



|                       |               |          |
|-----------------------|---------------|----------|
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| Form approved by:     |               |          |
| Inspected by:         | GM            | 22/07/14 |
| Supervisor in charge: | TK            | 22/07/14 |

## J-Lab Apex Magnet Small Coil - Coil Test Record

### Test Item:

|            |   |
|------------|---|
| Test Item: | (1) Water Circuit Leak Test.  |
| Detail:    | Apply water pressure of 1.5 [Mpa] to each cooling circuit for 30 minutes and check for leakage. |

### Unit Under Test:

|                     |             |                  |   |
|---------------------|-------------|------------------|---|
| Contract:           | Customer    | Purchase Order # | Magnet Serial Number  |
|                     | J-Labs      | 881190           | PO # 197292   |
| Part:               | Drawing No. | Revision         | Description   |
|                     | 062713-00   | 0                | Large Coil 90° Assembly <input checked="" type="checkbox"/> |
|                     | 062713-01   | -                | Large Coil 45° Assembly <input type="checkbox"/>            |
| Coil Serial Number: | 89038       |                  |   |

### Equipment:

|                 |               |               |                      |
|-----------------|---------------|---------------|----------------------|
|                 | Model         | Serial Number | Calibration Due Date |
| Pressure Gauge: | Dwyer DPGW-09 | BSL-0004-DPG  | 23/07/2015           |

### Test Condition:

|               |            |                  |
|---------------|------------|------------------|
| Date:         | 22/07/2014 | [DD / MM / YYYY] |
| Ambient Temp: | 16.4       | [°C]             |
| Humidity:     | 71         | [%]              |

### Criteria:

|              |                          |
|--------------|--------------------------|
| Observation: | No water leaks detected. |
|--------------|--------------------------|

### Results:

|            |                  |   |          |
|------------|------------------|---|----------|
| Pancake 1: | <del>Leaks</del> | / | No Leaks |
| Pancake 2: | <del>Leaks</del> | / | No Leaks |
| Pancake 3: | <del>Leaks</del> | / | No Leaks |
| Pancake 4: | <del>Leaks</del> | / | No Leaks |

Strike through whatever is not applicable

### Judgement:

|      |   |                 |
|------|---|-----------------|
| PASS | / | <del>FAIL</del> |
|------|---|-----------------|

Strike through whatever is not applicable



|                       |               |
|-----------------------|---------------|
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| Form approved by:     |               |
| Inspected by:         | GM 23/07/14   |
| Supervisor in charge: | TK 23/07/14   |

## J-Lab Apex Magnet Small Coil - Coil Test Record

### Test Item:

|            |  |
|------------|--|
| Test Item: | (2) Water Circuit Flow Test.   |
| Detail:    | Measure the flow rate of each cooling circuit at a pressure drop of 32.5 [PSI] and water inlet temperature of 35 [°C]. |

### Unit Under Test:

|                     |                                       |                            |   |
|---------------------|---------------------------------------|----------------------------|---|
| Contract:           | Customer<br>J-Labs                    | Purchase Order #<br>881190 | Magnet Serial Number<br>PO # 197292                               |
| Part:               | Drawing No.<br>062713-00<br>062713-01 | Revision<br>0<br>-         | Description<br>Large Coil 90° Assembly<br>Large Coil 45° Assembly |
| Coil Serial Number: | 89038                                 |                            |   |

### Equipment:

|                 |              |                  |                      |
|-----------------|--------------|------------------|----------------------|
|                 | Model        | Serial Number    | Calibration Due Date |
| Flow Meter:     | RS           | FG5              | 10/01/2015           |
| Pressure Gauge: | Dwyer DPG-09 | BSL-0009-DPG-788 | 11/07/2015           |
| Pressure Gauge: | Dwyer DPG-09 | BSL-0009-DPG-788 | 8/05/2014            |

### Test Condition:

|               |            |                  |
|---------------|------------|------------------|
| Date:         | 23/07/2014 | [DD / MM / YYYY] |
| Ambient Temp: | 14.4       | [°C]             |
| Humidity:     | 69         | [%]              |

### Criteria:

|              |  |
|--------------|--|
| Measurement: | Water flow rate $\geq$ 3.95 [L/min] @ 32.5 [PSI] pressure drop |
|--------------|--|

### Results:

|            | Pressure [PSI] |        |       | Flow Rate<br>[l/min] |
|------------|----------------|--------|-------|----------------------|
|            | Inlet          | Outlet | Drop  |                      |
| Pancake 1: | 40.2           | 8.71   | 31.49 | 3.95                 |
| Pancake 2: | 42.7           | 10.11  | 32.59 | 3.95                 |
| Pancake 3: | 43.2           | 10.55  | 32.65 | 3.95                 |

