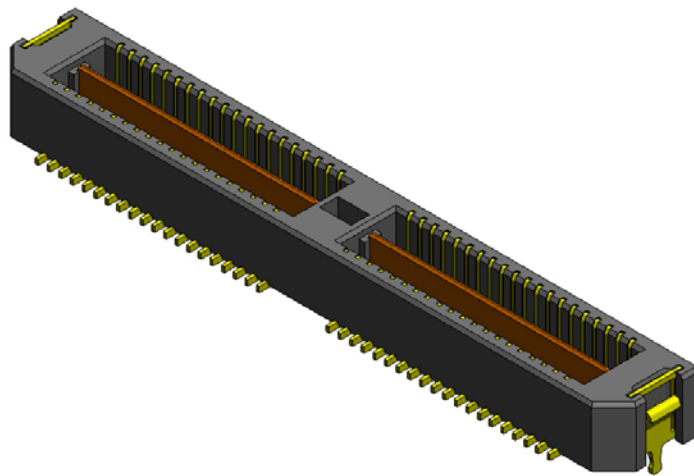
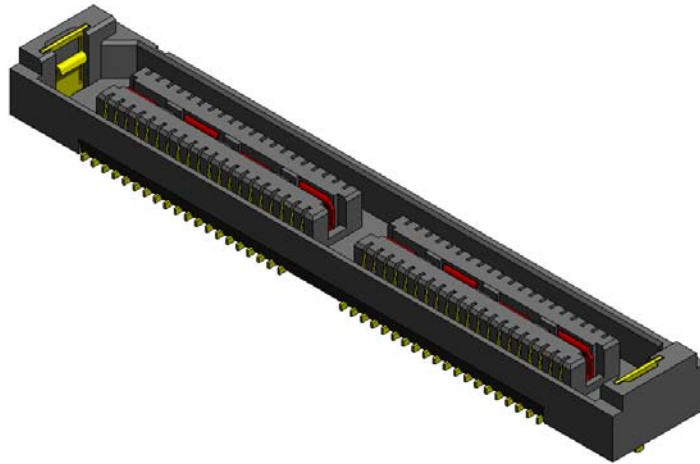




Project Number: Supplemental Test Report		Tracking Code: TC1021--3401_Report_Rev_2	
Requested by: Ben Cooper		Date: 9/10/2010	Product Rev: 0
Part #: QSE-XXX-01-F-D-A-L/QTE-XXX-01-F-D-A-L		Lot #: na	Tech: Gary Lomax Eng: Eric Mings
Part description: QTE/QSE			Qty to test: 30
Test Start: 05/26/2010	Test Completed: 6/1/2010		



