

REVISION OF SPECIFICATION / STR

Ref:Current Spec. No. C-K610(Rev-1) Corrigendum-1 Amendment-4, STR for Stain Proof Fire Retardant Upholstery Cloth.

5. RDSO is reviewing the specification/STR to cater to the latest technological developments in the field, modify clauses not relevant in the present context and making them more enabling with focus on functional requirements.
6. It is requested that your comments / suggestions with regard to improvements / modifications in specification / STR of this item may be submitted in the following format alongwith the justification for the changes required.

Part A: Basic Information

SN	Particulars	Information
1	Name	
2	Designation	
3	Professional Qualification	
4	Organization / Firm's Name	
5	Address for Correspondence	
6	Contact No.	
7	Email ID	
8	<u>In case of Firm / Individual:</u> Manufacturing experience of item (or similar Item) on which comments are offered	
9	<u>Where relevant:</u> Whether any technical document to support suggested changes is available / enclosed for better appreciation	

Part B: Comments / suggestions on the specification

SN	Clause No. of RDSO STR / Spec	Clause, as exists in RDSO STR / Spec	Clause , as it should read after incorporation of comments / suggestions in the RDSO Spec / STR	Justification for changes

Comments may be sent to:

Director/SS/Carriage
Research Designs and Standards Organization
Manak Nagar, Lucknow – 226011

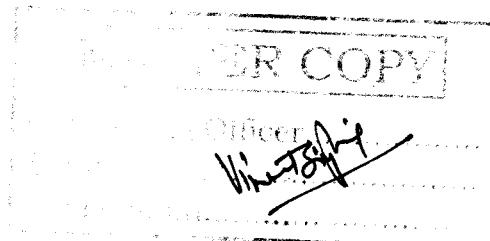
Email: edcar.rdso@gmail.com Or dirssrdso@gmail.com

Ref: CG-WI-4.2.1-1 ver-1.0	Page 1 of 10	Date of Issue: August-2016	Spec.No.C-K610 (Rev.1)
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INDIAN RAILWAYS



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SCHEDULE OF TECHNICAL REQUIREMENTS FOR STAIN PROOF FIRE RETARDANT UPHOLSTERY CLOTH

S. No.	Month/Year of issue	Revision / Amendment	Page No.	Reason for Amendment
1.	June, 2006	-	-	First issue
2.	June, 2009	Rev.1	All	Properties improved. Section – B for infrastructure and quality control added
3.	April, 2013	Amendment.1	5	i) Colour Fastness to day light has been classified as Type test. ii) Toxicity test has been assigned as acceptance test. iii) Random quality check added under para 5.1.
4.	April, 2015	Amendment.2	4, 6&9	i) Fire Worthiness Properties upgraded ii) Heat Release Rate test specified
5.	May,2015	Corrigendum-1	6	Clause 5.4 of Section –A deleted from Amendment-2
3.	Sept.-2015	Amendment.3	6	New clause 5.4 of Section –A added
4.	Aug.-2016	Amendment.4	3	To include the ISO Doc. No. QO-D-7.1-11, new sub clause no. 1.2 added under clause no. 1 of Section -A

Issued By:

Carriage Directorate
Research Designs and Standards Organization
Manak Nagar, Lucknow – 226011.

Signature			
Name & Designation	Prepared By: Sonu Kr. Gupta JE/Design/SS	Checked By: Praveen Kumar Dy. Director/SS	Approved By: Director/SS

Amendment slip No. 4 of August 2016 in Spec No. C-K610 (Rev.1) Schedule of Technical Requirements for Stain proof fire retardant upholstery cloth

Section-A: - New clause 1.2 added as under

1.2 'All the provisions contained in RDSO's ISO procedures laid down in Document No. QO-D-7.1-11 dated 19.07.2016 (titled "Vendor-Changes in approved status") and subsequent versions/amendments thereof, shall be binding and applicable on the successful vendor/vendors in the contracts floated by Railways to maintain quality of products supplied to Railways.'



