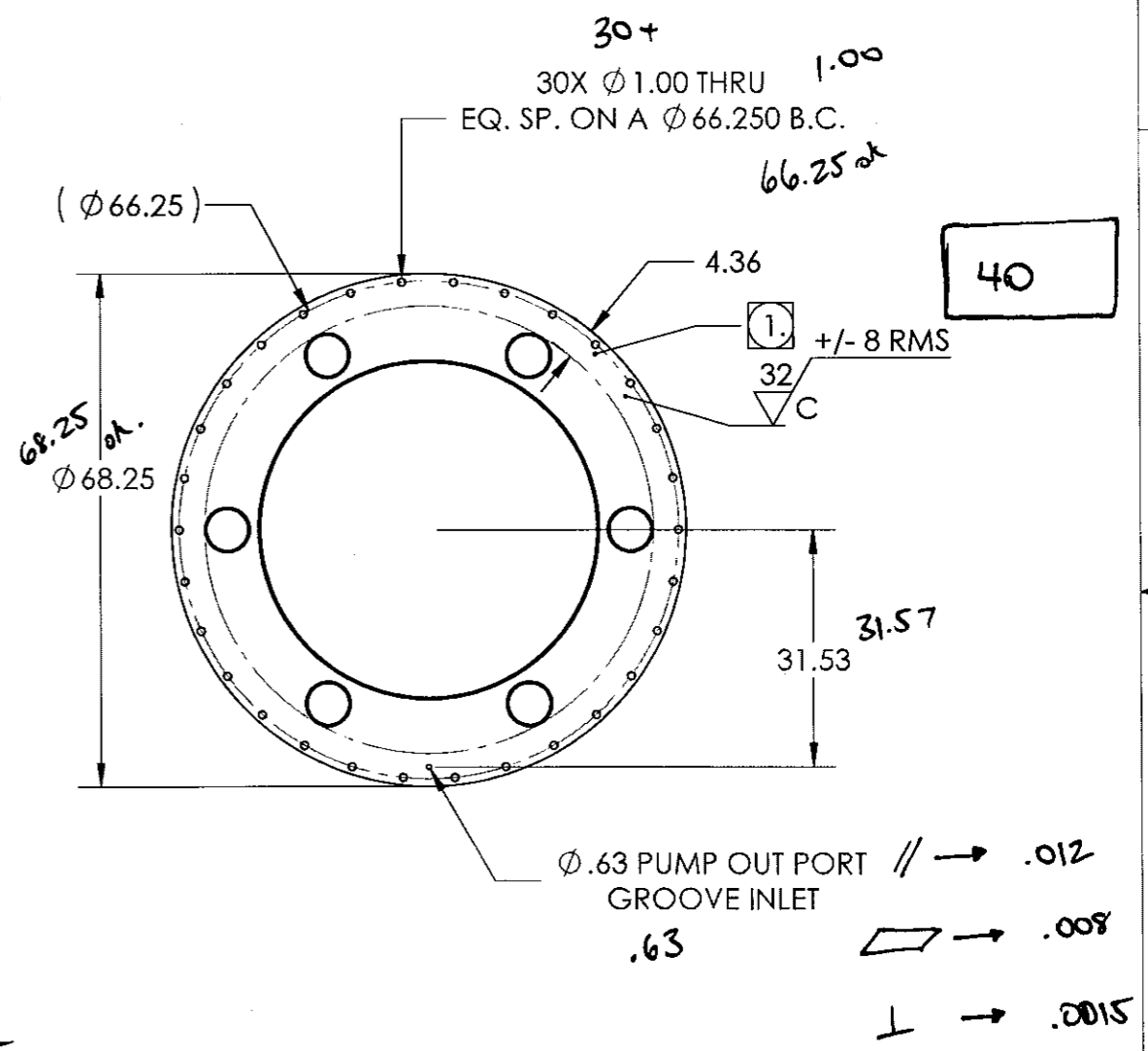
