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## TECHNICAL ADVICE

*ADV-2018-02*

OF THE EUROPEAN UNION AGENCY FOR RAILWAYS

for

THE EUROPEAN COMMISSION

regarding

*NB-Rail QC-RST-022 on Pantograph Verification at RS subsystem level*

### Disclaimer:

The present document is a non-legally binding advice of the European Union Agency for Railways. It does not represent the view of other EU institutions and bodies, and is without prejudice to the decision-making processes foreseen by the applicable EU legislation. Furthermore, a binding interpretation of EU law is the sole competence of the Court of Justice of the European Union.

## 1. General context

1.1 By its letter (Ares (2018) 5303793) of 16 October 2018, the European Commission asked the Agency for a technical advice regarding a question from NB-Rail about its QC-RST-022 concerning "Pantograph verification at rolling stock subsystem level, EC verification process".

1.2 It is the position of NB-Rail that there is a possible discrepancy between clause 6.2.3.20 ("Current collection dynamic behaviour") in the TSI relating to the subsystem 'rolling stock - locomotives and passenger rolling stock' subsystem of the rail system in the European Union (Commission Regulation (EU) No 1302/2014, "TSI LOC&PAS (1302/2014/EU)"<sup>1</sup>) and the interpretation provided in the related Application Guide, ERA/GUI/07-2011/INT, ver.2.02 dated 09 November 2016 (part concerning the section 4.2.8.2.9.6: Pantograph contact force and dynamic behaviour).

NB-Rail proposes to change the text in the Application Guide which, in the opinion of NB Rail, seems based on previous TSI relating to the rolling stock sub-system of the trans-European high-speed rail system (Commission Decision 2008/232/EC of 21 February 2008) and TSI relating to the energy sub-system of the trans-European high-speed rail system (Commission Decision 2008/284/EC of 6 March 2008).

## 2. Legal background

2.1 The Commission based its request on Article 41 of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004<sup>2</sup> (the Agency Regulation).

## 3. Analysis

3.1 In clause 4.2.8.2.9.6 *Pantograph contact force and dynamic behaviour* of the TSI LOC&PAS (1302/2014/EU) it is stated that:

*"(3) Rolling stock and pantographs fitted on rolling stock are designed to exert a mean contact force  $F_m$  on the contact wire in a range specified in clause 4.2.12 of the TSI Energy, in order to ensure current collection quality without undue arcing and to limit wear and hazards to contact strips. Adjustment of the contact force is made when dynamic tests are performed.*

...

*(5) The verification at rolling stock subsystem level (integration in a particular vehicle) shall allow to adjust the contact force, taking into account aerodynamic effects due to the rolling stock and the position of the pantograph in the unit or train fixed or predefined formation(s); the conformity assessment procedure specified in clause 6.2.3.20."*

3.2 At the rolling stock subsystem level, the requirement for the design is explicit in (3) of the mentioned TSI section, being the mean contact force ( $F_m$ ) exerted on the contact wire in accordance to the range specified in clause 4.2.12 of the Commission Regulation (EU) No 1301/2014 of 18 November 2014 on the technical specifications for interoperability relating to the 'energy' subsystem of the rail system in the Union (hereafter ENE TSI (1301/2014/EU)<sup>3</sup>).

3.3 At the rolling stock unit level, the particular assessment procedure to "*allow to adjust the contact force, taking into account aerodynamic effects due to the rolling stock and the position of the pantograph in the unit or train fixed or predefined formation(s)*", is set down in clause 6.2.3.20.

<sup>1</sup> OJ L 356, 12.12.2014, p. 228.

<sup>2</sup> OJ L 138, 26.5.2016, p.1.

<sup>3</sup> OJ L 356, 12.12.2014, p. 179

3.4 In clause 6.2.3.20 of the TSI LOC&PAS (1302/2014/EU), it is stated that:

*“(1) When a pantograph, holding an EC declaration of conformity or suitability for use as IC, is integrated in a rolling stock unit which is assessed according to the LOC&PAS TSI, dynamic tests shall be carried out in order to measure the mean contact force and standard deviation or the percentage of arcing, in accordance with the specification referenced in Appendix J-1, index 100 up to the design speed for the unit.*

.....

*(5) The measured results shall be in accordance with the clause 4.2.8.2.9.6 for either mean contact force and standard deviation or percentage of arcing”.*

3.5 The application guide of TSI LOC&PAS, for the clause 4.2.8.2.9.6, currently states that:

*“When this pantograph is integrated in a particular rolling stock, the Applicant for this rolling stock has to make the necessary adjustments in order to get a mean contact force in the range specified in the TSI (e.g. adjusting aerodynamical components of the pantograph to a specific position).”*

3.6 In accordance with clause 6.2.3.20, theoretically, and only for the parameter current collection quality, it would be possible to choose between the 2 methods: either the mean contact force and standard deviation or the percentage of arcing.

3.7 However, in accordance with the section 4.2.8.2.9.6 of the TSI LOC&PAS (1302/2014/EU), the only explicit criteria for the requirement ‘current collection quality’ is the mean contact force and standard deviation. This is why the text in the application guide of TSI LOC&PAS, mentioned above, refers to the mean contact force.

3.8 It is also important to remark that the conditions for the assessment procedure for the use of the arcing method can be more demanding (see EN 50317:2012 clause 9) as for example:

- The control sections should not be shorter than 10 km and should be travelled at a constant speed (A tolerance of  $\pm 2.5$  km/h).
- For output, only sections of line with the pantograph current greater 30% of the nominal current per pantograph shall be analysed.

