

# Rolling stock TSIs LOC&PAS, WAG, Noise and PRM

## TSI Workshops Open Days: Germany 2024

Bonn, 12<sup>th</sup> and 13<sup>th</sup> December 2024

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EUROPEAN  
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# TSI package 2023 - Overview

Texts adopted by the Railway Interoperability and Safety Committee (RISC) on 30 March 2023, and published in [EUR-Lex](#) in August 2023.

1. Commission Implementing Regulation 2023/1694 **amending** Commission Regulations (EU):
  - No 321/2013 (**WAG TSI**),
  - No 1299/2014 (**INF TSI**),
  - No 1300/2014 (**PRM TSI**),
  - No 1301/2014 (**ENE TSI**),
  - No 1302/2014 (**LOC&PAS TSI**),
  - No 1304/2014 (**NOI TSI**)
  - and Commission Implementing Regulation (EU) 2019/777 (**RINF**)
2. Commission Implementing Regulation 2023/1693 **amending** Implementing Regulation (EU) 2019/773 (**OPE TSI**)
3. Commission Implementing Regulation 2023/1695 **repealing** Regulation (EU) 2016/919 (**CCS TSI**)
4. Commission Implementing Decision 2023/1696 **amending** Implementing Decision 2011/665/EU (**ERATV**)

Dec 2024 update: Translation corrections published on

[https://data.europa.eu/eli/reg\\_impl/2019/773/corrigendum/2024-12-05/oj](https://data.europa.eu/eli/reg_impl/2019/773/corrigendum/2024-12-05/oj)

Focus on some aspects of the TSI package for the subsystem rolling stock:

- Derailment detection and prevention for freight wagons;
- Noise assessment of composite brake blocks at IC level;
- Codification for combined transport;
- Unique authorisation for passenger coaches;
- Special vehicles;
- TSI PRM: what is new on rolling stock side;
- New transition regime for TSIs applicable to rolling stock and CCS;

# Derailment Detection Device



- Are the derailment detection devices mandatory in WAG and LOC&PAS TSI?
- What exactly are the functions of these devices?

# Where in the TSIs?

## LOC&PAS TSI

- 4.2.9.3.7 Derailment detection and prevention signal processing
- 4.2.9.3.7a On-board derailment detection and prevention function

## WAG TSI

- 4.2.3.5.3 Derailment detection and prevention function
  - 4.2.3.5.3.1 General requirements
  - 4.2.3.5.3.2 Derailment prevention function (DPF)
  - 4.2.3.5.3.3 Derailment detection function (DDF)
  - 4.2.3.5.3.4 Derailment detection and actuation function (DDAF)

All the clauses above are voluntary? Yes!

However, if derailment detection and protection is fitted, it has to be in accordance with the TSI.

# DDF and DPF in locomotive only



The DPF/DDF can be fitted in the locomotive in accordance with clause 4.2.9.3.7a of TSI LOC&PAS

precursor to derailment  
detected

Signal processing in accordance  
with point 4.2.9.3.7 of TSI  
LOC&PAS.



derailment  
detected





# DPF and DDF both in Locomotive and freight wagon

## Derailment Prevention DPF



precursor to derailment  
detected



Signal processing in accordance  
with point 4.2.9.3.7 of TSI  
LOC&PAS.

## Derailment Detection DDF



derailment  
detected



# Additional issues related to DDF/DPF

## Derailment Prevention DPF



The DPF/DDF fitted in the freight wagons may send the signal to the driver's cab of the locomotive via an electronic tool (e.g, a tablet).

## Derailment Detection DDF



precursor to derailment  
detected



In such case, the requirements of signal processing set out in TSI LOC&PAS do not apply (the tablet is outside the scope of the TSI LOC&PAS)

derailment  
detected





# Other function available

Derailment  
Detection  
and  
Actuation  
DDAF



derailment detected

Application of brakes  
No driver override →  
The risk of false derailment  
detections shall be limited to  
an acceptable level.  
DDAF can be isolated directly  
in the wagon when stopped.

