

Schedule

CAST Laboratories Pte Ltd
27 Gul Avenue
Singapore 629667

Certificate No. : LA-1998-0142-D

Issue No. : 22

Date : 01 June 2018

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FIELD OF TESTING : Non-Destructive Testing

| NDT TECHNIQUES | MATERIALS /PRODUCTS TESTED | STANDARD METHODS/ TECHNIQUES/EQUIPMENT |
|--|--|--|
| <p>1. RADIOGRAPHIC TESTING (Portable)</p> <p>a) Gamma Ray</p> <p>b) X-ray</p> | <p>All materials/products & Weldments, Casting and Forging under the General Standards</p> | <p><u>General Standards</u></p> <p>ASME Sec. V, Art.1, 2 & 22 : 2015Ed API 1104 : 2013Ed Add 2016 ASTM E 94 : 2010Ed ASTM E 999 : 2015Ed BS EN ISO 17636-1 :2013 BS EN ISO 17636-2:2013 AWS D1.1/D1.1M: 2015Ed.</p> <p><u>Specific Standards</u></p> <p>ASME Section VIII Div 1 : 2015Ed. ASME Section VIII Div 2 : 2015Ed. ASME Sec.I : 2015Ed. ASME Sec. IX : 2015Ed. ASME B31.1 : 2016 ASME B31.3 : 2016 ASME B31.8 : 2014Ed. API 1104 : 2013Ed. Add 2016 API 653 : 2009Ed. Add 2016 API 620 : 2013Ed. Add 2014 AWS D1.1 : 2015Ed. BS EN ISO 10675-1:2013 API 650 : 2013Ed Add 2016</p> |

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|--|--|--|
| <p>2. ULTRASONIC TESTING</p> <p>a) Contact Method/Pulse Echo Techniques</p> <p>b) Thickness Gauging</p> | <p>All Materials / Products & Weldments, Casting, Forging and Rolling under the General Standards.</p> | <p><u>General Standards</u> ASME Sec. V, Art 1, 4, 5 & 23: 2015Ed AWS D1.1/D1.1M : 2015Ed. API 1104: 2013Ed. Add 2016 ASTM E-164 : 2015 Ed ASTM E-114 : 2015 Ed ASTM E-797 : 2015Ed BS EN ISO 16810: 2014 Ed BS EN ISO 17640 : 2010Ed. BS EN ISO 17635 : 2016</p> <p><u>Specific Standards</u> ASME Section VIII Div 1 : 2015Ed. ASME Section VIII Div 2 : 2015Ed. ASME Sec.I: 2015Ed. ASME Sec. IX: 2015Ed. ASME B31.1: 2016 ASME B31.3: 2016 ASME B31.8: 2014Ed. AWS D1.1: 2015Ed. API 1104: 2013Ed. Add 2016 API 653: 2009Ed. Add 2016 API 620: 2013Ed. Add 2014 BS EN ISO 11666: 2010Ed. BS EN 10160: 1999Ed BS EN 10228-3 : 2016Ed BS EN 10228-4 : 2016Ed. API 650: 2013Ed Add 2016 ASTM A435/A435M: 2012 ASTM A578/A578M: 2012Ed. ASTM E797: 2015Ed.</p> |

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|---|---|--|
| <p>3. MAGNETIC PARTICLE TESTING Visible and Florescent Techniques</p> | <p>Ferromagnetic Materials, All Materials / Products & Weldments, Castings & Forgings covered under the General Standards</p> | <p><u>General Standards</u> ASME Sec. V, Art.1, 7 & 25: 2015Ed AWS D1.1 /D1.1M: 2015Ed. API 1104: 2013 Ed Add 2016Ed. ASTM E-709: 2015Ed BS EN ISO 9934-1: 2001Ed. BS EN ISO17638 : 2016 BS EN ISO17635 : 2016</p> <p><u>Specific Standards</u> ASME Section VIII Div 1 : 2015Ed. ASME Section VIII Div 2 : 2015Ed. ASME Sec.I : 2015Ed. ASME Sec. IX : 2015Ed. ASME B31.1 : 2016 ASME B31.3 : 2016 ASME B31.8 : 2014Ed. API 1104 : 2013Ed.Add 2016 API 653 : 2009Ed. Add 2 2016 API 620 : 2013Ed.Add 1 2014 BS EN ISO 23278 : 2009Ed. API 650 : 2013Ed Add 2 2016</p> |
| <p>4. LIQUID PENETRANT TESTING Solvent Removable Method - Visible Dye</p> | <p>Non Porous Materials / All Materials / Products & Weldments under the General Standards</p> | <p><u>General Standards</u> ASME Sec.V, Art.6 & 24 : 2015Ed AWS D1.1/D1.1M : 2015Ed. API 1104 : 2013Ed.Add 2 2016 ASTM E-165 : 2012Ed ASTM E-1220 : 2010Ed. ASTM E-1417 : 2013Ed BS EN ISO 3452-1 : 2013Ed BS EN ISO 17635 : 2016</p> |

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| <p>5. POSITIVE MATERIAL IDENTIFICATION (PMI)</p> <p>X-ray Fluorescent Analysis</p> <p>6. TIME OF FLIGHT DIFFRACTION (TOFD)</p> | <p>All the Materials/Products & Weldments covered the general standard</p> <p>All Materials / Weldments under the General Standards</p> | <p><u>Specific Standards</u> ASME Section VIII Div 1 : 2015Ed. ASME Section VIII Div 2 : 2015Ed. ASME Sec.I : 2015Ed. ASME Sec. IX : 2015Ed. ASME B31.1 : 2016 ASME B31.3 : 2016 ASME B31.8 : 2014Ed. AWS D1.1 : 2015Ed. API 1104 : 2013Ed.Add 2 2016 API 653 : 2009Ed. Add 2 2016 API 620 : 2013Ed. Add 1 2014 BS EN ISO 23277 : 2015 API 650 : 2013Ed Add 2 2016</p> <p><u>General Standard</u> ASTM E-1085 : 2009Ed. ASME Sec II : 2015Ed</p> <p><u>General Standards</u> ASME Sec.V: 2015Ed</p> <p><u>Specific Standards</u> ASME Section VIII Div 1 : 2015Ed. ASME Section VIII Div 2 : 2015Ed. ASME Sec.I : 2015Ed. ASME Sec. IX : 2015Ed. ASME B31.1 : 2016Ed. ASME B31.3 : 2016Ed. ASME B31.8 : 2014Ed. ASTM E2373 (2014)</p> |

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| 7. PHASED ARRAY ULTRASONIC TESTING (PAUT) | All Materials / Weldments under the General Standards | <u>General Standards</u> ASME Sec.V: 2015Ed <u>Specific Standards</u> ASME Section VIII Div 1 : 2015Ed. ASME Section VIII Div 2 : 2015Ed. ASME Sec.I : 2015Ed. ASME Sec. IX : 2015Ed. ASME B31.1 : 2016Ed. ASME B31.3 : 2016Ed. ASME B31.8 : 2014Ed. |

Approved signatories

Mr. He Yi - For all items
Mr. Penna Yadagiri Sharma - For UT & PT
Mr. Tai Jan Lean - For MT & PT

Note :

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results. The **management system requirements** in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 **Quality Management Systems — Requirements** and are aligned with its pertinent requirements.