

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK



4413

Accredited to
ISO/IEC 17025:2017

MS Testing

– a trading division of Mariner Systems (UK) Ltd

Issue No: 021 Issue date: 05 December 2019

5 Maple Way
Aycliffe Industrial Park
Newton Aycliffe
Co Durham
DL5 6BF

Contact: Mr S Thompson
Tel: +44 (0)1325 321366
Fax: +44 (0)1325 319369
E-Mail: info@mstesting.co.uk
Website: www.mstesting.co.uk

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
<p>Electrical installations in ships - Control and instrumentation</p> <p>Maritime navigation and Radio communication equipment and systems</p>	<p>ENVIRONMENTAL TESTS (non-explosive items)</p> <p>1. CLIMATIC</p> <p>1.1 HIGH TEMPERATURE - Constant/Cyclic</p> <p>Max temp: + 70 °C Max chamber size: 1.6 m x 1.9 m x 1.6 m</p> <p>Max temp: + 100 °C Max chamber size: 0.8 m x 0.8 m x 0.8 m</p> <p>Max temp: + 180 °C Max chamber size: 1.2 m x 1.0 m x 1.2 m</p> <p>1.2 LOW TEMPERATURE - Constant/Cyclic</p> <p>Min temp: - 25 °C Max chamber size: 1.6 m x 1.9 m x 1.6 m</p> <p>Min temp: - 40 °C Max chamber size: 0.8 m x 0.8 m x 0.8 m</p> <p>Min temp: - 60 °C Max chamber size: 1.2 m x 1.0 m x 1.2 m</p>	<p>BS EN 60068-2-2:2007 IEC 60068-2-2:2007 BS EN 60945, section 8.2.</p> <p>BS EN 60068-2-1:2007 IEC 60068-2-1:2007 BS EN 60945, section 8.4.</p>



4413
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

MS Testing
– a trading division of **Mariner Systems (UK) Ltd**
Issue No: 021 Issue date: 05 December 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	<p>ENVIRONMENTAL TESTS (cont'd)</p> <p>1. CLIMATIC (cont'd)</p> <p>1.3 HIGH HUMIDITY - Constant/Cyclic</p> <p>Humidity range: 10 % rh to 98 % rh (at temps > + 10 °C) Max temperature: + 70 °C Max chamber size: 1.6 m x 1.9 m x 1.6 m</p> <p>1.4 SALT MIST Temp range: ambient to + 55 °C</p> <p>2. INGRESS PROTECTION</p> <p>Protected against solid objects greater than 50 mm dia</p> <p>Protected against solid objects greater than 12.5 mm dia Protected against solid objects greater than 2.5 mm dia Protected against solid objects greater than 1.0 mm dia Dust Protected Dust Tight Protected against splashing water Protected against water jets Protected against powerful water jets Protected against the effects of immersion</p> <p>3. DYNAMIC</p> <p>3.1 VIBRATION - Sinusoidal (ambient temperature) Freq range: 2 to 3000 Hz Max pk/pk displacement: ± 25 mm</p>	<p>IEC 60068-2-30:2005 IEC 60068-2-78:2001 BS EN 60068-2-30:2005 Test Db BS EN 60068-2-78:2002 BS EN 60068-2-78:2013 BS EN 60945, section 8.3</p> <p>IEC 68-2-52:Kb EN 60068-2-52:Kb:1996 BS EN 60945:2002, section 8.12 Lloyds Spec No 1:2002, CI 16</p> <p>BS EN 60529:1992 Amd 1 & 2</p> <p>IP1X</p> <p>IP2X</p> <p>IP3X</p> <p>IP4X</p> <p>IP5X IP6X IPX4 IPX5 IPX6 IPX7</p> <p>BS EN 60068-2-6:1996 BS EN 60068-2-6:2008 IEC 60068-2-6:2007 BS EN 60945, section 8.7</p>



4413
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

MS Testing
– a trading division of **Mariner Systems (UK) Ltd**
Issue No: 021 Issue date: 05 December 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	<p>3. DYNAMIC (cont'd)</p> <p>3.2 VIBRATION – Random (ambient temperature) Freq range: 2 to 3000 Hz Max pk/pk displacement: ± 25 mm</p> <p>3.3 SHOCK - Half sine (ambient temperature) Max severity: 15 gn Pulse width: 11 ms</p> <p>3.4 STATIC INCLINATION Max angle: 45° Max item size: 3 m x 3 m x 3 m Max mass: 500 kg</p> <p>3.5 DYNAMIC INCLINATION Max angle: 45° Max item size: 3 m x 3 m x 3 m Max mass: 500 kg</p> <p>3.6 ACOUSTIC NOISE Sound pressure level at 1 m 30 to 135 dBA</p>	<p>BS EN 60068-2-64:2008 IEC 60068-2-64:2008</p> <p>BS EN 60068-2-27:1993 BS EN 60068-2-27:2009</p> <p>IEC 60092-504:2001</p> <p>IEC 60092-504:2001</p> <p>BS EN 60945, section 11.1</p>
	<p>4. VOLTAGE TESTS</p> <p>High Voltage Tests 1500V ac</p> <p>Insulation Breakdown 500 V dc 100 M Ohms</p> <p>Power supply Variation</p> <p>Power Supply Failure</p>	<p>IACS Req:1991/issue 5:2006 E 10 IEC 60947-2</p> <p>IEC60092-504 prior to and following Damp heat and low temperature tests in IEC 60945:2002 8.3 and 8.4</p> <p>IEC 60945:2002 10.7</p> <p>IEC 60945:2002 10.8</p>



