

<b>STR Cl. no.</b>	<b>Description</b>	<b>SCR Comments received</b>	<b>Remarks</b>
1.0	SCOPE: This schedule of technical requirements covers the minimum requirement of M&P and testing facilities for development and manufacturing of brake system for use on 3-phase, 25 kV AC Electric Locomotive.	Nil	-
2.0	<b>MANUFACTURING REQUIREMENTS:</b>		-
2.1	CNC machining & turning centres for machining the various components of the brake system.	Nil	-
2.2	System to calibrate the CNC Machines, testing and measuring equipments and their records. Calibration should be done at least once in a year unless stated otherwise.	Nil	-
2.3	Adequate dry compressed regulated air supply for testing of the air brake valves & brake assemblies on test benches.	Nil	-
2.4	Facility of hot phosphating, Zn plating and anodizing plants to carry out the desired surface treatment processes with accuracy should be available with vendor or sub vendor.	To be modified as: Facility of hot phosphating, Zn plating, anodizing and sand blasting.....	Added in final draft and may be considered after getting final comments from stake holders.
2.5	Facility of suitable capacity and size to achieve the desired flatness on the main panel plates before assembly.	Nil	-
2.6	Facility for press fitting of bushes in various components	Nil	-
2.7	Test facilities for checking the Tri plate panel assemblies for internal leakages and also have suitable arrangement for checking air leakage of reservoirs.	Nil	-
3.0	<b>Testing &amp; Measuring Facilities</b>		
3.1	Distributor Valve Endurance test bench for one million cycles with application counter.	Nil	-
3.2	Test benches for testing the performance of all type of valves & sub assembly of the total system for Indigenized items of Brake Panel. For imported items OEM test certificate/ Quality certificate is mandatory.	Nil	-
3.3	A separate test bench for testing the complete brake panel in fully assembled condition. This	Nil	-

	facility should be able to simulate the actual performance conditions of the equipment as in locomotive.		
3.4	Firms or Sub Vendors should have separate electronic assembly and test facilities for manufacturing, assembly and testing of the various electronic cards used in the brake control system. The electronic component card manufacturing and testing should be manned by qualified and experienced engineers/technicians to carry out the assembly and testing operations. Electronic cards assembly shall be carried out with precaution against electro static charge. In case electronic cards are not being manufactured in house, firm should have proof of OEM with certificates.	Nil	-
3.5	Adequate number of dimensional gauges with digital readout.	Nil	-
		To be added: During individual performance testing of various valves, parameters like "Pressure and Timings" of individual valves (D2 Relay valve, EP Relay valve, Distributor valve etc) should be given clearly by the OEM in the testing proforma and same may be shared to shed/RDSO.	Not pertains to STR
4.0	<b>OTHER FACILITY AND DETAILS</b>		
4.1	Rubber/Rubber bonded items should be stored in a dark & dust proof area with humidity and temperature control. The use of these should follow 'first-in-first-out' system.	Nil	-
4.2	Adequate facilities for transportation like fork lifter with pallets, Cranes & hand trolleys etc. should be available for smooth handling of the products during various stages of manufacture and after final assembly.	Nil	-
4.3	Painting booth with facilities of spray painting of air brake equipment should be available.	Nil	-

4.4	The firm should have facility for carrying out Mechanical Shock & vibration tests or alternatively the firm should get it tested from a Government approved laboratory and submit the test certificate to RDSO for approval.	Nil	-
5.0	<b>LABORATORY &amp; TESTING FACILITIES.</b>		
5.1	<b>Testing Machines</b>	Nil	-
a)	a) Spring Load testing machine to check various springs.	Nil	-
b)	Hardness testing machine for checking hardness of casting and forging items (Rockwell and Brinell Hardness Testing Machine). <i>Testing from the NABL accredited lab may be considered</i>	Nil	-
c)	Shore Hardness tester for checking the hardness of rubber items.	Nil	-
d)	Pressure gauge calibrator for calibration of Pressure gauges.	Nil	-
e)	UTM (for checking tensile strength & elongation of the rubber slabs). <i>Testing from the NABL accredited lab may be considered.</i>	Nil	-
f)	Profile Projector to check the profile of components	Nil	-
g)	Salt Spray test equipment for checking the plating/coating life. <i>Testing from the NABL accredited lab may be considered.</i>	Nil	-
h)	Industrial Endoscopy Machine.	Nil	-
i)	Coating thickness measuring instrument.	Nil	-
j)	Surface roughness tester.	Nil	-
5.2	<b>Measuring and calibrating Instruments</b>		
a)	Surface Plate.	Nil	-
b)	Vernier Callipers with dial and digital indicators.	Nil	-
c)	Set of Gauges for measuring critical dimensions.	Nil	-
d)	Digital Surface finish tester.	Nil	-
e)	Digital Vernier type Height gauges.	Nil	-
f)	Inside micrometers with digital readouts.	Nil	-
g)	Outside micrometers with digital readouts.	Nil	-
h)	Digital thickness tester for rubber items.	Nil	-
i)	Digital three points bore gauge.	Nil	-
j)	Plating / coating thickness gauge for checking layer of phosphating and plating.	Nil	-
k)	Air pressure gauges of adequate capacities.	Nil	-
l)	Three dimensional Co-ordinate measuring machines	Nil	-
5.3	<b>Test Benches</b>		
a)	Test bench and leakage test stand for Distributor valve and the brake control unit.	Nil	-
b)	Test bench for performance test of various brake valves individually.	Nil	-
c)	Test bench for different type of Check Valves.	Nil	-
d)	Loco simulation test rack for testing of complete		-

