BY KKS



LBL Job#16-1167  
 P/N 27H638  
 S/N 002  
 PO#20492 Item#1

LBL Job#16-1167  
 P/N 27H638  
 S/N 002  
 PO#20492 Item#1

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/16/17  
 BY KKS

3/17/17



STEEL  
 INDUSTRIES  
 INC.

SO# 150385 151237

GRADE 7075

HEAT# 371551 381554

CUSTOMER: METALEX

PO# 20492-8L-1167

P/N

THERMAL TREATMENT:

SOLUTION ANNEAL 890

3 HR @ min

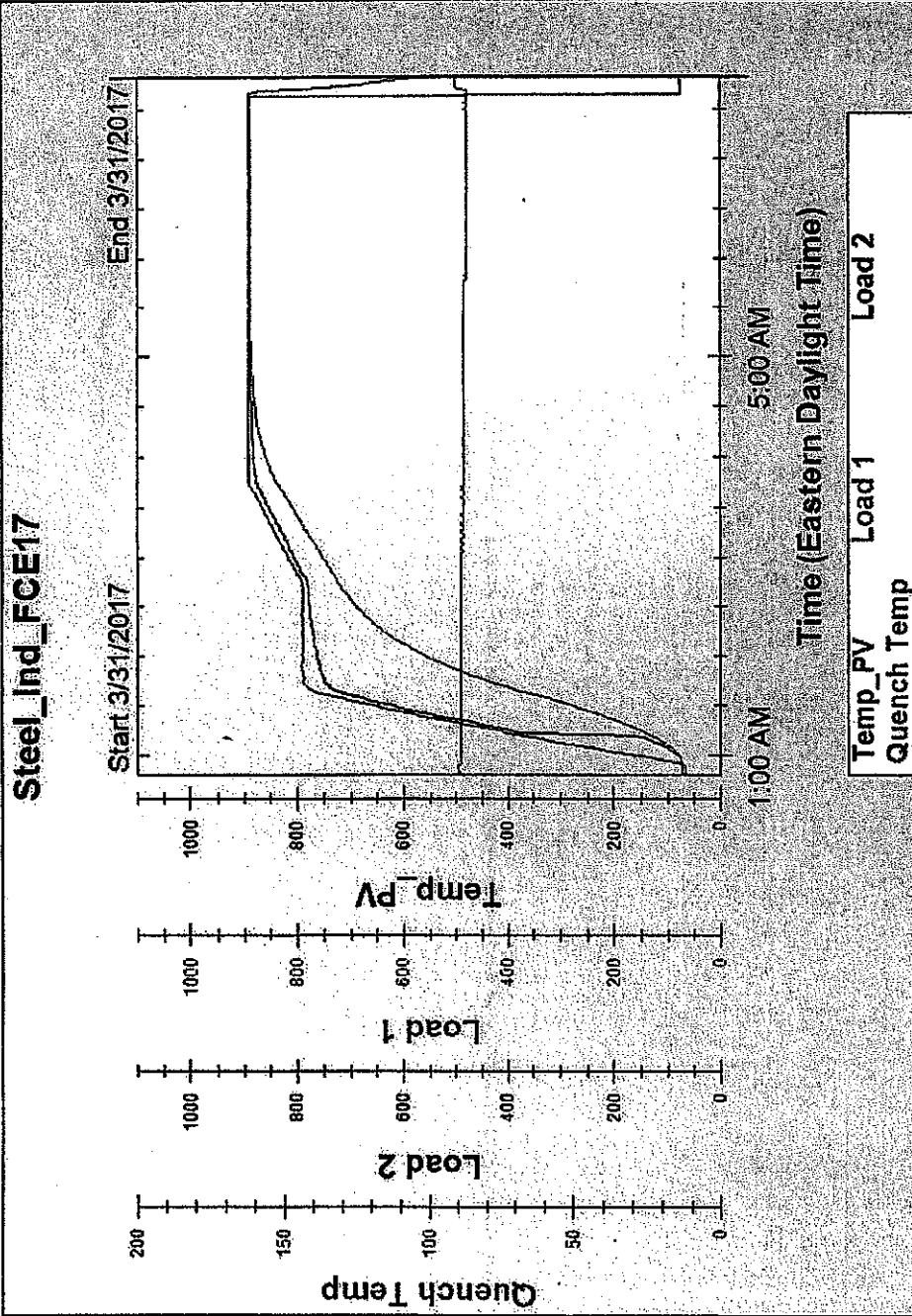
WATER QUENCH

Leo  
 Beverley

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R7.5.1.4

05/04





LBL Job#16-1167  
 P/N 27H638  
 S/N 002  
 PO#20492 Item#1

M T X  
 06/16/17

METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/16/17  
 BY KKS



STEEL  
 INDUSTRIES  
 INC.