**Mating & un-mating force Test Report**

**QTE/QSE**

**QSE-020-01-F-D-A-L/QTE-020-01-F-D-A-L**

**QSE-040-01-F-D-A-L/QTE-040-01-F-D-A-L**

## CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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### SCOPE

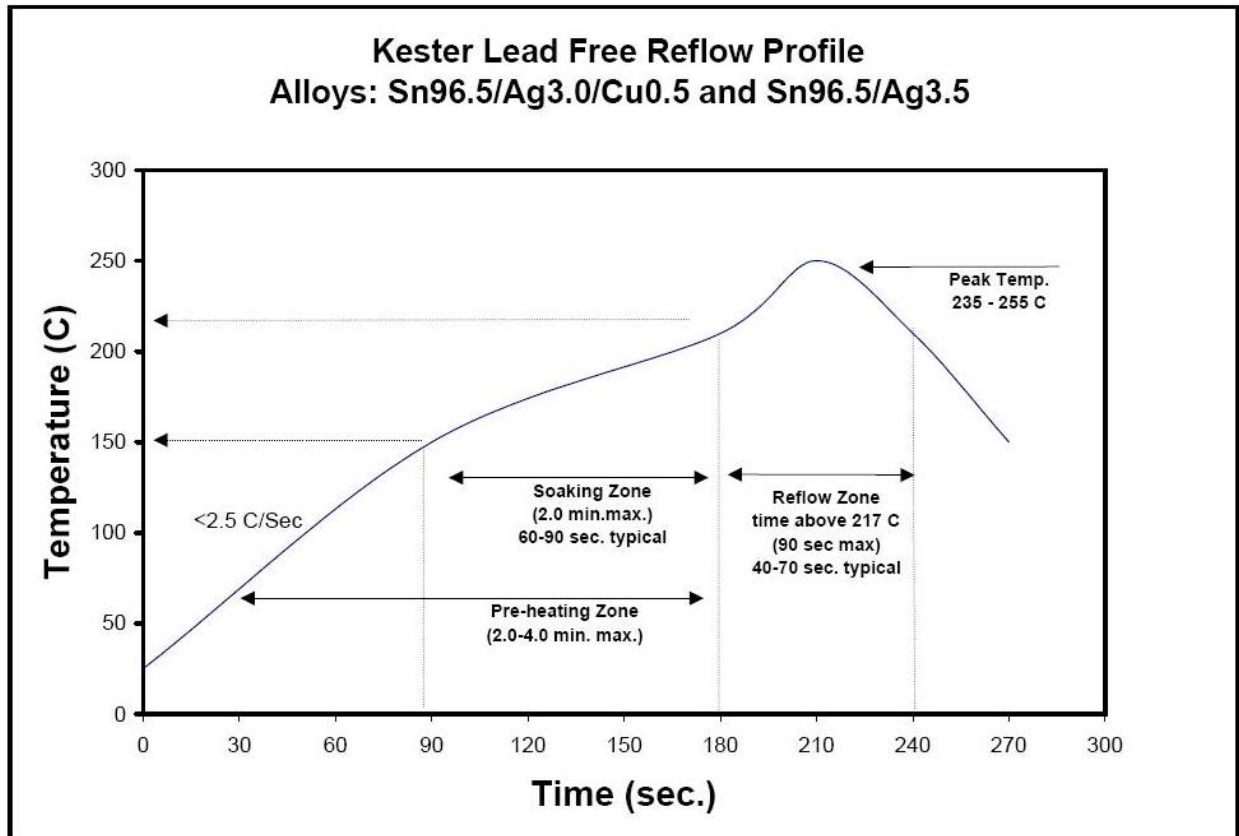
To perform the following tests: Mating&unmating force test. Please see test plan.

### APPLICABLE DOCUMENTS

Standards: EIA Publication 364

### TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 7) Any additional preparation will be noted in the individual test sequences.
- 8) Solder Information: Lead Free
- 9) Re-Flow Time/Temp: See accompanying profile.
- 10) Samtec Test PCBs used: PCB-102499-TST-XX

**TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)**

**FLOWCHARTS****Mating/Unmating**

<b>TEST STEP</b>	<b>GROUP A1 10 Boards (QSE-020-01-F-D-A)</b>	<b>GROUP A2 10 Boards (QSE-040-01-F-D-A)</b>
<b>01</b>	Mating / Unmating (on Cycles 1-5)	Mating / Unmating (on Cycles 1-5)
<b>02</b>	5 Cycles (10 Total)	5 Cycles (10 Total)
<b>03</b>	Clean w/Compressed Air	Clean w/Compressed Air
<b>04</b>	Mating / Unmating	Mating / Unmating
<b>05</b>	5 Cycles (15 Total)	5 Cycles (15 Total)
<b>06</b>	Clean w/Compressed Air	Clean w/Compressed Air
<b>07</b>	Mating / Unmating	Mating / Unmating
<b>08</b>	5 Cycles (20 Total)	5 Cycles (20 Total)
<b>09</b>	Clean w/Compressed Air	Clean w/Compressed Air
<b>10</b>	Mating / Unmating	Mating / Unmating
<b>11</b>	5 Cycles (25 Total)	5 Cycles (25 Total)
<b>12</b>	Clean w/Compressed Air	Clean w/Compressed Air
<b>13</b>	Mating / Unmating	Mating / Unmating
<b>14</b>	25 Cycles (50 Total)	25 Cycles (50 Total)
<b>15</b>	Clean w/Compressed Air	Clean w/Compressed Air
<b>16</b>	Mating / Unmating	Mating / Unmating

