SLOVENSKI STANDARD
SIST EN 16330:2014

01-januar-2014

Oprema za vzdrževalna dela zimske službe in službe za vzdrževanje cest - Pogon in krmiljenje priključenega stroja - Hidravlični sistemi in električni vmesniki

Winter and road service area equipment - Power system and related controls - Power hydraulic system and electric interfaces

Winterdienst- und Straßenbetriebsdienstausstattung - Antrieb und Steuerung von Anbaumaschinen - Leistungshydraulik und elektrische Schnittstellen

Matériels de viabilité hivernale et d'entretien des dépendances routières - Organes de puissance et commandes associées - Organes de puissance hydrauliques et interfaces électriques

Ta slovenski standard je istoveten z: **EN 16330:2013**

ICS:

43.160	Vozila za posebne namene	Special purpose vehicles

SIST EN 16330:2014 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16330

April 2013

ICS 43.160

English Version

Winter and road service area equipment - Power system and related controls - Power hydraulic system and electric

Matériels de viabilité hivernale et d'entretien des dépendances routières - Organes de puissance et commandes associées - Organes de puissance hydrauliques et interfaces électriques

Winterdienst- und Straßenbetriebsdienstausstattung - Antrieb und Steuerung von Anbaumaschinen - Leistungshydraulik und elektrische Schnittstellen

This European Standard was approved by CEN on 7 March 2013.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 16330:2013: E

Contents

Page

Foreword 3

1 Scope 4

2 Normative references 4

3 Power hydraulic system for municipal vehicles – requirements 4
3.1 Classification of power hydraulic systems 4
3.2 Drive of the oil pump 4
3.3 Hydraulic system 4
3.4 Connection between the hydraulic system of the vehicle and the implements 5
3.5 Flow rates 5
3.6 Pressure 5
3.7 Power 5
3.8 Capacity of the oil tank 5
3.9 Maximum oil temperature, cooling capacity test procedure 5
3.9.1 General 5
3.9.2 Cooling capacity test procedure 5
3.9.3 Example for calculating the Δp for the test, which has to be adjusted at the flow restrictor 7
3.10 Line cross sections 7
3.11 Couplings and functions 8
3.11.1 Hydraulic system class 1 8
3.11.2 Hydraulic system class 2 8
3.12 Screwed joints 9
3.12.1 Plug, male with coupling nut (female thread), pressure line, green 9
3.12.2 Socket, female (male thread), separate return line, black 10
3.12.3 Table of thread dimensions, male thread H2 10
3.12.4 Tables of coupling dimensions [mm] 12
3.13 Hydraulic fluid 12

4 Power supply 24V/125A for electrical hydraulic unit 12
4.1 Use of the socket 12
4.2 Specification of the socket 13
4.3 Circuit diagram 14
4.4 Maximum current 14

5 Universal electrical connection 15
5.1 General 15
5.2 Receptacle at the vehicle front and behind the cabin 15
5.3 Plug for implement cable fitting to socket according to 5.2 17
5.4 Correspondent in-cabin receptacle to the front-mounted socket fitting to 5.2 18
5.5 Plug for control unit cable fitting to 5.4 20
5.6 Correspondent in-cabin receptacle to the socket 5.2 behind the cabin 21
5.7 Plug for implement cable fitting to socket according to 5.6 22

Bibliography 23

Foreword

This document (EN 16330:2013) has been prepared by Technical Committee CEN/TC 337 “Winter maintenance and road service area maintenance equipment”, 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 October 2013, and conflicting national standards shall be withdrawn at the latest by October 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.

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.

1 Scope

This European Standard applies to power systems equipped for operation and to drive implements and attachments such as hydraulic driven front sweepers, mowers or suction sweepers on winter service vehicles or road service vehicles equipped with front-mounting plates according to EN 15432-1.