Amendment slip No. 3 of September 2015 in Spec No. C-K610 (Rev.1) Schedule of Technical Requirements for Stain proof fire retardant upholstery cloth

Section-A: - New clause 5.4 added as under

5.4 Test for Heat release rate (HRR) shall be a type test and carried out on every six month till 31.03.2016. Thereafter it will be part of acceptance test.

Agmt
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Corrigendum-1 of May 2015 in Amendment slip No. 2 in RDSO Spec. No. C-K610
(Rev.1) Schedule of Technical Requirements for Stain Proof fire retardant upholstery cloth.

Clause No. 5.4 of Section-A is deleted from amendment slip no. 2 of April 2015

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Amendment slip No. 2 of April, 2015 to STR No. C-K610 (Rev.1) for Stain Proof fire retardant upholstery cloth.

Section-A :- In table No.1.of Clause 2.5, Properties at S. No. 7, 8 & 10 has been amended, property at S. No. 12 added and shall be read as under:

S.No.	Properties	Value	Method of test
7.	Resistance to spread of flame	Class-A	Appendix -5 of UIC 564-2
8.	Limiting oxygen index	Minimum 35	IS: 13501
10.	Deterioration of visibility due to smoke	Class-A	Appendix -15 of UIC 564-2
12.	Heat Release Rate (MARHE i.e. Maximum Average Rate of Heat Emission in KW/m ²) as specified in EN 45545-2:2013	R21 (HL3)	ISO 5660-1: 25 KW/m ²

Section-A: - New clause – 5.4 added as under

5.4 Test for Heat release rate (HRR) shall be a type test and carried out on every six month till 01.01.2016. Thereafter it will be part of acceptance test.

Section-B: - New clause – 4.10 added as under

4.10 The firm should have in-house testing facilities as per ISO 5660-1 for conducting test for Heat release rate (HRR) w.e.f. 01.01.2016. Till such time, firm should arrange testing at reputed laboratory as decided between IR/Inspecting Authority and manufacturer. The cost of testing will be borne by the manufacturer.

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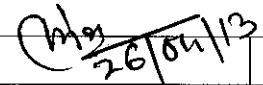
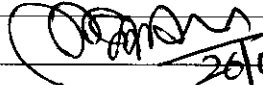
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Amendment slip No. 1 of April 2013 to STR No. C-K610 (Rev.1) for Stain Proof fire retardant upholstery cloth.

Clause No. -5.1 of Section – A may be read as under,

- 5.1 All the tests given in Table – 1 except Colour fastness to day light shall be carried out on each lot. The test for Colour fastness to day light is type test and shall be done once in six month. However manufacturers shall carry out this test for each lot and maintain the records of test results. Record of test result should be furnished by the manufacturer to inspecting agency at the time of inspection. RDSO may pick samples randomly from consignee end for quality check at any time. In case the samples do not conform to this schedule, the inspection of material will be suspended and action against the manufacturer for down gradation/delisting will be taken as per extent procedure.

Signature			
Name & Designation	Prepared By	Checked By	Approved By

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**SCHEDULE OF TECHNICAL REQUIREMENTS FOR STAIN PROOF
FIRE RETARDANT UPHOLSTERY CLOTH**

0. FOREWORD

- 0.1 This schedule covers the technical requirements / provision relating to material, and tests and does not include all the necessary provisions of contract.
- 0.2 This schedule draws reference to some of the relevant Naval, UIC, AATCC and other Indian Standard specification. Unless otherwise specified, the latest version of the relevant specifications shall be taken as reference.
- 0.3 For the purpose of deciding whether a particular requirement of this schedule is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with the IS: 2. The number of significant places retained in the rounded off value should be the same as that of the specified value in this schedule.
- 0.4 In this schedule due consideration has been given to the development in the field of textile materials and process technologies, serviceability, requirements of IR and the practices followed in advanced countries in this field.
- 0.5 This schedule consists of two sections i.e. Section-A and Section-B. Section-A covers the technical requirements, methods of sampling and tests of stain proof fire retardant upholstery cloth used in coaching stock and Section- B covers infrastructure requirements for manufacture, testing and quality control at the works of the manufacturers.

