

## MINIMUM TECHNICAL CHARACTERISTICS OF RAILWAY TRANSPORT TO BE USED BY TRANSIT TRAFFIC

The undermentioned technical characteristics of the railway transport have been based on the Agreement on Organizational Aspects of Combined Transport Services between Europe and Asia concluded in 1997 under the areas of the Organization for Cooperation between Railways (OSZhD) which is compatible with the European Agreement on Important International Combined Transport Lines and related Installations (AGTC) of 1st February 1991 (ECE/TRANS/88).

### **TECHNICAL CHARACTERISTICS OF RAILWAY LINES OF IMPORTANCE FOR TRANSIT AND COMBINED (MULTIMODAL) TRANSPORT**

The **parameters** of railway lines of importance for transit and combined (multimodal) transport are shown in the Table-I below. The target values shown in column A of the Table are to be regarded as important objectives to be achieved in accordance with national railway development plans. Any divergence from these values should be regarded as exceptional.

Railway lines have been divided into two main categories:

- (A) **Existing** lines which can, if necessary, be modernized. If modernization or adaptation is difficult or impossible, the requirements for these lines may be eased;
- (B) **New** lines to be built.

The parameters shown in Table-I also apply, where appropriate, to ferry services which are an integral part of the railway network.

TABLE-I

**PARAMETERS OF RAILWAY LINES OF  
IMPORTANCE FOR TRANSIT AND COMBINED TRANSPORT**

Categories of railway lines		A		B
		Existing lines		New lines
		At present	Target values	
1	Gauge	1435mm 1520mm 1676mm		1435 (1) 1520 (1) 1676
2	Number of tracks	1-2	1-2	1-2
3	Loading gauge (static)	According to the Annex-5 to SMGS	OSZhD/ UIC(2) GB	OSZhD/ UIC(2) GC
4	Minimum distance between tract centers (1)	4.0-4.8	4.5-4.8m	4.5-4.8m
5	Nominal minimum speed	40-90 km/h	90-120 km/h (3)	120 km/h (3)
6	Authorized axle load by the speed: upto 100 km/h above 100 km/h	17.27-22.5t 20t	22.5t 20t	22.5t 22.5t
7	Maximum gradient (1)	(Not specified)		12.5 mm/m
8	Minimum useful siding length	385-850m	750-850m	750-850m

1. Recommended.
2. UIC (International Union of Railways)
3. Minimum standards for Combined Transport Trains

**Footnote to Sr.No.3 of the Table:**

The Railways having limits different from the Loading gauge (static) from Annex-5 to SMGS, should inform it to the Railway Administrations of the other Contracting Parties.

**Footnote to Sr.No.5 of the Table:**

The Railway Administrations establishing provisional speed limits of different levels than the speed mentioned at Sr.No.5 of the Table should inform to the Railway Administrations of the other Contracting Parties about it.

## **Explanation of some Parameters contained in the above Table**

### **1. Number of Tracks**

Transit and Combined transport lines must provide adequate capacity and enable strict compliance with timetables.

It is generally possible to meet both requirements only on a line with at least two tracks. However, single-track lines are permissible if the other parameters of the Agreement are complied with.

### **2. Loading Gauge**

The minimum loading gauge for Transit and Combined transport lines are featured at **Figure-1**.

Since, on new lines, the use of a large gauge does not usually entail any major investment the UIC GC gauge has been chosen.

The UIC GC gauge allows, for instance:

- a. The transport of road goods vehicles and road trains (lorry with trailer, articulated vehicle, tractor and semi-trailer) conforming to the European road loading gauge (height 4m, width 2.5m) on special wagons with a loading height of not more than 60 cm above rail level;
- b. The transport of ordinary road semi-trailers of 2.5m width and 4m height on recess wagons with normal bogies;
- c. The transport of ISO containers of 2.44m width and 2.9m height on ordinary flat wagons;
- d. The transport swap bodies of 2.5m width on ordinary flat wagons;
- e. The transport of containers/swap bodies of 2.5m width and 2.9m height on suitable wagons.

