



BSI Standards Publication

Paints and varnishes - Determination of resistance to humidity

Part 1: Condensation (single-sided exposure)

National foreword

This British Standard is the UK implementation of EN ISO 6270-1:2018. It is identical to ISO 6270-1:2017. It supersedes BS EN ISO 6270-1:2001, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ST1/10, Test methods for paints.

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.

© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 94860 2

ICS 87.040

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 28 February 2018.

Amendments/corrigenda issued since publication

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

EUROPEAN STANDARD

EN ISO 6270-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2018

ICS 87.040

Supersedes EN ISO 6270-1:2001

English Version

**Paints and varnishes - Determination of resistance to
humidity - Part 1: Condensation (single-sided exposure)
(ISO 6270-1:2017)**

Peintures et vernis - Détermination de la
résistance à l'humidité - Partie 1: Condensation
(exposition sur une seule face) (ISO 6270-1:2017)

Beschichtungsstoffe - Bestimmung der Beständigkeit
gegen Feuchtigkeit - Teil 1: Kondensation
(einseitige Beanspruchung) (ISO 6270-1:2017)

This European Standard was approved by CEN on 30 October 2017.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 6270-1:2018) has been prepared by Technical Committee ISO/TC 35/SC 9 "General test methods for paints and varnishes" in collaboration with Technical Committee CEN/TC 139 "Paints and varnishes" the secretariat of which is held by DIN.

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 July 2018, and conflicting national standards shall be withdrawn at the latest by July 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 6270-1:2001.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 6270-1:2017 has been approved by CEN as EN ISO 6270-1:2018 without any modification.

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Limitations	1
5 Principle	2
6 Apparatus	2
6.1 Construction of the apparatus	2
6.2 Water bath	2
6.3 Installation of the apparatus	3
7 Test specimen	4
8 Procedure	4
9 Evaluation	4
10 Precision	4
11 Test report	4
Bibliography	6

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 Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition ([ISO 6270-1:1998](http://www.iso.org/iso/6270-1:1998)), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the title has been changed;
- the terms and definitions clause has been added;
- a limitations clause concerning the use of other than standard test conditions has been added;
- the preparation of test specimens from liquid paints has been deleted, so only the exposure of coated specimens is described;
- the normative requirement on evaluation in accordance with ISO 4628 has been deleted; information has been moved to the introduction, as it is in [ISO 6270-2](http://www.iso.org/iso/6270-2);
- the size of the test specimens has been changed;
- the requirement to use water of grade 3 purity in accordance with [ISO 3696](http://www.iso.org/iso/3696)^[1] was deleted;
- a clause on installation of the apparatus has been added;
- the precision has been clarified;
- the normative references have been updated;
- the supplementary test conditions previously in [Clause 4](#) and Annex A have been integrated in the test report, as appropriate, or deleted.

A list of all the parts in the ISO 6270 series can be found on the ISO website.

Introduction

This document is intended to give consistent conditions and procedures for the conditioning of pre-prepared test specimens which are to be evaluated for defects, which may develop when they are subjected to humid ambient atmospheres such as constant condensation-water atmospheres or alternating condensation-water atmospheres.

The tests are designed to clarify the behaviour of the test specimens in humid ambient atmospheres, and to pinpoint any defects in the protection of the test specimens against corrosion. The testing of coatings in these atmospheres does not necessarily give lifetime prediction data.

After conditioning, the test specimens are evaluated either in accordance with agreed documents, such as the appropriate part(s) of ISO 4628, or by procedures agreed between the interested parties.

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

Paints and varnishes - Determination of resistance to humidity —

Part 1: Condensation (single-sided exposure)

1 Scope

This document specifies a method for determining the resistance of paint films, paint systems and related products to conditions of condensation in accordance with the requirements of coating or product specifications.

The method is applicable to coatings, both on porous substrates such as wood, plaster and plasterboard and on non-porous substrates such as metal. It provides an indication of the performance likely to be obtained under severe conditions of exposure where continuous condensation occurs on the surface.

The procedure can reveal failures of the coating (including blistering, staining, softening, wrinkling and embrittlement) and deterioration of the substrate.

NOTE The shape and preparation of the test specimens, the duration of the test and the assessment of the test results are not covered by this document.

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 3270](#), *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

[ISO 4618](#), *Paints and varnishes — Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in [ISO 4618](#) apply.

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

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

— ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Limitations

Temperature and humidity are important parameters affecting test results. Deviations from the requirements specified can lead to results that are not comparable. However, the interested parties may agree upon alternative parameters and these parameters shall be reported.

5 Principle

A coated test specimen is exposed to continuous condensation, and the effects of the exposure are evaluated by criteria agreed in advance between the interested parties, these criteria usually being of a subjective nature.

6 Apparatus

6.1 Construction of the apparatus

6.1.1 The apparatus shall be constructed of chemically resistant materials, and consist essentially of an electrically heated water bath, designed so that the cover is formed by the blanking specimens (6.1.3) or test specimens, the upper faces of which are exposed to the environment (6.2.1), such that gaps are minimized and condensation forms on the inner face of the test specimens.

