3267784/2024/O/o PED/PS&EMU/RDSO

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GOVERNMENT OF INDIA MINISTRY OF RAILWAYS

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RESEARCH DESIGNS AND STANDARDS ORGANISATION

एoसीo कोच के ड्राई टाइप एअर फिल्टर की विशिष्ट
SPECIFICATION FOR DRY TYPE AIR FILTER FOR AIR-CONDITION COACHES

vkj-Mh-,l-vk-@ih-bi-@Lid@,-lh-@0055 & 2003 (रिवी० 3)
RDSO/PE/SPEC/AC/0055-2003 (Rev. '3')

S. N	Date of Amendment	Amendment/ Revision	Reason for Amendment
1	Nov-2014	02	Reliability improvement
2	Oct-2024	03	Filter media as EN 45545 HL-3 compliant

अनुमोदित
APPROVED

प्रधान कार्यकारी निदेशक/पीएस एण्ड ईएमयू
PED/PS & EMU

SPECIFICATION FOR DRY TYPE AIR FILTER FOR AIR-CONDITION COACHES

1.0 FOREWORD

1.1 This specification lays down the technical requirement for design, manufacture and testing of different type of dry type air filter, used in AC coaches i.e. in under slung type as well as roof Mounted AC Package Unit for LHB AC coaches and Vande Bharat trains supersedes the earlier RDSO specification no. RDSO/PE/SPEC/AC/0055-2003 (Rev. '2')

2.0 SUPPIER'S RESPONSIBILTY

2.1 The manufacturer is responsible to supply the filter assembly along with filter media confirming to the specification, RDSO may conduct quality audit at firm's premises manufacturing process & quality control of filter.

3.0 General requirements and service condition

3.1 Environmental conditions:

Ambient air temp:	-4 to 57 deg C
Average ambient air temp.	35 deg. C
Average speed	200 Km/h
Max.temp. Inside coach under sun	70 deg. C
Max. Relative Humidity	100%
Atmosphere	Extremely dusty and desert weather and desert terrain in certain areas. The content in the air may reach as high value as 1.6 mg/m^2.
Coastal area	The equipment shall be designed to work in Coastal area in humid salt laden and corrosive atmosphere. The maximum values of the condition will be as under : Maximum pH value 8.5 Sulphate 7 mg/liter Max. concentration of chlorine 6 mg/liter Max. conductivity 130 micro semen/CM
Annual rain fall	Ranging between 1750 to 6250 mm.
Altitude	Not exceeding 1200 m
Shocks and Vibration	The filter assembly shall withstand satisfactoily vibrations and shocks normally encountered in service as indicated below: a) Max. vertical acceleration - 3.0 g b) Max. laterall acceleration - 3.0 g

	c) Max. longitudinal acceleration - 3.0 g ('g' being the value of acceleration due to gravity)

4.0 GOVERNING SPECIFICATIONS:

S.N	Standard	Description
1	EN779:2012 or ISO 16890 for Filter Media	Method for determination of Filter media Grade as per filtration efficiency required for Fresh and Return air filters
2	EN 45545 HL-3 Grade	Fire & Safety compliance For Filter Media used in Conventional, LHB, Vande Bharat/Train 18, Vande sleeper, Cab AC and all types of Coaches (Filter media manufacturer TC applicable)
3	IS 17570 Part 1: 2021 ISO 16890-1 :2016	Air filter for general ventilation – Technical specification requirements and classification system based upon particular matter efficiency (ePM)

5.0 Dimensions and utility of the filters

5.1 The type, size & utility of the filters used in AC coaches are as under:

Type of coaches	Description	Size in mm	Qty. Per coach
RMPU type AC coaches (conventional & Garibrath)	Fresh air filter	260x230x60	4
	Return air filter	620x460x50 or 550x500x50	4
RMPU type AC coaches (LHB)	Fresh air filter	495x260x12.5	4
	Return air filter	680x260x115	4
Under slung type AC coaches	Fresh air filter	580x300x75	As per requirement
	Return air filter	644x300x40 or 324x249x40	As per requirement
Train 18 / Vande Bharat	Fresh air filter	Fresh Air filter drawing shall be submitted to RDSO for approval.	4
Train 18 / Vande Bharat	Return Air filter	Return Air Filter drawing hall be submitted for	4

		approval.	

Note: Technical parameters/performance of filters for other type of coaches not mentioned above e.g. Metro Railway Kolkata, Double Decker, AC EMU etc. shall also be governed by this specification.

6.0 TECHNICAL REQUIREMENTS:

6.1 Frame

6.1.1 The filters for RMPU of conventional & Graibrath RMPU type coaches will be as per sheet 1 of RDSO drawing No. RDSO/PE/SK/AC/0057-2003 (Rev. '2') (sheet 1 of 2).

6.1.2 The filter for under slung type coaches will be as per sheet 2 of RDSO drawing No.RDSO/PE/SK/AC/0057-2003 (Rev. '1') (sheet 2 of 2).

6.1.3 The Return & fresh air filter for LHB design of RMPU shall be as per RDSO drawing No.RDSO/PE/SK/AC/0073-2004 (Rev. '1') & RDSO/PE/SK/AC/0074-2004 (Rev. '1') respectively.

6.1.4 The filter frame of RMPU of conventional & Graibrath AC coaches and return air filter of RMPU for LHB coaches will have the provision to avoid wrong fitment of the filter as shown in respective drawings.

