

Reasoned document based on the comments received from TDK and ABB on STR No. TI/STR/005 (Revision 2)

Cl	Content	Comments	RDSO's remarks
	Vendor		'Firm' has been mentioned in place of 'Vendor'
4.1	The Vendor should possess valid ISO 9001 certificate for manufacture of same/similar item at his works address for which approval is being sought and it should be broadly covered in the scope of the certification for manufacture and supply.	TDK: ISO 9001 certificate should include scope for Design and manufacturing.	Accepted and clause modified as under: The Vendor should possess valid ISO 9001 certificate for manufacture of same/similar item at his works address for which approval is being sought and it should be broadly covered in the scope of the certification for design, manufacture and supply.
5.0	Particle size: i. More than 5 microns - 50 particles per cu.ft. ii. 5 microns to 1 micron - 150 particles per cu.ft. iii. Less than 1 micron - 200 particles per cu.ft.	TDK: Particle count is very high. Suggestion: > 5 micron : 1 1 to 5 micron : 25 0.5 to 1 micron : 100	Not accepted as it is related to the environment wherein the capacitor bank winding activity is performed.
6.11	Oscillation null detector	TDK: This is outdated equipment. Can be removed from list. Couple of decades ago, there was Schering Bridge to measure Tan delta & capacitance and separate null detector to check balance condition of bridge. Modern equipment have built-in null detector. Tan delta & capacitance values are directly displayed on screen.	Accepted and deleted. The Oscillation null detector is an analogue equipment used in Tan- δ measurement. Schering Bridge which requires null detector was in use for measuring Tan- δ etc. Now a days, digital equipment is available to measure the requisite parameters of testing involved in capacitor. In view of the above clause 6.1 modified as under Cl. 6.1 Tan- δ & capacitance measuring instrument capable of displaying the values of Tan- δ & Capacitance (Latest equipment

		The Tan delta & capacitance measuring instrument is already covered in clause 6.1	having built in null detector should be available and mentioned)
Pg1	Document title	ABB: The document title shall be “Schedule of Technical Requirement for Manufacturing & testing facilities and quality control requirement for Shunt and Series Capacitor Bank for Traction Sub – Station of Indian Railways”	Accepted and modified as under: Schedule of Technical Requirement for Manufacturing & testing facilities and quality control requirement for Shunt and Series Capacitor Bank for Traction Sub – Station of Indian Railways
Cl.2.4	<p>The applicant firm must have detailed agreement between the applicant firm & contract manufacturer in case of contract manufacturing for the purpose of effective quality control on capacitors manufactured at contract manufacturer premises at various stages i.e., raw material stage, production stage, quality control, finished product awaiting dispatch, marketing and after sale service/guaranty obligations. The applicant firm must be the manufacturer of similar product. The detailed agreement must cover the following aspects:</p> <ul style="list-style-type: none"> ➤ The Drawing/designs and raw materials should be as per the design & acceptance criteria of the principal applicant for manufacturing the capacitor units in the brand name of applicant firm only. In case the contract manufacturing, firm manufacture similar goods under different brand or for different principal necessary delineation of process to be ensured. 	<p>ABB: We do not advice or endorse approving of ‘contract manufacturing’ of capacitors. The life of HV/MV Capacitors is primarily dependent on raw materials, design and manufacturing process. The manufacturer needs to have very close monitoring of these three aspects based on which only product can deliver the required performance as per defined quality standards. If design responsibility is taken by one party and manufacturing is on other party, this accountability gets diluted. Further, to maintain the standards of manufacturing process, putting accountability of warranty to a party who is not a manufacturer is not preferred. Reason being that in case of any failure in the capacitor at any site,</p>	Accepted. The clause 2.3 stipulating contract manufacturing in the STR deleted. Para 4.0 of ISO Doc. No. QO-D-8.1-5 stipulates that RDSO shall grant approval only to the OEM.

