PD ISO/TR 19688:2019

BSI Standards Publication

Rotodymanic pumps — Hydraulic performance acceptance test using a model pump

bsi.

National foreword

This Published Document is the UK implementation of ISO/TR 19688:2019.

The UK participation in its preparation was entrusted to Technical Committee MCE/6, Pumps and pump testing.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2019

ISBN 978 0 539 03272 7

ICS 23.080

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2019.

Amendments/corrigenda issued since publication

Date	Text affected

PD ISO/TR 19688:2019

TECHNICAL REPORT

ISO/TR 19688

First edition
2019-01-10

Rotodymanic pumps — Hydraulic performance acceptance test using a model pump

Pompes rotodynamiques — Modèle réduit de pompe utilisé pour les essais de performance hydraulique

Reference number
ISO/TR 19688:2019(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 115, *Pumps*, SC 2, *Methods of measurement and testing*.

Introduction

Wherever the capacity of a manufacturer's test facility is not appropriate to realise the necessary physical preconditions for testing a pump at realistic flow/head conditions the alternative of a model pump is taken. By means of the similitude theory, a model pump is used to assess and calculate the ability of the real pump to be built. The option using such model pump or prototype pump is chosen

— when the capacity of the pump, namely its flow rate and/or its power input (e.g. flow rate ≥35,000 m^3/h, and P_2 ≥ 5,000 kW), exceeds the limitations of the test facility, or

— one part or parts of the pump should be constructed by concrete walls and reproduction of the whole assembly is impractical.

In consideration of these given facts the application of a model pump for the hydraulic performance acceptance test is an efficient and effective alternative. The advantages using a model pump may also include:

— a higher precision due to the difference in measurement uncertainties;

— minimising costs in respect to material and other resources;

— and shorter delivery period(s) of the prototype pump(s).

For many years, manufacturers have developed and specified independent calculation approaches and collected experiences to handle the similitude theory for pumps and their specifics. Several calculation models are described in the pertinent literature. This document describes testing methods using model pumps for hydraulic performance acceptance tests in addition to other testing methods given in ISO 9906 as hydraulic performance acceptance tests for prototype pumps.

This document has been initially established based on prior standards such as the Japanese Industrial Standard JIS B 8327. This document combined with ISO 9906 presents new testing methods for hydraulic acceptance tests of pumps.

TECHNICAL REPORT **ISO/TR 19688:2019**

Rotodymanic pumps — Hydraulic performance acceptance test using a model pump

1 Scope

This document describes hydraulic performance tests (including cavitation tests) using a small size pump (centrifugal, mixed flow or axial pump, hereinafter referred to as a "model pump").

This document is used for pump acceptance tests with a geometrically similar model pump to guarantee the performance of a large size pump manufactured for practical use (hereinafter, a "prototype pump"). This document, however does not preclude a temporary assembly inspection or other tests on the prototype pump. Moreover, it is preferable to conduct the tests with prototype pumps unless

— the capacity of the pump, namely its flow rate and/or its power input, is beyond the limitations of the test facility, though it is difficult to set a criterion for carrying out a model pump test instead of the prototype pump test in terms of the volume rate of flow or the power input,

— a part of the pump is to be constructed by concrete walls and reproduction of the whole assembly is impractical,

— model tests are specified by the purchaser, or

— it is difficult to carry out the prototype pump test due to any other reasons.

This document applies to performance tests under steady operating conditions corresponding to the prototype pump.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 General terms

3.1.1
performance test
test to examine the performance of a pump in a state free from the influence of cavitation