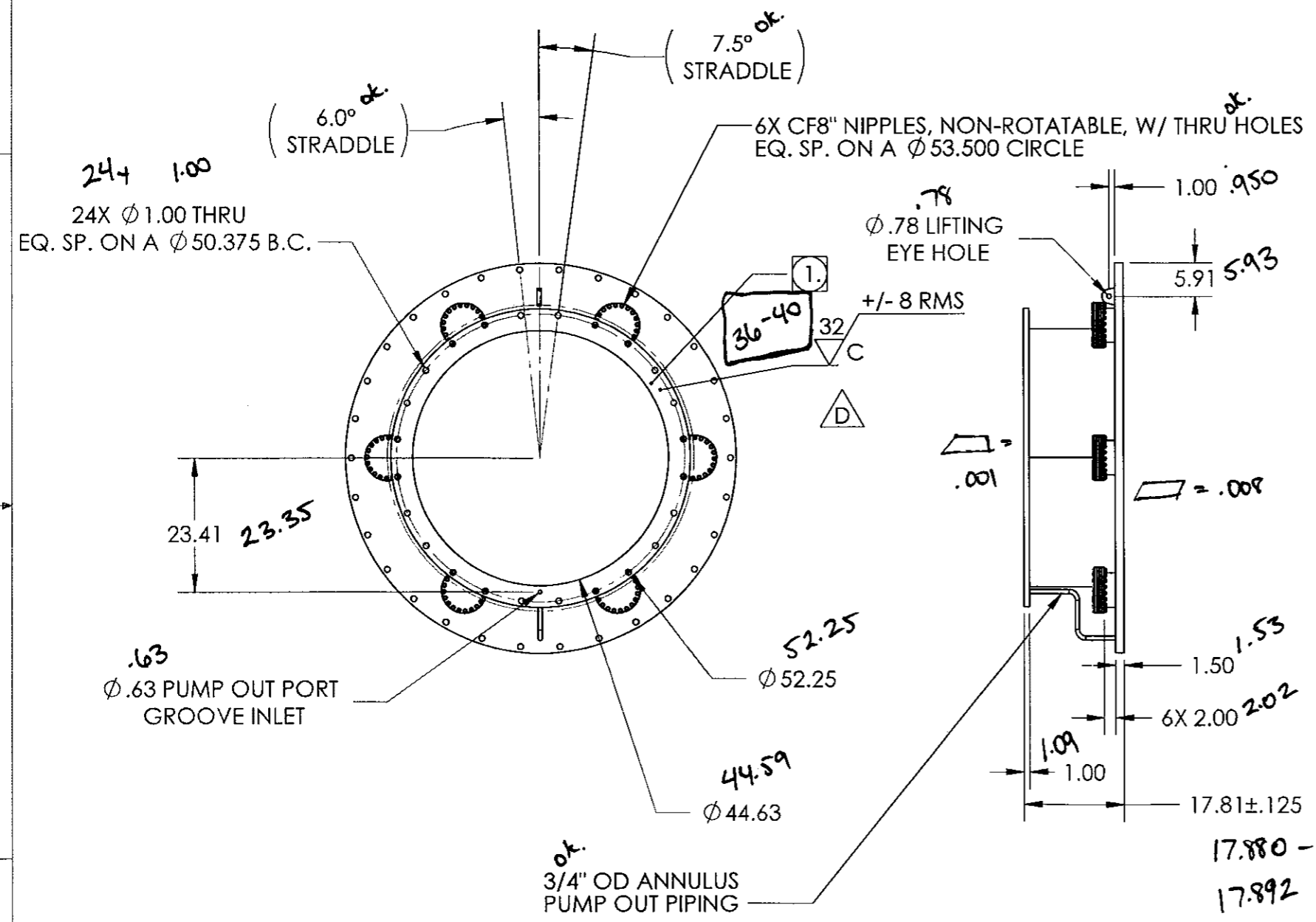


