

Training

Training documents

Unified braking scheme

Training

Stand 28.10.2021

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1 Introduction

Extensive regulations must be observed when forming trains. Particularly in international traffic, the respective national regulations can create obstacles and hinder unrestricted rail traffic. For this reason, the European Union (EU), European Union Agency for Railway (ERA), International Union of Railways (UIC) and DB Cargo AG, among others, are focusing on the harmonization and simplification of operational regulations in railroad operations. Under this umbrella, a committee of brake experts from various European RUs has been formed under the leadership of Xrail and has drawn up the following regulations on brake adjustment and the content of brake notes including wagon lists.



2 Brake

2.1 Brakes at the train

The new basic rules for brakes at trains are:

- The first and last wagon of a wagon rake must have active brakes
- Any train may have up to 3 consecutive unbraked wagons

2.2 Setting the brakes

2.2.1 Brake position

Depending on the design of the brake, the brake position change can be used to select brake positions with different braking effects:

Brake positions: **G - P**

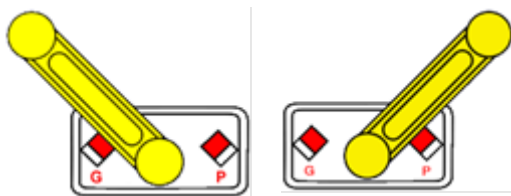


Figure 1 and 2: Brake positions

The basis for setting is the brake position specified in the train's timetable.

2.2.2 Train in brake position G

The maximum speed of the train shall not exceed 100 km/h.

Every wagon with a functioning braking system shall in principle be G-braked. However up to 12 axles are allowed to be P-braked. For any further wagons that cannot be G-braked the brakes are to be isolated, anyway in that case no more than 3 consecutive wagons can be unbraked.

The hauled mass of the train shall not exceed 4000 t.



G-braked trains		
Wagon rake weight	Brake position of all vehicles	Maximum allowance of brake position P
0...800 t	G	12 axles, for the rest brakes are to be turned off if brake position G is not possible
801...1200 t		
1201...1600 t		
1601...2500 t		
2501...4000 t		

Table 1: G-braked trains

2.2.3 Train in brake position P

The P-brake-system shall in principle be in operation on all vehicles and, without exception, on the last vehicle.

In the case of a hauled mass of more than 800t but not exceeding 1200t the active locomotive(s) at the head of the train shall be G-braked.

In the case of a hauled mass of between 1200t and 4000t, in addition to the locomotive at the head of the train, the first five hauled vehicles in the train shall be G-braked. This braking regime is also known as “Long Locomotive” (LL).

Even if one of the first five vehicles does not have a functioning braking system it shall nevertheless be considered as LL.

If articulated wagons or wagon units which can not be separated in service are part of the LL and if they have bogies or more than 3 individual wheel sets, the parts of the wagons are counted individually as vehicles. Moreover, all vehicles of any single wagon unit (or all parts of any articulated wagon) must come under the same braking regime.

In the case of a hauled mass of between 1601t and 2500t wagons with a total weight under 32t are not allowed. There are also articulated and permanently coupled wagons not allowed.

In the case of a hauled mass of between 2501t and 4000t wagons with a total weight under 40t are not allowed. There are also articulated and permanently coupled wagons not allowed.



If the required brake position is not possible or permitted in a vehicle, the brake of this vehicle shall be isolated.

Point 2.2.3.1 provides detailed examples of Long Locomotive rule set.

P-braked trains				
Wagon rake weight	Brake position of leading active locomotives	Brake position of the first 5 vehicles thereafter	Brake position of all following vehicles	What if required brake position not possible?
0...800 t	P	P	P	Turn brakes off
801...1200 t	G	P	P	
1201...1600 t	G	G	P	
1601...2500 t	G	G*	P*	
2501...4000 t	G	G**	P**	

Table 2: P-braked trains

* Wagons < 32 t not allowed, articulated and permanently coupled wagons not allowed

