Issue date: 01 November 2023
Valid Until: 02 February 2029

NO: SAMM 545

LABORATORY LOCATION/ CENTRAL OFFICE:	MATERIAL DIVISION, NUSANTARA TECHNOLOGIES SDN. BHD. NO. 5, JALAN ANGGERIK MOKARA 31/45 SEKSYEN 31, KOTA KEMUNING, , 40460, SELANGOR MALAYSIA
ACCREDITED SINCE :	12 MARCH 2025
FIELD(S) OF TESTING:	MECHANICAL

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017).

This laboratory's fulfillment 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 test results and calibrations. 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 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

CENTRAL LOCATION:	MATERIAL DIVISION, NUSANTARA TECHNOLOGIES SDN. BHD. NO. 5, JALAN ANGGERIK MOKARA 31/45 SEKSYEN 31, KOTA KEMUNING, , 40460, Selangor
FIELD(S) OF TESTING :	MECHANICAL,

SCOPE OF TESTING : MECHANICAL

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Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
Metal & Metal Products (welded)	Tensile Test (Up to 200 tons)	ASTM A370:2022 ASTM E8/E8M:2022 BS EN ISO 6892-1:2019 / ISO 6892-1:2019 ASME IX: 2023 AWS D1.1/D1.1M: 2020 AWS D1.2/D1.2M: 2014 AWS D1.6/D1.6M: 2017 API 1104: 2021 AS 1210: 2010/amdt 2-2015 AS 3992: 2020/amdt 1:2023 AS 2205.2.2: 2003 AS 2205.2.1: 2003 BS EN ISO 15614-1: 2017+A1: 2019 / ISO 15614-1:2017+A1: 2019 Clause 7.4.1: BS EN ISO 4136: 2022 / ISO 4136: 2022 BS EN ISO 15614-2: 2005 / ISO 15614-2: 2005/COR2: 2009 Clause 7.4.2: BS EN ISO 4136: 2022 / ISO 4136: 2022 BS EN ISO 15614-6: 2006 / ISO 15614-6:2006 Clause 8.4.2: BS EN ISO 4136: 2022 / ISO 4136: 2022 BS 4515-1: 2009 Clause 8.3.2.2: BS EN ISO 4136: 2022 / ISO 4136: 2022 BS 4515-2: 1999

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Bend Test (Continue)	ASME IX: 2023 AWS D1.1/D1.1M: 2020 AWS D1.2/D1.2M: 2014 AWS D1.6/D1.6M: 2017 API 1104: 2021 AS 1210: 2010/amdt 2-2015 AS/NZS 3992: 2020 ASTM E190: 2021 AS 3992: 2020/amdt 1:2023 AS/NZS 2205.3.1:2020 BS EN ISO 15614-1: 2017+A1: 2019 ISO 15614-1: 2017+A1: 2019 Clause 7.4.2: BS EN ISO 5173: 2023 / ISO 5173: 2023 BS EN ISO 15614-2: 2005 / ISO 15614-2: 2005/cor2: 2009 Clause 7.4.3: BS EN ISO 5173: 2023 / ISO 5173:2023 BS EN ISO 15614-6: 2006 / ISO 15614-6:2006 Clause 8.4.3: BS EN ISO 5173: 2023 ISO 5173:2023 BS EN ISO 9606-1: 2017 / ISO 9606-1:2012 /cor2:2013 Clause 6.4 / 6.5: ISO 5173: 2023
	Fracture Test Nick Break	ASME IX: 2023 AWS D1.1/D1.1M: 2020 AWS D1.2/D1.2M: 2014 AWS D1.6/D1.6M: 2017 API 1104:2021 AS 1210: 2010/amdt 2-2015 AS 3992: 2020 / amdt 1:2023 AS/NZS.2205.4.1:2019 BS 4515-1: 2009 Clause 8.5.2.2 BS EN ISO 9606-1: 2017 / ISO 9606-1: 2012/cor2:2013 Clause 6.4 / 6.5: ISO 9017: 2017

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Vickers Hardness Test (0.2 to 30 kgf Load)	API 1104: 2021 ASTM E92: 2017 ASTM E384: 2022 BS EN ISO 6507-1: 2018 / ISO 6507-1: 2018 AS 3992: 2020 / amdt 1:2023 AS 2205.6.1:2003 BS EN ISO 15614-1: 2017+A1: 2019 / ISO 15614-1: 2017+A1: 2019 Clause 7.4.5: BS EN ISO 9015-1: 2011 / ISO 9015-1: 2011 BS 4515-1: 2009 Clause 8.3.2.5 / 8.4.3.4 / 8.5.2.4 / Annex B: BS EN ISO 6507-1: 2018 / ISO 6507-1: 2018 BS 4515-2: 1999 Clause 8.5.2.4 / 8.7.2.4: BS EN ISO 6507-1: 2018 / ISO 6507-1:2018
	Brinell Hardness Test	ASTM E10: 2018 BS EN ISO 6506-1: 2014 / ISO 6506-1: 2014
	Rockwell Hardness Test (C Scale)	ASTM E18: 2022 BS EN ISO 6508-1: 2016 / ISO 6508-1: 2016