It is allowed to combine functions:

- DPF and DDF
- DPF and DDAF

# Acoustic assessment of composite brake blocks at IC level



# Where in the TSIs?

IC 'friction element for wheel tread brake' (brake blocks) already had requirements in the TSI WAG (for braking performance)

## **TSI NOI**

- 4.2.3.a. Friction elements for wheel tread brakes
- 5. INTEROPERABILITY CONSTITUENTS
  - 5.2.1. Friction element for wheel tread brakes
- 6. CONFORMITY ASSESSMENT AND EC VERIFICATION
  - 6.1.2.1. Friction element for wheel tread brakes of freight wagons
- Appendix F - ASSESSMENT OF ACOUSTIC PERFORMANCE OF A BRAKE BLOCK



# A new (and existing) IC

- In the revised TSI Noise, there are additional requirements for the acoustical certification.
- The same component needs to be assessed at IC level against both TSIs
  - The testing process (bench test) is very similar, so the economical cost is kept controlled.
  - Existing exemptions for the TSI WAG are kept for the requirements of the TSI WAG only
  - New exemptions are defined in the TSI Noise for the requirements of the TSI Noise only

If a freight wagon under assessment is fitted with acoustically certified blocks, this means that such wagon fulfils the TSI Noise?

**No!** The wagons must be assessed at subsystem level against the TSI Noise (pass-by Noise) in any case.

# Wagons for combined transport



# Combined Transport codification system



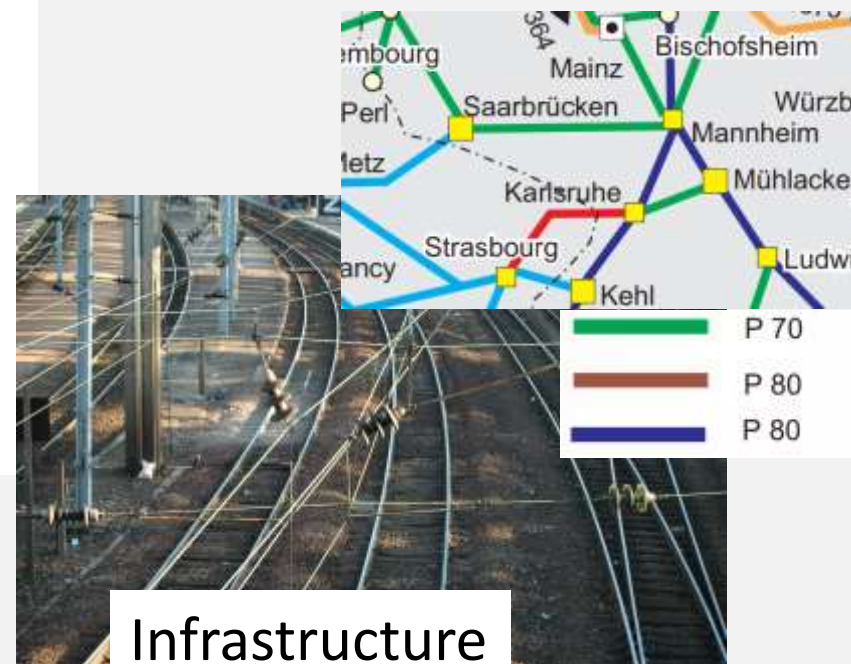
Intermodal Loading Unit



Operations



Wagon



Infrastructure



# Codification of wagons



Wagon Code =  
 1 or more letter(s)  
 (Wagon Compatibility Code)  
 Series of digits  
 (Wagon Correction Digits)



## WAG TSI Appendix H:

- The WCC shall be determined for all units and assessed by a Notified Body.
- The WCD comparison shall be performed for all units and assessed by a Notified Body. The WCD may be calculated.

# “Unique authorisation” for passenger coaches



## LOC&PAS TSI

- 7.1.1.5. Conditions for having a vehicle type authorisation and/or an authorisation for placing on the market of passenger coaches not limited to a particular area of use.
- 7.1.1.5.1 Conditions applicable to coaches intended to be used in **predefined formations**
- 7.1.1.5.2 Additional optional conditions applicable to coaches intended to be used in **general operation**



