

TUVASAS DMU 124R

Product Description of window and blind

Approved by	1-Dec-2008	H.G. RYU	
Reviewed by	1-Dec-2008	H.S. KIM	
Written by	1-Dec-2008	Y.D. KIM	
	Date	Name	Signature

	Product Description of window and blind	DOC. NO.: REDD101424
		DATE : 13. Oct. 2014
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		PAGE : 3/10

Contents

1. Introduction	4
2. Application Standards	4
3. Arrangement of Windows	4
3.1. Side Windows.....	5
3.2. Door Windows.....	7
4. Blind	8
4.1. General.....	8
4.2. Functionally required conditions	8
4.3. Screen material.....	8
4.4. Guide rail.....	8
4.5. Upper roll supporter and adhesion a bracket	9
4.6. Hook bracket.....	9
4.7. Upper tension spring.....	9
4.8. Screen guide stand and roller bush	9
4.9. Lower wire bracket.....	9

	Product Description of window and blind	DOC. NO.: REDD101424
		DATE : 13. Oct. 2014
		REV. NO.: Rev. A
		PAGE : 4/10

1. Introduction

This document provides the technical description of window and blind design for Diesel trainset(hereafter DMU) of Turkish Wagon Industry Co.(hereafter, TUVASAS) in accordance with requirement of the Technical Specification (TS).

2. Application Standards

UIC 560 Clause 7 Windows

UIC 651 Layout of driver's cabs in locomotives, railcars, multiple unit trains and driving trailers

UIC 564-1 Leaf to be classified in Volumes

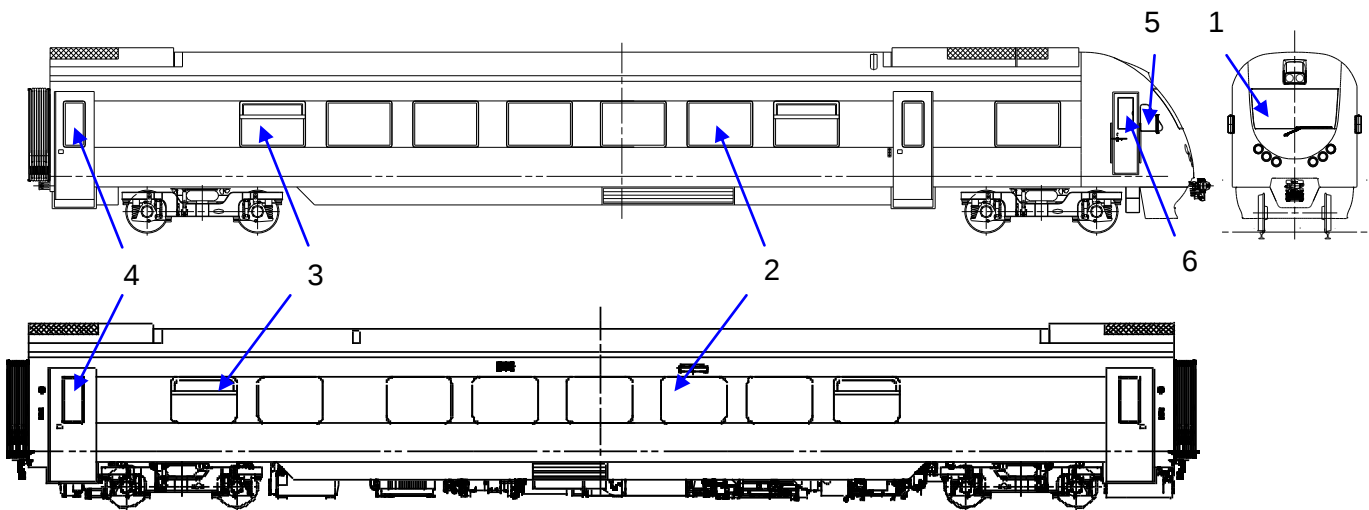
UIC 566 Loadings of coach bodies and their components

ECE R43 (EDE 324 Regulation No.43)

3. Arrangement of Windows

Types of windows are arranged for the Tuvasas DMU train as shown Figure1.

- ▶ One windshield is provided in front of the each car with driver cabin.
- ▶ Six side fixed windows are provided on each side of each car.
- ▶ Two side openable windows are provided on each side of each car.
- ▶ Four passenger side door windows are provided on each side of each car.



