Annexure-01

Compliance Sheet for Universal Multi- Mode coating thickness Measuring System

Sl. NO	Specifications	Compliance/ Clarification
1 Scope of supply		
The scope of supply shall include the provision, installation, commissioning, and demonstration of the Universal Multi-Mode coating thickness Measuring System for coating thickness measurements and material testing. Additionally, the scope shall encompass the training of VSSC [1] personnel for a minimum of two days following installation and commissioning.		
2 Technical Specification of Universal Multi-Measuring System 2.1 The Universal Multi-Measuring System should be equipped with the following measurement modules (Separate equipment working on the below mentioned working principles are not acceptable)		

Sl No	Module	Intended Use (Measurement of)	Standard of compliance	
2.1.1	Dual mode (Eddy current method & Magnetic induction method)	a) The non-conductive coating thickness on the non-ferrous substrate b) The non-conductive coating thickness on the ferromagnetic substrate. c) Non-conductive coating thickness on austenitic and Duplex steel d) Nickel-Phosphorus coatings on Non-Ferrous Substrates	ISO[2] 2360 and ISO 2178, ASTM[3] D7091 or equivalent	
2.1.2	Phase-sensitive Eddy current method	a) Coating thickness of Cu[4], Zn [5], & Ni [6] on ferromagnetic substrate b) High conductive coating thickness on low conductive substrate	ISO 21968 or equivalent	

[1] VSSC—Vikram Sarabhai Space Centre
[2] ISO—International Organization for Standardization
[3] ASTM—American Society for Testing and Materials
[4] Cu—Copper
[5] Zn—Zinc
[6] Ni—Nickel

Sl. NO	Specifications			Compliance/ Clarification
		c) Copper thickness on PCB [7] Material(Cu/Iso [8]) and PCB Holes d) Electrical conductivity of non-ferrous materials		
2.1.3	Magnetic Induction method	a) Galvanic Ni coating thickness on non-ferrous metals/non-conductive substrate b) coating thickness of Cu, Al [9] & Pb [10] on Ferro-magnetic substrate c) Nickel-Phosphorus coatings on Non-Ferrous Substrates	ISO 2178, ASTM D7091 or equivalent	
2.1.4	Magnetic method	a) Thick NF[11] coatings on steel and iron without Eddy current induced measurement errors. b) Ferromagnetic coatings on non-ferromagnetic substrate materials. c) Nickel coating thickness on PCB.	ISO 2178 and ASTM 7091 Or equivalent	
2.1.5	Coulometric System	Coating thickness destructively and thickness of multi-layered Nickel on different substrates	ASTM B764-94 and DIN [12] 50022 in addition to DIN ISO 2177 or equivalent	
2.2 The Universal Multi-Measuring System shall have the following features:				
Sl No	**Features**	**Details**		
2.2.1	Display type and resolution	Backlit touch screen (≥750 x 550 pixels)		

[7] PCB—Printed Circuit Boards
[8] Iso—Insulator materials (non-conductive)
[9] Al—Aluminum
[10] Pb—Plumbum (Lead)
[11] NF—Non-Ferrous
[12] DIN—Deutsches Institut Fur Normung (German Institute for Standardisation)

Sl. NO	Specifications		Compliance/ Clarification
2.2.2	Units Display	Coating thickness (µm), Ferrite content (Fe[13] %), Electrical conductivity (%IACS[14]).	
2.2.3	Graphical Presentation	Shows measurements with limiting values.	
2.2.4	Software	Windows-based	
2.2.5	Statistical Display	Displays mean, standard deviation, min, max, range; Shall include histogram and Factory Diagnosis Diagram.	
2.2.6	Tolerance & Capability	Tolerance limits entry and process capability calculation.	
2.2.7	Output & Export	Online/offline output; export as text	
2.2.8	Report Templates	Customizable for different applications.	
2.2.9	Connectivity	LAN, USB, HDMI	
2.2.10	Memory (minimum)	Internal 256MB, expandable via USB.	
2.2.11	Power Supply	Compatible with Indian electric supply (230 V±10V and 50 Hz±5%)	
2.2.12	Dimensions & weight	≤ 400mm x 200mm x 300mm & ≤ 10Kg.	
2.2.13	Operating Temperature range	10 to 40°C or wider	