The purpose of this standard is to ensure interchangeability of vehicles and implements. The minimum requirements on the performance and the components of the hydraulic system, as well as the kind and the size of the connecting elements between the vehicle and the implement, are specified in the standard.

Clause 3 of this standard does not cover applications where the implements need a continuous hydraulic oil flow less than 45 l/ min.

Clause 4 is dealing with the electrical connection between vehicle and implement to drive an electrically driven hydraulic pump, used in trucks without hydraulic systems.

Clause 5 is dealing with a universal electrical connection used for front mounted mowers, spreaders and other road service area equipment with the following functions: power supply and transmitting CAN BUS signals.

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.

ISO 16028, *Hydraulic fluid power — Flush-face type, quick-action couplings for use at pressures of 20 MPa (200 bar) to 31,5 MPa (315 bar) — Specifications*

ISO 16844-2, *Road vehicles — Tachograph systems — Part 2: Electrical interface with recording unit*

3 Power hydraulic system for municipal vehicles – requirements

3.1 Classification of power hydraulic systems

In this document, two different power hydraulic systems are standardized:

— class 1: medium power system;

— class 2: high power system.

3.2 Drive of the oil pump

The oil pump shall be driven directly by the vehicle engine and independently from the vehicle drive train. A clutch or a coupling between the engine and the pump is permissible. A drive ratio between the engine and the pump is allowed.

3.3 Hydraulic system

The hydraulic system consists of one open type circuit.

The hydraulic system consists in either one variable displacement pump or one or two constant pumps.

If there are two constant pumps, the flow rates shall be added (parallel circuits).

The system consists of:

— one primary excess pressure protection device; and

— one switching device for unpressurised circulation. Each circuit or both circuits together shall be equipped with an oil reservoir and a filter for protection of the hydraulic system.

A load sensing signal is optional.

3.4 Connection between the hydraulic system of the vehicle and the implements

Hydraulic connectors shall be:

— quick couplings for the system class 1 (see Table 2);

— screwed joints for the system class 2 (refer to 3.12).

3.5 Flow rates

— Nominal flow rate system class 1: min. 45 l/ min, max. 60 l/ min at 75 % of the nominal engine speed

— Nominal flow rate system class 2: min. 60 l/ min, max. 100 l/ min at 75 % of the nominal engine speed

3.6 Pressure

— Pressure system class 1: min. 20 MPa (200 bar), max. 24 MPa (240 bar)

— Pressure system class 2: min. 24 MPa (240 bar), max. 30 MPa (300 bar)

3.7 Power

— Minimum continuous power system class 1: P_{min} = 15 kW

— Minimum continuous power system class 2: P_{min} = 24 kW

3.8 Capacity of the oil tank

The capacity of the oil tank shall be such, that a removal by the implements up to 15 l shall not affect the ability of the hydraulic system to work properly.

3.9 Maximum oil temperature, cooling capacity test procedure

3.9.1 General

The cooling capacity of the hydraulic system for road service vehicles shall be at least 50 % of the minimum continuous power (see 3.7).

An oil cooler shall be installed in the return to the oil tank via filter.

3.9.2 Cooling capacity test procedure

The cooling capacity shall be verified with a test, which is described below.

While executing the hydraulic system test, the difference between the hydraulic oil temperature in the oil tank and the ambient air temperature shall not exceed ΔT = 50 K, i.e. with an ambient air temperature of 30 °C, the hydraulic oil temperature in the oil tank shall not exceed 80 °C.

An adjustable restrictor for simulating the power loss shall be connected to the couplings of the hydraulic system. The restrictor should be adjusted to a value Δp that gives a power absorption equivalent to 50 % of the minimum continuous power at 75 % of the rated engine speed. During the test, a temperature difference between the hydraulic oil temperature in the oil tank and the ambient air temperature of ΔT = 50 K shall not be exceeded.

The oil temperature has to be measured at the outlet of the oil tank.

Variable displacement pumps shall be fixed to the maximum swivel angle.

