INTERNATIONAL STANDARD

ISO 37182

First edition
2022-06

Smart community infrastructures — Smart transportation for fuel efficiency and pollution emission reduction in bus transportation services

Infrastructures urbaines intelligentes — Transport intelligent pour l'efficacité énergétique et la réduction des émissions polluantes dans les services de transport par autobus

Reference number
ISO 37182:2022(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 268, *Sustainable cities and communities*, Subcommittee SC 2, *Sustainable cities and communities - Sustainable mobility and transportation*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Massive energy consumption is one of the unavoidable issues that every modern city faces. To effectively provide transportation services for citizens and city visitors, cities need to continuously consume energy. There are significant benefits if energy consumption is reduced, even if the reduction amount is small at any given time or place.

In transportation operations, small efforts provide significant energy savings. Railway operations have options that can easily save energy. Modifying run curves in a train schedule is a typical example which minimizes energy consumed while running a train. This method has been used in railway operations for a long time.

In bus operations, it does not appear to be as easy to make such savings. Bus transportation services have tried to reduce energy or fuel consumption with experience accumulated over a long time. The best way to achieve fuel efficiency is to continually drive a bus at a speed up to and including the limit designated in each section on its route and to keep running at a constant speed. This method, while dependent on the bus driver's conduct, is still effective. Using telecommunication systems enables fuel efficiency to be achieved more successfully, by processing information on bus driving practices and then transmitting this to other places. These practices have already been shown to result in significant fuel efficiency in bus driving, even if such efforts are made locally or by individual bus drivers. However, as previously mentioned, widespread employment of this method will result in huge energy savings. Additionally, in engine-driven bus operations, there will also be a reduction in GHG, NOx/SOx and particle emissions. Bus transportation is the largest passenger service network, utilizing huge numbers of buses. This effort will contribute to a reduction in air pollutants emitted from these vehicles.

ISO Guide 82 has been taken into account in the development of this document with regards to addressing sustainability issues.

Smart community infrastructures — Smart transportation for fuel efficiency and pollution emission reduction in bus transportation services

1 Scope

This document describes criteria to organize smart transportation to save fuel in bus transportation services where the reduction of energy consumption is intended. Smart transportation aims not only at fuel efficiency, but at pollutant emission reduction for engine driven buses, as well as the financial stabilization of bus transportation services for citizens and city visitors.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1
bus driving
running of a bus vehicle service for passenger transport purposes by a licenced bus driver

Note 1 to entry: Types of buses include commuter buses, bus rapid transit (BRT), inter-city buses and highway buses.

3.2
fuel
energy source of fossil fuel which is consumed by driving buses

Note 1 to entry: Examples of fossil fuels include petroleum and natural gas.

3.3
digitalized tachograph
on-board record of *bus driving* (3.1), which is digitally recorded during the driving after departure from a bus dispatch office until return thereto

3.4
crew report
document prepared by a bus driver on completion of a work schedule designated by his or her supervisors, in order to inform the supervisors of any issues while on duty, including incidents, accidents, bus-mechanical malfunctions and troubles in passenger services, especially while driving the bus

3.5
daily driving report
document prepared by combining a tachograph and a *crew report* (3.4), which also contains an evaluation of the manner in which the bus driver drove during the work schedule