SO# 150305 151237

GRADE 7075

HEAT# 372642 371551 JN  
 301556

CUSTOMER: METALEX

PO# 20492-06-1167

PIN

THERMAL TREATMENT:

AGE 2.50

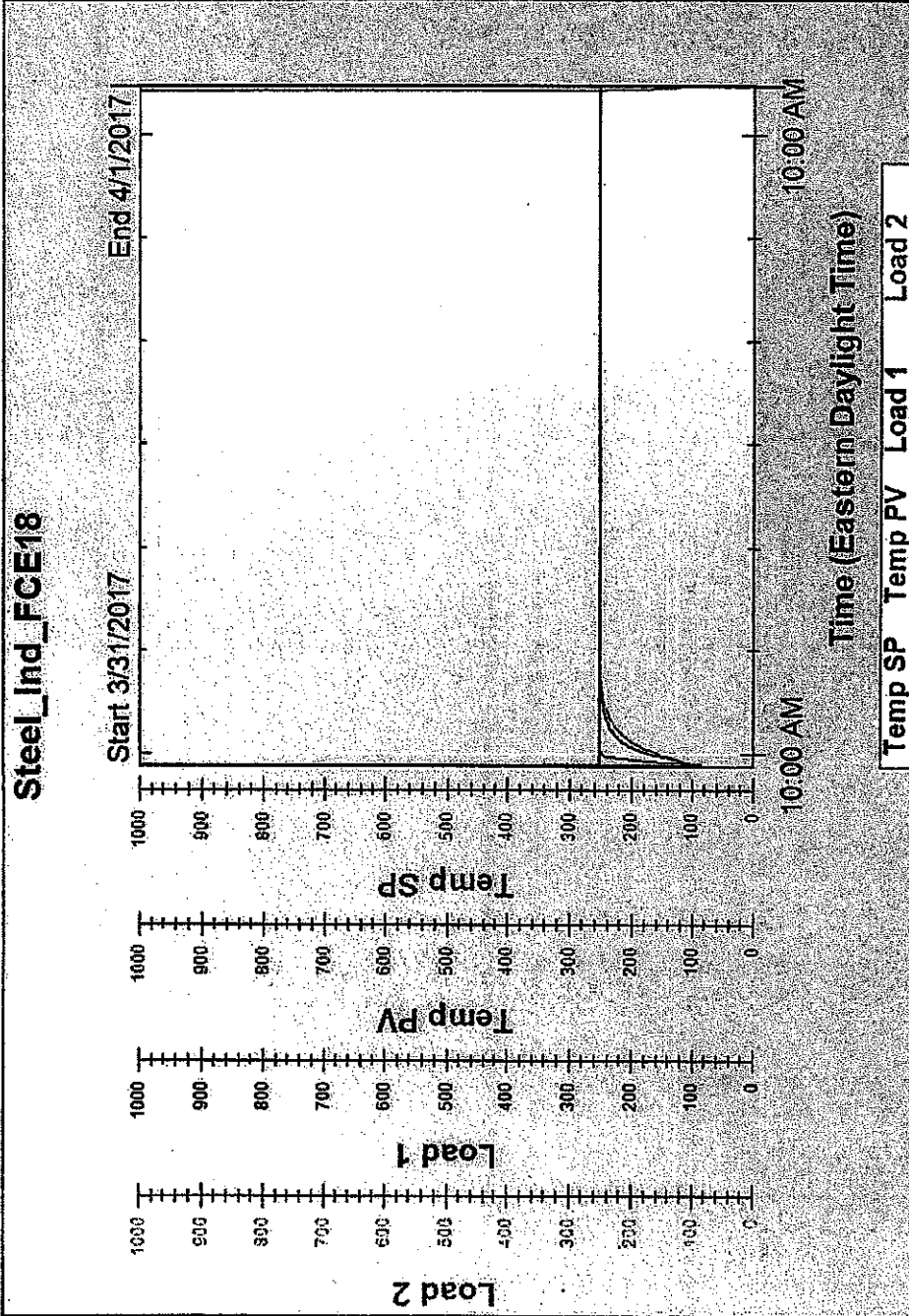
24 HR 4 MIN

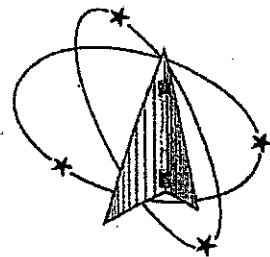
Air cool

Leo

Beverley

DATE: 06/16/17  
 TIME: 10:00 AM  
 BY: KKS





**Westmoreland Mechanical Testing & Research, Inc.**  
 P.O. Box 388; 221 Westmoreland Drive  
 Youngstown, PA 15696-0388 U.S.A.  
 Telephone: 724-537-3131 Fax: 724-537-3151  
 Website: [www.wmtr.com](http://www.wmtr.com) E-Mail: [admin@wmtr.com](mailto:admin@wmtr.com)  
 WMT&R is a technical leader in the material testing industry.



TESTING CERT 621-01 & 621-02

**CERTIFICATION**

Section 1 of 2  
 WMT&R Report No. 7-59013  
 P.O. No. 150385 T-4  
 WMT&R Quote No. QIN140118  
 Condition T652  
 Heat No. 372642

April 6, 2017  
 Steel Industries Inc.  
 12600 Beech Daly Road  
 Redford Twp., MI 48239

Attention: Laura Master

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 11, dated 12/03/2008.  
 The following tests were performed on this order: TENSILE

TENSILE RESULTS: AMS 4310E, ASTM E8-16a, ASTM B567-15  
 REQUIREMENTS: UTS ksi (Min 73Max →) 0.2% YS ksi (Min 61Max →) 4D Elong. % (Min 91Max →)  
 SPEED OF TESTING: 0.005 in./in./min., 0.05 in./min./in.  
 MATERIAL: 7075-T652

Heat No.	Direction	TestLog Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig		4D Final		Machine Number	AIUR
													GL (in.)	GL (in.)	GL (in.)	GL (in.)		
372642	Tang.	93857H	Room	80.9	69.3	11.5	22	10.0	16170	13860	0.5046	0.4452	2.00	2.23	0.19997899	M26	A	

TENSILE RESULTS: AMS 4310E, ASTM E8-16a, ASTM B567-15  
 REQUIREMENTS: UTS ksi (Min 71Max →) 0.2% YS ksi (Min 59Max →) 4D Elong. % (Min 41Max →)  
 SPEED OF TESTING: 0.005 in./in./min., 0.05 in./min./in.  
 MATERIAL: 7075-T652

Heat No.	Direction	TestLog Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig		4D Final		Machine Number	AIUR
													GL (in.)	GL (in.)	GL (in.)	GL (in.)		
372642	Axial	93858H	Room	81.5	66.8	15.0	31	10.3	16320	13960	0.5048	0.4186	2.000	2.300	0.20013755	M26	A	

LBL Job#16-1167  
 P/N 27H638  
 S/N 002  
 PO#20492 Item#1



METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/16/17  
 BY KKS

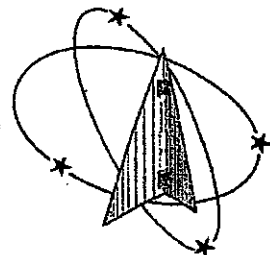
Matt Wojton  
 Tensile Supervisor



April 6, 2017

Testing Specialists for Aerospace, Automotive, and Material Testing Fields  
 Locations in: Youngstown, PA U.S.A. - Tel. (724) 537-3131 and  
 Bamberg, Oxn U.K. - Tel. +44 (0) 1295 261211

NOTE: THE RECORDING OF THIS DOCUMENT OR REPRODUCTION OF THIS DOCUMENT IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN APPROVAL OF WMT&R, INC. IS PROHIBITED.



**Westmoreland Mechanical Testing & Research, Inc.**  
 P.O. Box 388; 221 Westmoreland Drive  
 Youngstown, PA 15696-0388 U.S.A.  
 Telephone: 724-537-3131 Fax: 724-537-3151  
 Website: [www.wmtr.com](http://www.wmtr.com) E-Mail: [admin@wmtr.com](mailto:admin@wmtr.com)  
 WMTR is a technical leader in the material testing industry.



Accredited  
**Madcap**  
 Materials Testing Laboratory

TESTING CERT 821-01 & 821-02

Section 2 of 2  
 WMT&R Report No. 7-59013  
 P.O. No. 150385 T-4

**CERTIFICATION**

April 6, 2017  
 Steel Industries Inc.

TENSILE RESULTS: AMS 4310E, ASTM E8-16a, ASTM B557-15  
 REQUIREMENTS: UTS ksi (Min 69)Max → 0.2% YS ksi (Min 57)Max → 4D Elong. % (Min 2)Max →  
 SPEED OF TESTING: 0.005 in./min., 0.05 in./min./in.  
 MATERIAL: 7075-T652

Heat No.	Direction	TestLog Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D		Machine Number	AIUR	
													Orig. GL (in.)	Final GL (in.)			
372642	Radial	93859H	Room	81.6	68.5	9.6	16	10.9	4094	3437	0.2528	0.2322	1.000	1.097	0.05019310	M26	A

DISPOSITION: Acceptable  
 AIUR: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

Requirements provided by Steel Industries Inc.

LBL Job#16-1167  
 P/N 27H638  
 S/N 002  
 PO#20492 Item#1



METALEX  
 Q.A. DEPT  
 ACCEPTED  
 DATE 06/16/17  
 BY KKS

April 6, 2017



*Matthew J. Weston*  
 Matt Weston  
 Test Supervisor

Testing Specialists for Aerospace, Automotive, and Material Testing Fields  
 Locations in Youngstown, PA U.S.A. - Tel. (724) 537-3131 and  
 Banbury, Oxon U.K. - Tel. +44 (0) 1295 261211

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**Ultrasonic Field Service Report**

**Certification #: 11053**

**Bill to Address:**  
**STEEL INDUSTRIES, INC.**  
**12600 BEECH DALY ROAD**  
**REDFORD, MI. 48239**

**Inspection Performed at Address:**  
**STEEL INDUSTRIES, INC.**  
**12600 BEECH DALY ROAD**  
**REDFORD, MI. 48239**

**Customer PO#: 15046**


Part Number/ Description:	27H638 (Rolled Ring)							
Job Number:	151237	LBL Job#16-1167	<table border="1"> <tr> <td>METALEX</td> </tr> <tr> <td>Q.A. DEPT</td> </tr> <tr> <td>ACCEPTED</td> </tr> <tr> <td>DATE 06/16/17</td> </tr> <tr> <td>BY KKS</td> </tr> </table>	METALEX	Q.A. DEPT	ACCEPTED	DATE 06/16/17	BY KKS
METALEX								
Q.A. DEPT								
ACCEPTED								
DATE 06/16/17								
BY KKS								
Quantity:	01	P/N 27H638						
Lot / Serial Number(s):	151237-01	S/N 002						
Heat Number(s):	371551	PO#20492 Item#1						
Tag Number(s):	148326							
Surface Finish:	250 RMS OR BETTER							

Instrument		Transducer	
Make: Olympus		Manufacture: Sonatest	
Model: Epoch LTC Serial#: 090122906		Serial Number: 125/14	
Calibration Due Date: 6/13/2017		Lateral Indent: 10%	
Couplant: ECHOGEL GR14		Frequency: 2.25MHz	
Method: CONTACT		Size: 1.0" Angle: 0°	
Cable Length: 6FT <input checked="" type="checkbox"/> Bnc To Bnc/Lemo <input type="checkbox"/> Micro-dot		Set up Db: UTL1- 62dB, UTL2- 67dB	
Calibration Standards: FBH- 823F, 7075-3-0175		Range: UTL1- 10.0, UTL2- 5.0	
		<input checked="" type="checkbox"/> Inches <input type="checkbox"/> MM	
		<input checked="" type="checkbox"/> Straight Beam <input type="checkbox"/> Angle Beam	

Customer Information Only

Process Specification:	ASTM B594-13, XRI 7013 Rev 2.1, SII-B594 Rev 1.1	
Acceptance Criteria:	ASTM B594-13 Class A	
Marking Requirements:	SEE CUSTOMER REQUIREMENTS	
Material Type:	7075	
Quantity Inspected: 01	Quantity Accepted: 01	Quantity Rejected: 00
Inspect time begin: 10:00 AM	Inspect time end: 10:30 AM	LEFT BLANK INTENTIONALLY

Cause for rejection/comments: 01 PIECE TESTED TO THE ABOVE SPECIFICATIONS. NO REPORTABLE INDICATIONS WERE FOUND AT THE TIME OF INSPECTION. BOTH FACES OF RING WERE UT INSPECTED.