PROPRIETARY AND CONFIDENTIAL  
 THE INFORMATION CONTAINED IN THIS  
 DRAWING IS THE SOLE PROPERTY OF  
 GNB CORPORATION. ANY  
 REPRODUCTION IN PART OR AS A WHOLE  
 WITHOUT THE WRITTEN PERMISSION OF  
 GNB CORPORATION IS PROHIBITED.

3473/1

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	REVISED MODEL TO MATCH MFG. PROCESSES	6/9/10	MKM2
	B	REVISED TOLERANCE BLOCK, GD&T TOLERANCE WAS .05, NOW .03	6/24/10	MKM2
	C	REVISED TOLERANCES ON BOLT CIRCLES, 68.25 WAS 68.50; CALLED OUT FLANGE THICKNESSES, LARGE FLANGE IS NOW 1.5 THK. WAS 1.0	7/20/10	MKM2
	D	ADDED FINISH CALL-OUTS, RELEASED TO PRODUCTION	8/20/2010	MKM2



- NOTES
- VACUUM SEALING SURFACE ✓
  - ALL CONFLAT FLANGES ARE NON-ROTATABLE WITH THRU HOLES. ✓

MATERIAL: AISI 304/AISI 304L DUAL CERT PER SA240

UNLESS OTHERWISE SPECIFIED: WEIGHT: 1276.64#

DIMENSIONS ARE IN INCHES

TOLERANCES: FINISH 125

ANGULAR:  $\pm$  0°30'

.XX  $\pm$  .06

.XXX  $\pm$  .005

UNSPECIFIED FILLETS: R.015

BREAK EDGES .010x45°

REMOVE ALL BURRS

// . □ . ⊥ WITHIN .03

THIRD ANGLE PROJECTION

APPROVALS	DATE
DRAFTER MKM2	6/9/10
CHECKER RW	6/14/10
ENGINEER MKM2	6/9/10

GNB CORPORATION  
 SCIENTIFIC AND INDUSTRIAL EQUIPMENT

3200 DWIGHT RD. SUITE 100  
 ELK GROVE, CA, 95758  
 916-395-3003 FAX: 916-395-3363  
 www.gnbvalves.com

TITLE: OUTLINE, ADAPTER A-16

DO NOT SCALE DRAWING

B DWG. NO. 114141-00

SCALE: 1:24

SHEET 1 OF 1

REV D



Subject: Aqueous Cleaning Procedure (LIGO Only)  
Revision: B Page 9 of 9

QP1750-D2

**GNB - LIGO FINAL CLEANING RECORD**

**This Version For Adapters, Septums & Other Vac Boundary Items**

Component (or item) Name: <i>Z<sup>ND</sup> A-16</i>	GNB Dwg Number: <i>114434-005</i>	Serial Number: <i>85110</i>	Date: <i>4-28-11</i>
---	--------------------------------------	--------------------------------	-------------------------

**External Surfaces - Detergent Wash & Rinse**

Start Time: *10:00* End Time: *10:20*

**OPTIONAL: Pre-Rinse / Component Heat-Up**

Rinse Water Temperature: Typical VB Surface Temperature Attained:

Start Time: End Time:

**VBS - Detergent Wash**

VB Surfaces:	Start Time: <i>10:20</i>	End Time: <i>10:45</i>	
Area Location:	Approx Sq.Ft.:	Start Temp:	Time to get to 130F:
#1		<i>95</i>	
#2		<i>97</i>	

**First DI Rinse**

Start Time: *10:45* End Time: Rinse Duration at least 15 minutes? (y/n): *Y*

**Spot Check for Film or Residue**

Swab Coloration Evident? (y/n): *N* If yes, comments & title/signature:

**Final DI Rinse**

Start Time: *11:00* End Time: Rinse Duration at least 15 minutes? (y/n): *Y*

**Nitrogen Blow Dry**

Start Time: *12:00* End Time: *12:15*

Operator(s): 1: *Cloney* 2: *Danny*

Comments:


**Visual Inspection (VC-Exterior / Vis+UV-VB Surfaces)**

Vacuum Boundary?  pass  fail: Title of Inspector: *Project Manager*

External Surfaces?  pass  fail: Signature/Date: *[Signature] 4-28-11*

Comments:

