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Document Title: Guidelines for approval of Prototype wagon and waiver from manufacturing of prototype wagon



RESEARCH DESIGNS & STANDARDS ORGANIZATION

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QM-G-8.1-5

Guidelines for approval of Prototype wagon and waiver from manufacturing of prototype wagon

1.0 Amendment History:

S. No.	Amendment Date	Version	Reasons for Amendment
1.	28.08.2018	1.0	First issue under ISO 9001:2015. Approved by ED/QA(Mech) on file No. QAM/ISO-9001:2015/Doc-Approval on date 28.08.2018.

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2.0 Purpose:

- i) To inspect and approve the prototype wagon in compliance to para no.12.2 of General Standard specification no.G-72(Rev.3).
- ii) To waive prototype wagon manufacturing based on verification of availability of jigs and fixtures and manufacturing facilities where prototype wagon manufacturing is not required.

3.0 Scope of Application:

The guidelines are applicable for manufacturing of prototype wagons of all types of wagons by all wagon manufacturers (PSU & Private wagon builders) except new design wagon which have not yet been manufactured by any of the approved wagon manufacturer.

4.0 Procedure:

4.1 Criteria for prototype wagon manufacturing and waiver:

SN	Description	Activity	Approving authority
1.	New design wagon	Prototype inspection and approval	Wagon Directorate for first wagon by any of the approved manufacturer
2.	Wagons already in production		
a)	<i>Proto Approval-</i>		
	1 st time or discontinuity of same type wagon is more than 18 months	Proto wagon to be manufactured & Zonal director shall send complete file to Hq's office (Lucknow) with recommendation .	ED/QA(Mech)
b)	<i>Proto Waival-</i>		
(i)	Discontinuity of same type wagon is 12 to 18 months	Control wagon to be manufactured	Zonal Director (with intimation to ED/QA (Mech)
(ii)	Discontinuity of same type wagon is less than 12 months (This is also applicable when wagon production of same design is in continuation but contract is different)	Waiver of Proto wagon manufacturing	Zonal Director (With intimation to ED/QA(Mech)

4.2 Procedure for manufacturing and inspection of proto wagons:

The following steps shall be adopted by the wagon builders for manufacturing and inspection of proto wagons.

4.2.1 Opening of Wagon Inspection file

Wagon Inspection file may be opened by Zonal Director or any officer nominated by him in his absence on submission of following documents by Wagon Manufacturers:

- i) RDSO vendor registration approval certificate (G-105 certificate) issued by Wagon Directorate (Other than PSU)
- ii) Against private order, letter from Director/I&L/RDSO/LKO or any officer nominated by ED/QA(M) for advising Zonal Director to open inspection file. Before advising opening of file, Director/I&L/RDSO/LKO shall ensure that permission for procurement of wagon from Railway Board has been obtained and charges such as Wagon inspection charges, Wagon design loan/drawing approval charge to RDSO Wagon Directorate/RDSO QA (Mech.) Directorate/RITES (as applicable) have been paid by Wagon manufacturer. The status of charges having been paid shall be endorsed in letter addressed to Zonal Director for opening of inspection file.
- iii) Wagon order copy with valid Delivery Period (Complete contract copy).
- iv) Unconditional acceptance of Wagon order by Wagon manufacturer.
- v) File opening request letter by wagon manufacturer.

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4.2.2 Approval of construction drawings:

Wagon manufacturer shall take constructions drawings from wagon Dte as per procedures and shall follow the same for manufacturing of wagon. For any deviation from RDSO drawings and use of firm's construction drawings, approval of Wagon Dte may be taken before manufacturing of wagon. Circulation of construction drawing should be done by Wagon manufacturer for in-house use through control of documents as stipulated in ISO 9001: 2015

4.2.3 Approval of WPS (Welding procedure system):

WPS should be approved by Wagon Dte against each contract. Wagon manufacturer will get approval of WPS before manufacturing of wagon against Railway Board's contract / Private order. However, if there is no deviation of design / drawings for wagon already manufactured by wagon manufacturer, approval may be given by concerned Zonal Director for manufacturing of wagon against a contract after submission of approved WPS (approved by Wagon Dte) with duly filled formats by wagon manufacturer. In case standard WPS has been issued by Wagon Dte, approval may be given by concerned Zonal Director/I&L for manufacturing of wagon against a contract after submission of standard WPS with duly filled formats by wagon manufacturer. In such case, wagon manufacturer will purchase a copy of standard WPS from Wagon Dte.

