

BUY-OFF AND QUALIFICATION REPORT

Machine Description:		Ref No. <u>Q-005</u>
TAPING MACHINE 07 TAPE AND REEL		Package Type : 8L SOIC
Purpose : MACHINE QUALIFICATION PRIOR PRODUCTION USE		
Serial No : 530	Model No : AT28	Control No : CN020
Cal. Spec No: TFP05 - 004	PM Spec No: TFP05 - 004	
Type of Qualification Run		

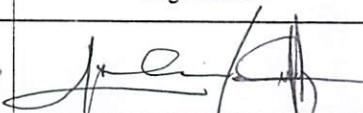
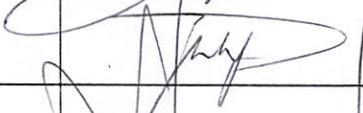
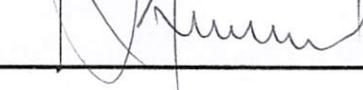
Critical Product Attributes		No. of Sample Units	Summary of Reports
Bent Leads Chipout Coplanarity Others		1 lot	OK

Qualification Requirements: (if applicable)

GR& R	<u>14.6 %</u>	Calibration	<u>PASSED</u>
Jam Rate	<u>N/A</u>	ESD Grounding	<u>OK</u>
UPH	<u>N/A</u>	Cpk	<u>1.7</u>

Type of Release:

FULL RELEASE

Approvals	Name	Signature	Date
Performed by	L. ABAYAN / R. CASBADILLO		<u>12/15/2002</u>
Maintenance	L. MANEJA		<u>12/15/2002</u>
Production	V. ADOAVE		<u>12/15/02</u>
Quality Assurance	R. DELACRUZ		<u>12/15/02</u>
Operations	L. FERRANCOZ		<u>12/15/2002</u>

EQUIPMENT QUALIFICATION SAFETY INSPECTION CHECKLIST

ITEMS TO BE CHECKED	YES	NO	REMARKS
ELECTRICAL			
1. Set on the right power requirement?	✓		
2. Provided with the right type of plug?	✓		
3. Provided with the right size of power supply cable?	✓		
4. No temporary wiring installed?	✓		
5. No electrical wires lying on floors which can cause trip injury?	✓		
MACHINE GUARDS:			
7. Machine cover sensors provided?		✓	
8. Emergency Shut-off switch provided?	✓		
SAFETY SIGNS			
9. Warning cover sensors provided?		✓	
10. Hazardous voltage sign provided?	✓		
11. Hazardous temperature signs provided?	✓		
MACHINE LOCATION AND CONDITIONS			
12. Location clean and well lighted?	✓		
13. No leaks of fuel, oil air, water and/or other gases?	✓		
14. No sharp and pointed parts exposed?	✓		
OTHERS:			
15. Equipment safety rules, Operation Manuals and guidelines provided	✓		
16. Operators and technicians properly trained on electrical safety and use of fire extinguisher?	✓		

CALIBRATION REPORT

EQUIPMENT:	MANUFACTURER	CONTROL NO.	REPORT NO.
TAPING MACHINE # 07	STI	EN020	O10
MODEL NO.	SERIAL NO.	CAL SPEC NO.	
AT28	530	TFP 05-004	
CAL. INTERVAL	CAL. BY	MAINT. CAL ENG'R.	
QUARTERLY	002/048	002	
TEMP. (°C) 22°C	CAL. DATE Dec. 12, 02	CAL TECH 002	
RH (%) 53%	CAL. DUE Feb. 12, 03		

CALIBRATION STANDARD USED

DESCRIPTION	MANUFACTURER	MODEL No.	CONTROL NO.	SERIAL NO.	ACCURACY	CAL. DATE	CAL. DUE	TRACEABILITY
Dthermometer	CHINKA	ST 807	EN005	906889	+/- 75%	09-01-02	04-01-03	N1120C
Thermocouple	PIANRA	Type K	EN0053	NA	NA	08-21-02	08-21-03	N1120C

CALIBRATION INFORMATION

FUNCTION TESTED	NOMINAL	TOLERANCE	INITIAL READING	FINAL READING	REMARKS
Sealing Temperature					
Front	180°C	+/- 50	181.0°C	181°C	
	180°C	}	180°C	180°C	
Rear	102°C	}	101°C	101°C	
	180°C	}	149°C	149°C	

QA REMARKS : _____

Signature and date



TO : Process Eng'g (ADGT) /
FROM : Telford SVC., Phils Inc / L. Abayan
DATE : 12 December 2002
SUBJECT : **QUALIFICATION REPORT FOR STI TAPE & REEL # 07
for SOIC PACKAGE.**

1.0. Background

Telford Equipment qualification for Facility transfer to Totori Sanyo

2.0 Objective

To Qualify the STI AT28 (TnR # 07)machine configured for ADGT SOIC package

3.0 Qualification Process

3.1 STI AT28– Set-up to 8L SOIC RN

3.2 Performed machine GR&R:

Run 10 unit samples on the machine in GRR mode, in terms of Coplanarity, Pitch Min. and Max. standoff.

3.2.1 Result : all below 20% (See attached file)

3.3 Inspection Accuracy Reading

3.3.1 Telford used an actual unit for the inspection accuracy reading of STI tape & reel Run 10 units at STI tape and reel and record the reading.

Same unit were measured on Comparator tool.

Data showed two different inspection measurement result.

Delta is the difference between the two recorded measurement.

Coplanarity , Pitch and Stand-off were the lead parameters considered in the inspection qualification. (Attached result)

3.3.2 Result : all correlation data showed delta below of 0.5 mils (see attached)

3.4 ESD Grounding check

3.4.1 Using digital multi-meter, measured all unit path track with respect to ESD ground.

3.4.2 Criteria: All readings should be below 10 Ohms (see below result)

Input track : 0.2 Ohms
Vision track : 0.2Ohms
Output track : 0.2 Ohms

3.5 Peel Back Force Test measurement : CpK

- 3.5.1 Seal approximately 12 inches of SSOP carrier tape.
- 3.5.2 Measured 25 samples of sealed carrier tape and get measurement of each strip using GPD peel strength tester at 20 to 80 grams setting.
- 3.5.3 Criteria : Above 1.33 (Result = 1.7 ,see attached data)

4.0 CONCLUSION AND RECOMMENDATION

TNR 07 Serial number 610 has successfully passed all the requirements and is now qualified for production use for SOIC RN Package, and therefore recommended for ADGT P.E verification.

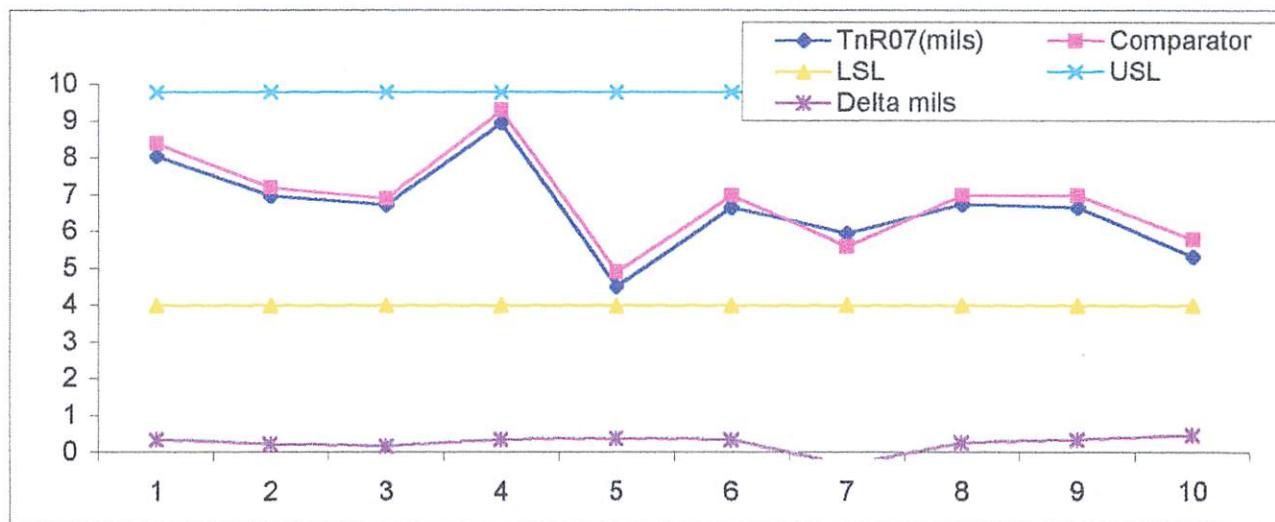
CARRIER TAPE PEEL STRENGTH TEST
FOR STI TnR #07 (serial #610)

Sample	Min	Max	Ave.	Range
1	36	63	54	27
2	30	56	46	26
3	43	66	59	22
4	33	56	48	23
5	47	70	63	24
6	45	77	66	32
7	50	79	68	28
8	44	72	60	29
9	24	56	48	33
10	41	74	58	33
11	40	67	56	27
12	49	76	66	28
13	50	70	61	20
14	55	80	70	24
15	48	76	66	28
16	52	76	68	24
17	37	56	49	19
18	42	68	57	26
19	46	72	63	26
20	42	79	63	37
21	28	57	47	28
22	42	72	60	30
23	32	55	45	22
24	45	75	63	30
25	48	77	66	28
26	38	62	54	25
27	40	76	63	36
28	53	77	67	24
29	36	63	53	27
30	52	71	64	19
Std. Dev	7.808	8.207	7.439	
Sum	1268	2074	1771	
Average	42.267	69.133333	59.03333	
Cpk				1.7

8L SOIC Accuracy Reading (TnR07)

min. standoff

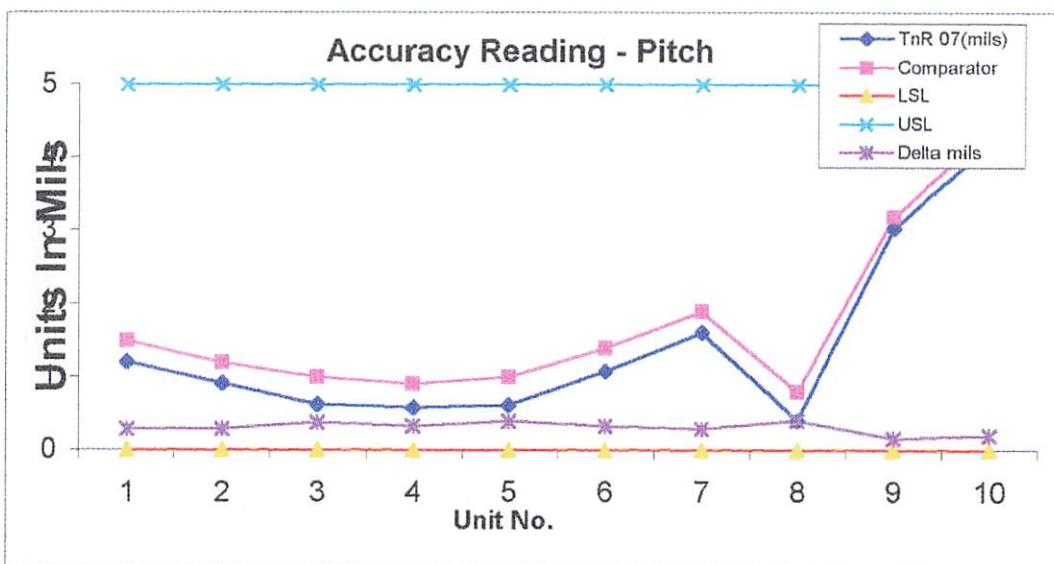
Trial No.	TnR07(mils)	Comparator	LSL	USL	Delta mils
1	8.05	8.4	4	9.8	0.35
2	6.98	7.2	4	9.8	0.22
3	6.73	6.9	4	9.8	0.17
4	8.96	9.3	4	9.8	0.34
5	4.51	4.9	4	9.8	0.39
6	6.66	7	4	9.8	0.34
7	5.95	5.6	4	9.8	-0.35
8	6.74	7	4	9.8	0.26
9	6.66	7	4	9.8	0.34
10	5.33	5.8	4	9.8	0.47



8L SOIC Accuracy Reading (TnR07)

Pitch L(Lead pitch offset)