SECTION- A

1. SCOPE

This section covers requirements and method of sampling and testing of fabric to be used for stain proof fire retardant upholstery cloth for all types of SG and EOG AC coaches including chair cars of Shatabdi coaches.

2. REQUIREMENTS

- 2.1 The fabric should be manufactured out of inherent permanent flame retardant fibre whose flame retardancy does not diminish either with ageing (ultra violet light degradation) or repeated washing. At the same time it is preferable to have fibre of substances which do not nourish bacteria.
- 2.2 The base fabric shall be of plain & woven design, free from yarn defects and stains and should lay flat when it is spread. There should not be any chemical coating over the surface to achieve flame retardancy. It shall be thoroughly desized, scoured and heat set so as to maintain dimensional stability and have no shrinkage. The construction features like denier, number of ends and picks, shall be adjusted in such a way that the fabric retains the required level of air permeability. The fabric shall be sufficiently pliable and free from tackiness.

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- 2.3 The finished fabric should conform to the sample standardised by RDSO in respect of appearance, finish, shade / colour and pattern. However, in case of fabric material is different from sample standardised by RDSO, allowance may be made for the slightly different finish and minute shade variation inherent consequent to another material being used with prior approval of RDSO, Lucknow.
- 2.4 The roll length should be 100 ± 5 metres or as ordered. Short lengths of minimum 20 metres length shall be permitted but the number of such short lengths shall not be more than 2 per lot and the total short lengths shall not be more than 5% of the total ordered quantity.
- 2.5 Usable width of the finished fabric shall be 120 cm (min.) or as specified by the purchaser. Upholstery shall comply with the requirements given in the Table-I. Unless otherwise stated in the individual test procedure, the tests shall be conducted at 27 ± 2 °C and at $65 \pm 5\%$ relative humidity.

TABLE I

S.No.	Properties	Value	Method of test
1.	Mass of upholstery gms/sq.metre	450 ± 20	IS: 7016 (Part-1)
2.	Breaking strength (kg/5 cm width) (Min.) a) Direction A b) Perpendicular to direction A	100 80	IS: 7016 (Part-2)
3.	Tearing strength (load in kg) Min. in either direction (calculation of results to get value in kg/cm should not be done)	4.0	Method C2 of Appendix C of IS: 2076
4.	Colour fastness to dry and wet rubbing	Shall not stain	Appendix C of IS: 1259
5.	Colour fastness to day light OR Accelerated fading test	Not less than No.4	Appendix D of IS: 1259 Appendix E of IS: 1259/ISO 105 B02
6.	Dimensional change (%)max.(shrinkage in warp or weft direction)	2.5	Appendix F of IS: 1259
7.	Resistance to spread of flame	Minimum Class-B	Appendix -5 of UIC 564-2 OR
8.	Limiting oxygen index	Minimum 28	IS: 13501
9.	Toxicity	Less than 1	NCD 1409*
10.	Deterioration of visibility due to smoke	Minimum Class-B	Appendix -15 of UIC 564-2 OR
11.	Stain proof test		
	a) Water repellency –spray test	Rating- Minimum 80	AATCC-22-2001
	b) Oil repellency-Hydrocarbon resistance test including greasy food	Grade- Minimum 6	AATCC-118-2002

Note: For S.No.-2, the direction with higher value shall be taken, as A and the other direction shall be perpendicular to A

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3. TESTS

- 3.1 The test shall be conducted as prescribed in relevant specification mentioned against each test in table-1.
- 3.2 Test pieces shall be cut from the samples in the required number and in the appropriate manner as specified in the individual methods of test. Samples for tear strength and resistance to spread of flame as stipulated in Table I shall be cut as per test methods prescribed, from additional length of the upholstery.
- 3.3 The specimen for resistance to spread of flame shall be subjected to ten washing cycles and for water repellency-spray test & Oil repellency-Hydrocarbon resistance test including greasy food shall be subjected to four washing cycles in home laundering without any reactive chemicals like bleach etc. before conducting the test.