4.2.4 Approval of inspection check sheet:

Inspection check sheet for each type of wagon is to be approved by Wagon Dte. Wagon manufacturer will approach Wagon Dte for approval of check sheet in case check sheet has not been approved earlier by wagon Dte for a wagon to be manufactured by wagon manufacturer against Railway Board's contract / Private order. In case check sheet is available in RDSO website, separate approval of check sheet is not required. The same should be followed.

4.2.5 Approval of Quality Assurance Programme:

- (a) Wagon manufacturer shall submit a Quality Assurance Programme in QM-RF-8.1-3 format. Wagon manufacturers shall also include the following additional details in QAP:
- i) Type of wagon to be manufactured.
 - ii) Nos of wagon proposed to be manufactured per month.
 - iii) List of shop made components and brought out components.
 - iv) Master operation chart with operation and tooling code for shop made components, sub assemblies and assemblies.
 - v) Details of jigs, fixtures, templates, and gauges to be used for manufacturing of wagon with permissible tolerances (allowance for wear) and frequency of checking.
 - vi) Quality assurance plans for important components and wagon structures.
 - vii) Internal Check sheets for checking quality of important components /sub-assemblies.
 - viii) Firm's approved vendors for bought out components (Non DM).
 - ix) Firm's Check sheets for checking quality of bought out items (Non DM).
 - x) Firm's Check sheets for checking quality of shop made components
- (b) For new design wagon, QAP shall be approved by Wagon Directorate. If wagon design has already been manufactured by any of the wagon manufacturer, QAP shall be approved by concerned Zonal Director/I&L as per para no. 13.1 of G-72 (Rev. 3) against each contract. However, in case standard QAP has been issued by Wagon Dte, the same should be submitted with duly filled format no. and other details for approval by concerned Zonal Director/I&L. In such case, wagon manufacturer will procure a copy of standard QAP from Wagon Directorate. Other details, however, can be got added if necessary for regular inspection by QA(Mech) Dte.
- (c) In case of same wagon design, which has been manufactured by the wagon manufacturer in past, QAP shall be revalidated provided that no change in QAP is required. Documentary evidence must be produced in support of said executed wagon order. Before revalidation of QAP, Zonal office has to verify the documentary evidence and changes in drg/spec of wagon and its components. In case of any change, fresh QAP should be submitted to zonal office for approval.

4.2.6. Documents to be submitted to Zonal office before start of manufacturing of Proto-type wagon by Wagon Manufacturer

- a) Request letter by Wagon manufacturer to start proto wagon manufacturing against Railway Board's contract / Private order.
- b) Copy of specification of relevant wagon.
- c) Complete drawing set issued/approved by Wagon Directorate
- d) Approved QAP
- e) Approved WPS.

- f) Approved inspection check sheet.
- g) Load test chart approved by Wagon Dte.
- h) Layout drawings of all drilling jigs, fixtures, templates and gauges. Latest calibration record of the same duly verified by TPQCA & resident RDSO inspector.
- i) Details of calibration of all relevant tools and welding machines.
- j) List of qualified welders duly certified by Certifying agencies.
- k) List of details of any relaxation/alteration/deviation approved by Wagon Dte
- l) Statement regarding no. of wagon proposed to be manufactured per month.

After scrutiny of the above documents, a letter will be issued by Zonal Director to the Wagon manufacturer for the start of manufacturing of Proto-type wagon.

