

Methods for

The sampling and analysis of flue gases —

Part 2: Analysis by the Orsat apparatus

Co-operating organizations

The Solid Fuel Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Association of Consulting Engineers
- British Cast Iron Research Association
- British Coke Research Association*
- British Ironfounders' Association
- British Mechanical Engineering Confederation
- British Steel Industry*
- Chamber of Coal Traders
- Chemical Industries Association*
- Coal Utilisation Council
- Coke Oven Managers' Association
- Combustion Engineering Association
- Council of Ironfoundry Associations
- Department of the Environment*
- Department of Trade and Industry*
- Domestic Solid Fuel Appliances Approval Scheme
- Electricity Council, the Central Electricity Generating Board and Area Boards in England and Wales*
- Gas Council*
- Heating and Ventilating Contractors' Association
- Institute of British Foundrymen
- Institute of Fuel*
- Institution of Gas Engineers*
- Institution of Heating and Ventilating Engineers
- Institution of Mechanical Engineers
- Low Temperature Coal Distillers' Association of Great Britain, Ltd.
- National Coal Board*
- Society of British Gas Industries*
- Water-tube Boilermakers' Association*
- Women's Advisory Council on Solid Fuel

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this standard:

- British Ceramic Research Association
- British Laboratory Ware Association
- Cement Makers' Federation
- Institute of Petroleum
- Institute of Water Pollution Control
- Institution of Chemical Engineers
- Institution of Civil Engineers
- Institution of Electrical Engineers
- Iron and Steel Institute
- Scientific Instrument Manufacturers' Association
- Society of Chemical Industry
- Society of Glass Technology

This British Standard, having been approved by the Solid Fuel Industry Standards Committee, was published under the authority of the Executive Board on 27 October 1971

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Foreword

This standard makes reference to the following British Standards:

BS 1751, *General purpose glass stopcocks*.

BS 2775, *Rubber stoppers and tubing of flexible materials for laboratory use*.

BS 3447, *Glossary of terms used in the glass industry*.

This British Standard was first issued in 1952 as a guide to the selection of suitable procedures for the sampling and analysis of flue gases. For the purpose of this standard, "flue gas" is defined broadly as the gaseous product arising from the combustion of fuel or from the combustion of any carbonaceous matter in materials being processed. The subsequent revision was extended to cover not only flue gases from domestic and industrial fuel-burning installations but also those from various industrial processes. The present edition is virtually unaltered except for the introduction of SI units, where necessary.

The sampling and analysis of a flue gas is most often required for one or more of the following purposes:

- 1) checking and controlling the efficiency of combustion,
- 2) calculating heat balances,
- 3) detecting air or gas inleakage,
- 4) determining compositions and hence calculating volumes of waste gases,
- 5) determining moisture contents,
- 6) assessing the effect of the gas on other parts of the plant, e.g. corrosion or tube blockage,
- 7) determining substances likely to cause pollution of the atmosphere,
- 8) determining toxic gases.

For the control of combustion efficiency, calculation of heat balances and detecting air inleakage, the determination of carbon dioxide, carbon monoxide and oxygen covers most practical requirements. For more precise work sulphur dioxide, hydrogen and methane must be taken into account and a separate method used for low concentrations of carbon monoxide. In assessing the effect of flue gases on other parts of a plant and in guarding against pollution of the atmosphere, determinations of dew-point, sulphur dioxide, sulphur trioxide and nitrogen oxides may be necessary.

The revised standard has been divided into the following parts:

- *Part 1: Methods of sampling;*
- *Part 2: Analysis by the Orsat apparatus;*
- *Part 3: Analysis by the Haldane apparatus;*
- *Part 4: Miscellaneous determinations;*
- *Part 5: Semi-routine analyses.*

The standard deals with the following determinations:

Carbon dioxide
Oxygen
Carbon monoxide
Hydrogen
Methane
Moisture
Dew-point
Sulphur dioxide
Sulphur trioxide
Nitrogen oxides
Total oxides of sulphur

Except in Part 5, no reference has been made to modern procedures for gas analysis by chromatographic, infra-red or other physical methods, some of which form the basis of other British Standards.

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 to iv, pages 1 to 9 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.