



PREQUALIFICATION CRITERIA FOR  
TRAIN SET (SLEEPER) 80 SETS PROJECT

PQC/ PES-TE/BOI-80  
trainsets

Revision No. 00

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## 1.0 Pre-Qualification Criteria

1.1 The bidder should be a manufacturer/supplier of the product for Rolling stock application of Railways for 3 phase IGBT based Train sets/RRTS/Semi high speed trains/AC EMU/MEMU/Metros in India or any railway systems in the world.

1.2 For supplies made in India, bidder should be approved vendor of Indian Railways /Metro/RRTS.

**OR**

For supplies made to any railway systems in the world, bidder shall provide approval, authenticated by country's recognized railway organization. Acceptance of such approvals will be at BHEL's discretion.

1.3 The product should have valid type test certificates complying to relevant latest IEC and other standards mentioned in the Reference Technical Specification for rolling stock application on the date of submission of the tender. The bidder shall fully comply with the type and routine test & inspection clause of the technical specification. The bidder shall conduct/repeat type tests either partially or fully **for the offered product** without any price implication to BHEL. Decision to conduct type test shall be at BHEL's discretion.

**OR**

The bidder shall provide valid type test certificate/reports complying to relevant latest IEC and other standards for similar product supplied as per clause 1.1. Acceptance of such type test certificate/reports will be at BHEL's discretion. In such case, bidder will be considered for technical evaluation. The bidder shall conduct type tests fully **for the offered product**, without any price implication to BHEL.

1.4 Those bidder(s) who are registered with BHEL/ BHEL's customer (as the case may be) shall be considered for technical evaluation, subject to meeting above PQC clauses.

Bidders who are not registered with BHEL/BHEL's customer (as the case may be) can also quote in the tender. However, their credentials will be assessed for consideration in the tender, before price bid opening, subject to meeting above PQC clauses.

## 2.0 Documents to be submitted

All the relevant documents proof for points referred in 1.0 shall be submitted along with the tender.

Rev. 00

Approved: Anjul

Prepared

Narasimha Shenoy

Checked

C David

Date:  
19.01.2024

Checklist - Documents to be submitted by Bidder					
Sl. No.	Particulars	Acceptable documentation	Submitted with Tender	Document/s submitted by bidder	Remarks by Bidder
1	PQC qualification documentation	<ul style="list-style-type: none"> <li>• RDSO/Indian Railways approval for Indian bidders</li> <li>• Relevant PO copies</li> <li>• Performance statements/certificate</li> </ul>	YES / NO		
2	Type test reports & protocol	<ul style="list-style-type: none"> <li>• Recent type test reports from NABL-accredited laboratory and/or protocol for Indian bidders</li> <li>• Recent type test reports from international accreditation agencies for international bidders and/or protocol</li> </ul>	YES / NO		
3	Routine test protocol	<ul style="list-style-type: none"> <li>• Routine test protocol</li> </ul>	YES / NO		
4	QAP [Quality Action Plan]	<ul style="list-style-type: none"> <li>• QAP [Quality Action Plan]</li> </ul>	YES / NO		
5	Clause-by-clause compliance - duly signed & stamped	<ul style="list-style-type: none"> <li>• Signed &amp; stamped copy of complete specification</li> <li>• Bidder's document tabling each specification clause and indicating the compliance against each clause</li> </ul>	YES / NO		
6	No deviation format - duly signed & stamped	<ul style="list-style-type: none"> <li>• No deviation format, duly filled-in &amp; signed/stamped</li> </ul>	YES / NO		
7	Drawings & datasheets if applicable	<ul style="list-style-type: none"> <li>• Drawing with all required data &amp; BoM</li> <li>• Datasheet with all required parameters mentioned &amp; BoM</li> <li>• Catalogue for standard product with all technical &amp; dimensional details mentioned</li> </ul>	YES / NO		
8	HL3 compliance	<ul style="list-style-type: none"> <li>• Certificate from NABL approved lab or any International accreditation agency</li> </ul>	YES / NO		
9	Bill of Materials	<ul style="list-style-type: none"> <li>• Unpriced copy of price format indicating "Quoted" against each line item</li> </ul>	YES / NO		
10	Spares for 35 years' maintenance requirement	<ul style="list-style-type: none"> <li>• Preventive &amp; Corrective Maintenance Schedule with list of spares, in line with Chapter-5 of Technical Specification.</li> <li>• Unpriced list of above spares with yearly consumption including replacements.</li> </ul>	YES / NO		
11	Checklist	<ul style="list-style-type: none"> <li>• This checklist duly filled-in</li> </ul>	YES / NO		
12	Contact details for correspondence	<ul style="list-style-type: none"> <li>• Email &amp; contact details of representative to contact for technical &amp; commercial queries</li> </ul>	YES / NO		
13	Authorization for bid signing	<ul style="list-style-type: none"> <li>• Notarized/suitable valued bond paper stating authorization for bid signing</li> </ul>	YES / NO		
14	Formats in tech spec	<ul style="list-style-type: none"> <li>• All formats to be filled which ar part of the technical documentation .</li> </ul>	YES / NO		
15	RAMS Documentation	<ul style="list-style-type: none"> <li>• Sample documents on RAMS compliance (as applicable) as per Chapter-4 of Technical Specification.</li> </ul>	YES / NO		
<b>Note to bidder -</b>					
1	Bidder shall necessarily fill this checklist and upload it as a part of the documentation towards this tender. Incomplete documentation may make your offer liable for rejection				
2	Bidder shall upload the documents in a logical sequence & include a table of content clearly indicating the page numbers				
3	This list is not exhaustive & BHEL may ask for additional documentation from bidders in the course of evaluation of the offers				