4.2.7 Inspection of Proto wagon

- (a) Wagon manufacturer will submit request for inspection of prototype wagon, with all the documents listed under 4.2.6 and any other document which may be relevant but not listed, to the concerned Zonal Director/I&L.
- (b) Nominated/Resident inspecting officials will carry out the inspection. In case of defects noticed by the nominated inspecting officials in stages as well as in final proto wagon inspection, the same must be communicated to the wagon builder for rectification in writing.
- (c) After rectification, Wagon manufacturer need to offer the same for re-inspection, in writing, to inspecting official. It is in the interest of wagon manufacturer to complete the wagon and offer good quality wagon for inspection to avoid delays in inspection and approval. Times lines as decided by HQ shall be followed after rectification and final offer of proto wagon.
- (d) Before commencement of prototype wagon inspection, inspecting official shall –
 - i) Verify all jigs, fixtures, templates and gauges. Check control dimension of important fixtures / jigs and record it.
 - ii) Steel ledgers may be verified for availability of steels for the wagon under contract. Related challan, mill TC, RITES test certificates (where applicable) & in-house chemical test may be verified. It should be ensured that steel has been procured as per Railway Board's latest guidelines.
 - iii) Ledgers of wheel set and CTRB shall be verified for availability. It shall be ensured that wheel sets has been procured as per Railway Board's latest guidelines.
 - iv) Original DM of all RDSO inspected components to be seen and copies to be verified.
 - v) All TC & internal test record of all non DM items to be verified. Inspecting official will do sample check for verifying the quality.
 - vi) Verify challan & I.Cs of RITES for Paints & Welding Consumables and Category I items. Inspecting officials will do sample check by matching hologram pasted on material and RITES certificate.
 - vii) Verify copy of challan & WTC of coupler (other than RDSO inspected) (as applicable).
 - viii) Ensure that materials and components received for manufacturing of wagons should be properly stacked and kept under cover when necessary. Class of material to be indicated by specified colour code.
- (e) Prototype wagon and components should be kept ready for inspection as detailed below –
 - i) One wagon assembled, painted and lettered complete in all respect.
 - ii) A second wagon with the underframe with floor welded/riveted and completed in all respect without painting with the body assembled with service bolts/tack welds only.
 - iii) A third under-frame should be bolted / tacked and kept on under-frame fixture. One wagon set of side body, end body, door assembly, roof assembly (as applicable) should be kept on respective fixture in fit up and tack welded condition.
 - iv) One sample each of shop made components and from the list of bought-outs.
- (f) Approved inspection check sheet, drawing, QAP & WPS which will be followed for wagon manufacturing are to be checked by inspecting officials and any discrepancy will be highlighted during stage inspection.