Mating/Un-Mating Forces = EIA-364-13

### ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

#### MATING/UNMATING:

- 1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
- 2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
- 3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

**RESULTS****Mating – Unmating Forces****QSE-020-01-F-D-A-L/QTE-020-01-F-D-A-L**

- **Initial (After 1 Cycles)**
  - **Mating**
    - **Min** ----- 3.05 Lbs
    - **Max** ----- 4.83 Lbs
  - **Unmating**
    - **Min** ----- 2.53 Lbs
    - **Max** ----- 4.08 Lbs
- **After 5 Cycles**
  - **Mating**
    - **Min** ----- 3.16 Lbs
    - **Max** ----- 4.29 Lbs
  - **Unmating**
    - **Min** ----- 2.95 Lbs
    - **Max** ----- 4.28 Lbs
- **After 10 Cycles**
  - **Mating**
    - **Min** ----- 2.99 Lbs
    - **Max** ----- 4.54 Lbs
  - **Unmating**
    - **Min** ----- 2.85 Lbs
    - **Max** ----- 4.51 Lbs
- **After 15 Cycles**
  - **Mating**
    - **Min** ----- 3.11 Lbs
    - **Max** ----- 4.98 Lbs
  - **Unmating**
    - **Min** ----- 3.22 Lbs
    - **Max** ----- 4.66 Lbs
- **After 20 Cycles**
  - **Mating**
    - **Min** ----- 2.90 Lbs
    - **Max** ----- 4.85 Lbs
  - **Unmating**
    - **Min** ----- 3.15 Lbs
    - **Max** ----- 4.91 Lbs
- **After 25 Cycles**
  - **Mating**
    - **Min** ----- 3.00 Lbs
    - **Max** ----- 4.07 Lbs
  - **Unmating**
    - **Min** ----- 3.03 Lbs
    - **Max** ----- 4.54 Lbs
- **After 50 Cycles**
  - **Mating**
    - **Min** ----- 3.32 Lbs
    - **Max** ----- 4.56 Lbs
  - **Unmating**
    - **Min** ----- 3.75 Lbs
    - **Max** ----- 5.07 Lbs

**RESULTS CONTINUED****Mating – Unmating Forces****QSE-040-01-F-D-A-L /QTE-040-01-F-D-A-L**

- **Initial (After 1 Cycles)**
  - **Mating**
    - **Min** ----- 5.73 Lbs
    - **Max** ----- 8.29 Lbs
  - **Unmating**
    - **Min** ----- 3.14 Lbs
    - **Max** ----- 6.40 Lbs
- **After 5 Cycles**
  - **Mating**
    - **Min** ----- 5.54 Lbs
    - **Max** ----- 6.68 Lbs
  - **Unmating**
    - **Min** ----- 3.18 Lbs
    - **Max** ----- 6.81 Lbs
- **After 10 Cycles**
  - **Mating**
    - **Min** ----- 5.38 Lbs
    - **Max** ----- 6.48 Lbs
  - **Unmating**
    - **Min** ----- 3.42 Lbs
    - **Max** ----- 7.05 Lbs
- **After 15 Cycles**
  - **Mating**
    - **Min** ----- 5.49 Lbs
    - **Max** ----- 6.41 Lbs
  - **Unmating**
    - **Min** ----- 3.61 Lbs
    - **Max** ----- 6.97 Lbs
- **After 20 Cycles**
  - **Mating**
    - **Min** ----- 5.51 Lbs
    - **Max** ----- 6.51 Lbs
  - **Unmating**
    - **Min** ----- 4.81 Lbs
    - **Max** ----- 6.73 Lbs
- **After 25 Cycles**
  - **Mating**
    - **Min** ----- 5.70 Lbs
    - **Max** ----- 6.61 Lbs
  - **Unmating**
    - **Min** ----- 4.01 Lbs
    - **Max** ----- 6.76 Lbs
- **After 50 Cycles**
  - **Mating**
    - **Min** ----- 6.00 Lbs
    - **Max** ----- 7.15 Lbs
  - **Unmating**
    - **Min** ----- 4.32 Lbs
    - **Max** ----- 7.30 Lbs

