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Railway applications — Heating, ventilation and air conditioning systems for rolling stock —

Part 4: Design parameters, and test and inspection items for the HVAC unit

Applications ferroviaires — Systèmes de chauffage, ventilation et climatisation pour le matériel roulant —

Partie 4: Paramètres de conception et éléments d'essai et d'inspection pour l'unité HVAC

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Introduction

Since the heating, ventilation and air conditioning (HVAC) unit is one of the main components of the HVAC system, its quality and performance is a key issue to improve thermal comfort and energy efficiency for rolling stock.

The purpose is:

— to develop a common International Standard for the validation of a HVAC unit,

— to establish methodologies and requirements on a component basis to demonstrate conformity with the technical specifications of the HVAC unit,

— to establish a clear scope of responsibility in case performance issues occur after mounting the HVAC unit on the rolling stock.

The justification is:

— currently, there is no common International Standard for the validation of a HVAC unit;

— generally, existing national and regional HVAC unit standards are designed for air-conditioning systems in buildings; there only a few standards for rolling stock;

— therefore, there is a need to unify the methodologies of the HVAC unit standards into one single document;

— this will not affect any existing national or regional standard.

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Railway applications — Heating, ventilation and air conditioning systems for rolling stock —

Part 4: Design parameters, and test and inspection items for the HVAC unit

1 Scope

This document specifies requirements and guidelines for:

— the design parameters to be provided to the heating, ventilation and air conditioning (HVAC) unit manufacturer by the rolling stock manufacturer ("Customer") and the railway operator,

— the test and inspection items, requirements and methods used by the HVAC unit manufacturer to verify that the HVAC unit conforms with the design parameters.

This document is applicable to HVAC units for the passenger area and driver's cabs in urban (metro, tramway), suburban, regional and main line vehicles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3743-1, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room*

ISO 3743-2, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering methods for small, movable sources in reverberant fields — Part 2: Methods for special reverberation test rooms*

ISO 3744, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

ISO 3745, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Precision methods for anechoic rooms and hemi-anechoic rooms*

ISO 3746, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane*

ISO 3747, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering/survey methods for use in situ in a reverberant environment*

ISO 9614-2, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning*

ISO 19659-1, *Railway applications — Heating, ventilation and air conditioning systems for rolling stock — Part 1: Terms and definitions*

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ISO 19659-2, *Railway applications — Heating, ventilation and air conditioning systems for rolling stock — Part 2: Thermal comfort*

ISO 19659-3, *Railway applications — Heating, ventilation and air conditioning systems for rolling stock — Part 3: Energy efficiency*

IEC 60077-1, *Railway applications — Electric equipment for rolling stock — Part 1: General service conditions and general rules*

IEC 60077-2, *Railway applications — Electric equipment for rolling stock — Part 2: Electrotechnical components — General rules*

IEC 61373, *Railway applications — Rolling stock equipment — Shock and vibration tests*

IEC 62236-3-2, *Railway applications — Electromagnetic compatibility — Part 3-2: Rolling stock — Apparatus*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19659-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.2 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 19659-1 and the following apply.

AC	Alternating current
CMM	Coordinate measuring machine
DB	Dry bulb
DC	Direct current
EMC	Electromagnetic compatibility
FEM	Finite element method
FFT	Fast Fourier transform
FST	Fire, smoke and toxicity
GWP	Global warming potential
HF	High frequency
HVAC	Heating, ventilation and air conditioning
LED	Light emitting diode
PTC	Positive temperature coefficient
PTU	Portable testing unit
RMS	Root mean square

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