2<sup>ND</sup> A-16, 17 1<sup>ST</sup> A-18 assembled at bakeout

	QP1750-A7	
	Subject: Leak Test Procedure (LIGO Only) Revision: B Page 4 of 4	

GNB - LIGO LEAK TEST RECORD AND CERTIFICATION			
Detector			
Mdl: Varian VSMD301	SN: LL10074045	Cal. Exp. Date: 6-9-11	Tracer Gas: He4
Std Lk Rate: 9.1 <sup>-8</sup> @ 19.2°C	Std Response: 9.1 <sup>-8</sup> @ 19.2°C		
Component	(1)	(2)	(3)
Component Name	2 <sup>ND</sup> A-16	2 <sup>ND</sup> A-17	1 <sup>ST</sup> A-18
GNB Drawing No. & Rev.	114434-005	114436-005	114444-005
Serial No.	85110	85112	85113
Leak Test Data			
Pressure	1.4 <sup>-4</sup> with only leak checker		
Duration	4		
Response	NO LEAK DETECTED!		
Leak Rate Allowable: $\leq 1 \times 10^{-9}$ Torr-L/S			
Welds I, Measured	6.7 $\times 10^{-10}$	6.7 <sup>-10</sup>	6.7 <sup>-10</sup>
Welds II, Measured	6.7 $\times 10^{-10}$	6.7 <sup>-10</sup>	6.7 <sup>-10</sup>
CF III, Measured	6.7 <sup>-10</sup>	6.7 <sup>-10</sup>	6.7 <sup>-10</sup>
Performed By/Date: Clarence Bleby/Dan	Pre-Final Clean	Post Bakeout <input checked="" type="checkbox"/>	
Witnessed By: M. Putz	Title: Final Assembly & Test SUPERVISOR		
Signature/Date: M. Putz			
Comments:	leak checker calibrated at 5:45 "CAL @ 1:30 PRE FINAL L/C"		
Annulus Pump-down			
Allowable: $\leq 1 \times 10^{-5}$ Torr	Pass / Fail	Pass / Fail	Pass / Fail
Annulus1/CategoryIV			
Annulus1/CategoryV			
Measured Vacuum			
Annulus2/CategoryIV			
Annulus2/CategoryV			
Measured Vacuum			
Performed By/Date:			
Witnessed By:	Signature/Date:		
Comments:			

Base Pressure with turbo + scroll after ramp down  
 6.8<sup>-8</sup>  
 Isolate turbos and spin down so only leak checker is  
 pulling on chamber for leak check.  
 START LEAK RATE 9  $\times 10^{-9}$  TORR L/SEC  
 RATE 9  $\times 10^{-9}$  TORR L/SEC

GNB - LIGO LEAK TEST RECORD AND CERTIFICATION			
Detector			
Mdl: Varian VSMD301	SN: LL10076045	Cal. Exp. Date: 6-9-11	Tracer Gas: He4
Std Lk Rate: $7.6 \times 10^{-8}$	Std Response: $7.6 \times 10^{-8}$		
Component	(1)	(2)	(3)
Component Name	2 <sup>nd</sup> A-16		
GNB Drawing No. & Rev.	114434-005		
Serial No.	85110		
Leak Test Data			
Pressure	$3.4 \times 10^{-5}$		
Duration			
Response	No Leak		
Leak Rate Allowable: $\leq 1 \times 10^{-9}$ Torr-L/S			
Welds I, Measured	$3.4 \times 10^{-5}$	$3.3 \times 10^{-10}$	Pass
Welds II, Measured	$3.4 \times 10^{-5}$	$3.3 \times 10^{-10}$	Pass
CF III, Measured	$3.4 \times 10^{-5}$	$3.3 \times 10^{-10}$	Pass
Performed By/Date: Clancey Bleh 4-4-11	Pre-Final Clean <input checked="" type="checkbox"/>	Post Bakeout <input type="checkbox"/>	
Witnessed By:	Title:		
Signature/Date:			
Comments:			
Annulus Pump-down			
Allowable: $< 1 \times 10^{-5}$ Torr	Pass / Fail	Pass / Fail	Pass / Fail
Annulus1/Category IV	Pass		
Annulus1/Category V			
Measured Vacuum	$1 \times 10^{-5}$		
Annulus2/Category IV			
Annulus2/Category V			
Measured Vacuum			
Performed By/Date: Clancey 4/5/11	Signature/Date:		
Witnessed By:	Signature/Date:		
Comments:			

4/6/11 Rate of rise 8:21  $3.4 \times 10^{-5}$  8:53  $4.16 \times 10^{-4}$  32 min  $.32 \times 10^{-3}$  101 mtorr/min

**Bake Out Data Collection Sheet**

Date: 5/23/11 Technician: Clancey Component: 2<sup>nd</sup> A-16, A-17, 1<sup>st</sup> A-18

