



RECOMMENDATION FOR USE

NB-Rail Coordination Group

Administrative Decision according to Interoperability Directive (EU) 2016/797 art. 30.6 and Interoperability Directive 2008/57/EC art. 28.5

RFU-RST-090

Issue 03
Date 20/02/2019
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TITLE	
AUDIBLE INFORMATION IN CAB	
ORIGINATOR	SUBJECT RELATED TO
LLOYD'S REGISTER	TSI L&P CR 2011/291/EU TSI L&P 1302/2014, TSI NOI CR 2011/229/EU, TSI NOI 1304/2014
AMENDMENT RECORD:	
Draft03a: revision of 'answer to question 3' by Belgorail	
Draft03b: Correction of answer 1 according to ERA comments	
DESCRIPTION AND BACKGROUND EXPLANATION	
<p>To prevent information (acoustic signals) to be missed by the train driver, audible information (beeps, bells, gongs etc.) in the cab of a locomotive or multiple units needs to be louder than the ambient noise level. For that reason, the TSI LOC&PAS states:</p> <ul style="list-style-type: none">• <i>TSI LOC&PAS 2011/291/EU section 4.2.9.3.4: Audible information generated by on-board equipment inside the cab for the driver shall not be lower than 6 dB(A) above the median received noise level in the cab, measured as defined in the noise TSI.</i>• <i>TSI LOC&PAS 1302/2014 section 4.2.9.3.4: Audible information generated by onboard equipment inside the cab for the driver shall be at least 6 dB(A) above the noise level in the cab (this noise level taken as reference being measured under conditions specified in the TSI Noise).</i> <p>Railway operating companies are reluctant to accept an audible information sound level fixed at 6 dB(A) above the ambient noise level at maximum speed, because in general, this level generates very annoying noise inside the cab at lower speeds. Railway operating companies prefer instead an audible information sound level which is dependent on the ambient noise level.</p> <p>This approach is also supported by UIC 612-01 chapter 7: <i>The volume chosen by the driver shall alter in correspondence with the ambient noise level. In case of automatic adjustment of the audible information, 6 dB(A) above the actual ambient noise in the cab shall be sufficient.</i></p> <p>The TSI text gives rise to several questions:</p> <ol style="list-style-type: none">1. What is 'audible information'?2. What is meant by 'median received noise level' (TSI NOI CR 2011/229/EU) or 'noise level' (TSI NOI 1304/2014)?3. How should audible information be measured?	
RFU PROPOSAL	

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Answer to question 1:

Audible information is all acoustical information generated by on-board equipment (e.g. a loudspeaker) intended to be handled by the driver. The TSIs for the Rolling Stock subsystem require the driver to receive a signal in the following situations:

- seize of an axle by the wheel rotation monitoring system (refer to requirement (8) in TSI LOC&PAS 1302/2014 clause 4.2.4.6.2);
- one or more passenger alarms have been activated (refer to requirement (3) in TSI LOC&PAS 1302/2014 clause 4.2.5.3.2);
- not functioning of the passenger alarm system (refer to requirement (2) in TSI LOC&PAS 1302/2014 clause 4.2.5.3.6);
- emergency opening of one or more doors (refer to requirement (4) in TSI LOC&PAS 1302/2014 clause 4.2.5.5.5);
- warning to the driver before triggering a lack of driver's activity (refer to requirement (2) in TSI LOC&PAS 1302/2014 clause 4.2.9.3.1);
- notification by the fire detection system (refer to requirement (2) in TSI LOC&PAS 1302/2014 clause 4.2.10.3.2).

For these signals, if these are acoustic, the requirement is: $L_{pAFmax,signal} - L_{pAeq,T} \geq 6 \text{ dB(A)}$.

Answer to question 2:

'Median received noise level' or 'noise level' is interpreted as the ambient noise level ($L_{pAeq,T}$, with T being 60 seconds); the method to be used is defined in the noise TSI. There is no relation between method and speed.