1. Driver Cabin Front glass (Windshield)
2. Side window glass (Fixed)
3. Side window glass (Openable)
4. Passenger Side Door glass (Fixed)
5. Driver Cabin Side window glass (Fixed)
6. Driver Cabin Side door glass (Sliding Openable)

Figure 1. Window Arrangement

	Product Description of window and blind	DOC. NO.: REDD101424
		DATE : 13. Oct. 2014
		REV. NO.: Rev. A
		PAGE : 5/10

3.1. Side Windows

The side window gives an outside view of passengers. The side window assembly is retained using the direct bonding at outside and grazing rubber at inside of coach, shown in Figure 5. A window glass is consisted of double grazed type. The glasses for the side windows are double pane type with the 5mm tempered tinted glass on the inside and outside. The space between the tempered glasses is 6mm and filed dried air to prevent moisture condensation. The size of each side window will be 1400mm (L) x 953mm(H) x 16mm(t). Also, in case of emergency, tempered glass will be to break easy by hammer.

3.1.1. Specification for Side Window

The detail specification and conceptual design for side window are following table I and figure 2.

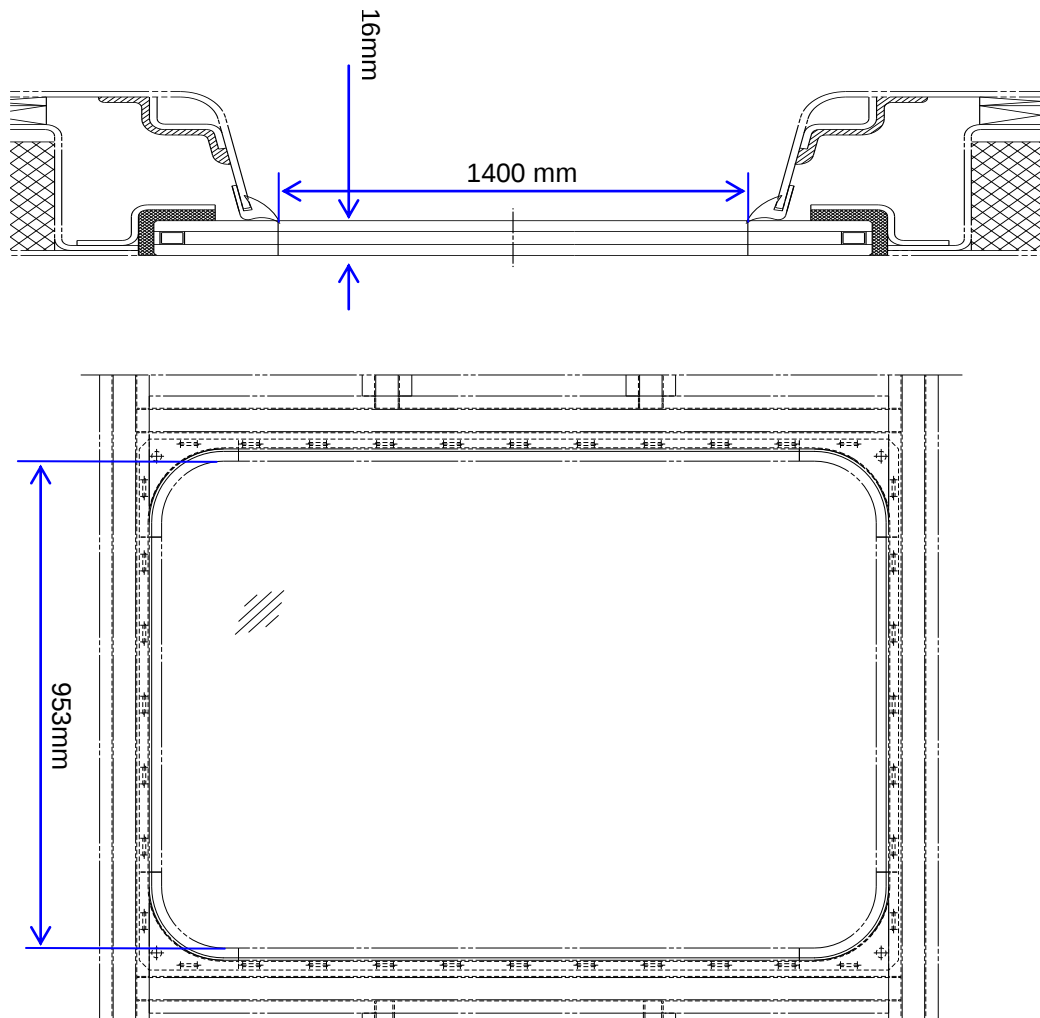


Figure 2. Side Window Assembly

	Product Description of window and blind	DOC. NO.: REDD101424
		DATE : 13. Oct. 2014
		REV. NO.: Rev. A
		PAGE : 6/10

