

WASHINGTON SITE
INSTALLATION CONTRACTOR
QA DATA

CONTRACT NO.: PC 175730
PROGRAM I.D.: LIGO VACUUM EQUIPMENT
PSI DOCUMENT NO.: V049-8-863
V049-8-864
V049-8-865
V049-8-866
V049-8-867

SUBMITTED TO:

California Institute of Technology
391 South Holliston Avenue
Pasadena, CA 91125

SUBMITTED BY:

Process Systems International, Inc.
20 Walkup Drive
Westborough, MA 01581





Radiographic Examination Report

DATE 3-23-98 PAGE 1 OF 2

CLIENT: APOLLO

LOCATION: SHOP

214 E. ALBANY
KENNEWICK WA 99336

PROCEDURE: #NDE-01

REV: 2

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
ANSI	_____	5 x 7	<u>12</u>	SL - Slag Lines	DT - Drop Through	CX - Root Convexity	
ASME	<u>B31.3</u>	4 x 10	_____	P - Porosity	SI - Slag Inclusion	CV - Root Concavity	
API	_____	4 1/4 x 17	_____	T - Tungsten Inclusion	BT - Burn Through	OX - Oxidation	
AWS	_____	7 x 17	_____	IF - Incomplete Fusion	UC - Undercut	MM - Mismatch	
OTHER	_____	14 x 17	_____	IP - Incomplete Penetration	C - Crack	HB - Hollow Bead	
AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>SPOOL #1 Fw #1</u>						
<u>0</u>		X					
<u>90</u>		X					
	<u>Fw #2</u>						
<u>0</u>		X					
<u>90</u>		X					
	<u>Fw #3</u>						
<u>0</u>		X					
<u>90</u>		X					
	<u>Fw #4</u>						
<u>0</u>		X					
<u>90</u>		X					
	<u>SPOOL #2 Fw #1</u>						
<u>0</u>		X					
<u>90</u>		X					
	<u>Fw #4</u>						
<u>0</u>		X					
<u>90</u>		X					

Radiographer T. Martini Level II Interpreter T. Martini Level II
Customer _____



P. 2 of 2
 3-23-98
 Form RT-1B
 Proc. RT-01 Rev 2
 RT-Report # _____

RADIOGRAPHIC TECHNIQUE SHEET

SINGLE-WALL RADIOGRAPHIC TECHNIQUES

Source Ci or KUPMA	57		
Pipe Diameter	2"		
Views	2		
Distance Source to Film	22"		
Focal Spot Size	.146"		
Material Type/Thickness	SS .062"		
Geometric Unsharpness			
Penetrameter (s)	12		
Shim Thickness	.060"		
Film Type	50		
Technique #	F		

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-Wall-Film Arrangement		IGI Penetrameter		Location Marker Placement
			End View	Side View	Selection	Placement	
Any	Single wall	Single wall				Source Side	Other Side
Any	Single wall	Single wall				Source Side	Other Side
Any	Single wall	Single wall				Source Side	Source Side

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-Wall-Film Arrangement		IGI Penetrameter		Location Marker Placement
			End View	Side View	Selection	Placement	
24" or Less	Double-Wall at least 2 Exposures at 90 deg. to each other for complete coverage	Double-Wall Real Source Opposed Source Side and Film Side				Source Side	Other Side
24" or Less	Double-Wall at least 2 Exposures at 90 deg. to each other for complete coverage	Double-Wall Real Offset Source Side and Film Side				Source Side	Other Side

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-Wall-Film Arrangement		IGI Penetrameter		Location Marker Placement
			End View	Side View	Selection	Placement	
Any	Double-Wall at least 3 Exposures 120 deg. to each other for complete coverage	Single-Wall				Source Side	Other Side
Any	Double-Wall at least 3 Exposures 120 deg. to each other for complete coverage	Single-Wall				Source Side	Other Side



Radiographic Examination Report

214 E. ALBANY
KENNEWICK WA 99336

DATE 2-12-98 PAGE 1 OF 3

CLIENT: APOLLO

LOCATION: SHOP

PROCEDURE: #NDE-01

REV: 2

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
<input checked="" type="checkbox"/> ANSI		5 x 7	<u>32</u>	SL - Slag Lines	DT - Drop Through	CX - Root Convexity	
<input checked="" type="checkbox"/> ASME	<u>B31.3</u>	4 x 10		P - Porosity	SI - Slag Inclusion	CV - Root Concavity	
<input type="checkbox"/> API		4 1/2 x 17		T - Tungsten Inclusion	BT - Burn Through	OX - Oxidation	
<input type="checkbox"/> AWS		7 x 17		IF - Incomplete Fusion	UC - Undercut	MM - Mismatch	
<input type="checkbox"/> OTHER		14 x 17		IP - Incomplete Penetration	C - Crack	HB - Hollow Bead	
AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>PU-103-73 (4") W-28</u>				<u>WGV 20 W-3</u>		
<u>0-1</u>		<u>X</u>		<u>0</u>		<u>X</u>	
<u>1-2</u>		<u>X</u>		<u>90</u>		<u>X</u>	
<u>2-3</u>		<u>X</u>			<u>WGV 20 W-4</u>		
<u>3-0</u>		<u>X</u>		<u>0</u>		<u>X</u>	
	<u>PU-103-73 (4") W-29</u>			<u>90</u>		<u>X</u>	
<u>0-1</u>		<u>X</u>			<u>WGV 20 W-5</u>		
<u>1-2</u>		<u>X</u>		<u>0</u>		<u>X</u>	
<u>2-3</u>		<u>X</u>		<u>90</u>		<u>X</u>	
<u>3-0</u>		<u>X</u>			<u>WGV 20 W-6</u>		
	<u>G-2WC-400 4" W-34A R1</u>			<u>0</u>		<u>X</u>	
<u>0-1</u>		<u>X</u>		<u>90</u>		<u>X</u>	
<u>1-2</u>		<u>X</u>			<u>WGV 20 W-7</u>		
<u>2-3</u>		<u>X</u>		<u>0</u>		<u>X</u>	
<u>3-0</u>		<u>X</u>		<u>90</u>		<u>X</u>	
	<u>WGV 20 W-1</u>				<u>WGV 20 W-10</u>		
<u>0</u>		<u>X</u>		<u>0</u>		<u>X</u>	
<u>90</u>		<u>X</u>		<u>90</u>		<u>X</u>	
	<u>WGV 20 W-2</u>				<u>WGV 20 W-11</u>		
<u>0</u>		<u>X</u>		<u>0</u>		<u>X</u>	
<u>90</u>		<u>X</u>		<u>90</u>		<u>X</u>	

Radiographer T. Martini Level II Interpreter T. Martini Level II

Customer _____



Radiographic Examination Report

214 E. ALBANY
KENNEWICK WA 99336

DATE 2-12-98 PAGE 2 OF 3

CLIENT: APOLLO

LOCATION: SHOP

PROCEDURE: #NDE-01 REV: 2

Acceptance Criteria	Film Count	Weld Discontinuity Codes	
ANSI _____ ASME _____ API _____ AWS _____ OTHER _____	5 x 7 _____ 4 x 10 _____ 4 1/2 x 17 _____ 7 x 17 _____ 14 x 17 _____	SL - Slag Lines P - Porosity T - Tungsten Inclusion IF - Incomplete Fusion IP - Incomplete Penetration	DT - Drop Through SI - Slag Inclusion BT - Burn Through UC - Undercut C - Crack CX - Root Convexity CV - Root Concavity OX - Oxidation MM - Mismatch HB - Hollow Bead

AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>WGU 20 W-14</u>						
<u>0</u>		X					
<u>96</u>		X					

Radiographer T Martini Level II Interpreter T Martini Level II

Customer _____



RADIOGRAPHIC TECHNIQUE SHEET

SINGLE-WALL RADIOGRAPHIC TECHNIQUES

Source Ci or KUPMA	84	84	
Pipe Diameter	4"	1 1/2"	
Views	4	2	
Distance Source to Film	4.5'	20"	
Focal Spot Size	.146	.146	
Material Type/Thickness	SS .062	SS .062	
Geometric Unsharpness			
Penetrameter (s)	10F	12	
Shim Thickness	.060"	.090"	
Film Type	DR	50	
Technique #	G	F	

Proc. O.D.	Exposure Technique	Radiograph Viewing	Source-to-Film Arrangement		IQI Penetrometer		Location Marker Placement
			End View	Side View	Selection	Placement	
Any	Single Wall	Single Wall				Source Side	Other Side
Any	Single Wall	Single Wall				Source Side	File Side
Any	Single Wall	Single Wall				Source Side	Source Side

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

Proc. O.D.	Exposure Technique	Radiograph Viewing	Source-to-Film Arrangement		IQI Penetrometer		Location Marker Placement
			End View	Side View	Selection	Placement	
File or Lys	Double Wall At Least 2 Exposures at 120 amp. in Each Direction for Complete Coverage	Double Wall Read Separately Source Side and Film Side Images				Source Side	Other Side
File or Lys	Double Wall At Least 2 Exposures at 120 amp. in Each Direction for Complete Coverage	Double Wall Read Off-line Source Side and Film Side Images				Source Side	Other Side

Proc. O.D.	Exposure Technique	Radiograph Viewing	Source-to-Film Arrangement		IQI Penetrometer		Location Marker Placement
			End View	Side View	Selection	Placement	
Any	Double Wall At Least 2 Exposures 120 amp. in Each Direction for Complete Coverage	Single Wall				Source Side	File Side
Any	Double Wall At Least 2 Exposures 120 amp. in Each Direction for Complete Coverage	Single Wall				Source Side	File Side



Radiographic Examination Report

DATE 11-21-97 PAGE 1 OF 2

CLIENT: APOLLO SHEET METAL

LOCATION: SHOP

214 E. ALBANY
KENNEWICK WA 99336

PROCEDURE: #NDE-01

REV: 2

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
X ANSI _____ ASME <u>B31.3</u> API _____ AWS _____ OTHER _____		5 x 7 <u>16</u> 4 x 10 _____ 4 1/2 x 17 _____ 7 x 17 _____ 14 x 17 _____		SL - Slag Lines P - Porosity T - Tungsten Inclusion IF - Incomplete Fusion IP - Incomplete Penetration DT - Drop Through SI - Slag Inclusion BT - Burn Through UC - Undercut C - Crack CX - Root Convexity CV - Root Concavity OX - Oxidation MM - Mismatch HB - Hollow Bead			
AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	CA-105-TS (M126)				CA-105-TS (M126)		
	Weld #7 WELDER #42				Weld #9 WELDER #42		
0-1		X		0-1		X	
1-2	Pipe Seam I.D. U.C.	X		1-2		X	
2-3	CV	X		2-3	Pipe Seam I.P.		X
3-0		X		3-0		X	
	CA-105-TS (M126)				CA-105-TS (M126)		
	Weld #8 WELDER #42				Weld #38A WELDER #42 <small>with repair</small>		
0-1		X		0-1	Pen in weld will reshot	X	
1-2	Pipe Seam IP		X	1-2	P		X
2-3		X		2-3		X	
3-0		X		3-0		X	

Radiographer T Martin Level II Interpreter T Martin Level II
 Customer _____



11-21-97

Form RT - 1B
Proc. RT - 01 Rev _____
RT. Report # _____

RADIOGRAPHIC TECHNIQUE SHEET

SINGLE-WALL RADIOGRAPHIC TECHNIQUES

Source Ci or KUP/MA			
Pipe Diameter	69		
Views	4"		
Distance Source to Film	41"		
Focal Spot Size	.146"		
Material Type/Thickness	SS .120"		
Geometric Unsharpness			
Penetrator (s)	10F		
Shim Thickness	.090"		
Film Type	DR		
Technique #	G		

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-Weld-Film Arrangement		IQI Penetrator		Location Marker Placement
			End View	Side View	Selection	Placement	
Any	Single-Wall	Single-Wall			Source Side	Film Side	Either Side
Any	Single-Wall	Single-Wall			Source Side	Film Side	Film Side
Any	Single-Wall	Single-Wall			Source Side	Film Side	Source Side

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-Weld-Film Arrangement		IQI Penetrator		Location Marker Placement
			End View	Side View	Selection	Placement	
24" or Less	Double-Wall: At Least 3 Exposures at 90 deg. to Each Other for Complete Coverage	Double-Wall: Read Summation Source Side and Film Side Images			Source Side		Either Side
24" or Less	Double-Wall: At Least 2 Exposures at 90 deg. to Each Other for Complete Coverage	Double-Wall (Excess Read Offset) Read Offset Source Side and Film Side Images			Source Side		Either Side

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-Weld-Film Arrangement		IQI Penetrator		Location Marker Placement
			End View	Side View	Selection	Placement	
Any	Double-Wall: At Least 3 Exposures 120 deg. to Each Other for Complete Coverage	Single-Wall			Source Side	Film Side	Film Side
Any	Double-Wall: At Least 3 Exposures 120 deg. to Each Other for Complete Coverage	Single-Wall			Source Side	Film Side	Film Side



DATE 10-29-97 PAGE 1 of 2

CLIENT: APOLLO SHEET METAL (#A126)

LOCATION: SHOP

Radiographic Examination Report

PROCEDURE: #NDE-01 REV: 2

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
ANSI		5 x 7	<u>18</u>	SL - Slag Lines	DT - Drop Through	CX - Root Convexity	
<input checked="" type="checkbox"/> ASME	<u>B31.3</u>	4 x 10		P - Porosity	SI - Slag Inclusion	CV - Root Concavity	
API		4 1/2 x 17		T - Tungsten Inclusion	BT - Burn Through	OX - Oxidation	
AWS		7 x 17		IF - Incomplete Fusion	UC - Undercut	MM - Mismatch	
OTHER		14 x 17		IP - Incomplete Penetration	C - Crack	HB - Hollow Bead	

AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>PU-103-T3 W-3 246</u>				<u>RU-046 W-13 246</u>		
<u>0-1</u>	<u>CV</u>	<u>X</u>		<u>0</u>		<u>X</u>	
<u>1-2</u>	<u>CO</u>	<u>X</u>		<u>90</u>		<u>X</u>	
<u>2-3</u>		<u>X</u>			<u>RU-0200 W-13 246</u>		
<u>3-0</u>		<u>X</u>		<u>0</u>		<u>X</u>	
	<u>PU-103-T3 W-4 246</u>			<u>90</u>		<u>X</u>	
<u>0-1</u>		<u>X</u>			<u>RU-0200 W-13 246</u>		
<u>1-2</u>	<u>CV</u>	<u>X</u>		<u>0</u>		<u>X</u>	
<u>2-3</u>	<u>CO</u>	<u>X</u>		<u>90</u>		<u>X</u>	
<u>3-0</u>		<u>X</u>					
	<u>PU-103-T3 W-5 246</u>						
<u>0-1</u>		<u>X</u>					
<u>1-2</u>		<u>X</u>					
<u>2-3</u>		<u>X</u>					
<u>3-0</u>		<u>X</u>					

Radiographer T. Mastini Level II Interpreter T. Mastini Level II

Customer _____



DATE 10-1-97 PAGE 1 of 2

CLIENT: APOLLO (LIGO TIL)

LOCATION: SHOP

Radiographic Examination Report

PROCEDURE: #NDE-01 REV: 2

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
ANSI		5 x 7	<u>8</u>	SL - Slag Lines	DT - Drop Through	CX - Root Convexity	
<input checked="" type="checkbox"/> ASME	<u>B31.3</u>	4 x 10		P - Porosity	SI - Slag Inclusion	CV - Root Concavity	
API		4 1/2 x 17		T - Tungsten Inclusion	BT - Burn Through	OX - Oxidation	
AWS		7 x 17		IF - Incomplete Fusion	UC - Undercut	MM - Mismatch	
OTHER		14 x 17		IP - Incomplete Penetration	C - Crack	HB - Hollow Bead	

AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>4" VA-1154-1B1 WELDER 2-32</u>						
	<u>W#5</u>						
<u>0-1</u>		<input checked="" type="checkbox"/>					
<u>1-2</u>		<input checked="" type="checkbox"/>					
<u>2-3</u>		<input checked="" type="checkbox"/>					
<u>3-0</u>		<input checked="" type="checkbox"/>					
	<u>4" VA-1153-1B1 WELDER 2-46</u>						
	<u>W#8</u>						
<u>0-1</u>		<input checked="" type="checkbox"/>					
<u>1-2</u>		<input checked="" type="checkbox"/>					
<u>2-3</u>		<input checked="" type="checkbox"/>					
<u>3-0</u>		<input checked="" type="checkbox"/>					

Radiographer Tony Martini Level II Interpreter Tony Martini Level II

Customer _____



DATE 10-7-97 PAGE 1 of 2

CLIENT: APOLLO

LOCATION: SHOP

PROCEDURE: #NDE-01 REV: 2

Radiographic Examination Report

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
ANSI		5 x 7	<u>4</u>	SL - Slag Lines	DT - Drop Through	CX - Root Convexity	
<input checked="" type="checkbox"/> ASME	<u>B31.3</u>	4 x 10		P - Porosity	SI - Slag Inclusion	CV - Root Concavity	
API		4 1/2 x 17		T - Tungsten Inclusion	BT - Burn Through	OX - Oxidation	
AWS		7 x 17		IF - Incomplete Fusion	UC - Undercut	MM - Mismatch	
OTHER		14 x 17		IP - Incomplete Penetration	C - Crack	HB - Hollow Bead	

AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>4" VA-257-1B1</u>						
	<u>W#13, welder 2-42</u>						
<u>0-1</u>		<u>X</u>					
<u>1-2</u>		<u>X</u>					
<u>2-3</u>		<u>X</u>					
<u>3-0</u>		<u>X</u>					

Radiographer T. Martini Level II Interpreter T. Martini Level II

Customer _____

10-7-91



RADIOGRAPHIC TECHNIQUE SHEET

SINGLE-WALL RADIOGRAPHIC TECHNIQUES

Source Ci or KUR/MA	30		
Pipe Diameter	3"		
Views	4		
Distance Source to Film	4"		
Focal Spot Size	.146"		
Material Type/Thickness	St. .120"		
Geometric Unsharpness			
Penetrameter (s)	10F		
Shim Thickness	.090"		
Film Type	DR		
Technique #	6		

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-to-Film Arrangement		IQI Penetration		Location Marker Placement
			End View	Side View	Section	Placement	
Any	Single Wall	Single Wall				Source Side	Either Side
Any	Single Wall	Single Wall				Source Side	Opposite Side
Any	Single Wall	Single Wall				Source Side	Source Side

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-to-Film Arrangement		IQI Penetration		Location Marker Placement
			End View	Side View	Section	Placement	
75 in. or Less	Double Wall At Least 3 Exposures at 90 deg. to Each Other for Complete Coverage	Double Wall Read Separated Source Side and Film Side Images				Source Side	Either Side
75 in. or Less	Double Wall At Least 2 Exposures at 90 deg. to Each Other for Complete Coverage	Double Wall (Reverse Read) Other Side Source and Film Side Images				Source Side	Either Side

DOUBLE-WALL RADIOGRAPHIC TECHNIQUES

Pipe O.D.	Exposure Technique	Radiograph Viewing	Source-to-Film Arrangement		IQI Penetration		Location Marker Placement
			End View	Side View	Section	Placement	
Any	Double Wall At Least 3 Exposures 120 deg. to Each Other for Complete Coverage	Single Wall				Source Side	Opposite Side
Any	Double Wall At Least 3 Exposures 120 deg. to Each Other for Complete Coverage	Single Wall				Source Side	Opposite Side



DATE 9-23-97 PAGE 1 of 2

CLIENT: APOLLO (LIGO TIL)

LOCATION: SHOP

Radiographic Examination Report

PROCEDURE: #NDE-01 REV: 2

Acceptance Criteria		Film Count		Weld Discontinuity Codes			
<input checked="" type="checkbox"/>	ANSI	5 x 7	<u>8</u>	SL - Slag Lines	DT - Drop Through	CX - Root Convexity	
<input checked="" type="checkbox"/>	ASME <u>B31.3</u>	4 x 10		P - Porosity	SI - Slag Inclusion	CV - Root Concavity	
	API	4 1/2 x 17		T - Tungsten Inclusion	BT - Burn Through	OX - Oxidation	
	AWS	7 x 17		IF - Incomplete Fusion	UC - Undercut	MM - Mismatch	
	OTHER	14 x 17		IP - Incomplete Penetration	C - Crack	HB - Hollow Bead	
AREA	COMMENTS	ACC	REJ	AREA	COMMENTS	ACC	REJ
	<u>4" VA-438-1B1 WELDER Z-32</u>						
	<u>W#1</u>						
<u>0-1</u>		X					
<u>1-2</u>		X					
<u>2-3</u>		X					
<u>3-0</u>		X					
	<u>4" VA-472-1B1 WELDER Z-46</u>						
	<u>W#6</u>						
<u>0-1</u>		X					
<u>1-2</u>		X					
<u>2-3</u>		X					
<u>3-0</u>		X					

Radiographer Tony Martin Level II Interpreter Tony Martin Level II

Customer _____

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIGO III Contractor: Apollo Report No: ~~NA20~~ N/A

Drawing or Specification: Spec V-049-2-029 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested: General welding surveillance at Kennecott fab. Shop

Inspection or Test Description: SMAW using E7018 electrodes as per WPS AWS-SMA-01. Welders Z-32 (Loftus) & Z-46 (Phillips)

Results: Welds are excellent quality & meet or exceed minimum acceptance standards given in AWS D1.1 Section 8.

Deficiencies: None

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: W. T. Meloy Date: 9/9/07

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: <i>LIGO III</i>	Contractor: <i>APOLLO</i>	Report No: <i>N/A</i>
Drawing or Specification: <i>V-049-2-21</i>	Test Equipment Used (Incl ID): <i>N/A</i>	
Item Inspected or Tested: <i>General observation/surveillance of piping supports</i>		
Inspection or Test Description: <i>Welding @ Kennewick Shop: SMAW using E7018 electrodes</i>		
Results: <i>Satisfactory - welders are using approved methods & procedures</i>		
Deficiencies: <i>- None -</i>		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: <i>John T. McHenry</i>	Date: <i>9/10/97</i>	

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LIGO III

Contractor:

Apollo

Report No:

N/A

Drawing or Specification:

V-049-2-021

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

General observation/surveillance of pipe
support welding @ Kennewick Shop.