** Wagons < 40 t not allowed, articulated and permanently coupled wagons not allowed



2.2.3.1

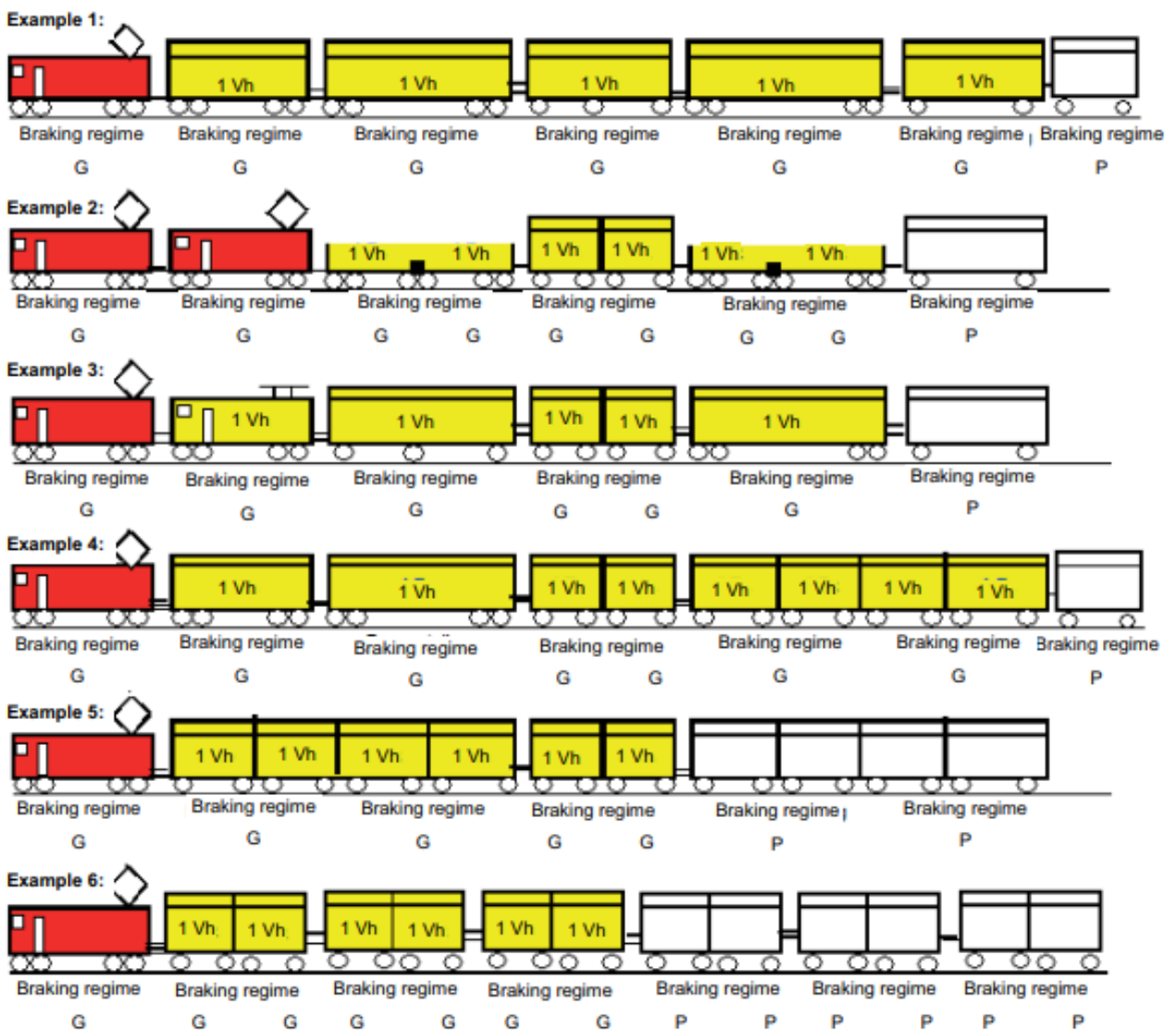
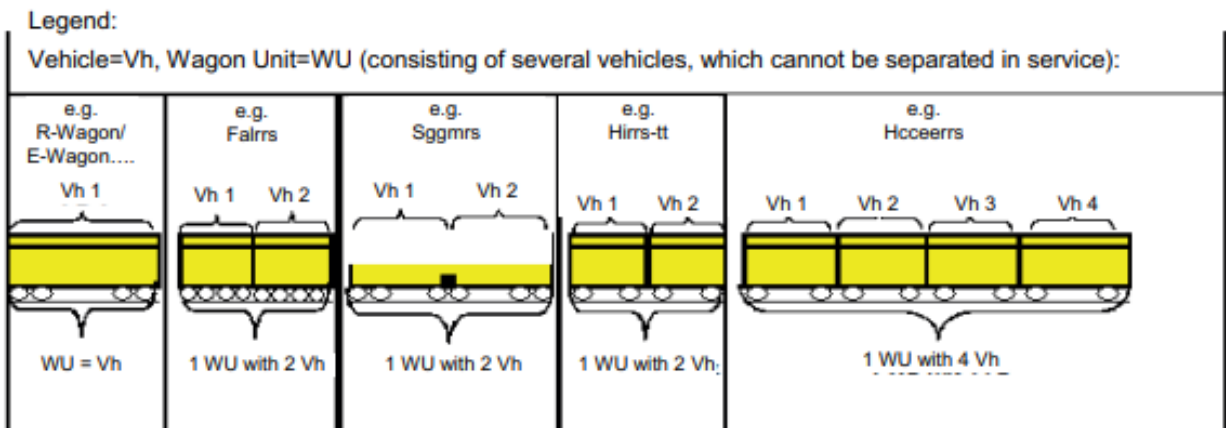


