

Methods for the

Sampling and analysis of flue gases —

Part 5: Semi-routine analyses

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	Gas Council*
British Cast Iron Research Association	Heating and Ventilating Contractors' Association
British Coke Research Association*	Institute of British Foundrymen
British Ironfounders' Association	Institute of Fuel*
British Mechanical Engineering Confederation	Institution of Gas Engineers*
British Steel Industry*	Institution of Heating and Ventilating Engineers
Chamber of Coal Traders	Institution of Mechanical Engineers
Chemical Industries Association*	Low Temperature Coal Distillers' Association of Great Britain Ltd.
Coal Utilisation Council	National Coal Board*
Coke Oven Managers' Association	Society of British Gas Industries*
Combustion Engineering Association	Water-tube Boilermakers' Association*
Council of Ironfoundry Associations	Women's Advisory Council on Solid Fuel
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*	

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

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Foreword

This standard makes reference to the following British Standards:

BS 1752, *Laboratory sintered or fritted filters.*

BS 1756, *Methods for the sampling and analysis of flue gases — Part 1: Methods of sampling — Part 3: Analysis by the Haldane apparatus — Part 4: Miscellaneous analysis.*

BS 3156, *Methods for the analysis of fuel gases.*

BS 3250, *Thermal testing of domestic solid fuel burning appliances with convection — Part 1: Flue loss method.*

BS 4314, *Apparatus for physical methods of gas analysis — Part 1: Infra-red gas analysers for industrial use.*

BS 4559, *The preparation of gaseous mixtures.*

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 this part, 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 12, 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.

