

# Schedule

Quantum Technologies Global Pte Ltd  
192 Pandan Loop  
#06-07 Pantech Business Hub  
Singapore 128381

Certificate No. : LA-2016-0606-C

Issue No. : 6

Date : 17 May 2022

Page : 1 of 4

FIELD OF TESTING : Calibration and Measurement

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION AND MEASUREMENT CAPABILITY (CMC*)
<p><b>A. Mechanical</b> On-site calibration: Universal Testing Machine (UTM) Pendulum Impact Tester</p> <p><b>1. Force</b> Classification 0.5, 1, 2 &amp; 3 - Compression Load Cell/Transducer - Tension Load Cell/Transducer</p> <p><u>Using Dead Weights</u></p> <p>a. 1 N to 200 N (Tension) 1 N to 200 N (Compression)</p> <p><u>Using Load Cells</u></p> <p>b. 200 N to 2 kN (Tension) 200 N to 2 kN (Compression)</p> <p>c. 2 kN to 20 kN (Tension) 2 kN to 20 kN (Compression)</p>	<p>ISO 7500-1: 2018</p> <p>QTG-02-WP-003-02 Rev 03</p> <p>QTG-02-WP-003-01 Rev 03</p>	<p>0.018 N 0.017 N</p> <p>0.42% 0.42%</p> <p>0.18% 0.13%</p>

\* CMC is expressed as an expanded uncertainty estimated at a level of confidence of approximately 95 %.

# Schedule



Certificate No. : LA-2016-0606-C

Issue No. : 6

Date : 17 May 2022

Page : 2 of 4

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION AND MEASUREMENT CAPABILITY (CMC*)
d. 20 kN to 200 kN (Tension) 20 kN to 200 kN (Compression)		0.14% 0.14%
<b>2. Strain</b>		
<u>Extensometer</u>		
a. Up to 50mm	ISO 9513: 2012	8.6 µm
b. Up to 50mm	ASTM E83: 2016	0.0001 mm/mm
<u>Displacement</u>		
a. 0 mm to 100mm	ASTM E2309/E2309M: 2016	2.0 mm
<u>Gauge Length</u>		
b. 20 mm Gauge Length		0.03 mm
c. 25 mm Gauge Length		0.04 mm
d. 50 mm Gauge Length		0.04 mm
<b>3 Impact Tester</b>		
a. Metallic Materials - Charpy	ISO 148-2: 2016 ASTM E23: 2018	
Potential Energy		
300 J		0.22 J
450 J		0.33 J
Error of Indicated Energy For 300 J & 450 J		0.41 J
Center of Percussion 748.25 mm		0.6mm

# Schedule



Certificate No. : LA-2016-0606-C

Issue No. : 6

Date : 17 May 2022

Page : 3 of 4

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION AND MEASUREMENT CAPABILITY (CMC*)
<p>b. Plastic Materials - Charpy Potential Energy 2 J 5 J</p> <p>Impact Velocity 2 J (2.901 m/s) 5 J (2.901 m/s)</p> <p>-Izod Potential Energy 2.75 J 5.5 J</p> <p>Impact Velocity 2.75 J (3.46m/s) 5.5 J (3.46 m/s)</p> <p>Center of Percussion 330.92 mm Error of Indicated Energy For all hammers</p>	<p>ISO 13802: 2015</p>	<p>0.004 J 0.010 J</p> <p>0.0026 m/s 0.0026 m/s</p> <p>0.004 J 0.007 J</p> <p>0.0021 m/s 0.0021 m/s</p> <p>0.6 mm</p> <p>0.004 J</p>
<p><b>B. Temperature and Humidity</b> On-site calibration of: Temperature Chamber, Humidity Chamber, Chiller Climatic Chamber, Oven, LN<sub>2</sub> Tank</p> <p>1. Temperature Calibration / Temperature Mapping</p> <p>a. -196 °C b. -80 °C to &lt; -70 °C c. -70 °C to &lt; -25 °C d. -25 °C to 120 °C</p>	<p>QTG-02-WP-004-02 Rev 04 IEC 60068-3-5: 2018</p>	<p>2.5 °C 1.3 °C 0.9 °C 0.6 °C</p>

# Schedule



Certificate No. : LA-2016-0606-C

Issue No. : 6

Date : 17 May 2022

Page : 4 of 4

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION AND MEASUREMENT CAPABILITY (CMC*)
e. >120 °C to 180 °C f. >180 °C to 280 °C g. >280 °C to 300 °		0.8 °C 2.6 °C 3.6 °C
2. Humidity / Temperature Calibration Humidity / Temperature Mapping		
a. 10 °C to 55 °C b. (10 to 65) % relative humidity c. (>65 to 95) % relative humidity d. 55 °C to 90 °C e. (10 to 95) % relative humidity f. 10 °C to 90 °C g. (10 to 95) % relative humidity	QTG-02-WP-004-03 Rev 04 IEC 60068-3-6: 2018  Dew Point Mirror QTG-02-WP-004-04 Rev00 IEC 60068-3-6: 2018	0.8 °C 2.7 % relative humidity 3.5 % relative humidity 0.7 °C 4.0 % relative humidity 0.8 °C 2.7 % relative humidity

## Approved signatories

- Mr Chong Tai Wei - All items
- Mr Samuel Kwong Chee Heng - For A1. Force, A2. Strain
- Mr Sean Xiong - For Item B. Temperature and Humidity

## Note :

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A laboratory's fulfilment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid calibrations results. The **management system requirements** in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.