The **existing lines** through mountainous regions have many tunnels conforming to the loading gauge, or gauges of slightly greater height at the center of the track. Increasing this to conform to the UIC GC gauge is in almost all cases impossible from the economic and financial standpoints.

The UIC GB gauge has therefore been chosen for these lines, as it allows, for instance:

- a. The transport of ISO containers of 2.44m width and 2.90m height on flat container wagons with a loading height of 1.18m above rail level;
- b. The transport of swap bodies of 2.5m width and 2.6m height on ordinary flat wagons (loading height of 1.246m);
- c. The transport of semi-trailers on recess wagons;
- d. The transport of containers/swap bodies of 2.6m width and 2.9m height on special low-loader wagons.

Most existing Transit and Combined transport lines offer at least the UIC B gauge. In the case of the others, improvement to that standard would not normally require major investment.

### 3. **Nominal Minimum Speed**

The nominal minimum speed would be determined by the geometrical characteristics of the track (radius of curves), safety requirements and the braking coefficients of the rolling stock.

### 4. **Authorized Axle Load**

This is the authorized load per axle which Transit and Combined transport lines should be able to bear.

Transit and Combined transport lines should be capable of taking the most modern existing and future rolling stock traffic, in particular:

**Wagons with a load per axle of 20t. which corresponds to UIC classification C. Pursuant to UIC decisions a wagon load per axle of 22.5t has been adopted for speeds up to 100 km/h. The load per axle limits of 20t are those set by the UIC regulations.**

In accordance with the UIC regulations, the said loads per axle are applicable for a wheel diameter of not less than 840 mm.

Figure - 1

**Loading gauges GA, GB and GC to UIC leaflet 506 OR**

## **MINIMUM INFRASTRUCTURE STANDARDS FOR TRANSPORT SERVICES**

### **A. Requirements for Transit and Combined Transport Services**

1. In order to guarantee the efficient and expeditious transport flows necessitated by modern methods of producing and distributing goods, transit and combined transport services should fulfil the following requirements in particular:

- (a) Departure/arrival in line with customers' needs **(in particular, late closing times for loading, and early delivery of goods)** to ensure regular services;
- (b) Swift door-to-door transport, high punctuality, reliable transport times;
- (c) Reliable and timely information on the transport procedures, simple documentation, low risk of damage;
- (d) Ability to carry all types of standard containers and other loading units that can be carried in international road haulage between Europe and Asia. In this connection, account should be taken of the foreseeable developments regarding weights and dimensions of loading units.

2. These requirements should be fulfilled through:

- (a) High transport speed from the place of departure to the place of destination, including all stops, which would be about the same as, or greater than that of end-to-end transport by road;
- (b) Use of consignee's non-working hours (e.g. carriage at night) so that goods can be delivered in the morning, as desired by customers;
- (c) Availability of appropriate equipment in sufficient quantities, and the potential of the infrastructure;
- (d) Use of direct trains, if possible;
- (e) Organizational measures to improve transport service by using modern telecommunication systems.

3. In order to meet the above requirements, trains and infrastructure should be of satisfactory efficiency, i.e. meet certain minimum standards that must be complied with by all the authorities involved in a given transport relation.

## **B. Operational parameters of trains**

4. Trains used for transit and Combined transport should meet the minimum standards: given in Table-II below:

**Table-II**

Minimum values Parameters	At present	Target
Speed	60-90 km/h	90-100/100-120 km/h
Length of train	365-850 m	750-850 m
Weight of train	600-3200t	1,500-3200t
Load per axle	20t	22.5/20t

If direct trains cannot be run, trains should, if possible, consist of only a few wagon groups, the wagons in each group having the same destination. In addition, the number of en route stops for direct trains, including at border crossings, should be kept as low as possible.

5. Rolling stock should meet the above standards for speed and load per axle and be capable of carrying all the loading units which have to be taken into consideration in respect of weights and dimensions.

6. Trains for transit and combined transport should have the highest priority. Their timetables should be designed so as to meet customers' needs for reliable and regular transport services.

## **C. Minimum standards for railway lines**

7. Railway lines used for transit and combined transport should have sufficient capacity to avoid waiting time for the corresponding trains.

