

## EXPLANATORY MEMORANDUM

### THE RAIL VEHICLE ACCESSIBILITY (HEATHROW EXPRESS CLASS 360/2) EXEMPTION ORDER 2005

2005 No. 86

1. This explanatory memorandum has been prepared by the Department for Transport and is laid before Parliament by Command of Her Majesty.

#### 2. Description

2.1 This Order exempts certain specified new rail vehicles, which have been built for use by Heathrow Express Ltd, from a requirement of the Rail Vehicle Accessibility Regulations 1998 (S.I. 1998/2456, amended by S.I. 2000/3215). The Order imposes a condition and sets an expiry date.

#### 3. Matters of special interest to the Joint Committee on Statutory Instruments

3.1 None.

#### 4. Legislative Background

4.1 Section 46 of the Disability Discrimination Act 1995 (“the DDA”) empowers the Secretary of State to make rail vehicle accessibility regulations (“RVAR”) to ensure that it is possible for disabled persons, including wheelchair users, to travel in safety and reasonable comfort in those vehicles to which the regulations apply. The regulations, which were made in 1998 and amended in 2000, apply to rail vehicles constructed or adapted for passenger use, and first brought into use after 31<sup>st</sup> December 1998.

4.2 Section 47 of the DDA enables the Secretary of State, on receipt of an application for exemption from particular requirements of the RVAR, to make Orders authorising specified regulated rail vehicles to be used in passenger service even though they do not conform to all of the requirements of the RVAR. Such Orders may contain conditions and set time limits.

4.3 The application for this exemption Order has been made because the vehicles do not comply with one of the requirements of the Regulations. This is the requirement that the floor of a vestibule adjoining a doorway in the side of a regulated rail vehicle shall contrast in colour with the adjacent floor in the passenger saloon. (The definition of ‘contrast’ in the RVAR relates to the contrast in the amount of light reflected by the surfaces that are required to contrast.) In this particular case, the carpets that Heathrow Express will be using in their vehicles do not offer a strong enough contrast to achieve compliance. The reasons for Heathrow Express not being able to comply are twofold. First, the use of a light coloured carpet causes compliance problems as they are subject to heavy, unsightly staining, due to considerable passenger usage, and it is very difficult to maintain the original colour. Secondly, due to the nature of the Heathrow Express service, the carpets are subject to the higher fire performance requirements of British Standard 6853 (as the trains run through long

tunnels), which reduces the number of compliant carpets available. They have considered the possibility of using other types of floor material but none have been considered appropriate for the ambience of the vehicles. A copy of their application is attached to this Memorandum at Annex B.

## **5. Extent**

5.1 This instrument applies to Great Britain.

## **6. European Convention on Human Rights**

6.1 Not applicable.

## **7. Policy background**

7.1 The policy objectives of the parent Act are to ensure that all rail vehicles first brought into use after a certain date are designed in accordance with the specific requirements of the RVAR, so as to enable disabled persons to travel in them in comfort and safety. However, the Act provides the Secretary of State with a power to exempt specified vehicles from particular requirements, on application by the operator, where he is satisfied that it is not possible for the vehicles to comply fully with the Regulations, and where this failure will not seriously compromise the ability of disabled persons to travel in the vehicles. Each application is considered on a case by case basis.

7.2 In this instance the operator has found it extremely difficult to find two carpets that offer a suitable contrast due to the lack of carpets available. The problem is exacerbated by the fact that, due to the nature of the service, the vehicles are subject to more stringent fire safety requirements. There is the additional problem that, even if they did provide compliant carpets, the lighter one would be likely to be subject to heavy staining which would be difficult to clean and cause difficulties in making the carpets remain compliant. In mitigation, Heathrow Express have installed a Low Level Marker Lighting System (LLMS) on the floors of their vehicles to aid egress in an emergency. Strips of this lighting run between the vestibule and saloon which help to provide a visual aid by breaking up the 2 surfaces. This innovative measure was the main consideration in favour of the exemption being granted and we are hoping to see evidence that it achieves its purpose. There are two photographs attached to this Memorandum at Annex C which show the LLMS a) with a reference wheelchair in place and b) showing how the LLMS appears when separating the two carpets. A condition has been added to the Order that this lighting system must remain fully operational at all times the vehicles are in service.

7.3 Section 47(3) of the DDA requires the Secretary of State, as part of the consideration of an application for exemption, to consult the Disabled Persons Transport Advisory Committee ("DPTAC"), together with any other appropriate persons. The DPTAC was established under section 125 of the Transport Act 1985 to advise the Government on transport policy as it affects the mobility of disabled people. The DPTAC has been consulted on this application, and supplied comments, a copy of which are attached to this Memorandum at Annex A. The DPTAC were disappointed that Heathrow Express could not find two carpets that offered a compliant contrast but were encouraged by the fact that the LLMS system of emergency lighting would be in place to help break up the two surfaces. They also

appreciated the problems associated with heavy staining of the carpets around the door areas. They therefore recommended that the exemption be granted for a period of 10 years, the expected life of the carpets.