	Bake Out Day 1 <u>5/23</u>			Bake Out Day 2 <u>5/24</u>			Bake Out Day 3 <u>5/25</u>		
	Time	Temp	Pressure	Time	Temp	Pressure	Time	Temp	Pressure
1:00 AM					86	8.8 <sup>-6</sup>			
2:00 AM					92	9.6 <sup>-6</sup>			
3:00 AM									
4:00 AM									
5:00 AM					104	8.3 <sup>-6</sup>			
6:00 AM					110	7.2 <sup>-6</sup>			
7:00 AM					116	8.2 <sup>-6</sup>			
8:00 AM					122	9.4 <sup>-6</sup>		150	6.7 <sup>-6</sup>
9:00 AM					128	9.9 <sup>-6</sup>			
10:00 AM					134	1.1 <sup>-5</sup>			
11:00 AM					140	1.5 <sup>-5</sup>			
12:00 PM					146	1.1 <sup>-5</sup>			
1:00 PM					150	1.2 <sup>-5</sup>			
2:00 PM									
3:00 PM		26	3.4 <sup>-4</sup>						
4:00 PM		32	1.7 <sup>-4</sup>						
5:00 PM		38	1.3 <sup>-4</sup>					150	4.6 <sup>-6</sup>
6:00 PM		44	1.1 <sup>-4</sup>						
7:00 PM		50	8.5 <sup>-5</sup>						
8:00 PM		56	6.1 <sup>-6</sup>						
9:00 PM		62	6.4 <sup>-6</sup>						
10:00 PM		68	6.7 <sup>-6</sup>						
11:00 PM		74	6.9 <sup>-6</sup>						
12:00 AM		80	7.6 <sup>-6</sup>						

	Bake Out Day 4 <sup>5/26</sup>			Bake Out Day 5 <sup>5/27</sup>			Bake Out Day 6		
	Time	Temp	Pressure	Time	Temp	Pressure	Time	Temp	Pressure
1:00 AM					78	5.1 <sup>-7</sup>			
2:00 AM					72	3.6 <sup>-7</sup>			
3:00 AM					66	2.8 <sup>-7</sup>			
4:00 AM					60	1.5 <sup>-7</sup>			
5:00 AM					54	1.2 <sup>-7</sup>			
6:00 AM					48	9.2 <sup>-8</sup>			
7:00 AM					42	7.2 <sup>-8</sup>			
8:00 AM		150	4.2 <sup>-6</sup>		36	5.6 <sup>-8</sup>			
9:00 AM					30	5.4 <sup>-8</sup>			
10:00 AM					24	6.5 <sup>-8</sup>			
11:00 AM									
12:00 PM									
1:00 PM		150	4.7 <sup>-6</sup>						
2:00 PM		144	4.6 <sup>-6</sup>						
3:00 PM		138	3.9 <sup>-6</sup>						
4:00 PM		132	3.1 <sup>-6</sup>						
5:00 PM		126	2.7 <sup>-6</sup>						
6:00 PM		120	2.4 <sup>-6</sup>						
7:00 PM		114	1.2 <sup>-6</sup>						
8:00 PM		108	9.9 <sup>-7</sup>						
9:00 PM		102	9.6 <sup>-7</sup>						
10:00 PM		96	8.7 <sup>-7</sup>						
11:00 PM		90	8.3 <sup>-7</sup>						
12:00 AM		84	5.6 <sup>-7</sup>						



QP1750-A3

Subject: Testing, PCL&NVR (LIGO Only)

Revision: A

Page 5 of 7

Page 1 of 2

### GNB - LIGO CLEANLINESS TESTING RECORD

Component (check only 1)

- 114141-00 A16 Adptr     114142-00 A17 Adptr     114143-00 A18 Adptr     114144-00 Mid-St Sp
- 114146-00 MC-B     114146-01 MC-B     114146-02 MC-B     114146-03 MC-B
- 114145-00 MC-A     114425-00S Sept. Plt.
- 114424-01S Sept. Plt.     114424-02S Sept. Plt.     114424-03S Sept. Plt.     114424-04S Sept. Plt.

