BSI Standards Publication

Railway applications — Classification system for railway vehicles

Part 4: Function groups

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National foreword

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Normative: Requirements conveying criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted.

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When rounded values require unit conversion for use in the UK, users are advised to use equivalent values rounded to the nearest whole number. The use of absolute values for converted units should be avoided in these cases. For example:

5 km/h has an equivalent value of 3 mile/h

The UK participation in its preparation was entrusted to Technical Committee RAE/1, Railway Applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2013.

ISBN 978 0 580 67611 6

ICS 01.110; 45.060.01

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2013.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15380-4

January 2013

ICS 01.110; 45.060.01

English Version

Railway applications - Classification system for railway vehicles - Part 4: Function groups

Applications ferroviaires - Système de classification pour véhicules ferroviaires - Partie 4: Groupes des fonctions

Bahnanwendungen - Kennzeichnungssystematik für Schienenfahrzeuge - Teil 4: Funktionsgruppen

This European Standard was approved by CEN on 3 November 2012.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Ref. No. EN 15380-4:2013: E

Contents

Figures

Tables

Foreword

This document (EN 15380-4:2013) 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 July 2013, and conflicting national standards shall be withdrawn at the latest by July 2013.

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

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

This series of European Standards "*Railway applications — Classification system for railway vehicles*" consists of the following parts:

— *Part 1: General principles*;

— *Part 2: Product groups*;

— *Part 3: Designation of installation sites and locations*;

— *Part 4: Function groups* (the present document);

— *Part 5: Systems, System groups — System requirements*.

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

Introduction

The Functional Breakdown Structure is used by all parties involved in the rolling stock product definition phase and the following processes to structure the functional requirements and use cases according to a standardized list of functions. It starts with the concept and spreads across the whole product life cycle. During this period, the level of detail of the structure could be adapted according to the project progress. This means that functions in a product concept catalogue mainly are described by requirements. The transfer into implementable hardware and software takes place later.

The Product Breakdown Structure (PBS) shown in EN 15380-2 and the Functional Breakdown Structure (FBS) shown in EN 15380-4 complement each other. While the PBS, consisting of the standardized list of subsystems and devices, is used for structuring system requirements and related use cases, the FBS standard describes the functions of a vehicle and is used to obtain a correlation between functional requirements and the structure of functions and the related use cases. These structures describe different views on the rolling stock product. The importance of the two structures may be different according to the users' tasks as well the project stage (see also EN 15380-1:2006, Annex C).

The FBS can also be used for specifying tasks as well as for analysing tasks.

The functional assessment supports the whole engineering process and the field of RAMS/LCC (Reliability, Availability, Maintainability, Safety/Life-Cycle Costs). Often during the project process RAMS/LCC values have to be given at a stage when insufficient information regarding the technical solution is available. (At this stage of a project, EN 15380-2 is not applicable.)

In all cases in which functionality is a key issue (e.g. safety and reliability analyses, inspections and testing, maintenance programmes, field data acquisition and related documentation), communication is based on a functional vehicle structure composed of functional groups – particularly when cross-system or interdisciplinary considerations are important.

Functions are grouped into levels regardless of their vehicle specific technical realisation. Hence the function groups and function descriptions were developed without considering how each function may be achieved in practice. This is consistent with the EN 81346 series. This also applies when the functional vehicle breakdown structure is met in tracing vehicle properties, for example during the validation phase. Many of the required properties fixed in the product concept catalogue are realised, diagnosed and rated as functioning or malfunctioning during operation. Only afterwards is the link made to the physical structure and then to the assessment of the function of technical solutions.

There is not necessarily a simple one to one relationship between each function and its technical realisation. A system or item of equipment can contribute to different functions at the same time or in sequence. This means that an entity can be related to different functions and even from different levels (see Annex A).

Assignment of examples for well known function carriers are given for easier understanding.

1 Scope

This European Standard is concerned with the functions associated with general railway vehicles or their assemblies. It covers functionality associated with systems and equipment such as wheelsets and bogies, doors, brakes and traction.

This standard may also be applied to railway vehicles with very specific functions like track machines and snow ploughs. However, while the functions that are common with general railway vehicles are included, the functions which are specific to their work processes are not included in this standard. They will be added for these individual projects.

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 15663, *Railway applications — Definition of vehicle reference masses*

3 Terms and definitions

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

3.1
function
specific purpose or objective to be accomplished, that can be specified or described without reference to the physical means of achieving it

[SOURCE: IEC 61226:2009]

Note 1 to entry: A function transfers (considered as a black-box) input parameters (material, energy, information) into aim related output parameters (material, energy, information) performed by technical means and/or human beings.

3.2
transverse function
sub function which may apply to more than one higher level function

Note 1 to entry: For example, providing diagnostics or displaying information.

3.3
Functional Breakdown Structure (FBS)
hierarchical structure summarising a set of functions leading to the same general focus or service

Note 1 to entry: To define the level of a function within a FBS, see Clause 5.

3.4
function level
level of group functions of equal purpose

Note 1 to entry: Assignment to the appropriate level is described in the rules.

3.4.1
1st level function
functional domain or general focus or service for the considered (rolling stock) system