7.4 However, it has been decided that only a **two-year** period will be granted, so that Heathrow Express can provide evidence from research with people with visual impairments that the LLMS provides reasonable alternative contrast. It should be noted that the exemption only applies to four trains. The Department also plans to do some research on the effect this type of lighting system has on people with impaired vision. The Department has also consulted Her Majesty's Railway Inspectorate, the Strategic Rail Authority and the Office of Rail Regulation. Having taken the comments made by the consultees into account, the Secretary of State has decided to grant the exemption for the period shown in the Order.

## **8. Impact**

8.1 A Regulatory Impact Assessment has not been prepared for this instrument as it has no impact on business, charities or voluntary bodies.

8.2 The impact on the public sector is negligible.

## **9. Contact**

Peter Colmans at the Department for Transport, Tel: 020 7944 4916 or e-mail [Peter.colmans@dft.gsi.gov.uk](mailto:Peter.colmans@dft.gsi.gov.uk), can answer any queries regarding the instrument.

Annex A

Ffion Grant  
Secretariat  
Disabled Persons Transport  
Advisory Committee

1/14 Great Minster House  
76 Marsham Street  
London  
SW1P 4DR

Direct line: 020 7944 8013  
Fax: 020 7944 6998  
Minicom: 020 7944 3277  
GTN Code: 3533

E-mail: [ffion.grant@dft.gov.uk](mailto:ffion.grant@dft.gov.uk)  
Website: [www.dptac.gov.uk](http://www.dptac.gov.uk)

15 July 2004

Peter Colmans  
DfT Mobility and Inclusion Unit  
1/18 Great Minster House  
76 Marsham Street  
London  
SW1P 4DR

Dear Peter

**Disability Discrimination Act 1995  
Rail Vehicle Accessibility Regulations 1998  
Application for Exemption by Heathrow Express Ltd**

Thank you for seeking DPTAC's advice on this application for exemption under Section 47(3) of the Disability Discrimination Act 1995.

Heathrow Express Ltd were seeking an exemption from regulation 7(b) in regards to their Class 360/2 vehicles.

In making our recommendations, DPTAC have considered the applications in terms of their implications and effect on disabled passengers.

We have not necessarily taken any financial, technical or operational issues into account. We accept that the Mobility and Inclusion Unit of DfT, after consultation with other relevant bodies, will include these wider considerations when making their recommendation to the Secretary of State.

DPTAC's views are set out in Annex A.

Yours sincerely

**Ffion Grant**  
**DPTAC Secretariat**

## **RVAR Exemption Application**

**Heathrow Express Ltd**

Class 360/2

**Considered July 2004**

### **Regulation Clause Number**

7(b)

### **Regulation**

7. The floors of areas used by passengers in a regulated rail vehicle shall comply with the following requirements:

(b) the floor of a vestibule adjoining a doorway in the side of a vehicle shall contrast with the adjacent floor in the passenger saloon of that vehicle;

### **Period Sought**

Permanent

### **DPTAC Recommendation**

When considering this exemption, DPTAC felt it important to remember that the intention of this particular regulation is to give clear visual information to passengers by defining distinct areas of the vehicle. In this particular instance, it was considered that the demarcation of the vestibule and passenger saloon is effectively done using the 'Low Level Marker System' of emergency lighting, in addition to the physical structure of the vehicle.

DPTAC are aware of the problem operators are experiencing in sourcing compliant floor coverings which maintain the required contrast when in service.

DPTAC have dealt with several similar applications, from operators whose vestibule floor coverings have become unsightly and in some cases non compliant due to staining and routine wear and tear. This is especially relevant at the vehicles entry points, as has a detrimental effect on the travel experience of all passengers.

DPTAC welcome Heathrow Express' efforts to investigate alternatives, but are disappointed that they have been unable to find a compliant solution.

**Therefore DPTAC recommend that this exemption should be granted for the life of the carpet (this is estimated at 10 years).**

During this time DPTAC would expect Heathrow Express Ltd to investigate and source appropriate and compliant carpets, able to withstand the rigorous use it receives in these conditions.

DPTAC would also expect that by the time these carpets need to be replaced, this will be covered by the excepted Refurbishment Regulations.

If granted DPTAC recommend that this exemption should only remain valid for Class 360/2 vehicles, as specified in the application, when operated by Heathrow Express Ltd on this service.

## Annex B

### Introduction

An exemption is proposed by Heathrow Express Limited, its offices being at 3<sup>rd</sup> Floor, 30 Eastbourne Terrace, Paddington, London W2 6LE.

The exemption is applied for in respect of the Class 360/2, a new train being built by Siemens in Germany for the owner Heathrow Airport Limited (HAL), which will be operated by Heathrow Express. The vehicle identification numbers and unit numbers are shown in Appendix 3.

