

Incinerators —

Part 2: Methods of test and calculation for the performance of incineration plant for the destruction of hospital waste

UDC [696.139:628.474]:615.4.002.68

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This British Standard, having been prepared under the direction of the Building Services Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 July 1987

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First published as BS 3316
December 1960
First revision October 1973
Second revision in Parts July 1987

The following BSI references relate to the work on this standard:
Committee reference SEB/40
Draft for comment 83/12478 DC

ISBN 0 580 15837 3

Amendments issued since publication

Amd. No.	Date of issue	Comments

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Foreword

This Part of BS 3316 has been prepared under the direction of the Building Services Standards Committee.

The revision of BS 3316:1973 is published in four Parts in an attempt to highlight the interfaces involved in the successful specification and the design of incineration plant. BS 3316-1 to BS 3316-4 collectively supersede BS 3316:1973 which is withdrawn.

Part 1 specifies the standard performance requirements which have to be met by an incinerator, and which can be verified by testing the incinerator in accordance with the methods of test and calculation given in this Part.

This Part details a comprehensive range of tests, so that testing can be performed according to the size, complexity and intended purpose of an incinerator installation. Only for large and complex installations will the full range of test methods need to be applied.

Part 3 identifies the information which should be supplied by the purchaser to the manufacturer, and the form in which this information should be presented. This information should include a requirement that the incinerator, when set to work, should meet the standard performance requirements given in Part 1.

The figures on bulk densities given in the previous edition are not included because they were found to be misleading. Hospital waste varies considerably in density between hospitals and throughout each day. The designer of the incinerator has to take that variability into account. If and when research takes place which provides useful figures on bulk density, these will be incorporated into the standard.

Part 4 gives guidance to both purchaser and manufacturer on the options which have to be identified and the methods of achieving certain specified requirements in a manner that will satisfy the standard performance requirements specified in Part 1. Part 4 also gives important guidance on matters such as operational training, maintenance and safety measures.

The testing of incineration plant, after the completion of installation and of setting to work, is essential in order to establish that the specified performance and test criteria have been attained in any given installation.

Special attention is drawn to the precision of measurement which can be attained in certain of the tests specified. Where appropriate, measurement errors are considered under the relevant methods of test, and due account of these errors has to be taken when determining decisions of a pass/fail nature.

This British Standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

It is accepted that incinerators and incineration systems are designed to meet the specific needs of the purchaser and the local requirements such as the positioning of the incinerator. Standards are generally presented as descriptive or performance specifications which lay down the characteristics of a product in terms of its size, shape, materials etc., or in terms of the function it has to perform defined by methods of test for each appropriate parameter. However, it is accepted that incineration plant do not lend themselves to either of these approaches or a combination of these approaches within one document. An incineration plant cannot be appraised satisfactorily except in its working environment and when burning the hospital waste for which it is designed. Therefore the revision of BS 3316:1973 has attempted to make a clear distinction between the interfaces involved in the successful specification and design of the incineration plant.

1 Scope

This Part of BS 3316 describes methods of test for the performance of the incineration plant to be carried out in accordance with Part 1 and as specified by the purchaser in accordance with Part 3. These tests are made after installation when the plant is operating in accordance with the manufacturer's instructions. In addition certain methods of calculation are given.

Methods of test for materials and methods of construction are not included.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 3316 the definitions given in BS 3316-1 apply.

3 Surface temperature

3.1 Apparatus

3.1.1 *Proprietary temperature detectors*, e.g. temperature sensitive crayons or adhesive tape (simple method).

3.1.2 *A surface thermocouple*, i.e. flat strip type, with a voltage-measuring instrument, complying with BS 1041-4 (thermocouple method).

3.1.3 *Contact paste, silicone based* (thermocouple method).

3.2 Simple method

Before commencement of capacity testing (see clause 10) apply temperature-sensitive detector tapes or crayons (3.1.1) to the surfaces of the incinerator that have to be touched by the operators during operation and a sufficient number of other external sites on the incinerator to ensure a representative record of surface temperatures (not fewer than six).

Record sets of temperature readings, commencing half-way through capacity test, at hourly intervals until the end of the specified/design working day (i.e. when charging of the incinerator has been completed) and tabulate readings¹⁾. During temperature testing, record the ambient temperature using a thermocouple or mercury-in-glass thermometer. If results are within 5 K of the criteria given in BS 3316-1, discontinue the test and carry out the procedure described in 3.3.

3.3 Thermocouple method

Press the thermocouple detector (3.1.2) on to the surfaces specified in 3.2 to be measured, using contact paste (3.1.3) to enhance thermal contact (see Figure 1 and Figure 2). Allow the measuring element to come into equilibrium with the surface (i.e. no change in indicated temperature).

Take temperature readings at the intervals given in 3.2.

During temperature testing, record the ambient temperature using a thermocouple or mercury-in-glass thermometer. Tabulate the sets of temperature readings as described in 3.2.

3.4 Temperature correction

Correct the highest temperature reading obtained at each site to assume an ambient temperature of 20 °C as against the actual ambient temperature recorded in 3.2 or 3.3.

¹⁾ See the example report sheets given in A.1.