4413
Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

MS Testing
– a trading division of Mariner Systems (UK) Ltd
Issue No: 021 Issue date: 05 December 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	<p align="center">5. EMC TESTS</p> <p>5.1 Electrostatic Discharge 8 kV Air Discharge 6 kV Contact Discharge</p> <p>5.2 Electrical Fast Transient Bursts 2 kV</p> <p>5.3 Surge 2 kV</p> <p>5.4 Compass Safe Distance</p> <p>5.5 Radiated Immunity 80 to 2000 MHz, 10 V/m 2000 to 2700 MHz, 3 V/m</p> <p>5.6 Conducted Emissions 9 kHz to 30 MHz</p>	<p>IEC 60945:2002 10.9 IEC 61000-4-2:2001 IEC 61000-4-2:2008 EN 61000-4-2:2009</p> <p>IEC 60945:2002 10.5 IEC 61000-4-4:2004 EN 61000-4-4:2004 EN 61000-4-4:2004 + A1:2010 EN 61000-4-4: 2012</p> <p>IEC 60945:2002 10.6 IEC 61000-4-5:2005 EN 61000-4-5:2006 EN 61000-4-5: 2014 + A1: 2017</p> <p>IEC 60945:2002 11.2</p> <p>IEC 60945:2002 10.4 EN 61000-4-3:2006 + A1:2008 EN 61000-4-3: 2006 + A1: 2008 + A2: 2010</p> <p>IEC 60945:2002 9.2 EN 55016-2-1:2009 EN 55016-2-1:2009 + A2: 2013 EN 55016-2-1:2014 EN 55016-2-1: 2014 + A1: 2017 EN 55022:2006+ A1:2007 (excluding telecommunication ports) EN 55022:2010 EN 55032:2015 Excluding antenna port EN 55014-1:2006 EN 55014-1:2006 + A1:2009 EN 55014-1:2017 EN 55011:2009 +A1:2010 EN 55011:2016 + A1:2017 (excluding Group 2 apparatus)</p>



4413

Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

MS Testing

– a trading division of Mariner Systems (UK) Ltd

Issue No: 021 Issue date: 05 December 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	<p>5. EMC TESTS (cont'd)</p> <p>5.7 Radiated Emissions 150 kHz to 3000 MHz</p> <p>5.8 Discontinuous Emissions (Clicks): 10 kHz to 30 MHz</p> <p>5.9 Conducted Current Harmonics (Emissions) Measurements up to 40th Harmonic Equipment Input Current \leq 16A per phase</p> <p>5.10 Conducted AC Mains Flicker (Emissions)</p> <p>5.11 Voltage Dips and Interruptions</p> <p>5.12 Power Absorbing Emissions Measurements (Power Clamp) 30 to 300 MHz</p> <p>5.13 Conducted Low Frequency Immunity 50 Hz - 10 kHz</p> <p>5.14 Conducted Radio Frequency Immunity 150 kHz to 230 MHz RF Voltage up to 10 V rms</p>	<p>IEC 60945:2002 9.3 EN 55016-2-3:2006 AN 55016-2-3: 2006 + A1: 2007 + A2: 2014 EN 55022:2006 + A1:2007 EN 55022: 2010 EN 55032: 2015 EN 55014-1:2006 EN 55014-1: 2006 + A1:2009 EN 55014-1: 2017 EN 55011:2009 + A1:2010 (excluding Group 2 apparatus) EN 55011:2016 (excluding Group 2 apparatus) EN 55011: 2016 + A1: 2017 (excluding Group 2 apparatus)</p> <p>EN 55014-1:2006 + A1:2009 EN 55014-1: 2017</p> <p>EN 61000-3-2:2006 +A2:2009 EN 61000-3-2:2014</p> <p>EN 61000-3-3:2008 EN 61000-3-3: 2013</p> <p>EN 61000-4-11:2004 EN 61000-4-11: 2004 + A1: 2017</p> <p>EN 55014-1:2006 EN 55014-1: 2006 + A1: 2009 EN 55014-1: 2017 EN 55016-2-2:2004 +A1:2005, + A2:2005</p> <p>IACS E10: 2006 IACS E10: 2014</p> <p>EN 61000-4-6:2009 EN 61000-4-6: 2014 IEC 60945:2002 10.3</p>



4413

Accredited to
ISO/IEC 17025:2017

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

MS Testing
– a trading division of Mariner Systems (UK) Ltd
Issue No: 021 Issue date: 05 December 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	<p align="center">5. EMC TESTS (cont'd)</p> <p>5.15 Power Frequency Magnetic Fields (Immunity) Frequency: DC to 1 kHz Field Strength: Up to 30 A/m</p> <p>5.16 Power-Frequency Magnetic Fields (Immunity) (Pulsed) Field Strength: Up to 1000 A/m</p> <p>5.17 Product Standards</p> <p>The EMC standards listed are accredited to the extent that they call up the basic standards as accredited within this schedule.</p>	<p>EN 61000-4-8:1993 + A1:2001 EN 61000-4-8: 2010</p> <p>EN 61000-4-9:1993 +A1:2001</p> <p>EN 50130-4:1994 + A1:1998, A2:2003 EN 50130-4: 2011 + A1: 2014 EN 50270:2006 EN 55014-2:1997 + A2:2008 EN 55014-2: 2015 EN 55024:1998 + A1:2001 & A2:2003 EN 55024:2010 + A1:2015 EN 61000-6-1:2007 EN 61000-6-2:2005 EN 61000-6-3:2007 EN 61000-6-3:2007 + A1:2011 EN 61000-6-4:2007 EN 61000-6-4:2007 + A1:2011 EN 61326-1:2006 EN 61326-1:2013 EN 61326-2-6:2013 EN 50121-4:2006</p>
END		