

ISO9001:2015	Document No: QC-G-8.1-3	Version No 2	Date Effective: 0.08.2020
Document Title: Item Specific guideline & Schedule of Technical Requirements for Vendor Registration for manufacture and supply of Glass Filled Nylon-66 Insulating Liners & High Density Polythene Dowels			



RESEARCH DESIGNS & STANDARDS ORGANIZATION

Manaknagar, Lucknow – 226011

Document No: QC-G- 7.1-5, Ver. '2'

Document Title : Item Specific guideline & Schedule of Technical Requirements
for Vendor approval for manufacture and supply of Glass Filled Nylon-66
Insulating Liners & High Density Polythene Dowels

1.0 Amendment History:

Amendment Date	Version	Reasons for Amendment
24.08.2018	1.0	First issue under new documentation system
28.08.2020	2.0	Amendment in Specification and quality improvement

2.0 Purpose:

This guideline is based on Indian Railway standard specification for manufacture of Glass Filled Nylon-66 Insulating Liners & High Density Polythene Dowels for use in railway track issued by Track Design Dte.

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of RDSO. The purpose is to specifically define the guidelines for vendor approval Glass Filled Nylon-66 Insulating Liners & High Density Polythene Dowels allotted to Quality Assurance Civil Directorate of RDSO as well as to specify technical and other Requirements in context with adequate space needed for storage of raw/finished material, manpower and plant/ machinery & equipment required for manufacture and supply of metal liners.

3.0 Scope of Application

This shall be applicable for initial **capability assessment, periodic Quality audit** for extension of approval, up-gradation of vendors and maintaining their approved list. In case of any variation between the procedure/provision given in work instruction and that in the 'Item- specific guidelines', the later shall prevail. The competent authority wherever referred to in this document shall mean Executive Director, Quality Assurance Civil Dte.

4.0 Procedure / Details

Procedure/details are annexed.

5.0 Referenced Documents:

1. **Indian Railway Standard specification for Glass Filled Nylon-66 Insulating Liners S.No. T-44-1995**
2. **ISO Apex Documents of RDSO**

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/QAC	ED/QAC	DD/XEN/AIE/ARO	Track Design Dte. & M&C Dte.	All approved vendors through website
Compliance of directives contained in this document	DD/XEN/AIE/ARO	Director/QAC	-	-	-
Requirement of deviation from this directive	Director/QAC	ED/QAC	DD/XEN/AIE/ARO	Track Design Dte. & M&C Dte.	-

Abbreviations

QA	Quality Assurance.
QAC	Quality Assurance Civil.
ED/QAC	Executive Director/Quality Assurance Civil
RDSO	Research Designs & Standards Organization
DD	Dy. Director
XEN	Executive Engineer
AIE	Assistant Inspecting Engineer.

A. ITEM SPECIFIC GUIDELINES

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1.0 The process of approval will involve following steps / activities.

- i) Vendor seeking fresh registration shall register online on RDSO Website www.rdsso.indianrailways.gov.in.
- ii) Submit duly filled-in **online** fresh application form along with ~~initial assessment~~ **vendor registration** charges as applicable at the time of submission.
- iii) **Upload the document as mentioned alongwith QAP and legal documents.** ~~Submit a key plan & layout plan, on Auto CAD (A 1/A 2 Size), for technical approval by this office. The layout plan should indicate the adjacent plot productions unit thereof, roads, boundaries etc.~~
- iv) The specification & relevant drawings are **available on RDSO website and same can be downloaded from RDSO website. The charges of these documents are included in fresh registration charges and no need to deposit separate charges for these documents at the first time.** All payments should be made through RDSO payment portal of SBI “SB Collect” or through NEFT/RTGS.
- v) After **downloading application/proforma along with documents & charges verification**, it will be scrutinized by Quality Assurance Civil Directorate and if details are found satisfactory, the works unit of the firm will be visited for ~~Technical~~ Capability Assessment.
- vi) If any shortcomings are observed during the visit, the same will be conveyed to the firm for their compliance.
- vii) After satisfactory compliance by the firm, **the firm is advised to submit gauge checking charges and inspection gauges of the drawings of Glass Filled Nylon-66 Insulating Liners & High Density Polythene Dowels will be checked and approved during STR verification visit.**
- viii) After clearance / approval of two sets of inspection gauges as mentioned in para (vii) above, the firm would be advised to start trial production and to submit internal test results in formats as per QAP for manufacture and testing. If the internal test results are found satisfactory, the firm would be advised for drawl of samples manufactured in presence of RDSO official from their works. Charges of drawl of samples will be obtained from the firm as applicable.
- ix) The testing of the samples drawn will be carried out as per clause laid down in IRS specification for Glass Filled Nylon-66 Insulating Liners for track S.No. T-44 1995. If test report is found satisfactory and other conditions are fulfilled, the firm would be accorded approval in the **“List of RDSO Vendors for developmental order”**. The firm will be advised to start production of the product. If implementation of QAP is found satisfactory, the purchaser may be advised to get the inspection of the product done by RITES or themselves.

