



National Institute of Standards & Technology

Certificate

Standard Reference Material 1048

Cup Furnace Smoke Toxicity Method Standard

Nonflaming and Flaming Combustion Modes

30-Minute Exposure

or

30-Minute Exposure plus a Post-Exposure Observation Period of

14 Days

This Standard Reference Material (SRM) is intended primarily for evaluating the operation of the Cup Furnace Smoke Toxicity Method under two combustion modes (flaming and nonflaming) and two observation periods (30-minute exposure and 30-minute plus 14-day post-exposure period).[1] SRM 1048 consists of 8 square sheets of plastic (acrylonitrile-butadiene-styrene copolymer). The size of each sheet is approximately 254 mm² (10 square inches) with a nominal thickness of 0.762 mm (0.030 inch). The sheets should be cut into 25.4 mm² specimens for testing. The number of sheets included in each SRM should be sufficient to calibrate the Cup Furnace Smoke Toxicity System four times; i.e., with this number of sheets, one should be able to determine the autoignition temperature and both the nonflaming and flaming LC₅₀ values four times.

For purposes of calibrating the Cup Furnace Smoke Toxicity method, both LC₅₀ values and N-Gas values plus their respective 95% confidence limits have been determined. The certified values are presented in the following table.

Observation time	Combustion mode	LC ₅₀ ± 95% CL ^a (g/m ³)	N-Gas value ± 95%CL ^a
WE ^b	Flaming	27 ± 3	1.4 ± 0.2
	Nonflaming	58 ± 15	1.2 ± 0.2
WE & PE ^c	Flaming	25 ± 3	1.5 ± 0.2
	Nonflaming	53 ± 12	1.4 ± 0.1

a. 95% confidence limits

b. WE-Within the 30-minute exposure

c. WE & PE-Within the 30-minute exposure plus the 14-day post-exposure observation period

Gaithersburg, MD 20899
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Each of these LC_{50} values and N-Gas values are based on three separate series of tests; each series was statistically analyzed to generate a LC_{50} and an N-Gas value. The uncertainty of each fit and the differences between series were incorporated into the final certified LC_{50} and N-Gas values. Details of the test procedure are presented in [1]; the research conducted to develop this SRM is described in [2].

The measurements leading to the certification of this SRM were conducted B.C. Levin, M. Paabo, and N. Eller of the Fire Measurement and Research Division. An interlaboratory evaluation was conducted by Mobay Corporation, National Institute of Standards and Technology, Southwest Research Institute, and U.S. Testing Company, Inc.

The statistical analysis was performed by S.B. Schiller of the NIST Statistical Engineering Division.

The technical and support aspects concerning the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

REFERENCES

- [1] Levin, B.C., Fowell, A.J., Birky, M.M., Paabo, M., Stolte, A., and Malek, D., Further Development of a Test Method for the Assessment of the Acute Inhalation Toxicity of Combustion Products, NBSIR 82-2532, National Bureau of Standards, Gaithersburg, MD (1982).
- [2] Levin, B.C., Paabo, M. and Schiller, S.B., A Standard Reference Material for Calibration of the Cup Furnace Smoke Toxicity Method for Assessing the Acute Inhalation Toxicity of Combustion Products, Journal of Research of the National Institute of Standards and Technology, Volume 96, Number 6, November-December 1991.