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Charpy Impact Test (Ambient to Minus 196 -•°C)	ASTM A370:2022 ASME IX: 2023 AWS D1:1/D1.1M: 2020 AWS D1.6/D1.6M: 2017 API 1104: 2021 AS 1210: 2010/amdt 2-2015 AS 3992: 2020 / amdt 1:2023 ASTM E23: 2018 AS 2205.7.1:2023 BS EN ISO 148-1: 2016 / ISO 148-1: 2016 BS EN ISO 15614-1: 2017+A1: 2019 ISO 15614-1: 2017+A1: 2019 Clause 7.4.4: BS EN ISO 9016: 2022 BS 4515-1: 2009 Clause 8.3.2.6 / 8.4.3.5: BS EN ISO 9016: 2022 / BS EN ISO 148-1: 2016 / ISO 148-1: 2016 BS 4515-2: 1999 Clause 8.5.2.6 / 8.7.2.6: BS EN ISO 9016: 2022 / BS EN ISO 148-1: 2016 / ISO 148-1: 2016

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Macro Etch Examination (Up to 20X Magnification)	ASME IX: 2023 AWS D1.1/D1.1M: 2020 AWD D1.2/D1.2M: 2014 AWS D1.6/D1.6M: 2017 API 1104: 2021 AS 1210: 2010/amdt2-2015 AS 3992: 2020 / amdt 1:2023 AS/NZS 2205.5.1:2019 ASTM E340: 2015 BS EN ISO 9606-1: 2017 / ISO 9606-1: 2012/cor2:2013 Clause 6.4: BS EN ISO 17639:2022 BS EN ISO 15614-1: 2017+A1: 2019 ISO 15614-1: 2017+A1: 2019 Clause 7.4.3: BS EN ISO 17639: 2022 BS EN ISO 15614-2: 2005 / ISO 15614-2: 2005/COR2: 2009 Clause 7.4.5: BS EN ISO 17639: 2022 BS EN ISO 15614-6: 2006 / ISO 15614-6:2006 Clause 8.4.4: BS EN ISO 17639: 2022 BS 4515-1: 2009 Clause 8.3.2.4: BS EN ISO 17639: 2022 BS 4515-2: 1999 Clause 8.5.2.3.2: BS EN ISO 17639: 2022
Metal & Metal Products	Tensile Test (Up to 200 tons)	ASTM A370: 2022 ASTM E8/E8M: 2022 BS EN ISO 6892-1: 2019 / ISO 6892-1: 2019 BS EN 10025-1: 2004 MS EN 10025-1: 2011 MS EN 10025-2: 2011 JIS Z 2241: 2022

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
	Through Thickness Test	ASTM A770: 03 (2018) BS EN 10164: 2018 ASTM A370:2022 BS EN ISO 6892-1:2019
	Charpy Impact Test (Ambient to minus 196 -•°C)	ASTM A370: 2022 ASTM E23: 2018 BS EN ISO 148-1: 2016 / ISO 148-1: 2016
	Bend Test	ASTM E290: 2022 BS EN ISO 7438: 2020 / ISO 7438: 2020 JIS G 3444: 2021
	Macro Etch Examination (Up to 20X Magnification)	ASTM E381: 2022 ASTM E340: 2015
	Flaring Test	ASTM A370: 2022 ASTM A450: 2021 BS EN ISO 8493: 2004 / ISO 8493: 1998 BS EN ISO 8495: 2013 / ISO 8495: 2013 ABS Rules (Chapter 5, Section 8)
	Flattening Test	ASTM A370: 2022 ASTM A450: 2021 BS EN ISO 8492: 2013 / ISO 8492: 2013 JIS G 3444: 2021
	Vickers Hardness Test (0.2 to 30 kgf Load)	ASTM A370:2022 ASTM E384:2022 ASTM E92:2017 BS EN ISO 6507-1:2018 / ISO 6507-1:2018 JIS Z 2244-1:2020
	Brinell Hardness Test	ASTM A370: 2022 ASTM E10: 2018 BS EN ISO 6506-1: 2014 / ISO 6506-1: 2014
	Rockwell Hardness Test (C Scale)	ASTM A370: 2022 ASTM E18: 2022 BS EN ISO 6508-1: 2016 / ISO 6508-1: 2016
Mechanical Testing On Bolts And Nuts	Tensile Test (Up to M36)	ASTM A370: 2022 ASTM F606/F606M:2021 BS EN ISO 6892-1:2019/ ISO 6892-1:2019 ISO 898-1: 2013 / BS EN ISO 898-1: 2013 JIS Z 2241:2022