	<b>Vande Bharat Project</b>
	<b>RAMS TEMPLATES</b>
	<b>CONTENTS</b>
<b>1</b>	<b>Breakdown + Inherent Failure Reliability Prediction</b>
<b>2</b>	<b>Critical failures analysis</b>
<b>3</b>	<b>Failure Mode Effects and Criticality Analysis (FMECA)</b>
<b>4</b>	<b>System/Sub-Systems Hazard Analysis (SHA)</b>
<b>5</b>	<b>Hazard Log + SIL</b>
	<b>Note</b> All table are in accordance to the EN 50126-1-2-3 used as guideline. Refer to above standard for definition and meaning of contents. Minor differences may exist due to application of specific requirement from Railway Administration or final User

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RAMS code				Equipment /System Breakdown				Part number	Data Input	DTC	MC	TC	NDTC		λ unit. BASIC (FPMH)	Duty Cycle %	λ Effett. BASIC (FPMH)	λ Train Level (FPMH)	λ Train Level LEVEL 1 (FPMH) ( 16 CarTrain)	λ Train Level LEVEL 2 (FPMH) ( Sub System)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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Critical Failures Analysis	
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## Failure Mode Effects and Criticality Analysis (FMECA)

<b>Project:</b>															<b>Document No/Rev:</b>			
<b>System:</b>										<b>System Supplier:</b>					<b>Issue date:</b>			
<b>Sub-System:</b>																		
<b>Drawing no:</b>																		
Position No	Part/LRU Code	Description	P/N	Coach type	Function	Phase	Failure mode		Cause of Failure Mode	Failure rate (FPMH)	Failure effect			Criticality		Failure identification /detection	Preventive and compensating measures	Remarks
							Fail. Mode index	Failure Mode			Local	System	Train	Service	Safety			

System/Sub-Systems Hazard Analysis (SHA)

:								Document No/Rev:							
:								Issue date:							
stem:															
g no:															