For testing the system, the fans of the hydraulic oil cooler need to be engaged.

Test condition: ambient air temperature 25 °C ± 10 °C.

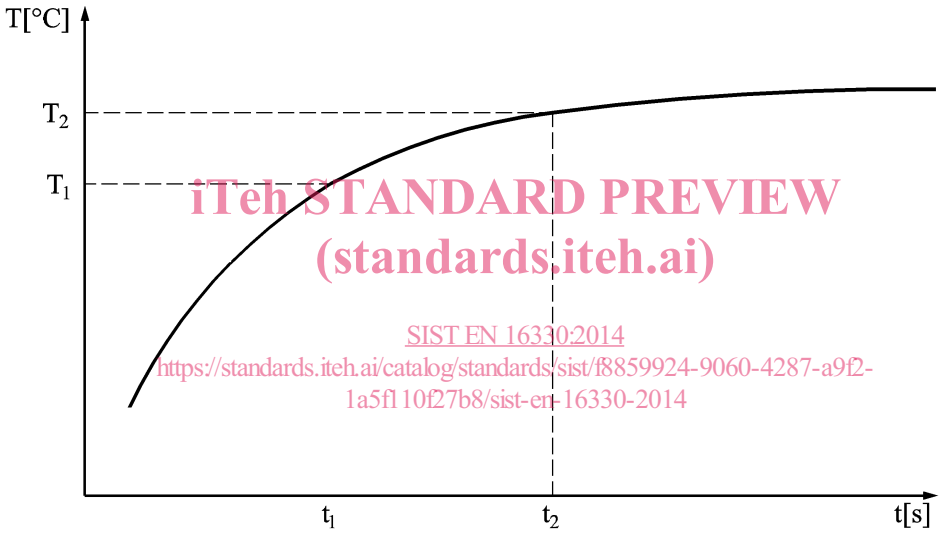


Figure 1 — Temperature rise over time

The test can be terminated when the temperature gradient (T_2 – T_1) / (t_2 – t_1) is less than 5 K / 20 min.

Table 1 — Minimum cooling capacity

	Cooling capacity [% of the minimum continuous power]	max. ΔT [K]
Winter maintenance vehicle	10	50
Road service vehicle (winter and summer use)	50	50

T oil temperature at the outlet of the oil tank

ΔT temperature difference between the hydraulic oil temperature in the oil tank and the ambient air temperature

t time

$$P = Q \times p \quad (1)$$

where

P is power according to the minimum continuous power (see 3.7);

Q is volume flow of circuit 2 at 75 % of the rated engine speed (maximum volume flow when variable displacement pumps are being used);

p is adjusted pressure at the flow restrictor.

3.9.3 Example for calculating the Δp for the test, which has to be adjusted at the flow restrictor

Power hydraulic system, e.g. class 2 ➔ P_{min} = 24 kW (3.7)

Rated engine speed, e.g. 2 200 min^{-1} ➔ 75 % of rated engine speed = 1 650 min^{-1}

Cooling capacity 50 % ➔ 50 % of 24 kW = 12 kW

Calculation of the pressure at the flow restrictor: $\Delta p = P/Q$

e.g. Q = 80 l/ min, P = 12 kW ➔ Δp = 90 bar

With this value of Δp, the test has to be executed.

3.10 Line cross sections

System class 1	min. internal diameter 12 mm
System class 2	min. internal diameter 20 mm
Separate return line via filter/oil cooler system class 1	min. internal diameter 20 mm
Separate return line via filter/oil cooler system class 2	min. internal diameter 28 mm
Unpressurised return line class 1	min. internal diameter 10 mm
Unpressurised return line class 2	min. internal diameter 12 mm

3.11 Couplings and functions

3.11.1 Hydraulic system class 1

The hydraulic couplings of the hydraulic system class 1 shall be in accordance with ISO 16028.

