

CHAPTER 11

INTERIOR FITTINGS

1101 GENERAL DESCRIPTION

Interior fittings are the fittings inside the coach consisting of panels, seats, berths, windows, lights, fans, sanitary fittings etc. All coaching stock shall be furnished according to the standards laid down by the Railways/RDSO for the various types and classes of vehicles in service.

1102 AMENITY FITTINGS FOR COACHING STOCK

For passenger to have a comfortable train journey various passenger amenities fittings have been provided in the trains. Schedule of amenities for coaching stock (broad gauge) is indicated in Table 11.1.

Table 11.1

SCHEDULE OF PASSENGER AMENITY FITTINGS FOR BG COACHES									
Description	Air conditioned coaches				Non Air conditioned coaches				
	First class	2Tier sleeper	3Tier sleeper	Chair car	First class	Sleeper	Day coach	General	Double decker
1) Depth of faces of partition to the edge of:									
I. Seat (for seating purpose)	785	557 Long 665 Trans	635	680	785	560 Long 570 Trans	505	505	505
II. Berth (for sleeping purpose)	785	557 Long 665 Trans	600 Long 635 Trans	NA	785	560 Long 570 Trans	NA	NA	NA
2) Length									
I. Berth	2010	1877	1835	NA	2010	1870	NA	1676	NA
3) Hip width for passenger									
	610	550	550	450	610	480	415	480	450
4) Height clearance for seat / berth									
I. Clear space below seats	265	340	305	--	340	340	340	340	--
II. Height of top of seat from floor	405	405	420	405	405	405	405	405	405
III. Clear space between top of seat and bottom of upper berth bunk	900	900	610	NA	900	900	NA	900	NA
5) Corridor width									
	700	575	575	430	700	575	430	570	570
6) Bay width									
I. Four berths/general component	2312	1876	1830	NA	2312	1700	1575	1575	1575

SCHEDULE OF PASSENGER AMENITY FITTINGS FOR BG COACHES									
Description	Air conditioned coaches				Non Air conditioned coaches				
	First class	2Tier sleeper	3Tier sleeper	Chair car	First class	Sleeper	Day coach	General	Double decker
II. Coupe single row	1600	1150	-	NA	1500	1050	880	880	880
III. Pitching of chairs	NA	NA	-	565	NA	NA	NA	NA	NA
7) Knee room									
I. Four berther	710	535	535	NA	710	535	535	535	535
II. Coupe	710	450	NA	NA	710	450	340	340	340
8) Lavatory									
I. In side area in Sq. metre	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
II. Max. No. of passengers per lavatory	6	13	17	20	12	20	27	25	36
9) Body side door									
I. Max. No. of passengers per door a side	12	40	34	40	40	60	60	60	72
10) Electrical requirement									
A- Lighting									
i) Minimum lux at horizontal plane 840 mm above floor level									
a) Compartment	40	30	30	30	30	30	30	30	30
b) Lavatory	16	16	16	16	16	-	11	11	11
c) Corridor	16	16	16	16	16	-	-	-	-
ii) Individual switches for ceiling light	Yes	Yes	Yes	No	Yes	Yes	No	No	No
iii) Berth reading light with switches	Yes	Yes	No	No	Yes	No	No	No	No
iv) Night light	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
v) Individual switch for night light	Yes	Yes	Yes	No	Yes	Yes	No	No	No
vi) Toilet engage light	Yes	Yes	Yes	Yes	No	No	No	No	No
vii) Toilet engage sign	No	No	No	No	No	No	No	No	No
viii) Socket outlet 110V	No	No	No	No	No	No	No	No	No
ix) Call bell push button	yes	No	No	No	No	No	No	No	No

SCHEDULE OF PASSENGER AMENITY FITTINGS FOR BG COACHES										
Description	Air conditioned coaches					Non Air conditioned coaches				
	First class	2Tier sleeper	3Tier sleeper	Chair car	First class	sleeper	Day coach	General	Double decker	
B. Fannage										
i) No of fans										
a) Compartment	One for two berths	One per bay	One per bay	One per row	One per berth	3 per bay	3 per bay	3 per bay	3 per bay	
b) Lavatory	One per lav.	One per lav.	One per lav.	One per lav.	No	No	No	No	No	
ii) Size/type of fan										
a) Compartment (Swivelling = S) (Fixed = F)	400 mm (S)	300 mm (F)	300 mm (F)	400 mm (F)	400 mm (S)	400 mm (F)	400 mm (F)	400 mm (F)	400 mm (S)	
b) lavatory	200 mm (F)	200 mm (F)	200 mm (F)	200 mm (F)	No	No	No	No	No	
c) Regulator for fans	Yes	Yes	No	yes	Yes	No	No	No	No	
d) On/Off switch for fans	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	
11) Compartment and doorway fittings										
a) Cushioned seats and back rests	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	
b) Cushioned berths	Yes	Yes	Yes	NA	Yes	Yes	NA	NA	NA	
c) Longitudinal luggage racks i) Light (L) ii) Sturdy (S)	L	L	L	S	L	No	S	S	L	
d) Folding or fixed table	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
e) Roof ventilators										
i) Compartment	No	No	No	No	Yes	Yes	Yes	Yes	Yes	
ii) Doorway	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
f) Tumbler holder	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
g) Ash tray										
i) Compartment	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
ii) Door way	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
h) Waste paper basket dust bin										
i) Compartment	Yes	No	No	No	No	No	No	No	No	
ii) Door way	Yes	Yes	Yes	Yes	No	No	No	No	No	
i) Foot rest	No	No	No	Yes	No	No	No	No	No	
j) Notices	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
k) Mirror with shelf										
i) Compartment	Yes	Yes	Yes	No	Yes	No	No	No	No	
ii) Doorway	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