Trial No.	TnR 07(mils)	Comparator	LSL	USL	Delta mils
1	1.21	1.5	0	5	0.29
2	0.91	1.2	0	5	0.29
3	0.62	1	0	5	0.38
4	0.58	0.9	0	5	0.32
5	0.61	1	0	5	0.39
6	1.08	1.4	0	5	0.32
7	1.61	1.9	0	5	0.29
8	0.4	0.8	0	5	0.4
9	3.04	3.2	0	5	0.16
10	4.2	4.4	0	5	0.2

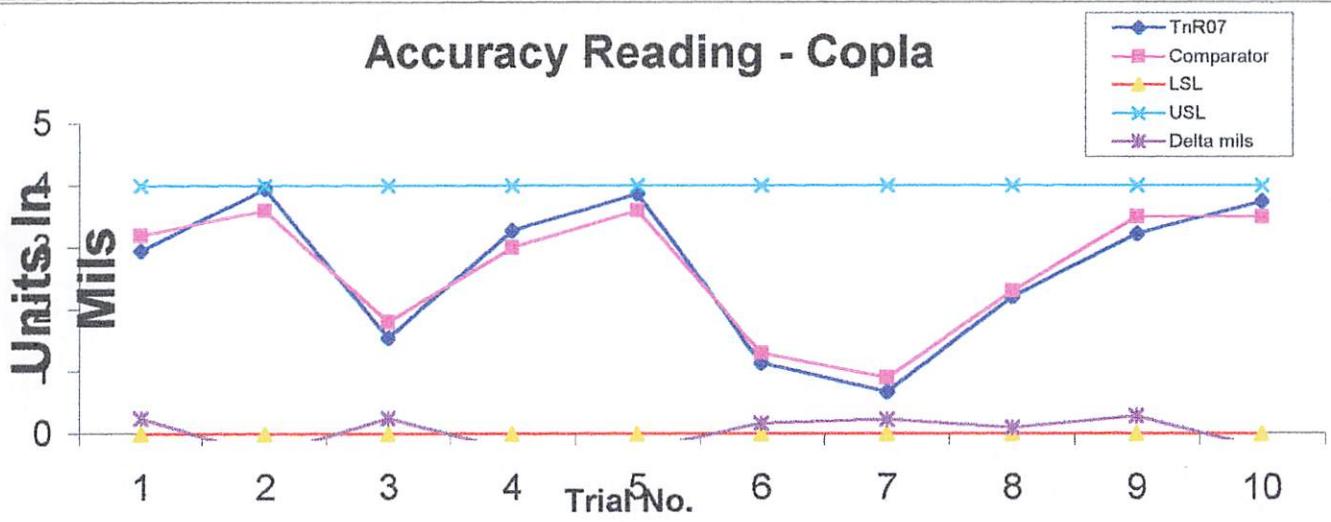


8L SOIC Accuracy Reading (TnR 07)

Coplanarity

Trial No.	TnR07	Comparator	LSL	USL	Delta mils
1	2.95	3.2	0	4	0.25
2	3.95	3.6	0	4	-0.35
3	1.55	1.8	0	4	0.25
4	3.27	3	0	4	-0.27
5	3.87	3.6	0	4	-0.27
6	1.13	1.3	0	4	0.17
7	0.67	0.9	0	4	0.23
8	2.21	2.3	0	4	0.09
9	3.22	3.5	0	4	0.28
10	3.74	3.5	0	4	-0.24

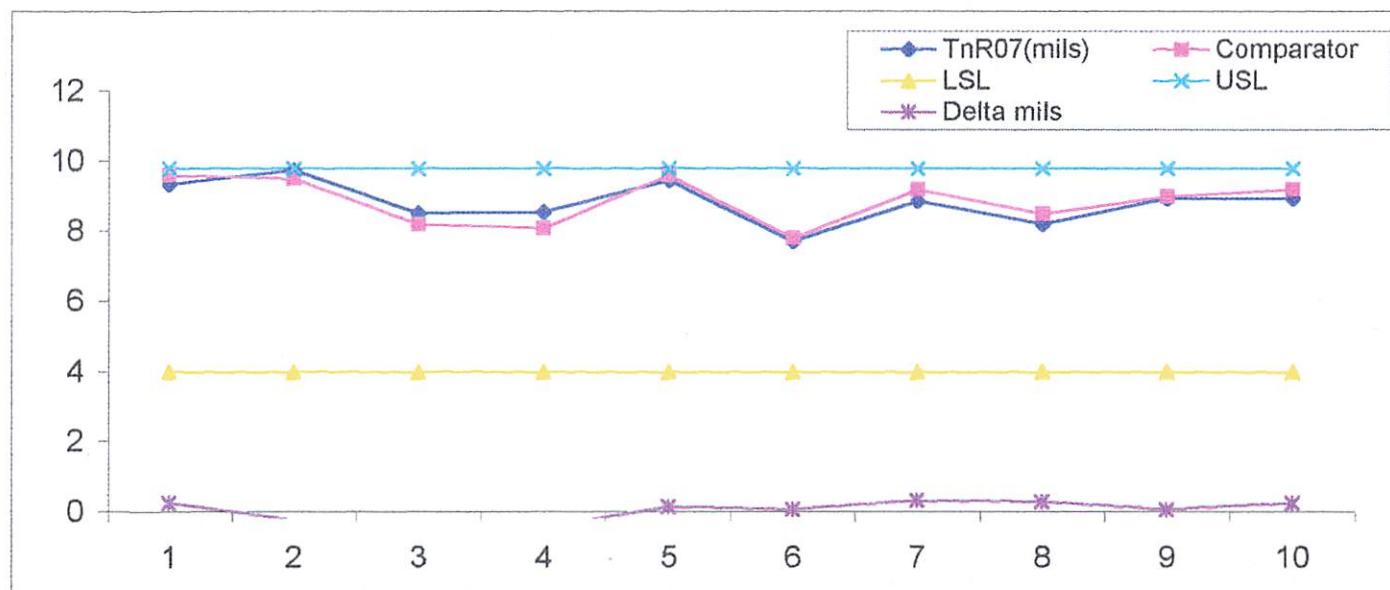
Accuracy Reading - Copla



8L SOIC Accuracy Reading (TnR 07)

Max. standoff

Trial No.	TnR07(mils)	Comparat or	LSL	USL	Delta mils
1	9.34	9.6	4	9.8	0.26
2	9.74	9.5	4	9.8	-0.24
3	8.52	8.2	4	9.8	-0.32
4	8.56	8.1	4	9.8	-0.46
5	9.45	9.6	4	9.8	0.15
6	7.72	7.8	4	9.8	0.08
7	8.87	9.2	4	9.8	0.33
8	8.21	8.5	4	9.8	0.29
9	8.93	9	4	9.8	0.07
10	8.94	9.2	4	9.8	0.26



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Part No. and Name: SOIC 8
 Characteristics Pitch
 Specification: 0.5 mils
 $= 5.0000$
 From Data Sheet: R 0.09

Gage Name: tnr 07
 Gage No:
 Gage Type: VISION SYSTEM

Date: # 12/11/02
 Performed By:
 Leand / Andy.

$$\bar{X}_{\text{DIFF}} = 0.033333 \quad R_p = 3.8044$$

Measurement Unit Analysis		% Process Variation																					
Repeatability - Equipment Variation (EV)																							
$\begin{aligned} EV &= R \times K_1 \\ &= \underline{0.09} \times \underline{3.05} \\ &= \underline{0.2745} \end{aligned}$		<table border="1"> <thead> <tr> <th>Trials</th> <th>K₁</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>4.56</td> </tr> <tr> <td>3</td> <td>3.05</td> </tr> </tbody> </table>		Trials	K ₁	2	4.56	3	3.05														
Trials	K ₁																						
2	4.56																						
3	3.05																						
Reproducibility - Appraiser Variation (AV)		$\begin{aligned} AV &= \sqrt{(\bar{X}_{\text{DIFF}} \times K_2)^2 - (EV^2/nr)} \\ &= \sqrt{(\underline{0.03333} \times \underline{2.70})^2 - (\underline{0.2745}^2 / \underline{10} \times \underline{3})} \\ &= \underline{0.074754} \end{aligned}$																					
<table border="1"> <thead> <tr> <th>Operators</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>K₂</td> <td>3.65</td> <td>2.70</td> </tr> </tbody> </table>		Operators	2	3	K ₂	3.65	2.70	$\begin{aligned} n &= \text{number of parts} \\ r &= \text{number of trials} \end{aligned}$															
Operators	2	3																					
K ₂	3.65	2.70																					
Repeatability & Reproducibility (R & R)		$\begin{aligned} R &= \sqrt{EV^2 + AV^2} \\ &= \sqrt{\underline{0.2745}^2 + \underline{0.0748}^2} \\ &= \underline{0.284497} \end{aligned}$																					
<table border="1"> <thead> <tr> <th>Parts</th> <th>K₃</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>3.65</td> </tr> <tr> <td>3</td> <td>2.70</td> </tr> <tr> <td>4</td> <td>2.30</td> </tr> <tr> <td>5</td> <td>2.08</td> </tr> <tr> <td>6</td> <td>1.93</td> </tr> <tr> <td>7</td> <td>1.82</td> </tr> <tr> <td>8</td> <td>1.74</td> </tr> <tr> <td>9</td> <td>1.67</td> </tr> <tr> <td>10</td> <td>1.62</td> </tr> </tbody> </table>		Parts	K ₃	2	3.65	3	2.70	4	2.30	5	2.08	6	1.93	7	1.82	8	1.74	9	1.67	10	1.62	$\begin{aligned} \%R &= 100[R & R / TV] \\ &= 100[\underline{0.2845} / \underline{6.1697}] \\ &= \underline{4.6} \% \end{aligned}$	
Parts	K ₃																						
2	3.65																						
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8	1.74																						
9	1.67																						
10	1.62																						
Part Variation (PV)		$\begin{aligned} PV &= R_p \times K_3 \\ &= \underline{3.8044} \times \underline{1.62} \\ &= \underline{6.163128} \end{aligned}$																					
Total Variation (TV)		$\begin{aligned} TV &= \sqrt{(R & R)^2 + PV^2} \\ &= \sqrt{(\underline{0.2845}^2 + \underline{6.1631}^2)} \\ &= \underline{6.169691} \end{aligned}$																					
		$\begin{aligned} \%PV &= 100[PV / TV] \\ &= 100[\underline{6.1631} / \underline{6.1697}] \\ &= \underline{99.9} \% \end{aligned}$																					
		$\begin{aligned} \text{PT/Ratio} &= \text{Tolerance/EV} \\ &= \underline{18.215} \end{aligned}$																					
(Ratio must be 10 or better)																							

All calculations are based upon predicting 5.15 sigma (99.0% of the area under the normal distribution curve).

K1 is 5.15/d2, where d2 is dependent on the number of trials (m) and the number of parts times the number of operators (g) which is assumed to be greater than 15. d2 values are from Appendix E.

AV - If a negative value is calculated under the square root sign, the appraiser variation (AV) defaults to zero (0).

K2 is 5.15/d2*, where d2* is dependent on the number of operators (m) and (g) is 1, since there is only one range calculation.

K3 is 5.15/d2*, where d2* is dependent on the number of parts (m) and (g) is 1, since there is only one range calculation.

d2* is obtained from Table D3, "Quality Control and Industrial Statistics," A. J. Duncan. (See Appendix H, Reference 9).

