

**Rotodynamic pumps - Hydraulic performance
acceptance tests - Grades 1, 2 and 3 (ISO 9906:2012)**

This document is a preview generated by EVS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 9906:2012 sisaldab Euroopa standardi EN ISO 9906:2012 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 9906:2012 consists of the English text of the European standard EN ISO 9906:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 01.05.2012.	Date of Availability of the European standard is 01.05.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 23.080

Võtmesõnad: acceptance, acceptance testing, performance tests, pumps, rotodynamic pumps, testing conditions, tests,

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Aru 10, 10317 Tallinn, Eesti; www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:
Aru 10, 10317 Tallinn, Estonia; www.evs.ee; phone 605 5050; e-mail info@evs.ee

English Version

Rotodynamic pumps - Hydraulic performance acceptance tests -
Grades 1, 2 and 3 (ISO 9906:2012)

Pompes rotodynamiques - Essais de fonctionnement
hydraulique pour la réception - Niveaux 1, 2 et 3 (ISO
9906:2012)

Kreiselpumpen -Hydraulische Abnahmeprüfung - Klassen
1, 2 und 3 (ISO 9906:2012)

This European Standard was approved by CEN on 16 March 2012.

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, 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

Foreword

This document (EN ISO 9906:2012) has been prepared by Technical Committee ISO/TC 115 "Pumps" in collaboration with Technical Committee CEN/TC 197 "Pumps" 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 November 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.

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 supersedes EN ISO 9906:1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, 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, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 9906:2012 has been approved by CEN as a EN ISO 9906:2012 without any modification.

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols and subscripts	1
3.1 Terms and definitions	1
3.2 Terms relating to quantities	3
3.3 Symbols and subscripts	9
4 Pump measurements and acceptance criteria	10
4.1 General	10
4.2 Guarantees	11
4.3 Measurement uncertainty	11
4.4 Performance test acceptance grades and tolerances	15
4.5 Default test acceptance grades for pump application	21
5 Test procedures	22
5.1 General	22
5.2 Date of testing	22
5.3 Test programme	22
5.4 Testing equipment	22
5.5 Records and report	22
5.6 Test arrangements	23
5.7 Test conditions	23
5.8 NPSH tests	23
6 Analysis	26
6.1 Translation of the test results to the guarantee conditions	26
6.2 Obtaining specified characteristics	27
Annex A (normative) Test arrangements	28
Annex B (informative) NPSH test arrangements	37
Annex C (informative) Calibration intervals	40
Annex D (informative) Measurement equipment	41
Annex E (informative) Tests performed on the entire equipment set — String test	46
Annex F (informative) Reporting of test results	48
Annex G (informative) Special test methods	52
Annex H (informative) Witnessed pump test	53
Annex I (informative) Conversion to SI units	54
Annex J (informative) Measurement uncertainty for NPSH test	56
Bibliography	57

Introduction

The tests in this International Standard are intended to ascertain the performance of the pump and to compare this with the manufacturer's guarantee.

The nominated guarantee for any quantity is deemed to have been met if, where tested according to this International Standard, the measured performance falls within the tolerance specified for the particular quantity (see 4.4).

Rotodynamic pumps — Hydraulic performance acceptance tests — Grades 1, 2 and 3

1 Scope

This International Standard specifies hydraulic performance tests for customers' acceptance of rotodynamic pumps (centrifugal, mixed flow and axial pumps, hereinafter "pumps").

This International Standard is intended to be used for pump acceptance testing at pump test facilities, such as manufacturers' pump test facilities or laboratories.

It can be applied to pumps of any size and to any pumped liquids which behave as clean, cold water.

This International Standard specifies three levels of acceptance:

- grades 1B, 1E and 1U with tighter tolerance;
- grades 2B and 2U with broader tolerance;
- grade 3B with even broader tolerance.

This International Standard applies either to a pump itself without any fittings or to a combination of a pump associated with all or part of its upstream and/or downstream fittings.

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.

ISO 17769-1, *Liquid pumps and installation — General terms, definitions, quantities, letter symbols and units — Part 1: Liquid pumps*

ISO 17769-2, *Liquid pumps and installation — General terms, definitions, quantities, letter symbols and units — Part 2: Pumping system*

3 Terms, definitions, symbols and subscripts

3.1 Terms and definitions

For the purposes of this document, the terms, definitions, quantities and symbols given in ISO 17769-1 and 17769-2 and the following apply.

NOTE 1 Table 1 gives an alphabetical list of the symbols used and Table 2 gives a list of subscripts; see 3.3.

NOTE 2 All formulae are given in coherent SI units. For conversion of other units to SI units, see Annex I.

3.1.1 General terms

NOTE All of the types of test in 3.1.1 apply to guarantee point to fulfil the customer's specification(s).

3.1.1.1

guarantee point

flow/head (Q/H) point, which a tested pump shall meet, within the tolerances of the agreed acceptance class