Main System ID	Hazard Category	Hazard description (general)	Hazard Identification (detailed)	Hazard description (detailed)	Sequential Numbering	Phase / Operation mode	System / Sub-Sytem / Component	Causes	Consequence Potential accident/ damage	Severity Level	Probability	Risk Category	Preventive/compensating actions (Design, Maintenance, Operational Safeguards)	Target risk category	Remarks / Documents reference	Comments
Code that univocally identifies the system object of SHA	Numbering for each hazard of the corresponding "hazard type category"	Hazard category in accoding with Hazard List	Numbering for each hazard of the corresponding "hazard type"	Specific description of the generic hazard	Progressive number associated to previous column	- Running / Normal operation - Running / Degraded operation - Running / Multiple operation - Running / Emergency operation - Standstill / Parking - Standstill / Stabling - Standstill /Driver cab change - Depot / Manoeuvre - Depot / Maintenance	System/ subsystem /component from which the hazard originates	Description of the cause that originate the corresponding hazard	Description of the consequences that could occour in case of the corresponding hazard. The subject of the consequences shall be identified.	Severity level category	Estimed Frequency of Hazard	Risk category and acceptance criteria	The preventive and mitigation measures identified in order to reach the Target risk Objective.All the useful Design, Maintenance, Operational safeguards shall be taken into account, and where available, a reference to applicable standards or regulation shall be reported.	Desired risk category and acceptance criteria	Reference to drawings or specification or documents	Any useful comments for a better understanding. For example it shall be highlighted If an hazard needs to be exported to the vehicle builder / train operator

## Hazard Log + SIL

[illegible][illegible]



## Corrective Maintenance Analysis

<b>Doc. No</b>		<b>Rev No.</b>	<b>00</b>
<b>Date:</b>			
<b>Project</b>	<b>Vande Bharat Project</b>		
<b>Equipment:</b>			
<b>Supplier:</b>			
<b>Compiled by:</b>			

			REMARKS
Manpower cost		Rs/hrs	
Yearly distance run	<b>3,50,000</b>	<b>km</b>	
LCC period	<b>35</b>	<b>Years</b>	
Fleet (nr. of trains)	<b>80</b>	<b>Trains</b>	

Name of project			Corrective Maintenance results		TOTAL COST		35		Maint. hours per 1000 km		Maintenance time [h]		FLEET level maintenance hours sum	
System:			Name of system		Period:		years				Global Manhours [h]		FLEET level manhours sum	
Material cost [ Rs/1000km]		Manpower cost [ Rs/1000km]		Total cost [ Rs/1000km]		Train/year								
MTTR [h]		Total failure rate [t/10*6 h]				Train/period								
						Fleet/Period								

Preventive Maintenance Analysis			
Doc. No		Rev No.	
Date:			
Project	Vande Bharat Project		
Equipment:			
Supplier:			
Compiled by:			

  

			REMARKS
Conversion speed		km/hrs	
Manpower cost		Rs/hrs	
Yearly distance run	3,50,000	km	
Running days per year		days	
LCC considered period	35	years	
Basic maintenance frequency		km	
Distance covered in the considered period	1,22,50,000	km	
Train-sets number in the fleet	80	Trains	

Name of project			Preventive Maintenance results									35	[YEARS] Maintenance												Material	ManPower	Total										
System: name of system															Maintenance time [h]		Train-set level maintenance hours sum			Train / Year																	
Material cost [Rs/1000km]	Manpower cost [Rs/1000km]														Total cost [RS/1000km]												Global Manhours [h]		Train-set level manhours sum			Train / Period					
					Vehicle		TRAIN																						Fleet / Period								
RAMS LRU code	Description		Part Number P/N		DTC	MC	TC	NDTC	Total Q.ty	Step N°	Maintenance Level	Maintenance task	Standard Tool	Special Tool	Material	Frequency unit	Multiple	Cancellation per year	Cancellation at life end	Frequency [km]	People		Failure diagnosis [min]	Integrator accessibility [min]	Supplier accessibility [min]	Change/ Repair/ Functional check [min]	Other activity [min]	n. people OFF train	Off train activity Time [min]	Global Operation Time [ h ]	Global Man Time [h/man]	Material cost [ Rs]	Remark / Note	35	Per Type of Item	Per Type of Item	Per Type of Item
																					Level	Nr												Years Nr of interventions	Material cost [ € / 1000 km ]	Manpower cost [ € / 1000 km ]	Total cost [ € / 1000 km ]
1		Equipment / System																																			
		(Sub-Assembly A)																																			
		Item 1																																			
		Item 2																																			
		(Sub-Assembly B)																																			
		Item 3																																			
		Sub-Item 1																																			
		Sub-Item 2																																			
		Sub-Item 3																																			
		Sub-Item 4																																			
		Sub-Item 5																																			
		Sub-Item 6																																			