OPERATOR	TRAIL #	PART										AVERAGE
		1	2	3	4	5	6	7	8	9	10	
Daniel Pless	0											
Avg	1	1.300000	1.000000	.770000	.570000	1.070000	1.090000	.360000	3.020000	4.200000	1.395000	
Avg	2	1.200000	.940000	.610000	.560000	1.160000	1.160000	.370000	3.010000	4.220000	1.426000	
Avg	3	1.210000	.910000	.620000	.580000	1.080000	.610000	1.160000	4.000000	3.400000	1.415667	
RNG	4	1.266667	.950000	.666667	.570000	1.090000	1.090000	.376667	3.023333	4.206667	X ^a	
RNG	5	1.200000	.900000	.600000	.560000	1.080000	1.080000	.360000	3.020000	4.200000	1.415667	
RNG	6	1.220000	.930000	.630000	.570000	1.172000	.980000	.500000	2.950000	4.220000	1.431000	
RNG	7	1.340000	.630000	.580000	.610000	1.010000	1.650000	.510000	2.940000	4.260000	1.431000	
RNG	8	1.330000	.580000	.640000	.520000	1.040000	1.640000	.560000	2.940000	4.220000	1.425600	
RNG	9	1.296667	1.006667	.623333	.560000	1.100000	1.100000	.440000	2.970000	4.280000	X ^a	
RNG	10	1.200000	.910000	.680000	.680000	1.080000	1.080000	.440000	2.970000	4.280000	X ^a	
RNG	11	1.310000	.990000	.670000	.570000	1.172000	.980000	.500000	2.950000	4.220000	1.431000	
RNG	12	1.230000	.930000	.610000	.560000	1.010000	1.650000	.510000	2.940000	4.260000	1.431000	
Avg	13	1.310000	1.070000	.580000	.640000	1.040000	1.640000	.560000	2.940000	4.220000	1.425600	
RNG	14	1.283333	999667	.633333	.560000	1.266667	1.010000	.4570000	2.943333	4.233333	X ^a	
RNG	15	1.280000	1.040000	999667	.633333	1.010000	.070000	.060000	0.900000	0.900000	0.900000	
PART	16	080000	140000	090000	090000	070000	1.010000	.060000	080000	1.60000	0.010000	R ^b
Avg (N)	17	1.282222	984444	.641111	.593333	1.034444	1.036667	1.600000	.435600	2.973900	4.240000	R ^b
Ndx X =	18	1.449000	-R ^b	.084000	-R ^b	0.79000	1412667	1-X ^c	3	1=	.090000	R ^b
Ndx X =	19	1.449000	-R ^b	.090000	-R ^b	2.580000	1-X ^c	3	1=	.090000	1.32200	
Ndx X =	20	1.449000	-R ^b	.090000	-R ^b	0.00000	1-LCT ^a				.000000	
General Info												
# Parts	300000	# Operators	1000000	# Trials	3000000	# Dots	1000000	Out of tolerance ranges	0.5400	Mean R	0.5400	

a

Part No. and Name: SOIC 8
 Characteristics Min Standoff
 Specification: 4 mils
 = 5.0000

Gage Name: tnr 07
 Gage No:
 Gage Type: VISION SYSTEM

Date: # 12/11/02
 Performed By:
 Leand / Andy

From Data Sheet: R 0.096667

 $\bar{X}_{\text{DIFF}} = 0.014667$ $R_p = 4.3$

Measurement Unit Analysis		% Process Variation	
Repeatability - Equipment Variation (EV)			
$\begin{aligned} EV &= R \times K_1 \\ &= \underline{0.096667} \times \underline{3.05} \\ &= \underline{0.294834} \end{aligned}$		$\begin{aligned} %EV &= 100[EV/TV] \\ &= 100[\underline{0.2948} / \underline{6.9722}] \\ &= \underline{4.2 \%} \end{aligned}$	
Reproducibility - Appraiser Variation (AV)		$\begin{aligned} AV &= \sqrt{[(\bar{X}_{\text{DIFF}} \times K_2)^2 - (EV^2/nr)]} \\ &= \sqrt{[(\underline{0.01467} \times \underline{2.70})^2 - (\underline{0.2948}^2 / \underline{10} \times \underline{3})]} \\ &= \underline{0} \end{aligned}$	
$\begin{aligned} Operators & \quad 2 \quad 3 \\ K_2 & \quad 3.65 \quad 2.70 \end{aligned}$		$\begin{aligned} %AV &= 100[AV/TV] \\ &= 100[\underline{0} / \underline{6.9722}] \\ &= \underline{0.0 \%} \end{aligned}$	
n = number of parts r = number of trials			
Repeatability & Reproducibility (R & R)			
$\begin{aligned} R &\& R = \sqrt{(EV^2 + AV^2)} \\ &= \sqrt{(\underline{0.29483}^2 + \underline{0}^2)} \\ &= \underline{0.294834} \end{aligned}$		$\begin{aligned} %R &\& R = 100[R & R/TV] \\ &= 100[\underline{0.2948} / \underline{6.9722}] \\ &= \underline{4.2 \%} \end{aligned}$	
Part Variation (PV)		$\begin{aligned} PV &= R_p \times K_3 \\ &= \underline{4.3} \times \underline{1.62} \\ &= \underline{6.966} \end{aligned}$	
$\begin{aligned} Parts & \quad 2 \quad 3 \\ K_3 & \quad 3.65 \quad 2.70 \end{aligned}$		$\begin{aligned} %PV &= 100[PV/TV] \\ &= 100[\underline{6.966} / \underline{6.9722}] \\ &= \underline{99.9 \%} \end{aligned}$	
Total Variation (TV)		$\begin{aligned} TV &= \sqrt{(R & R^2 + PV^2)} \\ &= \sqrt{(\underline{0.29483}^2 + \underline{6.966}^2)} \\ &= \underline{6.972237} \end{aligned}$	
$\begin{aligned} Parts & \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \\ K_3 & \quad 2.30 \quad 2.08 \quad 1.93 \quad 1.82 \quad 1.74 \quad 1.67 \quad 1.62 \end{aligned}$		$\begin{aligned} PT/\text{Ratio} &= \text{Tolerance/EV} \\ &= \underline{16.959} \end{aligned}$	
(Ratio must be 10 or better)			

All calculations are based upon predicting 5.15 sigma (99.0% of the area under the normal distribution curve).

K1 is 5.15/d2, where d2 is dependent on the number of trials (m) and the number of parts times the number of operators (g) which is assumed to be greater than 15. d2 values are from Appendix E.

AV - If a negative value is calculated under the square root sign, the appraiser variation (AV) defaults to zero (0).

K2 is 5.15/d2*, where d2* is dependent on the number of operators (m) and (g) is 1, since there is only one range calculation.

K3 is 5.15/d2*, where d2* is dependent on the number of parts (m) and (g) is 1, since there is only one range calculation.

d2* is obtained from Table D3, "Quality Control and Industrial Statistics," A. J. Duncan. (See Appendix H, Reference 9).

Decimal Places	PART										AVERAGE		
OPERATOR/ TRAIL #	0	1	2	3	4	5	6	7	8	9	10		
1 A 1	8.030000	6.930000	6.720000	8.940000	4.400000	7.030000	6.710000	5.990000	6.730000	5.410000	6.683000		
2 A 2	8.050000	6.930000	6.730000	8.840000	4.480000	7.200000	6.530000	5.950000	6.710000	5.350000	6.677000		
3 A 3	8.050000	6.980000	6.730000	8.960000	4.510000	7.140000	6.660000	5.950000	6.740000	5.330000	6.705000		
4 AVG	8.043333	6.946667	6.726667	8.913333	4.463333	7.123333	6.633333	5.963333	6.726667	5.363333	6.690333		
5 RNG	0206000	4150000	0100000	1200000	1100000	1700000	1800000	0400000	0300000	0800000	R _a = 081000		
6 B 1	7.950000	6.960000	6.730000	8.940000	4.670000	7.010000	6.550000	5.810000	6.540000	5.820000	6.696000		
7 B 2	7.990000	6.970000	6.700000	8.940000	4.750000	6.860000	6.420000	5.850000	6.560000	5.870000	6.691000		
8 B 3	8.030000	6.900000	6.710000	8.950000	4.700000	7.070000	6.420000	5.880000	6.560000	5.920000	6.714000		
9 AVG	7.990000	6.943333	6.713333	8.943333	4.706667	6.980000	6.456667	5.846667	6.553333	5.870400	X _a = 6.700333		
10 RNG	0800000	0700000	0300000	0100000	0900000	2100000	1100000	0300000	0200000	1000000	R _b = 078000		
11 C 1	7.940000	6.880000	6.690000	8.900000	4.650000	7.010000	6.550000	5.890000	6.540000	5.940000	6.703000		
12 C 2	7.900000	6.960000	6.700000	8.840000	4.680000	6.980000	6.570000	5.920000	6.520000	5.980000	6.693000		
13 C 3	7.970000	7.130000	6.740000	8.990000	4.760000	6.980000	6.580000	5.960000	6.290000	5.770000	6.717000		
14 AVG	7.903333	6.990000	6.710000	8.910000	4.696667	6.940000	6.580000	5.923333	6.450000	5.896667	X _c = 6.705000		
15 RNG	170000	250000	050000	150000	110000	010000	020000	070000	250000	210000	R _c = 131000		
16 PART	AVG(X _a)	7.998829	6.960000	6.716667	8.922222	4.622222	7.011111	6.536667	5.911100	6.576700	5.710000	R _p = 4.300000	
17 R _a	081000	-R _a	078000	-R _a	131000	# OF OPERATORS=	3	=	096667	R= 096667			
18 Min X =	6.705000	-Min X=	6.690333	= X _{Min}									
19 R =	096667	x D _a *=	2.58000	= UCL _a									
20 R =	096667	x D _a *=	00000	= LCL _a									
Max R	0.2500												
General Info.													
# Trials	3.000000												
# Operators	3.000000												
# Parts	10.00000												
Out of tolerance ranges													

Analyze

Unit Analysis and Process Variation

Appendix 3

Part No. and Name: SOIC 8
 Characteristics Max Standoff
 Specification: 9.8 mils
 = 5.0000

Gage Name: tnr 07
Gage No:
Gage Type: VISION SYSTEM

Date: # 12/11/02
Performed By:
Leand / Andy

From Data Sheet: R 0.138333

$$\bar{x}_{\text{B}} = 0.063$$

R = 1.964444

Measurement Unit Analysis			% Process Variation		
Repeatability - Equipment Variation (EV)					
EV	=	$R \times K_1$	Trials	K_1	
	=	0.138333×3.05	2	4.56	%EV = $100[EV/TV]$
	=	<u>0.421916</u>	3	3.05	= $100[0.4219 / 3.2138]$
					= <u>13.1</u> %
Reproducibility - Appraiser Variation (AV)					
AV	=	$\sqrt{(\bar{X}_{DIFF} \times K_2)^2 - (EV^2/nr)}$			
	=	$\sqrt{(\underline{0.063} \times 2.70)^2 - (\underline{0.4219}^2 / \underline{10} \times \underline{3})}$			
	=	<u>0.151658</u>	Operators	2	%AV = $100[AV/TV]$
			K ₂	3	= $100[0.1517 / 3.2138]$
					= <u>4.7</u> %
Repeatability & Reproducibility (R & R)					
R & R	=	$\sqrt{(EV^2 + AV^2)}$			
	=	$\sqrt{(\underline{0.42192}^2 + \underline{0.1517}^2)}$			
	=	<u>0.448345</u>	Parts	K_3	%R & R = $100[R \& R/TV]$
			2	3.65	= $100[0.4483 / 3.2138]$
			3	2.70	= <u>14.0</u> %
Part Variation (PV)					
PV	=	$R_p \times K_3$			
	=	1.96444×1.62			
	=	<u>3.182399</u>	4	2.30	%PV = $100[PV/TV]$
			5	2.08	= $100[3.1824 / 3.2138]$
			6	1.93	= <u>99.0</u> %
Total Variation (TV)					
TV	=	$\sqrt{(R \& R^2 + PV^2)}$			
	=	$\sqrt{(\underline{0.44835}^2 + \underline{3.1824}^2)}$			
	=	<u>3.213826</u>	7	1.82	PT/ Ratio = Tolerance/EV
			8	1.74	= <u>11.851</u>
			9	1.67	
			10	1.62	
					(Ratio must be 10 or better)

All calculations are based upon predicting 5.15 sigma (99.0% of the area under the normal distribution curve).

K1 is $5.15/d_2$, where d_2 is dependent on the number of trials (m) and the number of parts times the number of operators (g) which is assumed to be greater than 15. d_2 values are from Appendix E.

AV - If a negative value is calculated under the square root sign, the appraiser variation (AV) defaults to zero (0).

K2 is 5.15/d2*, where d2* is dependent on the number of operators (m) and (α) is 1, since there is only one operator.

KZ is $5.15/d_2$, where d_2 is dependent on the number of operators (m) and (g) is 1, since there is only one range calculator.