6.2 Filter Media

6.2.1 Filter media used shall be of synthetic non-woven polyester as per standard EN779 or ISO 16890 from a reputed filter media manufacturer providing TC of Filtration Grade tested from reputed Lab, covered with stainless steel wire mesh on both side and crimped in the form of folding for pleated filters only and in compliance to EN45545 HL-3 Grade for Conventional, LHB, Train 18 or Vande Bharat Coaches, Sleeper, Cab AC and all types of coaches. Number of folds shall be chosen so as to meet the performance requirements

6.2.2 Maximum number of folds of filter media to meet the requirement shall be as under:

A) Conventional & Garibrath RMPU

S.N	Filter/Size	Minimum Nos. of folds
1	fresh air filter (260x230x60 mm)	13
2	Return/mixed air filter (620x460x50 mm)	20
3	Return/mixed air filter (550x500x50 mm)	18

B) LHB RMPU

S.N	Filter/Size	Minimum Nos. of folds
1	fresh air filter (495x260x12.5 mm)	Pad
2	Return/mixed air filter (680x415x50 mm)	5/6

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SSE/TL-AC	Director/TL-AC

C) Train 18 / Vande Bharat

S.N	Filter/Size	Minimum Nos. of folds
1	fresh air filter	13 folds per feet.
2	Return Air filter	10 folds per feet.

6.2.3 The Grade of the media used in various type of filters shall be as under:

S.N	Type of filter	Filter media Grade
1	RMPU type AC coaches.	
	fresh air filter	Filter media Grade G3
	Return air filter	Filter media Grade G4
2	RMPU LHB type AC coaches.	
	fresh air filter	Filter media Grade G3
	Return air filter	Filter media Grade G4
3	Under slung type coaches	
	fresh air filter	Filter media Grade G3
	Return air filter	Filter Media Grade G4
4	Train 18 & Vande Bharat type coaches fresh Air filter	G3 Grade
5	Train 18 & Vande Bharat type coaches Return Air filter	G4 Grade

6.2.4 The media shall be tested for following physical parameters:

S.N	Parameters	Test methods	Permissible value
1	Filtration Grade G3 and G4	EN779:2012 or ISO 16890	TC from Filter media manufacturer will be considered.
2	Fire & Safety	As per EN45545 HL -3 Compliance	TC from Filter media manufacturer will be considered.

6.2.5 Specimen of the filter media shall be got tested as specified in clause no. 6.2.4, No. 1 from any of the reputed laboratory once in a year except items No. 2, which shall be done once in five years and filter media manufacturer TC acceptable. The test results of media shall be submitted to RDSO/purchaser during inspection, if demanded.

6.3 Performance para meter against dust concentration

6.3.1 Following are the requirement dust of the filters:

Application	Velocity in mtr. Per min	Resistance when clean (In mm WG (max.))	Final resistance (In mm WG (max.))

RMPU type coaches (conventional & Garibrath)			
fresh air filter	100	4	12
Return air filter	100	3	10
RMPU type coaches (LHB)			
fresh air filter	100	6	16
Return air filter	100	5	14
Under slung type coaches			
fresh air filter	100	4	12
Return air filter	100	3	10
Train 18 & Vande Bharat Coaches			
Fresh air filter	100	6	16
Return air filter	100	5	14

6.4 The various sizes of wire mesh over filter media in conventional as well as in LHB type RMPU filter shall be as per respective drawings.

6.5 The schedule of Technical Requirements (STR) for this item is RDSO/PE/STR/AC/0010-2003 (Rev. '1') or latest.

6.6 Manufacturer shall be submitted clause by clause compliance of this specification before offering the prototype for type test.

6.7 All testing and measuring instruments at the works of manufacturers shall be calibrated from any Govt. Recognized laboratory/institution.

7.0 MAINTAINBILITY

7.1 The filter media should be capable of being cleaned with a jet of dry compressed air of approximately 2kg/cm2 pressure from a distance of 150 mm from filter face from the opposite side of airflow direction. The life of filter media depends on its final pressure drop or maximum 18 months whichever is early.

8.0 INTERCHANGEABILITY

8.1 The complete filter should be interchangeable with any other make of filter. It should also be possible to replace filter media.

9.0 MARKING:

9.1 Each filter shall be marked (permanent nature) with the following information:

Name of Manufacturers
Year, month & Serial number of manufacture the filter
Type & Size of filter
RDSO spec & drawing No.

9.2 Each filter shall be marked (permanent nature) with the following
"DO NOT CLEAN FILTERS WITH WATER"

10.0 TESTS:

10.1 Only after the drawings and the design have been approved and the clearance given to this effect, the manufacturer shall take up the manufacture of the prototype unit. It is to be clearly understood that any changes, required to be done in the prototype or any additional tests other than those specified herein, are required to be conducted on the prototype unit or its components, they shall be done expeditiously. During the process of manufacture of the equipment, if the purchaser/RDSO so desires, he may conduct/repeat any of the routine or additional tests to satisfy himself that the quality of the filter being manufactured is of the requisite standards.

10.2 The suitability of filters shall be ascertained by inspection & bench test at firm's works.

10.3 Some or all type test shall be repeated once in three years by RDSO and purchaser, if required on sample basis, so as to confirm the quality of the product to meet the specification requirement.

10.4 In addition, the manufacturer shall repeat the test to witness by representative of RDSO and purchaser either totally or in part in following cases without any additional cost:-

- Modification of the equipment likely to affect its function
- Resumption production after an interruption of more than two years.
- Revision of the specification.

10.4.1 RDSO may conduct surprise check on manufacturing process and quality control along with any of the tests to ensure quality of product and its conformance to RDSO's specification.

10.6 The following test shall be carried out at the works of the manufacturer or at a reputed testing laboratory in presence of Indian Railway's representative on the prototype of filters as per relevant governing specifications modified of amplified as under: -

SN	Test description	Clause No.	Type test	Routine test	Acceptance test
1.	Visual inspection and dimensional checks	(Clause 10.7.1)	√	√	√
2.	Flow rate V/S pressure drop	(Clause 10.7.2)	√	√	√*
3	Dust holding capacity & Initial Gravimetric	(Clause 10.7.3)	√	-	-

	arrestance Efficiency				
4	Filter media Fire and safety test	(Clause 10.7.4)	√	-	√**
5	Filter efficiency test.	(Clause 10.7.3)	√	-	√
6	BIS certified filters	(Clause 10.9)	√	√	√

* Test to be conducted on 2% of lot offered subject to minimum 10 nos.
** On one sample (media) of each size in each lot offered.

10.7 Type test

10.7.1 Visual inspection and dimensional checks

In this test the general workmanship and the dimensions of the filter shall be checked as per RDSO drawing mentioned in clause 6.1.1, 6.1.2 & 6.1.3.