4. SAMPLING AND CRITERIA FOR CONFORMITY

- 4.1 In any consignment, all the rolls of upholstery fabric offered against one despatch note and of same design/composition shall constitute one lot.
- 4.2 Conformity of the lot to the requirements of the specification shall be ascertained for each lot separately. The number of samples to be drawn will be as follows:-

SCALE OF SAMPLING

Lot size (Rolls)	No. of rolls to be selected
1 to 10	1
11 to 50	2
51 to 100	3
101 to 200	4

5. No. OF TEST

- 5.1 All the tests given in Table-I shall be carried out on each lot except toxicity test shall be carried out on each lot. The test for toxicity index shall be done once in six months. Each of the length obtained from a lot shall be examined for visual defects and if found satisfactory, further tests as specified shall be carried out.
- 5.2 From each of the rolls selected according to clause 4.2, suitable length of fabric shall be cut, care being taken to exclude not less than 0.25 m length of upholstery fabric from either end. The test specimens necessary for the various tests specified in the standard shall be cut, from the lengths of upholstery fabric thus obtained. Scheme of selection of test specimens from the sample length is given in clause 3.2. All the samples shall be kept out of contact from one another or any other material that may cause contamination.

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5.3 RDSO may draw the samples for quality checks at its discretion and firm shall arrange the testing of these samples in a reputed outside laboratory as decided between RDSO and manufacturer. Testing charges shall be borne by the manufacturer.

6. CRITERIA FOR CONFORMITY OF BULK SAMPLE

6.1 The lot shall be declared as conforming to specification for various characteristics referred in Table-1, if for each of the characteristics the test results on all the individual specimens are found to be within limits of the specification. Failing of a sample on account of any of the characteristics shall mean rejection of full lot.

7. PACKING

- a) The material shall be securely packed in the form of a roll so as to ensure safe transportation.
- b) The material shall be packed in neat and dry condition. Each roll/bolt of the upholstery fabric shall be marked at outer end (within 5 cm) showing nomenclature of the store, category number, manufacturer's name and trade mark, month and year of manufacture, meterage and lot number.
- c) Each piece of upholstery fabric shall be neatly rolled on a LDPE / HGPE tube 19 mm. The roll shall then be packed suitably with the layer of polyethylene film 0.05 mm (IS: 2508). These rolls so packed then be further packed in a layer of Hessian Cloth (IS: 2818). The seam of the Hessian packed shall be sewn with twine jute supply. While stitching, care shall be taken to avoid any damage to the upholstery fabric.

8. MARKING

Manufacturers name/Trade mark, month and year shall be screen printed on side of the cloth at salvage area along the length at a distance of not more than 2 meters.

Before despatch, each pack, shall be legibly marked with indelible marking ink/paint showing the following details:

- a) Nomenclature and category number of the store.
- b) Quantity packed. Total number of rolls and total meterage
- c) Lot and serial number.
- d) Month and year of packing.
- e) Name and trade mark of the manufacturer.
- f) Name and address of the consignee.
- g) Inspector's stamp.
- h) A/T number and date.

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9. STORAGE

The rolls of upholstery shall be stored vertically on dry, clean, firm and level surface under covered area. The rolls shall be protected from dust, moisture, sunlight etc.

10. WARRANTY

The store supplied against an order shall be deemed to bear a warranty of the manufacturer against defective materials/workmanship and performance for a period of 42 months from the date of supply or 36 months from the date of fitment whichever is earlier. If from the date of receipt of the stores, the stores supplied are found by the consignee to be so defective, the same shall be replaced immediately with serviceable stores without any charges or cost.

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SECTION-B

1. SCOPE

- 1.1 This section covers the infrastructural requirements for manufacture and testing of stain proof fire retardant upholstery cloth.

2. REQUIREMENTS

- 2.1 All vendor seeking registration with RDSO shall comply all the requirements mentioned below.