R_3 is $5.15/d_2^2$, where d_2^2 is dependent on the number of parts (m) and (g) is 1, since there is only one range calculation.

GAGE REPEATABILITY AND REPRODUCIBILITY
DATA SHEET

Appendix 2

a

Decimal Places:	0	PART										AVERAGE																																																																														
OPERATOR/ TRIAL #		1	2	3	4	5	6	7	8	9	10																																																																															
1. A 1		9.350000	9.820000	8.470000	8.570000	9.520000	7.770000	8.670000	8.220000	8.930000	8.030000	8.735000																																																																														
2. A 2		9.280000	9.830000	8.540000	8.640000	9.520000	7.620000	8.820000	8.250000	8.930000	8.930000	8.836000																																																																														
3. A 3		9.340000	9.740000	8.520000	8.560000	9.450000	7.720000	8.870000	8.210000	8.930000	8.940000	8.828000																																																																														
4. AVG.		9.323333	9.796667	8.510000	8.590000	9.496667	7.703333	8.786667	8.226667	8.930000	8.633333	X _a = 8.799667																																																																														
5. RNG.		070000	090000	070000	080000	070000	150000	200000	040000	000000	910000	R _a = 168000																																																																														
6. B 1		9.190000	9.670000	8.380000	8.510000	9.330000	7.780000	.9040000	8.350000	8.990000	8.740000	8.793000																																																																														
7. B 2		9.250000	9.630000	8.440000	8.510000	9.260000	7.770000	9.080000	8.310000	9.050000	8.700000	8.800000																																																																														
8. B 3		9.200000	9.830000	8.490000	8.480000	9.400000	7.700000	9.110000	8.380000	9.120000	8.780000	8.849000																																																																														
9. AVG.		9.213333	9.710000	8.436667	8.500000	9.330000	7.750000	9.076667	8.346667	9.053333	8.740000	X _b = 8.815667																																																																														
10. RNG.		060000	200000	110000	030000	140000	080000	070000	020000	130000	080000	R _b = 097000																																																																														
11. C 1		9.400000	9.800000	8.510000	8.570000	9.290000	7.730000	9.030000	8.360000	9.160000	8.630000	8.848000																																																																														
12. C 2		9.780000	9.630000	8.580000	8.600000	9.360000	7.820000	9.090000	8.280000	9.280000	8.660000	8.908000																																																																														
13. C 3		9.300000	9.450000	8.560000	8.540000	9.290000	7.810000	9.050000	8.290000	9.360000	8.670000	8.832000																																																																														
14. AVG.		9.493333	9.626667	8.550000	8.570000	9.313333	7.786667	9.056667	8.310000	9.266667	8.653333	X _c = 8.862667																																																																														
15. RNG.		480000	550000	070000	060000	070000	090000	060000	080000	200000	040000	R _c = 150000																																																																														
16. PART AVG.(X _p)		9.343333	9.711111	8.498889	8.553333	9.380000	7.746667	8.973333	8.294400	9.083300	8.675600	R _p = 1.964444																																																																														
17. [R _a = 168000 + R _p = .097000 + R _c = 150000] / [# OF OPERATORS = 3] = 138333 R = 138333																																																																																										
18. [Max X = 8.862667 - Min X = 8.799667] = X _{avg}												063000																																																																														
19. [R = 138333 x D ₄ * = 2.580000] = UCL _R												356899																																																																														
20. [R = 138333 x D ₃ * = .000000] = LCL _R												000000																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 2px;">General Info</td> <td colspan="11" style="padding: 2px;"></td> </tr> <tr> <td># Trials</td> <td>3.000000</td> <td colspan="11" style="height: 20px;"></td> </tr> <tr> <td># Operators</td> <td>3.000000</td> <td colspan="11" style="height: 20px;"></td> </tr> <tr> <td># Parts</td> <td>10.000000</td> <td colspan="11" style="height: 20px;"></td> </tr> <tr> <td colspan="13" style="text-align: center; font-size: small;">Out of tolerance ranges</td> </tr> <tr> <td colspan="13" style="text-align: center; font-size: small;">Max R = 0.9100</td> </tr> </table>													General Info													# Trials	3.000000												# Operators	3.000000												# Parts	10.000000												Out of tolerance ranges													Max R = 0.9100												
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Max R = 0.9100																																																																																										

ANALYSIS ACT 508

a

Part No. and Name: SOIC 8
 Characteristics Coplanarity
 Specification: 0-4 mils
 = 5.0000
 From Data Sheet: R 0.057333

Gage Name: tnr 07
 Gage No:
 Gage Type: VISION SYSTEM

Date: # 12/11/02
 Performed By:
 Leand/Andy

$$\bar{X}_{\text{DIFF}} = 0.3693$$

$$R_p = 4.227777$$

Measurement Unit Analysis			% Process Variation	
Repeatability - Equipment Variation (EV)				
EV	=		%EV	= 100[EV/TV]
=	R x K ₁		=	100[0.1749 / 6.9233]
=	<u>0.057333</u> x <u>3.05</u>		=	<u>2.5</u> %
=	<u>0.174866</u>			
Reproducibility - Appraiser Variation (AV)			%AV = 100[AV/TV]	
AV	=	$\sqrt{(\bar{X}_{\text{DIFF}} \times K_2)^2 - (EV^2/nr)}$	=	100[<u>0.9966</u> / <u>6.9233</u>]
=	$\sqrt{(\underline{0.3693} \times \underline{2.70})^2 - (\underline{0.1749}^2 / \underline{10} \times \underline{3})}$		=	<u>14.4</u> %
=	<u>0.996599</u>		n = number of parts	
			r = number of trials	
Repeatability & Reproducibility (R & R)				
R & R	=	$\sqrt{(EV^2 + AV^2)}$	%R & R	= 100[R & R/TV]
=	$\sqrt{(\underline{0.17487}^2 + \underline{0.9966}^2)}$		=	100[<u>1.0118</u> / <u>6.9233</u>]
=	<u>1.011824</u>		=	<u>14.6</u> %
Part Variation (PV)			%PV = 100[PV/TV]	
PV	=	$R_p \times K_3$	=	100[<u>6.849</u> / <u>6.9233</u>]
=	<u>4.22778</u> x <u>1.62</u>		=	<u>98.9</u> %
=	<u>6.848999</u>			
Total Variation (TV)			PT/ Ratio = Tolerance/EV	
TV	=	$\sqrt{(R & R^2 + PV^2)}$	=	<u>28.593</u>
=	$\sqrt{(\underline{1.01182}^2 + \underline{6.849}^2)}$			
=	<u>6.923336</u>			
			(Ratio must be 10 or better)	

All calculations are based upon predicting 5.15 sigma (99.0% of the area under the normal distribution curve).

K1 is 5.15/d2, where d2 is dependent on the number of trials (m) and the number of parts times the number of operators (g) which is assumed to be greater than 15. d2 values are from Appendix E.

AV - If a negative value is calculated under the square root sign, the appraiser variation (AV) defaults to zero (0).

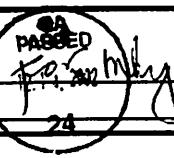
K2 is 5.15/d2*, where d2* is dependent on the number of operators (m) and (g) is 1, since there is only one range calculation.

K3 is 5.15/d2*, where d2* is dependent on the number of parts (m) and (g) is 1, since there is only one range calculation.

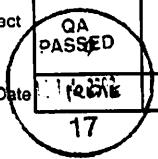
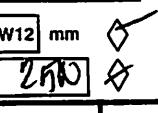
d2* is obtained from Table D3, "Quality Control and Industrial Statistics," A. J. Duncan. (See Appendix H, Reference 9).

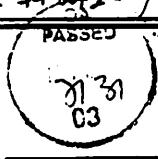
PROCESS TRAVELER

Package Type	: 8L SOIC	Job No.	: 3848
Customer	: ANALOG	Qty per Reel	: 2500
Date Rec'd	: DECEMBER 14, 2002	Quantity In	: 2471
Device No	: U8041-REEL-RAC/S1	Prepared By	: 160
Lot No	: K74892.4	Requirement	: TNR TT MS LI
Carrier Tape Vendor/PN :	A I M -S08P-3-3500	Width (mm) :	W12
Cover Tape Vendor /PN :	SUMILITE -Z7302	Leader (pkts):	30
Reel Type Vendor /PN :	PEAK - P5076	Trailer (pkts):	156
Tray Vendor / PN	: N/A	Unit Orientation :	C1

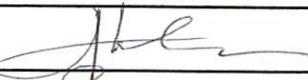
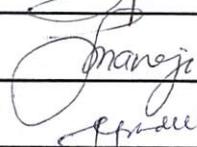
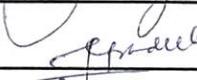
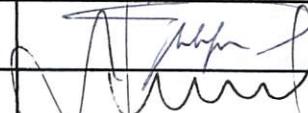
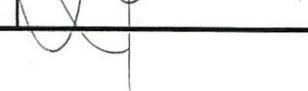
MARKING INSTRUCTION			SPECIAL INSTRUCTION		
Recipe / Customer Instruction	Actual Marking	IQA	TNR	FVI	
1) AD8041	1) AD 8041	/	/	/	
2) AR 0248	2) AR 0248	/	/	/	
3) K72006	3) K72006	/	/	/	
4)	4)				
5)	5)	007903160000			
BAKING Oven No. : N/A	Bake Temp. : N/A	Date / Time Start : N/A			
Performed by : N/A	Bake Hrs. : N/A	Date / Time End : N/A			
QA INCOMING		If lot was received in dry pack:			
Quantity : 2971	Inspected By: 	Reflow Temp Used : N/A			
Sample Size: 25	(0.65 % AQL)	Exposure Time : N/A			
MARK SCAN / LEAD SCAN					
Machine No. : N/A	Quantity In : N/A	Reject Quantity : N/A	Mc Orientator On <input checked="" type="checkbox"/>		
Yield : N/A	Residual : N/A	Quantity Out : N/A	Performed By : N/A		

TAPE & REEL	Peal Back Force Requirement : min. <u>14</u> gms max <u>80</u> gms	Mc Orientator On <input checked="" type="checkbox"/>
Machine No. : <u>7118402</u>	Air Pressure : <u>55</u> psi <input checked="" type="checkbox"/>	Performed By : <u>9131</u>
Peal Back Force Result min <u>34</u> gm <input checked="" type="checkbox"/> max. <u>67</u> gm <input checked="" type="checkbox"/>	Quantity In : <u>2821</u>	
Temperature Setting : front <u>60</u> °C <input checked="" type="checkbox"/> rear <u>70</u> °C <input checked="" type="checkbox"/>	Quantity Out : <u>2500</u>	
Carrier Tape Lot No. <u>S08P-110702-H03/F</u>	Reject Quantity : <u>111</u>	
Cover Tape Lot No. <u>27C7095ES2</u>	Reject Breakdown : <u>IM-L4 BL-18</u>	
Reel Lot No. <u>103002</u>	Residual Quantity : <u>210</u>	
Date/Time Start : <u>12/14/02 / 1125</u>	Yield : <u>94.3%</u> <u>95.7%</u>	
Date/Time End : <u>12/14/02 / 1330</u>	<u>12/14/02</u>	

100% VISUAL INSPECTION			QA OUTGOING (VISUAL INSPECTION)					
Quantity In	1st <u>2900</u>	2nd	3rd	Quantity In /Out	1st <u>2500</u>	2nd	3rd	NCMR #
Reject Qty	<u>0</u>			Reject Qty	<u>0</u>			
Quantity Out	<u>2900</u>			Type of Defect				
Type of Defect	<u>0</u>			Insp. By / Date	<u>12/14/02</u>			
Insp. By / Date	<u>900711402</u>			Sample Size :	<u>125</u> (0.065%)	Remarks :	<u>K74892-9</u>	
Carrier Tape Verification	Width <u>W12</u> mm <input checked="" type="checkbox"/>	Quantity per reel <u>2500</u> 						

DRY PACK Yes <u>N/A</u>	No <u>N/A</u>	BOXING	QA BUY-OFF
Reflow Temp Used: <u>N/A</u>	Exposure Time : <u>N/A</u>	Performed By / Date : <u>016/12/1402</u>	Performed By / Date :
Vacuum Mc <u>N/A</u>	Machine Setting: <u>N/A</u>		
Performed By: <u>N/A</u>	Date : <u>N/A</u>		

BUY-OFF AND QUALIFICATION REPORT

Machine Description:		Ref No. <u>Q-005</u>	
<u>TAPING MACHINE</u>			
Affected Area:	TAPE & REEL	Package Type : SOIC	
Purpose : TAPING MACHINE QUALIFICATION			
Serial No :	530	Model No : AT2800	
Cal. Spec No:	TFP03-004	PM Spec No : TFP05-004	
Type of Qualification Run			
3 K UNITS QUALIFICATION RUN			
Critical Product Attributes	No. of Sample Units	Summary of Reports	
Bent Leads	3000	0	
Chipout	3000	0	
Coplanarity	3000	0	
Others <i>MARK</i>	3000	0	
			
Qualification Requirements: (if applicable)			
GR& R	<u>14.8%</u>	Calibration	PASSED
Jam Rate	<u>1:3000</u>	ESD Grounding	OK
UPH	<u>6458</u>	Cpk	<u>2.65</u>
Type of Release:			
Full Release			
Approvals	Name	Signature	Date
Performed by	L. ABAYAN / L. MANEJA		11-13-00
Maintenance	L. MANEJA		11-13-00
Production	E. PADILLA		11-13-00
Quality Assurance	R. DELA CRUZ		11-13-00
Operations	L. FERRAN COL		11/13/2000

TELFORD SVC., PHILS. INC.