Type	Glass spec.	Glass total thickness	Color	Light Transmission (Approx.)	Test Standard
Side Window	Tempered Double Glass	16mm	Bronze	55%±10%	BS 857 or ECE R43

Table I. Specification of Side window glass

3.1.2. Specification for Side Openable Window

Openable window is fitted to it to allow opening for emergency ventilation of the car in the event of failure of the HVAC system. The side window consists of two sections, one can be opened inwards and one fixed lower section. This side window is developed with the opening part hinged in a system with several S-springs. This system allows two fixed positions for the opening part: closed and opened at approximately 30° angles. The closed position is also kept with a latch located in the handle. Usually the system does not need any lubrication.

The upper section, Openable window, can be opened inwards about 30° by pressing a pushbutton and pulling the window handle. If the opened window is pushed outwards about 10°, it is closed automatically by the restoring force of the springs in the frame and remains closed by the aid of a window latch. The Openable window glass is removable from car inside but the lower glass from car outside. The detail specification and conceptual design for side Openable window are following table II and figure 3.

The thickness of side Openable window glass is the same with side window glass. In addition, a yellow strip of the passenger silent alarm will be installed on the Openable window frame.

Items	Main Components	Material	Finish
Openable Window assembly	Sealant (Bond)	Sikaflex 265	Black
	Cross Frame	Aluminum, A6063S-T5	Black Anodized
	S-Spring	Stainless steel	-
	Window Handle	Aluminum die casting	Black Anodized
	Locking Device	Stainless	Natural
	Upper Glass	Tempered double glass	16mm
Lower Glass		Tempered double glass	16mm
Glazing	Rubber	Chloroprene	Black

Table II. Specification of main components of Side Openable Window

	Product Description of window and blind	DOC. NO.: REDD101424
		DATE : 13. Oct. 2014
		REV. NO.: Rev. A
		PAGE : 7/10