10.7.2 Flow rate V/S pressure drop

During this test, the temperature of the air shall be maintained at 30 to 45 deg. C with relative humidity of 40 to 75%. The samples of prototype proposed for type testing shall be clean & covered. After weighing, the filter shall be set in its place in the test rig ensuring perfect seating. A manometer shall be connected across the filter to read the pressure drop across the filter. The pressure drop at the specified flow rate should not be more than the required as mentioned in clause 6.3, when the filter is clean.

10.7.3 Initial Gravimetric Arrestance %

The dust feed gear and the filter shall be installed in a level position on the test ring. The dust feed gear shall be charged with required amount of test dust as specified in ISO 16890 or IS 17570, Test dust as mentioned in IS 17570 standard OR ISO 16890 shall be used during test. The exhauster will be started and the airflow through the filter will be adjusted to the maximum rated value of the filter under test. Air temperature & relative humidity shall be recorded and filter resistance shall be recorded before the test by means of manometer provided across the orifice plate or pitot tube. The orifice plate provided in test rig shall be duly calibrated in conjunction with test rig & manometer scale. Similarly, the feeder is set in operation and filter resistance is noted at regular intervals. The test is carried till be specified filter resistance is reached. Record the final filter resistance, air temperature and relative humidity. Exhauster is witched off and the remaining dust in the feed hopper is weighed. Any dust remaining in the approached section of the test dust shall be removed carefully and its weight is added to that of the dust remaining in the feed hopper. Carefully remove the filter from the housing and weigh it to ascertain the weight of the dust retained. Compute the efficiency of the filter by the formula given below:

Initial Gravimetric Arrestance % = Weight of the dust remain to filter x 100 / Weight of total amount of actual dust fed

The average arrestance of the return air filter for all type of coaches shall be between 60% to 85% as per ePM coarse as per IS 17570 or ISO 16890, whereas the efficiency of fresh air filter for all types of AC coaches shall be between 50% to 65% as per ePM coarse as per IS 17570 or ISO 16890

(**Note** : The test rig required for undertaking test mentioned in clause 10.7.2 & 10.7.3 shall be leak proof. The orifice plated / pitot tube of the test rig shall be properly calibrated in conjunction with the test rig and manometer scale from contain identification number of orifice plate or pitot tube & test rig.)

Test Dust or Loading Dust – As per L2 test dust as specified in ISO 15957, Test dust TC compulsory from Test Dust manufacturer)

10.7.4 Fire & safety test:

The filter media used in the filter shall be in compliance to EN 45545 HL- 3 Grade

10.7.5 Routine Test:

All the tests mentioned in clause 10.6 under routine test shall be carried out by the firm at their own works. The documentation of the results shall be maintained as per QAP and shall be made available, when demanded by the inspection authority.

10.8 ACCEPTANCE TEST:

10.8.1 All the tests mentioned in clause 10.6 under acceptance test shall be carried out by the inspecting official nominated by purchase/consignee at firm's premises.

10.9 BIS certificate or license is compulsory with manufacturer for products, BIS marking required on all filters delivered to Indian Railways directly or indirectly (filter supplied to RMPU manufacturers also).

11.0 GUARANTEE/ WARRANTY

11.1 GUARANTEE/ WARRANTY obligation of the equipment shall be as per IRS condition of contract.

12.0 CARTEL FORMATION

12.1 The firms will not engage cartel formation with other firms and will also submit a declaration in this regard as per enclosed Annexure ‘A’.

13.0 ENCLOSURES

a) RDSO drawing No.RDSO/PE/SPEC/AC/0055-2003 (Rev. ‘2’) sheet 2 of 2: “Dry type fresh and return air filter for under slung AC Coaches”.
b) RDSO drawing No.RDSO/PE/SPEC/AC/0055-2003 (Rev. ‘2’) sheet 1 of 2: “Dry type fresh and return air filter for conventional & Garibrath RMPU Coaches”.
C) RDSO drawing No.RDSO/PE/SK/AC/0073-2004 (Rev. ‘1’): The return air for LHB design of RMPU”.
d) RDSO drawing No.RDSO/PE/SK/AC/0074-2004 (Rev. ‘1’) : The fresh air for LHB design of RMPU”

e) Annexure A — Undertaking against Cartel Formation
F) Annexure B — Technical details to be furnished by the firm at the time of prototype testing

ANNEXURE - A

We, …… hereby, give an undertaking that as a Registered Vendor for manufacture and supply of ……., will not be a part of a cartel with other vendors and will be quoting competitive rates in the tenders invited by the Indian Railways/PUs.

We …… are aware of the fact that the Registering Authority i.e. RDSO may de-list the name of our firm from the Master List of Approved Vendors if complaint is received about such cartel formation from any of the Railways/Production Units.

Seal and signature
(Authorised signatory of the firm)

Date:

Place:

Seal:

ANNEXURE -B

TECHNICAL DETAIL TO BE FURNISHED BY THE FIRM AT THE TIME OF PROTOTYPE

<table>
<tr><th>S.N</th><th>Description</th><th>Details</th></tr>
<tr><td>1.</td><td>Name/Address of the firm</td><td></td></tr>
<tr><td>2.</td><td>Governing specification</td><td></td></tr>
<tr><td>3</td><td>Filter type</td><td></td></tr>
<tr><td>4</td><td>Filtration (gravimetric) efficiency
A) For fresh air filter
B) For return air filter</td><td></td></tr>
<tr><td>5</td><td>Pressure drop in new filter in mm WG</td><td><table><tr><td>S.N</td><td>Filter size</td><td>Initial pressure drop</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>6</td><td>Cleaning method (To be furnished in separate sheet)</td><td></td></tr>
<tr><td>7</td><td>Material of frame
1. Filter for under slung AC coaches
2. Filter for conventional RMPU
3. Filter for LHB RMPU</td><td></td></tr>
<tr><td>8</td><td>Material & Size of wire mesh
1. Filter for under slung AC coaches
2. Filter for conventional RMPU
3. Filter for LHB RMPU</td><td></td></tr>
<tr><td>9</td><td>Provision to avoid wrong fitment provided in RMPU filters</td><td></td></tr>
<tr><td>10</td><td>Details of filter media
a) Makes
b) GSM
c) Thickness of media</td><td><table><tr><td>S.N.</td><td>Filter Size</td><td>Make of media</td><td>GSM</td><td>Thickness</td></tr><tr><td>1</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>11</td><td>Nos. Of folds</td><td><table><tr><td>S.N.</td><td>Filter Size</td><td>Nos of folds</td></tr><tr><td>1</td><td></td><td></td></tr><tr><td>2</td><td></td><td></td></tr></table></td></tr>
</table>