EQUIPMENT QUALIFICATION SAFETY INSPECTION CHECKLIST

Equipment Description : AT28 TAPING MACHINE		Manufacturer: STI		
Serial # : 530	Model # : AT2800	Control # : CN020		
Affected Area: TAPE & PEEL	Package type : SOIC	Checked By : L. ABAYAN		
ITEMS TO BE CHECK	YES	NO	REMARKS	
ELECTRICAL :				
1 Set on the right power requirement?	✓			
2 Provide with the right type of plug?	✓			
3 Provide with the right size of power supply cable ?	✓			
4 No Temporary wiring installed?	✓			
5 No electrical wires lying on floors which can cause trip injury?	✓			
6 Over current safety fuse provided?	✓			
MACHINE GUARDS :				
7 Machine cover sensors provided ?	✓			
8 Emergency Shut-Off switch provided ?	✓			
SAFETY SIGNS :				
9 Warning signs are posted to point out dangerous condition ?	✓			
10 Hazardous voltage sign provided ?	✓			
11 Hazardous Temperature sign provided ?	✓			
MACHINE LOCATION AND CONDITIONS:				
12 Location clean and well lighted ?	✓			
13 No leaks of fuel,oil,air, water and or other gases ?	✓			
14 No sharp and pointed parts exposed ?	✓			
OTHERS :				
15 Equipment safety rules, Operation Manuals & guidelines provided. ?	✓			
16 Operators and Technician properly trained on electrical Safety, use of Fire extinguisher ?	✓			

TELFORD SVC., PHILS. INC.

CALIBRATION REPORT

EQUIPMENT : TAPING MACHINE	MANUFACTURER: STI	CONTROL #: CN020	REPORT #: 001
MODEL # : AT2800	SERIAL #: 530	CAL SPEC #: TFP05 - 004i	
CAL. INTERVAL QUARTERLY	CAL. DATE 11-12-00	CAL DUE : 12-12-01	
TEMP.: 24 °C RH: 45 %	CAL. BY: 002 / Leand	MAINT.CAL ENG'R L. MANEJA	
		CAL. TECH. L. ABAYAN	

CALIBRATION STANDARD USED

DESCRIPTION	MANUFACTURER	MODEL #	SERIAL #	CONTROL #	ACCURACY	CAL. DATE	CAL. DUE
D. THERMOMETER	SHINKA	N/A	ST300	CN005	± .75 %		
T. PROBE	SHINKA	TYPE K	N/A	CN008	N/A		

CALIBRATION INFORMATION

MAINT-03 REV.1

PAGE 1 OF 1

TO :

FROM :

DATE :

SUBJECT : **QUALIFICATION REPORT FOR STI TAPE & REEL #07 (SOIC 8Leads)**

A. Background

TELFORD SVC, Phil., has been previously qualified as Tape & Reel sub-con facility for SOIC, MSOP,& TSSOP packages using STI tape & reel equipment. However, due to customer request we revised our qualification based on the format given to us by Analog Devices.

B. Objective

Qualify tape and reel process of TELFORD SVC using STI AT28 Tape & Reel

C. Qualification Process

1.1 STI – Equipment to be qualified.

1.2 Qualification result (see attached)

Inspection Accuracy Reading

Telford used a golden unit for the inspection accuracy reading of STI tape & reel
Run the units at STI tape and reel and record the reading.

Same unit will be measured on Comparator tool.

Data showed two different inspection measurement result.

Delta is the difference between the two recorded measurement.

Coplanarity , Bent lead and Stand-off were the lead parameters considered in the inspection qualification.

1.2.1 COPLANARITY

TRIAL #	TNR07 (Mils)	Comparator	Delta (Mils)
1	4.62	4.61	0.01
2	4.62	4.61	0.01
3	4.61	4.61	0
4	4.62	4.61	0.01
5	4.6	4.61	0.01

1.2.2 BENT LEAD

TRIAL #	TNR07 (Mils)	Comparator	Delta (Mils)
1	9.01	9	0.01
2	9.00	9	0
3	9.04	9	0.04
4	9.01	9	0.01
5	8.97	9	0.03

1.2.3 STAND-OFF

TRIAL #	TNR07 (Mils)	Comparator	Delta (Mils)
1	6.44	6.4	0.04
2	6.45	6.4	0.05
3	6.44	6.4	0.04
4	6.43	6.4	0.03
5	6.43	6.4	0.03

Data show that all reading result are within 0.5 mils for coplanarity, bent lead and stand-off parameter.

1.2.4 GR&R (refer to attached data)

LEAD PARAMETER	%R&R
1.2.4.1 Coplanarity	4.23%
1.2.4.2 Bent Lead	9.52%
1.2.4.3 Stand-off (max)	5.94%
1.2.4.4 Stand-off(min)	14.08%
1.2.4.5 Pitch	11.04%

D. CONCLUSION AND RECOMMENDATION

Telford SVC, Phils has successfully passed all the requirements and recommended as a subcon facility for Tape and Reel process of SOIC package using STI AT28 Tape and Reel.

MEASUREMENT SYSTEM CORRELATION STUDY

M/C TYPE :	TNR07	DATE :		PAGE:	1	OF	1	UCL				
M/C SN# :	530	TEST :						LCL				
PERSON:					COMMENTS:							
PKG.TYPE	8L SOIC	UNITS:	mils.	%R&R=	4.23%							
PARAMETER:	Coplanarity			LSL:								
USL:												
								SUM	AVE	STDEV		
Device# 1 :	5.37	5.39	5.41	5.37	5.41	5.43	5.41	5.47	5.37	48.63	5.403333	0.033166
Device# 2 :	3.54	3.54	3.52	3.52	3.53	3.55	3.56	3.56	3.57	31.89	3.543333	0.018028
Device# 3 :	1.38	1.37	1.38	1.41	1.37	1.29	1.34	1.34	1.38	12.26	1.362222	0.034561
Device# 4 :	4.74	4.75	4.8	4.83	4.82	4.82	4.8	4.86	4.86	43.28	4.808889	0.042262
Device# 5 :	5.03	5.04	5.03	5.03	5.1	5.04	5.02	5.09	5.09	45.47	5.052222	0.031535
Device# 6 :	4.63	4.6	4.75	4.65	4.65	4.67	4.65	4.62	4.64	41.86	4.651111	0.042262
Device# 7 :	3.04	3.03	3.04	3.05	3.04	3.05	3.04	3.02	3.09	27.4	3.044444	0.019437
Device# 8 :	6.14	6.16	6.17	6.18	6.19	6.2	6.17	6.16	6.19	55.56	6.173333	0.018708
Device# 9 :	8.74	8.75	8.8.	8.74	8.75	8.75	8.73	8.78	8.73	69.97	8.74625	0.01598
Device# 10 :	5.51	5.52	5.49	5.52	5.5	5.52	5.51	5.51	5.51	49.59	5.51	0.01
SUM	48.12	48.15	39.59	48.3	48.36	48.32	48.23	48.41	48.43			
AVE	4.812	4.815	4.398889	4.83	4.836	4.832	4.823	4.841	4.843			
STDEV	1.961115	1.96926	1.490172	1.958786	1.971239	1.985715	1.968372	1.983932	1.956022			

MEASUREMENT SYSTEM CORRELATION STUDY

M/C TYPE :	TNR07	DATE :		PAGE:	1	OF	1	UCL				
M/C SN# :	530	TEST :						LCL				
PERSON:					COMMENTS:							
PKG.TYPE	8L SOIC		UNITS: mils.	%R&R=	11.04%							
PARAMETER:	PITCH		USL:									
LSL:												
Pitch												
Device# 1 :	1.71	1.71	1.8	1.76	1.69	1.73	1.74	1.78	1.77	SUM	AVE	STDEV
Device# 2 :	6.8	6.92	6.84	6.88	6.88	6.96	6.96	6.91	6.9	62.05	6.894444	0.052228
Device# 3 :	10.01	10.09	10.13	10.14	10.14	10.08	10.05	10.09	10.02	90.75	10.08333	0.04899
Device# 4 :	1.08	1.12	0.94	1.03	1.08	1.05	0.98	1.05	1.1	9.43	1.047778	0.057615
Device# 5 :	4.56	4.5	4.53	4.42	4.57	4.59	4.26	4.34	4.22	39.99	4.443333	0.139911
Device# 6 :	1.16	1.15	1.19	1.18	1.14	1.17	1.19	1.16	1.27	10.61	1.178889	0.038224
Device# 7 :	9.12	9.13	9.16	9.09	9.12	9.16	9.13	9.08	9.16	82.15	9.127778	0.029486
Device# 8 :	0.31	0.56	0.42	0.52	0.5	0.4	0.29	0.39	0.57	3.96	0.44	0.103199
Device# 9 :	1.98	2.06	2.3	1.99	2.02	2.22	1.88	1.95	1.96	18.36	2.04	0.135554
Device# 10 :	1.11	1.09	1.1	1.08	1.02	1	1	1	1	9.4	1.044444	0.049018
SUM	37.84	38.33	38.41	38.09	38.16	38.36	37.48	37.75	37.97			
AVE	3.784	3.833	3.841	3.809	3.816	3.836	3.748	3.775	3.797			
STDEV	3.619488	3.615227	3.628778	3.62371	3.640629	3.642732	3.659025	3.634756	3.600534			

MEASUREMENT SYSTEM CORRELATION STUDY

M/C TYPE :	TNR07	DATE :		PAGE:	1	OF	1	UCL			
M/C SN# :	530	TEST :						LCL			
PERSON:			COMMENTS:								
PKG.TYPE	8L SOIC	UNITS:	mils.	%R&R=		9.52%					
PARAMETER:	Bent Lead										
LSL:			USL:								
Bent Lead											
Device# 1 :	1.43	1.45	1.51	1.48	1.44	1.45	1.46	1.51	1.47	SUM	
Device# 2 :	5.97	6.08	5.98	6.03	6	6.1	6.11	6.08	6.06	AVE	
Device# 3 :	8.73	8.77	8.86	8.83	8.83	8.81	8.76	8.79	8.7	STDEV	
Device# 4 :	0.66	0.61	0.47	0.52	0.59	0.6	0.5	0.56	0.56		
Device# 5 :	3.97	3.93	3.92	3.83	3.99	4.03	3.65	3.74	3.68		
Device# 6 :	0.82	0.82	0.86	0.84	0.81	0.83	0.84	0.81	0.89		
Device# 7 :	7.43	7.42	7.41	7.43	7.37	7.41	7.38	7.35	7.4		
Device# 8 :	0.31	0.42	0.29	0.42	0.42	0.34	0.25	0.35	0.44		
Device# 9 :	1.66	1.72	1.91	1.65	1.68	1.85	1.56	1.61	1.62		
Device# 10 :	1.05	1.03	0.95	0.99	1.04	0.97	0.95	0.99	0.97		
SUM	32.03	32.25	32.16	32.02	32.17	32.39	31.46	31.79	31.79		
AVE	3.203	3.225	3.216	3.202	3.217	3.239	3.146	3.179	3.179		
STDEV	3.1151	3.121913	3.144364	3.139727	3.12469	3.139255	3.151177	3.129158	3.103423		