3.9 Although both assessment methods for the current collection quality indicated in chapter 6.2.3.20 of TSI LOC&PAS (1302/2014/EU) are allowed (measure the mean contact force and standard deviation or the percentage of arcing), the Applicant needs to present evidences of compliance with the requirement in 4.2.8.2.9.6 of the TSI LOC&PAS (1302/2014/EU) for the mean contact force and standard deviation. The current statement in the application guide of TSI LOC&PAS is therefore aligned with the requirement.

3.10 The use of Arcing method cannot be requested to the applicant in addition to an assessment made using the mean contact force and standard deviation, for the requirement ‘current collection quality’.

#### 4. The advice

There is no discrepancy between clause 6.2.3.20 (“Current collection dynamic behaviour”) of the TSI LOC&PAS (1302/2014/EU) and the guidance provided on the matter in the Application Guide ERA/GUI/07-2011/INT, ver.2.02 dated 09 November 2016.

Nevertheless the Agency will consider in future updates of the Application Guide the opportunity to introduce more detailed explanations, as elaborated in the present Technical Advice.

Valenciennes,

14.01.2019

Josef DOPPELBAUER  
Executive Director





## QUESTION / CLARIFICATION

Ref. Ares(2018)5303793 - 16/10/2018

### CO-ORDINATION BETWEEN NOTIFIED BODIES

INTEROPERABILITY DIRECTIVE AND SUBSEQUENT AMENDMENTS ON THE INTEROPERABILITY OF THE RAIL SYSTEM WITHIN THE UNION

QC-RST-022

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### TITLE

PANTOGRAPH VERIFICATION AT ROLLING STOCK SUBSYSTEM LEVEL, EC VERIFICATION PROCESS

### ORIGINATOR

ITALCERTIFER

### SUBJECT RELATED TO

TSI LOC & PAS 2014 (1302/2014)

### DESCRIPTION AND BACKGROUND EXPLANATION

Clause 6.2.3.20. *Current collection dynamic behaviour (clause 4.2.8.2.9.6) related to the assessment at rolling stock level*, provides:

*“(1) When a pantograph, holding an EC declaration of conformity or suitability for use as IC, is integrated in a rolling stock unit which is assessed according to the LOC&PAS TSI, **dynamic tests shall be carried out in order to measure the mean contact force and standard deviation or the percentage of arcing, in accordance with the specification referenced in Appendix J-1, index 100 [EN 50317:2012 relevant cl.] up to the design speed for the unit.***

[...]

*(5) The measured results shall be in accordance with the clause 4.2.8.2.9.6 for **either** mean contact force and standard deviation **or** percentage of arcing.”*

Considering the text of the clause 6.2.3.20:

- requirements provided by EN 50317:2012, directly referenced by TSI clause, and copied below:

*“To check the performance capability of the current collection system at least the following data shall be measured:*

- *the contact wire uplift at the support as the pantograph passes:*  
**and either**
- *the mean contact force and standard deviation*  
**or**
- *the percentage of arcing.”*

The requirements in the TSI and in the referenced EN seem to allow use of the arcing measurement method to assess the pantograph at rolling stock assessment level.

This interpretation seems not consistent with the following text of the Application Guide (ERA/GUI/07-2011/INT ver. 2.02 dated 09 November 2016):

*“Clause 4.2.8.2.9.6: Pantograph contact force and dynamic behaviour*

[...]

*When this pantograph is integrated in a particular rolling stock, the Applicant for this rolling stock has to make the necessary adjustments **in order to get a mean contact force in the range specified in the TSI (e.g. adjusting aerodynamical components of the pantograph to a specific position).***”



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This sentence seems:

- consistent with provisions of TSI RST HS 2008 (2008/232/EC) and TSI HS ENE 2008 (2008/284/EC)
- NOT consistent with provisions of the LOC&PAS 2014 (1302/2014) and TSI ENE 2014 (1301/2014)

### Conclusions

TSI LOC&PAS2014 (1302/2014) seems to permit:

- *the mean contact force and standard deviation*
- or**
- *the percentage of arcing.*

### SUGGESTED RESOLUTION / INTERPRETATION

The last sentence of the Clause 4.2.8.2.9.6: Pantograph contact force and dynamic behaviour of the Application Guide (ERA/GUI/07-2011/INT ver. 2.02 dated 09 November 2016) should be changed/interpreted accordingly to one of the following options.

#### **OPTION 1**

When a pantograph certified at IC level is integrated in a particular rolling stock, the applicant for this rolling stock has to make the necessary adjustments in order to get *either*:

- *the mean contact force and standard deviation*
- or**
- *the percentage of arcing*

in the range specified in the TSI (e.g. adjusting aerodynamical components of the pantograph to a specific position) and getting the static force in the range, for the considered system, provided by clause 4.2.8.2.9.5 of the TSI.

#### **OPTION 2**

When a pantograph certified at IC level is integrated in a particular rolling stock, the applicant for this rolling stock has to make the necessary adjustments in order to get

- *the contact wire uplift at the support as the pantograph passes:*  
**and either**
- *the mean contact force and standard deviation*



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*or*

- *the percentage of arcing.*

in the range specified in the TSI (e.g. adjusting aerodynamical components of the pantograph to a specific position) and getting the static force in the range, for the considered system, provided by clause 4.2.8.2.9.5 of the TSI.

#### ORGANISATION(S) REQUESTED TO RESPOND (E.G. TSI GROUP, RISC, ERA ETC.)

RISC, ERA

#### DATE OF AGREEMENT AT NB RAIL PLENARY MEETING

PLE050, 18/05/2017

#### RESPONSE FROM ORGANISATION ABOVE

Disclaimer: ERA TO always supersedes NB-Rail suggested solution in case of difference.