# Objectives with amendment 2023

Authorise a



in all EU



with a single



One set of harmonised TSIs rules

No National rule

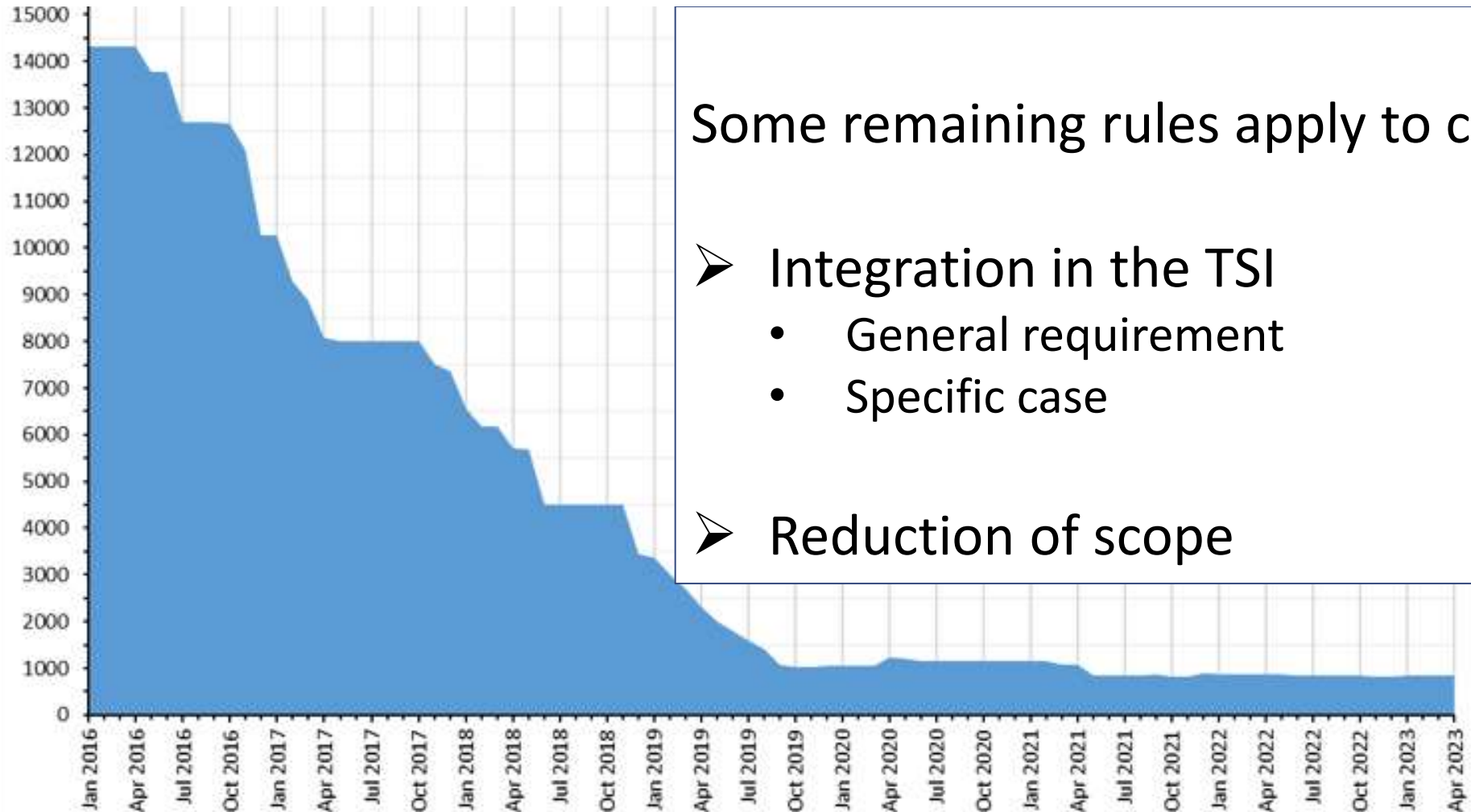
No Designated Body

Authorisation delivered by ERA

No National Safety Authority

# No national rule?

## Cleaning up national rules: process ongoing since 2016



Some remaining rules apply to coaches:

- Integration in the TSI
  - General requirement
  - Specific case
- Reduction of scope

# Conditions applicable to coaches in predefined formation?

LOC&PAS 7.1.1.5.1

- Specific coach characteristics such as :

- Not equipped with:



CCS onboard



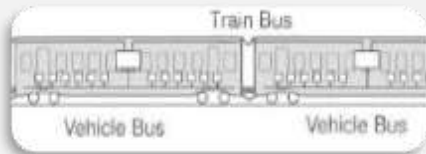
Traction equipment's  
(thermal or electric)



- Equipped with:



Forged and rolled  
Mini Ø above 760 mm



Train Communication  
Network (IEC 61375-1)