	brake system assembly including the “Input/output” electrical signal tests along with Blending signals & various traction signals required for proper functioning, including followings:		
i	Cab activation signals.	Nil	-
ii	Parking Brake signals	Nil	-
iii	Battery Positive & Negative Signals.	Nil	-
iv	Isolating cocks feedback signals.	Nil	-
v	Dynamic braking signals.	Nil	-
vi	Vigilance related signals	Nil	-
vii	Brake blending signals.	Nil	-
viii	Different pressure feedback signals.	Nil	-
ix	Pneumatic braking effort demanding signals.	Nil	-
x	Speed inhibited signals	Nil	-
xi	To bail off signal of Auto BC in Regenerative braking mode (DBI signal).	Nil	-
xii	To bail off Auto BC when PVEF is pressed except emergency brake application.	Nil	-
xiii	Emergency Brake pressure switches indication (Traction interlock).	Nil	-
e)	Test facilities for testing of various PCBs in case of manufacturing in house otherwise test certificate from PCB manufacturer is mandatory.	Nil	-
f)	Facility of testing/setting of various pressure switches as per RDSO SMI-0327	Nil	-
		To be added: The test facility shall be able to create various faults which are possible for logging in the brake system (DDS) in addition to the faults which will be logged in DDS of VCU. This will enable sheds to test the software integrity of the stand alone brake system.	Added in final draft and may be considered after getting final comments from stake holders.

**Sub:** Specification & STRs being uploaded on RDSO website for comment/suggestion.

**Ref:** Vigilance Cell-RDSO note no CVO/RDSO/Confdl/2020/dated 23.06.2020, 27.08.2020 & 21.08.2020.

#### Compliance of Vigilance Note

S.No	Para of Vigilance Dte. Note	STR no. RDSO/2007/EL/STR/0076 Rev '4' 2 for Brake system for three phase Electric Locomotives XXX-2019
1.	1(a). Some of draft/provisional specifications are in use even after a lapse of many years. Such specifications to be identified by each dte. head and finalized specification be issued as per ISO procedures on priority.	Not applicable for this final draft STR
2.	1(b). Some of the specifications uploaded on RDSO web site are not fully legible / readable. Legible/readable copy to be uploaded on priority.	do
3.	1(c). All drawings/Specifications of sub-systems/sub-assemblies not uploaded with some of the specifications. It compels vendor to obtain these from RDSO separately which is against the spirit of ease of doing business	do
4.	1(d). Outdated/withdrawn BIS/international standards find mention in many of the specifications.	do
5.	1(e). In many of the specifications, test procedures along with pass/fail criteria not described leaving	do

	<p>ample scope for arbitrariness on the part of inspector involved in the testing of the sample of the item during the vendor registration process or during purchase inspection. All specifications must contain test procedures along with pass/fail criteria. No new/revised specification should be released for implementation without test plans/formats.</p>	
<b>STR</b>		
6.	<p>2(a). Some of draft/provisional STRs are in use even after a lapse of many years. Such STRs to be identified by each dte. head and finalized STR be issued as per ISO procedures on priority.</p>	<p>The rev '1' STR was finalized &amp; issued in April '2019' following the ISO procedure.</p> <p>Now, as per instruction the final draft STR is being issued again.</p>
7.	<p>2(b). Very restrictive/narrow eligibility criteria by specifying experience of same item has been stipulated in some of the STRs. Eligibility criteria to be broad based.</p>	<p>No such criteria have been stipulated in the STR.</p>
8.	<p>2(c). Similarly specific M&amp;P/T&amp;P instead of activity/process based M&amp;P/T&amp;P has been stipulated in some of the STRs. It needs critical review.</p>	<p>M&amp;P/T&amp;P are stipulated as per requirement for manufacturing of quality preview.</p> <p>The STR had been uploaded on RDSO website dated 21.07.2020.</p> <p>It will be reviewed again after getting comments from various stakeholder on the draft.</p>
9.	<p>2(d). Some of the STRs uploaded on RDSO web site are not fully legible / readable. Legible/readable copy to be uploaded immediately.</p>	<p>Being ensured</p>
10.	<p>2(e). In one of the dte, revision of STR has been entrusted to the QA dte</p>	<p>Not applicable.</p>