## DATA SUMMARIES

## MATING/UNMATING:

QSE-020-01-F-D-A-L /QTE-020-01-F-D-A-L

	After 1 Cycle				After 2 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	13.57	3.05	11.25	2.53	13.74	3.09	11.43	2.57
Maximum	21.48	4.83	18.15	4.08	23.09	5.19	18.77	4.22
<b>Average</b>	16.68	<b>3.75</b>	14.78	<b>3.32</b>	16.69	<b>3.75</b>	15.11	<b>3.40</b>
St Dev	2.46	0.55	1.90	0.43	2.51	0.57	1.94	0.44
Count	10	10	10	10	10	10	10	10
	After 3 Cycles				After 4 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	13.12	2.95	11.61	2.61	13.30	2.99	12.37	2.78
Maximum	22.64	5.09	18.90	4.25	18.73	4.21	18.64	4.19
<b>Average</b>	15.82	<b>3.56</b>	15.23	<b>3.43</b>	15.23	<b>3.43</b>	15.47	<b>3.48</b>
St Dev	2.53	0.57	2.02	0.45	1.40	0.31	1.75	0.39
Count	10	10	10	10	10	10	10	10
	After 5 Cycles				After 10 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	14.06	3.16	13.12	2.95	13.30	2.99	12.68	2.85
Maximum	19.08	4.29	19.04	4.28	20.19	4.54	20.06	4.51
<b>Average</b>	15.27	<b>3.43</b>	15.91	<b>3.58</b>	15.76	<b>3.54</b>	16.60	<b>3.73</b>
St Dev	1.38	0.31	1.51	0.34	1.84	0.41	1.87	0.42
Count	10	10	10	10	10	10	10	10
	After 15 Cycles				After 20 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	13.83	3.11	14.32	3.22	12.90	2.90	14.01	3.15
Maximum	22.15	4.98	20.73	4.66	21.57	4.85	21.84	4.91
<b>Average</b>	16.27	<b>3.66</b>	17.14	<b>3.85</b>	16.75	<b>3.77</b>	17.87	<b>4.02</b>
St Dev	2.47	0.56	1.79	0.40	2.51	0.57	2.09	0.47
Count	10	10	10	10	10	10	10	10
	After 25 Cycles				After 50 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	13.34	3.00	13.48	3.03	14.77	3.32	16.68	3.75
Maximum	18.10	4.07	20.19	4.54	20.28	4.56	22.55	5.07
<b>Average</b>	16.45	<b>3.70</b>	17.77	<b>3.99</b>	18.41	<b>4.14</b>	20.05	<b>4.51</b>
St Dev	1.50	0.34	2.14	0.48	1.61	0.36	1.93	0.43
Count	10	10	10	10	10	10	10	10