SCHEDULE OF PASSENGER AMENITY FITTINGS FOR BG COACHES									
Description	Air conditioned coaches				Non Air conditioned coaches				
	First class	2Tier sleeper	3Tier sleeper	Chair car	First class	sleeper	Day coach	General	Double decker
l) Coat hook	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
m) Foot steps	Yes	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes
n) Magazine pouch	Yes	Yes	No.	Yes	Yes	No	No	No	No
o) Wash basin									
i) Compartment	Yes	No	No	No	No	No	No	No	No
ii) Door way	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
p) Ward robe with fixed hangers	Yes	No	No	No	No	No	No	No	No
q) Water cooler	Yes	Yes	No	Yes	No	No	No	No	No
r) Drinking water with container	Yes	Yes	Pouches	Yes	Yes	Yes	Yes	No	Yes
s) Thali rack	No.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
t) Linen room	Yes	Yes	Yes	No	No	No	No	No	No
u) Rings below berths for securing luggage	No	Yes	Yes	No	Yes	Yes	No	No	No
12) Lavatory fittings									
a) Shower bath	Yes	No	No	No	Yes	No	No	No	No
b) Wash basin	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
c) Towel rail	Yes	Yes	Yes	Yes	No	No	No	No	No
d) Flushing commode	one	One	One	One	One	Nil	Nil	Nil	Nil
e) Flushing pan	except one	except one	Except one	Except one	Except one	all	all	all	all
f) Push cock for lotah filler	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
g) Lotah shelf	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
h) Commode rail	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
i) Mirror shelf	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
j) Bottle opener	Yes	No	No	No	No	No	No	No	No
k) Coat hook	3	3	3	3	5	4	4	4	4
l) Soap dish (SD), Liquid soap container (LC)	Both	SD	SD	SD	SD	SD	SD	SD	SD
m) Lavatory chutes should be slanting so that ground is not visible from inside and lavatory discharge does not fall on rails and track fasteners.									
n) Inter communication Inter communication doors shall be provided between the two classes of accommodation in a composite coach.									
13) External fittings									
a) Reservation display plates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
b) Destination board	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
c) No. plates on mail & express trains only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes

The schedule of safety items for passengers to be available in the interior of the coach is given in Table 11.2

Table 11.2

Safety requirements									
SCHEDULE OF PASSENGER AMENITY FITTINGS FOR BG COACHES									
Description	Air conditioned coaches			Non Air conditioned coaches					
	First class	2Tier sleeper	3Tier sleeper	Chair car	First class	sleeper	Day coach	General	Double decker
a) Alarm pull No. of per	-	-	-	-	-	-	-	-	-
i) Compartment	1	1	1	6 Total	1	One	One	One	One
ii) Lavatory						Alarm	Alternate	Alternate	Alternate
iii) Corridor	2				2	Bay	Bay	Bay	Bay
b) Internal latches at top and bottom on body side doors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
c) Provision of pad locking arrangement from outside on one body side door	Yes	Yes	NA	Yes	Yes	Yes	NA	NA	NA
d) Internal latch and shout bolts with notched stopper and outside pad locking arrangement for compartment sliding door	Yes	NA	NA	NA	Yes	NA	NA	NA	NA
e) Throw over latch and Pad Locking arrangement for sliding of vestibule	NA	Yes	Yes	NA	Yes	Yes	No	No	No
f) Shout bolts and sliding door bolts for swing doors and pad locking for rolling shutters of vestibules	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
g) Latches for windows shutters of body side doors and partition walls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
h) Fire extinguishers	2	2	2	2	No	No	No	No	No
i) Safety bars on all window opening	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
j) Windows shutters									

i) Glass shutters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ii) Louvre shutters	No	No	No	No	No	No	No	No	No
iii) Louvre cum gauge shutters	No	No	No	No	Yes	Yes	Yes	Yes	Yes
iv) Frosted single glass sealed window	Yes	Yes	Yes	Yes	No	No	No	No	No
v) Louvre cum Frosted glass liftable type shutters	No	No	No	No	Yes	Yes	Yes	Yes	Yes

1103 FURNISHING MATERIALS ON PASSENGER COACHES

Furnishing materials in a coach have changed considerably over the years. Plastics, FRP and various other synthetic materials have been introduced which are light in weight and require less maintenance and give better aesthetics.

1103a Roof Panelling Sheet

2 mm thick Limpet asbestos sheet to RDSO specification No. C 8105 (Rev. 1) is the material used for Roof panels. **1.5 mm** thick NFTC (Natural Fibre thermoset Composite) to RDSO's specification No.C-9511 can be used as a permissible alternative to **2 mm** limpet asbestos sheet.

1103b Side Wall Panelling

Thermosetting synthetic resin bonded decorative laminated plastic sheets (LP sheets) of **3 mm** thickness to RDSO's specification No. C9602 is used for side wall panelling.

The LP sheets panelling provide aesthetic look to the coach interior. Being the bad conductor of heat and electricity, the LP sheets prevent the radiation of heat from atmosphere to inside coach. The L.P sheet provides seating to various passenger amenity fittings such as ash tray, tumbler holder, coat hook, mirror and mirror shelf, luggage rack and news paper pocket.