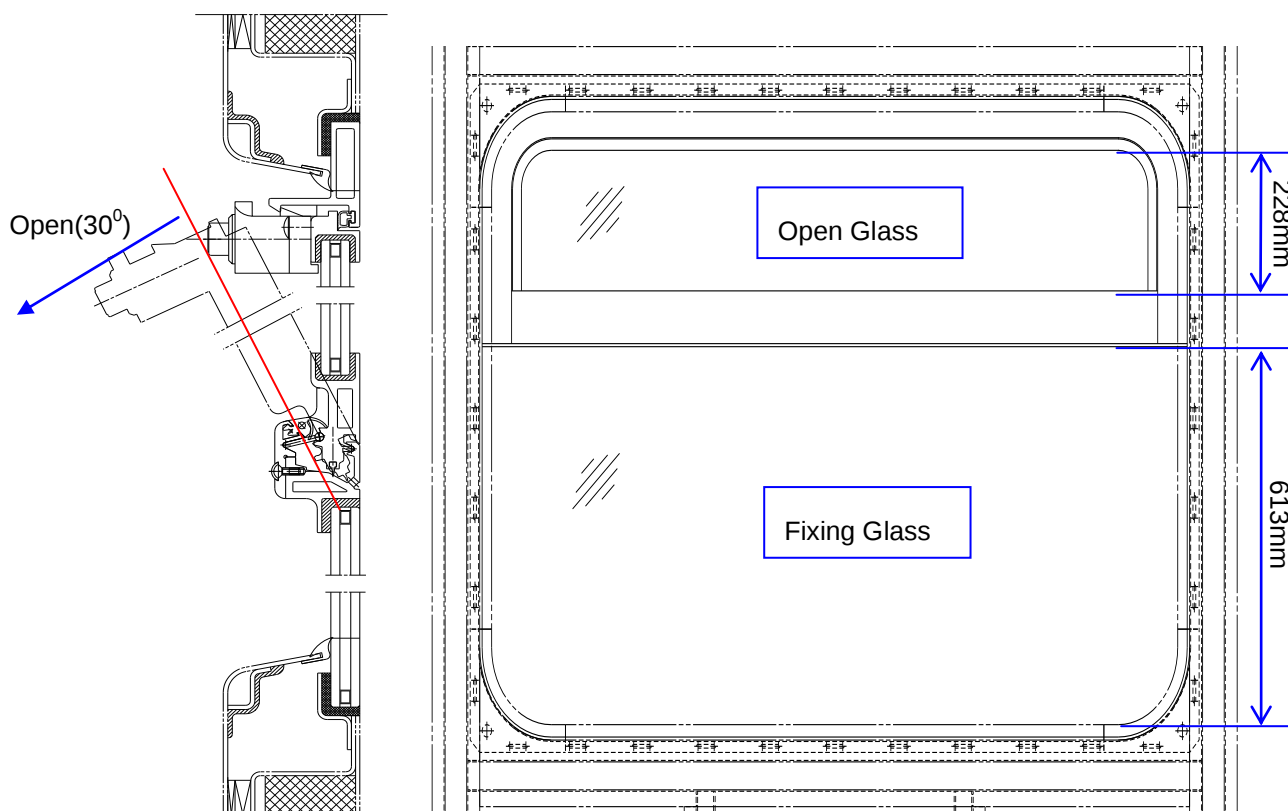


Figure 3. Side Openable Window Assembly

3.2. Door Windows

Window glass is fixed with fixture rubber on the window frame that is made of an aluminum profile. Please refer to Table III

Window	Glass spec.	Glass total thickness	Color	Light Transmission (Approx.)	Test Standard
Side Door	Laminated Glass	8.76mm	Bronze	$50 \pm 10\%$	BS 857 or ECE R43
Cab Side Door	Tempered Glass	6mm	Bronze	$50 \pm 10\%$	BS 857 or ECE R43
Cab Partition Door	Laminated Glass	8.76mm	Clear +mirror film	$30 \pm 10\%$	BS 857 or ECE R43
End Door	Tempered Glass	6mm	Clear	$88 \pm 10\%$	BS 857 or ECE R43

Table III. Specification of Door Window and Glazing

	Product Description of window and blind	DOC. NO.:	REDD101424
		DATE :	13. Oct. 2014
		REV. NO.:	Rev. A
		PAGE :	8/10

4. Blind

4.1. General

- ▶ The blinds control whole or partial lighting of inside passenger carriages.
- ▶ The blinds are operated in an up and down manner by manually for lighting control.
- ▶ It should be easy for passengers to control the location of blinds for whole or partial lighting control.
- ▶ The material of blinds makes for up and down operation without tearing or folding, and the blinds should be operated easily without any noise.

4.2. Functionally required conditions

- ▶ The “Profile” will be equipped on the side of blinds for the reduction of noise and stopper role, so passengers can control lighting as their wish.
- ▶ The blinds protect passengers from direct exposure to sunlight.
- ▶ The blinds should be designed for an easy exchange of textile screen.
- ▶ The whole blinds should be easily attached and separated for the smooth exchange of windows.
- ▶ It should be designed for free ascent and descent at any location with a simple structure.
- ▶ The blinds operate through the smooth operation of a control stand that ascends and descends along with an upper roll supporter and both guide rails.
- ▶ The blinds should not include any dangerous factors for passengers in normal usage state.
- ▶ The admitted load for the blinds operation is 2~3.5 daN.

4.3. Screen material

- ▶ The material is manufactured by coating PVC (more than 50%) on fiberglass.
- ▶ For the edge of the material, polyester strap will be treated by heat treatment.
- ▶ Tensile strength
 - Warp: more than 150 daN
 - Filling yarn: more than 100 daN
- ▶ Light fastness satisfies the degree that is over fifth degree in accordance with ISO 105 B01.
- ▶ The thickness of material should be under 0.9mm.
- ▶ The light transmission of the material should be over 90%.
- ▶ It should be under 500g.
- ▶ The color and outlook of the material should be same as the approved sample.

4.4. Guide rail

- ▶ Guide rails on both sides work as a guide rail of screen ascent and descent, and the profile

	Product Description of window and blind	DOC. NO.: REDD101424
		DATE : 13. Oct. 2014
		REV. NO.: Rev. A
		PAGE : 9/10

inside takes charge of noise and balance when screen ascends.

- ▶ Guide rails should be installed in a straight line for a smooth operation and noise prevention.

4.5. Upper roll supporter and adhesion a bracket

- ▶ The upper roll supporter and adhesional bracket have a fixing function so the screen material operates smoothly.
- ▶ The upper roll supporter should be installed in a straight line.