Prepared by SSE/TL-AC	Checked by Director/TL-AC

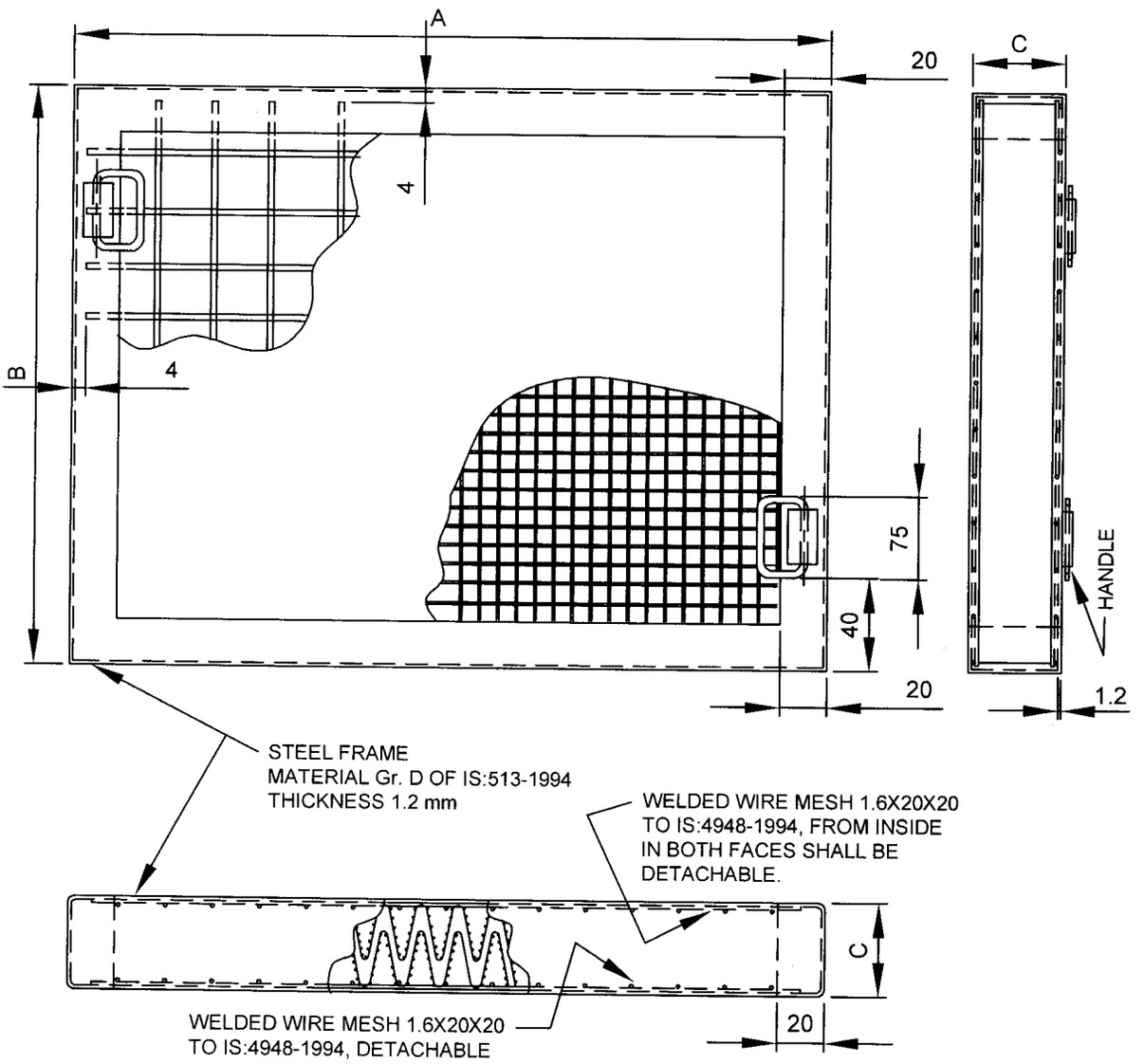
12	Weight of the filter	S.N. | Filter Size | Weight in kgs 1 2