Other Items (pr/description/quantity): **Z<sup>M</sup> A-16, A-17 IPA rinse test**

Revision:                      Serial Number:

#### Samples

Sample(s) Taken By: **Clancy/Rich**

Date: **5-10-11**

Sample 1 - Bottle Number & Area Sampled:

**Supply & rinsed sample bottle**

Sample 2 - Bottle Number & Area Sampled:

**Filtered supply & rinsed sample bottle**

Sample 3 - Bottle Number & Area Sampled:

**A-16, View Port w/ collection tool**

Sample 4 - Bottle Number & Area Sampled:

**A-16 inner wall**

Sample 5 - Bottle Number & Area Sampled:

**A-16 Flange small**

Sample 6 - Bottle Number & Area Sampled:

**A-17 small Flange**

AstroPak PO Number:

Ship Date, Carrier, Tracking#:

#### Test Result Disposition

AstroPak Test Report Attached?  (y/n):

Is this a Repeated Test?  (y/n)

Is Component Accepted or Rejected? **Accepted**

**particles passed**

Title: **dm**

Signature: **[Signature]**

Date: **5-15-11**

Comments (enter here and/or to right of sample area descriptions):

**FTIR PASSED**



QP1750-A3

Subject: Testing, PCL&NVR (LIGO Only)  
Revision: A

Page 5 of 7

Page 2 of 2

**GNB - LIGO CLEANLINESS TESTING RECORD**

*Component (check only 1)*

<input checked="" type="radio"/> 114141-00 A16 Adptr	<input checked="" type="radio"/> 114142-00 A17 Adptr	<input type="radio"/> 114143-00 A18 Adptr	<input type="radio"/> 114144-00 Mid-St Sp
<input type="radio"/> 114146-00 MC-B	<input type="radio"/> 114146-01 MC-B	<input type="radio"/> 114146-02 MC-B	<input type="radio"/> 114146-03 MC-B
<input type="radio"/> 114145-00 MC-A	<input type="radio"/> 114425-00S Sept. Plt.		
<input type="radio"/> 114424-01S Sept. Plt.	<input type="radio"/> 114424-02S Sept. Plt.	<input type="radio"/> 114424-03S Sept. Plt.	<input type="radio"/> 114424-04S Sept. Plt.
<input type="radio"/> Other Items (pr/description/quantity): 2 <sup>nd</sup> A-16, A-17 IPA Rinse test			

Revision: Serial Number:

**Samples**

Sample(s) Taken By: Clancy/Rich

Date: 5-10-11 Result Comments

Sample 1 - Bottle Number & Area Sampled:

#7 A-17 Inner wall

Sample 2 - Bottle Number & Area Sampled:

#8 A-17 View Port

Sample 3 - Bottle Number & Area Sampled:

Sample 4 - Bottle Number & Area Sampled:

Sample 5 - Bottle Number & Area Sampled:

Sample 6 - Bottle Number & Area Sampled:

AstroPak PO Number:

Ship Date, Carrier, Tracking#:

**Test Result Disposition**

AstroPak Test Report Attached? (y/n):  Is this a Repeated Test? (y/n):

Is Component Accepted or Rejected?

Title: PM Signature: [Signature] Date: 5-15-11

Comments (enter here and/or to right of sample area descriptions):

FTIR PASSED





ASTRO PAK

astropak.com

12201 Pangborn Avenue, Downey, CA 90241 (562) 293-3557 Fax (562) 803-3870  
For inquiries regarding in-process orders, please call Customer Service at (562) 293-3552 or (866) 492-7876 ext. 3552

**Certificate of Compliance**

Astro Pak Corporation hereby certifies that all processes required by your purchase order were performed and that all materials used were in accordance with the applicable specification(s). Any evidence of tampering with the package or seals prior to installation without specific approval, nullifies this certification.

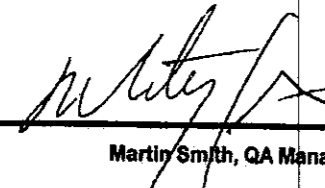
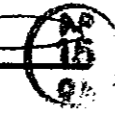
Customer GNB 3200 Dwight Road Suite 100 Elk Grove, CA 95758  
P.O. LC-0107-01 Log 93717264 Total Quantity 8 Date 5/13/2011

The process specification or service performed: Particle and NVR Testing

Tested per IEST-STD-CC1246D for particulate levels and reported results

Line #	Qty	Part #	Part Description	Extended Description	Serial #s	Job #
1	1	Bottle #1	Supply & Rinsed Sample bottle	Sample Tested at Level 43 A/7.69		
2	1	Bottle #2	Filtered/Supply & Rinsed Sample bottle	Sample Tested at Level 65 A/8.67		
3	1	Bottle #3	A-16, View Port w/collection tool	Delta Tested at Level 59 A/25		
4	1	Bottle #4	A-16 Inner Wall	Delta Tested at Level 27 A/100		
5	1	Bottle #5	A-16 Flange Small	Delta Tested at Level 32 A/25		
6	1	Bottle #6	A-17 Small Flange	Delta Tested at Level 50 A/100		
7	1	Bottle #7	A-17 Inner Wall	Delta Tested at Level 50A/33.3		
8	1	Bottle #8	A-17, View Port	Delta Tested at Level 39 A/50		

Quality Assurance

  
Martin Smith, QA Manager 

Date MAY 13 2011

Source Required No

Date



Astro Pak Corporation's Precision Clearing Facility - Downey CA is an AS 9100B:2004 and ISO 9001:2008 registered facility.

