



BSI Standards Publication

# Influence of metallic materials on water intended for human consumption — Dynamic rig test for assessment of metal release

Part 2: Test waters

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

*raising standards worldwide*™

**National foreword**

This British Standard is the UK implementation of EN 15664-2:2010.

The UK participation in its preparation was entrusted to Technical Committee EH/6, Effects of materials on water quality.

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.

© BSI 2010

ISBN 978 0 580 59691 9

ICS 67.250

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2010

**Amendments issued since publication**

Date	Text affected
------	---------------

---

EUROPEAN STANDARD

**EN 15664-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2010

ICS 67.250

English Version

## Influence of metallic materials on water intended for human consumption - Dynamic rig test for assessment of metal release - Part 2: Test waters

Influence des matériaux métalliques sur l'eau destinée à la consommation humaine - Banc d'essai dynamique pour l'évaluation du relargage de métaux - Partie 2: Eaux d'essai

Einfluss metallischer Werkstoffe auf Wasser für den menschlichen Gebrauch - Dynamischer Prüfstandversuch für die Beurteilung der Abgabe von Metallen - Teil 2: Prüfwässer

This European Standard was approved by CEN on 9 January 2010.

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 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 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 and United Kingdom.



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

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
<b>Foreword</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>4</b>
<b>1 Scope</b> .....	<b>5</b>
<b>2 Normative references</b> .....	<b>5</b>
<b>3 Terms and definitions</b> .....	<b>5</b>
<b>4 Test rig</b> .....	<b>5</b>
<b>5 Test water</b> .....	<b>5</b>
<b>5.1 Principles for the selection of test waters</b> .....	<b>5</b>
<b>5.2 Test water for reference materials</b> .....	<b>6</b>
<b>5.3 Test water for comparative testing</b> .....	<b>6</b>
<b>5.4 Test water for interaction of a local water with a material</b> .....	<b>6</b>
<b>Bibliography</b> .....	<b>7</b>

## Foreword

This document (EN 15664-2:2010) has been prepared by Technical Committee CEN/TC 164 "Water supply", 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 August 2010, and conflicting national standards shall be withdrawn at the latest by August 2010.

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 is one of a series of test methods which support associated product standards.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

In respect of potential adverse effects on the quality of water intended for human consumption caused by metallic materials, attention is drawn to the fact that the relevant national regulations remain in force until the adoption of verifiable European acceptance criteria. Water intended for human consumption is hereafter referred to as "drinking water" and means the same as the definition given at Article 2(1) of the Council Directive 98/83/EC on the quality of water intended for human consumption [1].

This document has been drafted in accordance with the CEN Internal Regulations, Part 3.

This document is Part 2 of a series dealing with the test method to determine the release of metals from metallic products into drinking water comprising:

- *Part 1: Design and operation*
- *Part 2: Test waters* (this document)
- *Part 3: Guidance on interpretation of results<sup>1)</sup>*

This part describes the selection of test waters for the test method to produce contact waters for the assessment of metal release from metallic materials.

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 and the United Kingdom.

---

1) Not yet registered as an active project.

## Introduction

The test method given in Part 1 of EN 15664 is designed to provide information on metal release over time from metallic materials into drinking water.

The test is based on a programme of alternating periods of once-through flow and stagnation in a rig simulating the conditions in a domestic distribution system.

The test can be used for three purposes as follows:

- a) to assess a material as a reference material for a category of materials using the results of several investigations in different waters covering a broad range of water compositions;
- b) to assess a material for approval by way of comparative testing;
- c) to obtain data on the interaction of local water with a material.

This part of EN 15664 specifies test water(s) when the test procedure is used for the purposes a) to c) above.

To assess a new category of materials it is required to test the candidate reference material in several waters. This set of waters represents a parameter set of conditions which might be realistically observed in the field as extreme conditions. The test waters defined in this part of EN 15664 are based on an overview on drinking water qualities in Europe and consider the present knowledge on the dependence of metal release on water qualities.

To add a new material to a category, a comparative test against the reference material is required with specific test water. These test waters are defined in this document.

## 1 Scope

This European Standard defines the requirements for test waters used in the dynamic test rig defined in EN 15664-1.

This document specifies test water(s) when the test procedure is used to:

- a) assess a material for approval as a reference material for a category of materials;
- b) assess a material for approval by way of comparative testing;
- c) obtain data on the interaction of local water with a material.

NOTE Local waters used for test waters are not treated with corrosion inhibitors.

## 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.

EN 12502-1:2004, *Protection of metallic materials against corrosion — Guidance on the assessment of corrosion likelihood in water distribution and storage systems — Part 1: General*

EN 15664-1:2008, *Influence of metallic materials on water intended for human consumption — Dynamic rig test for assessment of metal release — Part 1: Design and operation*

EN ISO 8044:1999, *Corrosion of metals and alloys — Basic terms and definitions (ISO 8044:1999)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8044:1999, EN 12502-1:2004 and EN 15664-1:2008 apply.

## 4 Test rig

The test rig shall be constructed and operated according to EN 15664-1.

## 5 Test water

### 5.1 Principles for the selection of test waters

For the selection of test waters all the following principles apply:

- parameters of the test waters are within the requirements of the Council Directive 98/83/EC [1];
- test waters shall be local waters and shall not be treated with corrosion inhibitors (except for 5.4);
- test waters shall represent realistic worst case waters for the purpose of the test.

The test water shall be selected depending on the purpose of the test, see 5.2, 5.3 and 5.4.

## 5.2 Test water for reference materials

Three test waters shall be used to collect data for the assessment of a new category of metallic material. These are: very hard neutral, soft acidic and soft alkaline. For these waters, annual mean values are given in Table 1.

**Table 1 – Test water characteristics for testing reference materials**

	Characteristics	pH	Alkalinity mmol/l	Sum of [Cl <sup>-</sup> ] and [SO <sub>4</sub> <sup>2-</sup> ] mmol/l	Oxygen	TOC mg/l
<b>Test water 1</b>	Very hard neutral water	7,1 to 7,5	> 5,0	> 3	> 70 % saturation	> 1,5
<b>Test water 2</b>	Soft water weakly acidic	6,7 to 7,1	0,5 to 1,3	-	> 70 % saturation	—
<b>Test water 3</b>	Soft water alkaline	8,0 to 8,4	0,7 to 1,3	-	> 70 % saturation	—

TOC shall not be increased by adding organic substances to the test water.

## 5.3 Test water for comparative testing

For comparative testing a local drinking water shall be used, provided that the water is suitably corrosive. This means that metal release rate(s) of the element(s) under consideration shall be high enough to result in metal concentrations for a valid comparison to be made.

NOTE It is recommended that the metal release behaviour of the reference material in the proposed test water is available.

## 5.4 Test water for interaction of a local water with a material

When the test procedure is used to obtain data on the interaction of local water with a material, the test water shall be the local water representative of the particular supply zone under consideration.

In this case, the water may contain corrosion inhibitors.



## Bibliography

- [1] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

.....

# British Standards Institution (BSI)

BSI is the independent national body responsible for preparing British Standards and other standards-related publications, information and services.

It presents the UK view on standards in Europe and at the international level.

It is incorporated by Royal Charter.

## Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.

**Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001**

BSI offers Members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

**Tel: +44 (0)20 8996 7669 Fax: +44 (0)20 8996 7001**

**Email: [plus@bsigroup.com](mailto:plus@bsigroup.com)**

## Buying standards

You may buy PDF and hard copy versions of standards directly using a credit card from the BSI Shop on the website [www.bsigroup.com/shop](http://www.bsigroup.com/shop). In addition all orders for BSI, international and foreign standards publications can be addressed to BSI Customer Services.

**Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001**

**Email: [orders@bsigroup.com](mailto:orders@bsigroup.com)**

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

## Information on standards

BSI provides a wide range of information on national, European and international standards through its Knowledge Centre.

**Tel: +44 (0)20 8996 7004 Fax: +44 (0)20 8996 7005**

**Email: [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)**

Various BSI electronic information services are also available which give details on all its products and services.

**Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048**

**Email: [info@bsigroup.com](mailto:info@bsigroup.com)**

BSI Subscribing Members are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.

**Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001**

**Email: [membership@bsigroup.com](mailto:membership@bsigroup.com)**

Information regarding online access to British Standards via British Standards Online can be found at [www.bsigroup.com/BSOL](http://www.bsigroup.com/BSOL)

Further information about BSI is available on the BSI website at [www.bsigroup.com/standards](http://www.bsigroup.com/standards)

## Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. This does not preclude the free use, in the course of implementing the standard of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained. Details and advice can be obtained from the Copyright & Licensing Manager.

**Tel: +44 (0)20 8996 7070**

**Email: [copyright@bsigroup.com](mailto:copyright@bsigroup.com)**

## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001

Fax +44 (0)20 8996 7001

[www.bsigroup.com/standards](http://www.bsigroup.com/standards)

*raising standards worldwide™*