2.3 The Universal Multi-Measuring System shall be supplied with following probes:

Sl no.	Probe Type	Application (To measure)	Specifications	Accessories	
2.4	Axial Single Hard Non-Replaceable Tip type Magnetic inductive microprobe	Non-conductive and non-ferrous coating on steel and iron (NC/Fe & NF/Fe).	a) Probe Diameter:≤10.0mm b) Length: ≤110mm c) Measuring Range: 0 to 700µm d) Accuracy: ± 0.5µm up to 25µm	2 Calibration foil set and Fe base for mentioned range	

[13] Fe—Ferrum (Iron)
[14] IACS—International Annealed Cupper Standard

Sl. NO		Specifications			Compliance/ Clarification
			±2% for 25-500 µm ±5% for 500-700µm e) Temperature Range: -10^{0}C to +40^{0}C f) Integral cable: ≥1.5m length		
2.5	Plug-in Type Magnetic Inductive Probe	Electroplated ferromagnetic coating thickness on a non-ferromagnetic substrate (Ni/NF).	a) Probe Diameter: ≤10.0mm b) Measuring Range: 0 to 200µm or wider c) Spring-loaded element with exchangeable pole d) Wear-resistant coating e) Memory for application-specific parameters f) Integral Cable Length: ≥1.5m	N/A	
2.6	Axial Single Tip Amplitude sensitive Eddy Current Probe	Non-conductive coating thickness on a non-ferrous substrate (NC[15]/NF).	a) Probe Diameter: ≤18.0mm b) Length: ≤60.0mm c) Measuring Range: 0 to 1200µm or wider d) Spring-loaded element with wear-resistant tip e) Integral cable length: ≥1.5m	Calibration foil set and NF base	
2.7	Axial Single Tip Phase Sensitive Eddy Current Smart Probe	Galvanic Ni coating thickness on steel or iron (Ni/Fe).	a) Probe Diameter: ≤16.0mm b) Length: ≤110.0mm c) Measuring Range: ≥ 2 to 100µm d) Lift-off Compensation: ≥200µm lacquer or air e) Frequency: ≥60KHz f) Spring-loaded element g) Integral Cable Length: ≥1 m	Fe base	
2.8	Magnetic Probe	Electroplated Ni coating thickness on non-ferrous or non-conductive substrates (Ni/NF or Iso).	a) Measuring Range: 0 to 150µm b) Microchip-enabled c) Integral cable: ≥1.5m length	Ni-saturated calibration foil set for NF/Fe & Calibration	

[15] NC—Non-Conductive

Sl. NO	Specifications	Compliance/ Clarification
	foil for NF/Fe base	
Note: Party may suggest any additional probes if required/mandated to carry out coating thickness measurement as suggested in Sl. No. 2.		
3 Technical Specification of Coulometric System:		
The system should be capable of measuring metallic/non-metallic Single or multiple coatings on the metallic or non-metallic substrate, with Potential difference by Coulometric anodic dissolution method.		
3.1 Measurement Capabilities:		
3.1.1 Measures single/multiple metallic coatings on metallic and non-metallic substrates.		
3.1.2 Electrochemical potential measurement via Coulometric method		
3.1.3 Measurement range: 0.5 to 50µm or wider.		
3.2 Display & Control:		
3.2.1 Graphical display: 110mm x 85mm or wider.		
3.2.2 Selectable depleting rate: 0.1 to 50µm/min or wider.		
3.2.3 Adjustable depleting amperage.		
3.3 Software & Evaluation:		
3.3.1 Software-controlled tests for Ni coatings on Fe, Al, or ABS[16] (4-layer system or more).		
3.3.2 Statistical measurement mode: mean, standard deviation, coefficient of variation, range, min/max values.		