1.0 In the case of new Vendor/firms the process of approval will be initiated only if the firm is **applied on-line or** placed with developmental order from Zonal Railways/ Railway Board or given go ahead from RDSO as per instructions /guidelines of Railway Board from time to time. Rest of the procedure for approval will be the same as detailed in para1.0 above. The firm shall be approved in **“List of RDSO Vendors for Developmental Orders”** after the inspection of initial quantity or after completion of developmental order whichever is earlier **in case developmental**

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order from Zonal Railways/ Railway Board or given go ahead from RDSO.

- 3.0 In case, firms approved for manufacturing of Glass Filled Nylon-66 Insulating Liners & High Density Polythene Dowels to one drawing, desires to develop the product to other drawings, the requisite inspection gauges will have to be approved by RDSO. After getting satisfactory internal test reports, the samples will be drawn and tested at RDSO. If test results on samples found satisfactory, the firm would be accorded approval to other drawings in “List of RDSO Vendors for Developmental Orders”.
- 4.0 Up-gradation from List of RDSO Vendors for Developmental Orders” to “List of Approved Vendors” as per procedure mentioned in RDSO’s latest ISO apex document No. QO-D-8.1-11 Ver.1.0.

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A. ITEM SPECIFIC GUIDELINES

In addition to the procedure for vendor approval given in the 'General guidelines for vendor approval' the following specific guidelines shall also be applicable to vendor seeking approval for manufacture of GFN-66 liners & Polyethylene Dowels.

a) GFN-66 liners

1. After successful assessment of firm in accordance with the 'General Guidelines for vendor approval' and approval of inspection gauges the firm will be asked to submit Internal test results of type tests and product testing as per scheme of testing for pre- acceptance test for approval of samples as embodied in the IRS specification for GFN-66 liners IRS.T-44-1995.
2. After the above results are considered acceptable by RDSO, samples for type tests and product testing for approval in RDSO shall be required to be manufactured in the presence of RDSO's representative and these shall be drawn by him. The samples for type tests and product testing shall be drawn in the same go.
- 2.1 Samples for approval shall be tested in two stages as given below:-
 - i) For type test
 - ii) For product testing.
- 2.2 The product testing shall be undertaken only if the samples have passed in the 'type tests'. If the samples fail in the type test, samples in product testing shall also be deemed to have failed and fresh samples shall be drawn both for the 'type tests' as well as for the 'product testing'.
- 2.3 If the samples pass in type tests and fail in product testing fresh samples shall be invited only for the product testing.
- 2.4 It shall be the firm's responsibility to ensure that 'as moulded' samples/specimen are sealed and guarded against the ingress of moisture. The samples should bear the signature of the RDSO's representative deputed to witness production and to draw the samples and signatures of the representative of the firm.
- 2.5 The samples will be left in sealed condition with the firm and it shall be the responsibility of firm to deliver the same to RDSO (M&C Dte.) within 15 days from the date of drawl of samples. The samples along with a set of approved gauges shall be sent to RDSO, with a letter addressed to the Director General/M&C RDSO, Lucknow and copy to the Director General/Track, RDSO, Lucknow.

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2.6 If the samples are not found satisfactory as per specification in RDSO testing, the firm will be intimated to submit fresh samples for testing as per the procedure described above.

~~2.7 If firms are already approved for similar component, they may not be required to seek clearance in the 'type tests' again. However, firms will be required to submit the inspection gauges for approval for the new design of liner above, before drawal of samples of the product for testing and approval in RDSO.~~

2.8 After the approval of samples both in type tests as well as in product testing, the firm will be considered for inclusion in the list of Part-II supplier, for the type of liners developed, as per the criteria laid in the general guidelines for vendor approval.

b) Polyethylene Dowels

1. After successful assessment of firm in accordance with the 'General Guidelines for vendor approval' and approval of inspection gauges the firm will be asked to submit Internal test results of various tests as per scheme of testing for pre-acceptance test for approval of samples as embodied in the IRS specification for Polyethylene Dowels, Provisional-1997.