MEASUREMENT SYSTEM CORRELATION STUDY

M/C TYPE :	TNR07	DATE :		PAGE:	1	OF	1	UCL				
M/C SN# :	530	TEST :						LCL				
PERSON:				COMMENTS:								
PKG.TYPE	8L SOIC	UNITS:	Mils.	%R&R=	5.94%							
PARAMETER:	Max Stand-off			LSL:								
USL:												
Max Standoff												
								SUM	AVE	STDEV		
Device# 1 :	14.08	14.16	14.17	14.27	14.33	14.22	14.2	14.29	14.14	127.86	14.20667	0.079373
Device# 2 :	11.91	11.81	11.85	11.58	11.59	11.83	11.74	11.82	11.85	105.98	11.77556	0.116845
Device# 3 :	9.86	9.81	9.87	9.89	9.84	9.82	9.77	9.78	9.86	88.5	9.833333	0.041231
Device# 4 :	11.87	11.85	11.87	11.88	11.84	11.96	11.89	11.98	11.95	107.09	11.89889	0.051099
Device# 5 :	13.13	13.09	13.1	13.14	13.18	12.61	13.22	13.42	13.3	118.19	13.13222	0.222642
Device# 6 :	12.13	12.15	12.28	12.3	12.15	12.19	12.12	12.14	12.4	109.86	12.20667	0.097468
Device# 7 :	11.24	11.12	11.24	11.27	11.11	11.1	11.02	11.07	11.06	100.23	11.13667	0.090416
Device# 8 :	8.59	8.77	8.57	8.61	8.53	8.48	8.43	8.42	8.53	76.93	8.547778	0.106628
Device# 9 :	15.41	15.32	15.33	15.27	15.35	15.31	15.3	15.28	15.3	137.87	15.31889	0.041966
Device# 10 :	8.86	8.84	8.87	8.89	8.88	8.92	8.92	8.87	8.86	79.91	8.878889	0.027131
SUM	117.08	116.92	117.15	117.1	116.8	116.44	116.61	117.07	117.25			
AVE	11.708	11.692	11.715	11.71	11.68	11.644	11.661	11.707	11.725			
STDEV	2.187479	2.160184	2.18555	2.179052	2.222836	2.172941	2.219306	2.251405	2.209878			

MEASUREMENT SYSTEM CORRELATION STUDY

M/C TYPE :	TNR07	DATE :		PAGE:	1	OF	1	UCL			
M/C SN# :	530	TEST :						LCL			
PERSON:				COMMENTS:							
PKG.TYPE	8L SOIC			%R&R=	14.80%						
PARAMETER:	Min Stand-off			LSL:							
				USL:							
Min Standoff											
								SUM	AVE	STDEV	
Device# 1 :	12.84	12.62	12.75	12.48	12.47	12.68	12.7	12.64	12.71	113.89	12.65444
Device# 2 :	8.15	8.19	8.15	8.08	8.16	8.14	8.28	8.2	8.2	73.55	8.172222
Device# 3 :	7.68	7.73	7.67	7.71	7.68	7.71	7.72	7.72	7.68	69.3	7.7
Device# 4 :	8.11	8.09	8.13	8.15	8.13	8.07	8.13	8.06	8.13	73	8.111111
Device# 5 :	7.23	7.27	7.23	7.16	7.24	7.7	7	6.91	6.91	64.65	7.183333
Device# 6 :	8.97	8.95	8.89	8.94	9.02	9.03	9.06	9.02	8.99	80.87	8.985556
Device# 7 :	9.29	9.29	9.31	9.29	9.53	9.55	9.7	9.72	9.7	85.38	9.486667
Device# 8 :	7.39	7.15	7.33	7.47	7.57	7.59	7.64	7.67	7.51	67.32	7.48
Device# 9 :	9.2	9.3	9.25	9.27	9.22	9.22	9.26	9.3	9.24	83.26	9.251111
Device# 10 :	7.58	7.65	7.67	7.64	7.65	7.64	7.71	7.68	7.66	68.88	7.653333
SUM	86.44	86.24	86.38	86.19	86.67	87.33	87.2	86.92	86.73		
AVE	8.644	8.624	8.638	8.619	8.667	8.733	8.72	8.692	8.673		
STDEV	1.653335	1.605623	1.628283	1.550215	1.543143	1.562676	1.629403	1.631331	1.658835		

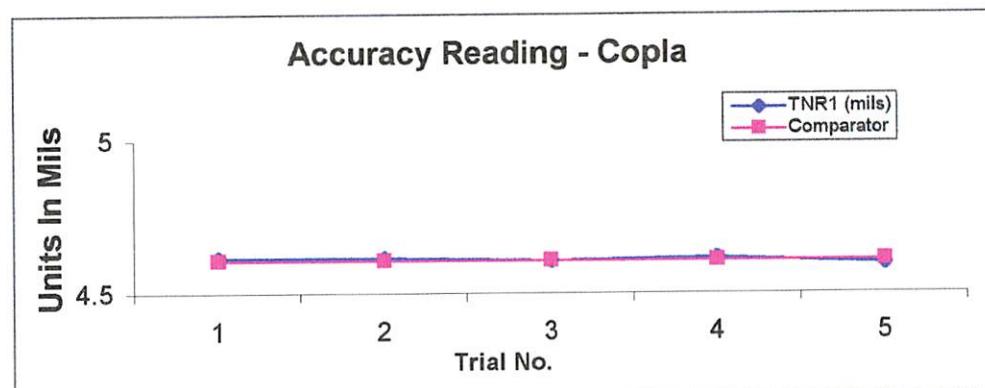
STI TNR7 Accuracy Reading - SOIC 8LDS

Trial No.	TNR1 (mils)	Comparator	Delta mils
1	6.44	6.4	-0.04
2	6.45	6.4	-0.05
3	6.44	6.4	-0.04
4	6.43	6.4	-0.03
5	6.43	6.4	-0.03



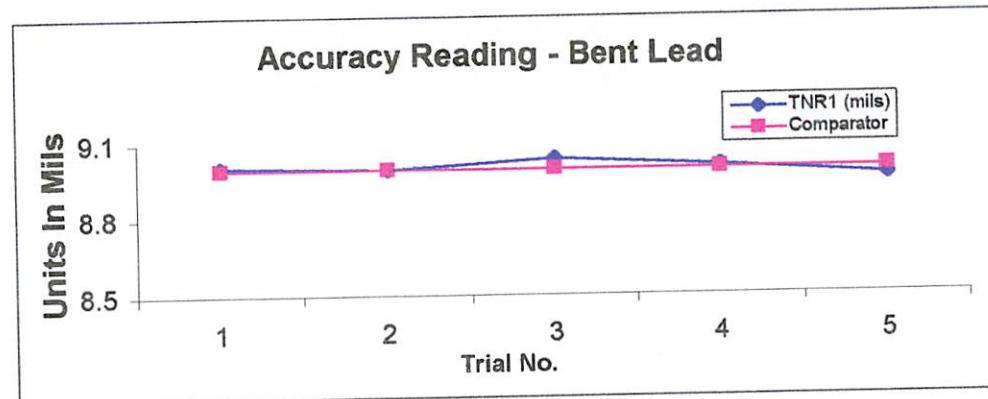
STI TNR7 Accuracy Reading - SOIC 8LDS

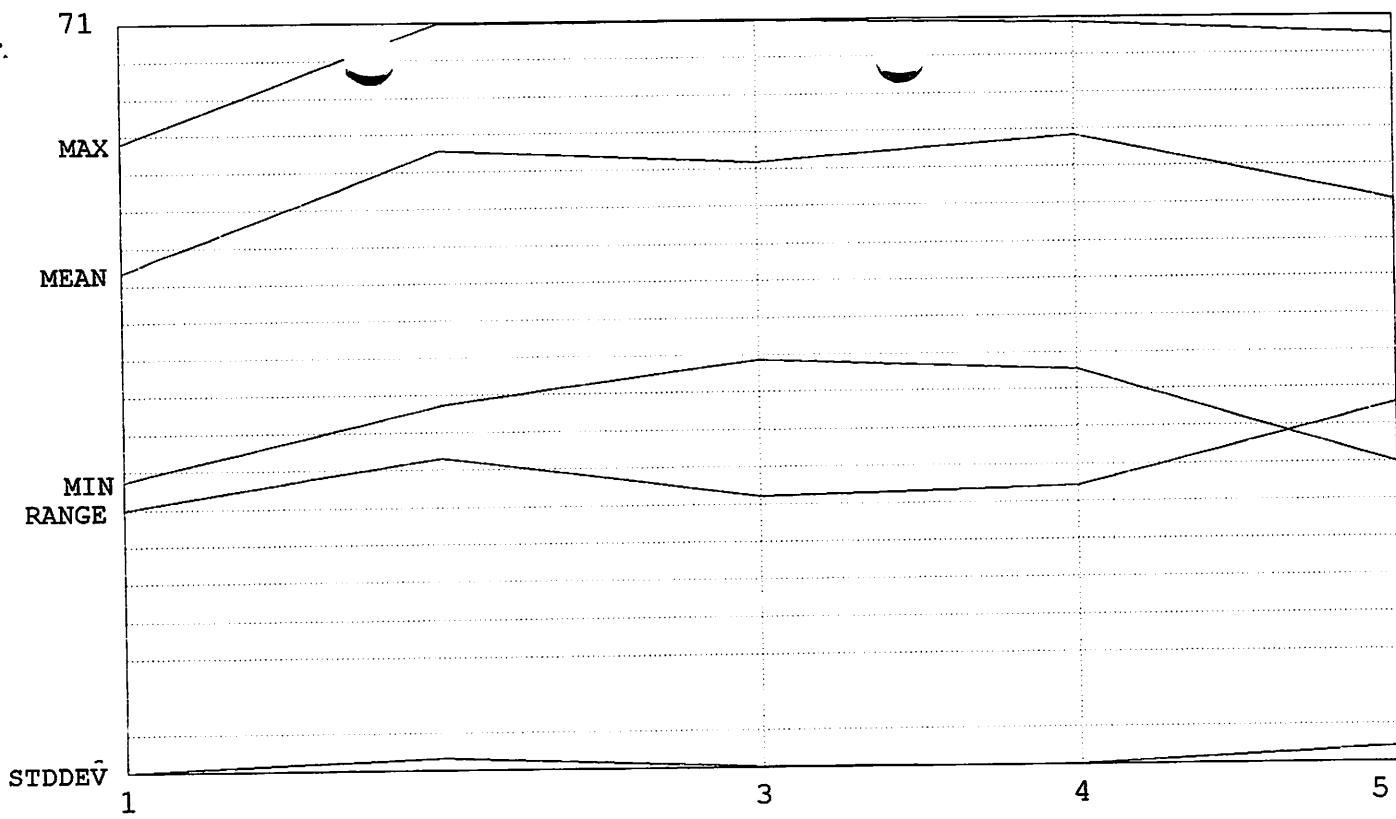
Trial No.	TNR1 (mils)	Comparator	Delta mils
1	4.62	4.61	-0.01
2	4.62	4.61	-0.01
3	4.61	4.61	0
4	4.62	4.61	-0.01
5	4.6	4.61	0.01



STI TNR7 Accuracy Reading - SOIC 8LDS

Trial No.	TNR1 (mils)	Comparator	Delta mils
1	9.01	9	-0.01
2	9	9	0
3	9.04	9	-0.04
4	9.01	9	-0.01
5	8.97	9	0.03