1103c Other Plastic Materials

i) Fibre Reinforced Plastic

FRP has the potential of wide range of application in coach interior. So far SMC (Sheet Moulding Compound) moulded window shutters, wall protectors and axle box front covers have been developed in FRP.

ii) Plastic Push Cocks

Plastic push cocks made of HDPE (high density polyethylene) to RDSO Spec. C-9121 are being used in place of metallic push cocks. These push cocks are less prone to the theft.

Better form of plastics are now readily available. Push cocks in PTMT

(Polytetramethyl triethylene) and acetal are also available.

1103d Attention in Workshop

- The interior fittings should be examined for corrosion and damage during pre inspection of the coach. All missing fittings should be made good and reported, defective ones removed from the coach, repaired and refitted.
- All distorted/ damaged panels should be replaced. No patch work should be resorted to and complete panel piece should be fitted. While replacing the panels, care should be taken to match the colour and design to the extent possible.
- While renewing ceiling panels opportunity should be taken to examine the insulation material. Full insulation should be checked when a coach is internally stripped fully after **5 to 7 years** to attend to corrosion on the roof sheets. Deficient/damaged insulation should be replaced.

1103e Anti-Pilferage Measures

In order to prevent theft of amenity fittings from coaches, workshop should carry out anti-pilferage measures on all coaches during POH, as prescribed by the Chief Mechanical Engineer or RDSO especially for the following items:

- i) Mirror and mirror shelf.
- ii) Soap dish.
- iii) Ash tray.
- iv) Push cock.
- v) Wash basin.
- vi) Tumbler holder.
- vii) Hand hold.
- viii) Upper berth hold.
- ix) Coat hook.
- x) Flushing valve.
- xi) Window frame.
- xii) Folding table.
- xiii) Lotah cock.
- xiv) Lotah shelf.
- xv) Shower rose.
- xvi) Wall protector.
- xvii) Foothold bracket.
- xviii) Fans
- xix) Lights

1103f Examination and repair practice in Carriage Maintenance Depot

i) **Primary/Secondary examination and Schedule A, B & C**

- Examine laminated panels & mouldings for damages /cracks.
- Visually inspect passenger amenity fittings, replace if found damaged / deficient.
- Examine visually curtain cloth in AC coaches and attend if necessary.
- Examine ventilation grills for damages.
- Examine luggage racks / bunks for breakage.
- Examine push cock, flush valve for function.
- Check and attend leakage in pipes, fittings and shower roses in lavatory.
- Clean drain grills and drain holes in bath room and wash basin if found choke up.
- Check and replace damage/missing mirrors/shelves/soap dishes.

1104 **WINDOWS**

1104a **Windows of Non AC Coaches**

The non AC coaches are provided with glass and louver shutters made out of FRP. The Glass panel of the shutter is made of safety toughened glass. The shutters work in the grooved frame work of the window assembly. To prevent the glass shutters from dropping a balancing mechanism comprising of spring, lever etc. is provided. To close the window positive force is required to be applied against the spring force. In the case of louvre shutters instead of the balancing mechanism a spring loaded safety latch is provided to prevent the louvre shutter from dropping.

1104b **Windows of AC Coaches**

AC Coaches are fitted with double glass sealed windows. Two types of sealed windows are presently in use and they are as under:

i) **AC windows of ICF coaches**

(Ref: ICF drawing No. WGFAC- 5-4-001.)

- a) Windows of earlier built ICF coaches consists of a outer glass shutter fixed on the out side of window opening of coach by studs and nuts and fully sealed with rubber packing all around and inner glass shutter which is top hinged on the inside and is capable of swinging open to clean inside surface of the glasses .
- b) In the recent built ICF coaches outer glass is directly inserted in the fixing rubber glued over window opening. Inner glass shutter and other fittings remains same as above.

ii) **AC windows of RCF Coaches**

(Ref Drg:AE 54103)

AC window of RCF built coaches are fitted with double glass hermetically sealed window units. Stainless steel supporting frame is welded in the inside of the window opening to support the window unit and also to fix specially designed sealing rubber profile. FRP window holding frame is screwed from inside of the coach to provide sealing of conditioned air.

In both types of sealed window toughened safety glass of **5.5/6 mm** thickness to IS 2553- Part II made from 'A' quality flat transparent glass to IS 2835 is used. A reflective sun control film of smoke grey colour is pasted on inside surface of outer glass.

1104c **Emergency Openable Windows**

(for Non- AC Coaches - ICF drg No. DMU/DPC -5-4-002 & ICF/STD-5-4-005) (for AC coaches - RDSO sketch SK-98161 alt. 1)

Emergency windows are provided as the third window from door on either side in passenger compartment.

1104d **Lavatory Windows (RDSO's Sk. 96104)**

FRP banjo type windows with frosted glass are fitted in lavatories.

1104e **Lavatory Windows of AC Coaches**
(ICF drg. No. WGFAC-5-5-001)

Sealed type windows with frosted glass are fitted in lavatories of AC coaches. Four protection bars are welded with outer frame.

1104f **Maintenance of AC windows in workshops**

- Broken, cracked, defaced or scratched glass should be replaced and the window frame repaired as necessary. Glass should be cleaned with lime and detergent before refitting. The rubber or felt lining between the glass and the frame should be changed every time the glass is removed. Chrome plated moulding, if provided, should be rechrome plated before fitting.
- In case of separate outer window, before fitting it, sealing compound should be applied on the joint surfaces of the coach as well as the window to form an air-tight joint. Sun control film should be pressed on the inside of outer glass.
- The hinges of inner window frame should be checked for easy operation and well oiled before refitting. The clamping catches should be attended to and tested for proper functioning.
- The rubber beading between window and coach body should be replaced if found set, deteriorated, or damaged, to ensure air tightness.
- The damaged FRP inner frames / holding frame should be replaced. The moulding on the window space between the outer and inner windows should be replaced if found deficient or damaged; otherwise, it should be well cleaned in position. In case of steel bodied coaches, the panel should be examined for corrosion and attended to as required.
- When components are replaced, it is good practice to assemble the sealed window on a mock-up window arrangement in the shop for correct fitment and sealing. This can then be taken as a set and fitted on the coach.

