 OTIF	ROLLING STOCK FREIGHT WAGONS – ANNEX Z			UTP WAG - Z Page 1 of 2
Status: IN FORCE	Version: 01	Ref.: A 94-02-Z/1.2011	Original: EN	Date: 01.12.2012

APTU Uniform Rules (Appendix F to COTIF 1999)

Uniform Technical Prescriptions (UTP) relating to the Subsystem Rolling Stock

FREIGHT WAGONS - ANNEX Z

STRUCTURE AND MECHANICAL PARTS - IMPACT (BUFFING) TEST

Explanatory note:

The texts of this UTP which appear without columns are identical with corresponding texts of the European Union regulations. Texts which appear in two columns differ; left-hand column contains the UTP regulations, right-hand column shows the text in the corresponding EU regulations. The text in the right hand column is for information only and not part of the OTIF regulations.

OTIF UTP

Corresponding text in EU regulations ¹

EU ref. ²

Z.1 BUFFING TESTS

Z.1.1 REQUIREMENT

An unbraked wagon standing on level straight track shall be capable, both when empty and laden, of withstanding the buffing shock resulting from impact by a wagon with a total laden weight on rail of 80 t and fitted with side buffers with a buffer energy storage capacity $\geq 30 \text{ kJ}$ ³. A difference in the height of buffers (empty and laden condition) of max. 50 mm can be tolerated.

Z.1.2 BUFFING TEST WITH EMPTY WAGON

The tests shall be carried out with an increasing speed up to 12 km/h ⁴. Between the speeds from 8 to 12 km/h an acceleration curve ($\ddot{x} = f(v)$) shall be recorded. The number of impacts can be limited.

Z.1.3 BUFFING TEST WITH LADEN WAGONS

For this test, the wagon shall be loaded to its maximum capacity. The direction of impact shall be reversed after each buffing impact except in the case of tank wagons. Buffing impact tests need not be undertaken for conventional flat wagons.

Z.1.4 WAGONS WITH SIDE BUFFERS


Preliminary tests are to be carried out with an increasing speed of impact. These preliminary tests shall be continued until one of two parameters (speed or force) attains the limiting values fixed in the following table .

¹ TSI Freight Wagons – The Annex to the Commission Decision 2006/861/EC published in the EU Official Journal L344 on 08.12.2006 as amended by Commission Decision 2009/107/EC published in EU Official Journal L45 on 14.02.2009.

² If no EU reference is indicated, it means that the chapter/section number is the same as in the OTIF text.

³ Recommendations concerning the type of buffer to be selected for different types of wagon are given in ERRI technical document DT 85 sheet B 3.0

⁴ Unless otherwise stated in the standard conditions and contract. In particular, with certain wagons, which are unacceptable for shunting on the gravity hump or for fly-shunting (i.e. type F-II), the buffing speed can be limited to 7 km/h.

	OTIF	ROLLING STOCK FREIGHT WAGONS – ANNEX Z			UTP WAG - Z Page 2 of 2
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40 identical buffing impacts shall then be carried out with this limit in force.

The preliminary tests and the series of buffing tests shall be conducted under the following conditions:

Table Z.1

Limiting values		Preliminary tests	Test series
Force per buffer	Buffing speed		
1 500 kN ⁽³⁾ ⁽⁴⁾ . at a buffing speed ≤ 12 km/h	12 km/h ⁽⁵⁾	10 buffing impacts at progressively increasing speeds up to 12 km/h, three of which with a speed of approximately 9 km/h. However, if an impact force per buffer of 1 500 kN is attained at a speed < 12 km/h, the speed shall not be increased above this value.	40 buffing impacts at the limit speed defined during the preliminary tests, viz: — either 12 km/h, or — the speed corresponding to a buffing force of 1500 kN ⁽⁵⁾ ⁽⁶⁾ ⁽⁷⁾

Notes:

- (1) Recommendations concerning the type of buffer to be selected for different types of wagon are given in ERRI technical document DT 85 sheet B 3.0
- (2) Unless otherwise stated in the standard conditions and contract. In particular, with certain wagons, which are unacceptable for shunting on the gravity hump or for fly-shunting (i.e. type F-II), the buffing speed can be limited to 7 km/h
- (3) The permissible tolerance on the buffer force at one end of the wagon is ± 200 kN, but the total force on both buffers shall not exceed 3 000 kN
- (4) If the wagon tested is equipped with buffers of category C, the limiting value of the buffer force can, subject to the agreement of the operator concerned, be reduced to 1 300 kN (with a buffing speed < 12 km/h) This does not apply to tank wagons intended for the transport of dangerous goods category 2 of the RID regulations. These are to be tested fitted with category A buffers.
- (5) If the value of the buffer force already reaches 1 000 kN for a buffing speed < 9 km/h, the wagon to be tested shall be equipped with higher capacity buffers.
- (6) If requested by the operator, buffing tests with a force above 1 500 kN and a speed of up to 12 km/h can be carried out at the end of the tests.
- (7) For wagons with hydrodynamic long-stroke shock absorbers the limiting value of the buffer force is reduced to 1000 kN.

Z.1.5 WAGONS EQUIPPED WITH AN AUTOMATIC COUPLER

The buffing speed of 12 km/h shall in all cases be obtained.

Z.1.6 RESULTS

The different buffing tests shall not result in any visible permanent deformations. The stresses occurring at certain critical points of the bogie/underframe, underframe/body and superstructure connections shall be recorded.

The results obtained shall satisfy the following conditions :

- The cumulative residual strains arising from the preliminary test and from the series of 40 buffing impacts shall be less than 2 ‰ and shall be stabilised before the 30th impact of the series. This does not apply however to those structural components covered by special provisions.
- The variations in leading dimensions shall not impair the quality of use of the wagon.