The Class 360/2 trains will be used to provide a stopping service between Paddington and Heathrow Airport to be known as Heathrow Connect. There will be two trains per hour. The trains will provide an improved link between Heathrow Airport and the Thames Valley and the Central and District Underground lines. It is intended that both air passengers and airport staff will use the trains.

Each train will be a 4-vehicle unit comprising two driving motor vehicles with two intermediate trailer vehicles. In normal passenger service the trains will operate as single units. Multiple unit operation will be limited to Empty Coaching Stock (ECS) movements and rescue. Passenger entrance vestibules will be situated 1/3<sup>rd</sup> and 2/3<sup>rd</sup> of the way along each vehicle with bi-parting doors on each side. Vehicle layout diagrams are included as Appendix 1.

*Exemption is being sought from Clause 7(b):*

**The floor of a vestibule adjoining a doorway in the side of a vehicle shall contrast with the adjacent floor in the passenger saloon of that vehicle;**

### ***Non-compliance***

Class 360/2 is one variant of Siemens' generic commuter-train design called Desiro UK. This generic design was conceived for operation on numerous routes throughout the UK. One factor considered as part of this concept was the variance in fire performance categorisation for different types of railway route as specified within BS 6853 (Code of practice for fire precautions in the design and construction of passenger carrying trains). All of the routes on which Desiro UK derivatives have thus far been introduced fall into BS 6853 Category II (surface operating environments) and therefore incorporate a commensurate level of fire resistance. However, Desiro UK was conceived in such a way that derivatives could be readily tailored to meet the requirements of Category Ib (substantial operating periods in a multi-track tunnel, or a tunnel with side exits to a walkway and escape shafts...).

The service route has been categorised as a Category Ib operating environment under BS 6853. Accordingly, the fire performance specifications for materials used on the Class 360/2 have been upgraded as required, providing this greater level of fire resistance. However, it has not been possible to identify suitable carpet floor coverings for the passenger saloons and vestibules from manufacturers' existing ranges which satisfy these requirements whilst also providing a level of colour contrast compliant with regulation 7(b). The HAL requirement is for only four train sets.



Because the production volume is so low, it is not economically viable for any manufacturer to develop a bespoke carpet for this application.

*The proposed carpets are manufactured by Solutions E2, the pattern is called Diamond and the colours are dark blue 010 in the saloon and grey 014 in the vestibule. Samples are available upon request.*

***Mitigation:***

The Class 360/2 trains for HAL will incorporate a “Low Level Marker System” (LLMS) to provide emergency floor lighting in all passenger saloons and vestibules. This system has been specified in recognition of recommendations relating to the clarity and illumination of emergency escape routes made by Lord Cullen in The Ladbroke Grove Inquiry Report. A similar system is now being retrospectively fitted to the Class 332 Heathrow Express trains which provide the current non-stop service between London Paddington and Heathrow Airport.

The LLMS system provides a row of LED (Light Emitting Diode) lights passing down the centre of the floor from one end of the vehicle to the other. At the boundary between each saloon and the adjacent vestibule a transverse row of illuminated arrows runs across the floor indicating the route to the nearest emergency door release control in that vestibule. Details of the LLMS system are included as Appendix 2.

This system is based on the same principles as similar systems employed in commercial aircraft, passenger ferries and cinemas and has been endorsed by human factors experts as being a proven method of successfully guiding passengers to emergency exits during dark or smoky conditions following an accident. Unlike commercial aircraft however, the LLMS system on the Class 360/2 trains will be permanently illuminated.

It is therefore asserted that the transverse elements of the LLMS will act as an indicator to passengers with sight impairments that they have crossed the boundary between vestibule and saloon.

***Impact of complying with the regulations:***

Various alternative options have been considered for the floor covering materials.

Rubber flooring in the vestibule has been rejected as not providing the appropriate ambience for these vehicles and this route. It has also been practically impossible to find a rubber flooring colour to achieve the requisite contrast in conjunction with the saloon carpet.

Thus there are no means currently available to achieve compliance.

In addition, it is an inherent problem for all train operators and manufacturers endeavouring to meet RVAR regulation 7(b) that light and dark floor coverings on rail vehicles both show dirt very quickly. The contrast in colour, even between compliant flooring material pairings, quickly becomes degraded. The situation is often at its worst when conditions for thorough and regular cleaning are at their most difficult, eg ingress of salt from platforms during icy conditions. Thus, compliance with Regulation 7(b) is difficult to achieve and maintain even under BS 6853 Category II fire performance regulations.

***Effects of non-compliance on the ability of a disabled person to use the train:***

It is understood that the low level of contrast between saloon and vestibule floor coverings will represent a departure from the standardised approach now being established as a result of the RVAR. It is therefore considered that this lack of contrast may cause a degree of confusion for some passengers with sight impairments as they move to and from the passenger saloons.