Cert. #42548



1 of 1



**ASTRO PAK**

# Certified Test Report

Customer: GNB Corporation

PO: LC-0107-01

Log # 93717264

Description: Samples

Specification: IEST-STD-CC1246D, Level 100A/20

## Acceptance Criteria and Results

Size/microns	> 5	> 15	> 25	> 50	> 100	NVR
Allowable	1,780	264	78	11	1	0.05 mg
1	54	15	4	0	0	0.13 mg
2	120	51	17	1	0	0.15 mg
Δ of 3	40	42	4	0	0	0.04 mg
Δ of 4	29	3	0	0	0	0.01 mg
IEST-STD-CC1246D Levels	34	43	41	NA	NA	A/7.69
IEST-STD-CC1246D Levels	45	63	65	50	NA	A/6.67
IEST-STD-CC1246D Levels	31	59	41	NA	NA	A/25
IEST-STD-CC1246D Levels	27	24	NA	NA	NA	A/100

1 = " 95% UCL = 70 particles > 5 μm / 0.1 m<sup>2</sup> ; LCL = 42 "

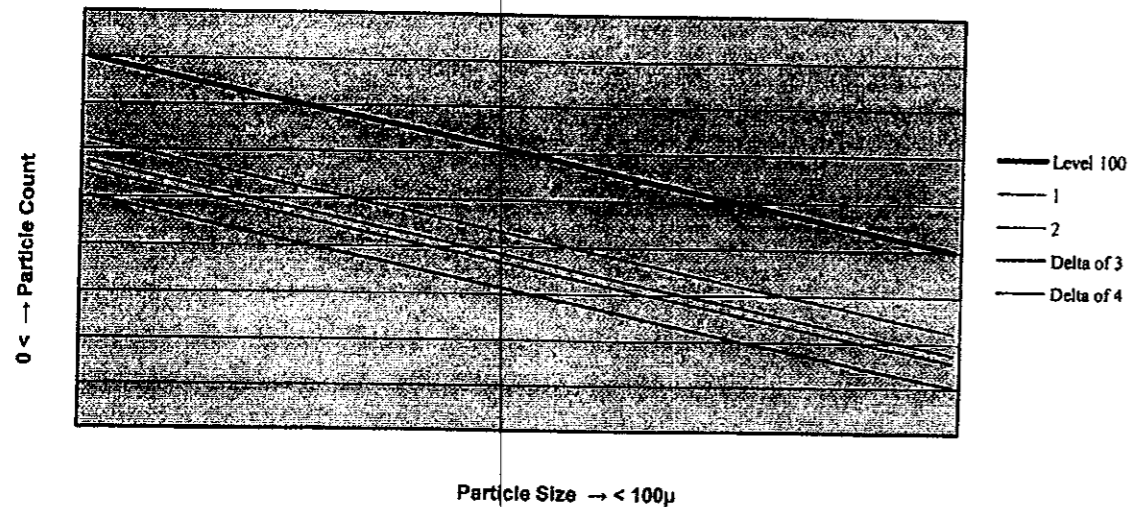
2 = " 95% UCL = 143 particles > 5 μm / 0.1 m<sup>2</sup> ; LCL = 101 "

Delta of 3 = " 95% UCL = 54 particles > 5 μm / 0.1 m<sup>2</sup> ; LCL = 30 "

Delta of 4 = " 95% UCL = 41 particles > 5 μm / 0.1 m<sup>2</sup> ; LCL = 20 "

NOTE: The graph below is merely a visual representation of the raw laboratory data reported above.  
The graph extrapolates the median cleanliness levels to form a graphable line.