Answer to question 3:

The TSI NOI (2011/229/EU), paragraph 4.2.3, refers to Appendix F for two different sound measuring methods: '*Measurements shall be made in accordance with Appendix F.*'

Appendix F:

- *For the measurements at maximum speed, the microphone shall be positioned at the level of the driver's ear (in the seated position), at the centre of a horizontal plane extending from the front window panes to the rear wall of the cab.*
- *For the measurements of the horn's impact, eight evenly spaced microphone positions around the position of the driver's head with a radius of 25 +/-2,5 cm (in the seated position) shall be used, in a horizontal plane. The arithmetic mean of the eight values shall be assessed against the limit.*

The TSI NOI (1304/2014), paragraph 6.2.2.4, refers to EN 15892:2011 for two different sound measuring methods:

- *The measurement shall be carried out at the level of the driver's ear when at their operating position, at the centre of a horizontal plane extending from the front window to the rear wall of the cab.*
- *The measurement shall be carried out at eight evenly spaced microphone positions in a horizontal plane at the height of a seated driver's ears, at a radius of 25 cm, while the external warning horn is sounding.*



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Proposed Method of Measurement

It is considered that the TSI requires the ambient noise (as reference point for the additional 6dB) to be measured according to the first method at various speeds defined by the Applicant. Recommended are at top speed and 20 km/h intervals below.

The measuring method for the audible information shall be proposed by the Applicant to the satisfaction of the NoBo. This method must fulfil the TSI. It is highly recommended to take the same method as indicated for the measurement of the horn's impact ($L_{pAFmax,signal}$ is the arithmetic mean of the 8 values measured during the individual signal duration).

THIS RFU WAS AGREED ON

PLENARY MEETING 55

THIS RFU ENTERS INTO FORCE ON

13/03/2019 (DATE OF PUBLICATION)

FROM THIS DATE ON THIS RFU CAN BE APPLIED INSTEAD OF THE PREVIOUS MANDATORY VERSION.

RFU APPLICATION IS MANDATORY STARTING FROM

13/03/2019

AT THIS DATE ANY PREVIOUS VERSIONS (*OR, ALTERNATIVELY, VERSION 02*) OF THIS RFU WILL BE WITHDRAWN.

RFUS SHALL BE APPLIED BY ALL NOBOS. PLEASE REFER TO RFU-STR-702, CHAPTER 3 OF THE SECTION "DESCRIPTION AND BACKGROUND EXPLANATION", FOR THE LEGAL BASIS SUPPORTING THIS OBLIGATION.

ERA COMMENTS

PLENARY MEETING 55 – 20/02/2019: NO COMMENTS



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Overview of requirements for audible information in the rolling stock subsystem (remove this page in the final version)