6.1.2 The top of the bath shall be designed so that the test specimens are held at the preferred angle of $(60 \pm 5)^\circ$ to the horizontal to permit drainage of condensed water, and shall be such that water draining from one specimen does not come into contact with another. In any case, the angle of the specimens to the horizontal shall be between 15° and 75° .

NOTE When revising ISO 6270:1980 to ISO 6270-1:1998, the angle of the specimens to the horizontal was changed from $(15 \pm 5)^\circ$ to $(60 \pm 5)^\circ$, and the temperature of the air below the specimens was maintained at $(38 \pm 2)^\circ\text{C}$ rather than at that of the water itself. Work has shown that the results do not differ substantially between the two sets of conditions.

6.1.3 Suitable inert blanking specimens shall be provided for use in setting up the apparatus if the number of test specimens is insufficient to form a complete cover.

6.2 Water bath

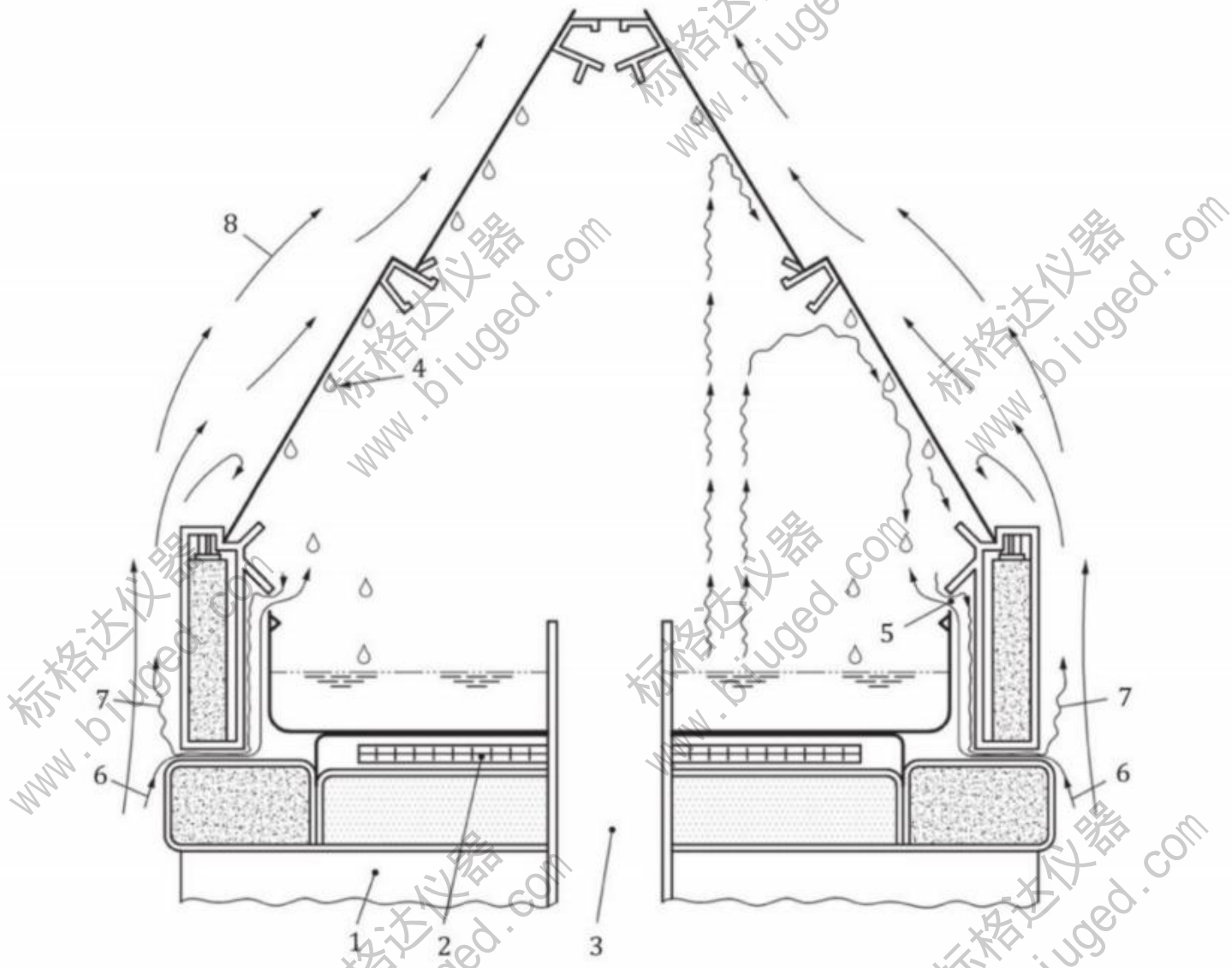
6.2.1 The sides of the water bath shall be suitably insulated to ensure that the temperature in the air space above the water, when measured approximately 25 mm below the test specimens, is maintained at a uniform temperature of $(38 \pm 2)^\circ\text{C}$ unless otherwise specified.