Inspection or Test Description:

Visual observation

Results:

Satisfactory - welders are using approved
methods & procedures. Note: Per Gene Kincaid, PSE,
support weld acceptance criteria is AWS D1.1, however,
welding may be done under Section II procedures.

Deficiencies:

- none -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the
contract unless noted otherwise. Accept Reject

Inspected by:

John T. W. [Signature]

Date:

9/11/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LLGO III

Contractor:

Apollo

Report No:

N/A

Drawing or Specification:

V-049-2-021

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

- Piping supports -

Inspection or Test Description:

General visual observation of
welding/welds at the kenn. shop.

Results:

Noted excessive reinforcement on some fillet
welds. Advised welders of the criteria for
same & asked for rework of the deficient items.

Deficiencies:

(see above)

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the
contract unless noted otherwise.



Accept



Reject

Inspected by:

TMelay

Date:

9/12/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

L160 III

Contractor:

APOLLO

Report No:

N/A

Drawing or Specification:

1049-2-021

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

Piping Supports

Inspection or Test Description:

General observation of welding/welds at the
Kear-Shop.

Results:

welds/welding is being accomplished
using approved procedures & methods.

Deficiencies:

- None -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise.



Accept



Reject

Inspected by:

John T. McElroy

Date:

9/15/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

L160 III

Contractor:

APOLLO

Report No:

N/A

Drawing or Specification:

Y-049-2-021

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

1) Piping supports & 2) 1B1, GN₂ exhaust piping.
at Kennewick Shop.

Inspection or Test Description:

1) General visual observation & 2) socket weld fit-up
exam.

Results:

- Accept -

- 1) SUPPORT weld quality, methods, & materials ok.
- 2) GN₂ pipe SW fit-up meets ANSI B31.3,
requirements (Spec # 1B1-GN₂-428-1B1 #1)

Deficiencies:

- NONE -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:

Chris. W. Day

Date:

9/16/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LIGO III

Contractor:

APOLLO

Report No:

N/A

Drawing or Specification:

SPEC. V-049-2-029

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

PIPE WELDING @ KENNEDY SHOP.

Inspection or Test Description:

VISUAL OBSERVATION/SURVEILLANCE INCLUDING VISUAL
EXAM OF FULL PEN BUTT WELD ROOT PASSES; COUNTER
BORE OF SCH 40 BW FLANGE TO SCH 10 IS CONFIRMED.

Results:

- SATISFACTORY -

Deficiencies:

- NONE -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise.

Accept

Reject

Inspected by:

John T. Meloy

Date:

9/18/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LIGO III

Contractor:

APOLLO

Report No:

N/A

Drawing or Specification:

SPEC. V-04A-2-029

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

PIPE WELDING AT KENNEDICK SHOP.

Inspection or Test Description:

VISUAL EXAM OF SW FIT-UP (PULL BACK) ON 1 1/2" - G.W. 339-1B1.
FIT-UP & ROOT PASS, AND COVER INSPECTION OF 4" FULL
PEN GTAW WELDS.

Results:

- SATISFACTORY -

Deficiencies:

- NONE -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise.



Accept



Reject

Inspected by:

John T. Maloney

Date:

9/19/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LIGAO III

Contractor:

Apollo

Report No:

N/A

Drawing or Specification:

Spec. V049-2-02a

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

Welding surveillance at Kennecott Shop.

Inspection or Test Description:

GTAW of 1BI N₂ exhaust piping.
general observation including visual exam of
weld fit-up & root passes.

Results:

- Satisfactory -

Deficiencies:

- none -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise.



Accept



Reject

Inspected by:

John T. Meloy

Date:

9/22/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIG0 III Contractor: APOLLO Report No: N/A

Drawing or Specification: Spec. V049-2-029 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested:
G₂ vent piping: system 1B1.

Inspection or Test Description: General observation/surveillance.
Fit-up/Root/Cover pass inspection on lines/grooves
4" VA-372-1B1 & 4" VA-438-1B1. Checked amps & volt
settings for GTAW process (70 & 10 respectively)

Results:
- Satisfactory -

Deficiencies:
- None -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: [Signature] Date: 9/23/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: Libro III Contractor: APOLLO Report No: N/A

Drawing or Specification: SPEC. V049-2-029 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested:
GN2 Vent piping: 9 system 1B1

Inspection or Test Description:
General observation/surveillance: GTAW.
Advised welders of acceptance criteria for RT. For
4 in sch 10 indications can be no greater than 1/32"

Results:
Satisfactory

Deficiencies:
- None -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: Albert Meloy Date: 2/24/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LIGO III

Contractor:

Apollo

Report No:

N/A

Drawing or Specification:

SPEC. VOWA-2-029

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

GN₂ Vent Piping : System 1B1.

Inspection or Test Description:

General observation/surveillance: GTAW.
Includes visual weld exam of selected
components.

Results:

- Satisfactory -

Deficiencies:

- None -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise.



Accept



Reject

Inspected by:

John T. W. Pelroy

Date:

9/25/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIGO III Contractor: Apollo Report No: N/A

Drawing or Specification: Spec. VOYA-2-029 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested: General welding surveillance;
pipe supports

Inspection or Test Description:
Visual observation of support welding;
Carbon-Fe-Carbon. Base metal preheat
within WPS limits.

Results:
- Satisfactory -

Deficiencies:
- None -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: John T. Melony Date: 9/20/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project:

LIGO III

Contractor:

APOLLO

Report No:

N/A

Drawing or Specification:

SPEC. V049-2-029

Test Equipment Used (Incl ID):

N/A

Item Inspected or Tested:

- IBI System p.p.ing -

Inspection or Test Description:

General observation of conditions/environmental factors.

Results:

- Satisfactory -

Deficiencies:

- none -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise.



Accept



Reject

Inspected by:

Jim T. Melroy

Date:

10/1/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: L100 III Contractor: APOLLO Report No: N/A

Drawing or Specification: SPEC. VOLTA-2-029 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested:
"CLEAN SYSTEM" PIPING: INITIAL WELDING. NOTE: PAVE EVERETT, PAI WAS "ON SITE" TO WITNESS SAME.

Inspection or Test Description:
VISUAL OBSERVATION OF FULL PEN FET-UP, ROOT CONDITION, & COVER CONDITION. CLEANLINESS PROVISIONS, INCLUDING CO₂ SPRAY, & HYDROCARBON CONTAMINATION WERE REVIEWED.

Results:
- SATISFACTORY -

Deficiencies:
- NONE -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: [Signature] Date: 10/2/97

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: L160 III Contractor: APOLLO Report No: N/A

Drawing or Specification: VOU2-2-029 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested:
1B1 GN₂ Vents Piping.

Inspection or Test Description: CONFIRMED ACCEPTABILITY OF INTERIOR WELDS ON SHIP ON FLANGES; PERFORMED FIT-UP & COVER PASS EXAM OF SOCKET WELDS.

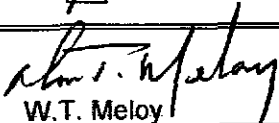
Results: - SATISFACTORY -

Deficiencies: - NONE -

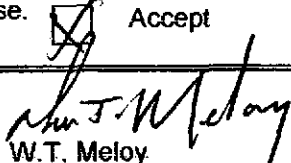
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: [Signature] Date: 10/8/97

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No.: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
1b1 System Piping		
Inspection or Test Description:		
Welding surveillance including: visual observation of 1B1 system (stainless steel) GTAW		
welding, fit-up & root pass inspection of GN2 line full penetration welding, and fit-up of socket		
weld valve including removal of internal seals to protect from welding heat.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Meloy	Date: 13 Oct. 1997	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
1b1 System Piping		
Inspection or Test Description:		
Welding surveillance including: visual observation of 1B1 system (stainless steel) GTAW welding, fit-up & root pass inspection of GN2 line full penetration welding.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Meloy	Date: 14 Oct. 1997	


**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No.: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of 1B1 system (stainless steel) GTAW welding, fit-up & root pass inspection of GN2 line full penetration welding; and observation of flange alignment process.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: <i>W.T. Meloy</i> W.T. Meloy		Date: 15 Oct. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of T-3 system (stainless steel) GTAW welding, fit-up, root pass & cover inspection of full penetration welding; including observation of the 10-second post-weld torch argon purge.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	Date: 16 Oct. 1997	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of T-3 system (stainless steel) GTAW welding root pass surveillance of full penetration welding; including observation of general welding practice.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Meloy	Date: 17 Oct. 1997	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

T-3 System Piping

Inspection or Test Description:

Welding surveillance including: visual observation of T-3 system (stainless steel) GTAW
welding fit-up, root pass, and cover inspection of full penetration welding; observation of
general welding practice.

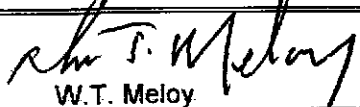
Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:  W.T. Meloy	Date: 20 Oct. 1997
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of T-3 system (stainless steel) GTAW welding root pass, and cover inspection of full penetration welding; observation of general welding practice.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy 10/27/97</i>	Date: 21 Oct. 1997

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A	
Item Inspected or Tested: T-3 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of T-5 system (stainless steel) GTAW welding fit-up, root pass, and cover inspection of full penetration welds; observation of general welding practice.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 10/22/97	Date: 22 Oct. 1997

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: VD49-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of T-3 system (stainless steel) GTAW welding cover inspection of conflat flange (at pipe interior) welds; observation of general welding practice.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	Date: 23 Oct. 1997	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 System Piping		
Inspection or Test Description: Welding surveillance including: visual observation of T-3 system (stainless steel) GTAW welding fit-up, root, and cover inspection of full penetration welds; observation of general welding practice.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: <i>W.T. Meloy</i> W.T. Meloy		Date: 24 Oct. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

1B1 System Piping

Inspection or Test Description:

Welding surveillance including: visual observation of 1B1 system (stainless steel) GTAW
welding fit-up, and cover inspection of socket welds; observation of general welding practice.
(Welding at site fabrication area)

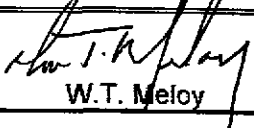
Results:

- Satisfactory -

Deficiencies:

- None -

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:  W.T. Mejoy	Date: 27 Oct. 1997
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

1B1 System Piping

Inspection or Test Description:

Welding surveillance including: visual observation of 1B1 system (stainless steel) GTAW welding fit-up & general welding practice. Advised welders of 50 degree minimum preheat for stainless steel welding.

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: <i>W. J. Meloy</i> W. J. Meloy	Date: 28 Oct. 1997
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item inspected or Tested:

Piping fabrication

Inspection or Test Description:

Welding surveillance including: general visual observation of stainless steel GTAW welding.

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: <i>W.T. Meloy</i> W.T. Meloy	Date: 29 Oct. 1997
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

T-5 Piping fabrication

Inspection or Test Description:

Welding surveillance including visual observation of stainless steel GTAW welding as follows:
general handling practice, CO2 spray, and preheat. Preheat is accomplished using a hot air gun.

Results:

-- Satisfactory --

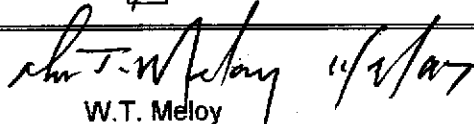
Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: <i>W.T. Meloy</i> W.T. Meloy	Date: 30 Oct. 1997
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-5 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: Final inspection of conflat flange interior weld.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 11/2/97	Date: 3 Nov. 1997

APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIGO Equip Set Contractor: Apollo Report No: N/A

Drawing or Specification: V049-2-021 Test Equipment Used (Incl ID): N/A

Item Inspected or Tested:
T-5 Piping fabrication

Inspection or Test Description:
Welding surveillance including visual observation of stainless steel GTAW welding as follows:
Fit-up, root, and cover inspection of full penetration weld, CO2 prep of filler and base metal, and preheat.

Results:
-- Satisfactory --

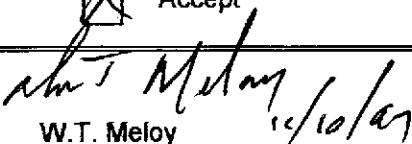
Deficiencies:
-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: *W.T. Meloy* 11/4/97 Date: 4 Nov. 1997
W.T. Meloy

L

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: fit-up and cover pass examination of SS socket weld fitting.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 12/10/97	Date: 10 Nov. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
1B1 Piping fabrication		
Inspection or Test Description:		
Welding surveillance including visual observation of stainless steel GTAW welding as follows:		
fit-up and root pass examination of thread-O-let fitting.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy</i> 11/11/97	Date: 11 Nov. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project:
LIGO Equip Set

Contractor:
Apollo

Report No:
N/A

Drawing or Specification:
V049-2-021

Test Equipment Used (Incl ID):
N/A

Item Inspected or Tested:

1B1 Piping fabrication

Inspection or Test Description:

Welding surveillance including visual observation of stainless steel GTAW welding as follows:
fit-up examination, confirmation of minimum required preheat.

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:


W.T. Meloy

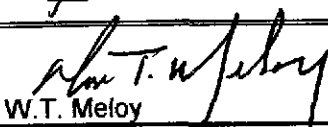
Date:

13 Nov. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (incl ID): N/A
Item Inspected or Tested: T-5 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: fit-up, root, and cover examination of full pen weld, confirmation of CO2 precleaning.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy <i>[Signature]</i> 11/18/97		Date: 18 Nov. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of welding including fit-up & cover pass visual weld exam.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy 		Date: 21 Nov. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

1B1 Piping fabrication

Inspection or Test Description:

Welding surveillance including visual observation of stainless steel GTAW welding as follows:
observation of welding including fit-up & cover pass visual weld exam of socket welds.

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:  W.T. Meloy	Date: 24 Nov. 1997
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APOLLO
GENERAL INSPECTION/TEST REPORT

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
1B1 Piping fabrication		
Inspection or Test Description:		
Welding surveillance including visual observation of stainless steel GTAW welding as follows:		
general observation of on-site 1B1 system welding (socket weld).		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy</i> 12/3/97	Date: 3 Dec. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No.: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: general observation of on-site 1B1 system welding (socket weld). Welder Z-4 1 st on site.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 12/4/97	Date: 4 Dec. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No.: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of on-site welding general practice including preheat, material handling, & tooling.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy 12/18/97		Date: 15 Dec. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of on-site welding including conflat flange fit-up & final visual exam of interior weld.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy</i> 12/16/97	Date: 16 Dec. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A	
Item Inspected or Tested: T-3 Piping fabrication		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of on-site welding general practice including material contamination control.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy 12/19/97</i>	Date: 17 Dec. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A	
Item Inspected or Tested:		
T-3 Piping fabrication		
Inspection or Test Description:		
Welding surveillance including visual observation of stainless steel GTAW welding as follows:		
observation of on-site welding including root pass & cover pass visual weld exam. & carbon to stainless		
contamination control.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	12/18/97	Date: 18 Dec. 1997

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
T-5 Piping fabrication		
Inspection or Test Description:		
Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of welding including root & cover pass visual weld exam.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy 1/7/98</i>	Date: 5 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
T-3 Piping fabrication		
Inspection or Test Description:		
Welding surveillance including visual observation of stainless steel GTAW welding as follows:		
observation of welding including root & cover pass visual weld exam.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy</i> 1/7/98	Date: 7 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T5 System piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: purge, fit-up, & cover pass final visual. WPS-P8-004.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: <i>W.T. Meloy 2/2/98</i> W.T. Meloy		Date: 13 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
T3 System Annulus piping fabrication		
Inspection or Test Description:		
Welding surveillance including observation of stainless steel GTAW welding as follows:		
final visual conflat flange (interior), use of carbide tooling.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meley	<i>W.T. Meley</i> 2/2/98	Date: 14 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
General piping fabrication		
Inspection or Test Description:		
Welding surveillance including general observation of stainless steel GTAW welding as follows:		
general practice, SS isolation, & handling.		
Results:		
-- Satisfactory --		
Deficiencies:		
-- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy 1/2/98</i>	Date: 15 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set

Contractor: Apollo

Report No: N/A

Drawing or Specification: V049-2-021

Test Equipment Used (Incl ID):
N/A

Item Inspected or Tested:

T3 Piping fabrication, annulus tubing

Inspection or Test Description:

Welding surveillance including visual observation of stainless steel GTAW welding as follows:
observation of welding including fit-up, & final visual, full pen manual welding. Welder Loftus
(WPS-P8-004)

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

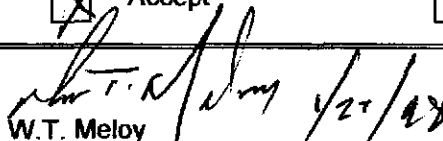
Inspected by: *W.T. Meloy* 1/21/98
W.T. Meloy

Date: 21 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested:		
T3 Piping fabrication		
Inspection or Test Description:		
Welding surveillance including visual observation of stainless steel GTAW welding as follows:		
observation of welding including fit-up for automatic SS full pen welding. Welder Loftus		
Results:		
- Satisfactory -		
Deficiencies:		
- None -		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy</i>	Date: 22 Jan. 98


**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 Piping fabrication - Right Mid Station		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of welding including fit-up, and final weld exam. Welder Loftus		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 1/27/98	Date: 26 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 Piping fabrication, annulus tubing		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of welding including preheat, & fit-up. Welder Kauer, WPS-P8-004		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy <i>W.T. Meloy 2/2/98</i>	Date: 28 Jan. 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T5 piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, and cover pass inspection. Welds made using WPS-P8-004; Welder Williams		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Meloy	Date: 13 March 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set

Contractor: Apollo

Report No: N/A

Drawing or Specification: V049-2-021

Test Equipment Used (Incl ID):
N/A

Item Inspected or Tested:

"1B1" piping fabrication - Welder was fabricating exhaust stacks for the Corner Station Mechanical Room vacuum pumps.

Inspection or Test Description:

Welding surveillance including observation of stainless steel GTAW welding as follows:
root, and cover pass inspection. Welds made using WPS-P8-004; Welder Kauer

Results:

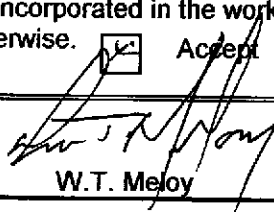
-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

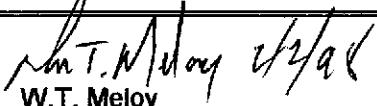
Inspected by:


W.T. Meloy

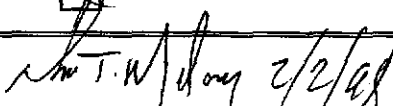
Date:

13 March 98

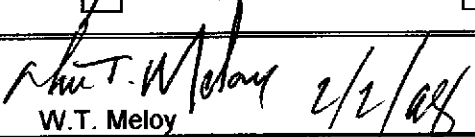
**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 Piping fabrication, annulus tubing		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of welding including fit-up, & final visual. Welder Loftus, WPS-P8-004		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy		Date: 29 Jan. 98

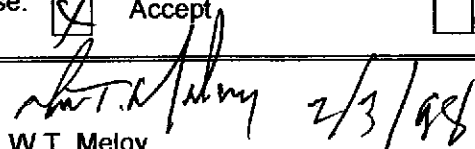
**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 Piping fabrication, annulus tubing		
Inspection or Test Description: Welding surveillance including visual observation of stainless steel GTAW welding as follows: observation of welding including fit-up, & final visual. Welder Loftus, WPS-P8-004		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 2/2/98	Date: 30 Jan. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A	
Item Inspected or Tested: 1B1 System piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: preheat & root pass final visual. WPS-P8-004. Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 2/2/98	Date: 2 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 System Annulus tubing fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, & joint prep including CO2 treatment. WPS-P8-007. Welder Loftus.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 2/3/98	Date: 3 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 System piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, root, & cover visual exam. WPS-P8-004. Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy <i>W.T. Meloy 2/4/98</i>		Date: 4 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

T3 System piping fabrication

Inspection or Test Description:

Welding surveillance including observation of stainless steel GTAW welding as follows:
fit-up, root, & cover visual exam. WPS-P8-004. Welder Kauer Line 4"-PV-301-T3 for Right Mid.

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by: <i>W.T. Meloy</i> W.T. Meloy	Date: 5 Feb. 98
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
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Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
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Item Inspected or Tested:

T3 Piping fabrication

Inspection or Test Description:

Welding surveillance including observation of stainless steel GTAW welding as follows:

fit-up, root & cover final visual exam WPS-P8-004; joint prep (CO2) and filler metal. Welder Kauer

Results:

-- Satisfactory --

Deficiencies:

-- None --

All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:  W.T. Meloy	Date: 6 Feb. 98
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**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No.: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T5 System piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: conflat final visual exam (interior). WPS-P8-004. Welder Kauer, line for Right Mid.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy <i>W.T. Meloy 2/9/98</i>		Date: 9 Feb. 98


**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T5 System piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: root & cover final visual exam; WPS-P8-004; Welder Kauer; Line 4"-CA-105-T5 Spool #6.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy <i>W.T. Meloy 2/11/98</i>		Date: 11 Feb. 98

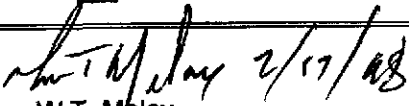
**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 & T5 Piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up & cover final visual exam WPS-P8-004, & final visual WPS-P8-007; Welders Kauer & Loftus respectively.		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	<i>W.T. Meloy</i> 2/12/98	Date: 12 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 LN2 Piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, & cover final visual exam WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Meloy		Date: 16 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No.: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: 1B1 Vent Piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: cover final visual exam WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 2/17/98	Date: 17 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 System Piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, root, & cover final visual exam WPS-P8-004; Welder Williams		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	 2/18/98	Date: 18 Feb. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A	
Item Inspected or Tested: Annulus tubing fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, & cover final visual exam WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	Date: 19 Feb. 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: Annulus tubing fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, & cover final visual exam WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	Date: 25 Feb. 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
----------------------------	-----------------------	-------------------

Drawing or Specification: V049-2-021	Test Equipment Used (Incl ID): N/A
---	---------------------------------------

Item Inspected or Tested:

Annulus Tubing fabrication

Inspection or Test Description:

Welding surveillance including observation of stainless steel GTAW welding as follows:
fit-up, and cover pass inspections for WPS-P8-004; Welder Kauer


Results:

-- Satisfactory --

Deficiencies:

-- None --

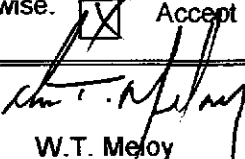
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:  W.T. Meloy	Date: 26 Feb. 98
--	---------------------

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-5 Piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: general procedure/process for WPS-P8-004; Welder Kauer		
Results: - Satisfactory -		
Deficiencies: - None -		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	Date: 27 Feb. 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T-3 Piping fabrication: 6" PV-102-T3 Spool #8 and Spool #11		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, root and cover pass inspections for WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Mejoy		Date: 3 Mar. 98

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: Annulus Tubing fabrication, miter groove weld		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, and cover pass inspections for WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Melby	Date: 3 March 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 / T5 piping fabrication: conflat flange		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, and cover pass inspections for WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: <i>W.T. Melo</i> W.T. Melo	Date: 5 March 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A

Item Inspected or Tested:

T5 piping fabrication

Inspection or Test Description:

Welding surveillance including observation of stainless steel GTAW welding as follows:
cover pass inspection. Welds made using WPS-P8-004; Welder Kauer

Results:

-- Satisfactory --

Deficiencies:

-- None --

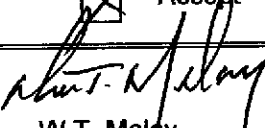
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. Accept Reject

Inspected by:  W.T. Meloy	Date: 10 March 98
---	-----------------------------

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T3 piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: root, and cover pass inspection. Welds made using WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by: W.T. Meloy	Date: 11 March 98	

**APOLLO
GENERAL INSPECTION/TEST REPORT**

Project: LIGO Equip Set	Contractor: Apollo	Report No: N/A
Drawing or Specification: V049-2-021		Test Equipment Used (Incl ID): N/A
Item Inspected or Tested: T5 piping fabrication		
Inspection or Test Description: Welding surveillance including observation of stainless steel GTAW welding as follows: fit-up, root, and cover pass inspection. Welds made using WPS-P8-004; Welder Kauer		
Results: -- Satisfactory --		
Deficiencies: -- None --		
All of the items tested or incorporated in the work are in compliance with the terms and conditions of the contract unless noted otherwise. <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject		
Inspected by:  W.T. Meley		Date: 12 March 98

**Apollo
Weld Inspection Record**

Project: LIGO Equipment Installation	Drawing: V049-4-A7A
Code: AWS D1.1	Date: 18 Jan. 1998
Welding Procedure: AWS SMA-01	Process: Manual SMAW
Welder Identification: Z-32	Filler Metal: E7018

Extent of Examination:

Final visual weld examination as follows:

1. 100% for modified support legs, Spool Piece # A-7A1. *W.T. Meloy 1/18/98*

Remarks:

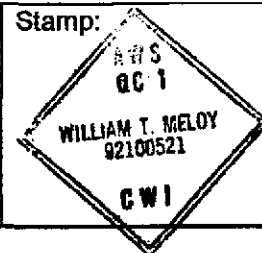
All welds meet acceptance criteria given in AWS D1.1 Section 8 and PSI Procedure

V049-2-128. *W.T. Meloy 1/18/98*


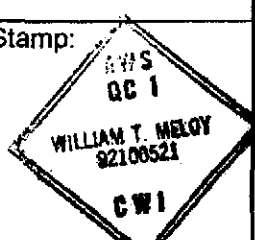
Inspected by:

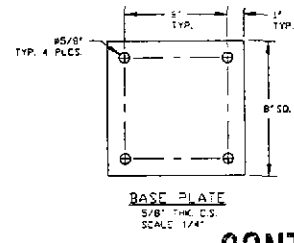
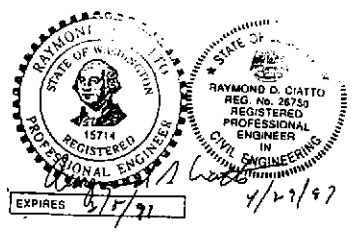
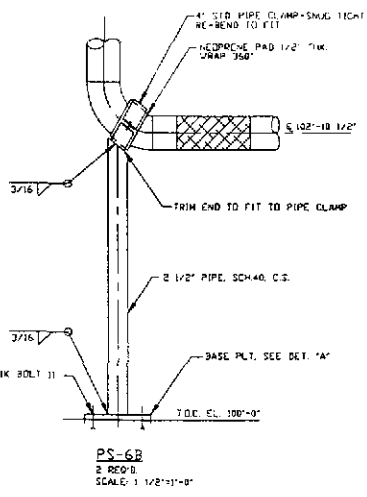
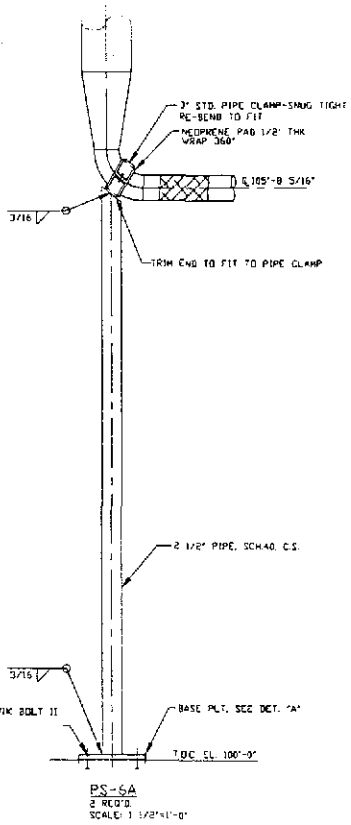
W.T. Meloy 1/18/98
W.T. Meloy

Stamp:



**Apollo
Weld Inspection Record**

Project: LIGO Equipment Installation	Drawing: V049-4-A7A
Code: AWS D1.1	Date: 12 Dec. 1997
Welding Procedure: AWS SMA-01	Process: Manual SMAW
Welder Identification: Z-4	Filler Metal: E7018
Extent of Examination:	
Final visual weld examination as follows:	
1. 100% for modified support legs, Spool Piece # WA-7B1 at Left Mid Station.	
Remarks:	
All welds meet acceptance criteria given in AWS D1.1 Section 8 and PSI Procedure	
V049-2-128.	
Inspected by:	<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;">  W.T. Meloy </div> <div style="text-align: center;"> 12/12/97 </div> </div>
Stamp:	
	

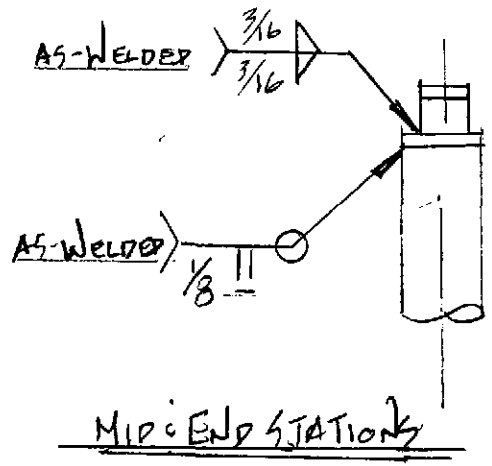
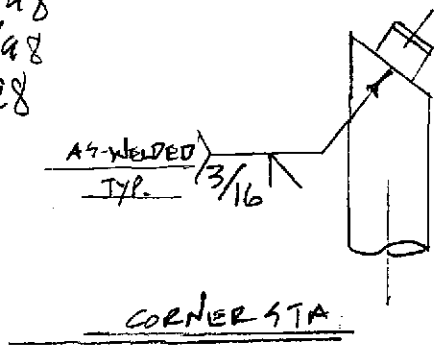


CONTROLLED-COPY

NOTES:
1) MATERIAL & FABRICATION BY FIELD CONTRACTOR
2) PAINT PER PSI SPEC V049-B-139

SYMBOL	DESCRIPTION	UNLESS OTHERWISE SPECIFIED	ISSUE DESCRIPTION	DATE	BY	CHKD	BRNCH	DATE	REV
V049-4-01A	PIPING G.A. CORNER STATION								
V049-4-02	SPEC FOR INSTALLATION	DO NOT SCALE THIS DWG.	RELEASED FOR CONSTRUCTION	1/28/97	ROL				
DWG. NO.	DESCRIPTION	USED ON	REV	DESCRIPTION	DATE	BY	CHKD	BRNCH	DATE
	REFERENCE DRAWINGS	NEXT ASST.							

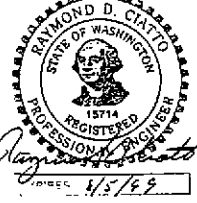
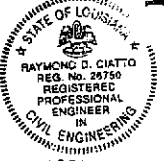
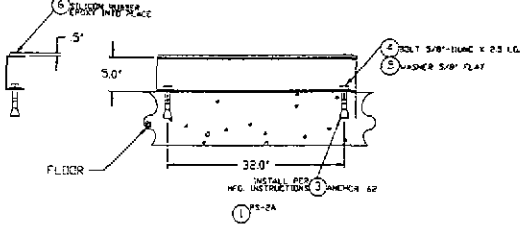
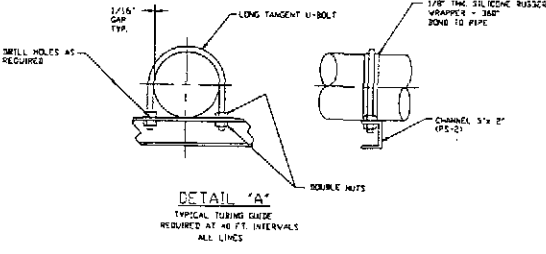
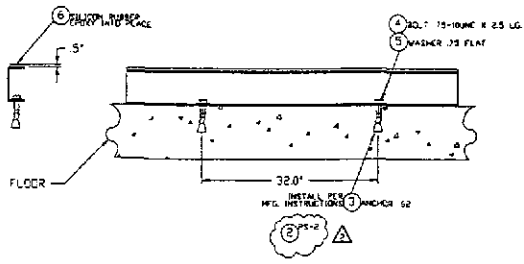
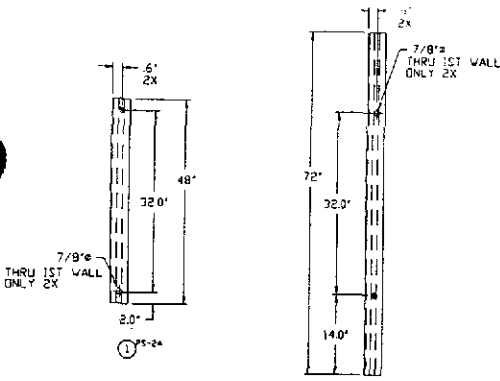
CORNER STATION 4 EA 3/3/98
 R. MID STATION 1 EA 3/3/98
 R. END STATION 1 EA 3/3/98



MID & END STATIONS

CONTROLLED-COPY

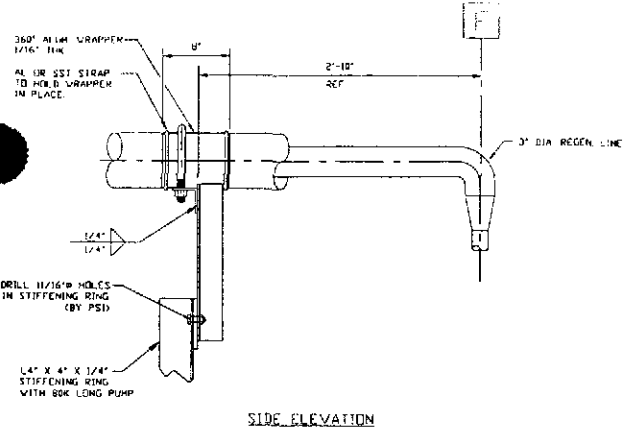
ITEM	PART NUMBER	QTY	UNIT	DESCRIPTION
1	PS-2A	7	4 FT	5" X 2" X 18" THK SHARP CORNER CHANNEL AL 6063-T52
2	PS-2	3	6 FT	5" X 2" 18" THK SHARP CORNER CHANNEL AL 6063-T52
3		3	AR	ANCHOR BOLT 1/2" X 3" LG. C.S. NICKEL PLT.
4		3	AR	BOLT 3/8" X 3" LG. C.S. NICKEL PLT.
5		3	AR	WASHER, 3/8" FLAT 304 S.S.T.
6		3	AR	RUBBER, SILICON 5" X 2" X 36" & 60" LG.
7		3	AR	EPOXY



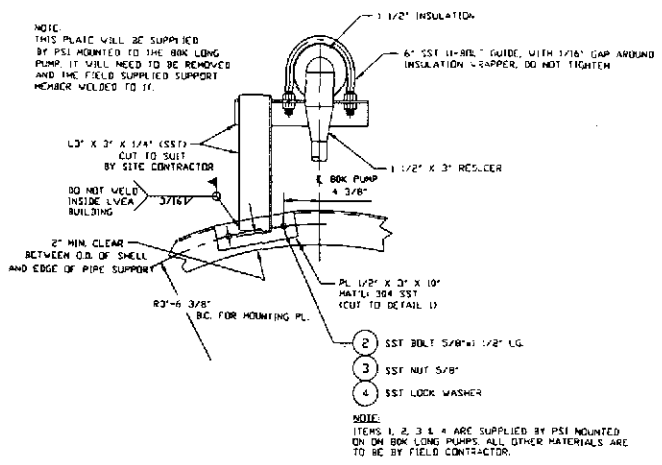
Raymond D. Clatto
DEC 4/5/99

NO.	DESCRIPTION	DATE	BY	CHKD	DATE	SCALE	SHEET	TOTAL
1	ISSUES FOR FABRICATION							
2	ISSUES FOR RELEASE / FOR UPDATE							
3	ISSUES FOR FOR							
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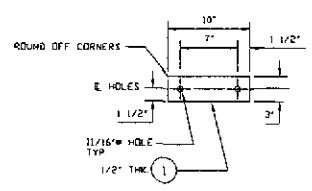
PROCESS SYSTEMS INTERNATIONAL, INC.
 PS-2 PIPE SUPPORT
 6' X 5' SPAN
 LIQD VACUUM EQUIPMENT
 V049-4-073
 SCALE: AS NOTED
 SHEET: 1 OF 1



SIDE ELEVATION



ELEV. LOOKING TOWARD VERTEX

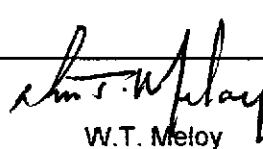
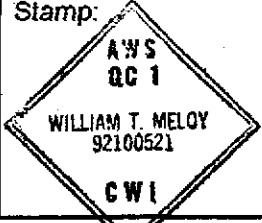


PS-5 PLATE
DETAIL '1'
P/N V04940701
MATERIAL 304 SST

CONTROLLED-COPY

REVISIONS AND DESCRIPTIONS REVISION 1: PS-5 PLATE DETAIL '1' P/N V04940701 MATERIAL 304 SST		ISSUE APPROVALS PROJECT: PS-5 PLATE DETAIL '1' P/N V04940701 MATERIAL 304 SST		PROCESS SYSTEMS INTERNATIONAL, INC. 1625 15 th ST. S.W. VANCOUVER, BC V6P 4R2, CANADA	
WORK IN PROGRESS DATE: 04/18/93 BY: [Signature]	WORK IN PROGRESS DATE: 04/18/93 BY: [Signature]	WORK IN PROGRESS DATE: 04/18/93 BY: [Signature]	WORK IN PROGRESS DATE: 04/18/93 BY: [Signature]	WORK IN PROGRESS DATE: 04/18/93 BY: [Signature]	PS-5 PIPE SUPPORT DETAIL BOX 15 CRYOPUMP CORNER STAT LIQD VACUUM EQUIPMENT CONTROL SHEET NO. V049-4-076 SHEET 1 OF 1

**Apollo
Weld Inspection Record**

Project: LIGO Equipment Installation	Drawing: RFC V049-072
Code: AWS D1.1	Date: 17 Oct. 1997
Welding Procedure: AWS SMA-01	Process: Manual SMAW
Welder Identification: Z-32	Filler Metal: E7018
Extent of Examination:	
Visual examination 100% for shear bars welded to base plate bottoms for components	
listed below; welded per details shown on RFC Sketch V049-073 Rev. 1:	
V049-4-B2A, & V049-4-B2B	
V049-4-B3A	
V049-4-B5A	
V049-4-B6	
V049-4-B7	
V049-4-B9	
Remarks:	
All welds meet acceptance criteria given in AWS D1.1 Section 8 and PSI Procedure	
V049-2-128. Includes inspections done 10/16/97 and 10/17/97.	
Inspected by:	<div style="text-align: center;">  W.T. MeLOY </div>
Stamp:	
	

**Apollo
Weld Inspection Record**

Project: LIGO Equipment Installation	Drawing: RFC V049-072
Code: AWS D1.1	Date: 13 Oct. 1997
Welding Procedure: AWS SMA-01	Process: Manual SMAW
Welder Identification: Z-10, Z-32	Filler Metal: E7018

Extent of Examination:

Visual examination 100% for shear bars welded to base plate bottoms for BSC8
S/N 08, and BSC7 S/N 05: Welded per details shown on RFC Sketch V049-072

Remarks:

All welds meet acceptance criteria given in AWS D1.1 Section 8 and PSI Procedure
V049-2-128.

Inspected by: <i>William T. Meloy</i> W.T. Meloy	Stamp:

REQUEST FOR CHANGE

Name of component affected: WB-6 & WB-7
 WB-2A, 2B, 3A, & 5A, and WB-9A, & 9B
 Drawing Number: See below
 See below

Project Name: LIGO
 PSI Project Number: V59Q49
 CAD File Number:
 Date Prepared: 10/6/97

Prepared By: R. D. Ciatto

Detailed description of change and reason for making same: For base plates connected to diagonal members of the above components, add shear bars as shown below. Drawings affected are:

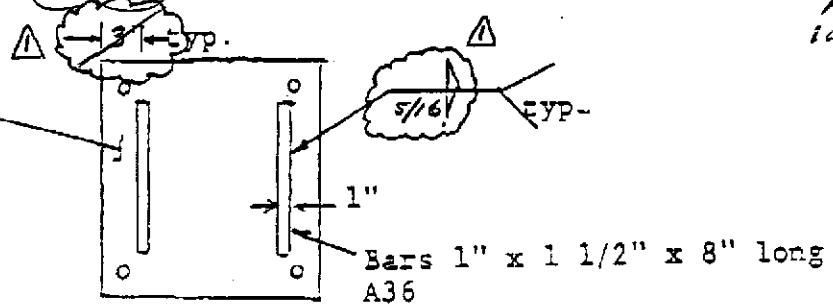
V049-4-B2A	R4	Sh. 5	Det. 15.
V049-4-B2B	R5	Sh. 5	Det. 15.
V049-4-B3A	R4	Sh. 5	Det. 15.
V049-4-B5A	R4	Sh. 5	Det. 15.
V049-4-B6	R6	Sh. 2	Det. 9.
V049-4-B7	R5	Sh. 2	Det. 9.
V049-4-B9	R4	Sh. 4	Det. 8.

OCT 14 1997
 APOLLO SHEET METAL, INC

14

(REVISED BY FIELD OFFICE VERBAK TO ALLOW ROOM FOR WASHER)
 Beam Centerline
 10/16/97

Underside of Base Plate



Note: 2 base plates per component are affected.

Reason: Floor at WA corner station is more than 1" lower than planned. Bars relieve bolt bending due to higher grout pad.

DISPOSITION - PROJECT MANAGER	ROUTE	DISTRIBUTION/SIGN-OFF
<input type="checkbox"/> IMMEDIATE DRAWING CHANGE	<input type="checkbox"/> Quality Assurance	Date _____
<input type="checkbox"/> IMMEDIATE BOM CHANGE	<input type="checkbox"/> Manufacturing	Date _____
<input type="checkbox"/> HOLD FOR AS BUILT CHANGE	<input type="checkbox"/> Electrical	Date _____
<input checked="" type="checkbox"/> HOLD FOR ACCUMULATION CHANGE	<input checked="" type="checkbox"/> Civil/Structural <i>R. D. Ciatto</i>	Date <i>9/14/97</i>
<input type="checkbox"/> NOT APPROVED (STATE REASON)	<input type="checkbox"/> Mechanical	Date _____
	<input type="checkbox"/> Process	Date _____
	<input checked="" type="checkbox"/> Project R. Curtis <i>R.C.C.</i>	Date <i>10/14/97</i>
	<input type="checkbox"/> EMS	Date _____

BY: _____ Date *10/14/97*

ASME CODED EQUIPMENT YES NO
 AI/ANI: _____ DATE: _____

RFC NUMBER: V049-073 Rev. 1
 DATE: 10/14/97 Sheet 1 of 1

nucor steel

MILL TEST REPORT NO.

07475

A Division of Nucor Corporation
PLYMOUTH, UTAH
UNITED STATES OF AMERICA

the Road

TOTAL P. 01

SOLD TO: PACIFIC STEEL
925 NORTH OREGON AVENUE
P O BOX 3095
PASCO, WA 99301

SHIP TO: PACIFIC IRON & STEEL
925 NORTH OREGON AVENUE
PASCO, WA 99301

INVOICE NUMBER: 31560
CUSTOMER P.O.: 33-60035
BILL OF LADING: 20133
SHIP DATE: 10/18/94

Item Description	Heat#	Yield	Tensile	Elong	C	Mn	P	S	SI
Grade		P.S.I.	P.S.I.	% IN"					
X 3 1/2 FLAT BAR ASTM A36-93a	233285	45,000	59,000	29.0	.16	.66	.007	.032	.19
		44,667	67,333	27.0					

509 545 0697 P. 01

PACIFIC STEEL PASCO

OCT-24-1997 12:12

Baltazar Rizzo

PLANT METALLURGIS QUALITY ASSURANCE MANAGER

NSU-39 R 034

ALL MELTING AND MANUFACTURING PROCESSES
PERFORMED IN THE UNITED STATES OF AMERICA.

REQUEST FOR CHANGE

Name of component affected: WBSC7 & WBSC8

Project Name: LIGO

Drawing Number: V049-4-023

PSI Project Number: V59049

Rev: 4

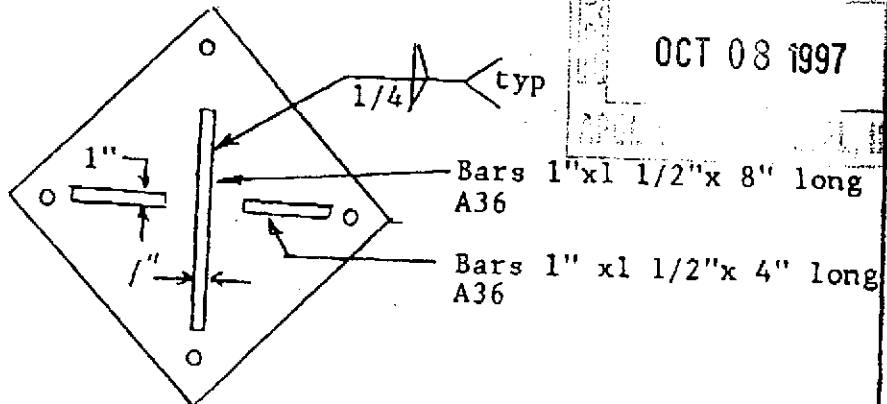
CAD File Number:

Prepared By: R. D. Diatto

Date Prepared: 10/6/97

Detailed description of change and reason for making same:

Add shear bars to bottom of each base plate for the above components as shown below.



Reason: Floor at WA corner station is more than 1" lower than planned. Shear bars are required to relieve high bolt bending due to higher grout pad.

See Calc. V049-1-160

DISPOSITION - PROJECT MANAGER	ROUTE DISTRIBUTION/SIGN-OFF																
<input type="checkbox"/> IMMEDIATE DRAWING CHANGE <input type="checkbox"/> IMMEDIATE BOM CHANGE <input type="checkbox"/> HOLD FOR AS BUILT CHANGE <input checked="" type="checkbox"/> HOLD FOR ACCUMULATION CHANGE <input type="checkbox"/> NOT APPROVED (STATE REASON)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td><input type="checkbox"/> Quality Assurance</td> <td>Date</td> </tr> <tr> <td><input type="checkbox"/> Manufacturing</td> <td>Date</td> </tr> <tr> <td><input type="checkbox"/> Electrical</td> <td>Date</td> </tr> <tr> <td><input checked="" type="checkbox"/> Civil/Structural <i>R. D. Diatto</i></td> <td>Date <i>10/6/97</i></td> </tr> <tr> <td><input type="checkbox"/> Mechanical</td> <td>Date</td> </tr> <tr> <td><input type="checkbox"/> Process</td> <td>Date</td> </tr> <tr> <td><input checked="" type="checkbox"/> Project R. Curtis <i>R.E.C.</i></td> <td>Date <i>10/7/97</i></td> </tr> <tr> <td><input type="checkbox"/> EMS</td> <td>Date</td> </tr> </table>	<input type="checkbox"/> Quality Assurance	Date	<input type="checkbox"/> Manufacturing	Date	<input type="checkbox"/> Electrical	Date	<input checked="" type="checkbox"/> Civil/Structural <i>R. D. Diatto</i>	Date <i>10/6/97</i>	<input type="checkbox"/> Mechanical	Date	<input type="checkbox"/> Process	Date	<input checked="" type="checkbox"/> Project R. Curtis <i>R.E.C.</i>	Date <i>10/7/97</i>	<input type="checkbox"/> EMS	Date
<input type="checkbox"/> Quality Assurance	Date																
<input type="checkbox"/> Manufacturing	Date																
<input type="checkbox"/> Electrical	Date																
<input checked="" type="checkbox"/> Civil/Structural <i>R. D. Diatto</i>	Date <i>10/6/97</i>																
<input type="checkbox"/> Mechanical	Date																
<input type="checkbox"/> Process	Date																
<input checked="" type="checkbox"/> Project R. Curtis <i>R.E.C.</i>	Date <i>10/7/97</i>																
<input type="checkbox"/> EMS	Date																
BY: <i>Richard Bayly</i> Date: <i>10/7/97</i> ASME CODED EQUIPMENT <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO AI/ANI: DATE:	RFC NUMBER: V049-072 DATE: <i>10/6/97</i> Sheet 1 of 1																

PROCESS SYSTEMS INTERNATIONAL, INC.

20 Walkup Drive, Westborough, Mass 01581

MATERIAL	HT. NO.	QC	DATE
ASTM A56			

PIECE NUMBER/ID GATE VALVE SUPPORT - 44"

CODE OR STANDARD AWS D1.1

QTY 8 EACH

PER PSI DWG 649-4-033 R1
(ATTACHED)

		WELD FIT-UP	WELD ROOT	WELD COVER	FLANGES	BOLTING	THREADS	GENERAL OR RANDOM LOCAL
NDE	VISUAL INSPECTION	N/A	N/A	<u>✓</u> N/A	N/A	N/A	N/A	N/A
	RADIOGRAPHY	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	ULTRASONIC TEST	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	LEAK TEST	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER	CLEANLINESS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DIMENSIONS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SURFACE PROFILE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TORQUE	N/A	N/A	N/A	N/A	N/A	N/A	N/A

COMPLETED PIECE ACCEPTANCE

W.T. Meloy 10/3/97
(QC) DATE
W.T. Meloy 10/3/97
(QAM) DATE

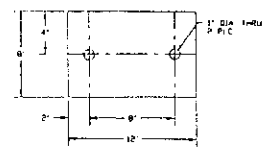
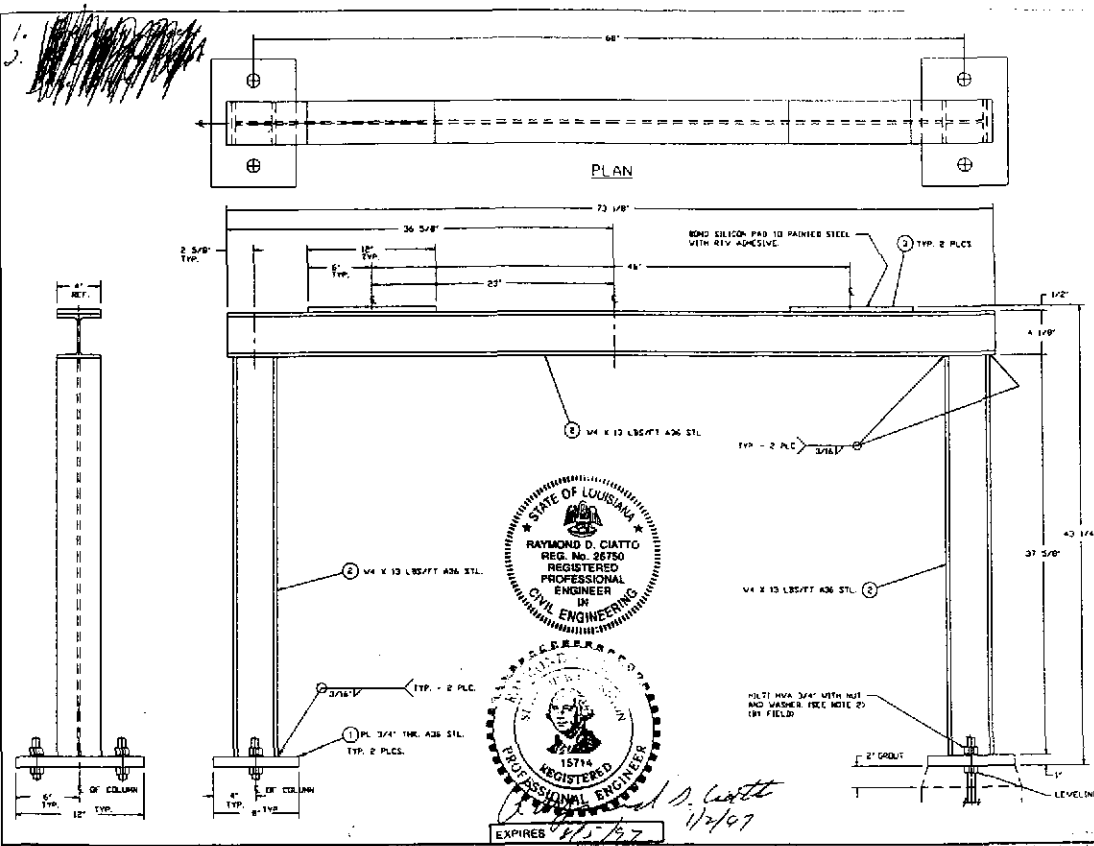


INCLUDES INSPECTIONS
DONE 10/1/97 & 10/2/97

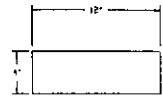
Apollo

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: SIGN OFF SHEET/TRAVELER	Job No.: M-126
Project: LIGO Equipment Set	Scale: None Dwn By:



ITEM 1
MATERIAL: 12" x 12" x 1/2" THK A36 STL. PLATE
QTY: 2 REQ.



ITEM 2
MATERIAL: 12" x 4" x 1/2" THK SILICON PAD
QTY: 2 REQ.

STATE OF LOUISIANA
 RAYMOND D. CIATTO
 REG. NO. 26750
 REGISTERED
 PROFESSIONAL
 ENGINEER
 IN
 CIVIL ENGINEERING

STATE OF LOUISIANA
 RAYMOND D. CIATTO
 REG. NO. 15714
 REGISTERED
 PROFESSIONAL
 ENGINEER

EXPIRES 11/2/97

TOTAL 8-REQUIRED WASHINGTON SITE
 TOTAL 4-REQUIRED LOUISIANA SITE

NOTES:
 1. FABRICATE & PAINT PER SPEC V049-0-129
 2. 25 MIN. DRYING - 6 5/8" 3/4" - INC. A563CP-A

REV. NO.	DESCRIPTION	REV.	DESCRIPTION	DATE	BY	CHKD.	APPV.	DATE	BY	CHKD.	APPV.	DATE	BY	CHKD.	APPV.

PROCESS SYSTEMS INTERNATIONAL, INC.
 44" GATE VALVE
 SUPPORT FRAME
 LIGG VACUUM EQUIPMENT

REV. NO. 0
 DATE 11/2/97
 DRAWN BY V049-4-023
 CHECKED BY
 APPROVED BY

MATERIAL	HT. NO.	QC	DATE
ASTM A56			

PIECE NUMBER/ID GATE VALVE SUPPORT - 44"

CODE OR STANDARD AWS D1.1

QTY 8 EACH

PER PSI DWG V49-4-033 R1
(ATTACHED)

	WELD FIT-UP	WELD ROOT	WELD COVER	FLANGES	BOLTING	THREADS	GENERAL OR RANDOM LOCAL
NDE	VISUAL INSPECTION	N/A	N/A	<i>W</i> N/A	N/A	N/A	N/A
	RADIOGRAPHY	N/A	N/A	N/A	N/A	N/A	N/A
	ULTRASONIC TEST	N/A	N/A	N/A	N/A	N/A	N/A
	LEAK TEST	N/A	N/A	N/A	N/A	N/A	N/A
OTHER	CLEANLINESS	N/A	N/A	N/A	N/A	N/A	N/A
	DIMENSIONS	N/A	N/A	N/A	N/A	N/A	N/A
	SURFACE PROFILE	N/A	N/A	N/A	N/A	N/A	N/A
	TORQUE	N/A	N/A	N/A	N/A	N/A	N/A

COMPLETED PIECE ACCEPTANCE

W.T. Meloy 10/5/97
(QC1) DATE
W.T. Meloy 10/5/97
(QAM) DATE



INCLUDES INSPECTIONS DONE 10/1/97 & 10/2/97

Apollo

1207 W. Columbia Dr. Kennewick, Wa 99336

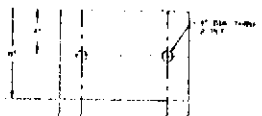
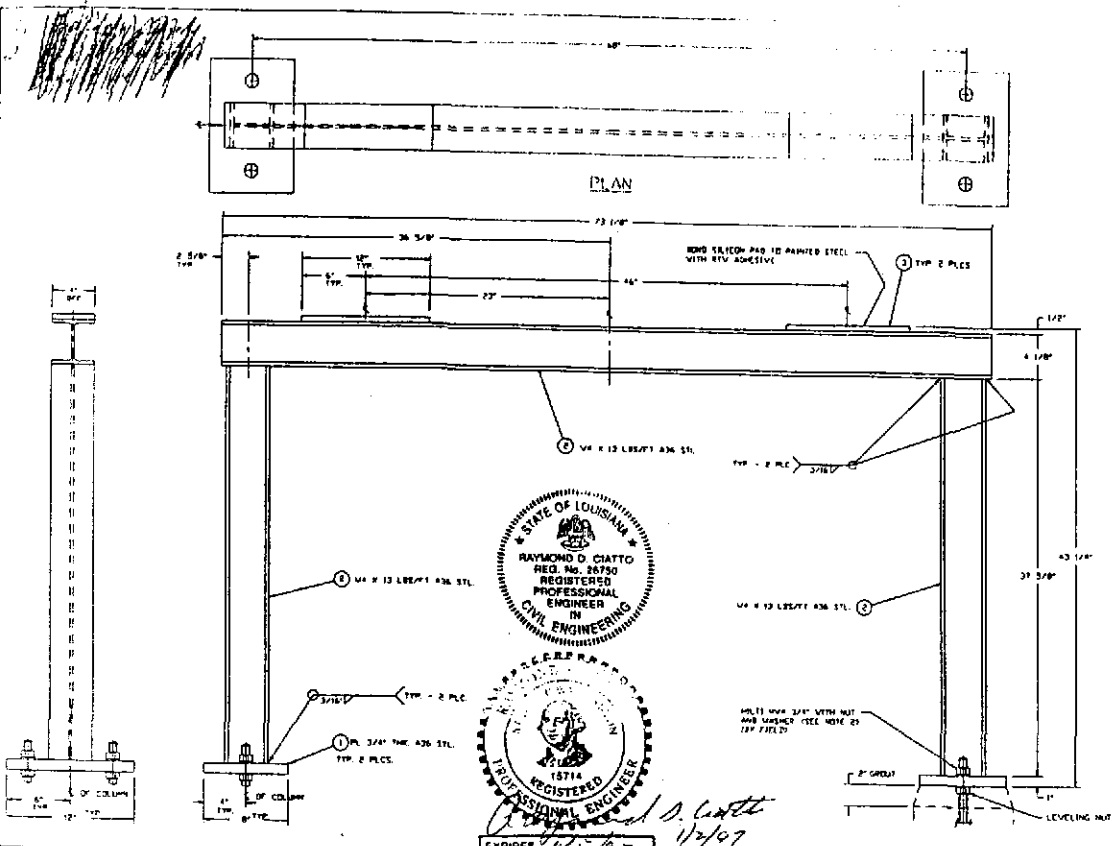
Title: SIGN OFF SHEET/TRAVELER

Job No.: M-126

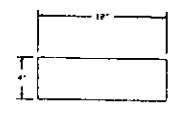
Project: LIGO Equipment Set

Scale: None

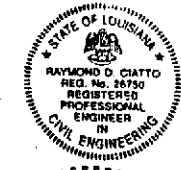
Dwn By:



ITEM 1
 SHELL 17" X 8 1/2" THK A36 STL PLATE
 QTY: 2 REQ'D



ITEM 2
 SHELL 17" X 8 1/2" THK SILICON PAD
 QTY: 2 REQ'D



EXPIRES 12/31/97

TOTAL #-REQUIRED WASHINGTON SITE
 TOTAL #-REQUIRED LOUISIANA SITE

NOTES:
 1) FABRICATE & PAINT PER SPEC V049-2-139
 2) MIN. ELEMENTS - 6 S/60, 3/4" DIA, A36 STEEL

REVISIONS AND COMMENTS 1. REVISED PER COMMENTS FROM CUSTOMER 2. REVISED PER COMMENTS FROM CUSTOMER 3. REVISED PER COMMENTS FROM CUSTOMER				MATERIALS LIST QTY. REQ'D PART NO. DESCRIPTION REFERENCE DRAWING				PROCESS SYSTEMS INTERNATIONAL INC. 447 STATE VALLEY SUPPORT FRAME LIGD VACUUM EQUIPMENT QTY: 2 V049-2-139			
--	--	--	--	---	--	--	--	---	--	--	--

MATERIAL	HT. NO.	QC	DATE
ASTM A36			

PIECE NUMBER/ID GATE VALVE SUPPORT - 48"

CODE OR STANDARD AWG D1.1

QTY 4 EACH

PER PSI DWG VALVE-4-034 R1
(ATTACHED)

		WELD FIT-UP	WELD ROOT	WELD COVER	FLANGES	BOLTING	THREADS	GENERAL OR RANDOM LOCAL
NDE	VISUAL INSPECTION	N/A	N/A	<input checked="" type="checkbox"/>	N/A	N/A	N/A	N/A
	RADIOGRAPHY	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	ULTRASONIC TEST	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	LEAK TEST	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER	CLEANLINESS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DIMENSIONS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SURFACE PROFILE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TORQUE	N/A	N/A	N/A	N/A	N/A	N/A	N/A

COMPLETED PIECE ACCEPTANCE

Wm T Meloy 10/3/97
(QC1) DATE
Wm T Meloy 10/4/97
(QAM) DATE

INCLUDES INSPECTIONS
DONE 10/1/97 & 10/2/97



Apollo

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: SIGN OFF SHEET/TRAVELER

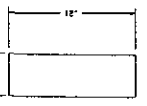
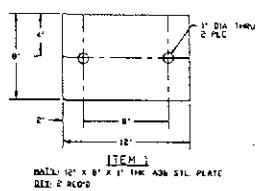
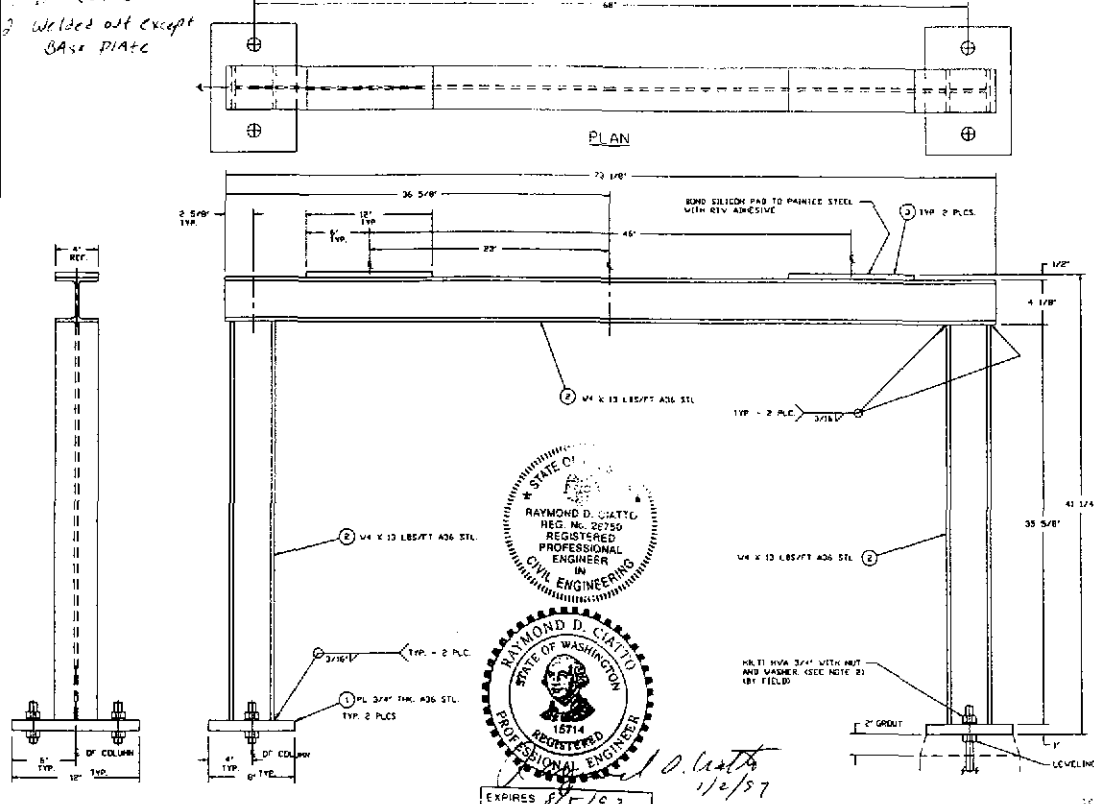
Job No.: M-126

Project: LIGO Equipment Set

Scale: None

Dwn By: *Wm*

1. Use cut steel
2. Welded out except
Base plate



STATE OF
RAYMOND D. GATTG
REG. NO. 26750
REGISTERED
PROFESSIONAL
ENGINEER
IN
CIVIL ENGINEERING

STATE OF WASHINGTON
RAYMOND D. GATTG
REGISTERED
PROFESSIONAL ENGINEER
15714

EXPIRES 8/5/97

R.D. Gattg
1/2/97

NOTES:
1. FABRICATE & PAINT PER SPEC V049-2-129.
2. 1/4\"/>

TOTAL 4-REQUIRED WASHINGTON SITE
TOTAL 2-REQUIRED LOUISIANA SITE

<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				NO.	DESCRIPTION	DATE	BY													<p>DATE: 1/2/97</p> <p>SCALE: AS SHOWN</p> <p>PROJECT: 48\"/> </p>				<p>PROCESS SYSTEMS INTERNATIONAL, INC. 2000 W. 10TH AVENUE, SUITE 100, DENVER, CO 80202</p> <p>48\"/> </p>			
NO.	DESCRIPTION	DATE	BY																								
<p>REV. NO. DESCRIPTION REV. NO. DESCRIPTION</p>				<p>REV. NO. DESCRIPTION REV. NO. DESCRIPTION</p>				<p>REV. NO. DESCRIPTION REV. NO. DESCRIPTION</p>																			

MATERIAL	HT. NO.	QC	DATE
ASTM A36			

PIECE NUMBER/ID SUPPORTS R-4 & 4A

CODE OR STANDARD AWH D1.1

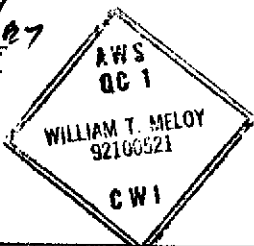
QTY 30 EACH

PER PSI DWG. V049-4-075 R2
(ATTACHED)

	WELD FIT-UP	WELD ROOT	WELD COVER	FLANGES	BOLTING	THREADS	GENERAL DR RANDOM LOCAL
NDE	VISUAL INSPECTION	N/A	N/A	N/A	N/A	N/A	N/A
	RADIOGRAPHY	N/A	N/A	N/A	N/A	N/A	N/A
	ULTRASONIC TEST	N/A	N/A	N/A	N/A	N/A	N/A
	LEAK TEST	N/A	N/A	N/A	N/A	N/A	N/A
OTHER	CLEANLINESS	N/A	N/A	N/A	N/A	N/A	N/A
	DIMENSIONS	N/A	N/A	N/A	N/A	N/A	N/A
	SURFACE PROFILE	N/A	N/A	N/A	N/A	N/A	N/A
	TORQUE	N/A	N/A	N/A	N/A	N/A	N/A

COMPLETED PIECE ACCEPTANCE

W. T. Meloy 10/2/97
(QC) DATE
W. T. Meloy 10/2/97
(QAM) DATE



INCLUDES INSPECTIONS
DONE 10/1/97

Apollo

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: SIGN OFF SHEET/TRAVELER

Job No.: M-126

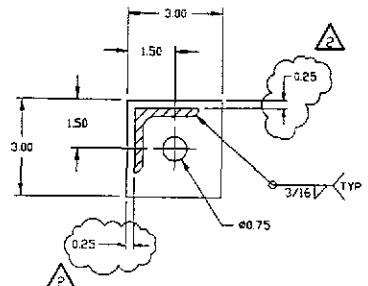
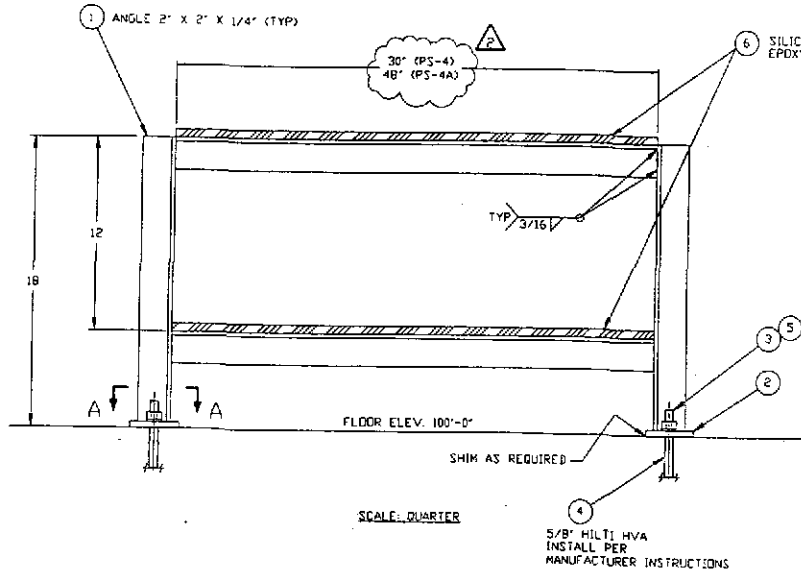
Project: LIGO Equipment Set

Scale: None

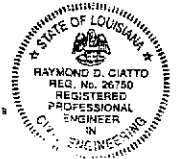
Dwn By: *W. T. Meloy*

2. Welding of all hangers in progress 4/17/59 - PS-4
 3. Waiting on Base plates to complete 13/24/59 - PS-4
 1. Short material 2x2x1/4 L 40" 15 PS-4 complete
 6 PS-4H complete

ITEM	PART NO.	SUFFIX	QTY PS-4	QTY PS-4A	QTY PS-4AUM	DESCRIPTION
1			8	11	FT	ANGLE 2" X 2" X 1/4" A36
2			2	2	EA	PLATE, 3" X 3" X 3/8"
3			2	2	EA	BOLT, 5/8"x3" LG. C.S. NICKEL PLT.
4			2	2	EA	ANCHOR, MULTI HVA 5/8" X 5" LG.
5			2	2	EA	WASHER, FLAT, 3/4" ID
6			5	8	FT	RUBBER, SILICON 1/2" X 2" W



NOTE:
 13 PAINT PER PSI SPEC. V049-2-139.



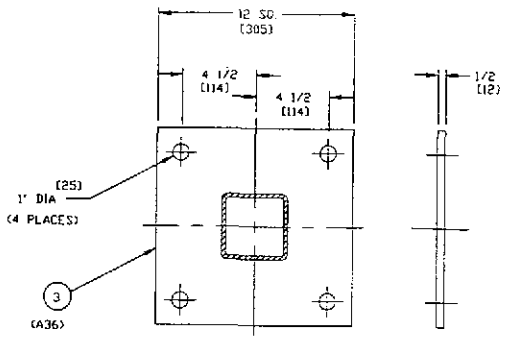
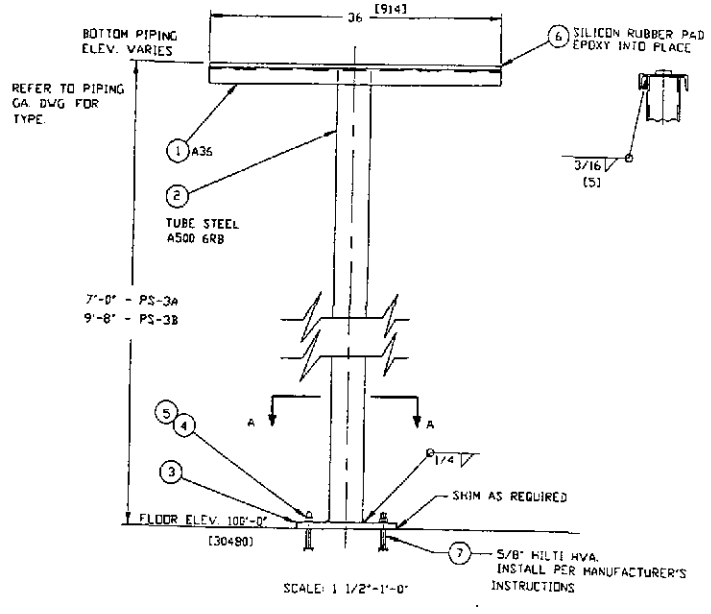
Raymond D. Ciatto
 4/17/59

REV. NO.	DESCRIPTION	DATE	BY	CHKD	APP'D	ISSUE DESCRIPTION
1	ISSUED FOR FABRICATION					
2	ISSUED FOR RELEASE FOR UPGRADE					
3	ISSUED FOR ERECTION					

CONTROLLED-COPY

1. Steel hits been cut 7/4
2. Fabrication completed except base plate

ITEM NO.	QTY	DESCRIPTION
1	1	ANCHOR MULTI HVA 5/8"x 5' LG
2	EA	TUBE, SQ. 1/4"x 4"x 20 FT. LG. A500 GR B
3	EA	PLATE, 1/4"x 12"x 12"
4	EA	BOLT 3/8"x 3" LG. C.S. NICKEL PLT.
5	EA	WASHER, FLAT, 3/4" ID
6	3	FT SILICON PAD 1/2" X 2" X 3 FT LG
7	EA	ANCHOR MULTI HVA 5/8"x 5' LG



SECTION A-A
SCALE: 1/4"
NOTE:
1. PAINT PER PSI SPEC V049-2-139

CONTROLLED-COPY

STATE OF LOUISIANA
RAYMOND D. CIATTO
REG. NO. 26750
REGISTERED PROFESSIONAL ENGINEER
IN CIVIL ENGINEERING

STATE OF WASHINGTON
RAYMOND D. CIATTO
1974 REGISTERED PROFESSIONAL ENGINEER

Raymond D. Ciatto
9/1/89

REV.	DESCRIPTION	DATE	BY	CHKD	APP'D
1	ISSUED FOR RELEASE / PFD UPDATE				
2	ISSUED FOR FOR/SIZE				

NO.	DATE	BY	CHKD	APP'D
1	12/27/96			
2	2/29/96			
3				
4				
5				
6				
7				
8				

NO.	DATE	BY	CHKD	APP'D
1	12/27/96			
2	2/29/96			
3				
4				
5				
6				
7				
8				

PROCESS SYSTEMS INTERNATIONAL INC.
12-26-94

PS-3 11-POST SUPPORT
MECH. ROOM PIPING
LIGG VACUUM EQUIPMENT

SCALE AS NOTED SHEET 1 OF 1

MATERIAL	HT. NO.	QC	DATE
A5Tm A36			
A5Tm A500			

PIECE NUMBER/ID SUPPORT 95-1, 44 each

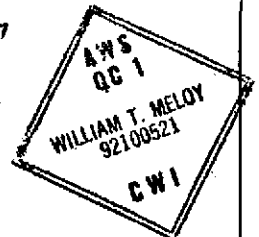
CODE OR STANDARD AWS D1.1

		WELD FIT-UP	WELD ROOT	WELD COVER	FLANGES	BOLTING	THREADS	GENERAL OR RANDOM LOCAL
NDE	VISUAL INSPECTION	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RADIOGRAPHY	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	ULTRASONIC TEST	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	LEAK TEST	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER	CLEANLINESS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DIMENSIONS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SURFACE PROFILE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TORQUE	N/A	N/A	N/A	N/A	N/A	N/A	N/A

COMPLETED PIECE ACCEPTANCE

W. T. Meloy 10/2/97
(QC) DATE

W. T. Meloy 10/2/97
(QAM) DATE



PETZ PSI DRAWING V04A-4-072 R.1
(ATTACHED)

Apollo

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: SIGN OFF SHEET/TRAVELER

Job No.: M-126

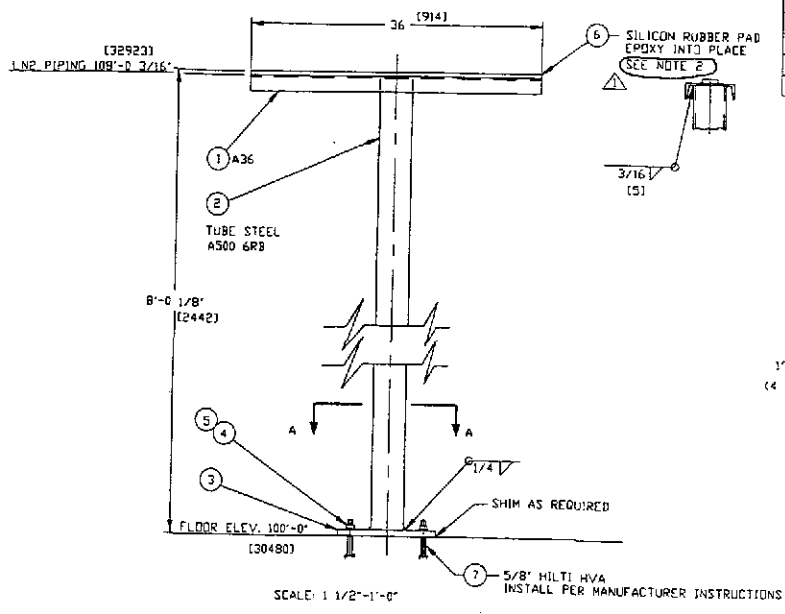
Project: LIGO Equipment Set

Scale: None

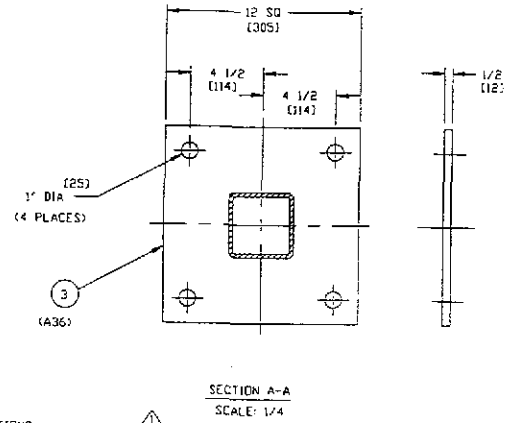
Dwn By:

W. T. Meloy

2x6 foot cutting out uprights 9/4



1	EA	CHANNEL C6x8.25x7.1x3.11
2	EA	TUBE SQ. 1/4"x4"x20 FT. LG. A500 GR. B
3	EA	PLATE, 1/2"x12"x12"
4	EA	BOLT, MILTI, 5/8"x3" LG CS NICKEL PLT
5	EA	WASHER, FLAT, 3/4" ID
6	3 FT	RUBBER, SILICDN 5"x2"x36"
7	EA	ANCHOR MILTI HVA 5/8"x5" LG



NOTE:
 1) PAINT PER PSI SPEC. V049-2-139.
 2) FOR TEE POSTS LOCATED OUTSIDE OF BUILDINGS, OMIT RUBBER PAD AND PROVIDE INSULATION PROTECTION SADDLES PER ATTACHMENT E2 OF SPEC. V049-2-153.



CONTROLLED COPY

DATE 4/5/94

<p>PROCESS SYSTEMS INTERNATIONAL, INC.</p> <p>1700 BROADWAY, SUITE 200, HOUSTON, TEXAS 77002</p> <p>713/861-1111</p>		<p>ISSUE HISTORY SHEET</p> <p>REVISIONS:</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>1</td> <td>11/27/90</td> <td>ISSUED FOR RELEASE / FOR UPDATE</td> </tr> <tr> <td>2</td> <td>1/29/96</td> <td>ISSUED FOR PDR/ASIS</td> </tr> </table>		NO.	DATE	DESCRIPTION	1	11/27/90	ISSUED FOR RELEASE / FOR UPDATE	2	1/29/96	ISSUED FOR PDR/ASIS	<p>PROJECT: PS-1 17'-POST SUPPORT LNE PIPING LIGB VACUUM EQUIPMENT</p> <p>DATE: 1/29/96</p> <p>SCALE: AS NOTED</p> <p>SHEET: 1 OF 1</p>	
NO.	DATE	DESCRIPTION												
1	11/27/90	ISSUED FOR RELEASE / FOR UPDATE												
2	1/29/96	ISSUED FOR PDR/ASIS												
<p>APPROVED:</p> <p>DATE: 1/29/96</p>	<p>DESIGNED BY: [Signature]</p>	<p>CHECKED BY: [Signature]</p>	<p>DATE: 1/29/96</p>	<p>SCALE: AS NOTED</p>										



The First Two Digits Of The Heat Number
Denote Plant Of Origin:
55 - Kankakee, Illinois Steel Division
58 - Birmingham, Alabama Steel Division
70 - Seattle, Washington Steel Division
84 - Jackson, Mississippi Steel Division

CERTIFIED MILL TEST REPORT

SOLD TO: PACIFIC IRON & STEEL
PO BOX 1549
GREAT FALLS, MT 59403-1549

BIRMINGHAM STEEL CORP
SEATTLE, WA STEEL DIVISION
2424 SW ANDOVER
SEATTLE, WA. 98106-1100
(206)933-2222

DATE: 45510030
08/12/97

B.L. NO.: 70-W72906

LOAD NO.: 7000055455

SHIP TO: PACIFIC IRON & STEEL
925 NO OREGON
PASCO, WA

HEAT NO.*	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS							
		YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% DEF	C Ni	Mn Cr	P Mo	S V	Si Cb	Cu	C.E.	
PO#: 33-62024 7098I0562	SEATTLE WA STEEL DIVISION 1-1/2x1-1/2x1/8" Ang 20' (44W) ASTM A36-94 CSA G40.21-87 GR 44W ASME SA36-95	51,655 356MPa	71,130 490MPa	28.9%			.15 .11	.72 .10	.015 .02	.025	.20	.41	.30%	
7098I0554	SEATTLE WA STEEL DIVISION 1-1/2x1-1/2x3/16" Ang 20' (44) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	46,500 321MPa	70,420 486MPa	27.3%		-2.6%	.17 .10	.60 .07	.007 .02	.027	.21	.29	.29%	
7098I0219	SEATTLE WA STEEL DIVISION 2x2x1/4" Ang 20' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	47,870 330MPa	70,260 484MPa	28.9%			.18 .09	.70 .09	.009 .02	.034	.25	.34	.32%	
7098I0220	SEATTLE WA STEEL DIVISION 2x2x1/4" Ang 20' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	51,280 354MPa	74,520 514MPa	28.9%			.17 .11	.73 .11	.013 .02	.036	.24	.40	.32%	
PO#: 33-62021 7097I4508	SEATTLE WA STEEL DIVISION 1/2x2" F1 20' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	49,300 340MPa	72,100 497MPa	22.7%			.18 .09	.67 .08	.009 .02	.028	.20	.41	.31%	

* SEE REVERSE FOR PLANT OF ORIGIN

I HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE CORPORATION.
ALL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT, INCLUDING

G. GIRALDO

QUALITY ASSURANCE

29May97 8:14

TEST CERTIFICATE

No: MAR 38403

Sold By:
INDEPENDENCE TUBE CORPORATION
6226 W. 74TH STREET
CHICAGO, IL 60638
Tel: 708-496-0380 Fax: 708-563-1950

P/O No 33111651
Rel
S/O No MAR 4207-012
B/L No MAR 2838-012 Shp 27May97
Inv No Inv

Sold To: (1604)
PACIFIC HIDE & FUR DEPOT
1401 3RD STREET N.W.
P.O. BOX 1549
GREAT FALLS, MT ** S9403

Ship To: (002)
PACIFIC HIDE & FUR DEPOT
C/O MID COLUMBIA WHSE
PASCO, WA 99301

Tel: 406-727-6222 Fax: 406-727-9833

CERTIFICATE of ANALYSIS and TESTS

Cert. No: MAR 38403
28May97

Part No
TUBING
4" SQ X 1/4" X 40'

Pcs Wgt
60 29304

Heat Number Tag No
M28572 7336

Pcs Wgt
20 9768

YLD=53966/TEN=67207/ELG=32.6

M28572 7337
M28572 7343

20 9768
20 9765

at Number
M28572

*** Chemical Analysis ***
C=0.21 Mn=0.76 P=0.011 S=0.012 Si=0.015 Al=0.043

MEETS THE REQUIREMENTS OF ASTM A-500 GRADE B(C)-93

P.O. 126-PF

P.O. 126-PR



The First Two Digits Of The Heat Number Denote Plant Of Origin:
 55 - Kankakee, Illinois Steel Division
 58 - Birmingham, Alabama Steel Division
 70 - Seattle, Washington Steel Division
 84 - Jackson, Mississippi Steel Division

CERTIFIED MILL TEST REPORT

SOLD TO: PACIFIC IRON & STEEL
 PO BOX 1549
 GREAT FALLS, MT 59403-1549

BIRMINGHAM STEEL CORP
 SEATTLE, WA STEEL DIVISION
 2424 SW ANDOVER
 SEATTLE, WA. 98106-1100
 (206)933-2222

45510030 1
 DATE: 08/27/97

B.L. NO.: 70-W73845

SHIP TO: PACIFIC IRON & STEEL
 925 NO OREGON
 PASCO, WA

LOAD NO.: 7000056661

HEAT NO.*	DESCRIPTION	PHYSICAL TESTS						CHEMICAL TESTS										
		YIELD P.S.I.	TENSILE P.S.I.	ELONG	Bend	WT% DEF	C	NI	Mn	Cr	P	Mo	S	V	Si	Cb	Cu	C.E.
PO#: 33-62079 7097I4855	SEATTLE WA STEEL DIVISION 6x8.2# Ch 20' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	58,500 403MPa	78,500 541MPa	25.0%		1.8%	.17 .12	.60 .07	.013 .02	.043	.25	.60	.30%					
PO#: 33-62045 7097I4866	SEATTLE WA STEEL DIVISION 6x8.2# Ch 40' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	56,750 391MPa	78,500 541MPa	25.0%		1.5%	.16 .14	.60 .13	.018 .02	.036	.20	.56	.29%					
PO#: 33-62024 7097I4506	SEATTLE WA STEEL DIVISION 1/2x2-1/2" Fl 20' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	51,600 356MPa	75,760 522MPa	26.6%			.19 .09	.78 .08	.010 .02	.033	.20	.38	.34%					
PO#: 33-62088 7097I4444	SEATTLE WA STEEL DIVISION 3x2x3/16" Ang 20' (44W/A36) ASTM A36-94 ASME SA36-95 CSA G40.21-87 GR 44W	64,700 377MPa	77,190 532MPa	31.3%		-2.1%	.15 .11	.73 .11	.012 .02	.033	.20	.41	.30%					
PO#: 33-62082 7098I0557	SEATTLE WA STEEL DIVISION 1-1/2x1-1/2x1/8" Ang 20' (44W/A36) ASTM A36-94	55,390 382MPa	77,490 534MPa	25.0%		-3.3%	.18 .08	.61 .08	.009 .02	.029	.19	.34	.30%					

*SEE REVERSE FOR PLANT OF ORIGIN

I HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE CORPORATION.
 ALL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT INCLUDING

G. GIRALDO

11Aug97 8:42

TEST CERTIFICATE

No: CHI 46254

Sold By:

INDEPENDENCE TUBE CORPORATION
6226 W. 74TH STREET
CHICAGO, IL 60638
Tel: 708-496-0380 Fax: 708-563-1950

P/O No 33111681
Rel PT I OF II
S/O No CHI 11742-006
B/L No CHI 8149-007 Shp 09Aug97
Inv No Inv

Sold To: (1604)
PACIFIC HIDE & FUR DEPOT
1401 3RD STREET N.W.
P.O. BOX 1549
GREAT FALLS, MT ** 59403

Ship To: (002)
PACIFIC HIDE & FUR DEPOT
C/O MID COLUMBIA WHSE
PASCO, WA 99301

Tel: 406-727-6222 Fax: 406 727-9833

CERTIFICATE of ANALYSIS and TESTS

Cert. No: CHI 46254
11Aug97

Part No
TUBING
6" X 4" X 1/4" X 40'

Pcs Wgt
12 7498

Heat Number Tag No
872618 603408

Pcs Wgt
12 7498

YLD=60571/TEN=74545/ELG=35

Heat Number 872618 *** Chemical Analysis ***
C=0.2 Mn=0.69 P=0.01 S=0.007 Si=0.05 Al=0.026

MELTED AND MANUFACTURED I.T.C./U.S.A.

MEETS THE REQUIREMENTS OF ASTM A-500 GRADE B(C)-93

P.O. 126-PF

AMERICAN STEEL
A DIVISION OF AMERICAN INDUSTRIES INC.

CERTIFICATE OF CONFORMANCE

DATE: 3-11-98

CUSTOMER: Apollo Sheet Metal Inc.

PURCHASE ORDER NUMBER: M-126-PS

A.S.I. INVOICE NUMBER: 5625

ITEM 4 1 x 8" x 12"

HEAT # _____ MILL: _____

SPECIFICATION TYPE AND NUMBER: A36 HR Carbon Steel

ITEM 5 1/2 x 12" x 12"

HEAT # _____ MILL: _____

SPECIFICATION TYPE AND NUMBER: A36 HR Carbon Steel

ITEM _____

HEAT # _____ MILL: _____

SPECIFICATION TYPE AND NUMBER: _____

THE ABOVE MATERIAL IS CERTIFIED TO MEET, AND COMPLIES IN ALL RESPECTS,
TO THE REQUIRED SPECIFICATIONS IN ACCORDANCE TO YOUR PURCHASE ORDER.

SIGNED: Lee M. Houston DATE: Mar. 11, 1998

(MATERIAL CERTIFICATION CLERK)

AMERICAN STEEL
A DIVISION OF AMERICAN INDUSTRIES INC.

CERTIFICATE OF CONFORMANCE

DATE: 3-11-98

CUSTOMER: Apollo Sheet Metal INC.

PURCHASE ORDER NUMBER: M-126-93

A.S.I. INVOICE NUMBER: 5625

ITEM 1 5/8 X 8" X 8"

HEAT # _____ MILL: _____

SPECIFICATION TYPE AND NUMBER: A 36 HR Carbon Steel

ITEM 2 1 X 8" X 14"

HEAT # _____ MILL: _____

SPECIFICATION TYPE AND NUMBER: A 36 HR Carbon Steel

ITEM 3 1/4 X 12" X 12"

HEAT # _____ MILL: _____

SPECIFICATION TYPE AND NUMBER: A 36 HR Carbon Steel

THE ABOVE MATERIAL IS CERTIFIED TO MEET, AND COMPLIES IN ALL RESPECTS,
TO THE REQUIRED SPECIFICATIONS IN ACCORDANCE TO YOUR PURCHASE ORDER.

SIGNED: [Signature]

DATE: Mar. 11, 1998

(MATERIAL CERTIFICATION CLERK)



CERTIFICATE OF COMPLIANCE

SOLD TO

Apollo Sheet Metal
1207 W. Columbia Drive
Kennewick, WA 99336

YOUR PURCHASE ORDER NUMBER

M126-PFS-TW

WE CERTIFY THE MATERIAL FURNISHED TO YOU, MEETS THE REQUIREMENTS OF YOUR PURCHASE ORDER.

2-1/2" STD DOM A106 GRB SMLS PIPE

Charlie Ralph

MANAGER

KELLER SUPPLY CO.
6509 WEST DESCHUTES
KENNEWICK, WA 99336

PHONE: 1 509 736 1000
FAX: 1 509 736 1022

DATE: 3/3/98



.....
CERTIFICATE OF COMPLIANCE
.....

SOLD TO

.....
Apollo Sheet Metal
.....
1207 W Columbia Drive
.....
Kennewick, WA 99336
.....

YOUR PURCHASE ORDER NUMBER

.....
M092
.....

WE CERTIFY THE MATERIAL FURNISHED TO YOU, MEETS THE REQUIREMENTS
OF YOUR PURCHASE ORDER.

2" STD DOM A53 ERW PIPE

Charlie Ralph
.....
MANAGER
.....
KELLER SUPPLY CO.
8509 WEST DESCHUTES
KENNEWICK, WA. 99336

DATE: 3/3/98
.....

PHONE: 1 509 736 1000
FAX: 1 509 736 1022

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-1*

Nor-Cal Job Number: *200937-000*

Part Number(s) and Qty.(s): *G-2WC-600 (qty. 8)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers
Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-6*

Nor-Cal Job Number: *194736-000*

Part Number(s) and Qty.(s): *800-600N (qty. 12)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers
Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-8*

Nor-Cal Job Number: *PO# 31189*

Part Number(s) and Qty.(s): *G-2WC-400 (qty. 33)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers

Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-9*

Nor-Cal Job Number: *PO# 31911*

Part Number(s) and Qty.(s): *G-2WK-400 (qty. 6)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.



Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-11*

Nor-Cal Job Number: *196356-001*

Part Number(s) and Qty.(s): *600-400N (qty. 57)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-12*

Nor-Cal Job Number: *195292-000*

Part Number(s) and Qty.(s): *G-7w-400 (qty. 8)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers
Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-19*

Nor-Cal Job Number: *PO# 33015*

Part Number(s) and Qty.(s): *G-2WC-250 (qty. 4)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers
Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-20*

Nor-Cal Job Number: *188090-000*

Part Number(s) and Qty.(s): *G-7wr-250-150 (qty. 4)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers

Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-25*

Nor-Cal Job Number: *PO# 26420*

Part Number(s) and Qty.(s): *G-2wc-150 (qty. 23)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Power

Quality Technician

ABE Product Certificate No:

303197

Buyer:

Avesta ABE Inc.
1800-J MacLeod Dr.
Lawrenceville, GA 30043

Your Ref:

3295
Noreal Tag
27106804

Product		
Article	Dimension	Grade
90 elbow	6"OD 14GA	304/304L
45 elbow		
Specification Standard		Dimension Standard
A774		B16.9

Manufacturer		
STRIP	Manufacturer	Die Stamped on Product
Specification Standard	AVESTA	91341
A240-98/SA240-95 TYPE	304/304L	

CHARGE ANALYSIS % / LADLE ANALYSIS %													
RM No.	C	Si	Mn	P	S	Cr	Ni	Mo	Ti	N	Co	CU	
303197	0.021	0.39	1.40	0.027	0.008	18.40	9.20	0.38		0.064	0.10	0.35	

TEST RESULTS													
RM No.	Rp0.2	Rp1.0	Rm	Elong%			Hardness	Hydr.test	Ringexp.	Flat-	Ind.		
	N/mm2	N/mm2	N/mm2	A5	A2	A80	B	MPa	test	eningtest		test	
303197	298	351	588	58			158						
	295	348	591	55			167						

Intergranular Corrosion Bend Test
ASTM A 262 Practice EX SIS 117105 DIN 50914

Cold formed X Welded X Heat Treated
1050-C, 1h/in., Water

Radiographic Examination: NO X-Ray
Visual and Dimensional Inspection: Approved

We hereby certify that the above data is a true copy of the test results issued to us by the raw material supplier.
E=EXT Z0,7=NOX-RAY Z0,9=100%X-RAY Rp0,20,2proofstress Rp1,01,0proofstress R=ROCKWELL-B(HRB) B=BRINELL(HB)
=INT Z0,8=10%X-RAY Z1=SS219711/2197 Rm Ultimate tensile strength C=ROCKWELL-C(HRC) V=VICKERS(HV)

PO# 32601-1,2
 PO# 32601-1,2
 PO# 32601-1,2

M. D.
971024
[Signature]

EGMO LTD.

P.O.B. 1111

Nahariya 22110 Israel

Tel.: 972-4-985 5121

Fax: 972-4-982 5810

ISO 9002 Certified



EGMO

Experts in Stainless Steel

PRODUCT SPECIFICATION AND TEST REPORT FOR COMPONENTS

JOB NO. : 809428 ITEM : N2WC-90 SHORT 304 POL-2 2.5"
PAGE NO.: 1

HEAT NO. : NZ43 INCOMING INSPECTION NO. : 605989

ITEM : TUBE 304 T=1.65 N.POL.ANN 2.5"

PRODUCTION [REDACTED] STAINLESS TYPE 304
STAINLESS TYPE 304

CHEMICAL COMPOSITION

Table with 2 parts. Part 1: ELEMENT, C, CR, MN, N, NI, P. Part 2: ELEMENT, S, SI. Values include percentages like .034, 18.202, 1.605, 8.555, .033, .007, .340.

TEST RESULT

TENSIL TEST table with columns: TEST NO, RM (MPA), RP0.2 (MPA), RP1 (MPA), A%, HRB. Values: 2172, 585.0000, 280.0000, 56.00, 78.

VISUAL AND DIMENSIONAL INSPECTION : OK

EDDY CURRENT TEST : OK

DATE : 16/06/97

APPROVED BY:-

SHPITZER AHARON
EGMO

PO. 55015

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *93640-12*

Nor-Cal Job Number: *204048-003*

Part Number(s), Revision(s) and Qty.(s): *971231-2 rev. NC (qty. 5)*

Purchase Order Number: *24-563791*

Serial Number(s):

Date: *January 16, 1998*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-17*

Nor-Cal Job Number: *200946-000*

Part Number(s) and Qty.(s): *450-250R (qty. 8)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 3, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers

Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-18*

Nor-Cal Job Number: *196804-000*

Part Number(s) and Qty.(s): *450-250N (qty. 13)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 3, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers

Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-21*

Nor-Cal Job Number: *Inventory*

Part Number(s) and Qty.(s): *ISO-63-250-OF (qty. 9)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 3, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers
Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-24*

Nor-Cal Job Number: *190071-000*

Part Number(s) and Qty.(s): *338-200N (qty. 26)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 3, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers
Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-26*

Nor-Cal Job Number: *200947-000*

Part Number(s) and Qty.(s): *275-150R (qty. 7)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 2, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

Kim Powers

Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *92694-27*

Nor-Cal Job Number: *195958-000*

Part Number(s) and Qty.(s): *275-150N (qty. 16)*

Purchase Order Number: *24-558975*

Serial Number(s):

Date: *December 3, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician



Slater Steels Corporation
Fort Wayne Specialty Alloys Division
 2400 Taylor Street West
 Fort Wayne, Indiana 46802-4600
 Telephone: (219) 434-2892 Fax: (219) 434-2905

Product Certification Report

Report Number 1059410
 ship with 1

Page 2 of 2

Slater Order I.D. 9700420 003		Order date 01-17-97		Commodity code 7152-9014		Customer I.D. 1354		Customer Purchase Order 47295	
Dim 1 2.7500	Dim 2 0.0000	Dim 3 0.0000	Heat I.D. 25413						
Product Shape Rounds			Product surface Centerless Ground			Customer grade 304/304L			
Lifts: 0006 0007 0008									

Electroslag remelt.

No welding or weld repair done.

Free of mercury and low melting alloy contamination.

This material was produced in accordance with Slater Quality System Manual, Rev. 6, dated 11/30/94

Material conforms to listed specifications.

Quality system is registered to ISO 9002.

The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes including Federal law, Title 18, Chapter 47. Please consult material safety data sheet (MSDS) for hazard information.

1-1059410-1

I hereby certify that the reported figures are correct as contained in the records of the corporation.

Met Lab Supervisor:

Dennis Hackett
 Dennis Hackett

219-434-2892-95-2 47295 01



Slater Steels Corporation

Fort Wayne Specialty Alloys Division

2400 Taylor Street West
Fort Wayne, Indiana 46802-4600

Telephone: (219) 434-2892 Fax: (219) 434-2905

Product Certification Report

Report Number 1059410

ship with 1

Page 1 of 2

Slater Order I.D. 9700420 003		Order date 01-17-97	Commodity code 7152-9014	Customer I.D. 1354	Customer Purchase Order 47295
Dim 1 2.7500	Dim 2 0.0000	Dim 3 0.0000	Heat I.D. 25413		
Product Shape Rounds		Product surface Centerless Ground		Customer grade 304/304L	

VINCENT METAL GOODS

Ship to

1211 W. LORING ST
PORTLAND, OR
EAGLE METALS DIV

97227

METAL GOODS

Sold to

DIV OF ALCAN ALUM.
P.O. BOX 12187
PORTLAND, OR

97212

Lifts: 0006 0007 0008

CONDITION A
ASTMA 479-95B

QQS 763 E Amend 1

ASTMA 276-95A

PARENT HEAT 47646

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
TOP	.012	1.82	.024	.001	.60	18.29	9.30	0.40	.40	.099	.076

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
T	.020	1.80	.025	.000	.59	18.26	9.33	0.40	.39	.101	.070

HB

→ 156

TENSILE PROPERTIES

	TS (PSI)	.2%YS (PSI)	%EL(2")	%RA
→	90600	48900	60.0	83.7

MACRO

→ OK

GRAIN SIZE

→ 6

ASTM A 262 PRACTICE E

OXALIC

→ 2

PERCENT FERRITE

PERMIABILITY

→ 1.0

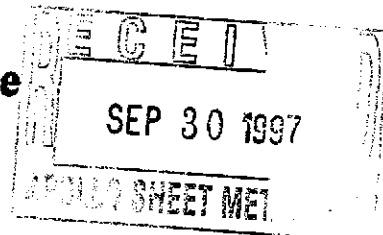
I hereby certify that the reported figures are correct as contained in the records of the corporation.

Met Lab Supervisor:

Dennis Hackett

1059410-00295 K-58-00295 49525 00 52364

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-29*

Nor-Cal Job Number: *195056-000*

Part Number(s) and Qty.(s): *FH-300-24-2CF (qty. 1)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 25, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in cursive script, appearing to read "Ch. Brown", written over a horizontal line.

Quality Technician

Allegheny Ludlum

Jessop Specialty Products
600 Green Street
Washington, PA 15301

Slip METAL BONDING
To 4755 FIRST AVE SOUTH
SEATTLE WA

70134

METAL BONDING
HTU ALUMINUM ALUMINUM COMP
PO BOX 346 IND APPOINTMENT
SAINT LOUIS MO 63166-0346

CERTIFIED ANALYSIS
TEST REPORT

LABORATORY NO. 711-050519
YOUR ORDER NO. 077447
RECEIVED DATE 08/10/95
DATE 08/10/95
ANALYST 452

H. D. O'Connor

APOLLO SHEET METAL, INC.

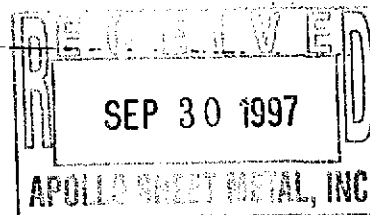
JESSOP T 304 STAINLESS WRAP
ASTM A240-91a ASME SA-240-93 ASTM A167-71 ASTM A242-90 PRACTICE A
ASTM A480-91a AWS-5713F
(MATERIAL)

Heat	Slip	Size	Pcs	Weight	ITEM CODE:
367907	29036 A	.6250 x 96.0000 x 258.0000	1	4615	319814
367946	29028 A	.5625 x 96.0000 x 264.0000	1	4263	319756
368030	29036 A	1.0000 x 96.0000 x 264.0000	1	7509	319905

Heat	C	Mn	P	S	SI	NI	CR	MO	CU	NI
367907	.049	1.72	.030	.0005	.40	8.29	18.32	.36	.07	.50
367946	.052	1.75	.026	.0004	.34	8.27	18.38	.30	.06	.25
368030	.050	1.70	.028	.0004	.37	8.29	18.24	.30	.11	.31

Heat	Gauge	Yield Strength	Tensile Strength	Elong	Red. of Area	Hardness	Bend	Corrosion	Grain Size
367907	.6250	44.7 KSI	90.8 KSI	57.1	77.5	BHN174	OK	OK	
367946	.5625	31.1 KSI	89.6 KSI	61.1	75.0	BHN179	OK	OK	
368030	1.0000	42.1 KSI	84.2 KSI	57.9	80.6	BHN170		OK	

MATERIAL WAS NOT WELD REPAIRED
MATERIAL WAS PRODUCED WITHOUT KNOWN CONTACT WITH MERCURY



AUG 23 1995

EXCEPT AS OTHERWISE NOTED, THIS MATERIAL HAS BEEN MADE AND TESTED IN ACCORDANCE WITH THE LISTED SPECIFICATIONS. THE RESULTS CONFORM TO THE SPECIFICATION AND CHARGE CERTIFICATE(S).

PO 29981 KL R-462-300N

APOLLO SHEET METAL, INC.

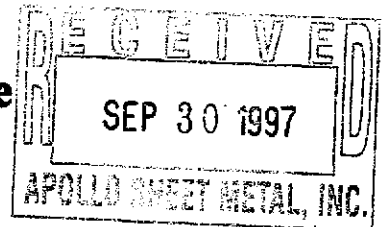
METAL BONDING

APOLLO SHEET METAL, INC.

APOLLO SHEET METAL, INC.

APOLLO SHEET METAL, INC.

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-27*

Nor-Cal Job Number: *195054-000*

Part Number(s) and Qty.(s): *FH-300-24-2CF (qty. 1)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 25, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in black ink, appearing to be "Ch. Brown", written over a horizontal line.

Quality Technician

PERSON TUBE, 100 ASPEN HILL ROAD
 Sold To: MARION/KEYSTONE**CA**
 P.O. BOX 2128
 POMONA
 Location: 0.750 O.D. X .035 Wall TP304 304L X Straight Length

NORTH BRANCH, CA 91769

(908)-218-1400 COPY # 3

S.O.#: 67384-00
 Customer PO#: 45-15366
 Date: April 24, 97

13 X # .035

WELDED/ASTM-A269-94A/A249-94A/ASME-SA249/SA249M-92A

MECHANICAL TESTS:

Reverse Flat	Reverse Flattening	Reverse Flange	Reverse Bend	Rockwell Hardness	Eddy Current	Hydrostatic P.S.I.	TENSILE TESTS:		
OK	OK	OK	OK	B71	OK	Tensile Str. P.S.I.	Yield Str. P.S.I.	Elong. In 2"	
20988 OK	OK	OK	OK	B73	OK	81818	41558	63	
1938 OK	OK	OK	OK		OK	86486	41891	59	

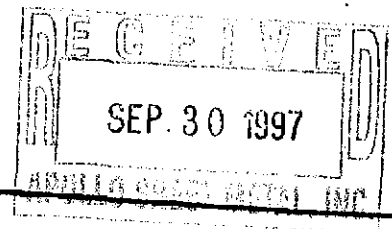
HEAT ANALYSIS

C	MN	P	S	SI	CR	NI	MO	TI	CU	AL	FE	N	CO	V	W	TI
20988 0.017	1.690	0.029	0.001	0.610	18.230	9.130	0.250	0.000	0.370	0.000	BAL	0.038	0.130	0.000	0.000	0.000
1938 0.026	1.570	0.028	0.003	0.290	18.160	8.450	0.230	0.000	0.270	0.000	BAL	0.600	0.000	0.000	0.000	0.000

ADDITIONAL INFORMATION

FINISHING--BRIGHT ANNEALED

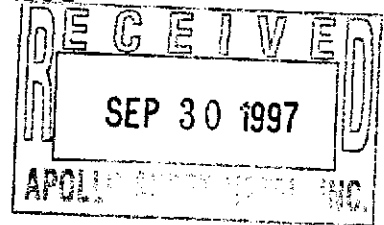
Air Test Under Water P.S.I.
 High Pressure Nitrogen P.S.I.



WARNING
 MATERIAL SAFETY DATA SHEETS FOR THIS PRODUCT HAVE BEEN SUPPLIED TO YOUR PURCHASING DEPARTMENT. FOR AN ADDITIONAL COPY PHONE 908-218-1400.
 CAUTION: PROCESSING THAT MAKES FUMES, DUST, OR SOLUTIONS MAY CAUSE LUNG DAMAGE. SEE MATERIAL SAFETY DATA SHEETS FOR FURTHER INFORMATION.

Anthony Giovanni

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-22*

Nor-Cal Job Number: *195051-000*

Part Number(s) and Qty.(s): *AN-NW-50-450 (qty. 5)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 25, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, Box 518, Yreka, California 96097, U.S.A.
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- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician



Slater Steels Corporation
Fort Wayne Specialty Alloys Division
 2400 Taylor Street West
 Fort Wayne, Indiana 46802-4600
 Telephone: (219) 434-2892 Fax: (219) 434-2905

Product Certification Report
 Report Number 1062790
 ship with 1

Page 1 of 2

Slater Order I.D. 9700420 002		Order date 01-17-97		Commodity code 7152-8010		Customer I.D. 1354	Customer Purchase Order 47295
Dim 1 2.0000	Dim 2 0.0000	Dim 3 0.0000	Heat I.D. 25411				
Product Shape Rounds		Product surface Centerless Ground			Customer grade 304/304L		

Ship to VINCENT METAL GOODS
 1211 W. LORING ST
 PORTLAND, OR
 EAGLE METALS DIV

Sold to METAL GOODS
 DIV OF ALCAN ALUM.
 P.O. BOX 12187
 PORTLAND, OR

97227

97212

Lifts: 0013

CONDITION A
 ASTM 278-95A
 ASMESA 193 95 ED - 95 ADDENDA
 AMS 5639G

QQS 763 E Amend 1
 ASTM 320-94A
 ASMESA 320 95 ED - 95 ADDENDA

ASTMA 193-95
 ASTM 479-95B
 ASMESA 479 95 ED - 95 ADDENDA

PARENT HEAT

47846

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
.017	1.81	.024	.001	.59	18.30	9.28	0.40	.39	.098	.072

EMICAL ANALYSIS

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
.025	1.82	.025	.001	.59	18.25	9.34	0.40	.40	.099	.067

HB

149

TENSILE PROPERTIES

TS (PSI)	.2%YS (PSI)	%EL(2")	%RA
79300	37000	59.5	83.9

MACRO

OK

GRAIN SIZE

3

ASTM A 262 PRACTICE E

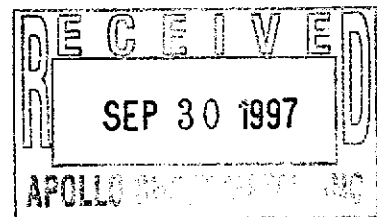
OXALIC

1

PERCENT FERRITE

PERMIABILITY

0.5



I hereby certify that the reported figures are correct as contained in the records of the corporation.

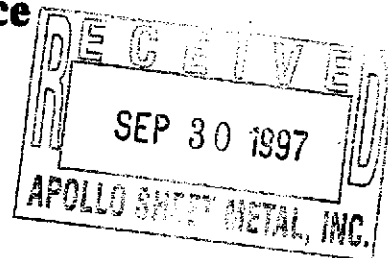
(Signature)

K-58-00200-ESR

10 51090

117051090 63 C.U.C. 141

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670*

Nor-Cal Job Number: *190497-000*

Part Number(s) and Qty.(s): *275-150I (qty. 20)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 25, 1997*

Nor-Cal Products Inc. certifies that:

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- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician

Mill Certificate



SAMMI STEEL CO., LTD.

Changwon Works
P. O. Box 95, Changwon, Korea
Telefax: 0551 84-2519

RECEIVED
SEP 30 1997
APOLLO SHEET METAL, INC.

Customer : 3101 DISTRIBUTOR (U.S.A)
Order No. : PBF-11545
Specification : ASTM-A276 EDITION: 94B
Steel Grade : T-304
Article : ROUND BAR

Cert No. : 45445
Melting Process : V.O.D.
Surface Condition : SMOOTH TURNED
Heat Treatment : SOLUTION TREATED

Bundle No.	Lot No.	Dimensions		Quantity	Mass		Test No.	
		Size	Length		kg	lb		
03-24532	6F11545000	2	3 / 4 IN.	12-14FT	9	1091	2405	5450-1
03-24533	6F11545000	2	3 / 4 IN.	12-14FT	9	1091	2405	

Heat No.	Chemical Composition (%)										
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	CO	N
Spec.	min.					8.00	18.00				
	max.	.08	1.00	2.00	.040	.030	10.50	19.00	.75	.75	.200
A06622	.08	.56	1.33	.029	.015	10.49	18.10	.25	.27	.088	.0164

Test No.	Mechanical Properties								
	Yield Strength	Tensile Strength	Elongation	Reduction of Area	Hardness Test		Impact Test	Decarburization Test mm	Grain Size Test
KSI	KSI	%	%	Body HB	Lab-				
Spec.	min.	30	75	40.0	60.0	140			
	max.		115			187			
5450-1	38	88	60.0	80.0	153				

	Non-Metallic Inclusions Test						
	KS / JIS (%)		ASTM				
	A	B+C	TYPE	A	B	C	D
			THIN				
			HEAVY				

Hardensability Test (HRC)	Distance ()	
	No. 1	
	No. 2	
	Distance ()	
No. 1		
No. 2		

Additional Remarks:
FREE FROM MERCURY CONTAMINATION. MICRO, MACRO & INTERGRANULAR CORROSION (ASTM-262-91 PRACTICE-E) TEST: OK. CERT. TO: ASTM-A484-92, A182-92, A193-92 B8-CL-1, A320-92 B8-CL-1, A479-92 COND.-A, ASME-SA182-93, SA193-93 B8-CL-1, SA320-93 B8-CL-1, SA479-93 COND.-A, AMS-5639F, MIL-8862B, QQ-S783E COND.-A. HEAT TREATMENT: 1050 C & W.C.

We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

Our quality system is certified in accordance with ISO 9002 by TÜV Hannover/Sachsen-Anhalt - TÜV-CERT

MAR. 29, '96

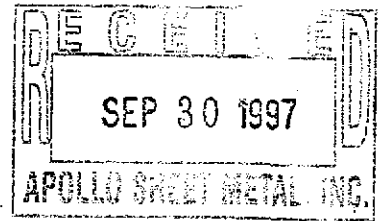
Date

Quality Assurance Manager

K. H. Cha

PO 30874 L4

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670*

Nor-Cal Job Number: *189627-000*

Part Number(s) and Qty.(s): *275-REC (qty. 20)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 25, 1997*

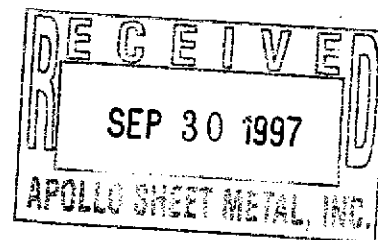
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in cursive script, appearing to read "U. Brown", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-37*

Nor-Cal Job Number: *PO# 31149*

Part Number(s) and Qty.(s): *B-31W-200-150 (qty. 2)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

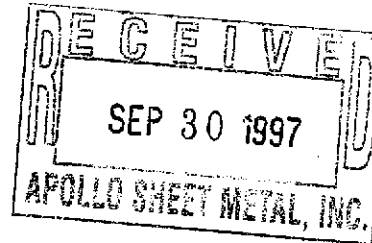
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in cursive script, appearing to read "C. J. Brown".

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-21*

Nor-Cal Job Number: *Inventory*

Part Number(s) and Qty.(s): *NW-50-CP-R1 (qty. 10)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

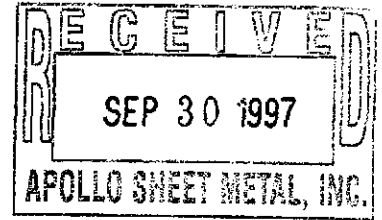
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in cursive script, appearing to read "C. E. Brown", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-20*

Nor-Cal Job Number: *195050-000*

Part Number(s) and Qty.(s): *B-275 (qty. 6)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

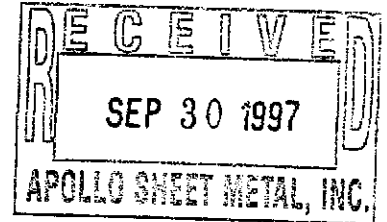
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in black ink, appearing to read "C. A. Brown", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-17*

Nor-Cal Job Number: *195047-000*

Part Number(s) and Qty.(s): *B-600 (qty. 47)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

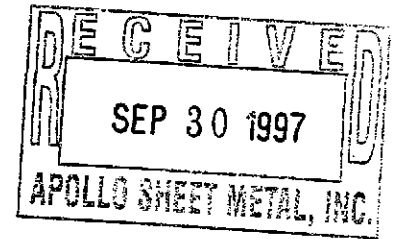
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in black ink, appearing to read "Al. Brown", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-16*

Nor-Cal Job Number: *195044-000*

Part Number(s) and Qty.(s): *B-800 (qty. 20)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

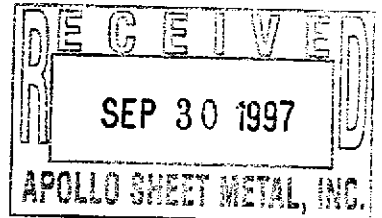
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.



Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-15*

Nor-Cal Job Number: *PO# 31484*

Part Number(s) and Qty.(s): *G-275-I (qty. 45)*

Purchase Order Number: *24-542920*

Serial Number(s):

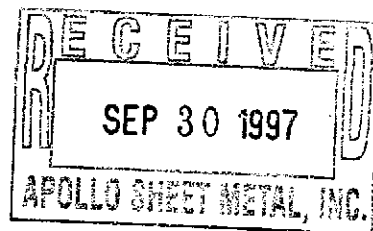
Date: *September 18, 1997*

Nor-Cal Products Inc. certifies that:

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Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-14*

Nor-Cal Job Number: *PO# 31243*

Part Number(s) and Qty.(s): *G-338-I (qty. 86)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

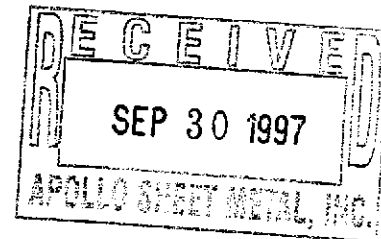
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in cursive script, appearing to read "Al Forner", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-13*

Nor-Cal Job Number: *PO# 31105*

Part Number(s) and Qty.(s): *G-450-I (qty. 40)*

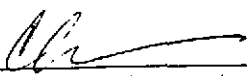
Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.



Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-12*

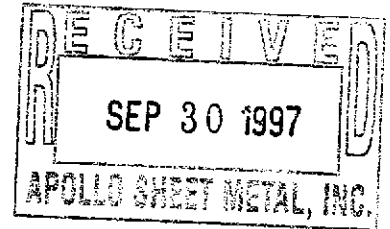
Nor-Cal Job Number: *PO# 31912*

Part Number(s) and Qty.(s): *G-600-I (qty. 118)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



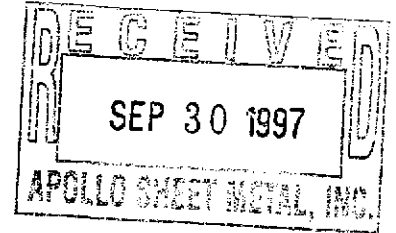
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in cursive script, appearing to read "Ch. Farmer", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-11*

Nor-Cal Job Number: *PO# 31243*

Part Number(s) and Qty.(s): *G-800-I (qty. 20)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.



Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-10*

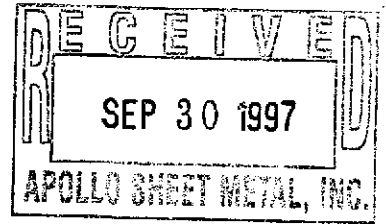
Nor-Cal Job Number: *188109-001*

Part Number(s) and Qty.(s): *275-150N (qty. 20)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-6*

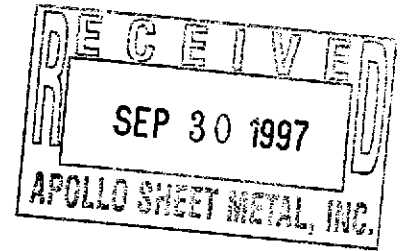
Nor-Cal Job Number: *166298-000*

Part Number(s) and Qty.(s): *450-250N (qty. 17)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-5*

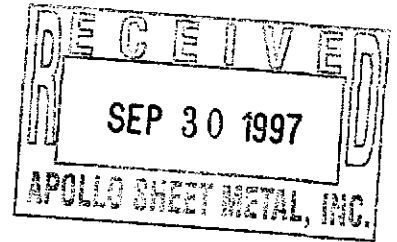
Nor-Cal Job Number: *195013-000*

Part Number(s) and Qty.(s): *450-250R (qty. 17)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



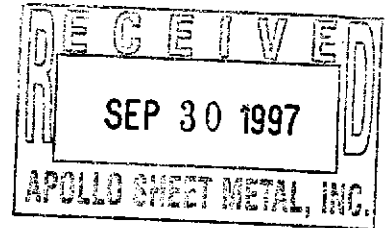
Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.

A handwritten signature in black ink, appearing to read "A. Brown", written over a horizontal line.

Quality Technician

Certificate of Conformance



Customer: *Keller Supply Co.*

Invoice Number: *89670-4*

Nor-Cal Job Number: *185758-000*

Part Number(s) and Qty.(s): *600-400N (qty. 55)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*

Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
- ◆ These parts were produced and functionally tested as required, in conformance with all contractually applicable drawing and/or purchase order specifications.
- ◆ The material and/or parts furnished under the above purchase order and on the above invoice were produced from materials for which Nor-Cal Products Inc., has available for examination, chemical and/or physical test reports or other evidence of conformance to applicable specifications.


Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-3*

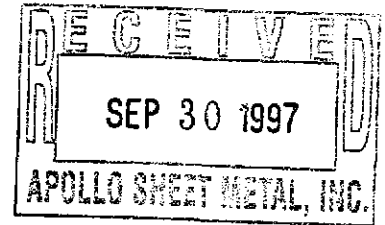
Nor-Cal Job Number: *195008-000*

Part Number(s) and Qty.(s): *600-400R (qty. 55)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
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Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-2*

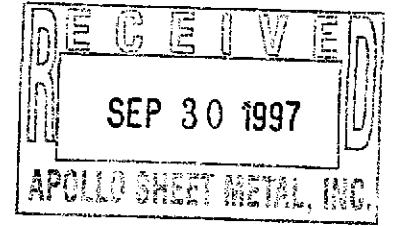
Nor-Cal Job Number: *185755-000*

Part Number(s) and Qty.(s): *800-600N (qty. 12)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



Nor-Cal Products Inc. certifies that:

- ◆ These parts were manufactured at Nor-Cal Products Inc., 1967 South Oregon Street, P.O. Box 518, Yreka, California 96097, U.S.A.
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A handwritten signature in cursive script, appearing to read "A. Brown", written over a horizontal line.

Quality Technician

Certificate of Conformance

Customer: *Keller Supply Co.*

Invoice Number: *89670-1*

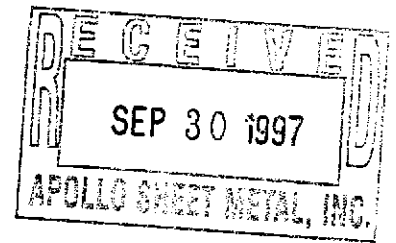
Nor-Cal Job Number: *195007-000*

Part Number(s) and Qty.(s): *800-600R (qty. 12)*

Purchase Order Number: *24-542920*

Serial Number(s):

Date: *September 18, 1997*



Nor-Cal Products Inc. certifies that:

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Quality Technician

Slater Steels Corporation

Fort Wayne Specialty Alloys Division

2400 Taylor Street West
Fort Wayne, Indiana 46802-4600
Telephone: (219) 434-2892 Fax: (219) 434-2905

P.2
Product Certification Report

Report Number 750310

Ship with 1

Page 1 of 2

Slater Order I.D. 9511116 004		Order date 12-27-95	Commodity code 712010	Customer I.D. 1602	Customer Purchase Order 13 AX 932577
Dim 1 3.0000	Dim 2 0.0000	Dim 3 0.0000	Heat I.D. 45088		
Product Shape Rounds		Product surface Centerless Ground		Customer grade 304	

Ship to JOSEPH T RYERSON & SON INC
65TH & HOLLIS STS
EMERYVILLE, CA

Sold to JOSEPH T RYERSON & SON INC
65TH & HOLLIS STS
EMERYVILLE, CA

94608

94608

Lifts: 0032

CONDITION A
7125-T
ASTMA 479-95A
ASTMA 262-88 Practice E

DUPONT SW300-M JAN 82
ASTMA 182-94C chem only
ASMESA 182 92 ED94ADDchem only
AMS 5639F

QQS 763 E Amend 1
ASTMA 278-95
ASMESA 479 92 ED - 94 ADDENDA

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	N
--> .062	1.87	.023	.028	.49	18.38	8.40	0.52	.31	.058

HB

--> 187

TENSILE PROPERTIES

TS (PSI)	.2%YS (PSI)	%EL(2")	%RA
--> 93200	43600	56.4	75.8

MACRO ASTM E381

MACRO

--> OK

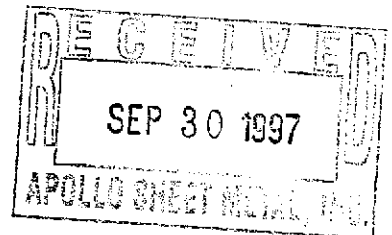
GRAIN SIZE

--> 8

ASTM A 262 PRACTICE E

OXALIC

--> OK



I hereby certify that the reported figures are correct as contained in the records of the corporation.

Met Lab Supervisor:

Dennis Hackett
Dennis Hackett



Slater Steels Corporation
Fort Wayne Specialty Alloys Division
 2400 Taylor Street West
 Fort Wayne, Indiana 46802-4600
 Telephone: (219) 434-2892 Fax: (219) 434-2905

Product Certification Report

Report Number 1056010

ship with 1

Page 1 of 2

Order I.D. 9700420 003	Order date 01-17-97	Commodity code 7152-9014	Customer I.D. 1354	Customer Purchase Order 47295
Dim 1 2.7500	Dim 2 0.0000	Dim 3 0.0000	Head I.D. 25821	
Product Shape Rounds	Product surface Centerless Ground	Customer grade 304/304L		

VINCENT METAL GOODS

Ship to
1211 W. LORING ST
PORTLAND, OR
EAGLE METALS DIV

METAL GOODS

Sold to
DIV OF ALCAN ALUM.
P.O. BOX 12187
PORTLAND, OR

97227

97212

Lifts: 0003 0004 0005

CONDITION A
ASTMA 479-95B

QQS 763 E Amend 1

ASTMA 276-95A

PARENT HEAT 48407

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
TOP	.010	1.81	.024	.001	.41	18.24	9.29	0.41	.52	.098	.077

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
BO1	.017	1.81	.026	.001	.38	18.26	9.36	0.41	.52	.098	.073

HB

> 170

TENSILE PROPERTIES

	TS (PSI)	.2%YS (PSI)	%EL(2")	%RA
>	83800	57500	53.8	81.6

MACRO

> OK

GRAIN SIZE

> 4

ASTM A 262 PRACTICE E

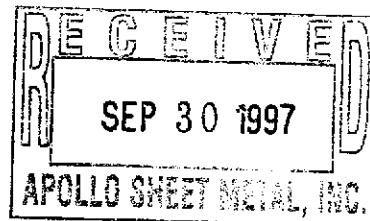
OXALIC

> 1

PERCENT FERRITE

PERMIABILITY

> 1.0



I hereby certify that the reported figures are correct as contained in the records of the corporation.

D. N. N. N.

P# 31867-1 25861 7.13 W.



Slater Steels Corporation
Fort Wayne Specialty Alloys Division
 2400 Taylor Street West
 Fort Wayne, Indiana 46802-4600
 Telephone: (219) 434-2892 Fax: (219) 434-2905

Product Certification Report
 Report Number 1053480
 ship with 1
 Page 1 of 1

Slater Order I.D. 9700420 004		Order date 01-17-97		Commodity code 7152-9412		Customer I.D. 1354	Customer Purchase Order 47295
Dim 1 3.3750	Dim 2 0.0000	Dim 3 0.0000	Heat I.D. 25412				
Product Shape Rounds			Product surface HR & Rough Turned			Customer grade 304	

Ship to VINCENT METAL GOODS
 1211 W. LORING ST
 PORTLAND, OR
 EAGLE METALS DIV

Sold to METAL GOODS
 DIV OF ALCAN ALUM.
 P.O. BOX 12187
 PORTLAND, OR

97227

97212

Lifts: 0009

CONDITION A

ASTMA 276-95A

ASTMA 479-95B

PARENT HEAT

47646

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
TOP	.017	1.82	.026	.001	.63	18.27	9.25	0.40	.41	.098	.071

CHEMICAL ANALYSIS

	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Co	N
BOT	.020	1.80	.029	.001	.62	18.24	9.23	0.40	.41	.097	.065

HB

→ 163

TENSILE PROPERTIES

	TS (PSI)	.2%YS (PSI)	%EL(2")	%RA
→	79100	38400	69.5	83.4

MACRO

→ OK

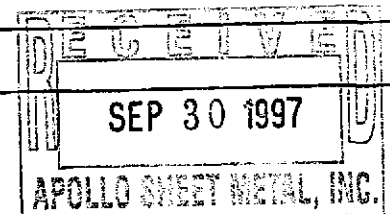
GRAIN SIZE

→ 3

ASTM A 262 PRACTICE E

OXALIC

→ 1



ESR melted.

No mercury or low melting alloy contamination. Continuous carbide and intergranular corrosion test OK.

Melted and manufactured in the United States.

Material conforms to listed specifications.

Quality system is registered to ISO 9002.

The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes including Federal law, Title 18, Chapter 47. Please consult material safety data sheet (MSDS) for hazard information.

I hereby certify that the reported figures are correct as contained in the records of the corporation.

Met Lab Supervisor:

Dennis Hackett
 Dennis Hackett

P.O. 28832 C-1



Avesta Sheffield East, inc.

Certificate of Analysis and Tests

OUR ORDER 81402 - 03

HEAT & PIECE 37706-3A 4/29/96

SOLD TO: VINCENT METAL GOODS
DIV OF RIO ALGOM INC
P O BOX 360
MINNEAPOLIS MN 55440

SHIP TO: VINCENT METAL GOODS
4755 FIRST AVE SOUTH
206-762-0600
SEATTLE WA 98134
937001-14

YOUR ORDER & DATE

98-062019 3/01/96

TAG# 393520

ITEM DESCRIPTION

HEAT & PIECE 37706 - 3A
WEIGHT 4736

FINISH 1
GRADE 304 UNS-S30400
DIMENSIONS .875 X 72.000 X 254.000 EXACT

SPECIFICATIONS

METAL GOODS SPECS FOR 304
NO WELD REPAIR ON MATERIAL
ASTM A167-93
AMS 5511P EXCEPT LINE MARK
ASTM A262-93 PRAC A

NO GRIPPER MARKS
ASTM A240-95A, ASME SA240-95
ASTM A480/A480M-94B
MIL-S-5059D WITH EXCEPTIONS
ASTM A262-93 PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
THEN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS

HARDNESS RB 80
GRAIN SIZE 5
YIELD STRENGTH (PSI) 45200
TENSILE STRENGTH (PSI) 88100
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION % IN 2" 59.0
REDUCTION OF AREA % 67.0

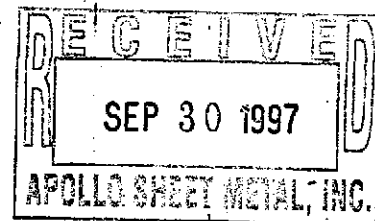
CHEMICAL COMPOSITION

CARBON (C) .04
MANGANESE (MN) 1.52
PHOSPHORUS (P) .028
SULFUR (S) .004
SILICON (SI) .45
CHROMIUM (CR) 18.26
NICKEL (NI) 8.13
COBALT (CO) .12
COPPER (CU) .52
MOLY (MO) .38
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM,
OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS
HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

J. BONGARDT, LAB MANAGER.

P.O. BOX 1975
Baltimore, Maryland 21203
Telephone: (410) 522-6200
FAX # 410-522-6247



R-450-KBC
37706-3A
375



SANDMEYER STEEL COMPANY
STAINLESS STEEL PLATE AND PLATE PRODUCTS
TOOL AND DIE STEELS
THE COUNTRY'S MOST COMPLETE CUTTING SERVICE ORGANIZATION

ONE SANDMEYER LANE • PHILADELPHIA, PA 19116-3598 • 215-464-7100 • 800-523-3663 • FAX: 215-677-1430

BILL TO

CERTIFICATE OF TEST

NOR-CAL PRODUCTS, INC.
 1967 S. OREGON STREET
 P. O. BOX 518
 YREKA, CA 96097-0518

WE CERTIFY THAT THE CHEMICAL ANALY AND MECHANICAL TEST RESULTS APPEAR IN THIS CERTIFICATE ARE CORRECT AND TRUE AS REPORTED BY THE MANUFACTUR

SANDMEYER STEEL COMPANY

CUSTOMER ORDER NO. 30037

E. GARDOSH - MANAGER, QUALITY ASSURANCE
 QUALITY CONTROL DEPARTMENT

DATE: 05/14/97

GRADE: 304	SPECIFICATION: ASME SA-240	HEAT NO.: 875327						
PIECES: 1	DESCRIPTION: 6.03" OD X 3-3/4" ID X 7/8" 1733 #1 R-600-400N	PLATE NO.: 69028						
HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
875327	0.053	1.690	0.029	0.001	0.440	8.310	18.300	0.08
HEAT NO.	Yield *	Tensile *	Elong	Hardness				
875327	45,800	90,200	57% IN 2"	BHN 179				

* LBS/IN2

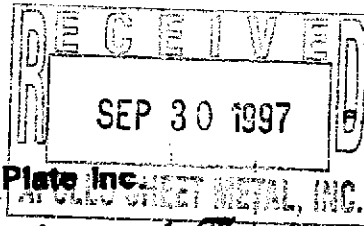
MATERIAL SOLUTION ANNEALED AT 1900 DEGREES F MINIMUM AND WATER QUENCHED OR RAPIDLY COOLED BY AIR
 MATERIAL MANUFACTURED BY ALLEGHENY LUDLUM STEEL CORP.