**DATA SUMMARIES CONTINUED****MATING/UNMATING:****QSE-040-01-F-D-A-L /QTE-040-01-F-D-A-L**

	After 1 Cycle				After 2 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	25.49	5.73	13.97	3.14	24.64	5.54	13.34	3.00
Maximum	36.87	8.29	28.47	6.40	34.47	7.75	29.80	6.70
<b>Average</b>	29.67	<b>6.67</b>	23.67	<b>5.32</b>	28.81	<b>6.48</b>	24.19	<b>5.44</b>
St Dev	3.60	0.81	4.39	0.99	3.45	0.78	5.19	1.17
Count	10	10	10	10	10	10	10	10
	After 3 Cycles				After 4 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	24.95	5.61	13.21	2.97	25.00	5.62	14.19	3.19
Maximum	32.07	7.21	29.89	6.72	31.27	7.03	29.62	6.66
<b>Average</b>	28.53	<b>6.41</b>	24.66	<b>5.54</b>	27.42	<b>6.16</b>	24.64	<b>5.54</b>
St Dev	2.71	0.61	5.46	1.23	2.35	0.53	5.26	1.18
Count	10	10	10	10	10	10	10	10
	After 5 Cycles				After 10 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	24.64	5.54	14.14	3.18	23.93	5.38	15.21	3.42
Maximum	29.71	6.68	30.29	6.81	28.82	6.48	31.36	7.05
<b>Average</b>	26.99	<b>6.07</b>	24.93	<b>5.60</b>	26.47	<b>5.95</b>	25.10	<b>5.64</b>
St Dev	1.90	0.43	5.38	1.21	1.56	0.35	5.24	1.18
Count	10	10	10	10	10	10	10	10
	After 15 Cycles				After 20 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	24.42	5.49	16.06	3.61	24.51	5.51	21.39	4.81
Maximum	28.51	6.41	31.00	6.97	28.96	6.51	29.94	6.73
<b>Average</b>	26.64	<b>5.99</b>	25.13	<b>5.65</b>	27.08	<b>6.09</b>	26.22	<b>5.89</b>
St Dev	1.29	0.29	4.51	1.01	1.47	0.33	3.04	0.68
Count	10	10	10	10	10	10	10	10
	After 25 Cycles				After 50 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	25.35	5.70	17.84	4.01	26.69	6.00	19.22	4.32
Maximum	29.40	6.61	30.07	6.76	31.80	7.15	32.47	7.30
<b>Average</b>	27.48	<b>6.18</b>	26.21	<b>5.89</b>	28.92	<b>6.50</b>	28.07	<b>6.31</b>
St Dev	1.35	0.30	3.47	0.78	1.69	0.38	3.81	0.86
Count	10	10	10	10	10	10	10	10

**DATA****MATING/UNMATING:**

QSE-020-01-F-D-A-L /QTE-020-01-F-D-A-L

Sample#	After 1 Cycle		After 2 Cycles		After 3 Cycles		After 4 Cycles		After 5 Cycles	
	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	3.70	3.77	3.72	3.83	3.55	3.85	3.42	3.82	3.36	3.84
2	3.40	2.53	3.45	2.57	3.33	2.61	3.24	2.78	3.16	2.95
3	3.31	3.04	3.41	3.18	3.33	3.28	3.24	3.33	3.33	3.42
4	4.55	3.38	4.00	3.35	3.34	3.46	3.37	3.47	3.39	3.53
5	3.49	3.29	3.48	3.50	3.37	3.62	3.38	3.62	3.33	3.59
6	4.83	4.08	5.19	4.22	5.09	4.25	4.21	4.19	4.29	4.28
7	3.83	3.34	3.85	3.49	3.57	3.43	3.51	3.57	3.46	3.66
8	3.05	3.01	3.09	3.08	2.95	2.92	2.99	3.02	3.38	3.55
9	3.53	3.25	3.65	3.37	3.49	3.33	3.44	3.40	3.31	3.37
10	3.82	3.54	3.69	3.38	3.54	3.50	3.45	3.57	3.33	3.57

