

ISO/TS 19700:2007-03 (E)

Controlled equivalence ratio method for the determination of hazardous components of fire effluents

| Contents | | Page |
|--------------------|---|-------------|
| Foreword | | v |
| Introduction | | vi |
| 1 | Scope | 1 |
| 2 | Normative references | 2 |
| 3 | Terms and definitions | 2 |
| 4 | Principle | 4 |
| 5 | Apparatus | 5 |
| 5.1 | General apparatus | 5 |
| 5.2 | Tube furnace | 5 |
| 5.3 | Calibrated thermocouples | 7 |
| 5.4 | Quartz furnace tube | 7 |
| 5.5 | Test-specimen boat | 7 |
| 5.6 | Test-specimen-boat drive mechanism | 7 |
| 5.7 | Mixing and measurement chamber | 8 |
| 5.8 | Analysis of gases | 9 |
| 5.9 | Determination of smoke | 11 |
| 5.9.1 | Aerosols and particulates | 11 |
| 5.9.2 | Optical density of smoke | 11 |
| 6 | Establishment of air supplies | 11 |
| 7 | Establishment of furnace temperature and setting of furnace temperature | 12 |
| 7.1 | General | 12 |
| 7.2 | Establishing furnace temperature profile to determine furnace suitability | 12 |
| 7.3 | Setting the temperature for an individual experimental-run condition | 13 |
| 8 | Test specimen preparation | 13 |
| 9 | Selection of test decomposition conditions | 14 |
| 9.1 | Selection of decomposition conditions for fire hazard analysis or fire-safety engineering | 14 |
| 9.2 | Stage 1b: oxidative pyrolysis from externally applied radiation | 14 |
| 9.3 | Stage 2: well-ventilated flaming | 14 |
| 9.4 | Stage 3a: small vitiated fires in closed or poorly ventilated compartments | 15 |
| 9.5 | Stage 3b: post-flashover fires in open compartments | 15 |
| 10 | Procedure | 15 |
| 10.1 | Decomposition of the test sample | 15 |
| 10.2 | Sampling and analysis of fire effluent and measurement of smoke density | 17 |
| 10.2.1 | General | 17 |
| 10.2.2 | Sampling of fire effluent | 17 |
| 10.2.3 | Determination of the mass of the specimen residue | 19 |
| 10.3 | Validity of test run | 19 |
| 11 | Calculations | 19 |
| 11.1 | General | 19 |

| | | |
|---|---|----|
| 11.2 | Mass-charge concentration and mass-loss concentration | 20 |
| 11.2.1 | Mass-charge concentration | 20 |
| 11.2.2 | Mass-loss concentration | 20 |
| 11.3 | Smoke density | 21 |
| 11.4 | Yield | 21 |
| 11.5 | Organic fraction | 22 |
| 12 | Test report | 23 |
| 13 | Repeatability and reproducibility | 24 |
| 13.1 | Repeatability | 24 |
| 13.2 | Reproducibility | 25 |
| 13.3 | Accuracy | 25 |
| Annex A (informative) Guidance on choice of additional decomposition conditions | | 26 |
| Annex B (informative) Calculation of lethal toxic potency for combustion products according to ISO 13344 using tube-furnace data | | 28 |
| Annex C (informative) Application of data from the tube-furnace test to assessment of toxic hazard in fires according to ISO 13571 | | 29 |
| Annex D (informative) Guidance on application of data from the tube-furnace test to health and safety assessments of combustion-products | | 30 |
| Annex E (informative) Guidance on application of data from the tube-furnace tests to assessment of environmental hazards of combustion products from fires | | 31 |
| Annex F (informative) Use of the tube-furnace method for bioassay purposes | | 32 |
| Bibliography | | 33 |