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
	Proof Load Test (Up to M36)	ISO 898-1: 2013 / BS EN ISO 898-1: 2013 ISO 898-2: 2022 / BS EN ISO 898-2: 2022
	Charpy Impact Test (Ambient to Minus 196 -•°C)	ASTM A370: 2022 ASTM E23: 2018 BS EN ISO 148-1: 2016 / ISO 148-1: 2016
	Vickers Hardness Test (0.2 kgf to 30 kgf Load)	ASTM A370: 2022 ASTM E384: 2022 ASTM E92: 2017 ASTM F606/F606M:2021 ISO 898-1: 2013 / BS EN ISO 898-1: 2013 ISO 898-2: 2022 / BS EN ISO 898-2: 2022
	Rockwell Hardness Test (C Scale)	ASTM A370: 2022 ASTM E18: 2022 BS EN ISO 6508-1: 2016 / ISO 6508-1: 2016 ASTM F606/F606M:2021 ISO 898-1: 2013 / BS EN ISO 898-1: 2013 ISO 898-2: 2022 / BS EN ISO 898-2: 2022
	Brinell Hardness Test	ASTM A370: 2022 ASTM E10: 2018 BS EN ISO 6506-1: 2014 / ISO 6506-1: 2014 ASTM F606/F606M:2021 ISO 898-1: 2013 / BS EN ISO 898-1: 2013 ISO 898-2: 2022 / BS EN ISO 898-2: 2022
	Shear Stress Test	ASTM A394:08 (2015) (Clause 11.2) ASTM F606/F606M 2021 (Clause 3.8)
Material Composition Analysis Low Alloy Steel stainless Steel duplex Steel	Material Composition (Optical Emission Spectrometer Method)	ASTM E415: 2021 ASTM E1086: 2022 BS EN 10025-1: 2004
Corrosion Test Stainless Steel duplex Steel nickel-based Steel	Intergranular Corrosion Test Pitting Test	ASTM A262: 15 (2021) (Practice E) ASTM G48: 11(2020) e1 (Method A)

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Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
Metallography	Metallography / Microstructure Examination -Sample Preparation -Chemical Etching -Microstructure Image (100X ~ 500X) Ferrite Content Measurement (100X ~ 500X)	ASTM E3: 2011 (Reapproved 2017) ASTM E407: 07 (2015) e1 BS EN ISO 17639: 2022 / ISO 17639: 2022 ISO/TR 16060: 2003 ASTM E562: 2019e1
Mechanical Test On Automobile Part	Welding Penetration Force Breakaway Test	DTSH5603G: 2006 MMC-ES-X75011: 2000 DTSB1503G: 2007 MMC-ES-X87010: 1992
Mechanical Test On Reinforcement Bar	Visual Inspection (Quality of Finished Steel)	MS 146: 2014 (Clause 7.2) BS 4449: 2005+A3: 2016 (Clause 7.2)
	Dimensions, Mass per Meter and Tolerance	MS 146: 2014 (Clause 7.4) BS 4449: 2005+A3: 2016 (Clause 7.3) MS ISO 15630-1: 2012 (Clause 12) BS EN ISO 15630-1: 2019 (Clause 12)
	Surface Geometry	MS 146: 2014 (Clause 7.5.2) BS 4449: 2005+A3: 2016 (Clause 7.4.2) MS ISO 15630-1: 2012 (Clause 10) BS EN ISO 15630-1: 2019 (Clause 10)
	Fatigue Test	MS 146: 2014 (Clause 7.3.4) BS 4449: 2005+A3: 2016 (Clause 7.2.4) ISO 6935-2: 2019 (Clause 9.5) MS ISO 15630-1: 2012 (Clause 8) BS EN ISO 15630-1: 2019 (Clause 8) ISO 15630-1: 2019 (Clause 8)