However, it is anticipated that the number of passengers experiencing such confusion will be mitigated by the provision of the LLMS, which will provide a clear indication for many passengers as to when they have crossed the boundary between vestibule and saloon.

It is possible that experience gained in service from the LLMS system will highlight its beneficial effects in this respect and support its wider application on rail vehicles.

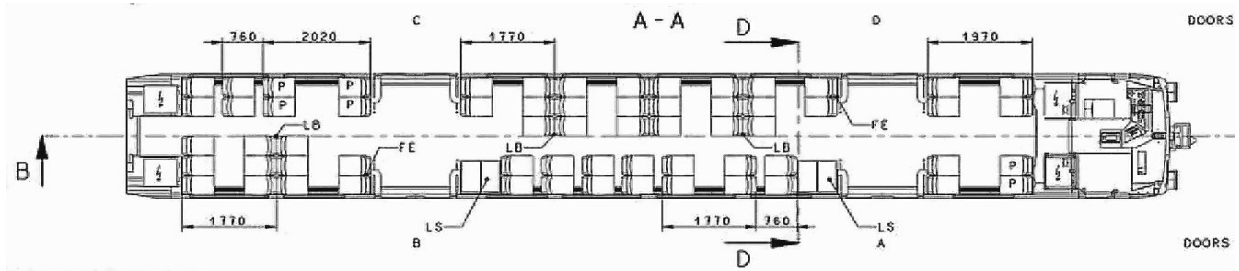
***Period of exemption and plans for later modification of rail vehicles:***

Due to the highly specialised combination of requirements for the floor coverings on these vehicles as well as their low numbers it is not anticipated that the carpet manufacturing industry will develop compliant materials. Exemption from regulation 7(b) is therefore sought for the life of the vehicles.

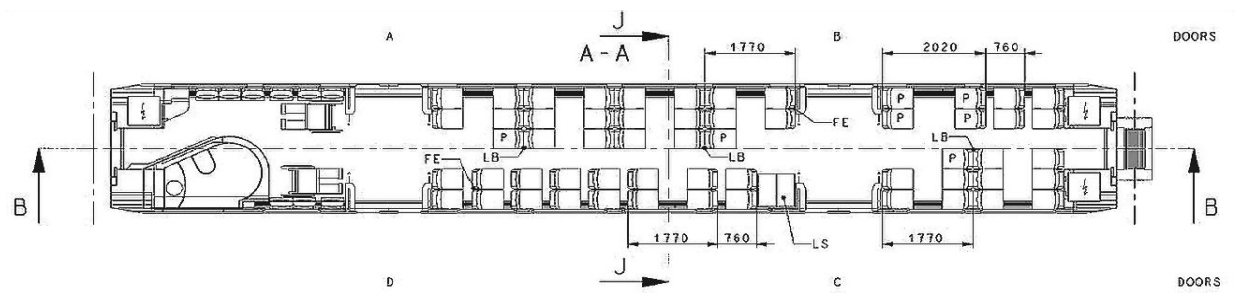
*Appendix 1*

Vehicle Layout Diagrams

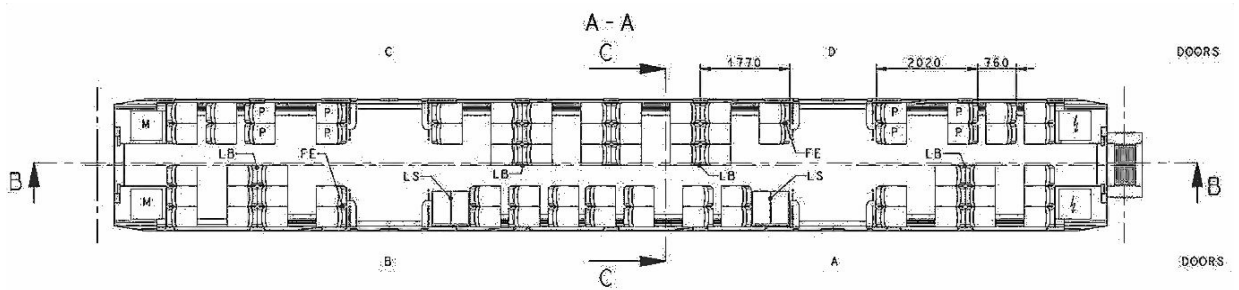
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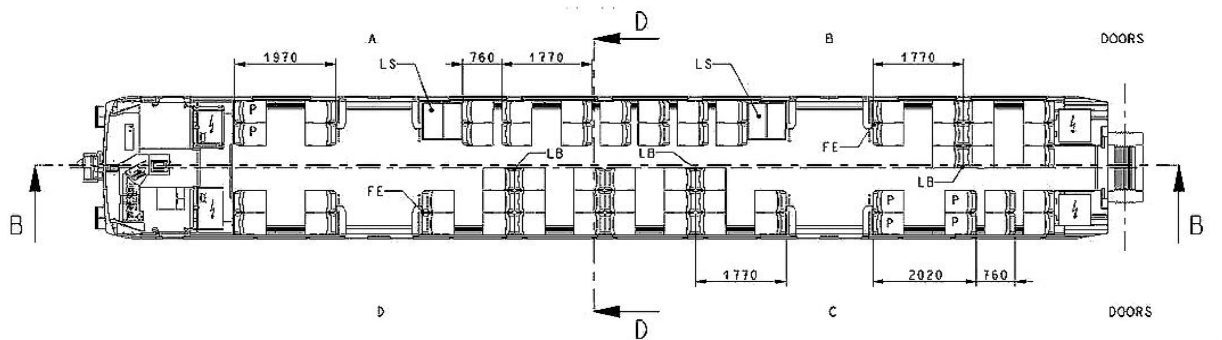
PTSOL