1104g **Maintenance of Windows of Non AC Coaches (ICF drg. no. T-5-4-701 & RDSO Sk. 96070) in workshops**

- All window shutters should be fully removed from the body shell at every second POH and also when they are found defective during pre inspection.
- When windows are not removed, the shutters should be checked for easy working by lifting and lowering them. The safety catches should also be checked to ensure that they are in working order and that, once they are engaged, the shutter should not be unlocked and opened. Their rubber channels, if deteriorated or torn, should be replaced.
- The entire window assembly should be dismantled and shutters removed. Presently windows are fitted with glass and louvre shutters having anodised aluminum or FRP shutter frames and louvers. The anodised aluminum / FRP shutters and other fittings on the newly built coaches should be cleaned with detergent only at the first POH. In subsequent POHs, these items should be painted with matching shades of paints, after painting oiling should be done on all the safety catches. Steel components should be cleaned of dust and dirt. The glass panes should be cleaned with lime and spirit. Broken or cracked glasses should be replaced with safety toughened glass. Under no circumstances should an ordinary glass sheet be used in shutters. Holes in the frames for safety catches, which have become oblong should either be bushed or plugged and re drilled. Torn, rusted or deteriorated wire gauze should be replaced by proper galvanized wire mesh.
- The shutters should be checked for easy working in grooves after rubber channels are replaced. Balancing mechanism for the shutters should be dismantled, cleaned and examined. All its worn out components like brass/nylon rollers should be repaired/replaced as required. Pin should be lightly greased. Backside and other portions of window frame

which get covered up when fitted on the coach should be painted before the balancing mechanism is reassembled.

- Spring tension should be correctly adjusted such that the shutter can be easily lifted and positioned wherever required.
- The wire gauge should be cleaned with a wire brush and blown with compressed air.
- A coat of mastic compound should be applied on the contact surface of rubber channels for keeping them in position.
- On body side door windows of non-air-conditioned coaches safety bars should be provided as given in RDSO sketch no. 84162, if not already existing.

1104h **Examination and Repair Practice in Carriage Maintenance Depot**

i) **Primary/Secondary examination and Schedule A, B & C**

- Examine window shutters of non AC coaches for smooth movement in railing to prevent rattling and disengaging of catches on run.
- Window frame on non AC coaches should not be broken and its glass, gauze wire and venetian louver should be in proper condition.
- Check window balancing mechanism on non AC coaches for proper function.
- Examine window safety catches for proper engagement in their slots.
- Check lavatory banjo shutters for damage/missing.
- Examine window frame and rubber profile of sealed windows in AC coaches for damages and attend if needed.
- Window bars should be provided and fixed in prescribed manner and replaced if damaged.
- Examine sealed windows of AC coaches, replace broken/damage glasses.

1105 **FLOOR**

1105a **Introduction**

The use of PVC flooring is used in both upper and lower class coaches. RDSO vide their letter No.MC/CB/Flooring dt. 26.04.89 have circulated the guidelines for using PVC flooring on main line coaches. As per RDSO 's letter No.MC/CB/Flooring Dated: 08.04.96. **12mm** Compreg floorboards shall be used whenever floorboards of complete coach require replacement. Use of PVC flooring improves the aesthetics of compartments, besides providing for hygienic condition and easy maintenance.

This arrangement is also considerably lighter (approx.1.1t) as compared to Decolite flooring. It also prevents corrosion of under frames by eliminating water seepage. For this purpose, proper laying technique, sealing of joints with thermo-welding process and selection of right shades are very essential.

1105b **Flooring arrangement in a Coach**

The flooring in the coaches will consist of a compreg sub-floor covered with PVC sheet. The following ICF drawings give details of the PVC flooring arrangement over plywood sub-floor :

1. ICF/SK.4-1-135 - PVC flooring for GS coaches.
2. ICF/SK.4-1-139 - PVC flooring for GSCN coaches.
3. GS.4-1-002 - PVC sheet covering over Decolite in lavatories.
4. ICF/SK.4-1-136 - PVC flooring for AC-2Tier coaches.
5. ICF/SK-4-1-101- Flooring in lavatory for AC-2 Tier Coaches.

1105c **Material description**

- 12mm Compreg floor board to RDSO Specification C-9407 (Revised) type – II shall be used for all new coaches or used for coaches whenever floor boards of complete coach require replacement.
- When only part of the floor is to be replaced , repair to floor shall be carried out by using Plywood - 19 mm thick plywood to IS-303-1975 Grade A fully treated for protection

against fungi, termite, marine borers and other insecticides and requirements of preservative treatment to IS:5539.

- PVC Flooring - 2mm thick homogeneous Vinyl Flooring, preferably, in roll form to RDSO specification No. C8515 (Rev.2). If laminated flooring is used, the top layer shall be of 1 mm hard wearing surface.
- Adhesive - Adhesive to fix PVC flooring to plywood Compreg will be Neoprene based rubber adhesive of Dunlop S-758 or Fevicol SR-998 make or equivalent quality.

