



# SLOVENSKI STANDARD

## SIST EN 14116:2003

01-december-2003

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### Posode za prevoz nevarnih snovi - Digitalni vmesnik za prepoznavalno napravo polnjenja

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

Tanks für die Beförderung gefährlicher Güter - Digitale Schnittstelle für das Produkterkennungssystem

Citernes destinées au transport de marchandises dangereuses - Interface numérique du dispositif de reconnaissance de produits

**Ta slovenski standard je istoveten z: EN 14116:2003**

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#### **ICS:**

13.300	Varstvo pred nevarnimi izdelki	Protection against dangerous goods
23.020.20	Posode in vsebniki, montirani na vozila	Vessels and containers mounted on vehicles
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

**SIST EN 14116:2003**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 14116**

June 2003

ICS 13.300; 23.020.20; 35.240.60

English version

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

Citernes destinées au transport de marchandises dangereuses - Interface numérique du dispositif de reconnaissance de produits

Tanks für die Beförderung gefährlicher Güter - Digitale Schnittstelle für das Produkterkennungssystem

This European Standard was approved by CEN on 21 April 2003.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

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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.

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EN 14116:2003 (E)

## 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.

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## 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

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### 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

**EN 14116:2003 (E)****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

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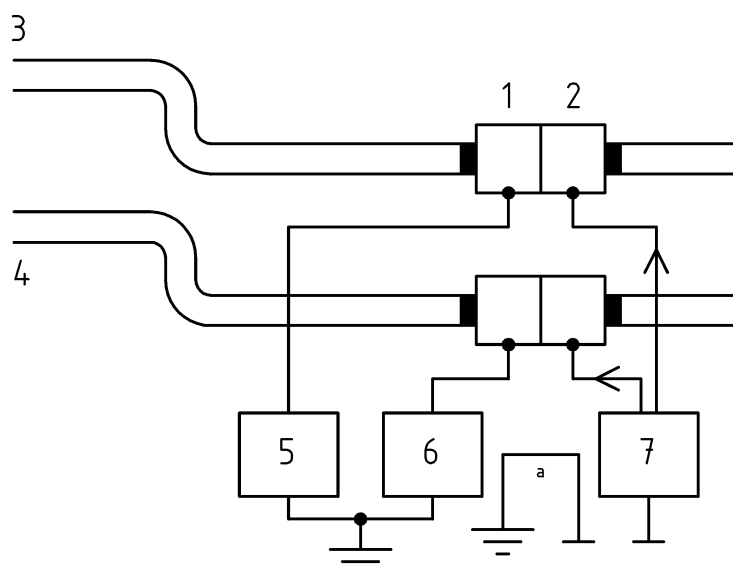
<https://standards.iteh.ai/catalog/standards/sist/54cbb8ce-bf4b-4b95-a00c-7bbad86ff198/sist-en-14116-2003>

**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

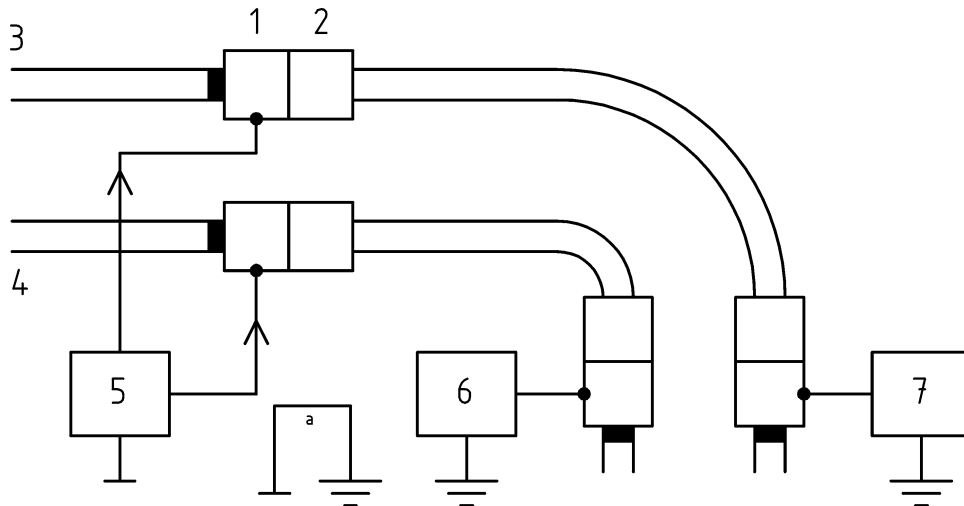
- 1 Pipework of loading arm with insulated coupling
- 2 Pipework of transport tank with insulated coupling
- 3 Vapour line
- 4 Product line
- 5 PID, vapour
- 6 PID, product
- 7 PRD

