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BS 2742:2009



BSI British Standards

Use of the Ringelmann and miniature smoke charts

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 8, an inside back cover and a back cover.

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Publishing information

This British Standard is published by BSI and came into effect on 31 May 2009. It was prepared by Subcommittee EH/2/1, *Stationary source emission*, under the authority of Technical Committee EH/2, *Air quality*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 2742:1969, which is withdrawn.

Relationship with other publications

This British Standard is intended to be used with either of two charts: BS 2742C, *Ringelmann chart* or BS 2742M, *Miniature smoke chart*.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- the 1972 Addendum has been removed: when it was developed, it was subject to uncertainty and in practice only should have only been applied to a limited number of coal burning chain grate stoker appliances (which are now rare); the relationship was not truly applicable to other firing methods or fuels as the particles emitted are of a different particle size distribution and reflectance;
- added description of the manufacture/form of BS 2742C, *Ringelmann chart* and BS 2742M, *Miniature smoke chart*;
- this revision does not alter the technical requirements from those stated in the 1958 and 1969 editions; the values, however, are now expressed in metric terms.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

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The method of visual assessment of smoke emission by comparison of the darkness of the smoke with standard shades of grey on a chart placed in a suitable position was devised by Professor Ringelmann of Paris in 1898. Professor Ringelmann obtained the shades of grey by cross-hatching in black on a white background so that a known percentage of the white was obscured. In use, the charts were placed at such a distance from the observer that the black lines merged into the white background and produced for each shade, apparently, a uniform grey. The numbers of the shades (the Ringelmann numbers) ranged from 0 (white) to 5 (black), the stages being by changes of 20% in obscuration of the background. The original charts were of large size so that the accuracy of reproduction could be obtained in a drawing office; since that time various other methods of reproduction have been tried and the size and details of the chart have been modified by various authorities from time to time.

Actually, Professor Ringelmann's original chart cannot have been drawn with 100% black ink on 100% white paper, since neither was obtainable. The commercially-printed charts in use for many years, including those issued by the U.S. Bureau of Mines, were printed on paper with a luminance factor of about 80%, with ink of luminance factor about 5%. Measurements on smoke which are accepted are derived from the use of commercially-printed Ringelmann charts, and therefore the British Standard Ringelmann chart, BS 2742C, which has been so printed as to reproduce with consistency shades of grey which are near the average of those to which users are accustomed. For convenience in size, the British Standard charts comprise the five shades corresponding to Nos. 0 to 4 Ringelmann; the black strip was included only for control during printing. A brief description of the construction of the British Standard Ringelmann chart, BS 2742C, is in Annex A. Annex B shows example chart holders and a sketch of the chart in use.

1 Scope

This British Standard provides guidance on the use of BS Ringelmann charts to assess smoke emissions from unregulated processes. It is not suitable for calibrating Continuous Emissions Monitoring Systems. It is not applicable to processes whose emissions are regulated by EU Directives with stated Uncertainty.

NOTE Most regulated processes have particulate emissions limits below Ringelmann 1.

This British Standard is intended for use with the related publications:

- BS 2742C, *Ringelmann chart*;
- BS 2742M, *Miniature smoke chart*.

Other measuring devices or charts are not suitable for use with this British Standard.