TSI LOC&PAS clause	Subclause	Requirement	Comments
4.2.4.6 Wheel rail adhesion profile - Wheel slide protection system	4.2.4.6.2. Wheel slide protection system	(8) Wheel rotation monitoring system (WRM): Units of design maximum speed higher or equal to 250 km/h shall be equipped with a wheel rotation monitoring system to advise the driver that an axle has seized; the wheel rotation monitoring system shall be designed according to the specification referenced in Appendix J-1, index 30, clause 4.2.4.3.	This advice is in the scope of clause 4.2.9.3.4, assuming that the advice is acoustic.
4.2.5.2 Audible communication system		(2) Trains shall be equipped as a minimum with a means of audible communication: — for the train crew to address the passengers in a train — for internal communication between the train crew and in particular between the driver and staff in the passenger area (if any).	This audible information is not generated by on-board equipment.
4.2.5.3 Passenger alarm	4.2.5.3.2 Requirements for information interfaces	(3) At the triggering of the passenger alarm, both visual and acoustic signs shall indicate to the driver that one or more passenger alarms have been activated.	This audible signal is in the scope of clause 4.2.9.3.4.
4.2.5.3 Passenger alarm	4.2.5.3.6 Degraded mode	(2) If the passenger alarm system is not functioning, either after intentional isolation by staff, due to a technical failure, or by coupling the unit with a non-compatible unit, this shall be permanently indicated to the driver in the active driver's cab, and application of the passenger alarm shall result in a direct application of brakes.	This indication is in the scope of clause 4.2.9.3.4, assuming that the indication is acoustic.
4.2.5.4 Communication devices for passengers		(5) The 'communication device' interface to passengers shall be indicated by a harmonised sign, shall include visual and tactile symbols and shall emit a visual and audible indication that it has been operated. These elements shall be in accordance with the PRM TSI.	The audible indication is not presented in the drivers cab.
4.2.5.5 Exterior doors: passenger access to and egress from Rolling Stock	4.2.5.5.5 Information available to the train crew	(4) Audible and visual alarm signal shall indicate to the train crew an emergency opening of one or more doors.	This audible signal is in the scope of clause 4.2.9.3.4.
4.2.7.2 Horn (audible warning device)	4.2.7.2.1 General	(2) Trains shall be fitted with warning horns in order to make the train audible.	The warning horn is not in the scope of clause 4.2.9.3.4, but in the TSI NOI.



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4.2.9.3 Driver machine interface	4.2.9.3.1. Driver's activity control function	(2) Before triggering a lack of driver's activity, a warning shall be given to the driver, in order for him to have the possibility to react and reset the system.	This warning is in the scope of clause 4.2.9.3.4, assuming that the warning is acoustic.
4.2.10.3 Measures to detect/control fire	4.2.10.3.2 Fire detection systems	(2) Upon fire detection the driver shall be notified and appropriate automatic actions shall be initiated to minimize the subsequent risk to passengers and train staff.	This notification is in the scope of clause 4.2.9.3.4, assuming that the notification is acoustic.
4.2.10.3 Measures to detect/control fire	4.2.10.3.2 Fire detection systems	(3) For sleeping compartments, the detection of a fire shall activate an acoustic and optical local alarm in the affected area. The acoustic signal shall be sufficient to wake up the passengers. The optical signal shall be clearly visible and shall not be hidden by obstacles.	The audible indication is not presented in the drivers cab.

TSI PRM clause	Subclause	Requirement	Comments
4.2.2.3 Doors	4.2.2.3.2. Exterior doors	(7) When a door is released for opening a signal shall be given that is clearly audible and visible to persons inside and outside the train. This alert signal shall last for a minimum of five seconds unless the door is operated, in which case it may cease after 3 seconds.	The audible indication is not presented in the drivers cab.
4.2.2.3 Doors	4.2.2.3.2. Exterior doors	(9) When a door that is automatically or remotely closed, is about to operate, an audible and visible alert signal shall be given to persons inside and outside the train. The alert signal shall start a minimum of 2 seconds before the door starts to close and shall continue while the door is closing.	The audible indication is not presented in the drivers cab.
4.2.2.7 Customer information	4.2.2.7.1 General	(1) The following information shall be provided: — Safety Information and safety instructions — Audible safety instructions coupled with visible signals in case of emergency — Warning, prohibition and mandatory actions signs — Information concerning the route of the train, including information about delays and unplanned stops, — Information concerning the location of on-board facilities	The audible indication is not presented in the drivers cab.
4.2.2.7 Customer information	4.2.2.7.4. Dynamic audible information		The audible indication is not presented in the drivers cab.
5.3.2.2 Standard and universal toilets: common parameters		(2) A visual and tactile (or audible) indication shall be given inside and	The audible indication is not

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		outside the toilet to indicate when a door has been locked.	presented in the drivers cab.
5.3.2.6 Interface of the call for aid device		(3) emit a visual and audible indication to the user that it has been operated.	The audible indication is not presented in the drivers cab.