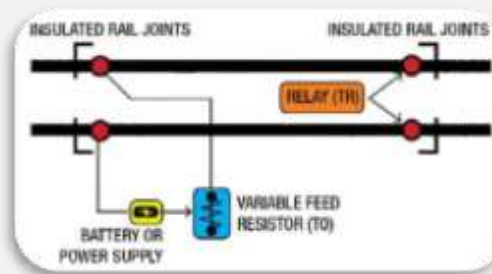
- Speed up to 250km/h



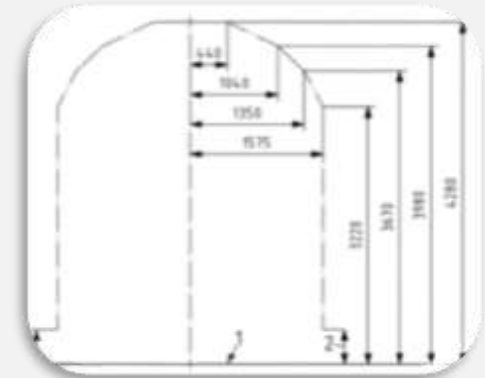
- Compatible with :



Track gauge : 1435 **and/or** 1668mm  
Rail Inclination : 1/20 **and/or**, 1/30 and/or  
**and/or** 1/40



Train detection system  
ERA/ERTMS/033281 - V 5.0



**One** of the reference  
profile:  
G1, GA, GB, GC or DE3  
including for lower part G11,  
G12 or G13.

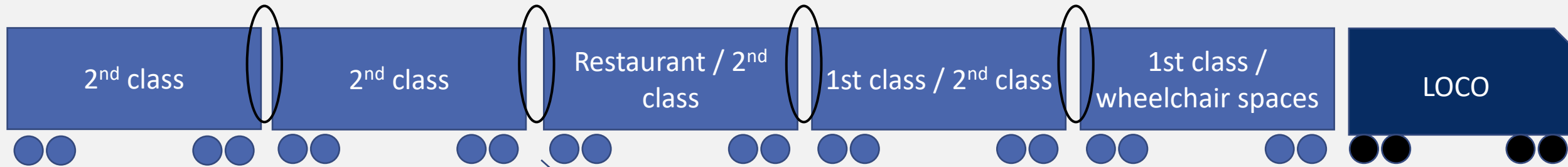


# Specific issue with national rules: Compatibility with train detection systems

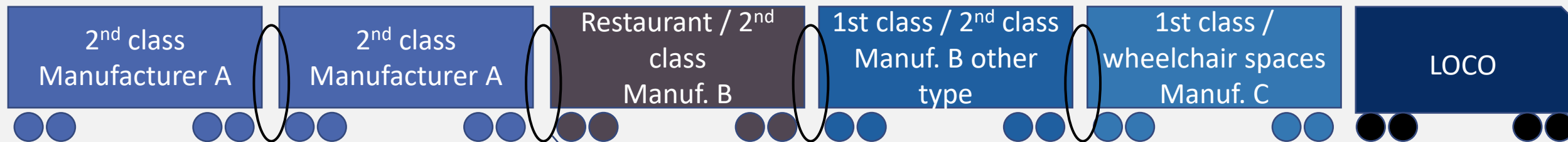
**Principle: to express the characteristics of the vehicles/trains and of the train detection systems in an harmonised way, i.e. the frequency management principle**

Pending the notification of specific cases referred to in Article 13 of CCS TSI, the notified national rules remain applicable

# Difference between coaches used in predefined formations and coaches for general operation



All coaches are from the same platform of Manufacturer A  
No Interfaces to specify – point 7.1.1.5.1



Coaches from different manufacturers  
Interfaces are to be specified in addition to the other reqs  
Point 7.1.1.5.2 **in addition to** 7.1.1.5.1

# Application of the TSIs to Special Vehicles

- Why 'Special vehicles' ?
- What are the special vehicles concerned?
- How TSIs apply to them?

# Why “special vehicles” ?

Necessary to be aligned with the Annex I of the Interoperability Directive!

2008/57:

## 1.2. Vehicles

The trans-European conventional rail system shall comprise all the vehicles likely to travel on all or part of the trans-European conventional rail network, including:

(...)