3. MANUFACTURING FACILITIES

- 3.1 The manufacturers shall have adequate space and a covered area with cemented floor to accommodate the following.
- a) Damp free place for storage of raw materials
 - b) Independent manufacturing area for stain proof fire retardant upholstery cloth.
 - c) Inspection area.
- 3.2 The firm should have composite mill with full facilities of spinning, weaving and processing at their works.

4 TESTING FACILITIES:

The firm should have the following testing facilities at their works,

- 4.1 The testing lab should have facility for temperature and humidity control as per clause – 2.5 of section - A.
- 4.2 The firm should have suitable tensile testing machine for testing the breaking strength and tearing strength.
- 4.3 The firm should have one weighing device with digital display of suitable capacity and a minimum accuracy of 1mg.
- 4.4 The firm should have suitable apparatus to test colour fastness to day light test or accelerated fading test.
- 4.5 The firm should have suitable apparatus to test colour fastness to dry and wet rubbing.
- 4.6 The firm should have a suitable water bath to test dimensional change.

- 4.7 The firm should have in-house testing facilities for conducting tests for fire properties i.e. Resistance to spread of flame as per Appendix-5 of UIC – 564-2 OR, Deterioration of visibility due to smoke as per Appendix-15 of UIC – 564-2 OR, Limiting Oxygen Index as per IS: 13501 and Toxicity Index as per NCD: 1409.
- 4.8 The firm should have suitable facilities for testing the water repellency and oil repellency including greasy food.
- 4.9 The firm should have the following instruments.
- a. Measuring tape
 - b. Measuring scale
 - c. Magnifying Glass

The firm should have arrangement for periodical calibration of all the apparatus & instruments.

5 QUALITY CONTROL REQUIREMENTS

- 5.1 The firm should have acquired ISO: 9001- 2000 certification from the agency accredited by NABCB and the product for which the approval is sought should be broadly covered in the scope of the certification for manufacture and supply.
- 5.2 The Quality manual of the firm for ISO: 9001- 2000 should clearly indicate at any stage the control over manufacturing and testing of the said railway product.
- 5.3 There should be a system to ensure the traceability of the product from raw material stage to finished product stage. The system should also facilitate to identify the raw material composition from the finish product stage.
- 5.4 It should be ensured that there is a Quality Assurance Plan for the product detailing the following various aspects:
- Organisation chart
 - Process flow chart
 - Stage inspection details from raw materials stage to finish product stage
 - Various parameters to be checked and level of acceptance of such parameters indicated and method to ensure control over them.
 - Disposal system of rejected raw material and components.
- 5.5 There should be at least one full time technologist having a minimum bachelor's degree in relevant field with experience of at least 5 years or a person with diploma in relevant field with 12 years experience. He should be free from day-to-day production, testing and quality control responsibilities. He should be mainly responsible for development of a product, analysis of products, control over raw material, and corrective action in case of difficulties in achieving the parameters.

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- 5.6 Ensure that the incharge of the Quality Control Section is having a qualification of minimum bachelor's degree in the relevant field and has a minimum of 5 years experience. Alternatively he should be a diploma holder with minimum of 12 years experience. He should be actively involved in day-to-day activities of quality control / stage inspection / compliance of QAP etc.
- 5.7 The firm must ensure that proper analysis is being done on monthly basis to study the rejections at various internal stages and it is documented.
- 5.8 The firm should ensure that latest version all the relevant specifications, IS standards are available with the firm.

6. DOCUMENTATION

Firm shall maintain the following documents/records:

- 6.1 A well documented Quality Plan.
- 6.2 Incoming raw material register with Test Certificates references of suppliers and internal test results.
- 6.3 Stage inspection results including finished products results.
- 6.4 Records of internal rejection and its analysis vis-à-vis action plan.
- 6.5 Records of final products inspection by external agencies (like RDSO), Non-conformity reports and case analysis as well as action taken thereof.
- 6.6 Records for maintenance of dies/moulds.
- 6.7 Ensure that proper systems are available for dealing with customer complaint.

7 TRAINING

- 7.1 Training needs should be identified for all concerned officials and regular training shall be organised and imparted on maintenance of machines, quality assurance, safety parameters etc.