Inspector Matt Beavers Level: II Stamp:  Date Tested: 4/7/2017  
 Printed Name: **Matt Beavers** Employee Certification Exp. Date: 11/30/2019  
 XRI Quality Manual Rev. 3.6 Dated 4/25/2012 (Fixed Process)

**REVIEWED**  
 By M.Sonntag at 11:40 am, Apr 10, 2017

1006 C ST UT 2.7 Local Level 3 4/20/2015  
 1961 THUNDERBIRD, TROY, MICHIGAN, 48084



**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.  
2016-1167

Qty  
2

Inspection Origin		Vendor (Sub-Tier Source) Identification		Customer Identification		
<input type="checkbox"/> Receiving <input type="checkbox"/> In-Process <input checked="" type="checkbox"/> Final <input type="checkbox"/> Rework/Repair <input type="checkbox"/> First Article		Vendor Name N/A		Part No. 27H638	REV C	P.O. Number 7325827
		Date Rec'd N/A	P.O. No. N/A	Part Name MQXFA-1 - Short Magnet Shell		
At Oper. 100	Serial Numbers: 001 & 002		Customer Name Lawrence Berkley Lab			
SPECIFICATION	B/P ZONE	INSPECTION METHOD / GAGE NO.	ACTUAL DIMENSION / GAGE VERIFICATION (Range of Readings or Accept Status)		QTY ACC	QTY REJ

**SHEET 1**

**NOTES: Unless Otherwise Specified**

All dimensions are in millimeters (mm) and values are in SI units. Dimensions and values in brackets are U.S. customary units (inch)	Note #1	N/A	Information	
Applicable standards and specifications: ASME Y14.5M-2009, Dimensioning and Tolerancing	Note #2	Spec. Review	Conforms	
1.6 [63] finish all machined surfaces per ASME B46.1, Surface Texture.	Note #3	Profilometer MX 1985	63/0R BETTER	
Remove all burrs and break edges 0.25 [.010] to 0.75 [.030] chamfer or radius. Radii must make a smooth transition with adjacent surfaces.	Note #4	Dial Calipers MX 1124 & Visual	CONFORMS	
Forged material shall conform to ASTM-B594-02 Class A spec. or equivalent.	Note #5	Cert.# 150385 and 151237	CONFORMS	
Permanently mark part with drawing number and part serial number if applicable, approximately where shown in 6 mm [.25] high characters. Marking process to be approved by LBNL prior to marking part.	Flag Note #6	Visual & Photo	CONFORMS	
Unless otherwise noted, dimensions apply in restrained state.	Note #7	CMM MX 2484	CONFORMS	

**Detail D**

16X 45 deg. X 1 [.039]	H8	Dial Calipers MX 1124 Protractor MX 697	(16x) 45° X .89-1.06	
Min R 0.75 - 1.53 Typ [.030 - .060]	H7	Radius Gage MX 2042	* REF. NCR # 10520 "URI" R 1.27-1.40	
8X (8) [.315]	H7	N/A	REFERENCE	
70 [2.756]	G7	CMM MX 2484	70.070-70.126	
(54.15) [2.132]	G8	N/A	REFERENCE	

STAMP 	INSPECTED BY 	DATE 6/21/17	PAGE 1 OF 4	QTY ACC 2	QTY REJ 0
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**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.  
**2016-1167**

Qty  
**2**

Inspection Origin		Vendor (Sub-Tier Source) Identification		Customer Identification		
<input type="checkbox"/> Receiving <input type="checkbox"/> In-Process <input checked="" type="checkbox"/> Final <input type="checkbox"/> Rework/Repair <input type="checkbox"/> First Article		Vendor Name <b>N/A</b>		Part No. <b>27H638</b>	REV <b>C</b>	P.O. Number <b>7325827</b>
At Oper. <b>100</b>		Date Rec'd <b>N/A</b>	P.O. No. <b>N/A</b>	Part Name <b>MQXFA-1 - Short Magnet Shell</b>		
Serial Numbers: <b>001 &amp; 002</b>		Customer Name <b>Lawrence Berkley Lab</b>				
SPECIFICATION	B/P ZONE	INSPECTION METHOD / GAGE NO.	ACTUAL DIMENSION / GAGE VERIFICATION (Range of Readings or Accept Status)		QTY ACC	QTY REJ

Section A-A						
2X 45 deg. X 2 [.078]	H5	Dial Calipers MX 1124 Protractor MX 697	<i>(2X) 45° X 1.9-2.03</i>			
All Around	H5	Dial Calipers MX 1124 Protractor MX 697	<i>ALL AROUND</i>			
Detail C						
4X 45 deg. X 0.5 [.020]	G3	Dial Calipers MX 1124 Protractor MX 697	<i>(4X) 45° X .38-.50</i>			
8X $\varnothing$ 8 +0.03/-0.00 [.315 +.001/-0.00]	G5	CMM MX 2484	<i>(8X) 8.002-8.030</i>			
ON A $\varnothing$ 556 BCD	G4	CMM MX 2484	BASIC DIMENSION			
$\varnothing$ 0.05 [.002]  A B	G4	CMM MX 2484	<i>W/in .05</i>			
$\varnothing$ 614 [24.173]	E7	N/A	REFERENCE			
$\varnothing$ 584 [22.99]	D8	N/A	BASIC DIMENSION			
$\varnothing$ 556 [21.890]	E8	N/A	REFERENCE			
$\perp$  0.1 [.004]  A	F6	CMM MX 2484	<i>W/in .039</i>			
B	F6	N/A	DATUM			
$\parallel$  0.1 [.004]  B	F5	CMM MX 2484	<i>W/in .022</i>			
325.64 [12.820]	F5	CMM MX 2484	<i>325.6072-325.6208</i>			
(15) [.591]	E5	N/A	REFERENCE			
(25) [.984]	D5	N/A	REFERENCE			
$\parallel$  0.2 [.008]  B	C6	CMM MX 2484	<i>W/in .0345</i>			
8 X 25 [.984]	D6	CMM MX 2484	<i>(8X) 24.928-25.015</i>			
16 X 15 [.591]	E6	CMM MX 2484	<i>(16X) 14.883-14.987</i>			
605.5 [23.838]	F3	CMM MX 2484	<i>605.471-605.568</i>			

STAMP 	INSPECTED BY 	DATE <i>6/21/17</i>	PAGE 2 OF 4	QTY ACC <b>2</b>	QTY REJ <b>0</b>
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**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.  
 2016-1167

Qty  
 2

Inspection Origin		Vendor (Sub-Tier Source) Identification		Customer Identification		
<input type="checkbox"/> Receiving	Vendor Name <b>N/A</b>	Part No. <b>27H638</b>		REV <b>C</b>	P.O. Number <b>7325827</b>	
<input type="checkbox"/> In-Process		Date Rec'd <b>N/A</b>	P.O. No. <b>N/A</b>		Part Name <b>MQXFA-1 - Short Magnet Shell</b>	
<input checked="" type="checkbox"/> Final	Serial Numbers: <b>001 &amp; 002</b>			Customer Name <b>Lawrence Berkley Lab</b>		
<input type="checkbox"/> Rework/Repair	At Oper. <b>100</b>					
<input type="checkbox"/> First Article						
SPECIFICATION	B/P ZONE	INSPECTION METHOD / GAGE NO.	ACTUAL DIMENSION / GAGE VERIFICATION (Range of Readings or Accept Status)	QTY ACC	QTY REJ	