Sample#	After 10 Cycles		After 15 Cycles		After 20 Cycles		After 25 Cycles		After 50 Cycles	
	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	3.71	4.07	3.77	4.21	3.87	4.35	3.95	4.48	4.27	5.02
2	2.99	2.85	3.18	3.22	2.90	3.15	3.00	3.03	3.32	3.75
3	3.65	3.73	3.11	3.57	3.31	3.77	3.44	3.75	3.91	4.18
4	3.64	3.66	4.05	3.83	4.49	4.17	3.95	4.30	4.16	4.31
5	3.47	3.75	3.31	3.55	3.71	3.70	4.07	3.92	4.56	4.29
6	4.54	4.51	4.98	4.66	4.85	4.91	3.91	3.46	4.45	4.21
7	3.34	3.92	3.50	4.09	3.63	4.24	3.72	4.54	4.29	4.98
8	3.33	3.65	3.72	3.87	3.70	3.84	3.65	4.09	4.17	4.67
9	3.54	3.66	3.73	3.89	3.85	4.19	3.92	4.40	4.39	5.07
10	3.22	3.52	3.23	3.65	3.35	3.85	3.38	3.97	3.87	4.60

**DATA CONTINUED****MATING/UNMATING:**

QSE-040-01-F-D-A-L /QTE-040-01-F-D-A-L

Sample#	After 1 Cycle		After 2 Cycles		After 3 Cycles		After 4 Cycles		After 5 Cycles	
	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	5.91	5.47	5.81	5.74	5.92	5.99	5.90	6.19	5.94	6.25
2	6.27	5.50	6.46	5.81	6.54	6.07	5.71	5.65	5.78	5.77
3	7.34	6.12	7.49	6.49	7.18	6.68	6.74	6.66	6.62	6.81
4	5.73	3.14	5.54	3.00	5.64	2.97	5.82	3.19	5.91	3.18
5	6.68	6.40	6.36	6.70	6.20	6.72	5.96	6.64	5.94	6.70
6	5.97	4.79	5.65	4.90	5.61	5.10	5.62	5.09	5.54	5.34
7	6.23	5.91	5.98	5.88	6.45	5.92	5.76	5.77	5.59	5.62
8	6.96	4.29	6.55	3.94	6.24	3.84	6.21	3.80	6.06	3.81
9	7.33	5.72	7.18	5.73	7.15	6.09	7.03	6.25	6.68	6.32
10	8.29	5.88	7.75	6.20	7.21	6.05	6.89	6.15	6.63	6.24

Sample#	After 10 Cycles		After 15 Cycles		After 20 Cycles		After 25 Cycles		After 50 Cycles	
	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	5.83	6.14	5.90	6.08	6.35	6.45	6.37	6.23	6.57	6.64
2	5.59	5.57	5.84	5.75	5.83	6.02	5.98	6.05	6.43	6.80
3	6.36	7.05	6.41	6.97	6.43	6.73	6.47	6.76	7.15	7.30
4	5.95	3.42	5.99	3.61	6.04	4.81	6.17	4.01	6.20	4.32
5	5.89	6.46	5.99	6.35	6.07	6.29	6.19	6.27	6.39	6.60
6	5.38	5.24	5.49	5.45	5.51	5.62	5.70	5.68	6.00	6.32
7	5.72	5.72	5.67	5.48	5.67	5.56	5.73	5.57	6.10	6.13
8	5.99	3.88	6.09	4.31	6.22	4.83	6.15	5.59	6.37	6.09
9	6.48	6.57	6.40	6.45	6.51	6.60	6.61	6.68	7.01	7.19
10	6.31	6.37	6.11	6.05	6.26	6.03	6.41	6.08	6.79	5.71

**EQUIPMENT AND CALIBRATION SCHEDULES****Equipment #:** TCT-04**Description:** Dillon Quantrol TC21 25-1000 mm/min series test stand**Manufacturer:** Dillon Quantrol**Model:** TC2 I series test stand**Serial #:** 04-1041-04**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;

... Last Cal: 05/07/2009, Next Cal: 05/07/2010