DISTRIBUTION

CHIEF ELECTRICAL ENGINEER:	
1	Northern Railway, Baroda House, New Delhi – 110 001.
2	Central Railway, II Floor, Parcel office, CST Mumbai – 400 001.
3	Eastern Railway, Fairlie Place, Kolkata – 700 001.
4	South Eastern Railway, Garden Reach, Kolkata – 700 043
5	Southern Railway, Park Town, Chennai – 600 003.
6	Western Railway, Churchgate, Mumbai – 400 020.
7	South Central Railway, Rail Nilayam, Secunderabad – 500 371.
8	East Central Railway, Dighi Distt- Vaishali, Hajipur Bihar- 844 101.
9	North Central Railway, Balmiki Crossing, Nawab Yusuf Road, Civil Lines, Allahabad- 211 001.
10	South Western Railway, 1st Floor, DRM Office, Hubli 580 020
11	South East Central Railway, Bilaspur.495004
12	North East Frontier Railway, Maligaon, Guwahati - 781001
13	North Eastern Railway, Gorakhpur – 273001
14	North Western Railway, Jaipur – 302006
15	West Central Railway, Jabalpur - 482001
16	East Coast Railway, Bhuvneshwar, Orrisa – 751016
17	Konkan Railway, Belapur Bhavan, Sector-11, Belapur, Mumbai - 400614
18	Metro Railway, 33 /1 J.L. Nehru road, Kolkata- 700071
19	Integral coach factory, Perambur, Chennai - 600038
20	Rail Coach Factory, Kapurthala (Punjab) – 144 602
21	Rail Coach Factory, Lal Ganj, Rae Barelie (U.P.)
CHIEF WORKS MANAGER:	
1	Matunga Workshop, Central Railway, Mumbai 400 019.
2	Liluah Workshop, Eastern Railway, Howrah
3	C&W Workshop , Northern Railway, Alambagh, Lucknow-226 05
4	C & W Workshop,N. Rly., Jagdhari – 135 002
5	Mechanical Workshop, NER, Gorakhpur – 273 012
6	Carraige Workshop, Southern Railway, Perambur, Ayanavaram, Chennai – 600023.
7	SCR, Lallagudda Workshop, Lallaguda, Secunderabad - 500017
8	Carriage Workshop, Western Railway, Lower Parel, Mumbai-400013
9	CRWS, W. C. Railway, Nishatpura, Bhopal-462010
10	Carriage Workshop, NW Rly,. Ajmer - 305001
11	Carriage Repair Workshop, Gadag Road, SWR, Hubli – 580 020
12	Carriage Workshop, S.W. Railway, Mysore Vishwanath.
13	Carriage Workshop, SE Rly., Kharagpur - 721301
14	New Bongaigaon , Railway Workshop, Dangtal, Distt. Bongaigaon, Assam-783380
15	Carriage and Wagon Workshop, N. C. Rly., Jhansi – 248003
16	Carriage and Wagon Workshop, WC Rly., Kota - 324002

Prepared by	Checked by
SSE/TL-AC	Director/TL-AC

17	Carriage and Wagon Workshop, Eeastern Rly., Liluha - 711204
18	Carriage and Wagon Workshop, W. Rly., Pratap Nagar, Vadodara - 390004
19	Carriage and Wagon Workshop, N Rly., Amritsar - 143001
20	Central Workshop, Goldenrock, S. Rly., Trichi - 620004
OTHERS:	
1	Director, IRIEEN, Nasik Road (Maharashtra). - 422101
2	Senior Professor (Elect.), Railway Staff College, Lalbaug, Vadodara. - 390004
3	Director, IRCAMTECH, Maharajpur, Gwalior – 474 020.



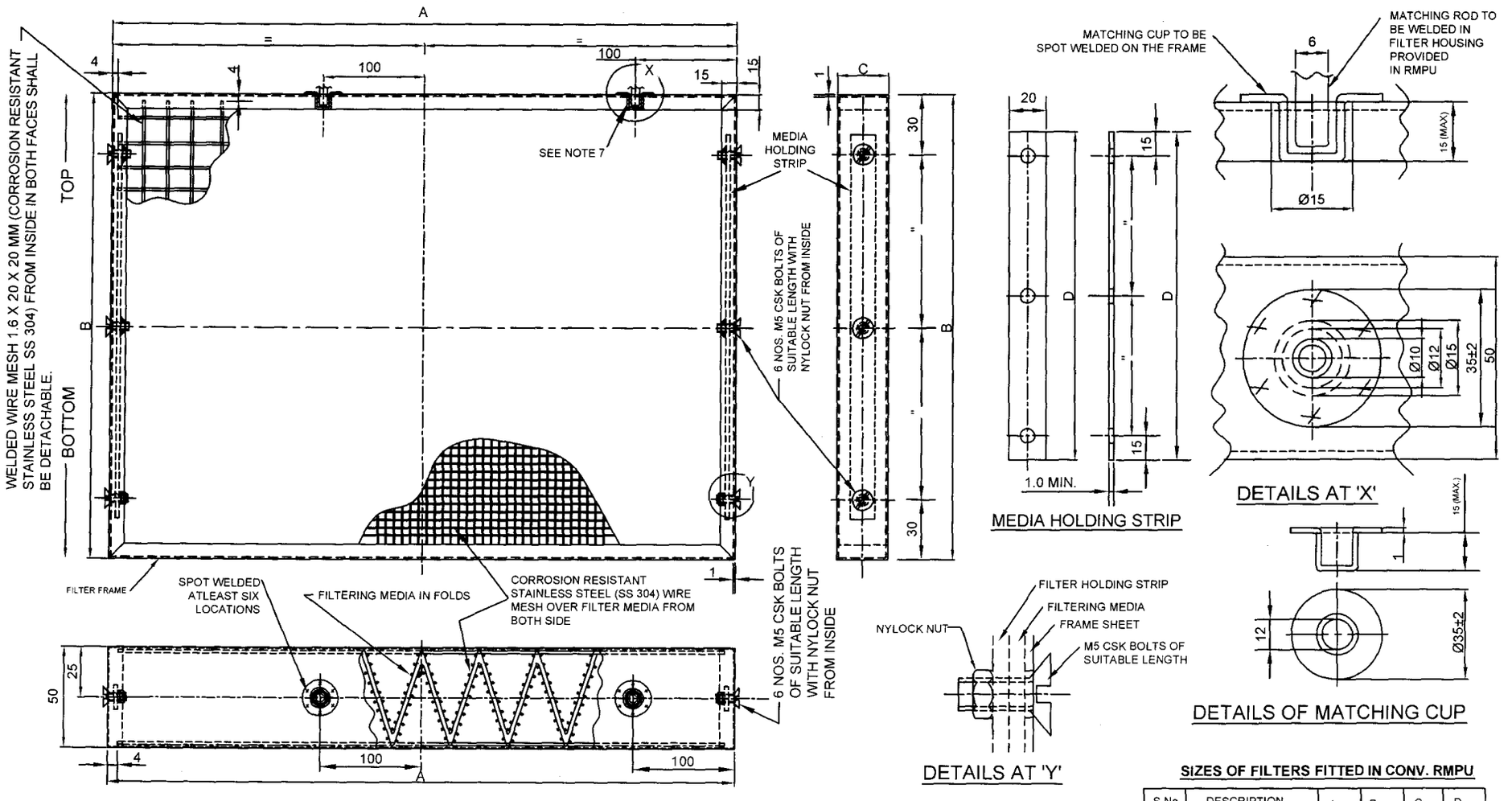
ITEM No.	DESCRIPTION	A	B	C
1.	FRESH AIR FILTER	580	300	75
2.	RETURN AIR FILTER	644	300	40
1.	RETURN AIR FILTER	324	249	40