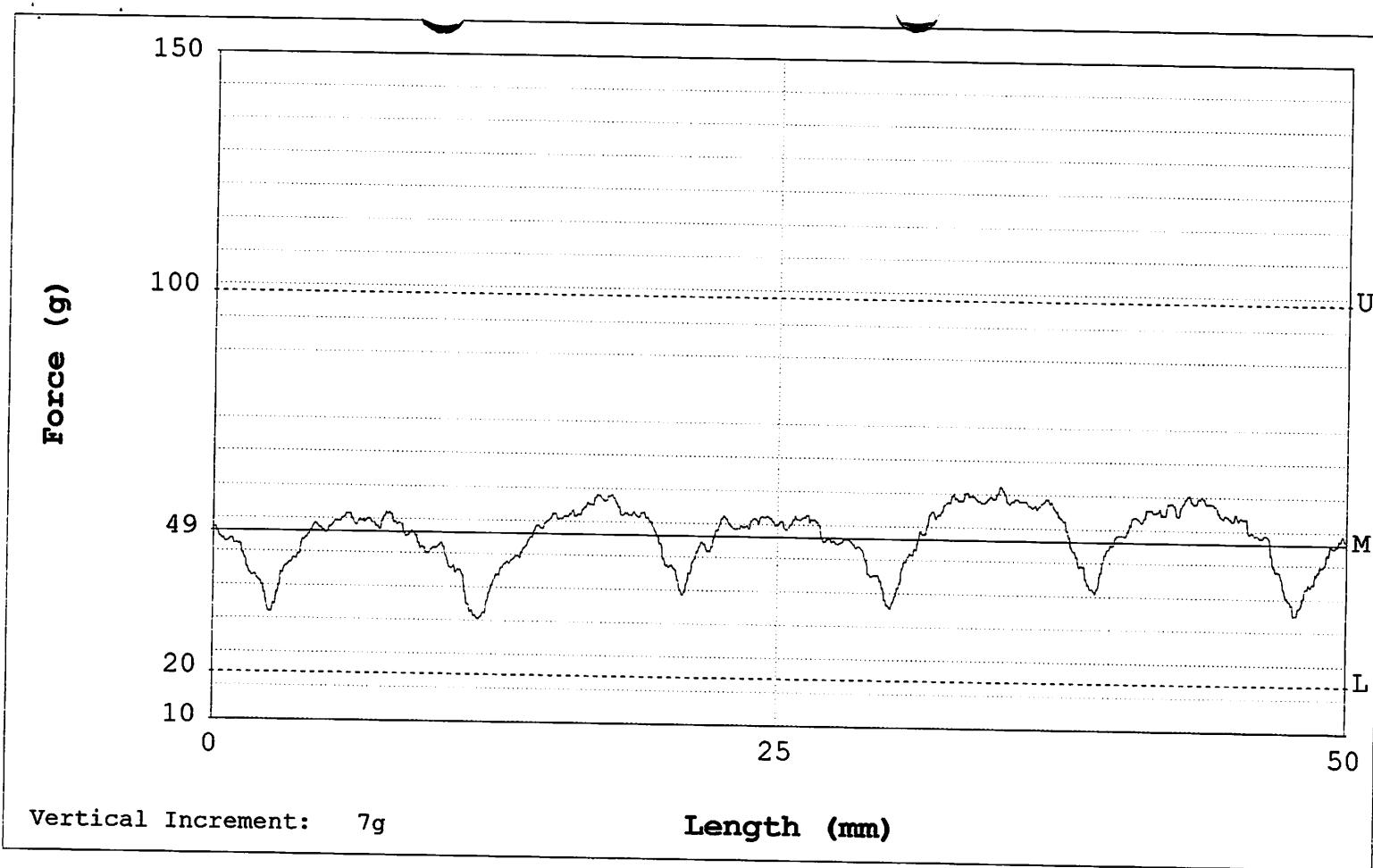




Vertical Increment: 3.2g Upper Limit: 100 Lower Limit: 20
Cpk-Upper: 0.4750 Cpk-Lower: 0.4666 Cpk: 2.6571

Comparison Test

Vendor Name:	Telford
Product Name:	SOIC8
Temperature (C):	180 Deg C
Pressure (PSI):	50
Seal Time (sec):	0.35
Machine Number	T&R # 07
Operator	Leand



Limit - Max:100g Min: 20g Range: 80g

Result - Max: 61g Min: 31g Range: 29g

Speed: 300mm/min

Mean: 49g

Standard Deviation: 7g

Comparison Test

Vendor Name: Telford

Product Name: SOIC8

Temperature (C): 180 Deg C

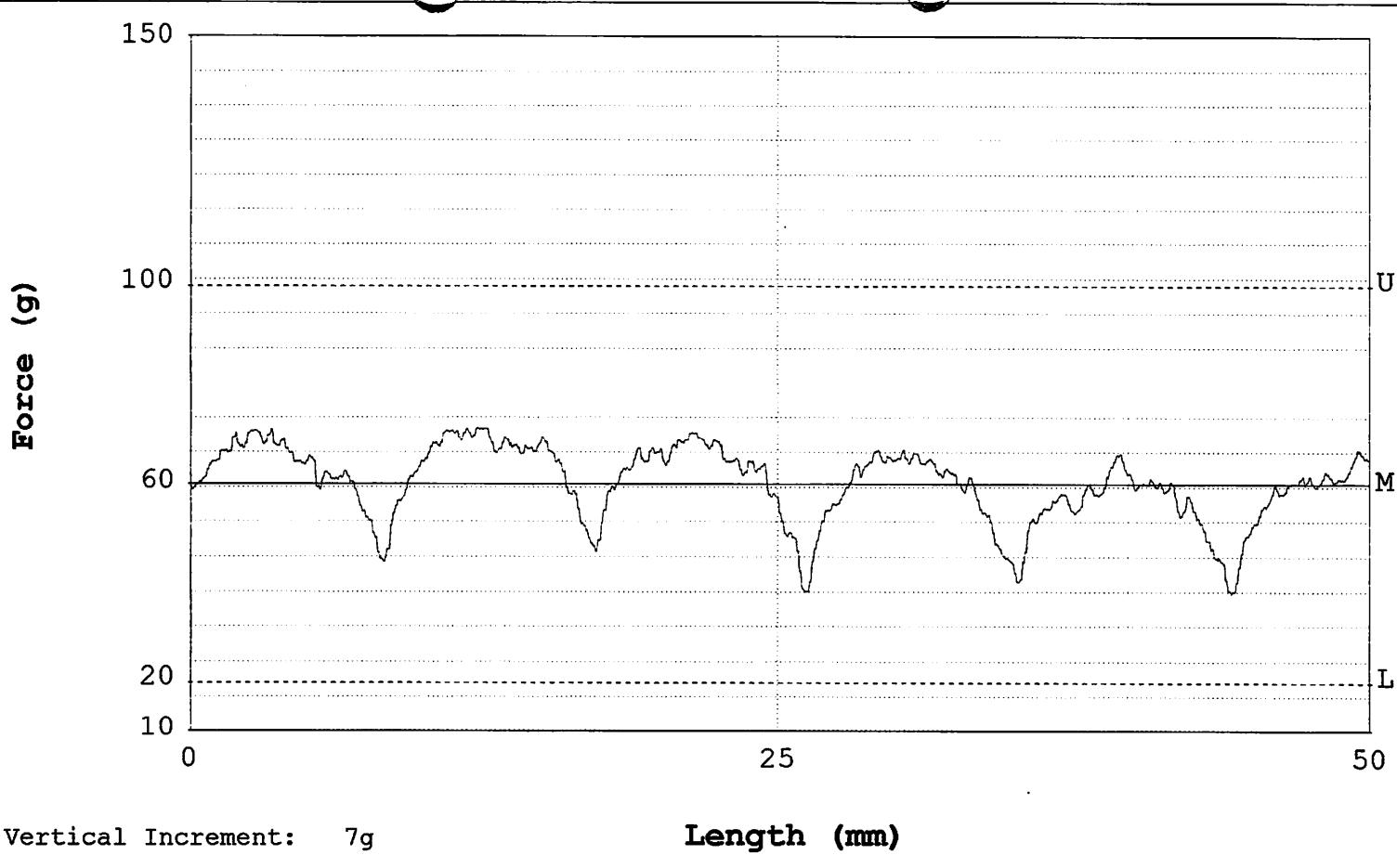
Pressure (PSI): 50

Seal Time (sec): 0.35

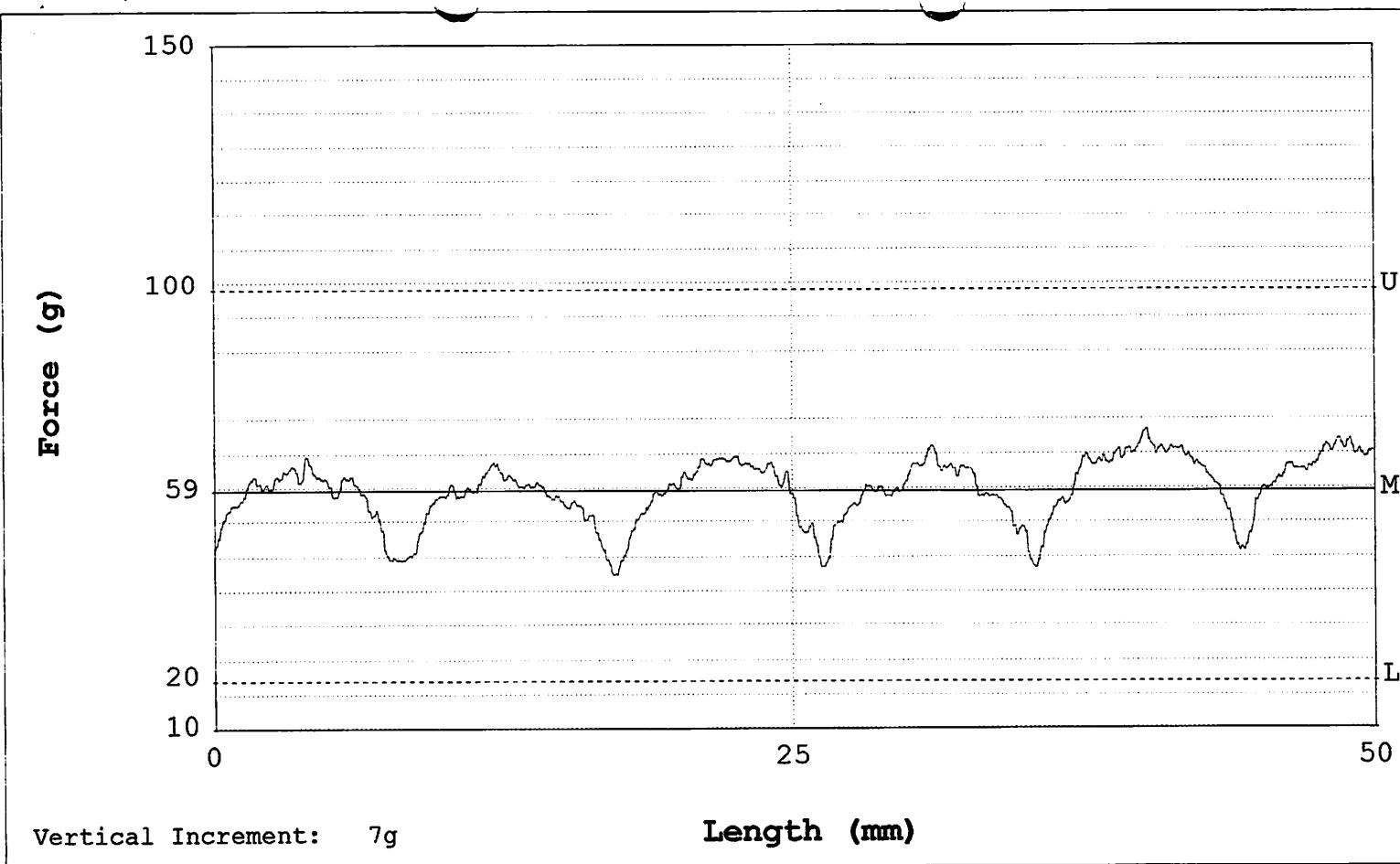
Machine Number T&R # 07

Operator Leand

test # 1



Comparison Test
Vendor Name: Telford
Product Name: SOIC8
Temperature (C): 180 Deg C
Pressure (PSI): 50
Seal Time (sec): 0.35
Machine Number T&R # 07
Operator Leand
test # 2