IOS

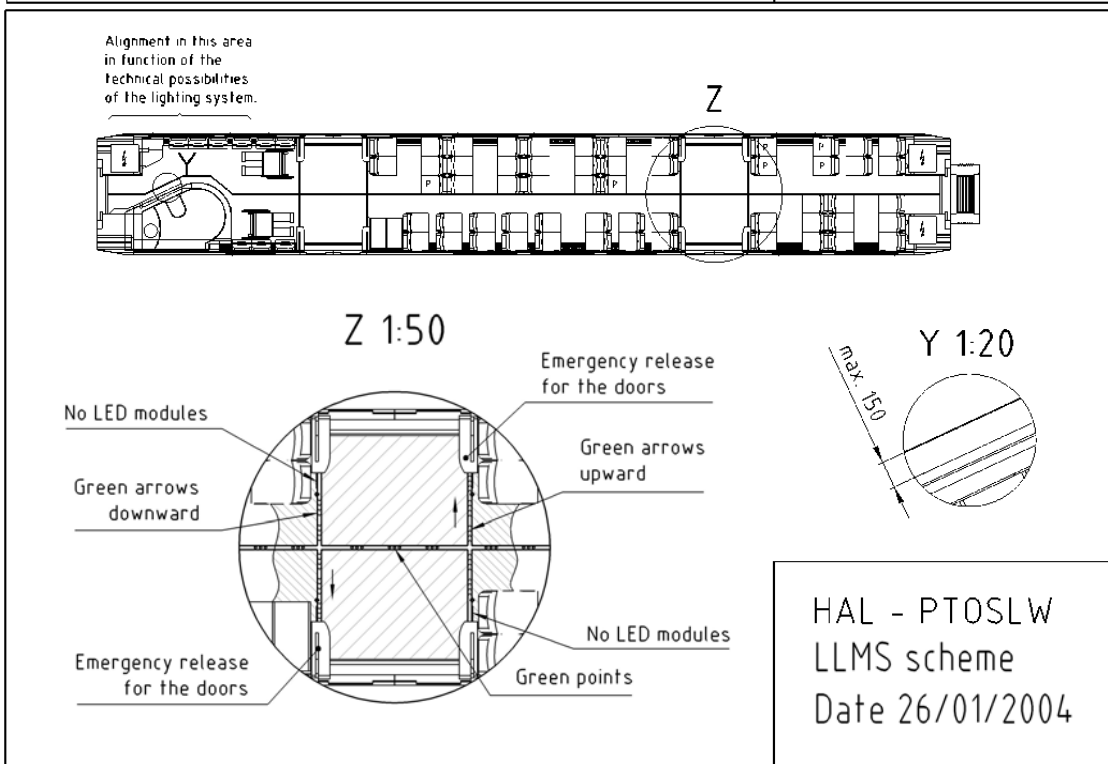
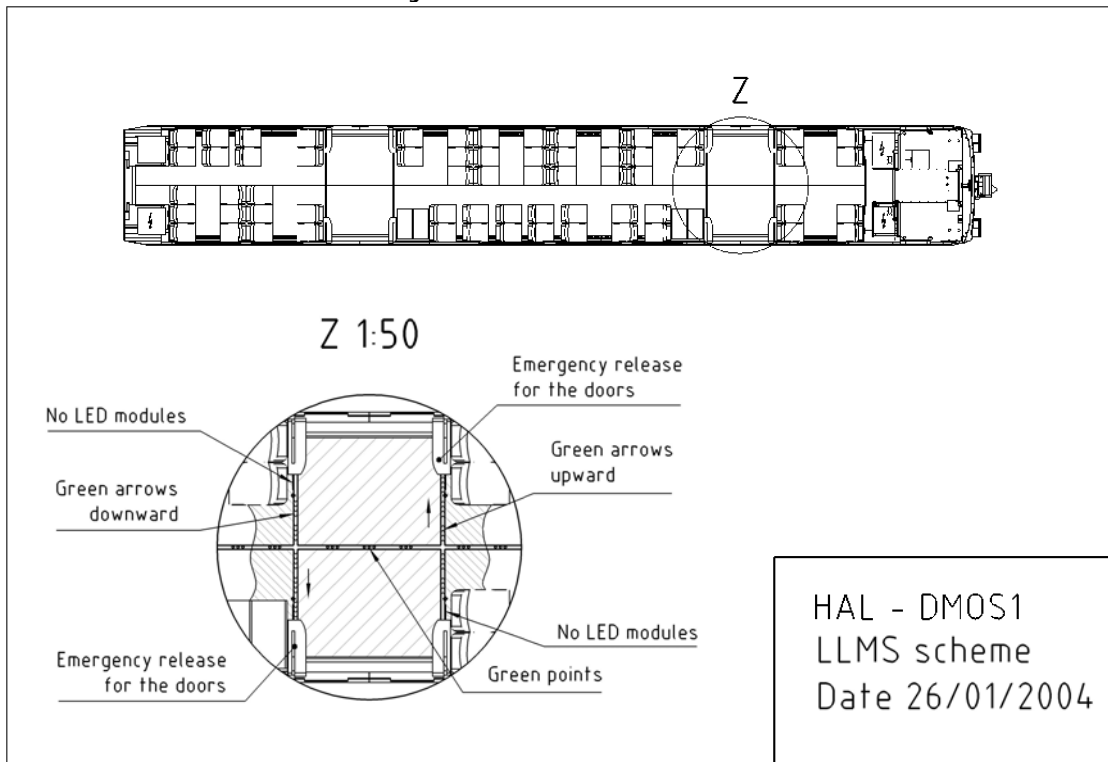