Temperatures of $(49 \pm 2)^\circ\text{C}$ and $(60 \pm 2)^\circ\text{C}$ are recommended if $(38 \pm 2)^\circ\text{C}$ is too low.

6.2.2 The water shall be maintained at a constant level by means of an automatic control device. If the device does not regulate the water level automatically, adjust the level of the water by regular addition of water.

The use of ordinary tap water may cause calcification of the apparatus, so follow the instrument manufacturer's instructions concerning the quality of the water used.

An example of a climatic chamber is shown in [Figure 1](#).



Key

- | | |
|----------------------------|------------------------------|
| 1 base cabinet | 5 moisture diffusion channel |
| 2 heater | 6 air in |
| 3 dry off air duct | 7 moisture out |
| 4 condensation on specimen | 8 convection currents |

Figure 1 — Example of a climatic chamber

6.3 Installation of the apparatus

The apparatus shall be installed in a room with an ambient atmosphere containing no corrosive constituents (e.g. it shall not be installed in a chemical laboratory), at a room temperature of $(23 \pm 5) ^\circ\text{C}$ and at a relative atmospheric humidity of 75 % max., in such a way that it is protected against draughts and solar radiation. In the case of comparison tests, the ambient temperature in the installation room shall be the standard temperature of $(23 \pm 2) ^\circ\text{C}$ in accordance with [ISO 3270](#).

7 Test specimen

The typical size of test specimens is 75 mm × 150 mm or 100 mm × 150 mm.

8 Procedure

8.1 Carry out the determination in duplicate, unless otherwise specified.

8.2 Set up the apparatus with blanking specimens in position and allow the apparatus to come to equilibrium. When the conditions specified in 6.2.1 are attained, swiftly replace the blanking specimens with the test specimens so that the test surface faces the water.

It is recommended that a control specimen of a paint with known durability be included with each series of test specimens.

In order to prevent a galvanic couple, the test specimens shall not be allowed to come into contact with each other or with other metallic material. If the specimens have not been edged, then non-metallic filler strips shall be used between the specimens.

8.3 Run the apparatus continuously throughout the prescribed test period, maintaining the conditions specified in 6.2.1, except for a short daily interruption to inspect, re-arrange or remove test specimens or to check and, if not performed automatically, adjust the level of the water.

9 Evaluation

9.1 Make a periodic examination of the specimens as quickly as possible, taking care not to damage the surfaces under test. Do not remove the specimens for more than 30 min in any 24 h period. Immediately replace specimens which have been removed by blanking specimens. Specimens may be blotted with absorbent paper to enable them to be examined more clearly, but shall then be immediately returned to the apparatus. They shall not be allowed to dry fully.

9.2 At the end of the specified test period, immediately examine the test surface for signs of deterioration, e.g. in accordance with the appropriate part(s) of ISO 4628[2] or by procedures agreed between the interested parties (see the Introduction).

9.3 If required, keep the specimens in the standard atmosphere in accordance with ISO 3270 for the specified period and examine the test surfaces for deterioration.

9.4 If an examination of the substrate for signs of attack is necessary, remove the coating by means of a non-corrosive paint remover unless otherwise specified.

10 Precision

Precision is not applicable to this document because this is only the stress test. Precision will result from the subsequent evaluations of the stressed test specimens.

11 Test report

The test report shall contain at least the following information:

- a) all details necessary for identification of the product tested, including a description of the test specimens and their pretreatment if applicable;
- b) a reference to this document, i.e. ISO 6270-1;

- c) the test temperature (see [6.2.1](#));
- d) the angle of the specimens in the apparatus (see [6.1.2](#));
- e) the duration of test period, including whether the test period is to be interrupted at intervals (for example during weekends) (see [8.3](#));
- f) when inspection of the test coating is to be carried out, including details of recovery period if applicable (see [9.3](#));
- g) the method of paint removal if the substrate is to be examined, and how the substrate is to be evaluated (see [9.4](#));
- h) the results of the test, including the results for the individual test specimens and all the other information required by the test standards used, quoting the relevant standard in each case (see [Clause 9](#));
- i) any deviation, by agreement or otherwise, from the test procedure described;
- j) any unusual features (anomalies) observed during the test;
- k) the dates and duration of the test.

Bibliography

- [1] [ISO 3696](#), *Water for analytical laboratory use — Specification and test methods*
- [2] ISO 4628 (all parts), *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance*

.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

标格达仪器
www.biuged.com

British Standards Institution (BSI)

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

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.
- Standards purchased in hard copy format:
 - A British Standard purchased in hard copy format is for personal or internal company use only.
 - It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI-Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email subscriptions@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services

Tel: +44 345 086 9001

Email (orders): orders@bsigroup.com

Email (enquiries): cservices@bsigroup.com

Subscriptions

Tel: +44 345 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK