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Railway applications – Track – Track geometry
quality –
Part 2: Measuring systems – Track recording
vehicles

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- Teil 2: Messsysteme - Gleismessfahrzeuge

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EN 13848-2:2006 (E)

Foreword

This document (EN 13848-2:2006) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European Standard is one of the series EN 13848 "*Railway applications — Track — Track geometry quality*" as listed below:

- *Part 1: Characterisation of track geometry*
- *Part 2: Measuring systems – Track recording vehicles*
- *Part 3: Measuring systems – Track construction and maintenance machines*
- *Part 4: Measuring systems – Manual and light weight devices*
- *Part 5: Geometric quality assessment*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This part 2 of the European Standard EN 13848 defines the specification for measurement systems to ensure that all track-recording vehicles produce comparable results when measuring the same track. In order to achieve this, it is essential to ensure that the methods of measurement are equivalent, the transfer functions of the filters are identical and the outputs and data storage formats are comparable. This standard doesn't define the requirements for vehicle acceptance.

EN 13848-2:2006 (E)

1 Scope

This European Standard specifies the minimum requirements for measuring principles and systems in order to produce comparable results. It applies to all measuring equipment fitted on dedicated recording vehicles, or on vehicles specifically modified for the same purpose, after the coming into force of the standard. It also defines the requirements of measurement.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 13848-1, *Railway applications – Track – Track geometry quality – Part 1: Characterisation of track geometry*

Other informative references concerning the environmental conditions (refer to 5.2) are provided in the Bibliography.

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1

track recording vehicle

self propelled or hauled vehicle with fixed, dedicated, measuring equipment and systems, used for the measurement, assessment and recording of track geometry parameters under loaded conditions, which measures and produces consistent results, to the requirements of EN 13848-1

3.2

sensor

device which detects, measures and translates characteristics of track geometry into quantities that can be used for further data processing

3.3

repeatability

degree of agreement between the values of successive measurements of the same parameter made under the same conditions (speed, direction of measurement), where the individual measurements are carried out on the same section of track subject to the following controls:

- same measurement method;
- same vehicle orientation;
- same method of interpretation;
- similar environmental conditions;
- short period of time between successive runs.

3.4

reproducibility

degree of agreement between the values of successive measurements of the same parameter made under varying conditions, where the individual measurements are carried out on the same section of track using the same measurement and interpretation methods, subject to one or more of the following:

- variation of speed;
- different directions of measurement;
- different vehicle orientations;
- different environmental conditions;
- short period of time between successive runs.

3.5

comparability

degree of agreement of different track recording vehicles achieved under the same conditions

3.6

validation

set of tests for determining if a track recording vehicle complies with the requirements of this standard

3.7

calibration

set of procedures for adjusting the measuring devices of track recording vehicles in order to meet the requirements of this standard

3.8

event

record of a track or line-side feature that can be either technical, physical or natural

3.9

localisation

information required to locate events and the measured track geometry

3.10

reference track

track with known characteristics necessary to allow adequate testing of the track geometry recording system

4 Symbols and abbreviations

For the purposes of this European Standard, the following symbols and abbreviations apply.

Table 1

No.	Symbol	Designation	Unit
1	$D1$	Wavelength range $3 \text{ m} < \lambda \leq 25 \text{ m}$	m
2	$D2$	Wavelength range $25 \text{ m} < \lambda \leq 70 \text{ m}$	m
3	$D3$	Wavelength range $70 \text{ m} < \lambda \leq 150 \text{ m}$ for longitudinal level Wavelength range $70 \text{ m} < \lambda \leq 200 \text{ m}$ for alignment	m
4	L_o	Lower limit of wavelength range $D1, D2, D3$	m
5	L_u	Upper limit of wavelength range $D1, D2, D3$	m
6	λ	Wavelength	m
7	ℓ	Twist base-length	m

5 Track recording vehicle

5.1 General description

For the purpose of this standard, the track geometry recording system of the vehicle is divided into several units as represented in Figure 1 below:

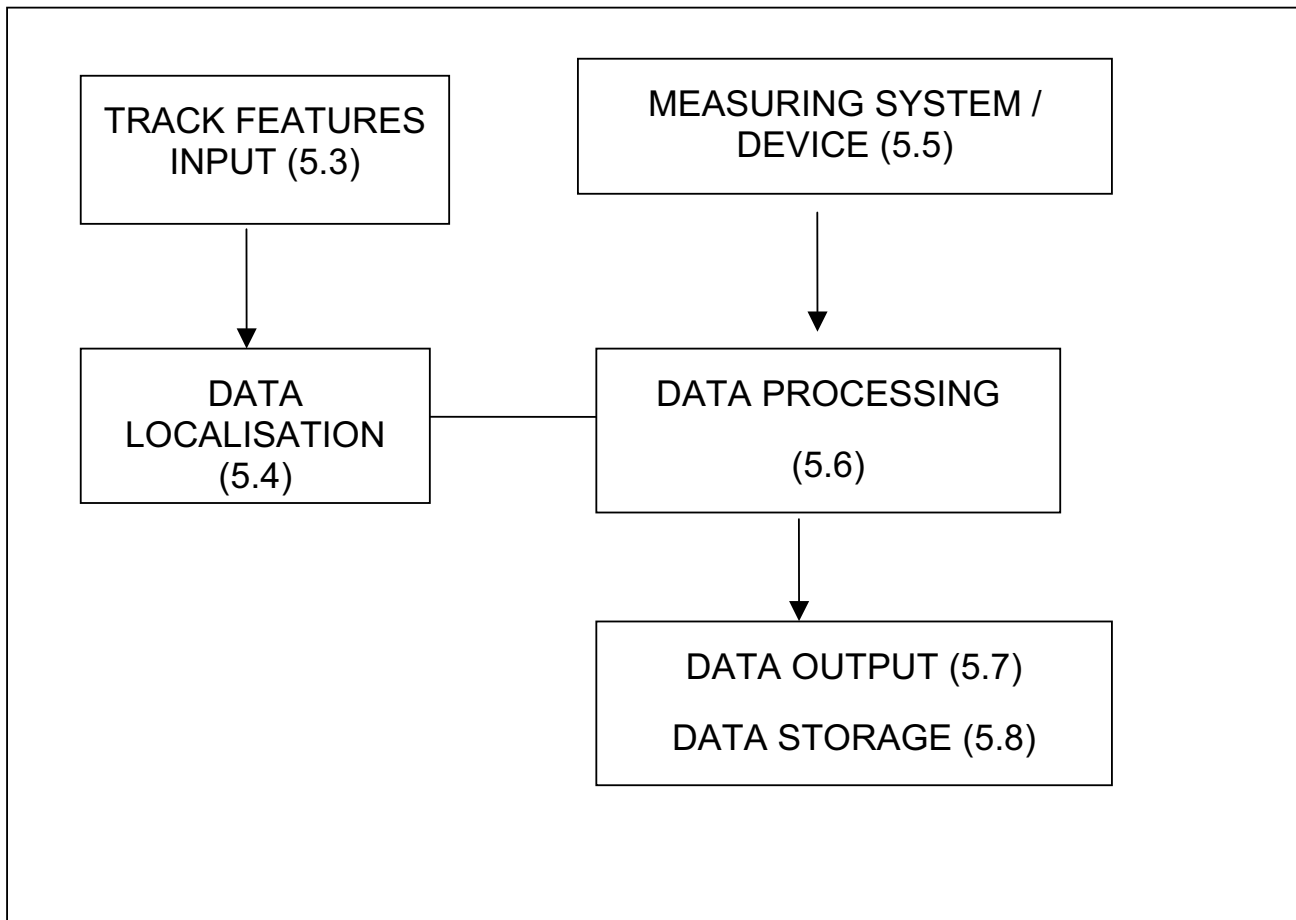


Figure 1 — Track geometry recording system

The track recording vehicle shall produce consistent results, irrespective of the measuring speed and direction of travel. These results can be used for track quality monitoring, maintenance planning and safety assurance as related to track geometry.

The track geometry recording system represents the totality of the equipment permanently installed on a track recording vehicle, intended to:

- measure track geometry parameters;
- measure the distance run by the vehicle during measuring operations;
- associate these two measurements in order to locate precisely on the track the values exceeding a prescribed threshold or other elements characterising the track;
- record these parameters on paper or on computer readable media;
- calculate, based on the direct measured parameters, other parameters of the track geometry (twist, curvature);
- process the measured data, preferably on board, in order to analyse the track geometry parameters;
- store the results analysis, preferably on board, in a form easily transferable to a database.

The output of the track geometry recording system shall meet the individual parameter requirements of EN 13848-1. All the measurements specified in EN 13848-1 shall be taken and stored during the run. They shall be graphically recorded and analysed in strict relation to the corresponding distance location.

The track geometry recording system shall be controlled and shall, either by means of contact-type or non-contact type sensors, allow track geometrical measurements as specified in EN 13848-1 under loaded conditions of the track.

The speed range shall be from standstill to the maximum permissible measuring speed of the vehicle if a chord-type measuring system is used; if an inertial-type measurement is used, a minimum speed may be necessary to measure some parameters (5 km/h is recommended).

The computer system shall be of a kind and type suitable for railway vehicle bound applications and shall represent a widely used and supported technology.

To prevent the interruption of the track geometry measurement and the loss of recorded data in case the measuring hardware power supply fails, it is recommended that an adequate uninterruptible power supply be provided.

5.2 Environmental conditions

5.2.1 Introduction

All the measuring devices fitted on a track-recording vehicle shall comply with the environmental conditions specified below.

5.2.2 Climatic conditions

For outside and inside components the following elements shall be respectively considered:

- **Outside components**
 - ambient temperature;