$\overline{=} 0.2 .008 A$	F3	CMM MX 2484	<i>w/in. 0024</i>			
449 [17.677]	F3	CMM MX 2484	<i>448.937-449.045</i>			
$\overline{=} 0.2 .008 A$	F3	CMM MX 2484	<i>w/in. 0324</i>			
259 [10.197]	E2	CMM MX 2484	<i>258.974-259.019</i>			
$\overline{=} 0.2 .008 A$	E2	CMM MX 2484	<i>w/in. 0207</i>			
24.15 +/- 0.05 [.951 +/- .001]	E2	CMM MX 2484	<i>24.1348-24.1488</i>			
$\overline{=} 0.2 .008 A$	E2	CMM MX 2484	<i>w/in. 0258</i>			
54.15 +/- 0.05 [2.132 +/- .001]	D2	CMM MX 2484	<i>54.1126-54.1928</i>			
$\overline{=} 0.2 .008 A$	D2	CMM MX 2484	<i>w/in. 0264</i>			
$\phi 584$ [22.99]	D3	CMM MX 2484	BASIC DIMENSION			
8X M6 [.236]	D4	Thread Gage MX 2213	<i>(8X) CONFIRMS TO GAGE</i>			
TAP $\nabla$ 20	D4	Dial Calipers MX 1124 Thread Gage MX 2213	<i>20 DP.</i>			
ON A $\phi 584$ Bolt Circle	C4	CMM MX 2484	BASIC DIMENSION			
$\oplus \phi 0.2 .008 A B$	C4	CMM MX 2484	<i>w/in. 1312</i>			
449 [17.677]	E4	CMM MX 2484	<i>448.943-449.027</i>			
$\overline{=} 0.2 .008 A$	E4	CMM MX 2484	<i>w/in. 008</i>			
45 deg.	E3	CMM MX 2484	BASIC DIMENSION			
259 [10.197]	E4	CMM MX 2484	<i>258.965-259.004</i>			
$\overline{=} 0.2 .008 A$	E4	CMM MX 2484	<i>w/in. 046</i>			
<b>Section B-B</b>						
$(\phi 584)$ [22.99]	B5	N/A	REFERENCE			
$\nabla 0.05 .002 $ Note #7	A5	CMM MX 2484	<i>w/in. 046</i>			
0.8 [32] surface finish	B6	CMM MX 2484	<i>.8 OR BETTER</i>			

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 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.  
 2016-1167

Qty  
 2

<b>Inspection Origin</b> <input type="checkbox"/> Receiving <input type="checkbox"/> In-Process <input checked="" type="checkbox"/> Final <input type="checkbox"/> Rework/Repair <input type="checkbox"/> First Article		<b>Vendor (Sub-Tier Source) Identification</b> Vendor Name: N/A Date Rec'd: N/A      P.O. No.: N/A		<b>Customer Identification</b> Part No.: 27H638      REV: C      P.O. Number: 7325827 Part Name: MQXFA-1 - Short Magnet Shell		
At Oper. 100	Serial Numbers: 001 & 002		Customer Name: Lawrence Berkley Lab			
SPECIFICATION	B/P ZONE	INSPECTION METHOD / GAGE NO.	ACTUAL DIMENSION / GAGE VERIFICATION (Range of Readings or Accept Status)	QTY ACC	QTY REJ	

Ø 614 +0.1/-0.0 [24.173 +.003/- .000]	B7	CMM MX 2484	614.0314 - 614.0464	MTX OC 7	
⊙   Ø 0.25 [.010] [A] Note #7	B7	CMM MX 2484	W/IN .018	MTX OC 7	
Ø 556 +0.1/-0.0 [21.890 +.003/- .000] Note #7	C7 & Red-tire	CMM MX 2484	556 - 556.011	MTX OC 7	
[A]	C6	N/A	DATUM	MTX OC 7	
<b>Detail F</b>					
Mark P/N here "27H638"	C4	Visual & Photo Replication	CONFORMS	MTX OC 7	
Mark serial number here in form of "XXX".	B3	Visual & Photo Replication	CONFORMS	MTX OC 7	
<b>Isometric View</b>					
Note 6	C2	Visual & Photo Replication	CONFORMS	MTX OC 7	

STAMP 	INSPECTED BY 	DATE 6/21/17	PAGE 4 OF 4	QTY ACC 2	QTY REJ 0
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**METALEX REQUEST FOR DISPOSITION**

CUSTOMER	<u>Lawrence Berkeley Lab.</u>	MX JOB #	<u>2016-1167</u>
ATTENTION:	<u>Mike Solis</u>	P.O. #:	<u>7325827</u>
PART #	<u>27H638</u>	QUANTITY	<u>1</u>
PART NAME	<u>SHORT MAGNET SHELL</u>	S/N(s) (if applicable)	<u>001</u>
IF APPLICABLE: MX NCR#	<u>10520</u>		

**PAGE 1 of 2**

1) Check one:  Discrepancy  Deviation Request  Suspect Product

**BLUEPRINT:**

Per Drawing 27H638, Sheet 1, Zone H7:  
Minimum radius of .030"/.060" typ in corners of (8X) slots

**ACTUAL:**

(4) slots on Datum B end of S/N 001 have sharp corners (up to 0.005" radius) per old Rev. BV drawing

See attached sketch for additional information.