- (g) Each sub assembly will be checked during manufacturing for edge preparation and fit up and after manufacturing for dimension, welding lock bolting and riveting quality. Tolerances in dimension should be as per appendix I & II of G-72 (Rev-3). Welding consumables should be used as per appendix III of G-72(Rev.3) and welding to be done as prescribed in para 8 and Appendix IV of G-72(Rev.3). Lock bolting and riveting should be done as per para 9 of G-72 (Rev-3)
- (h) Shot blasting & painting to be done as per para 11 of G-72(Rev.3).
- (i) Steels from second proto wagon (without painting) should be cut from side body, end body, floor etc. as advised vide ED/QA(Mech) letter no. QAM/DRM dt.31.12.2010 and got tested for chemical composition at firm's spectrometer in their presence/NABL accredited Laboratory
- (j) Complete wagon should be checked for dimension, camber, lock bolt/rivet quality, welding & other functional test as per approved inspection check sheet and WPS. Check sheet for stage wise to final inspection to be duly filled by quality control supervisors of firm and verified by RDSO officials.
- (k) Air brake testing of wagon to be done by SWTR as per approved check sheet and witnessed by inspecting official.
- (l) Prototype wagon is to be tested as per static load test chart approved by wagon Dte. Static load test and check of clearance, camber, buffer height etc. are to be taken under the following condition in presence of inspecting official not below the rank of Jr. scale officer nominated by concerned Zonal Director.
 - i) Empty, but with distributed load to represent the finished body without goods.
 - ii) Loaded (as indicated above at i), but with additional distributed load representing full carrying capacity load as specified.
 - iii) Loaded with over load (as para ii above) and with additional distributed load representing 25% of carrying capacity unless otherwise stated in relevant particular specification.
 - iv) After keeping 18 hrs in the condition mentioned in para (iii) above.
 - v) Empty as in para (i) above, after removing the load.
 Static load test should be conducted as per annexure-VII of G-72 (Rev.3)
- (m) Final tare weight of the prototype wagon should be measured in presence of inspecting official.
- (n) The wagon roof test shall be tested for leakage by passing the wagon under a RDSO design sprinkler booth with all doors closed. Leakage in the body joints are to be inspected from within after closing the door.
- (o) *Testing of Barrel:* Tank wagon when completed shall have fittings attached to it and unless otherwise specified in the particular specification the tank shall then be tested as specified in specification. Any defects appearing during this test, or should there be any sign of leakage, the defect shall be made good and the tank be tested again until it is perfectly tight and by all means to the complete satisfaction of the inspecting officials.
In case of petrol, oil and molasses tank wagons, the test is to be made with a dummy cover over the manhole.
- (p) *Calibration of barrels:* Before approval of proto-type, calibration of barrel should be got completed and certificate to be submitted with proto file.
- (q) Brake force test as per specification (if required in accordance to Wagon Dte's Note no. MW/APB/BMB dated 06.08.2014) should be carried out by manufacturer and got certified/verified by Wagon Dte.
- (r) Squeeze load test to be carried out by Design Dte./RDSO/Lucknow (if required as per specification).

4.3 Prototype wagon approval

- a) After completion of test/inspection mentioned in para 4.2.7 above, the wagon manufacturer will submit the complete prototype file containing all documents mentioned at **para 4.3.1** to the office of Zonal director and will offer the proto type wagon to Zonal director/I&L for final inspection. Zonal Director/I&L will take an appreciation note from inspecting official not below the rank of Jr. scale officer. Zonal Director/I&L will then inspect the prototype wagon.

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- a) On being satisfied, Zonal Director/I&L will recommend the case to Executive Director/QA (Mech.).
- b) The approval of the prototype wagon shall be given by ED/QA(Mech). However, ED/QA(Mech) may consider visiting the premises to see the prototype on case to case basis.

4.3.1 Documents to be submitted by wagon manufacturer in the proto case file while forwarding the case to HQ after final inspection of Proto-type wagon

- a) Request letter by Wagon manufacturer to start proto wagon manufacturing against Railway Board's contract / Private order and Permission letter to start manufacturing of proto wagon by zonal director
- b) Complete copy of specification of relevant wagon, if the spec is controlled by organisation other than RDSO
- c) Copy of complete wagon order including modification advises, if any, along with valid DP.
- d) List of details of any relaxation/alteration/deviation approved by Wagon Dte
- e) First & last page of QAP approved by zonal Director
- f) Letter of issue of WPS by wagon Dte with first page & last page of WPS
- g) Filled load test chart certified by RDSO inspecting official not below the rank of Jr. scale officer.
- h) Filled check sheet of wagon signed by QA Manager of firm and RDSO inspecting official
- i) Appreciation note of inspecting officer.
- j) List of RDSO inspected component with DM No. duly verified by the Inspecting official.
- k) List of RITES inspected components for wagon manufacturing (Paints, welding consumables and cat-I items) with IC No. duly verified by the Inspecting official.
- l) Steel sample test report verified by RDSO Inspector.
- m) Wagon weightment certificate duly certified by RDSO inspector.
- n) Brake force test certificate issued by Wagon Directorate, if required. If brake force test is not required as per Wagon Dte's note no. MW/APB/BMB dated 06.08.2014, then firm has to furnish the details of the earlier Brake Force test conducted by Wagon Directorate.
- o) Squeeze load test certificate/Letter of relaxation issued by Testing/Wagon Directorate, if required. If squeeze load test has been conducted earlier then firm has to furnish the details of the earlier conducted squeeze load test.
- p) Calibration certificate (in case of tank wagon) issued by calibration committee duly witnessed by inspector.
- q) Photograph of final wagon.
- r) Proto offered request letter by firm.
- s) Letter of deposition of design loan & inspection charges if any.
- t) Verified check list as mentioned at para 4.2.7 (d) (i) to (viii) by the Inspecting official