	<p>which does not appear to be in order. Design dte being the custodian of the STR should only under take revision of STR as has been the case with other dtes.</p>	
11.	<p>3. Current certificates/ credentials such as experience certificate, ISO certificate etc. submitted by some of the vendors have been found to be fake subsequently. There is a need to evolve standard procedure to verify the authenticity/genuineous of current certificate/ credentials of all vendors including the vendors around at the time of vendor registration.</p>	<p>Being ensured</p>
12.	<p>4. In spite of chasing at highest level, sincere efforts to review the specification &amp; STR do not appear to have been made. It is very important that specification &amp; STRs of items having less than 3 vendors should be truthfully reviewed&amp; all clauses coming in way of widening vendor base to be critically reviewed within the ambit of ISO laid down procedure. Prime responsibility of review of the specification/STR lie with concerned design/custodian dte.</p>	<p>Being ensured.</p>
13.	<p>5 Implementation/Compliance of vigilance cell letter number 18/Vig/Policy dated 04.06.2018 in regard to procedure to be followed for updating status of vendor in the event of revision of specifications/STR is not being ensured in some of the dtes. There is no monitoring of cut-in of revised specification/STR by existing</p>	<p>Not Applicable for draft STR/Specification. However, the matter will be ensured.</p>

	approved vendors. It is a serious matter to be looked.. Into personally by respective dte heads.	
14.	6. In the developmental vendor approval letter, there is no mention of the vendors approved drawing accepted deviation and approved sub vendors for outsourced activities /raw material. It makes comparison of supplied item with approved prototype difficult.	This will be ensured during issuing of prototype clearance letter.
15.	7. Prototype equipment tested and approved by RDSO is also not preserved in most of the cases giving a room to vendor supplying modified item subsequently	Not applicable for this final draft STR
16.	8. There is no monitoring of up gradation of developmental vendors to regular vendor or delisting of vendor for the committed lapses. Many old developmental vendors are appearing in the vendor directory it needs critical review	Not Applicable for draft specification & STR .However, monitoring of RDSO controlled Vendors is done through software “Failure reporting & Vendor performance monitoring system.
17.	9. There is confusion in some of the dte in regard to compliance of revised STR specially in respect of changed the eligibility criteria in respect of experience by the existing developmental vendors.	Not applicable in this case.
18.	10. As per existing provision in ISO procedure, no opportunity is required to be given to the vendor in case of nonconformities observed during prototype inspection against Ist time registration. Case is required to be closed straight away in case of observation of nonconformities. Some of the dtes.	Not applicable for this final draft STR

	are however, conveying the noted non-conformities to the vendor and taking final call to reject or approve vendor based on this action/compliance on non-conformities.	
19.	11. BOM (bill of materials) approved vendors list not put in the public domain. It needs to be done through appropriate mechanism.	Bill of material is the proprietary of firm. It is opined that before putting up the BOM in public domain the consent of firm should be taken.  Hence, this issue may be <i>decided by Competent Authority</i>
20.	12. In some of the specifications, requirement of field trials of prototype equipment has been specified without standardization of field performance feedback format. Issue of format for obtaining field performance to be ensured by design dte. Failure data downloaded from equipment/system (if available) should be invariably made use of.	Not applicable in this case.
21.	13. There is a need to generate sample plan for items for which RDSO undertake purchase inspection through PIMS.	Not applicable
22.	14. Correspondence during the registration process should only be at the addresses given in the registration application & important correspondence to be posted on web portal. Prime responsibility for this lies with nominated supervisor & officer signing the letter.	Being Ensured
23	15. In ordinate delay is noticed in	Noted for compliance.

	implementation/complying suggested system improvements issued by Vigilance dte with the approval' of the competent authority	
24	16. Inspite of clear out instruction of DG/RDSO new item are getting added to the vendor directory without seeking the approval of DG.	Not Applicable for the final draft Spec/STR.
25	17. Some of the dtes. are still seeking the approval of Railway board on specification before issue which need to be done away with.	Not applicable for the final draft Spec/STR.