**2) Cause:**

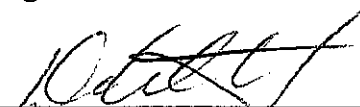
The CNC program status was marked as "Edit" on 1/13/17 for the added radii, but this status was automatically changed to a "C" when the machine number was changed in the program maintenance software, and therefore the Program Edit was never scheduled to be put onto a Programmer's schedule to revise the CNC programming.

**3) Corrective Action:**

The Program Maintenance software was revised to have a Change or "C" status show on the schedule over an Edit or "E" status. This logic has been changed so that the Edit status is priority.

All manufacturing teammates will be instructed on the program status field of their schedules. A teammate should only run a program that is in R or A status.

Work Instruction MXWI5040 will be updated and revised to provide clear instructions on what is required by the Programming Coordinator for various program statuses. The Programming Coordinator will be trained on this updated process and it will prevent programs from being released to the shop floor that are not in a correct program status.

4)  D. DANIEL FORREST 6/21/17  
Metalex Representative Signature Print Date

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



**METALEX REQUEST FOR DISPOSITION**

CUSTOMER	<u>Lawrence Berkeley Lab.</u>	MX JOB #	<u>2016-1167</u>
ATTENTION:	<u>Mike Solis</u>	P.O. #:	<u>7325827</u>
PART #	<u>27H638</u>	QUANTITY	<u>1</u>
PART NAME	<u>SHORT MAGNET SHELL</u>	S/N(s) (if applicable)	<u>001</u>
IF APPLICABLE: MX NCR#	<u>10520</u>		<b>PAGE 2 of 2</b>

5) Customer Disposition:

The shells will be accepted with sharp  
inside radius

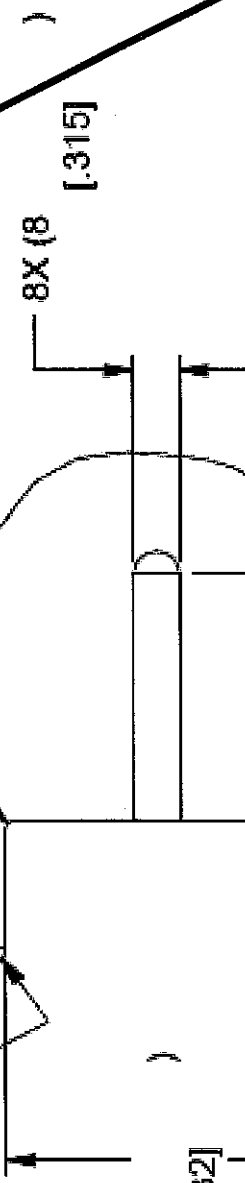
6) *Michael Solis* Michael Solis 6/21/2017  
Customer Representative Signature Print Date

16X 45° X 1

[.039]

MIN R	0.75	-1.53	TYP
	[.030	-.060	]

Actual: .005R max (sharp)



8X (8

[.315]

(54.15  
[2.132]

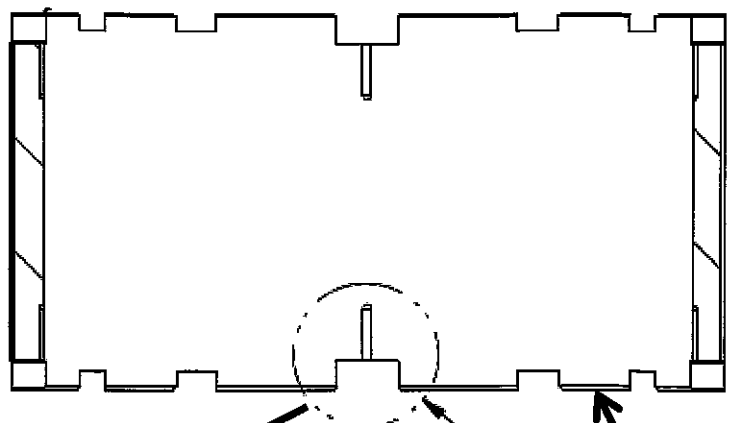
70

[2.756]

(4) SLOTS ON  
DATUM B END  
ONLY AFFECTED  
ON S/N 001

SEE DETAIL D

Datum B



SECTION A-A

DETAIL D  
SCALE 1.000