1105d **Attachment and Fixing**

i) **Laying procedure for Sub-flooring**

- **12 mm** Compreg floor board to RDSO Specification C-9407 (Revised) type –II should be laid properly in level (ensure level by suitable packing, if required) to the cross members/trough floor. Before laying, the joining edges of compreg sheet shall be coated with water sealing compound to specification No.IS:7084 - 1973. This is essential to ensure effective sealing at the joining edges to prevent any seepage of water.
- Drill holes on the compreg floor board and cross members/trough floors and fix it by self tapping counter sunk screws as per relevant drawings.
- Joints between compreg floor board should be minimum and if any gaps exist, the same should be filled with epoxy putty. (see note)

Note:- **5 Kgs.** of Epoxy putty is prepared to the following combination :

Table 11.3

French Chalk	2.1 Kg.
Resin HSK	2.1 Kg.
Acetone commercial	0.4 Kg.
Accelerator	0.2 Kg
Catalyst	0.2 Kg
Total	5.0 Kg.

- The self tapping screw head shall also be levelled by applying epoxy putty. This will ensure smooth level for effective laying of PVC flooring sheet and also avoid water seepage through screw holes.
- Scrap away excess putty, if any.
- Sweep and clean the coach floor thoroughly before laying the PVC floor sheets/rolls.

ii) **Laying of PVC Flooring**

- Spread open the PVC roll/sheet on half the width of coach (inside the coach)and leave it for some time (**30 to 40 minutes approx.**) to enable it to lie flat on the floor.
- Mark properly the position of the pillars, seat frames etc. on the PVC rolls/sheet and cut neatly around the pillars and frames.
- Fold the roll half way and spread a thin and even layer of adhesive with a notched trowel (serrator) on the compreg sub-floor. The recommended adhesive is Dunlop S-758 or Fevicol SR 998 or equivalent.
- Also apply adhesive on the rough reverse side of PVC flooring thinly and evenly as above.
- Allow some time for solvent evaporation (**30 minutes approx.**) to prevent solvent vapours being entrapped. As soon as the adhesive becomes touch dry, both on the floor and the PVC flooring, press down the sheet in position gently and gradually from one end taking care to prevent air from being entrapped. Follow same procedure for the other half of the same roll.
- No welding operation is allowed during laying of PVC, since the adhesive is flammable agent.
- After adhesive work of the 1st roll is over, apply pressure on the flooring with a steel roller of **25 kgs.** (approx.) so as to obtain perfect adhesion between PVC flooring and compreg sub floor and to eliminate air being entrapped.

- The second roll shall be laid in position, overlapping the 1st sheet by about 5 to 10 mm (see Fig.11.1) while spreading the roll, ensure the cuts on the PVC flooring match with pillars of partition and seat frames.
- "Trim in" the length by placing a straight edge along the centre of the Over-lapping edges, and with a sharp knife, cut through both thickness of PVC flooring at the same time. Pull out the overlapping edges of top and bottom of PVC flooring and press the same to the compreg floor to obtain perfect butt joint.

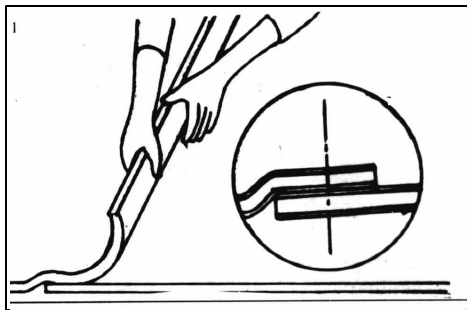


Figure 11.1

iii) **Thermo-Welding (Hot Air welding)**

Proper thermo-welding of PVC flooring is utmost necessary for obtaining satisfactory bonding/results. Thermo-welding of PVC flooring provides impervious continuous floor surface.

iv) **Grooving**

A grooving tool (hand or automatic) along with a straight edge/scale (see Figure 11.2) is used to groove the butting edges of the seam to approximately two third of the thickness of the wear layer of PVC flooring. This will leave a semi-



Figure 11.2

circular groove for thermo welding (see Figure 11.3 & 11.4).

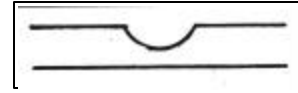


Figure 11.3

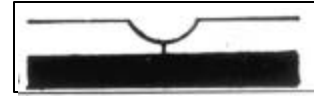


Figure 11.4

Note :-A deep groove cut (Figure 11.5) into the PVC flooring will result in an unsupported weld which may split in use.



Figure 11.5

v) **Welding**

Seams are thermo-welded with a hot-air gun using flexible transparent Vinyl welding cord (Figure 11.6). Details of welding equipment and PVC welding cord are given in the para 1105f. To ensure a thermo-welded seam of maximum strength, the gun must be held at the correct angle to the flooring and used at the correct speed. The correct angle is achieved when the 'foot' of the welding nozzle is parallel to the surface of the flooring. Start to weld the flexible cord into the PVC flooring at the most even and efficient rate to ensure the correct fusion of materials. Finish off as near to the end of the groove as possible. Welding of the ends of grooves on PVC flooring can be carried out with the use of hand roller.