NOTE: 1. FILTER HOUSING SHALL CONFORM TO ICF DRG. No. ICF/SK-4-4-092
2. TOLERANCES IN DIMENSIONS SHALL BE AS PER COARSE GRADE TO IS:2102 (PT.1)-1992

FILTER FOR UNDER SLUNG TYPE AC COACHES

REF. No.	PT. No.	DESCRIPTION	DETAIL DRG. No.	No. OFF	MATL.	SPEC.
REF.: ICF DRG. No. ICF/SK-4-4-091 RDSO DRG. No. SKEL 4109 (SHEET I & II)			SCALE : NTS	APPROVED BY FOR DG 30/11/14		
DRY TYPE FRESH AIR AND RETURN AIR FILTER FOR AC COACHES				FIRST ISSUED NOV. '03 SUPERSEEDS SKEL 4109(SH.-I & II) & REV.'0' OF THE SAME		
RDSO/PE/SK/AC/0057-2003 (Rev. '2') SHEET 2 OF 2				SUPERSEEDED BY		

DT.	OCT. '14
D	MS
C	



WIRE MESH SIZE OVER MEDIA

S.NO.	WIRE DIA (SWG)	NOS. OF DIVISIONS PER SQ. INCH
1.	26-28	121±4

SIZES OF FILTERS FITTED IN CONV. RMPU

S.No.	DESCRIPTION	A	B	C	D
1	RETURN AIR FILTER	620±2	460±2	50±2	430
2	RETURN AIR FILTER	550±2	500±2	50±2	470
3	FRESH AIR FILTER *	260±2	230±2	60±2	200

NOTES :
1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL USED IN FILTER FRAME SHALL BE OF SS GRADE 304. OVER FILTERING MEDIA.
3. TECHNICAL REQUIREMENT OF THE FILTER SHALL BE AS PER RDSO SPECIFICATION No. RDSO/PE/SPEC/AC/0055 - 2003 (Rev 2)
4. PROPER SEALING OF FILTERING MEDIA SHALL BE ENSURED. SO THAT THE LEAKAGE FROM THE FILTER DOES NOT TAKE PLACE.
5. THE INFORMATIONS AS SPECIFIED IN THE SPECIFICATION SHALL BE CLEARLY MARKED ON SUITABLE PLACE ON THE FRAME.
6. TOLERANCES IN DIMENSIONS SHALL BE AS PER COARSE GRADE TO IS:2102 (PT.1)-1993, UNLESS OTHERWISE SPECIFIED.
7. * THE MATCHING CUP SHALL BE PROVIDED ON THE BOTTOM SURFACE IN CASE OF FRESH AIR FILTER.
8. INSTRUCTION "DO NOT USE WATER FOR CLEANING" SHALL BE MARKED AT SUITABLE LOCATION.
9. MINIMUM NO OF FOLDS OF THE FILTER MEDIA SHALL BE AS PER CLAUSE 6.2.2 OF THE SPECIFICATION TO ACHIEVE THE TECHNICAL REQUIREMENT.

REF. No.	PART No.	DESCRIPTION	DETAIL DRG. No.	No. OFF	MATL.	SPEC.
REF.:		SCALE : NTS	APPROVED BY		FOR DG	11/14

DRY TYPE FRESH AIR AND RETURN AIR FILTER FOR AC COACHES
(CONVENTIONAL & GARIBRATH RMPU)

RDSO/PE/SK/AC/0057-2003 (Rev. '2') (SHEET - 1 OF 2)

FIRST ISSUED NOV '03

SUPERSEEDS REV. '1'

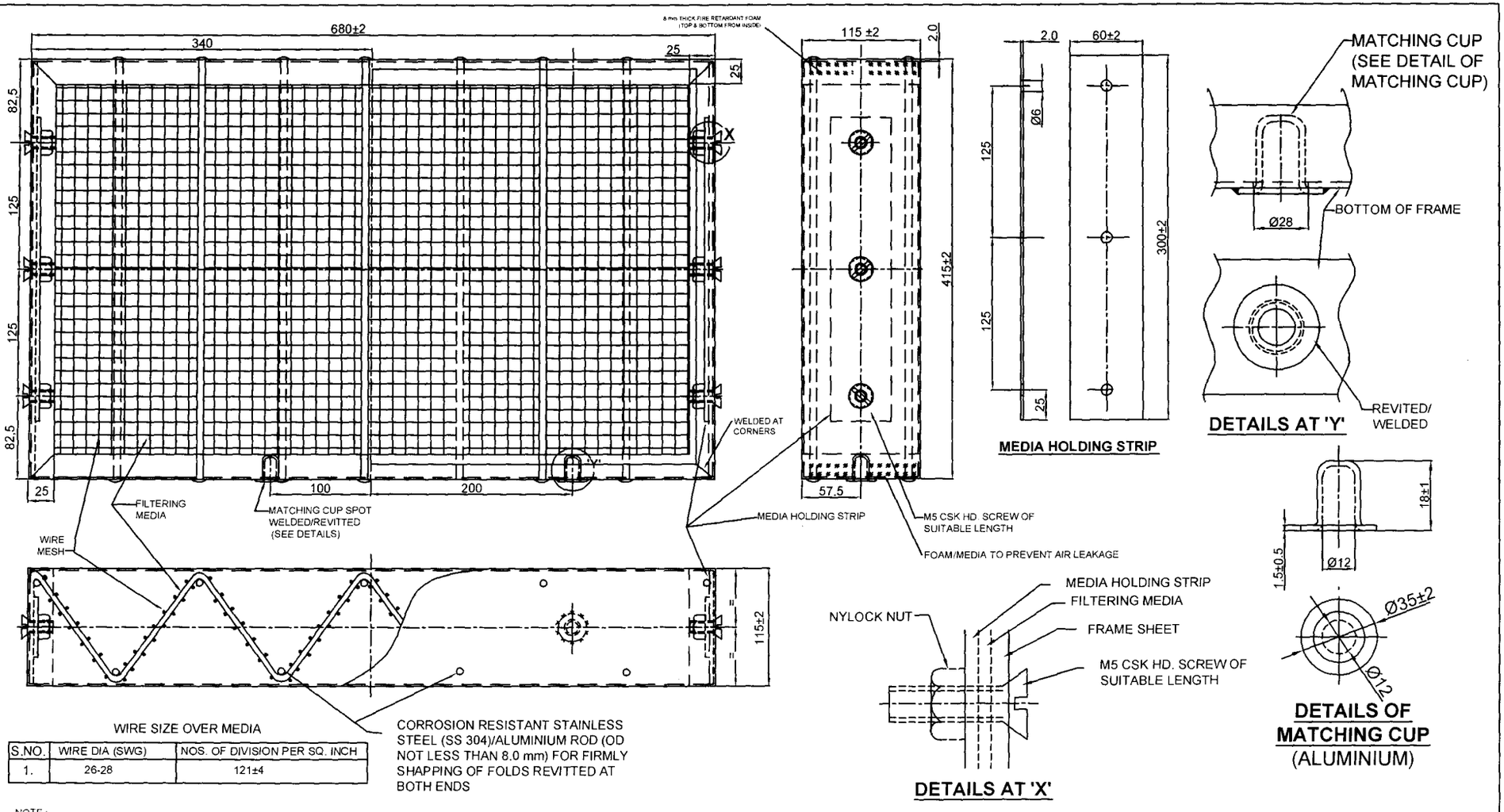
SUPERSEEDED BY REV.'2'