IEST-STD-CC1246D , Level 100



Lab Tech: Carlos Alcala  
 Date/Time: 05/12/11 1100  
 Relative Humidity: 46%  
 Temp: 67° F  
 Sample method: ASTM F303  
 Test Method: ASTM F311, F312 & F331

**THE ABOVE DATA HAS BEEN REVIEWED AND APPROVED**

*[Signature]*  
 AP 15 01  
 MAY 18 2011  
 Astro Pak Quality



# Certified Test Report

Customer: GNB Corporation

PO: LC-0107-01

Log # 93717264

Description: Samples

Specification: IEST-STD-CC1246D, Level 100A/20

## Acceptance Criteria and Results

Size/microns	> 5	> 15	> 25	> 50	> 100	NVR
Allowable	1,780	264	78	11	1	0.05 mg
Δ of 5	15	2	2	0	0	0.04 mg
Δ of 6	0	7	0	1	0	0.01 mg
Δ of 7	24	0	3	1	0	0.03 mg
Δ of 8	22	12	0	0	0	0.02 mg
IEST-STD-CC1246D Levels	21	20	32	NA	NA	A/25
IEST-STD-CC1246D Levels	NA	33	NA	50	NA	A/100
IEST-STD-CC1246D Levels	26	NA	37	50	NA	A/33.3
IEST-STD-CC1246D Levels	25	39	NA	NA	NA	A/50

Delta of 5 = " 95% UCL = 25 particles > 5 μm / 0.1 m<sup>2</sup>; LCL = 9 "

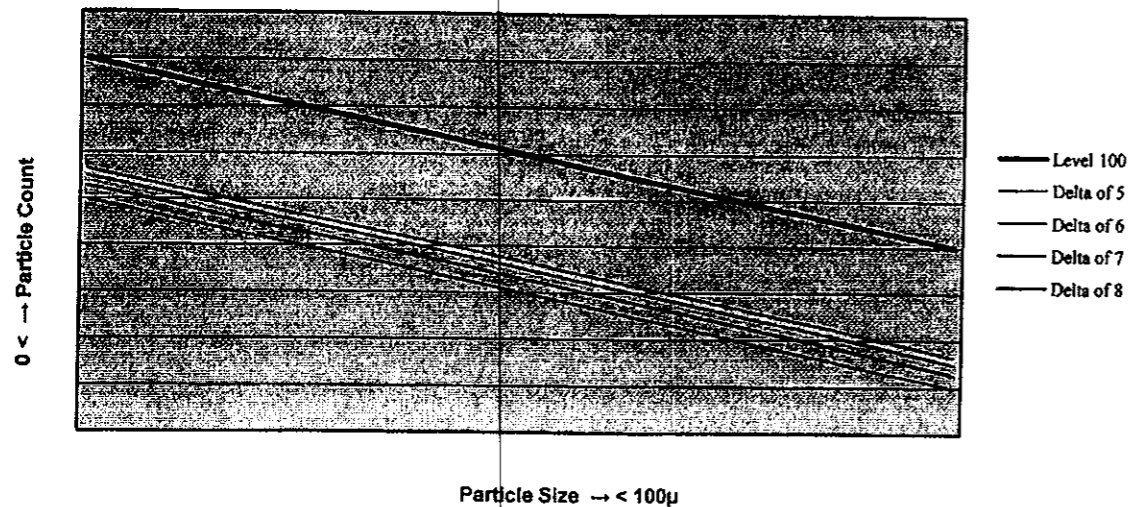
Delta of 6 = " 95% UCL = 4 particles > 5 μm / 0.1 m<sup>2</sup>; LCL = 0 "

Delta of 7 = " 95% UCL = 36 particles > 5 μm / 0.1 m<sup>2</sup>; LCL = 16 "

Delta of 8 = " 95% UCL = 33 particles > 5 μm / 0.1 m<sup>2</sup>; LCL = 15 "

NOTE: The graph below is merely a visual representation of the raw laboratory data reported above.  
The graph extrapolates the median cleanliness levels to form a graphable line.

IEST-STD-CC1246D, Level 100



Lab Tech: Carlos Alcala  
 Date/Time: 05/12/11 1300  
 Relative Humidity: 44%  
 Temp: 65° F  
 Sample method: ASTM F303  
 Test Method: ASTM F311, F312 & F331

THE ABOVE DATA HAS BEEN REVIEWED AND APPROVED

*Signature*  
 Astro Pak Quality  
 MAY 18 2011