4.6. Hook bracket

- ▶ It should be fix upper roll supporter with riveting on guide rail.

4.7. Upper tension spring

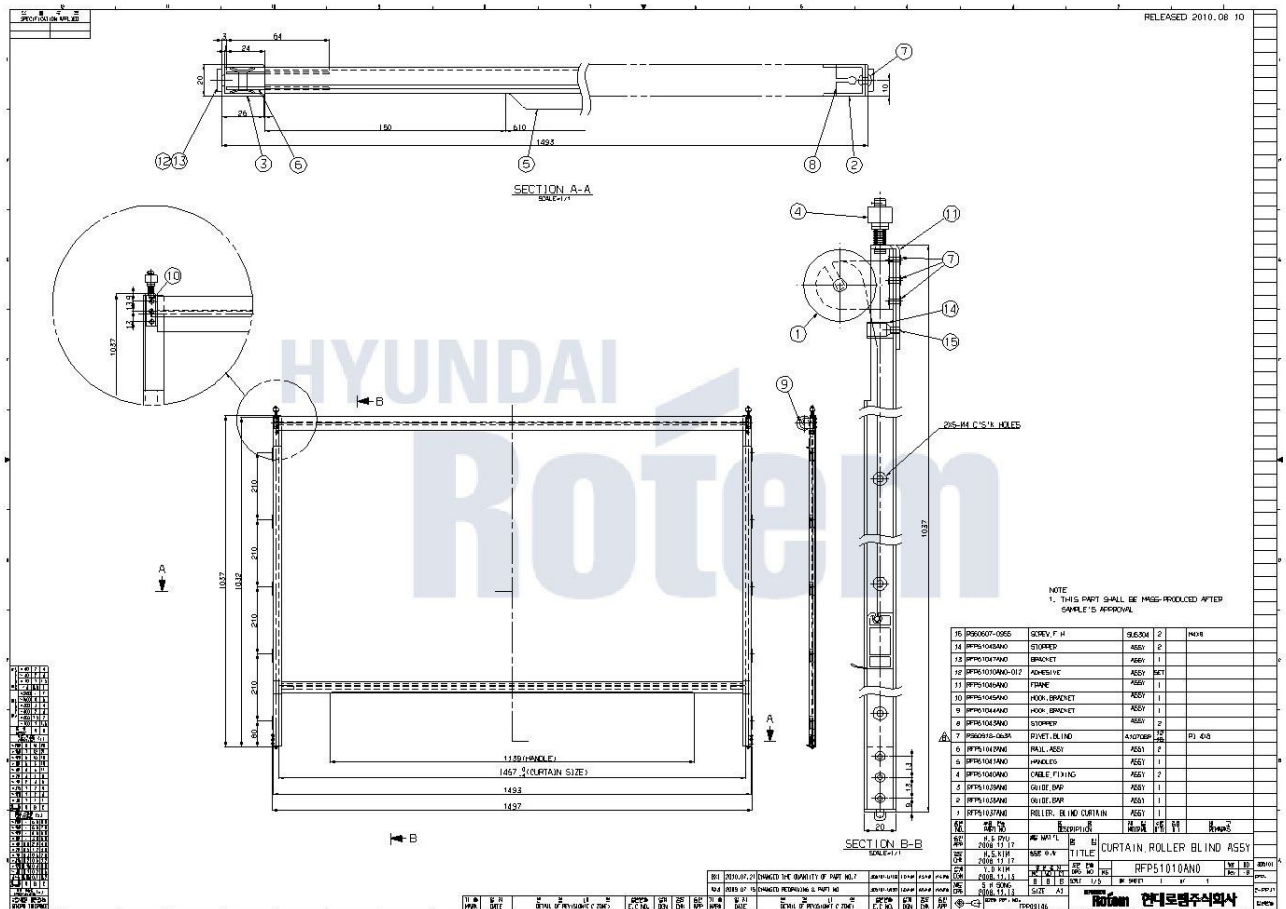
- ▶ The upper tension spring operates to control the balance of the ascent and descent of screen.

4.8. Screen guide stand and roller bush

- ▶ The screen guide stand is installed under the screen so it can be moved by lighting degree that passengers request.
- ▶ The roller bush is located on both sides of the screen guide stand, and it controls a crossing of power by upper adhesion a bracket and braking function.

4.9. Lower wire bracket

- ▶ The lower wire bracket takes charge of the balance of power that is from the upper adhesion a bracket and fixing function.



- Drawing of roll blind-