4.4 Prototype wagon waiver:

- (a) Wagon manufacturer after opening of wagon inspection file (as para 4.2.1) may request for waiver of prototype wagon. For waiver of prototype wagon manufacturing, Wagon manufacturer shall submit the following documents:
 - i) Approved inspection check sheet/Filled inspection check sheet signed by QA Manager of firm and RDSO inspecting official (In case of Control wagon)
 - ii) Approved QAP
 - iii) Approved WPS
 - iv) Approved Construction drawing set with approval of deviations if any from Wagon Directorate.
 - v) Layout drawing of all jigs, fixtures and templates duly verified by inspecting officials.
 - vi) Copy of last IC and DM.
 - vii) List of qualified welders who have been certified by certifying agencies.
 - viii) List of DM items and non DM items. Sources for procurement of Non DM items with check sheets for quality control.
 - ix) Request for waiver.
- (b) After verification of jigs and fixtures by RDSO inspector, one control wagon will be manufactured (if discontinuity of same type of wagon is 12 to 18 months (as per SN 2(b) of para 4.1) for checking of controlling dimension to validate process of wagon manufacturing. In control wagon, static load test will not be done. However, other test such as air brake testing, sprinkler test, hydraulic/pneumatic test (as applicable) and other test as per approved inspection check sheet should be ensured. Brake force and squeeze load test will be done as per concerned RDSO specification. However, control wagon is not required to be manufactured, if discontinuity of same type of wagon is less than 12 months.

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- (c) After inspection of control wagon by Zonal Director/I&L and scrutiny of relevant above mentioned documents, proto waiver may be granted by Zonal Director/I&L with intimation to ED/QA(Mech.) (as per para 4.1)

4.5 Whenever Joint Director is working in place of Director, Joint Director shall exercise all powers of Directors.

5.0 Referenced Documents:

None

6.0 Referenced Documents of External Origin:

None

7.0 Associated Records:

None

8.0 Responsibility and Authority:

Activity	Responsible	Approver	Supporting	Consulted	Informed
Creation, maintenance of this document	Director/I&L/LKO	ED/QA(Mech)	SE/SSE QA (Mech)	MR/ISO Cell	All zonal offices of QA(Mech)
Compliance of directives contained in this document.	Director/I&L/LKO	ED/QA(Mech)	SE/SSE, QA (Mech)	--	--
Requirement of deviation from directive.	Director/I&L/LKO	ED/QA(Mech)	SE/SSE QA (Meh)	MR/ISO Cell	All zonal offices of QA(Mech)

9.0 Abbreviations:

DG	Director General
MR	Management Representative
ED/QA(Mech)	Executive Director /Quality Assurance(Mechanical)
Director(I&L)	Director(Inspection & Liaison)
Dte	Directorate
Hq	Headquarter
QA	Quality Assurance
QAP	Quality Assurance Plan
IC	Inspection Certificate
DM	Dispatch Memo
WPS	Welding Procedure System
RDSO	Research Designs & Standards Organisation
PSU	Public Sector Undertaking/Unit
DRM	Directorate Review Meeting
DP	Delivery Period
PO	Purchase Order

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