### Judgement:

|   |
|---|
| PASS / <del>FAIL</del>                    |
| Strike through whatever is not applicable |

## J-Lab Apex Magnet Small Coil - Coil Test Record

### Test Item:

|            |   |
|------------|---|
| Test Item: | <b>4-4 (1) (b) (i) Resistance Measurement of Magnet.</b>  |
| Detail:    | Measure the resistance of each pancake and the whole coil by 4-terminal method.<br>Measure the temperature and correct the resistance measurement to 20 [°C]. |

### Unit Under Test:

|                     |              |                  |   |
|---------------------|--------------|------------------|---|
| Contract:           | Customer     | Purchase Order # | Magnet Serial Number  |
|                     | J-Labs       | <b>881190</b>    | <b>PO # 197292</b>  |
| Part:               | Drawing No.  | Revision         | Description   |
|                     | 062713-00    | <b>0</b>         | Large Coil 90° Assembly <input checked="" type="checkbox"/> |
|                     | 062713-01    | -                | Large Coil 45° Assembly <input type="checkbox"/>            |
| Coil Serial Number: | <b>89038</b> |                  |   |

### Equipment:

|               |                         |                  |                      |
|---------------|-------------------------|------------------|----------------------|
|               | Model                   | Serial Number    | Calibration Due Date |
| Thermometer:  | <b>HH506RA</b>          | <b>11000285</b>  | <b>11/04/2015</b>    |
| Power Supply: | <b>Isotech IPS303DD</b> | <b>321C095G2</b> | <b>25/10/2014</b>    |
| Voltmeter:    | <b>Isotech IDM72</b>    | <b>25900022</b>  | <b>8/05/2015</b>     |

### Test Condition:

|               |                   |                  |
|---------------|-------------------|------------------|
| Date:         | <b>22/07/2014</b> | [DD / MM / YYYY] |
| Ambient Temp: | <b>14.4</b>       | [°C]             |
| Humidity:     | <b>69</b>         | [%]              |

### Criteria:

|              |   |
|--------------|---|
| Measurement: | Record the resistance and temperature measurements below. |
| Observation: | No abnormalities  |

### Results:

|   | Pancake 1    | Pancake 2    | Pancake 3    | Coil         |      |  |
|---|--------------|--------------|--------------|--------------|------|--|
| R <sub>meas</sub> :   | <b>2.11</b>  | <b>2.10</b>  | <b>2.11</b>  | <b>6.31</b>  | [mΩ] |  |
| T <sub>meas</sub> :   | <b>14.2</b>  | <b>14.2</b>  | <b>14.2</b>  | <b>14.2</b>  | [°C] |  |
| R <sub>20°C</sub> :   | <b>2.154</b> | <b>2.151</b> | <b>2.153</b> | <b>6.458</b> | [mΩ] |  |
| $R_{20^{\circ}\text{C}} = R_{\text{meas}} ( 1 + 0.00393 ( 20 - T_{\text{meas}} ) )$ |              |              |              |              |      |  |

### Judgement:

|   |
|---|
| <b>PASS</b> / <del><b>FAIL</b></del>      |
| Strike through whatever is not applicable |

## J-Lab Apex Magnet Small Coil - Coil Test Record

### Test Item:

|            |  |
|------------|--|
| Test Item: | (4) Induced Voltage Test.  |
| Detail:    | Perform a 500V impulse test on the completed coil to verify the inter-turn insulation.<br>Record the resulting waveform. |

### Unit Under Test:

|                     |             |                  |   |
|---------------------|-------------|------------------|---|
| Contract:           | Customer    | Purchase Order # | Magnet Serial Number  |
|                     | J-Labs      | 881190           | PO # 197292   |
| Part:               | Drawing No. | Revision         | Description   |
|                     | 062713-00   | 0                | Large Coil 90° Assembly <input checked="" type="checkbox"/> |
|                     | 062713-01   | -                | Large Coil 45° Assembly <input type="checkbox"/>            |
| Coil Serial Number: | 89038       |                  |   |

### Equipment:

|                 |           |               |                      |
|-----------------|-----------|---------------|----------------------|
|                 | Model     | Serial Number | Calibration Due Date |
| Impulse Tester: | IWT 5000A | 1215A30005    | 4/12/2014            |