P.O. 30037 4-2

PO 29831 L-1 R-600-4001

Metal Goods Service Centers
Sales Order: 31-062761

Customer: norcal



Page: 1 of 1

DEC-87-1995 10:51

METAL GOODS SER



Avesta Sheffield Plate Inc.

Certificate of Analysis and Tests

OUR ORDER 66742 - 01

HEAT & PIECE 55231-4A2 12/01/95

SOLD TO: METAL GOODS/DIV OF ALCAN ALUMI
P. O. BOX 346
ST LOUIS MO 63164

SHIP TO: METAL GOODS SERVICE CENTER
4735 FIRST AVE. SOUTH
206-762-8600
SEATTLE WA 98134
614001-31

YOUR ORDER & DATE

98-034130 11/27/95

TAG# 319814 IC

ITEM DESCRIPTION

HEAT & PIECE 55231 4A2
WEIGHT 4694
FINISH 1
GRADE 304
DIMENSIONS 304 625 X 94.000 X 268.000 EXACT

SPECIFICATIONS

METAL GOODS SPECS FOR 304
ASTM A240-94A, ASME SA240-95
ASTM A480/A480M-94B
MIL-S-5059D
ASTM A262-93 PRAC A

NO GRIP MARKS-NO WELD REPAIR
ASTM A167-93
AND 5513F EXCEPT LINE MARK
ASTM A262-93 PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1750 DEGREES FARENHEIT MINIMUM.
THEN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS

HARDNESS RB 84
YIELD STRENGTH (PSI) 47812
TENSILE STRENGTH (PSI) 90267
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION % IN 2" 33.7
REDUCTION OF AREA % 68.1

CHEMICAL COMPOSITION

CARBON (C) .05
MANGANESE (MN) 1.43
PHOSPHORUS (P) .032
SULFUR (S) .003
SILICON (SI) .39
CHROMIUM (CR) 18.43
NICKEL (NI) 8.07
COBALT (CO) .12
COPPER (CU) .26
MOLY (MO) .34
NITROGEN (N) .07
COLUMBIUM (CB) .010
TITANIUM (TI) .010
ALUMINUM (AL) .007
TIN (SN) .013

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM,
OR MAKING FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS
HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

A. L. TRISSLER, LAB TESTING MANAGER

Avesta Sheffield Plate Inc.
P.O. Box 370
New Castle, Indiana 47362



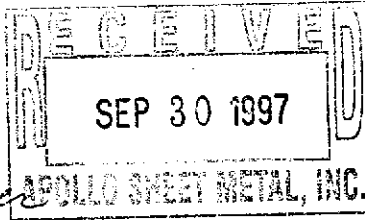
SANDMEYER STEEL COMPANY
 STAINLESS STEEL PLATE AND PLATE PRODUCTS
 TOOL AND DIE STEELS
 THE COUNTRY'S MOST COMPLETE CUTTING SERVICE ORGANIZATION

ONE SANDMEYER LANE • PHILADELPHIA, PA 19116-3598 • 215-464-7100 • 800-523-3663 • FAX: 215-677-1430

BILL TO

NOR-CAL PRODUCTS, INC.
 1967 S. OREGON STREET
 P. O. BOX 518
 YREKA, CA 96097-0518

Attn: Simon Palmer



CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEAR IN THIS CERTIFICATE ARE CORRECT AND TRUE AS CONTAINED IN THE RECORDS OF THE COMPANY

SANDMEYER STEEL COMPANY

CUSTOMER ORDER NO.

30037

E. GARDOSH - MANAGER, QUALITY ASSURANCE
 QUALITY CONTROL DEPARTMENT

DATE:

05/14/97

GRADE:	304	SPECIFICATION:	ASME SA-240	HEAT NO.:	161223
PIECES		DESCRIPTION			

150 8.03" OD X 5-3/4" ID X 1"
 1735
 #2 - R - 800-600N

PLATE NO. 18682

P.O. 30037-1

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
161223	0.066	1.630	0.029	0.001	0.460	8.150	18.240	0.07

HEAT NO.	Yield *	Tensile *	Elong	Hardness
161223	52,900	88,700	57% IN 2"	RR 83

* LBS/IN2

MATERIAL SOLUTION ANNEALED AT 1900 DEGREES F MINIMUM AND WATER QUENCHED OR RAPIDLY COOLED BY AIR

IC 319871

RECEIVED
SEP 30 1997
APOLLO SHEET METAL, INC.

Allegheny Ludlum CORPORATION
JESSOP Specialty Products
CALIFORNIA DIVISION

SALES ORDER

NOV 1996	DATE ENTER	SALESMAN NO.	INVT.	DEPT.	TAX	CUST. ORD. DATE	REQ. DATE	SALES ORDER NO.
	02/26/96	46R 000	02	70	N	02/23/96		DS -053630 REPRINT
9503197	METAL GOODS DIV ALCAN ALUMINUM CORP P O BOX 81186 SEATTLE WA		SHIP TO	METAL GOODS 4755 FIRST AVE SOUTH SEATTLE WA			98134	ROUTING TRUCK F.O.B. SHIPPING DELIVERED CUST. ORDER NO. 98-062006
		98108						

HEAT NO. 510730
MILL SOURCE Allegheny Ludlum Corporation
JESSOP Specialty Products

SIZE & DESCRIPTION 3/4" T304L

EXCEPT AS OTHERWISE NOTED, THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE LISTED SPECIFICATIONS AND RESULTS CONFORM TO THE SPECIFICATION AND ORDER REQUIREMENTS.

Allegheny Ludlum CORPORATION
JESSOP Specialty Products

500 Green Street
Washington, PA 15301

Bill LOS ANGELES WAREHOUSE
To ALLEGHENY LUDLUM CORP
14420 SOUTH MARQUARDT AVE
SANTA FE SPRINGS CA 90670

CERTIFIED MATERIAL TEST REPORT
YOUR ORDER NO. LP3632000
MEMO NO. 2563
DATE 109071
SALESMAN NO. 02/12/76
099
A. J. O'Donnor
AUTHORIZED SIGNATURE

JESSOP T 304L STAINLESS HRAP
AMS 5311F ASTM A167-91
ASTM A262-90 PRACTICE A (WAIVE CLM) ASTM A240-91a ASME SA-240-A93

Heat	Slip	Size	Pcs	Weight
770370	04725 B	1.0000 x 96.0000 x 269	3000	7666
870730	95736 B	.7500 x 96.0000 x 278	0000	5954

Heat	C	MN	P	S	SI	NI	CR	MO	CO	CU	N
770370	.023	1.85	.026	.0002	.32	8.67	18.39	.25	.13	.28	.086
870730	.022	1.69	.029	.0004	.44	8.26	18.34	.27	.10	.42	.089

Heat	Gauge	Yield Strength	Tensile Strength	Elong	Red. of Area	Hardness	Bend	Corrosion	Grain Size
770370	1.0000	38.4 KSI	82.2 KSI	62.2	79.0	BHN170		OK	
870730	.7500	43.3 KSI	35.6 KSI	58.1	79.0	BHN170		OK	

MATERIAL WAS NOT WELD REPAIRED

770730-75



Avesta Sheffield East, Inc.

11/22

Certificate of Analysis and Tests

OUR ORDER 80873 - 04 DUAL

HEAT & PIECE 37545-2A 4/20/96

SOLD TO: VINCENT METAL GOODS

SHIP TO: VINCENT METAL GOODS
4755 FIRST AVE. SOUTH
206-762-0600
SEATTLE WA 98134
614001-31

P. O. BOX 346
ST LOUIS MO 63166

YOUR ORDER & DATE

98-056777 2/15/96

12
TAG# 334482

ITEM DESCRIPTION

HEAT & PIECE 37545-2A
WEIGHT 6147
FINISH 1
GRADE 304
DIMENSIONS 1.125 X 72.000 X 257.000 EXACT
UNS-830400

SPECIFICATIONS

METAL GOODS SPECS FOR 304L
NO GRIP MARKS-NO WELD REPAIR
ASTM A167-93
MIL-S-5059D WITH EXCEPTIONS
ASTM A262-93 PRAC A

AMS 5511F EXCEPT LINE MARK
ASTM A240-95A, ASME SA240-95
ASTM A480/A480M-94B
ASTM A262-93 PRAC E

PLATES & TEST PCS SOLUTION ANNEALED @ 1950 DEGREES FARENHEIT MINIMUM.
THEN WATER COOLED OR RAPIDLY COOLED BY AIR
FREE OF MERCURY CONTAMINATION
HOT ROLLED, ANNEALED & PICKLED (HRAP)

MECHANICAL & OTHER TESTS

HARDNESS RB 72
GRAIN SIZE 5
YIELD STRENGTH (PSI) 35400
TENSILE STRENGTH (PSI) 81000
BEND OK
INTERGRANULAR CORROSION OK
ELONGATION 1 IN 2" 55.0
REDUCTION OF AREA 1 58.0

CHEMICAL COMPOSITION

CARBON (C) .01
MANGANESE (MN) 1.55
PHOSPHORUS (P) .031
SULFUR (S) .002
SILICON (SI) .39
CHROMIUM (CR) 18.31
NICKEL (NI) 8.64
COBALT (CO) .11
COPPER (CU) .48
MOLY (MO) .43
NITROGEN (N) .07

KNOWINGLY & WILLFULLY FALSIFYING OR CONCEALING A MATERIAL FACT ON THIS FORM,
OR MAKING FALSE, PICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS
HEREIN COULD CONSTITUTE A FELONY PUNISHABLE UNDER FEDERAL STATUTES.

J. BONGAROT, LAB MANAGER

10A29621L-1

P.O. BOX 1075
Baltimore, Maryland 21208
Telephone: (410) 522-6200
FAX # 410-522-6247

227-200-7 12967 01



NOR-CAL
PRODUCTS,
INC.

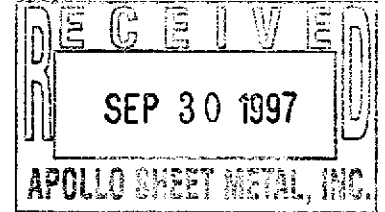
Manufacturers of
High Vacuum
Components

1967 S. Oregon St.
P.O. Box 518
Yreka, Ca 96097

800-824-4166
916-842-4457
FAX: 916-842-9130

FAX COVER SHEET

FAX: 916-842-9130



Please Deliver To:

Name Mark FAX 509-736-1022
 Firm Keller Supply Telephone _____
 City _____ Mail Stop _____
 From Diana Tudor Date September 23, 1997

Total Pages Including Cover 5

Re: PO 24-542920

Hi Mark:

Here are the certs I talked to you about. They are for Lines 48, 49, 50 and 51.

Please call me if you need "Tudoring".

Thanks,

Diana

HEAD OFFICE:
 705 OLDS INDUSTRIAL PARK ROAD
 FRAZER, PA 16126
 PHONE (412) 646-1500
 FAX (412) 646-1505 (LAB)

DAMASCUS-BISHOP

TUBE COMPANY, INC.



PO BOX 1189, RT. 30 & MAIN ROAD
 FRAZER, PA 19355
 PHONE (610) 647-3450
 FAX (610) 647-2640

2" X 065 304/304L H# H7

CERTIFICATE OF TEST

MARCEGALLA GROUP

BOLD TO EXCEL METALS
 6400 FLEET STREET

SHIP TO SAME

CTY OF COMMERCE, CA 90040

FLAN.	HYDRO	FLAT	FLAN	EDDY	REMO	RFLT
		OK	OK	OK	OK	OK

MILL ORDER NO.	680636-03
PURCHASE ORDER NO.	C1035
DATE SHIPPED	08/13/96
SPECIFICATIONS	
ASTM A249-94A, A-249-94A AND ASME SA-249-95 TIG WELDED	
OTHER SPECIFICATIONS	

MATERIAL SOLUTION ANNEALED AT 2,000 F FOR 1 HOUR PER INCH OF THICKNESS AND WATER
 QUENCHED BELOW 400 F IN LESS THAN 5 MINUTES. ANNEALED & PICKLED

ITEM	TYPE	O.D./I.D.	GA./SCH.	HEAT NO.	CARBON	MANG.	PHOS.	SULPHUR	SILICON	CHROMIUM	NICKEL	MOLY.	COPPER	COBALT	TI				
02	TP304/TP304L	2"	065	R761	.028	1.61	.027	.017	.27	18.15	8.49	.17	.32						

RECEIVED
 SEP 30 1997
 APOLLO SMELT METAL, INC.

ITEM	ROCKWELL HARDNESS	YIELD STRENGTH (PSI)	TENSILE STRENGTH (PSI)	ELONGATION	HYDRO PSI (IF APPLICABLE)	MELT SOURCE (IF APPLICABLE)	PIECES	PACKAGE
02	870	85,900	85,000	65%		F1	150	3000'

WE CERTIFY THAT THE CHEMICAL, PHYSICAL OR MECHANICAL TESTS REPORTED HEREIN ARE CORRECT AS SHOWN ON OUR RECORDS.

DAMASCUS

[Signature]
 D.C. MANAGER

P.02
 P.01-05
 19168429130
 01 FRR/ 029 RGR

SEP 23 1997 03:55P

P. 03
P. 05 05

HEADQUARTERS:
75 WOODS INDUSTRIAL PARK ROAD
GREENVILLE, PA 16125
PHONE (412) 846-1500
FAX (412) 846-1505 (LAB)

DAMASCUS-BISHOP

TUBE COMPANY, INC



PO BOX 1189, RT. 30 & MALIN ROAD
FRAZER, PA 19355
PHONE (610) 647-3450
FAX (610) 647-2540

2 1/2" O.D. x 0.065" WALL THICKNESS
1171150819

MILL ORDER NO.	701650-00
PURCHASE ORDER NO.	C1520
DATE SHIPPED	09/21/1997
SPECIFICATIONS	
ASTM A249-94A, A-249-94A AND ASME SA-249-95 EDITION 95 ADDENDA TIG WELDED	
OTHER SPECIFICATIONS	

ORDER TO
EXCEL METALS
6400 FLEET STREET

CITY OF COMMERCE, CA 90040

CERTIFICATE OF TEST

MARCELO ALVA
GROUP

SHIP TO SAME

FLAT	HYDRO	FLAT	FLAM	EDDY	RBND	RFLT
		OK	OK	OK	OK	OK

ADDITIONAL INFO:
MATERIAL SOLUTION ANNEALED AT 2,000 F FOR 1 HOUR PER INCH OF THICKNESS AND WATER
QUENCHED BELOW 800 F IN LESS THAN 3 MINUTES. ANNEALED & PICKLED

ITEM	TYPE	O.D./I.P.S. XXX	O.A./SCH. XXX	HEAT NO.	CARBON	MANGL.	PHOS.	SULPHUR	SILICON	CHROMIUM	NICKEL	MOLY.	COPPER	COBAL	NI				
01	TP304/TP304L	2"	085	150818	.015	1.59	.053	.015	.49	18.23	9.01	.33	.35	.14					

RECEIVED
SEP 30 1997
APOLLO SHEET METAL, INC.

ITEM	ROCKWELL HARDNESS	YIELD STRENGTH (PSI)	TENSILE STRENGTH (PSI)	ELONGATION	HYDRO PSI (IF APPLICABLE)	MELT SOURCE (IF APPLICABLE)	PIECES	FOOTAGE
01	B80	41,500	89,500	60%		D	105	2048'

WE CERTIFY THAT THE CHEMICAL,
PHYSICAL OR MECHANICAL TESTS
REPORTED HEREIN ARE CORRECT
AS SHOWN ON OUR RECORDS.

DAMASCUS

James A. [Signature]
O.C. MANAGER

P. 04

HEAD OFFICE:
 1105 INDUSTRIAL PARK ROAD
 GREENVILLE, PA 18125
 PHONE (412) 846-1500
 FAX (412) 648-1505 (LAB)

DAMASCUS-BISHOP

TUBE COMPANY, INC.



PO BOX 1189, RT. 30 & MALIN ROAD
 FRAZER, PA 19355
 PHONE (610) 647-3450
 FAX (610) 647-2540

11/2 X 0.05 304H/304L
 H# 2268

SOLD TO
 EXCEL METALS
 6940 FLEET STREET
 CITY OF COMMERCE, CA 90040

CERTIFICATE OF TEST

MARCEGAGLIA GROUP

SHIP TO SAME

MILL ORDER NO.	801194-01
PURCHASE ORDER NO.	C1470
DATE SHIPPED	12/20/96
SPECIFICATIONS	ASTM A749-94A, A-769-94A AND ASME SA-249-95 TIG WELDED
OTHER SPECIFICATIONS	

FLAT	HYDRO	FLAT	FLAT	EDDY	REND	REND

ADDITIONAL INFO:
 MATERIAL SOLUTION ANNEALED AT 2,000 F FOR 1 HOUR PER INCH OF THICKNESS AND WATER
 QUENCHED BELOW 800 F IN LESS THAN 3 MINUTES. ANNEALED & PICKLED

ITEM	TYPE	O.D./I.D.	GA./SCH.	HEAT NO.	CARBON	MANG.	PHOS.	SULPHUR	SILICON	CHROMIUM	NICKEL	MOLY.	COPPER	COBALT	IT				
02	TP304/TP304L	1-1/2"	065	2268	.022	1.64	.027	.010	.20	18.22	0.50	.22	.27						
03	TP304/TP304L	2"	065	263202	.030	1.76	.030	.016	.51	18.22	0.97	.25	.26	.17					

ITEM	ROCKWELL HARDNESS	WELD STRENGTH (PSI)	TENSILE STRENGTH (PSI)	ELONGATION	HYDRO PSI (IF APPLICABLE)	MELT SOURCE (IF APPLICABLE)	PIECES	FOOTAGE
02	B77	42,000	80,100	60%		0	190	0150'
03	B85	42,500	85,700	60%		0	272	5434'

RECEIVED
 SEP 30 1997
 APOLLO METALS INC.

WE CERTIFY THAT THE CHEMICAL, PHYSICAL OR MECHANICAL TESTS REPORTED HEREIN ARE CORRECT AS SHOWN ON OUR RECORDS.

DAMASCUS

James J. Stettin
 G.C. MANAGER

Sep-23-97 03:56P

3209 3

K-551-030-0
216 X 0.063 80440859
0440859

HEAL...TERS:
795 REYNOLDS INDUSTRIAL PARK ROAD
GREENVILLE, PA 16125
PHONE (412) 846-1500
FAX (412) 846-1505 (LAB)

DAMASCUS-BISHOP

TUBE COMPANY, INC.



PO BOX 1189, RT. 30 & MALIN ROAD
FRAZER, PA 19385
PHONE (810) 647-3450
FAX (810) 647-2540

CERTIFICATE OF TEST

MARCELAGLIA GROUP

Sold to
EXCEL METALS
6400 FLEET STREET

EXCEL METALS
6400 FLEET STREET

CITY OF COMMERCE, CA 90040

CITY OF COMMERCE, CA 90040

FLAR	HYDRO	FLAT	FLAN	EDDY	FLAND	FLIT

ADDITIONAL INFO.

MATERIAL SOLUTION ANNEALED AT 2,000 F FOR 1 HOUR PER INCH OF THICKNESS AND WATER QUENCHED BELOW 800 F IN LESS THAN 3 MINUTES. ANNEALED & PICKLED

MILL ORDER NO.	702026-00
PURCHASE ORDER NO.	C1516
DATE SHIPPED	08/01/1997
SPECIFICATIONS	
ASTM A249-96A, A-289-96 AND ASME SA-249-95 EDITION 95 ADDENDA TIG WELDED	
OTHER SPECIFICATIONS	

ITEM	TYPE	O.D./I.D.	GA./SCH.	HEAT NO.	CARBON	MANG.	PHOS.	SULPHUR	SILICON	CHROMIUM	NICKEL	MOLY.	COPPER	COBALT	TI				
01	TP300/TP304L	2-1/2"	065	0440858	.018	1.57	.026	.007	.35	18.58	0.89	.25	.18	.89					

RECEIVED
SEP 30 1997

ITEM	ROCKWELL HARDNESS	YIELD STRENGTH (PSI)	TENSILE STRENGTH (PSI)	ELONGATION	HYDRO PSI (IF APPLICABLE)	MELT SOURCE (IF APPLICABLE)	PIECES	FOOTAGE
01	B80	92,500	89,700	65%			109	2178'

APOLLO SHEET METAL, INC.

WE CERTIFY THAT THE CHEMICAL, PHYSICAL OR MECHANICAL TESTS REPORTED HEREIN ARE CORRECT AS SHOWN ON OUR RECORDS.

DAMASCUS

James J. Hatcher
D.C. MANAGER

P.05
F.UD.UD
17100-02100
1000
SEP-23-97 03:56P