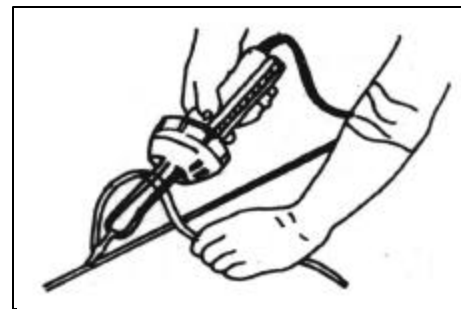


Figure 11.6

vi) **Trimming**

When the weld has cooled to room temperature, it should be trimmed off flush to the surface of the material with a trimming Spatula (**Figure 11.7**). If trimming is done before the welding cord has cooled, it will shrink below the surface of the flooring. If at this stage, the spatula disturbs the weld, this indicates that a positive joint has not been achieved. The existing weld should then be removed and the seam must be re-welded. To ensure that proper bond of PVC flooring to compreg base floor is obtained, allow it to dry for **24 hrs.** in normal atmospheric temperature. All the edges of PVC flooring in the compartments should be sealed with water sealing compound to avoid seepage of water.

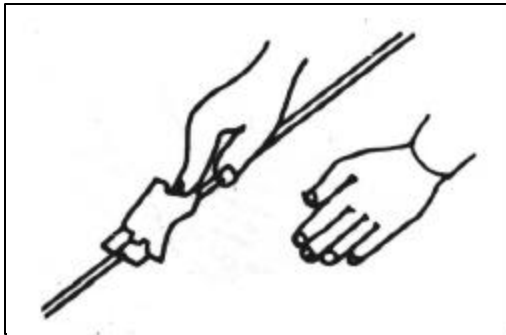


Figure 11.7

In the door way of GS coaches, an aluminum chequered sheet to IS:737 HS 20-W should be provided and properly anchored over PVC flooring to avoid any damage to PVC flooring.

Water sealing compound shall be used all around the aluminum chequered sheet as well as in the CSK screws to prevent seepage of water.

1105e **Lavatory Flooring**

All new coaches are provided with stainless steel inlay pasted with single piece PVC sheet to ICF drawing no. ICF/STD-4-1 001 in lavatories. Coaches having other types of lavatory floorings should be provided with stainless steel lavatory inlays during POH.

- The cracked, damaged or worn out PVC sheets should be removed and a new single piece PVC sheet should be pasted over stainless steel inlay.

- No patchwork should be done in the lavatory flooring.

1105f **Special Tools and Equipments**i) **PVC Flooring**

PVC flooring shall be to RDSO Schedule of Requirement No.C-8515 (Rev.2).

a) **HOT AIR WELDING EQUIPMENT**

- i) Hot air welding equipment - 750 watts capacity with air control device on the torch.
- ii) Roller with handle for pressing the weld deposits.
- iii) Welding Rod **2mm dia** PVC Electrode
- iv) Recommended procedure for welding of flexible PVC - to IS : 8002 - 1976
- v) Adhesive
 - Dunlop adhesive S-758
 - Fevicol SR - 998
- vi) Water proof sealing compound - Water proof sealing compound to IS: 1580-1960.

1105g **Maintenance Instructions**

- i) All coaches, both AC and non-AC, except the luggage compartment portion of SLR coaches, are provided with compreg flooring having a PVC sheet pasted on it. The cracked, damaged or worn out PVC flooring sheets should be removed. Swollen or otherwise damaged floor boards should be renewed and a new PVC patch of same colour should be pasted. The joints of PVC patch should be properly thermo-welded to prevent seepage of water. For laying and repair of PVC flooring over compreg, the procedure detailed in RDSO pamphlet no. C9001 should be followed.
- ii) The coaches undergoing corrosion repair should be provided with PVC flooring as per RDSO pamphlet no. C-9001.
- iii) The coaches undergoing normal repairs may continue with the flooring arrangement as existing, i.e., either Decolite or PVC flooring.

- iv) In case of Decolite flooring, the cracked, uneven or worn out flooring should be broken and patched with the same colour Decolite. At the time of decoliting the floor it should be ensured that dovetailed wooden battens are properly fitted and the Decolite mixture is prepared in accordance with the instructions given in IS 657 and IS 658. The Decolite surface should be smooth finished and given proper slope. Special care should also be taken at the edges, joints and at the pedestals to ensure that freshly laid Decolite leaves not even an invisible gap to permit water to seep through and cause corrosion of the trough floor underneath.

1105h **Examination and repair practice in Carriage Maintenance Depot**

i) **Primary/Secondary examination, Schedule A and B examination**

- Visually examine floor for any damages.

ii) **Schedule 'C' examination**

- Inspect and attend torn/damage/ cracked PVC flooring.
- Examine and attend opened PVC joints.
- Examine Drain holes in trough floor for accumulation of water due to clogging if noticed, inspect affected area for corrosion

1106 **SEATS AND BERTHS**

1106a **Cushioned Seats and Berths**

- i) The upholstery materials used for seats and berths of different classes of coaches is given in the following table.

Class of coach	Furnishing material	Cushion material
Ist class AC coaches and Executive class chair car of Shatabdi Express.	Flame retardant fabric upholstery to RDSO's STR No. C-9901.	Foam rubber cushion to IS:1741/60 Gr. 'B'
AC 2 tier and 3 tier, AC chair car, First class, First class chair car	Solid layer vinyl coated fabric to type II of RDSO's STR No. C- 9503.	Same as above
Sleeper class, Second class day coach	Solid layer vinyl coated fabric to type II of RDSO's STR No. C- 9503.	Same as above

For stitching the furnishing cloth, cotton sewing thread no. 30 is used, thread no. 40 for curtains. Cotton padding to Specification no. G/TEX/C - 1813 is used to give even shape to the cushion.