DT.	OCT. '14
D	MS
C	

CHANGES DONE
CONVENTIONAL RMPU ADDED, NYLOCK NUT ADDED, DIA OF CUP INCREASED FROM 10 TO 15 MM, SHEET THICKNESS 1.0 MM. OF FRAME SPECIFIED, DEPTH OF CUP 15 MM (MAX.) ADDED, NOTE CHNANGED, WIRE MESH CORROSION RESISTANT SS ADDED

STATUS	REV. No.	REF. No.	DESCRIPTION	APPD. BY	DATE
	1.	-	CONV. RMPU, LOCK NUT ADDED & CUP DIA INCREASED AND MAX DEPTH OF CUP SPECIFIED. CORROSION RESISTANT SS WIRE MESH & SIZE ADDED.	DSE/TL&AC SYSTEM DESIGN	JUNE'11

~~3267784/2024/O/o PED/PS&EMU/RDSO~~



WIRE SIZE OVER MEDIA

S.NO.	WIRE DIA (SWG)	NOS. OF DIVISION PER SQ. INCH
1.	26-28	121±4

CORROSION RESISTANT STAINLESS STEEL (SS 304)/ALUMINIUM ROD (OD NOT LESS THAN 8.0 mm) FOR FIRMLY SHAPPING OF FOLDS REVITTED AT BOTH ENDS

NOTE :
1) ALL DIMENSIONS ARE IN MM.
2) THICKNESS AND NOS. OF FOLDS SHALL BE CHOOSEN (MORE THAN THE MINIMUM NO OF FOLDS AS SPECIFIED IN THE SPECIFICATION) BY THE MANUFACTURER TO ACHIEVE THE TECHNICAL REQUIREMENT AS SPECIFIED.
3) DUST HOLDING CAPACITY OF THE FILTER SHALL BE FURNISHED BY THE FIRM.
4) MATERIAL OF THE FILTER FRAME SHALL BE OF CORROSION RESISTANT ALUMINIUM
5) TOLERANCES IN THE DIMENSIONS SHALL BE AS PER COARSE GRADE TO IS:2102 (PT.1)-1993, UNLESS OTHERWISE SPECIFIED.
6) THE FILTER SHALL BE PROVIDED ATLEAST 8 MM (MIN.) THICK FIRE RETARDANT FOAM ON TOP AND BOTTOM FROM INSIDE TO PREVENT ANY LEAKAGE OF AIR.
7) CORROSION RESISTANT STAINLESS STEEL (SS 304) WIRE MESH SIZE AS PER TABLE SHALL BE PROVIDED. THE WIRE MESH SHALL BE STITCHED WITH THE FILTER MEDIA WITH THE HELP OF SEWING MACHINE.
8) INSTRUCTION "DO NOT USE WATER FOR CLEANING" SHALL BE MARKED AT SUITABLE LOCATION.

REF. No	PART No.	DESCRIPTION	DRG No. DETAILS	No. OFF	MATL.	SPEC.
REF.			SCALE	APPROVED BY		FOR DG 30/11/14

RETURN AIR FILTER FOR RMPU (LHB VARIANT AC COACHES)

RDSO/PE/SK/AC/0073 - 2004 (REV.'1')

FIRST ISSUED (MAY '05)