**Mobile railway infrastructure construction and maintenance equipment may be included.**

2016/797:

## 2. Vehicles

For the purposes of this Directive, Union vehicles shall comprise all vehicles likely to travel on all or part of the Union's network:

(...)

— **special vehicles, such as on-track machines.**



# Special vehicles such as OTMs

LOC&PAS 2.2.2(C)

## TSI amendment 2023 introduce definitions of special vehicles:



1. **On Track Machines:** designed for construction and maintenance of the track and infrastructure.



2. **Infrastructure Inspection Vehicles:** monitor the condition of the infrastructure.



3. **Environment vehicles:** designed for clearance of the track from environmental conditions.



4. **Emergency vehicles:** designed for specific emergency use such as evacuation, firefighting, and recovery of trains.



5. **Road-Rail vehicles:** self-propelled machines able to move on rails and on the ground.

# How TSIs apply?

LOC&PAS 2.3.1

WAG TSI 7.1

- **In the scope of RST TSIs when :**
  - running on its own rail wheels (in running mode self-propelled or hauled), and
  - intended to be detected by a track-based train detection system.
- **For hauled special vehicle:**
  - Applicant can apply either the **WAG TSI** or the **LOC&PAS TSI** depending on the characteristics and the intended use of the vehicle in question in comparison with the technical scope of the respective TSIs.
- **Not in the scope of RST TSIs:**
  - Special vehicles in **working mode, travelling mode.**
  - **Road-Rail** vehicles.



- **Area of use of more than one MS(7.1.1.3(1)):**
  - Compliance with **TSI LOC&PAS** and the **TSI NOI** is **mandatory** .
  - Transition regime of 7 Years (table L1)
- **Area of use of one MS (7.1.1.3(2), 7.1.1.3(3)):**
  - Compliance with **TSI LOC&PAS** and **TSI NOI** (except for assessment of the driver's cab interior noise level) is **not mandatory**:
    - Applicant may decide to apply TSIs.
    - Applicant may apply **NRs** as regards the basic parameters of TSIs with following conditions:
      - If NRs “different to TSIs” **do not exist**, compliance with **TSIs is mandatory**.
      - If NRs “cover partially TSIs parameters”, the application of TSIs is **mandatory for parameters not covered**. NoBo delivers certificate limited to parameters assessed.
      - If NRs “different to TSIs exist”, special vehicle may be authorised against NRs.



- **TSI NOI is mandatory** when AoU is **more than one MS**.
- **TSI NOI is not mandatory** when special vehicle comply **only with NRs** as allowed in 7.1.1.3(2) **except for** assessment of the driver's cab interior noise level as referred in point 4.2.4 of TSI NOI:
  - Table 5 of TSI NOI provides Limit values for driver's cab interior noise.
  - These limit values **are not mandatory** for special vehicles. However, the demonstration of conformity referred to in point 6.2.2.4 shall be **performed** and the **resulting values shall be recorded in the technical file**.





# What happens in case of extension of AoU?

LOC&PAS 7.1.1.3






- **Case of Extension of area of use :**
  - When a special vehicle will have its area of use extended, the applicant can also decide to use NRs instead of the applicable TSI requirements **if for the previous authorisation it also decided to apply NRs.**

# TSI PRM: What is new on Rolling Stock side?



- Definition of an "interoperable wheelchair" in point 2.3 of TSI ("wheelchair the characteristics of which permit the full usage of all features of rolling stock designed for wheelchair users") to indicate that bigger wheelchairs can be used in trains but may not permit access to all facilities. Detailed requirements remain in annex M.

Inside the limits of Appendix M	Outside one or several limits of Appendix M but inside the limits defined by the RU (4.2.6.1 of TAP TSI)	Outside the limits defined by the RU (4.2.6.1 of TAP TSI)
		
Access to all services (point 4.2.2.13(4) to be considered)	Access to the train possible but access to services may be limited or impossible	No access to the train

- Clarification that when a service is provided on-board a train it should be made available to wheelchair users too at the wheelchair spaces (e.g. restaurant). This was added as a compromise because associations wanted that wheelchair users can access a restaurant even if it isn't in the same coach/car than the wheelchair spaces: this would have led to the enlargement of corridors to 800mm all the way from wheelchair spaces to a restaurant, i.e. a loss of 25% of seats
- News on IC's: The displays are no longer an interoperability constituent.



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