1106b **Maintenance in workshops**

- i) The berths and seats found defective due to opening of stitches, cracked / torn/ faded rexine, or sagged cushion should be removed from coach and sent to Trimming shop for repairs. Otherwise they should be cleaned in position with a suitable detergent or interior cleaning agent which does not damage/discolour and does not require water for rinsing.
- ii) After stripping the seats, backrests, berths, arm rests, etc., completely, the frame should be examined for distortion/crack. These should be first got repaired in fitting section or carpentry section as the case may be. The wooden battens of the frame for fixing the rexine should be examined and replaced if damaged / broken. The steel members should be painted and the wooden members varnished after repairs before doing upholstery repair work.
- iii) Following measures may be taken to improve the quality of upholstery work:
 - *Rounding of corners of berths and seats:* This eliminates corner folds where the rexine gets torn often for old design of berth.
 - *Use of nylon sewing thread:* Nylon thread has higher strength than cotton threads and hence reduces incidence of opening of stitches.
 - *Use of straight edge rexine cutting machine:* This helps in cutting rexine in a batch for improved repair work productivity
 - *Use of pneumatic staplers:*

Pneumatic staplers can be used instead of nailing.

Reclining Seats of Chair Cars

- The reclining chairs should be removed from the chair cars in every POH and sent to Fitting and Trimming shops for overhaul.
- Strip the chairs with adjustable backrests and replace worn out gear wheels and other components including bottom rail. The moving parts should be oiled and the assembly checked for even sliding before it is refitted. The upholstery portion should be repaired as given in section 1105c. The chrome plated legs, where provided, should be examined and re-chrome plated, if necessary. After the chairs are repaired and assembled, they should be tested for easy movement and firm securing in all reclining positions.
- Strip the reclining mechanism gear, and replace worn / defective parts. The components should be painted all over except sliding and rotating surfaces, which should be well greased. After assembly the chair should be tested for ease of rotation and proper locking.
- The folding table, if provided, on the base of the back- rest should be examined for loose or damaged hinges, broken or cracked moldings or damage to table top. Replace table if found damaged. Hinges and locking catch should be lightly oiled and examined and attended for proper operation

1106c **Examination and Repair Practice in Carriage Maintenance Depot**

i) Primary/Secondary examination

- Examine visually curtain cloth in AC coaches attend if necessary.
- Examine middle and upper berth chains.
- Examine the holding / securing brackets for seat and berths and attend if necessary.
- Examine snack table in upper class coaches for damages and rectify if necessary.

- Examine and repair damaged upholstery cushions and curtains.
- Wooden seats and frame should be cleaned

ii) Schedule A and B examination

- Examine as per (i) above.
- Wooden seats and frames should be disinfected.

iii) Schedule C examination

- Examine as per (ii) above.
- Examine reclining mechanism on chair cars for proper functioning and attend if necessary.

1107 **DOORS**

1107a **Examination in Workshop**

i) Body side Doors

- Doors should be checked for ease of working and corrosion, especially on the bottom side of the panels. If found heavily corroded, they should be removed and repaired as per RDSO Technical pamphlet C-7602 (Rev.1).
- The top and the bottom bearing pivots should be checked for worn ridges. If ridges are found they should be removed and if the condition warrants, the pivots should be replaced.
- The door handles, guard key locks and safety latches on the doors should be checked for smooth and easy working. The bent parts should be straightened or renewed as required. Pad locking plates on the doors.
- Dust excluding device in the form of a rubber tube is fitted all around on the door. This should be checked and if perished, or torn or decayed, should be renewed.
- If door safety latches are found bent or jammed, they should be repaired ensuring proper working.

ii) Sliding Doors

Sliding doors of upper class compartments

- Sliding doors should be removed in every POH. Top roller race and top guide rails should be checked for smooth working and replaced when worn more than **1 mm** on each part. The door stops at the top and bottom should be checked and adjusted. The ball bearings in the top guide rollers should be checked, greased and refitted or replaced as necessary. The ridges from the roller 'V' surfaces should be removed or, if worn too small the rollers should be replaced.
 - The automatic lock, specially its lock casing, should be checked for cracks at its flanges. If cracked, it should be replaced.
 - If the door operating rod is broken, it should be replaced.
 - The coach door should be checked for wear. If worn more than **1 mm**, it should be replaced.
 - The pins of the lock should be cleaned, oiled and refitted.
 - The internal door locking latches (parrot latches) and the tower bolts should be checked for ease of working and replaced if required.
 - While fitting the door, it should be ensured that the gap between the door and the panel does not exceed **4.5 mm**.
 - Broken glass in the observation windows provided in sliding doors of AC First class coaches should be replaced.
- Sliding doors should be removed at every POH. All corroded and damaged panels, louvres and members should be cut out and replaced.
 - Roller assembly should be removed and stripped. Replace rollers if found worn beyond **3 mm**, otherwise they should be reused after smoothening ridges or dents formed at the rolling surface. Similarly, other components should be examined and repaired or replaced as required. Perished / torn rubber sealing shall be replaced. After assembling the components, the moving parts of the assembly should be greased before fitting them in position on the door.
 - The bottom guide, door handle and door locking arrangements should be examined and repaired or replaced to ensure smooth working in operation and effective locking from inside and outside. The inside and outside locking arrangement shall be to sketch 75118 and 75210 respectively.
 - The door assembly, after repairs should be checked, preferably in a fixture, for its alignment of the top rollers and the bottom guide. The alignment should be corrected as required before the door assembly is passed for fitting on the coach.
 - Inspection door & pocket in partition for sliding door shall be provided as per ICF drawing TLR-4-2-717, SLR-4-2-002 & WLLRM-4-2-605 in respective coaches.