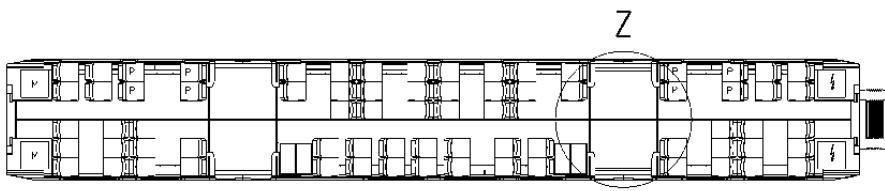
DMSOB



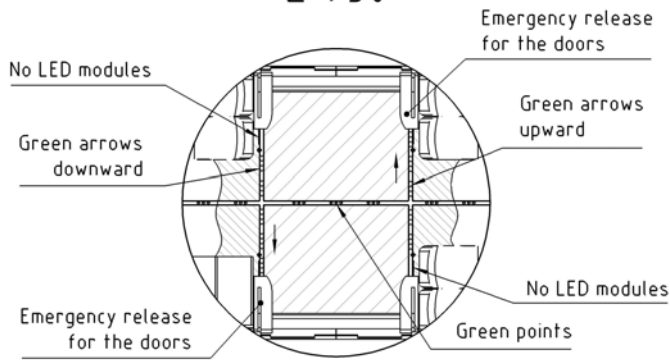
Appendix 2

Details of Low Level Marker System

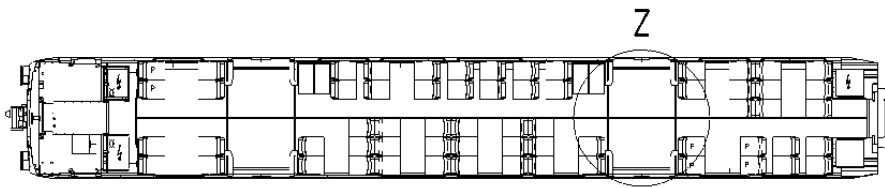