Table 2

P (Pressure line)	-	red	Continuous flow	ISO 16028 size 19 (plug)
T (Separate return line)		black	Discharge to tank via filter	ISO 16028 size 19 (socket)
Unpressurised return line	-	black	**(Opt.)** discharge directly to tank	ISO 16028 size 10 (socket)

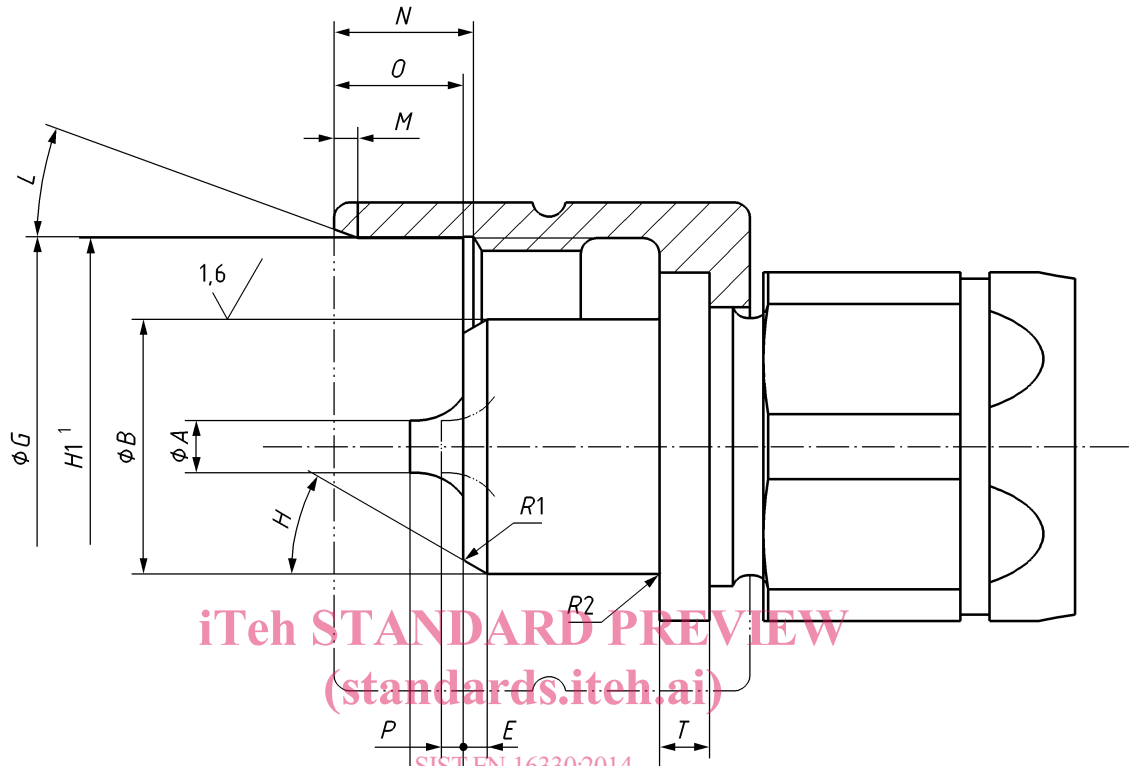
3.11.2 Hydraulic system class 2

Table 3

P (Pressure line)	-	green	Continuous flow	Screwed joints size 25 (plug, male) coupling nut female thread H1
T (Separate return line)		Black	Discharge to tank via filter	Screwed joints size 25 (socket, female) male thread H2
Unpressurised return line	-	black	**(Opt.)** discharge directly to tank	Screwed joints size 12,5 (socket, female) male thread H2

3.12 Screwed joints

3.12.1 Plug, male with coupling nut (female thread), pressure line, green



Key

C minus *P* = valve travel

Figure 2 — Plug, male with coupling nut (female thread), pressure line, green

NOTE 1 Table with coupling dimensions in 3.12.4.

NOTE 2 H1 – the female thread of the coupling nut is left to the manufacturer.