Sliding doors of luggage vans - ICF/BEML design (TLR-5-8-001)

iii) **Vestibule doors**

- a) *Sliding doors* - These should be attended as per instructions contained in section (ii) above. Semi-permanent locking arrangement shall be as per RDSO sketch 84154.
- b) *Flap doors* - They should be checked for ease of working, damages to their panels, hinges, locking bolts and other parts, and necessary repairs carried out.
- c) *Rolling shutters* - They should be checked for ease of working and damages and necessary repairs carried out.

It should be ensured that the locking arrangements for the sliding doors / flap doors / rolling shutters are provided and are in working order.

iv) **Corridor inter communication doors of air conditioned coaches**

Replace all damaged or perished lining to ensure proper sealing. Remove door closer and test for proper functioning. Defective door closer should be overhauled before fitting.

1107b **Examination and Repair Practice in Carriage Maintenance Depot**i) **Primary/Secondary examination, Schedule A, B and C Examination**

- Examine body side doors for working/ damages.
- Inspect door handles for damages/missing.
- Examine door for proper functioning. Also check that door is properly secured with hinges and pivots and should not be grazing with floor or door sill plates.
- Examine that the door locks and latches are firmly secured with correct sized screws and are properly engaging in their slot. The tongue of gravity type latch should be in proper alignment with its slot plate.
- Examine compartment sliding doors in AC first and ordinary first class coaches for smooth functioning.

- Thorough inspection and repair of sliding doors in SLR coaches should be undertaken.
- Examine door closer in AC coaches for proper functioning.
- Check lavatory hinge door for proper functioning.
- Examine lavatory door latches / tower bolts for proper function.

1108 **VESTIBULE**1108a **UIC type rubber vestibule (RDSO sketch - 99056) and Foot Plate arrangement**i) **Conversion to UIC type vestibule**

The existing stock can be provided with UIC type vestibule as per RDSO SK-99056. The following items/components are required for conversion.

Sr. No.	Description of item/ component	No. off / assly.	Drawing No.
1	Steel frame complete	1	RDSO SK-99057
2	Upper flange	1	RDSO SK-85248
3	Lateral side flange	2	
4	Rubber packing 6x75x1900	2	RDSO SK-99060
5	Rubber packing 6x75x1500	1	
6	Locking plate	2	RDSO SK-99058
7	Locking plate	2	
8	Locking plate	1	
9	Locking plate	1	
10	Special screw	17	RDSO SK-99059
11	Spring washer M10	53	IS:3063-65 tab-1 type B
12	Hex nuts M10 (D.C.)	70	IS:1363-92 Pt.3. Tab-1
13	CSK head screw AM 10x25	36	IS:1365-68, 4-6 Tab, 2 & 3
14	Snap head rivet dia. 5x10	10	IS:2998-82, Gr.1, Tab-1

Sr. No.	Description of item/ component	No. off / assly.	Drawing No.
15	Foot plate arrangement	1	RDSO SK-99057
16	Support bracket for foot plate	2	
17	Vestibule door sill arrangement	1	
18	Holding device for foot plate	2	T-2-5-699
19	Pin	2	RDSO SK-99059
20	Washer M20	2	
21	Split pin dia. 4X36	2	IS:549
22	Connecting component	2	ICF/SK-2-5-078
23	Foot plate holding bracket	2	RDSO SK-99057
24	LP sheet	2	
25	Spring plate	2	RDSO SK-99058

1108b Maintenance during POH

- Examine the steel frame complete for deformation, corrosion, welding crack. Repair the defective components. Straighten the deformed vertical channels by heating and pulling inwards by suitable chain & screw tensioning mechanism.
- Examine the LP sheet on the inside of frame. Wash and clean if found stained and dirty. Replace if found broken or cracked. For vestibules without LP sheet, painting may be done.
- Examine the condition of upper and lateral rubber flanges (bellows) for wear or cuts. The cracked portion up to **300 mm** on lateral side flange may be repaired by rubber patch and rubber solution. Replace if found beyond repair.
- Examine the fixing screws and nuts for rubber flanges. Tighten if found loose or replace if found missing.
- Examine the support brackets for foot plate. The deformed or corroded brackets which are beyond repair, should be replaced in position. See that the foot plate rests evenly on both the brackets. Replace the perished or missing rubber sheet on

the support brackets with rubber adhesive.

- Clean the foot plate with wire brush to remove muck, dirt, etc. accumulated on the foot plate surfaces. Examine the foot plate arrangement for wear, deformation or corrosion. Replace the foot plate if found beyond repair. Remove the sharp corners of the foot plate. Replace the worn out or broken wearing piece. Examine the condition of holding brackets and pins for wear, broken or welding crack. Replace if foot plate brackets and pins are found beyond repair. Paint foot plate with anti-corrosive paint.
- Examine the holding device for foot plate. Replace or repair if found defective. examine the hand rail for breakage, etc.
- Examine the bracket assembly and connecting components (if provided) for coupling the UIC vestibule with conventional vestibule. Replace the deformed or missing components.
- After completion of the repairs, all components should be painted with one coat of red oxide zinc chromate primer.

1108c Examination and repair practice in Carriage Maintenance Depot

i) Primary/Secondary examination, Schedule A, B & C examination'

- Examine visually rolling shutters/sliding doors of vestibule for smooth working.
- Inspect vestibule and its Rubber fittings for damages /missing components. Repair if necessary.
- Visually check vestibule fall plate, mounting brackets, pins and lock lever for ease of operation, damages/ deficiency.