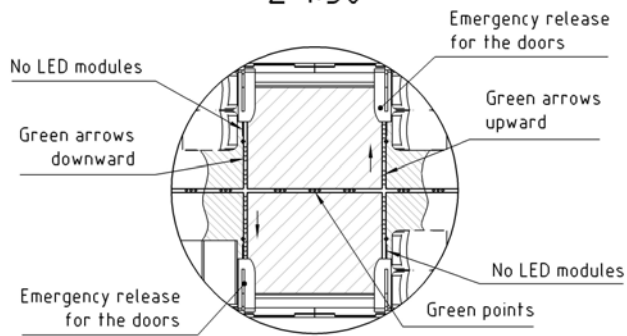
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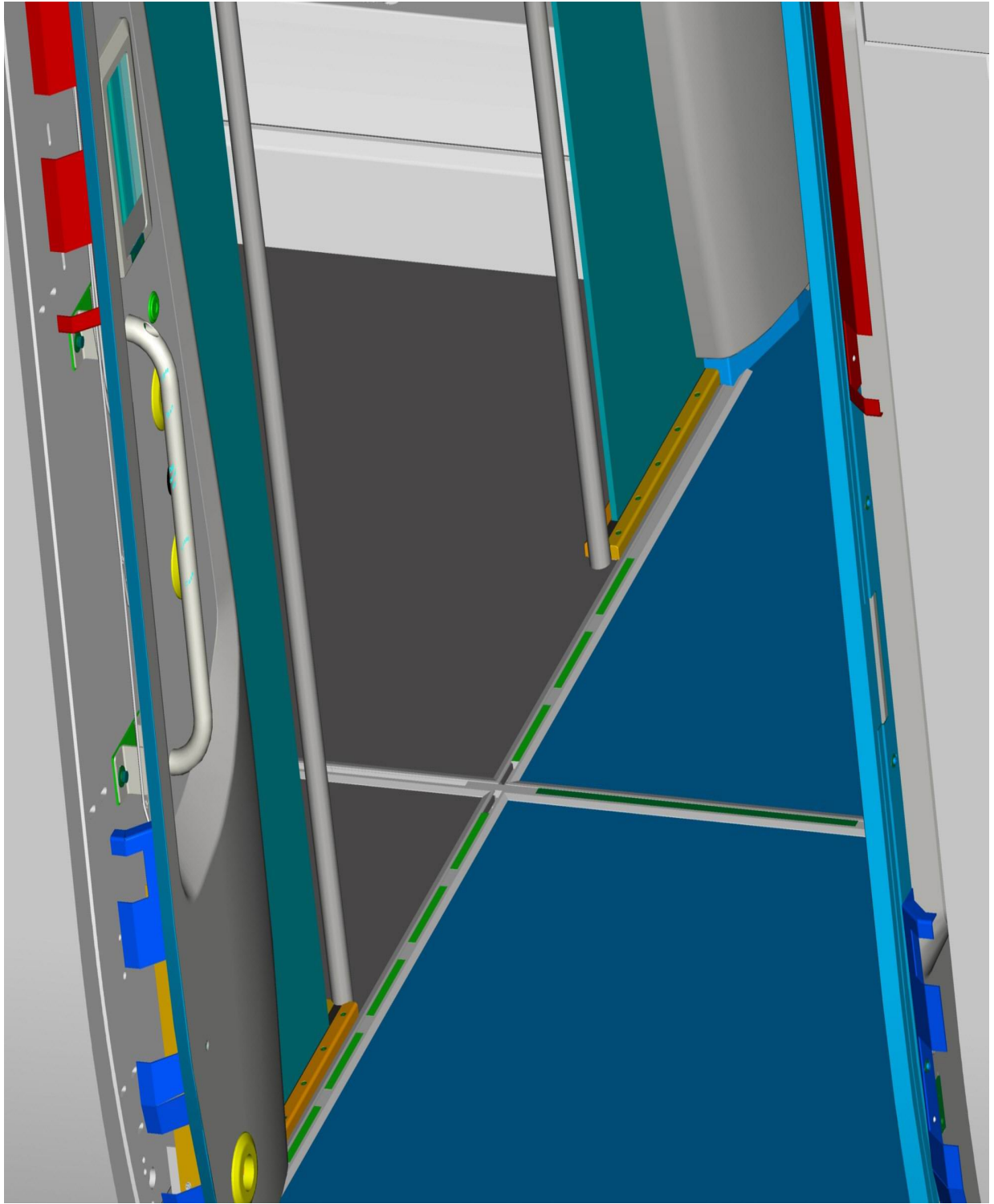
HAL - TDS1  
LLMS scheme  
Date 26/01/2004



