

English Version

## Electronic fee collection - Charging performance framework (ISO/TS 37444:2023)

Perception de télépéage - Cadre de performance  
d'imputation (ISO/TS 37444:2023)

Elektronische Gebührenerhebung - Rahmen zur  
Abbuchungsdurchführung (ISO/TS 37444:2023)

This Technical Specification (CEN/TS) was approved by CEN on 18 April 2023 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3

## European foreword

This document (CEN ISO/TS 37444:2023) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with Technical Committee CEN/TC 278 "Intelligent transport systems" the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN ISO/TS 17444-1:2017 and CEN ISO/TS 17444-2:2017.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## Endorsement notice

The text of ISO/TS 37444:2023 has been approved by CEN as CEN ISO/TS 37444:2023 without any modification.

---

---

## Electronic fee collection — Charging performance framework

*Perception de télépéage — Cadre de performance d'imputation*



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>Introduction</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>2</b>
<b>3 Terms and definitions</b>	<b>2</b>
<b>4 Symbols and abbreviated terms</b>	<b>6</b>
<b>5 Examination framework</b>	<b>7</b>
5.1 General	7
5.2 Method for defining a specific examination framework	7
5.2.1 General	7
5.2.2 Selection of metrics to be evaluated	8
5.2.3 Definition of environmental conditions and performance requirements	9
5.2.4 Determination of required sample sizes	9
5.2.5 Selection of methods for generating charging input and reference data	9
5.2.6 Determination of test routes and trips	9
5.2.7 Definition of measurement time period	10
5.2.8 Documentation of the specific examination framework	10
5.3 Sources of data	10
5.4 Methods of generating charging input	13
5.4.1 General	13
5.4.2 Predefined routes (identifier: "PVP")	14
5.4.3 Reference system (used in combination with identifiers: "PVR" and "UVR")	15
5.4.4 Simulated OBE/FE (identifier: "SO")	16
5.4.5 Dedicated OBE testing (identifier: "DO")	16
<b>6 Charging performance metrics</b>	<b>17</b>
6.1 General	17
6.2 Metric identification	20
6.3 Charge report metrics	21
6.3.1 General	21
6.3.2 Metrics relevant for all schemes	21
6.3.3 Metrics only applicable to discrete schemes	22
6.3.4 Metrics applicable to continuous schemes	23
6.4 Toll declaration metrics	24
6.4.1 General	24
6.4.2 Metrics relevant for all schemes	24
6.4.3 Metrics only applicable to discrete schemes	25
6.4.4 Metrics applicable to continuous schemes	26
6.5 Billing details metrics	27
6.6 Payment claim metrics	29
6.7 Exception list metrics	30
6.8 User account metrics	31
6.9 End-to-end metrics	32
6.10 Applicability of metrics scheme types	32
6.11 Charging metric selection tables	37
6.11.1 General	37
6.11.2 Discrete	37
6.11.3 Autonomous discrete	39
6.11.4 Autonomous continuous	41
<b>7 Examination tests</b>	<b>43</b>
7.1 General	43
7.2 Technology-independent tests	43
7.2.1 General	43

7.2.2	ET-CM-E2E-1 E2E — Correct charging rate .....	43
7.2.3	ET-CM-E2E-2 E2E — Overcharging rate .....	44
7.2.4	ET-CM-E2E-3 E2E — Undercharging rate .....	45
7.2.5	ET-CM-E2E-4 E2E — Late charging rate .....	46
7.2.6	ET-CM-UA-1 UA — Correct charging rate .....	46
7.2.7	ET-CM-UA-2 UA — Overcharging rate .....	47
7.2.8	ET-CM-UA-3 UA — Undercharging rate .....	48
7.2.9	ET-CM-UA-4 UA — Accurate application of payments and refunds .....	49
7.2.10	ET-CM-UA-5 UA — Accurate personalization of OBEs .....	49
7.2.11	ET-CM-EL-1 EL — Correct exception list generation rate .....	50
7.2.12	ET-CM-EL-2 EL — Incorrect exception list generation rate .....	50
7.2.13	ET-CM-PC-1 PC — Correct charging rate .....	51
7.2.14	ET-CM-PC-2 PC — Overcharging Rate .....	52
7.2.15	ET-CM-PC-3 PC — Undercharging rate .....	53
7.2.16	ET-CM-PC-4 PC — Latency — TC .....	53
7.2.17	ET-CM-PC-5 PC — Late payment claims rate .....	54
7.2.18	ET-CM-PC-6 PC — Rejected payment claim rate .....	55
7.2.19	ET-CM-BD-1 BD — Correct charging rate .....	55
7.2.20	ET-CM-BD-2 BD — Overcharging rate .....	56
7.2.21	ET-CM-BD-3 BD — Undercharging rate .....	57
7.2.22	ET-CM-BD-4 BD — Incorrect charging rate .....	57
7.2.23	ET-CM-BD-5 BD — Latency — TC .....	58
7.2.24	ET-CM-BD-6 BD — Late billing details rate .....	59
7.2.25	ET-CM-BD-7 BD — Rejected billing details rate .....	59
7.2.26	ET-CM-BD-8 BD — Incorrectly rejected billing details rate .....	60
7.2.27	ET-CM-BD-9 BD — Inferred billing details rate .....	60
7.2.28	ET-CM-CR-1 CR — Usage evidence availability .....	61
7.2.29	ET-CM-CR-2 CR — Usage evidence integrity .....	61
7.2.30	ET-CM-CR-3 CR — Usage evidence time-to-first-fix .....	62
7.3	Technology-dependent tests .....	63
7.3.1	Autonomous discrete specific examination tests .....	63
7.3.2	Discrete — Optional toll declaration metrics .....	73
7.3.3	Autonomous continuous specific examination tests .....	76
	<b>Annex A (informative) Examination test documentation template .....</b>	<b>86</b>
	<b>Annex B (informative) Examination framework considerations .....</b>	<b>87</b>
	<b>Annex C (informative) Statistical considerations .....</b>	<b>90</b>
	<b>Annex D (informative) Methods for reducing sample sizes during the evaluation phase .....</b>	<b>95</b>
	<b>Annex E (informative) Examples of specific examination frameworks .....</b>	<b>99</b>
	<b>Annex F (informative) Defining performance requirements .....</b>	<b>110</b>
	<b>Bibliography .....</b>	<b>118</b>