2. After the above results are considered acceptable by RDSO, samples of dumbbell and product testing for approval in RDSO shall be required to be manufactured in presence of RDSO's representative and these shall be drawn by him.

2.1 It shall be the firm's responsibility to ensure that samples are sealed properly. The samples should bear the signature of the RDSO's representative deputed to witness production and to draw the samples and signatures of the representative of the firm.

2.2 The samples will be left in sealed condition with the firm and it shall be the responsibility of firm to deliver the same to RDSO (M&C Dte.) within 15 days from the date of drawal of samples. The samples along with a set of approved gauges shall be sent to RDSO, with a letter addressed to the Director General/M&C RDSO, Lucknow and copy to the Director General/Track, RDSO, Lucknow.

2.3 Samples for approval shall be tested in RDSO for chemical properties & dimensions as per relevant specification and drawings.

2.4 If the samples are not found satisfactory as per specification in RDSO testing, the firm will be intimated to submit fresh samples for testing.

2.5 After the approval of samples in testing, the firm will be considered for inclusion

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in the list of Part-II supplier, for the type of liner developed, as per the criteria laid in the general guidelines for vendor approval.

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B. SCHEDULE OF TECHNICAL REQUIREMENTS FOR APPROVAL OF FIRMS TO MANUFACTURE GFN-66 LINERS & POLYETHYLENE DOWELS

1. SCOPE

The schedule of technical requirements covers the norms for manufacture of GFN-66 liners & Polyethylene dowels to be used in permanent way track on Indian Railways.

2. GENERAL & MANUFACTURE FACILITIES

The vendor seeking approval shall comply with all the below mentioned requirements.

- 2.1 Covered area with adequate space for storage of raw material and finished product should be available which is free from dampness and humidity. They should have separate damp free secured bond room with adequate space for accommodating at least 50,000 nos. of such finished product.
- 2.2 humidifier with digital temperature and humidity controller & indicator of suitable capacity for pre- dehumidiation of raw material should be available.
- 2.3 Horizontal screw type fully automatic PLC based injection-moulding machine should be available for moulding; preferably 380 gms shot (granules) capacity.
- 2.4 Temperature of hydraulic oil and moulds should be kept controlled by suitable cooling system.
- 2.5 Electrical hoist/manual block & tackle for mounting & dismounting of moulds should be available.
- 2.6 Suitably designed dies & moulds for products (minimum 2 nos. for each size & drawing No.) should be available. Dies/moulds may be of two cavity or multi-cavity, but permission will be given for bulk production as per the cavity number used during approval time. "Suitable designed dies & moulds for products (minimum 2 nos. for each size & drawing no.) should be available. Dies/ Moulds may be of two cavities or multi-cavities, but permission will be given for bulk production as per the cavity number used during approval time. It is mandatory to use hot runner moulds in case where manufacturer is using moulds having more than 4 cavities. However vendors who desire to use hot runner mould having four cavities or less is permitted.
- 2.7 Annealing tank of suitable capacity with thermostat facility and digital temperature indicator should be available.
- 2.8 For manufacturers seeking approval for dowels should have dies/moulds of at least 2-

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cavity Vertical type with motorised unscrewing (inside) shank system.

- 2.9 All the moulds/die shall be of hardened steel including the mould for tensile test piece. The manufacturer's insignia, drg. No. and cavity no. shall have permanent engraving while the manufacturing year marking may be of injector-pin type.
- 2.10 Manufacturer seeking approval for dowel should also have an electric heating-compression load type machine for providing slabs for tensile testing test piece preparation.
- 2.11 The manufacturer should have all in-house arrangement for screen printing so that the products treated & finished inside the factory.
- 2.12 De-flashing tools of suitable design in adequate nos. to be available.
- 2.13 Minimum infrastructure for maintenance and polishing of dies & moulds should be available in-house.
- 2.14 Diesel Generator of adequate capacity should be installed to take up the load of the entire plant in case of power failure.