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
	Tensile Test (Yield Strength, Ultimate Tensile Strength) Up to Y50	MS 146: 2014 (Clause 7.3.3) BS 4449: 2005+A3: 2016 (Clause 7.2.3) ASTM A1064/A1064M: 2022 BS EN ISO 6892-1: 2019 / ISO 6892-1: 2019 BS EN ISO 15630-1: 2019 (Clause 5) ISO 15630-1: 2019 (Clause 5) MS ISO 15630-1: 2012 (Clause 5)
	Bend Performance Test (Bend, Ageing & Re-bend Test)	MS 146: 2014 (Clause 7.3.5) BS 4449: 2005+A3: 2016 (Clause 7.2.5) ISO 6935-2: 2019 (Clause 9.3 & 9.4) MS ISO 15630-1: 2012 (Clause 7) BS EN ISO 15630-1: 2019 (Clause 6 & 7) ISO 15630-1: 2019 (Clause 6 & 7)
Mechanical Test On Welded Fabric	Dimensions Mass Per Meter And Tolerance	MS 145: 2014 (Clause 7.3) MS ISO 15630-1: 2012 (Clause 12) BS EN ISO 15630-1: 2019 (Clause 12)
	Surface Geometry	MS 145: 2014 (Clause 8.1.2, 8.1.3.2) MS ISO 15630-1: 2012 (Clause 10) BS EN ISO 15630-1: 2019 (Clause 10)
	Tensile Test (Yield Strength, Ultimate Tensile Strength)	MS 145: 2014 (Clause 7.2.3) BS 4483: 2005 (Clause 7.2.3) BS EN ISO 6892-1: 2019 / ISO 6892-1: 2019 BS EN ISO 15630-1: 2019 (Clause 5) ISO 15630-1: 2019 (Clause 5) BS EN ISO 15630-2: 2019 / ISO 15630-2:2019 MS ISO 15630-2: 2012 (Clause 5)

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
	Shear Strength Test (Ultimate Tensile Strength)	MS 145: 2014 (Clause 7.2.4) BS 4483: 2005 (Clause 7.2.4) BS EN ISO 15630-1: 2019 (Clause 5) ISO 15630-1: 2019 (Clause 5) BS EN ISO 15630-2: 2019 / ISO 15630-2: 2019 (Clause 7.1) MS ISO 15630-2: 2012 (Clause 7)
	Bend Performance Test (Bend, Ageing & Re-bend Test)	MS 145: 2014 (Clause 7.2.5) BS 4483: 2005 (Clause 8.1.3.2) BS EN ISO 15630-2: 2019 (Clause 6) MS ISO 15630-2: 2012 (Clause 6)
Mechanical Test On Steel Wire	Visual Inspection (Quality of Finished Steel)	MS 144: 2014 (Clause 8.1.2.2) BS 4482: 2005 (Clause 7.2)
	Dimensions, Mass Per Meter and Tolerance	MS 144: 2014 (Clause 7.3) BS 4482: 2005 (Clause 7.3) MS ISO 15630-1: 2012 (Clause 12) BS EN ISO 15630-1: 2019 (Clause 12)
	Surface Geometry	MS 144: 2014 (Clause 7.4.2) BS 4482: 2005 (Clause 7.4.2) MS ISO 15630-1: 2012 (Clause 10) BS EN ISO 15630-1: 2019 (Clause 10)
	Tensile Test (Yield Strength, Ultimate Tensile Strength) Up to 12mm Nominal Diameter	MS ISO 15630-1: 2012 (Clause 5) MS 144: 2014 (Clause 7.2.3) BS 4482: 2005 (Clause 7.2.3) ASTM A1064/A1064M: 2022 BS EN ISO 6892-1: 2019 / ISO 6892-1: 2019 BS EN ISO 15630-1: 2019 (Clause 5) ISO 15630-1: 2019 (Clause 5)
	Bend Performance Test (Bend, Ageing & Re-bend Test)	MS 144: 2014 (Clause 7.2.4) BS 4482: 2005 (Clause 7.2.4) MS ISO 15630-1: 2012 (Clause 7) BS EN ISO 15630-1: 2019 (Clause 6 & 7)
Mechanical Test On Reinforcement Coupler For Mechanical Splice Of Bars	Fatigue Test	ISO 15835-1: 2018 (Clause 5.4) ISO 15835-2: 2018 (Clause 5.5 exclude 5.5.4) ISO 15630-1: 2019 (Clause 8)

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	Tensile Test	ISO 15835-1: 2018 (Clause 5.3) ISO 15835-2: 2018 (Clause 5.3) BS EN ISO 15630-1: 2019 (Clause 5) ISO 15630-1: 2019 (Clause 5) BS EN ISO 6892-1: 2019 / ISO 6892-1: 2019