Limit - Max:100g Min: 20g Range: 80g

Result - Max: 71g Min: 41g Range: 30g

Speed: 300mm/min
Mean: 59g

Standard Deviation: 6g

Comparison Test

Vendor Name: Telford

Product Name: SOIC8

Temperature (C): 180 Deg C

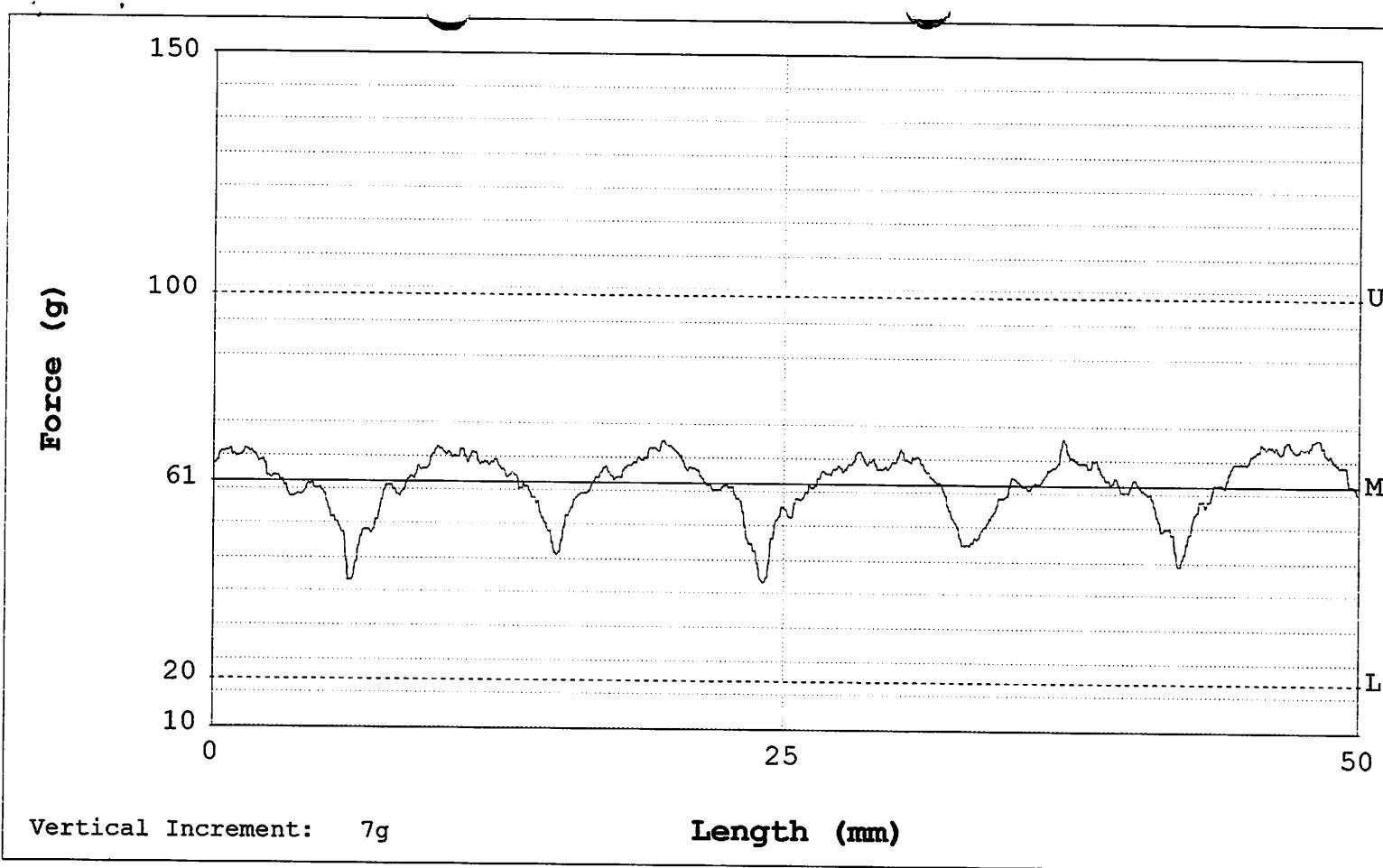
Pressure (PSI): 50

Seal Time (sec): 0.35

Machine Number T&R # 07

Operator Leand

test # 3



Limit - Max:100g Min: 20g Range: 80g

Result - Max: 71g Min: 40g Range: 30g

Speed: 300mm/min

Mean: 61g

Standard Deviation: 6g

Comparison Test

Vendor Name: Telford

Product Name: SOIC8

Temperature (C): 180 Deg C

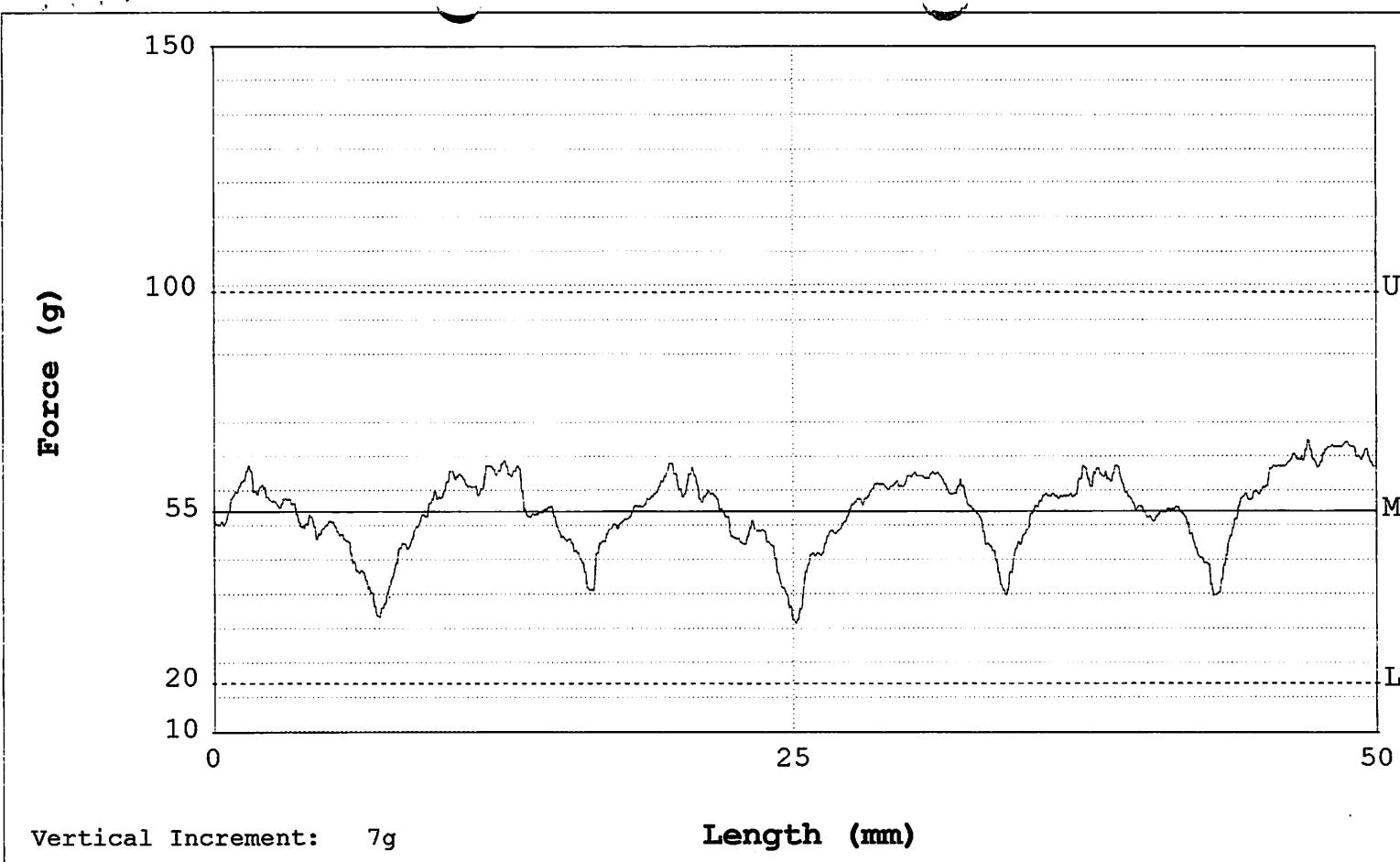
Pressure (PSI): 50

Seal Time (sec): 0.35

Machine Number T&R # 07

Operator Leand

test # 4



Comparison Test
Vendor Name: Telford
Product Name: SOIC8
Temperature (C): 180 Deg C
Pressure (PSI): 50
Seal Time (sec): 0.35
Machine Number T&R # 07
Operator Leand
test # 5

Tubing.txt

□ *****AT2800 LOT REPORT*****

□ Machine No : AT28
□ Lot no :
□ Last Lot no :
□ Mode : Tube/Tray
□ Package type : SOIC8L
□ Start time : 11:10:00 14:00:32
□ Stop time : 11/10/00 13:18:44
□ Lot Quantity : 3025
□ Output : 3000
□ Mark Reject : 0
□ Lead Reject : 0
□ USO : 0
□ Total Reject : 0
□ GPPH : 11700
□ NPPH : 11600
□ MTBA : 7.76
□ MTTA : 0.07
□ MUBA : 1512
□ Net Time : 0:15:23
□ Jam Time : 0:00:08
□ StandBy Time : 0:02:37
□ Total Jams : 1

Breakdown Code	Breakdown Description	Occurence	%
066	O/P Tube Clamper "UP" Sensor Not on.	001	100
Vision Result Percentage Distribution:		Units	%

Tape n Reel # 07
 Serial # 530
 Taping jamrate
 Specs : 1:3000

*****AT2800 LOT REPORT*****

<input type="checkbox"/> Machine No	:	AT28
<input type="checkbox"/> Lot no	:	
<input type="checkbox"/> Last Lot no	:	
<input type="checkbox"/> Mode	:	Taping
<input type="checkbox"/> Package type	:	SOIC8L
<input type="checkbox"/> Start time	:	11:13:00 15:06:43
<input type="checkbox"/> Stop time	:	11/13/00 14:36:58
<input type="checkbox"/> Lot Quantity	:	2603
<input type="checkbox"/> Output	:	2500
<input type="checkbox"/> Mark Reject	:	95
<input type="checkbox"/> Lead Reject	:	19
<input type="checkbox"/> USO	:	0
<input type="checkbox"/> Total Reject	:	114
<input type="checkbox"/> GPPH	:	6458
<input type="checkbox"/> NPPH	:	6458
<input type="checkbox"/> MTBA	:	24.28
<input type="checkbox"/> MTTA	:	0.00
<input type="checkbox"/> MUBA	:	2603
<input type="checkbox"/> Net Time	:	0:24:17
<input type="checkbox"/> Jam Time	:	0:00:00
<input type="checkbox"/> StandBy Time	:	0:04:19
<input type="checkbox"/> Total Jams	:	1

<input type="checkbox"/> Breakdown Code	Breakdown Description	Occurence	%
<input type="checkbox"/> -----			

<input type="checkbox"/> 088 Unit Jammed At The Reject Tube Inlet.	001	100.00
--	-----	--------

<input type="checkbox"/> Vision Result Percentage Distribution:	Units	%
<input type="checkbox"/> -----		
<input type="checkbox"/> Pass	2489	95.6
<input type="checkbox"/> Mark Error -> Template	95	3.65
<input type="checkbox"/> Top + Side Lead Measurement Error	19	0.73

Monday 13/11/2000 09:33:25
Machine = 0
Parameter File = soic8pin.dev
Number of Leads : 8
Number of Sides : 2
FOLDED OPTICS

Width of Top Cal Lines = 400.0 MILS
Height of Top Reflector = 50.0 MILS
Width of Bottom Cal Lines = 400.0 MILS
Height of Bottom Reflector = 50.0 MILS
Depth of Track = 10.0 MILS

XSCALES[TOP][0] = 0.92, YSCALES[TOP][0] = 0.92 MILs/Pixel
XSCALES[BOT][0] = 0.91, YSCALES[BOT][0] = 0.92 MILs/Pixel

TOP CAMERA ANGLE(0) = 0.25 DEGREES
BOT CAMERA ANGLE(0) = -0.01 DEGREES

BEST FOCUS VALUES :
LEFT TOP : 98, RIGHT TOP : 105
LEFT BOT : 107, RIGHT BOT : 107

Top Illuminator = 590, Top Cal Mark Position = 619.3
Bottom Illuminator = 480, Bottom Cal Mark Position = 618.1