8. For the improvement of railway lines which are planned to be used for transit and combined transport, the infrastructure parameters recommended by OSZhD/UIC should be applicable.

## **D. Minimum standards for terminals**

9. For the efficient handling of consignments at terminals the following requirements should be met:

- (a) The period from the latest time of acceptance of goods to the departure of wagons and from wagons' arrival to their availability for unloading should not exceed one hour;
- (b) The waiting time for road vehicles delivering or collecting loading units at terminals should not exceed 60 minutes;
- (c) Terminal sites should be chosen so that:
  - There is rapid and easy access to them from consignors' and consignees' facilities.
  - Within the rail network, they are well connected to long-distance lines and, for carriage by wagon groups, have good access to fast Combined Transport Trains.

10. The minimum standards for intermediate stations set out below should also apply to terminals.

#### **E. Minimum standards for intermediate stations**

11. En route stops made by Combined Transport Trains for technical or operational reasons should also be used for the performance of tasks (e.g. frontier controls, locomotive changes) that would otherwise require additional stops. The infrastructure of such intermediate stations should comply with the following requirements:

- a. The capacity of the various types of track (arrival/departure tracks, train formation tracks, sorting tracks, feeder tracks and gauge interchange tracks) should be such that necessary stops can be kept as short as possible;
- b. The above-mentioned tracks should have loading gauges that correspond to those of the railway lines to be used (UIC B or UIC C):
- c. The length of the tracks should be sufficient to accommodate complete Combined Transport Trains;
- d. If electric traction is used, the tracks should be accessible by electric locomotives (at frontier stations; by electric locomotives of the connecting railway concerned);
- e. The capacity for trans-shipment, wagon group exchange, gauge

interchange and frontier controls should be such that necessary stops can be kept as short as possible.

11.1 At **stations for the exchange of wagon groups**, stops for such operations should not exceed 180 minutes each. This could be achieved through the appropriate formation of trains (which should run over the longest possible distance, including across borders), as well as through the creation of adequate infrastructure at wagon group exchange stations.

11.2 At **border crossing points**, there should, as far as possible, be no stopping by Combined Transport Trains. If stops are unavoidable, they should be as brief as possible (not more than 180 minutes). This should be achieved:

- a. by forcing the performance of tasks normally effected at the border or, if that is not possible, by carrying out those tasks at inland points where the trains have to stop in any case for technical, commercial and/or administrative reasons;
- b. by stopping only once, if at all, at joint border stations.

11.3 At **gauge interchange and trans-shipment stations**, the development of time-saving cost-effective technologies is needed in order to be able to fulfil future requirements. Stops at such stations should be as brief as possible. The means available for gauge interchange or trans-shipment should be sufficient to guarantee short stops. The standards applicable to the transfer of loading units to wagons of a different gauge should be those applicable to trans-shipment at terminals.

11.4 At **ferry links/ports**, stops for consignments in transit and Combined transport should be as brief as possible (if possible, not more than one hour). This can be achieved by providing appropriate infrastructure at ferry port stations and appropriate ferry boats (see paragraph 12 below) and by the following measures:

- a. Application to necessary frontier control measures of the requirements set out in paragraph 11.2 above:
- b. Coordination of ferry and railway timetables and advance provision of information so as to accelerate the loading of ships and/or the formation of trains.

## **F. Minimum Standards for Ferries**

12. Ferry boats used for transit and combined transport should meet the following requirements:

- a. Dimensions and sizes consistent with the loading units and wagons to be carried:
- b. Quick loading and unloading of the ferry boats and stowage of cargo/wagons in accordance with the requirements of the subsequent carriage by rail (separation of combined transport from passenger and/or road transport, as appropriate).
- c. If loading units stay on wagons during the crossing, ferry boats should be easily accessible and time-consuming marshaling operations should not be necessary. Loading gauge, load per axle, etc should be consistent to the requirements of the OSZhD/UIC.
- d. If the transfer of cargo has to be effected without wagons, short and good road connections should be available for any necessary carriage by road between ferry terminal and railway terminal.