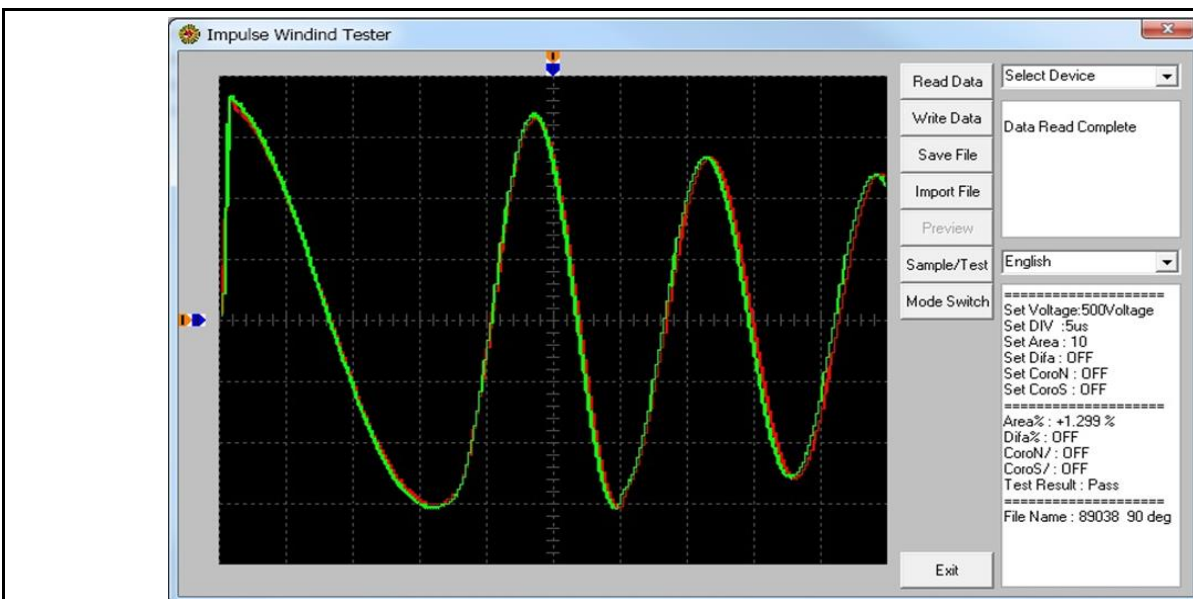
### Test Condition:

|               |            |                  |
|---------------|------------|------------------|
| Date:         | 22/07/2014 | [DD / MM / YYYY] |
| Ambient Temp: | 14.4       | [°C]             |
| Humidity:     | 69         | [%]              |

### Criteria:

|              |   |
|--------------|---|
| Measurement: | Record the resulting waveform and insert below.                                     |
| Observation: | No significant difference between the measured waveform and the reference waveform. |

### Results:



### Judgement:

|   |
|---|
| PASS / <del>FAIL</del>                    |
| Strike through whatever is not applicable |

## J-Lab Apex Magnet Small Coil - Coil Test Record

### Test Item:

|            |   |
|------------|---|
| Test Item: | (5) DC Hipot Test.  |
| Detail:    | Immerse the completed coil in tap water and then measure the leakage current between the coil terminals and the water bath at 4.8[kVDC] for 1 minute. |

### Unit Under Test:

|                     |                                       |                            |   |
|---------------------|---------------------------------------|----------------------------|---|
| Contract:           | Customer<br>J-Labs                    | Purchase Order #<br>881190 | Magnet Serial Number<br>PO # 197292                               |
| Part:               | Drawing No.<br>062713-00<br>062713-01 | Revision<br>0<br>-         | Description<br>Large Coil 90° Assembly<br>Large Coil 45° Assembly |
| Coil Serial Number: | 89038                                 |                            |   |

### Equipment:

|               |                          |                               |                                   |
|---------------|--------------------------|-------------------------------|-----------------------------------|
| Hipot Tester: | Model<br>Quadtech 20plus | Serial Number<br>S00300001272 | Calibration Due Date<br>5/03/2015 |
|---------------|--------------------------|-------------------------------|-----------------------------------|

### Test Condition:

|               |            |                  |
|---------------|------------|------------------|
| Date:         | 22/07/2014 | [DD / MM / YYYY] |
| Ambient Temp: | 14.4       | [°C]             |
| Humidity:     | 69         | [%]              |

### Criteria:

|              |  |
|--------------|--|
| Measurement: | Record the leakage current @ 4.8 [kVDC]                                  |
| Observation: | No evidence of breakdown or significant change in insulation resistance. |

### Results:

|                  |     |                   |
|------------------|-----|-------------------|
| Leakage Current: | 0.3 | [µA] @ 4.8 [kVDC] |
|------------------|-----|-------------------|

### Judgement:

|                        |
|------------------------|
| PASS / <del>FAIL</del> |
|------------------------|

Strike through whatever is not applicable