

Tanks for transport of dangerous goods — Digital interface for the product recognition device

The European Standard EN 14116:2003, with the incorporation of amendment A1:2005, has the status of a British Standard

ICS 13.300; 23.020.20; 35.240.60

National foreword

This British Standard is the official English language version of EN 14116:2003, including amendment A1:2005.

The start and finish of text introduced or altered by CEN amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee AUE/18, Tanks for the transport of dangerous goods, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 29 and a back cover.

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Amendments issued since publication

Amd. No.	Date	Comments
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English version

**Tanks for transport of dangerous goods - Digital interface for the
product recognition device**
(includes amendment A1:2005)

Citernes destinées au transport de marchandises
dangereuses - Interface numérique du dispositif de
reconnaissance de produits
(inclut l'amendement A1:2005)

Tanks für die Beförderung gefährlicher Güter - Digitale
Schnittstelle für das Produkterkennungssystem
(enthält Änderung A1:2005)

This European Standard was approved by CEN on 21 April 2003. Amendment A1 was approved by CEN on 28 July 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

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



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Foreword

This document (EN 14116:2003) has been prepared by Technical Committee CEN/TC 296 “Tanks for the transport of dangerous goods”, the secretariat of which is held by AFNOR.

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 December 2003, and conflicting national standards shall be withdrawn at the latest by December 2003.

Annexes A, B, and D are informative, Annex C is normative.

The user's attention is called to the possibility that for the hose communication methods described within this document use of an invention covered by patent rights may be required, see Annex B (informative).

This European Standard forms part of a coherent standards program comprising the following European Standards:

EN 13922, *Tanks for transport of dangerous goods with vapour pressure not exceeding 110 kPa at 50 °C (including petrol) – Service equipment – Level detection – Secondary shut off control system.*

prEN 13616, *Overfill prevention devices for static tanks for liquid petroleum fuels.*

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

Foreword to amendment A1

This European Standard (EN 14116:2003/A1:2005) has been prepared by Technical Committee CEN/TC 296 “Tanks for transport of dangerous goods”, the secretariat of which is held by AFNOR.

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

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

Product recognition, the subject of the standard, is the digital interface that allows product data and/or other information to be transferred between transport tanks and other installations.

1 Scope

This European Standard covers the digital interface at the product loading and/or discharge coupling which shall be used for the transfer of product related information and specifies the performance requirements, critical safety aspects and tests to provide compatibility of devices.

This European Standard specifies a digital interface which is suitable for use with liquid fuels.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 28601, *Data elements and interchange formats - Information interchange - Representation of dates and times*. (ISO 8601:1988 and technical corrigendum 1:1991).

EN 50014, *Electrical apparatus for potentially explosive atmospheres - General requirements*.

EN 50020, *Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i"*.

ISO 2859-1, *Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*.

3 Terms, definitions and abbreviations

3.1 Definitions

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

3.1.1

message

defined data set

3.1.2

telegram

frame that contains at least one standardized message

3.1.3

maximum input voltage (U_i)

according to EN 50020

3.1.4

maximum output voltage (U_0)

according to EN 50020

3.1.5

maximum input current (I_i)

according to EN 50020

3.1.6

maximum output current (I_0)

according to EN 50020

3.1.7

maximum input power (P_i)

according to EN 50020

3.1.8

maximum output power (P_0)

according to EN 50020

3.1.9

maximum internal capacitance (C_i)

according to EN 50020

3.1.10

maximum internal inductance (L_i)

according to EN 50020

3.2 Abbreviations

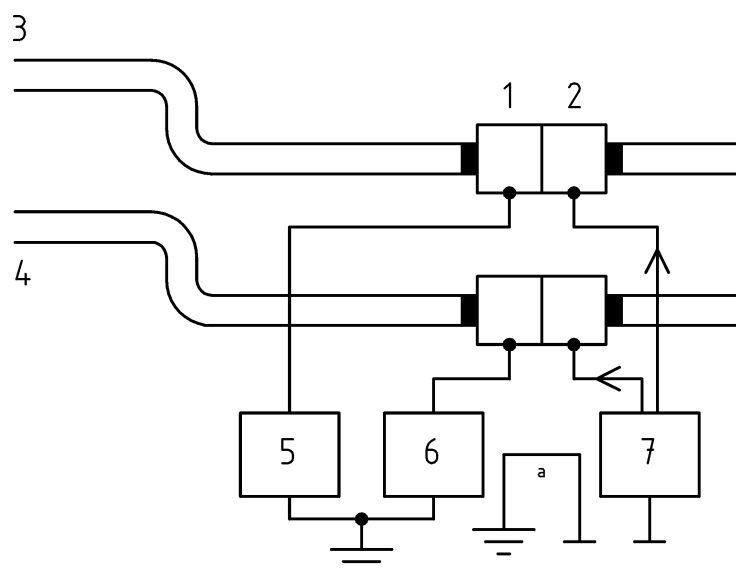
For the purpose of this European Standard, the following abbreviations apply:

AFTP	Association française des techniciens du pétrole
ASCII	American Standard Code for Information Interchange
CFPP	Cold Filter Plugging Point
ESD	Electro-Static Discharge
LSB	Least Significant Bit
MSB	Most Significant Bit
PID	Product Identification Device
PRD	Product Recognition Device
RON	Research Octane Number

4 Functions

Whenever a physical connection according to Figure 1 or Figure 2 is made, the digital interface enables the transfer of product recognition data to the transport tank. The purpose of this digital interface is to provide the data of the following types of applications:

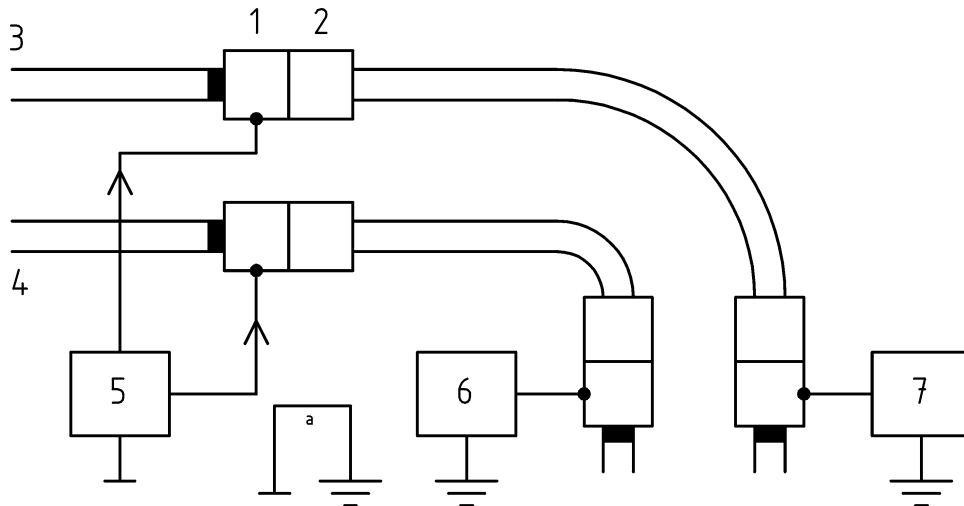
- a) automatic product identification for each compartment or tank;
- b) cross over prevention.



Key

- 1 Pipework of loading arm with insulated coupling
- 2 Pipework of transport tank with insulated coupling
- 3 Vapour line
- 4 Product line
- 5 PID, vapour
- 6 PID, product
- 7 PRD
- ^a Required, if only one connection is established

Figure 1 — Loading



Key

- 1 Pipework of transport tank with insulated coupling
- 2 Conductive hoses^b and pipework of stationary tank with insulated couplings
- 3 Vapour line
- 4 Product line
- 6 PID, product
- 5 PRD
- 7 PID, vapour
- ^a Required, if only one connection is established
- ^b If the discharge hoses are not conductive then the conductivity of these hoses shall be achieved by other means

Figure 2 — Unloading

PRD supplies an intrinsically safe circuit.

Hazardous area zoning vicinity of coupling and swivels - Zone 1, inside pipework - Zone 0.

5 Design characteristics

5.1 General

The PRD shall be located on the transport tank. The PID shall be connected in series to a current loop with the PRD.

The PRD reads the PID by powering the PID through the hose or loading arm. The PID then sends its data by modulating the supply current, which is sensed by the PRD, see Figure 3.

The PID sends its data, using messages, which are numbered from 1 to 255.

The PID always transmits "message #1". By implementing more messages, it is possible to program the PID with other types of information, see 6.6.

Since the PID modulates the supply current, PID's shall not be connected in parallel.