[16] ABS—Acrylonitrile Butadiene Styrene

Sl. NO	Specifications	Compliance/ Clarification
3.3.3	Graphical evaluation with histogram, normal probability chart, and process capability indices.	
3.3.4	Software for evaluating potential plots, coating thickness, and potential differences.	
3.4	Test Areas & Accessories:	
3.4.1	Test area sizes: Ø3.2mm, Ø2.2mm, Ø1.5mm, and Ø0.6mm.	
3.4.2	Stand for big/small parts with controlled electrolyte filling/emptying, alarm for saturation.	
3.4.3	Accessories: support arm, swiveling support, accessory case, eraser, replacement electrode, bush, shell gasket, O-ring seals, circular level, grounding cable, centering device, measuring cell base, 3x 1L plastic bottles, 3x 100ml electrolyte bottles, connecting cables.	
3.5	Predefined Applications & Memory:	
3.5.1	70+ standard applications for metal coatings, 12+ for metal wires, and 2+ for other measurements.	
3.5.2	Memory for 40+ applications, storing 2800+ measurements in 500+ blocks.	
3.6	Connectivity & Power:	
3.6.1	USB with connectors for PC, keyboard, and mouse.	
3.6.2	Suitable stand connector	
3.6.3	2+ banana jacks for auxiliary silver electrodes.	
3.6.4	Operates on Indian electric supply (230 V±10V and 50 Hz±5%)	
3.6.5	0.8m+ cable for hardware-to-cell connection.	

Sl. NO	Specifications		Compliance/ Clarification
3.6.6	Includes connecting plate and data storage software, plus PC connecting cable.		
3.7	The following accessories shall also be supplied along with the Coulometric System:		
Sl. No	**Description**	**Details**	
3.7.1	Additional Measuring Stand	Free swivelling support for middle and small parts with random form, with standard accessories.	
3.7.2	Electrolyte (1 Litre)	For Ag/Fe, Ni, Al, Iso; Cu/Fe; CuZn/Fe; Sn60Pb40/Fe; Cu/Zn; Pb/Fe, Cu.	
3.7.3	Electrolyte (1 Litre)	For Ni/Fe, Al, CuZn, Iso.	
3.7.4	Electrolyte (1 Litre)	For Electro less Ni/, Al, Iso.	
3.7.5	Electrolyte (1 Litre)	For Ag/Cu.	
3.7.6	Electrolyte (1 Litre)	For Zn/Fe, Ni, Al.	
3.7.7	Calibration Standard for Ag Coating	Ag/Fe; 6 to 9µm.	
3.7.8	Calibration Standard for Cu Coating	Cu/Fe; 10 to 15µm.	
3.7.9	Calibration Standard for Ni Coating	Ni/Cu; 11.5µm.	
3.7.10	Calibration Standard for Ag Coating	Ag/Cu; 15 to 20µm.	
3.7.11	Calibration Standard for Zn Coating	Zn/Fe; 6 to 9µm.	
3.7.12	Split up price quote for each items detailed in sl. No. 3.7.1 to 3.7.11 shall be included in price bid		
3.8	The system shall be provided with PC and display monitor, they should be from reputed brand like HP/Lenovo/Dell and be compatible with the supplied software with following nominal specifications:		
3.8.1	Processor: i7 12th generation or better		
3.8.2	RAM: 16GB DDR4 or better		

