

<b>STN</b>	<b>Špecifikácia a overovanie spotreby energie koľajových vozidiel.</b>	<b>STN P CLC/TS 50591</b>
		34 1513

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Obsahuje: CLC/TS 50591:2013

**118739**

---

Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, odbor SÚTN, 2014  
Podľa zákona č. 264/1999 Z. z. v znení neskorších predpisov sa môžu slovenské technické normy rozmnožovať a rozširovať iba so súhlasom Úradu pre normalizáciu, metrológiu a skúšobníctvo SR.

ICS 45.060.10

English version

## **Specification and verification of energy consumption for railway rolling stock**

Spécification et vérification de la  
consommation d'énergie pour le matériel  
roulant ferroviaire

Spezifikation und Überprüfung des  
Energieverbrauchs von  
Schienenfahrzeugen

This Technical Specification was approved by CENELEC on 2013-11-05.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

# **CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels**

# Contents

Page

<b>Foreword</b> .....	<b>4</b>
<b>1 Scope</b> .....	<b>5</b>
<b>2 Normative references</b> .....	<b>5</b>
<b>3 Terms, definitions and abbreviations</b> .....	<b>5</b>
<b>3.1 Terms and definitions</b> .....	<b>5</b>
<b>3.2 Abbreviations</b> .....	<b>7</b>
<b>4 General</b> .....	<b>7</b>
<b>5 Infrastructure description</b> .....	<b>8</b>
<b>5.1 General</b> .....	<b>8</b>
<b>5.2 Longitudinal profile</b> .....	<b>8</b>
<b>5.3 Speed profile</b> .....	<b>9</b>
<b>5.4 Curves</b> .....	<b>9</b>
<b>5.5 Tunnels</b> .....	<b>9</b>
<b>5.6 Electric traction system</b> .....	<b>9</b>
<b>5.7 Diesel fuel oil specifications</b> .....	<b>10</b>
<b>6 Operational requirements</b> .....	<b>10</b>
<b>6.1 General</b> .....	<b>10</b>
<b>6.2 In-service operation mode</b> .....	<b>10</b>
<b>6.3 Out of service mode</b> .....	<b>12</b>
<b>6.4 Environmental conditions</b> .....	<b>13</b>
<b>7 Simulation requirements</b> .....	<b>13</b>
<b>7.1 General</b> .....	<b>13</b>
<b>7.2 In-service operation mode</b> .....	<b>14</b>
<b>7.3 Out of service mode</b> .....	<b>14</b>
<b>7.4 Environmental conditions</b> .....	<b>15</b>
<b>7.5 Documentation</b> .....	<b>15</b>
<b>8 Verification</b> .....	<b>15</b>
<b>8.1 General</b> .....	<b>15</b>
<b>8.2 Infrastructure conditions</b> .....	<b>15</b>
<b>8.3 Timetable verification</b> .....	<b>16</b>
<b>8.4 Environmental conditions</b> .....	<b>16</b>
<b>8.5 Measurement equipment</b> .....	<b>16</b>
<b>8.6 Test rules</b> .....	<b>16</b>
<b>8.7 Documentation</b> .....	<b>17</b>
<b>9 Post processing</b> .....	<b>17</b>
<b>9.1 General</b> .....	<b>17</b>
<b>9.2 Train data</b> .....	<b>17</b>
<b>9.3 Time and driving style</b> .....	<b>17</b>
<b>9.4 Environmental conditions</b> .....	<b>18</b>
<b>9.5 Electric network characteristics</b> .....	<b>18</b>
<b>Annex A (normative) Definition of standard parameters</b> .....	<b>19</b>
<b>A.1 General</b> .....	<b>19</b>
<b>A.2 Infrastructure characteristics</b> .....	<b>19</b>
<b>A.3 Electric supply system characteristics</b> .....	<b>19</b>
<b>A.4 In service operation mode</b> .....	<b>20</b>
<b>A.5 Parked train service mode</b> .....	<b>21</b>
<b>A.6 Ambient conditions with seasonal changes</b> .....	<b>21</b>
<b>Annex B (normative) Definition of standard values for service profiles</b> .....	<b>22</b>
<b>B.1 General remarks</b> .....	<b>22</b>
<b>B.2 Suburban passenger traffic</b> .....	<b>22</b>
<b>B.3 Regional passenger traffic</b> .....	<b>23</b>
<b>B.4 Intercity passenger traffic</b> .....	<b>24</b>

<b>B.5 High-speed passenger traffic</b> .....	<b>25</b>
<b>B.6 Freight mainline</b> .....	<b>26</b>
<b>Bibliography</b> .....	<b>30</b>

## Figures

<b>Figure B.1 — Standard profile SUBURBAN</b> .....	<b>22</b>
<b>Figure B.2 — Standard profile REGIONAL</b> .....	<b>23</b>
<b>Figure B.3 — Standard profile INTERCITY</b> .....	<b>24</b>
<b>Figure B.4 — Standard profile HIGHSPEED</b> .....	<b>26</b>
<b>Figure B.5 — Standard profile FREIGHT mainline</b> .....	<b>27</b>

## Tables

<b>Table A.1 — Infrastructure characteristics</b> .....	<b>19</b>
<b>Table A.2 — Electric supply system characteristics</b> .....	<b>20</b>
<b>Table A.3 — In service operation mode</b> .....	<b>20</b>
<b>Table A.4 — Parked train service mode</b> .....	<b>21</b>
<b>Table A.5 — Ambient conditions with seasonal change</b> .....	<b>21</b>
<b>Table B.1 — Data of the SUBURBAN profile</b> .....	<b>23</b>
<b>Table B.2 — Data of the REGIONAL profile</b> .....	<b>24</b>
<b>Table B.3 — Data of the INTERCITY profile</b> .....	<b>25</b>
<b>Table B.4 — Data of the HIGHSPEED profile</b> .....	<b>26</b>
<b>Table B.5 — Data of the FREIGHT mainline profile</b> .....	<b>28</b>
<b>Table B.6 — Train data of the HIGHSPEED profile</b> .....	<b>29</b>

## **Foreword**

This document (CLC/TS 50591:2013) has been prepared by CLC/TC 9X/WG 11, "Energy Measurement on-board trains", of CLC/TC 9X "Electrical and electronic applications for railways".

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

## 1 Scope

This Technical Specification is applicable to the specification and verification of energy consumption of railway rolling stock.

It establishes a criterion for the energy consumption of rolling stock to calculate the total net energy consumed, either at pantograph or from the fuel tank, over a predefined service profile, in order to assure that the results are directly comparable or representative of the real operation of the train. For this purpose this document takes into account the energy consumed and regenerated by the rolling stock.

This Technical Specification provides the framework which gives guidance on the generation comparable energy performance values for trains and locomotives on a common basis and thereby supports benchmarking and improvement of the energy efficiency of rail vehicles.

This Technical Specification does not cover specification for comparison of energy consumption with other modes of transportation, or even for comparison between diesel and electric traction, dealing only with the energy consumption of the Railway rolling stock itself. Consequently, this document is not applicable to the evaluation of the carbon foot print of the railway transportation system.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 590, *Automotive fuels — Diesel — Requirements and test methods*

EN 13129-2, *Railway applications — Air conditioning for main line rolling stock — Part 2 : Type tests*

EN 15663:2009, *Railway applications — Definition of vehicle reference masses*

EN 50163, *Railway applications — Supply voltages of traction systems*

EN 50463 (all parts), *Railway applications — Energy measurement on board trains*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**