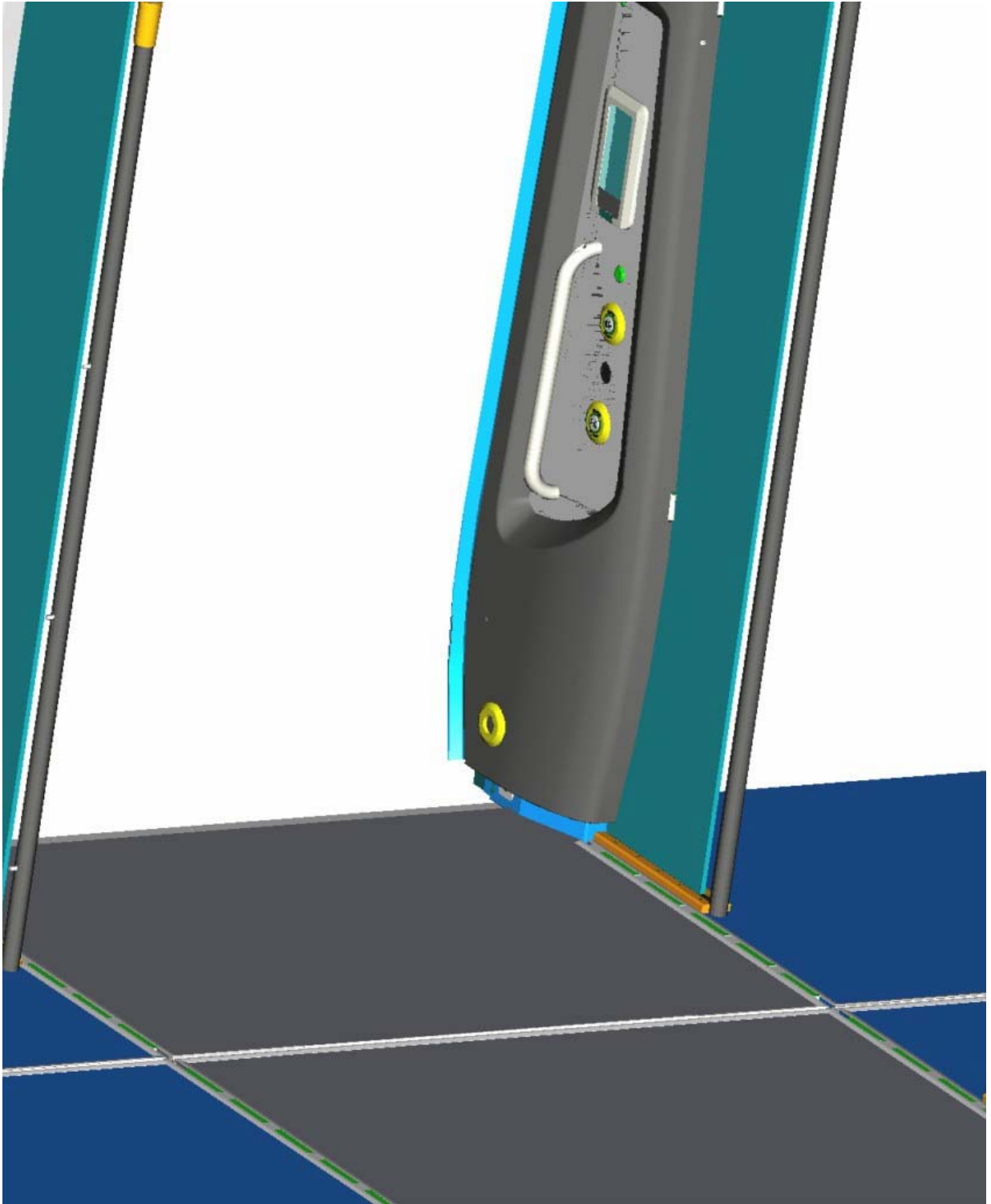
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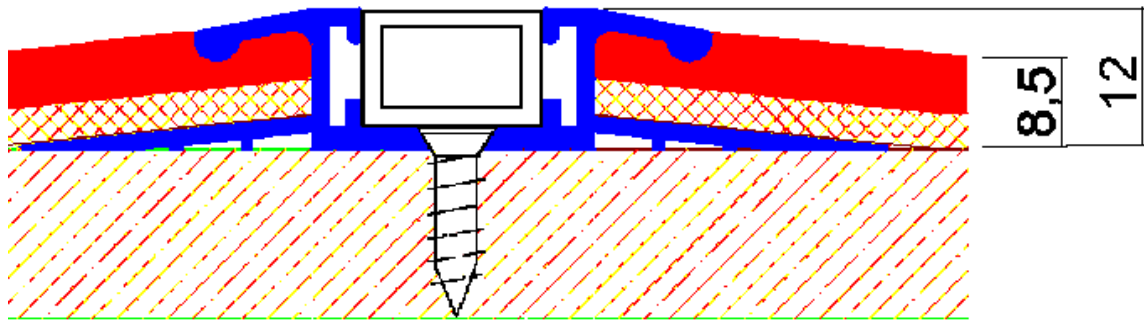
HAL - DMOS2  
LLMS scheme  
Date 26/01/2004



Computer model showing LLMS in vestibule



Computer model showing LLMS in vestibule



Section through LLMS extrusion profile, carpet and floor board



**Appendix 3**

**Table of applicable unit and vehicle numbers**

<b>Unit No</b>	<b>Vehicle No</b>	<b>Vehicle No</b>	<b>Vehicle No</b>	<b>Vehicle No</b>
	<b>DMOSA</b>	<b>TSO</b>	<b>PTSOL</b>	<b>DMOSB</b>
360201	<b>78431</b>	<b>72421</b>	<b>63421</b>	<b>78441</b>
360202	<b>78432</b>	<b>72422</b>	<b>63422</b>	<b>78442</b>
360203	<b>78433</b>	<b>72423</b>	<b>63423</b>	<b>78443</b>
360204	<b>78434</b>	<b>72424</b>	<b>63424</b>	<b>78444</b>

Annex C