<sup>a</sup> Required, if only one connection is established [SIST EN 14116:2003](https://standards.iteh.ai/catalog/standards/sist/54cbb8ce-bf4b-4b95-a00c-7bbad5c9083e/en-14116-2003)

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**Figure 1 — Loading**

## EN 14116:2003 (E)

**Key**

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

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<https://standards.iteh.ai/standards/standards/7bbad86ff198/sist-en-14116-2003> **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

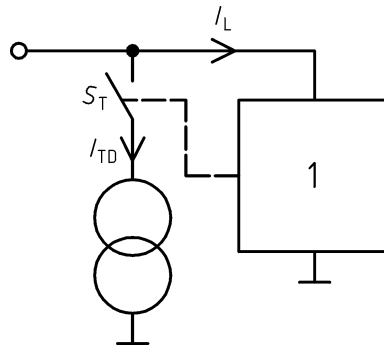
The PRD shall be located on the transport tank. The PID shall be connected in series to a current loop with the PRD.

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.



### Components

- 1 Electronic circuit
- $S_T$  Modulating switch
- $I_L$  Supply current without modulation
- $I_{TD}$  Supply current amplitude

Figure 3 — Basic circuit diagram of PID

## 5.2 Temperature range

Unless otherwise specified, the operating temperature range shall be  $-20\text{ °C}$  to  $+50\text{ °C}$ .

Where the product recognition device is subjected to temperatures outside the specified temperature range all applicable temperature values shall be extended. All other requirements shall remain unchanged.

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## 5.3 Materials of construction

The manufacturer shall provide with the equipment a full material specification for those parts, which may come into contact with the substances according to clause 1.

## 5.4 PRD

The PRD shall provide an intrinsically safe power supply with the values according to Table 1 to the PID.

Table 1 — DC electrical characteristics of PRD

Parameter	Unit	Min	Nom	Max	Ex-values <sup>a</sup>
Open-circuit voltage	V	11	12	15	$U_0 \leq 15$
Short-circuit current	mA	-	-	300	$I_0 \leq 300$
Output power	W	-	-	1,1	$P_0 \leq 1.1$
<sup>a</sup> Maximum value to ensure compliance with EN 50020.					

Explosive protection shall be at least EEx ia IIA according to EN 50014 and EN 50020.

## 5.5 PID

### 5.5.1 General specification

Explosive protection shall be at least EEx ia IIA according to EN 50014 and EN 50020.

Table 2 — DC electrical characteristics of PID

Parameter	Symbol	Unit	Min	Nom	Max	Ex-values <sup>a</sup>
Supply voltage		V	6	12	15	$U_i \geq 15$
Supply current without modulation	$I_L$	mA	0	5	10	$I_i \geq 300$
Supply current at $U_+ < 3$ V	$I_{OFF}$	mA	-	-	5	-
Maximum input power	$P_i$	W	-	-	-	$\geq 1.1$
Maximum internal capacitance	$C_i$	nF	-	-	-	$\leq 600$
Maximum internal inductance	$L_i$	$\mu$ H	-	-	-	$\leq 10$

<sup>a</sup> Maximum value to ensure compliance with EN 50020.

Table 3 — AC electrical characteristics of PID

Parameter	Symbol	Unit	Min	Nom	Max
Supply current amplitude	$I_{TD}$	mA	10	15	20
Clock rate	$f_{TC}$	Hz	4 800	4 880	4 960
Duty cycle	$cd_r$	%	40	50	60
Rise time of output signal	$t_{Tr}$	$\mu$ s	0	-	30
Fall time of output signal	$t_{Tf}$	$\mu$ s	0	-	30
Transmission delay after power on	$t_{Tds}$	ms	0	-	0,9

The timing diagram of PID is shown in Figure 4.