	<ul style="list-style-type: none"> ➤ The capacitors manufacturing should be done under supervision of applicant firm's representative as per quality assurance plan and Control plan of the applicant firm and all testing is done by applicant firm's representative only. ➤ The marketing, guarantee/warranty obligation etc. will be the responsibility of the applicant firm. 	<p>it will be very difficult to identify or pin-point on the manufacturer and arrive at root cause analysis for the failure. Further, capacitors are always a sub-component of a complete solution and</p> <p>hence solution provider should be accountable for the key component which is capacitor in this case for satisfactory operation of the system. In view, we request to not allow non-manufacturers to participate in RDSO /Railways as this will open the field to all types of contractors and there will be no control on the product.</p>	
3.4		<p>ABB</p> <p>Considering the criticality of the application, we propose that the manufacturer should have set up for Vacuum Impregnation which is completely automated through SCADA</p>	<p>Clause modified as under</p> <p>Vacuum impregnation chamber (set up) along with capacitor dielectric oil processing plant</p>
3.8	Tig welding machine	<p>ABB</p> <p>Welding machine shall be TIG welding/ MIG welding machine based on the manufacturer's technology and process</p>	<p>Option of MIG welding not accepted as welds are not as precise, strong, or clean as those formed by TIG welding operations.</p>
3.13	Shot blasting machine/Vapor degreasing plant*	<p>ABB</p> <p>We propose that shot blasting and painting activities shall be sub-contracted, under the quality control of the manufacturers, as these are only mechanical activities which does not</p>	<p>Outsourcing of the M&P at 3.13 and 3.14 is indicated under note.</p>

		relates to the performance of the offered equipment.	
5.0	<p>Particle size</p> <p>i. More than 5 microns - 50 particles per cu.ft.</p> <p>ii. 5 microns to 1 micron - 150 particles per cu.ft.</p> <p>iii. Less than 1 micron - 200 particles per cu.ft.</p>	<p>ABB</p> <p>The capacitor winding room should be certified for Class 10000 or Higher class to ensure dust control.</p>	<p>Not commented on the particle size and Class 10000 is not correlated with particle size, hence not accepted.</p>
6.0	<p>6.2 LCR meter / bridge</p> <p>6.10 Oscilloscope</p> <p>6.11 Oscillation null detector</p> <p>6.14 Rheostats of different ratings</p>	<p>ABB</p> <p>Due to the advancement in recent technologies, the firm may or may not possess the following instrument as part of testing and inspection facilities.</p> <p>LCR meter/ Bridge</p> <p>Oscilloscope</p> <p>Oscilloscope null detector</p> <p>Rheostats of different rating</p> <p>However routine test as per relevant standards/ specification shall be carried out with available instrument at the manufacturer works which shall cover the functional requirement of above instruments.</p>	<p>Oscilloscope null detector is removed from the list under clause 6.0 as the same required when Schering bridge was under use for measuring Tan delta & capacitance measuring instrument Tan-delta of the capacitor/capacitor bank. The Bridge, Rheostats of different rating are also required in measurement through Schering Bridge, hence being old practice of measurement, these instruments are also removed. Thus, the instruments under para 6.0 shall be as under and modified the STR accordingly.</p> <p>6.1 Tan-δ & capacitance measuring instrument capable of displaying the values of Tan-δ & Capacitance (Latest equipment having built in null detector should be available and mentioned)</p> <p>6.2 LCR meter</p> <p>6.3 Digital capacitance meter</p> <p>6.4 Million mega ohm meter</p>

			<p>6.5 DC & AC high voltage application test bench fitted with output meters with appropriate time measuring devices.</p> <p>6.6 Discharge test set up</p> <p>6.7 Oven for sealing test</p> <p>6.8 Megger upto 5 kV</p> <p>6.9 DC/AC Digital ammeter, voltmeter, wattmeter, phase angle measurement meter, timer & frequency meter</p> <p>6.10 Temperature and humidity indicator</p> <p>6.11 Vernier Caliper & micro-meter</p>
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