Sl. NO	Specifications	Compliance/ Clarification
	3.8.3 Internal Storage Capacity: 2TB or better	
	3.8.4 Operating System: Original Windows with licensed Microsoft word (compatible with software)	
	3.8.5 In addition to above a suitable Graphics card should also be provided	
	3.8.6 LED monitor of size ≥ 27" with high resolution of the order of ≥ 3MP	
3.9	A granite top (≤L—150 cm × W—75 cm × t—18mm) stand/table with foot rest, keyboard and mouse slider and side drawers, to place and operate the equipment shall be provided along with equipment.	
4	**General Specifications (Terms & Condition)**	
4.1	The offer should be submitted in two parts.	
4.1.1	**Part 1**: Technical bid containing details of the system meeting all technical specifications with all brochures/catalogs/technical data sheets and probe data sheets. The prices masked price bid with split up cost of the basic system with essential accessories, probes, optional accessories, AMC cost, and price list of probable spares required for the AMC period should also be attached.	
4.1.2	**Part 2**: Price bid offer of the system with split up cost for all the items as mentioned in part 1.	
4.2	The offered system should be the latest, standard model (manufactured within one year of the date of PO). The party has to mention the year of manufacturing along with the model number. Technical Brochure/Catalogue containing the full Technical specification of the system should be attached (in English).	
4.3	If party is a dealer/Indian agent, valid certificate (letter of authorization) from OEM shall be submitted.	
4.4	The party should have an after-sales service facility in India with service personnel trained and certified by the principal in troubleshooting/maintenance/calibration and software updates of the system.	
4.5	The offered system should be pre-calibrated and ready to use after commissioning. Factory Acceptance Test report shall be submitted by the party.	

Sl. NO	Specifications	Compliance/ Clarification
4.6	List of existing customers in India with the address to whom the same or similar systems are supplied and working in satisfactory condition are to be provided. The Party has to coordinate a visit of the VSSC team to any one of these customers as per our choice, if required during the technical offer evaluation.	
4.7	Party shall provide hands-on training to the NDTF-M personnel after I&C[17] at VSSC on all aspects of system capability .This training shall cover the setup of test parameters (as per specific applications), calibration, scanning, data acquisition, processing, analysis, archival, and presentation of processed data. Personnel shall also receive training in machine troubleshooting.	
4.8	The party has to give undertaking to ensure the availability of spare and service for at least next 10 years from the date of installation of the system. There should be commitment also from the part of OEM for assured support on real time basis, in case of breakdown/urgency/ if any (Letter of commitment from the OEM is to be attached along with the offer)	
4.9	The system supplied should be provided with two years of warranty from the date of installation & commissioning and thereafter under a Non-comprehensive annual maintenance contract for five years for which a separate order will be made.	
4.10	Conduct 2 PM visits and any number of BM visit (if required at free of cost) every year during the warranty and 2PM and 1 BM (if required at free of cost) visit during AMC period. Party has to quote for additional visits if more than one breakdown maintenance visit becomes necessary in a year	
4.11	The Party has to quote separately for the AMC with a price list of probable spares to be procured during the AMC period. The cost of AMC shall also be accounted for arriving at the L1 offer during bid evaluation.	
4.12	Scope of work in Warranty and AMC Period shall include checking and ensuring proper functioning of equipment and Software updating (if any latest version is available) at free of cost.	
4.13	Breakdown (if any) of the system both in warranty and AMC period has to be attended to within two consecutive working days on receipt of information from VSSC and periodic maintenance visit in due course on mutual agreement.	

[17] I&C—Installation and Commissioning

Sl. NO	Specifications	Compliance/ Clarification
4.14	During maintenance, replacement of parts if any, which are not available with VSSC has to be supplied by the party with prior approval from VSSC. Payment for the same shall be released separately on the certification of the successful functioning of the system after the replacement of the spare by VSSC and against the production of documentary evidence by the party.	
4.15	The party has to supply the certificates of warranty, calibration, conformities for electrical safety & environmental protection, operating instruction manual, and operational compliance along with the system.	
4.16	Party has to quote for all the specified concomitant accessories which are considered essential for commissioning and utilization of the machine even if not specified.	

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