Figure 2: Examples for LL



3 Train documents

With regard to the train's braking characteristics and consist the Railway Undertaking (RU) shall, at the departure station, issue the driver of an international train with the following documents:

- The braking sheet
- The wagon list

Provided they have been properly filled out, these two documents shall remain valid:

- Either along the whole route of the train, if both the consist and the braking characteristics are unchanged
- Or until the first point on the route where modification is made to either the consist and/or braking characteristics

3.1 Braking sheet

The braking sheet, containing all the necessary information about the train's braking characteristics and speed



3.1.1 Braking sheet content

Field number	Explanation of content		
0	ISO codes of countries in which this brake sheet is valid, fields 6 and 7 to be filled according to the given country.		
1	The RU issuing the brake sheet.		
2	Number of the train valid at departure from the "Valid from station" (field 4).		
3	Departure date of the train valid at departure from the "Valid from station" (field 4).		
4	The station from which this brake sheet and wagon list is valid.		
5	The station until which this brake sheet and wagon list is valid.		
6	The train index (e.g. ME100). In the absence of index the timetabled train type (P or G). In Switzerland the "Zugreihe" and "Bremsreihe" (e.g. A50). Provided per country.		
7	The maximum technically allowed speed of this train consist. Provided per country.		
8	Space for remarks about incidents and observations during the journey.		
9	Direct explanations or references to attached documents that describe the special features of the train.		
10	Tick if there are any goods with RID marking in the train.		
11	Tick if there are any shipments in the train that are marked as exceptional consignment (permission number present).		
12	Tick if there are additional documents added to the brake sheet that describe further restrictions that apply to the train.		
13	Tick if there are waste transports in train.		
14	Tick if more than 50% of train brake weight is braked by using cast-iron brake blocks (the rest being braked by composite or disc brakes).		
15	The highest railway line classification required by vehicles present in the train (e.g. D2).		
16	Brake setting of the train - G, P or LL (long locomotive).		
17a	The station from which these train parameters are valid.	Fields 17-18 are to be used for indicating the stretch for which the data is valid in case train parameters change the route. Several stretches to be used only in case the creation of a new brake sheet is not possible.	
17b	The station until which these train parameters are valid.		
18a	The number of the first wagon after the locomotive on the given stretch.		
18b	The number of the last wagon in the wagon rake on the given stretch.		
19	The counted number of vehicles in train.		a) active locomotives in the train b) wagons and inactive locomotives in the train
20	The summed length over buffers of vehicles in train, given in meters (rounded up).		
21	The summed hand brake holding force of vehicles that have hand brakes, in tons as well as kN (rounded down).		
22	The brake weight of vehicles in train after foreseen deductions, given in tons (rounded down).		



23	The gross weight of vehicles in train, given in tons (rounded up).	c) the overall total of vehicles in train
24	The available brake ratio of this train, given in %.	
25	The highest required brake ratio on the foreseen route for this train, given in %.	
26	The sequence of the locomotive in train consist, starting from the head of the train. Counting starts with 1.	
27	Locomotive number according to the UIC standard coding, digit groups to be separated by a space.	
28	Locomotive class.	
29	The counted number of axles the locomotive has.	
30	Length over buffers of the locomotive, given in meters (rounded up).	
31	Gross weight of the locomotive, given in kg (rounded up).	
32	The type of brakes used in the locomotive, abbreviations to be used: K - K-blocks L - L-blocks, LL - LL-blocks D - disc brakes F - cast iron blocks	
33	The brake position set at the given locomotive (G, P, E), several brake systems to be marked by using a plus '+' sign (e.g. P+E).	
34	The brake weight of the locomotive as applicable for the given brake position, given in tons (rounded down).	
35	Any further remarks about the locomotive in a free text form (e.g. a comment that the locomotive is at the rear or middle of the train).	