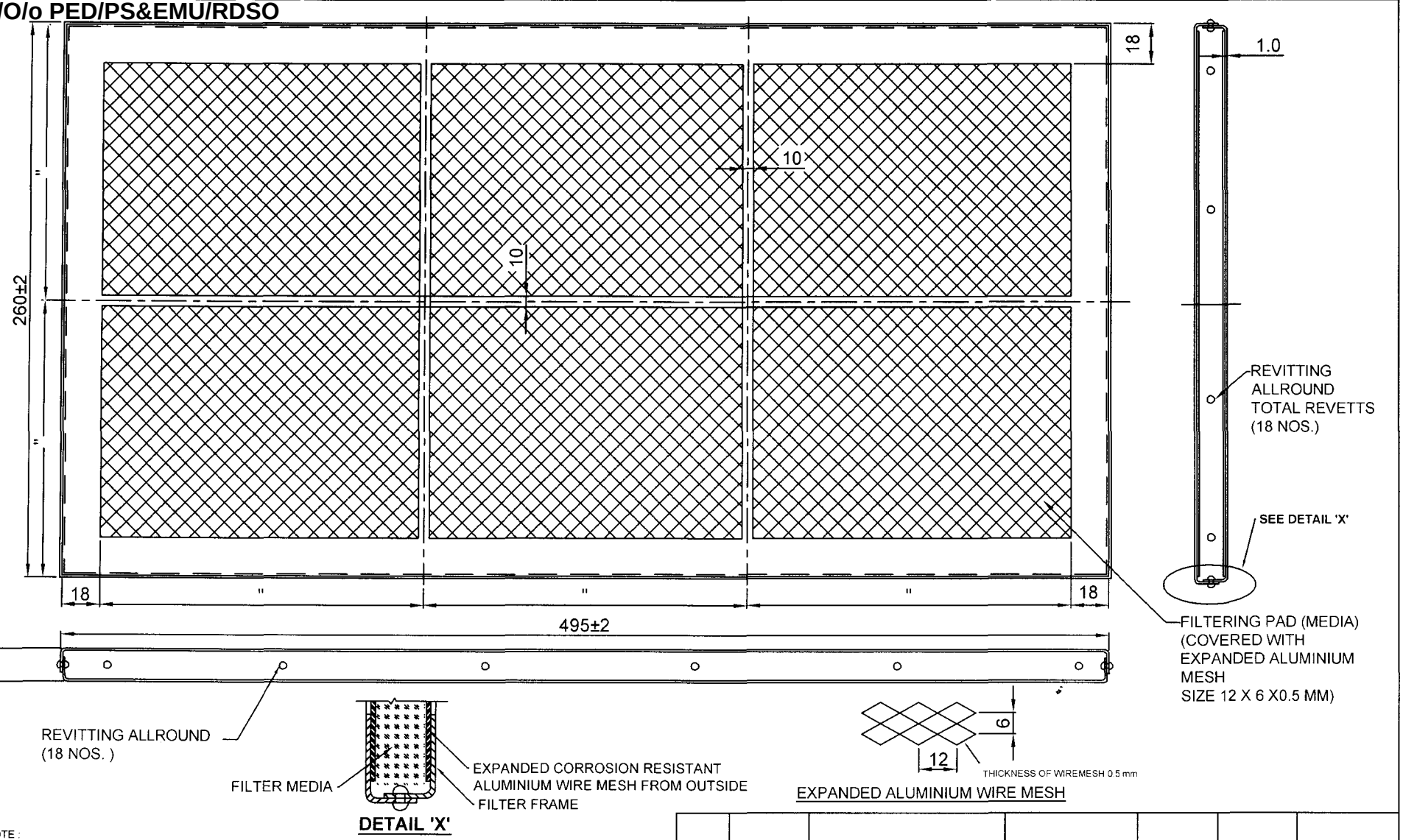
SUPERSEEDS Rev.0

SUPERSEEDED BY REV.1

DT.	OCT. 14
D	MS
C	

CHANGES DONE :
WIRE MESH SIZE OVER MEDIA & NY-LOCK NUT ADDED, NOTE CHANGED, MINIMUM NOS OF ROD SPECIFIED, ALUMINIUM SHEET THICKNESS 2.0 MM IN PLACE OF 2.5 MM

STATUS	ALT.	REF. NO.	DESCRIPTION	APPD.	DATE



NOTE :

1. ALL DIMENSIONS ARE IN MM.
2. THICKNESS OF THE FILTER MEDIA SHALL BE CHOSEN BY THE MANUFACTURER TO ACHIEVE THE TECHNICAL REQUIREMENTS AS SPECIFIED IN THE FILTER SPECIFICATION No.RDSO/PE/SPEC/AC/0055-2003 (REV.2)
3. DUST HOLDING CAPACITY OF THE FILTER SHALL BE FURNISHED BY THE MANUFACTURER.
4. MATERIAL OF THE FILTER FRAME & WIRE MESH SHALL BE OF CORROSION RESISTANT ALUMINUM . THE RIVETING WORK SHALL BE DONE WITH THE HELP OF RIVETING GUN INSTEAD OF HAMMER. THE RIVETS SHALL BE OF CORROSION RESISTANT ALUMINUM.
5. EASY REMOVAL OF THE FILTERING PAD (MEDIA) FOR CLEANING/REPLACEMENT PURPOSE AND PROPER HOLDING OF THE SAME DURING SERVICE TO AVOID ANY LEAKAGE OF THE OUTSIDE AIR SHALL BE ENSURED.
6. TOLERANCES IN OVERALL AND MOUNTING DIMENSIONS SHALL BE OF COARSE GRADE TO IS:2102 (PT.1), UNLESS OTHERWISE SPECIFIED.
7. FRAME OF THE FILTER SHALL BE IN TWO HALVES, REVITTED TOGETHER FROM ALROUND.
8. INSTRUCTION "DO NOT USE WATER FOR CLEANING" SHALL BE MARKED AT SUITABLE LOCATION ON EACH FILTER.

REF. No	PART No.	DESCRIPTION	DRG No. DETAILS	No. OFF	MATL.	SPEC.

REF.		SCALE	APPROVED BY
			FOR DG

FRESH AIR FILTER FOR RMPU (LHB VARIANT AC COACHES)

RDSO/PE/SK/AC/0074 - 2004 (REV.'1')

FIRST ISSUED (NOV. ' 11)

SUPERSEEDS REV.0

SUPERSEEDED BY REV. 1

DT.	OCT. '14'
D	MS
C	

CHANGES DONE IN REVISED SPECIFICATION DIMENSION 13.5 REDUCED TO 12.5±1, STRIP DIMENSION INCREASED FROM 5 TO 10 MM, EFFICIENCY CLAUSE DELETED, EQUIVALANT DUST SPECIFIED, EXPANDED WIREMESH ADDED, NOTE MODIFIED

STATUS	ALT.	REF. NO.	DESCRIPTION	APPD.	DATE