3. TESTING FACILITIES

- 3.1 Ambience in the testing laboratory should be suitably controlled for humidity and temperature with digital indicator facility.
- 3.2 Computerized tensile testing machine with extensometer or suitable measuring arrangement and all provisions in accordance with ASTM-D-638 & ISO-R-527 or testing strength and elongation percentage and speed gear system to suit the different testing speeds for different types/drg. No. should be available. Test fixture for checking cross breaking load should also be available.
- 3.3 Necessary apparatus for testing the melting point and specific gravity in accordance with BS2782 Part-I & Part –VI respectively should exist with digital display for melting point. The weighing balance used for weighing sample in air/water should have digital display.
- 3.4 A single pa digital type chemical balance shall be available having capacity to read upto 4th decimal.
- 3.5 Digital vernier callipers and three-point digital bore gauges (Min.2 nos. of each) should be available.
- 3.6 One Rockwell hardness tester having R-scale facility along with standard test block should be available.

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- 3.7 One shore 'D' hardness tester along with standard test block should be available for dowels.
- 3.8 One muffle furnace of capacity 0-1000 °C with temperature controller & indicator should be available along with sufficient numbers of desiccators and crucibles for checking glass filler by ash content (%).
- 3.9 Stopwatch with least count reading of 0.1 seconds should be available.
- 3.10 One melt-flow index test apparatus as per ASTM-D-1238 should be available for dowels.
- 3.11 Barometer& hygrometer in the laboratory should be available.
- 3.12 All measuring gauges of the products should be hardened/or chrome plated (two sets).
- 3.13 One magnifying glass of min 20x for checking surface finish and internal cavity should be available.
- 3.14 For checking calibration of tensile/compression testing machine, preferably one number proving ring of min. 5t capacity duly calibrated by NPL should be available with suitable links for in-house calibration.
- 3.15 3-D laser based equipment for measurement of critical dimensions (i.e. liner thickness, rib thickness and outer dimension) of GFN liners with facility for laser paint marking (green dots for dimensionally OK material and red dot for dimensionally not OK material) with provision for automatic segregation of pass and un-passed material shall be provided. The equipment shall be provided on production line (after annealing) itself. The firm shall be given 12 months' time to implement this item. Till such time, the existing provision of checking dimension through RDSO approved inspection gauges shall continue.

QUALITY CONTROL REQUIREMENTS

- 3.15 There should be a system to ensure the traceability of the product from raw material stage to finished product stage. This system should also facilitate to identify the raw material composition from the finish product stage.
- 3.16 Ensure that the system of First-in First-out is followed for raw material and the intermediate stage products.
- 3.17 Ensure that there is a Quality Assurance for the product detailing various

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aspects

- Organisational Chart
- Flow process chart
- Stage inspection details
- Non conformities in various parameters & control over them

The QAP shall be available as per the requirement details in "General Guidelines for Vendor Approval".

- 3.18 There should be at least one plastic technologist having a minimum bachelor's degree in relevant field & 5 years experiences or a person with diploma in relevant field with 12 years experience. He should be free from day-to-day production, testing & quality control responsibility. He should be mainly responsible for development and regular production of the product, analysis of products, control over raw material, corrective action in case of difficulties in achieving the parameters.
- 3.19 Ensure that the in-charge of the quality control section is having a qualification of minimum bachelor's degree in the relevant field and have minimum five years experience or a diploma holder with minimum 8 years experience. He should be actively involved in day-to-day activities of quality control / stage inspection / compliance of QAP etc.
- 3.20 The firm should have acquired ISO: 9000 certification and the product for which an approval is sought should be broadly covered in the scope of the certification for manufacture and supply.
- 3.21 The quality manual of the firm for ISO: 9000 should clearly indicate at any stage the control over manufacturing and testing of the said railway product.
- 3.22 Ensure that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented.
- 3.23 Ensure that all the relevant drawings, specifications, IS, BS standards, ASTM, ISO and test methods are available with the firm.
- 3.24 It is to be ensured that the dies and moulds are checked for accuracy for various critical predefined dimensions at least on weekly basis or after production of 500 pieces whichever is earlier and observations are recorded. The wear and tear of nozzle and barrels of injection moulding machine should also be checked at least once in month or after 50,000 nos. production (whichever is earlier) & observation recorded & shall be rectified if warranted by such records.

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3.25 Training need should be identified for all concerned officials & regular training shall be organised& imparted on maintenance of machine, quality assurance, safety parameters etc. & records maintained.

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