3.1.2 Braking sheet layout

International brake sheet and wagon list

			5. Country code			
1. Issuing RU	2. Train number	3. Departure date	6. Train profile:			
4a. Valid from station		4b. Valid to station		7. V _{max} , km/h:		

Train parameters

8. Remarks during the journey	9. Special features of the train
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<input type="checkbox"/> 10. Dangerous goods in train <input type="checkbox"/> 11. Exceptional consignment in train <input type="checkbox"/> 12. Additional documents about restrictions added <input type="checkbox"/> 13. Waste shipments in train	16a. Valid from station	16b. Valid to station	16c. Valid from station	16d. Valid to station		
	17a. # of first wagon	18a. # of last wagon	17c. # of first wagon	18c. # of last wagon		
	a	b	a+b	c	d	c+d
	Active locomotives	Wagons and inactive locomotives	Total	Active locomotives	Wagons and inactive locomotives	Total
19. Count, pcs						
20. Length, m						
21. Hand brake holding force, t / kN						
22. Braked weight after deduction, t						
23. Gross weight, t						
14. Required line classification	24. Available brake %:		24. Available brake %:			
15. Brake setting <input type="radio"/> G <input type="radio"/> P <input type="radio"/> P+LL <input type="radio"/> R	25. Required brake %:		25. Required brake %:			
	26. Missing brake %:		26. Missing brake %:			
	27. % of braked weight braked by cast iron blocks:		27. % of braked weight braked by cast iron blocks:			

Active locomotives in train

28. Seq.	29. Number	30. Class	31. # of axles	32. Length over buffers, m	33. Gross weight, kg	34. Brake block type	35. Brake position	36. Braked weight, t	37. Remarks
1									
2									
3									
4									
5									

38. Date of issue	39. Time of issue	40. Issued by (name, signature)	
41. Date of review	42. Time of review	43. Reviewed by (name, signature)	
			44. Remark



3.2 Wagon list

The wagon list of the hauled vehicles forming the rake, containing as a minimum the information needed by the driver to operate the train safely.

3.2.1 Wagon list content

Field number	Explanation of content
45.	The sequence of the wagon in the wagon rake (active locomotives are not counted). Counting starts with 1.
46.	Wagon EVN number according to the UIC standard coding, digit groups (1-2, 3-4, 5-8, 9-11 and 12) are to be separated by a space.
47.	The counted number of axles the wagon has.
48.	Length over buffers of the wagon, given in meters with two digits after comma.
49.	Weight of load on the wagon, given in kilograms.
50.	Gross weight of the wagon, given in kilograms.
51.	The type of brake blocks used in the wagon, abbreviations to be used: K - K-blocks L - L-blocks, LL - LL-blocks D - disc brakes F - cast iron blocks
52.	The braked weight of the wagon before foreseen deductions, given in tons (rounded down). For P-wagons the column P is to be filled, for G-wagons and M-wagons (Matrossow brakes) the column G is to be filled. In case of Matrossow brakes an additional remark 'Matrossow' is to be made in field 59. In case of inactive brakes a minus '-' sign is to be used.
53.	The hand brake holding force of the vehicle in case it has hand brakes, either only in kN or in tons as well as kN (all rounded down). Tons and kN to be separated by a slash '/' sign. In case of no hand brakes available, a minus '-' sign is to be filled in.
54.	The RID UN Numbers, Hazard Numbers and Danger Labels applying to the goods in the wagon. In case several RID codes apply then additional rows can be used for the same wagon. In case of no RID a minus sign '-' is to be used.
55.	Tick if there is a shipment in the wagon that is marked as an exceptional consignment, i.e. there is a permission number present.
56.	The destination station name of the wagon, written in text.
57.	The maximum permitted speed of the wagon according to the wagon (**, ***) and load condition, given in km/h. Statements about potential country-specific speed limits are to be filled in field 59.
58.	The railway line classification required for this wagon according to its loading condition. For the range of A-C only a letter (e.g. C) is to be given, starting from line class D also a number (e.g. D2) must be provided.
59.	Any further remarks about the wagon in free text form, e.g. statements about goods with specific risk on board or potential country-specific speed limitations for certain wagons.
60.	The date on which the wagon list was created. This field is mandatory.
61.	The time at which the wagon list was created. This field is mandatory.
62.	The name and signature of the person who created the wagon list. Alternatively, an ID code or any other reference can be used that ensures the user is traceable in the IT system of the RU issuing the document. This field is mandatory.



63.	The date on which the wagon list was either enhanced, corrected or additionally checked, should this be necessary.
64.	The time at which the wagon list was either enhanced, corrected or additionally checked, should this be necessary.
65.	The name and signature of the person who performed the enhancement, correction or additional check. Alternatively, an ID code or any other reference can be used that ensures the user is traceable in the IT system of the RU issuing the document.
66.	An explanation in free text describing the reason why fields 63-65 were used.



Notes
