

ISO 19702:2015-08 (E)

Guidance for sampling and analysis of toxic gases and vapours in fire effluents using Fourier Transform Infrared (FTIR) spectroscopy

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	2
3	Terms and definitions	2
4	Principles	3
5	Sampling	3
5.1	General	3
5.2	Temperature of the sampling system	4
5.3	Filter systems	5
5.4	Sampling probes	6
5.4.1	General	6
5.4.2	Single hole probes	7
5.4.3	Multi hole probes	7
5.4.4	Probe positioning	7
5.5	Sampling line	8
5.6	Pump selection, position, and flow rate	9
5.7	Response time of the sampling system	10
5.8	Optical cell	10
6	The FTIR spectrophotometer	11
6.1	Spectrophotometer environment	11
6.2	Detector	11
6.3	IR-source	11
6.4	Mirror alignment and cleanliness	11
6.5	Spectrophotometer compartment	12
6.6	Spectral range limits	12
6.7	Resolution	12
7	Calibration	12
7.1	Background noise	12
7.2	Limits of detection and of quantification (LD and LQ)	12
7.3	Calibration methods	13
7.4	Acquiring and collecting calibration standards	13
8	Measurement procedure	13
8.1	General	13
8.2	Daily checks and controls	13
8.2.1	General	13
8.2.2	Control of calibration method	13
8.2.3	Spectrophotometer sensitivity measurements	14
8.2.4	Sampling system tests	14
8.2.5	Control of the sampling flow rate	14
8.3	Preparation for sampling and analysis	15
8.4	Initial procedures immediately before a test	15

8.5	Procedures during sampling from a test	15
8.6	Procedures after a test	16
8.7	Data reduction	16
9	Test report	16
10	Precision and accuracy	17
10.1	General	17
10.2	LD and LQ	17
10.3	Repeatability and reproducibility	17
Annex A (informative) FTIR theory		18
Annex B (informative) FTIR sampling systems		20
Annex C (informative) Analysis of filter(s), the sampling line and probe for effluent retention		25
Annex D (normative) Response time determination of the complete FTIR sampling system		26
Annex E (informative) Considerations for FTIR optical cell selection		29
Annex F (normative) Verification of FTIR optical cell performance		31
Annex G (informative) Spectrophotometer		33
Annex H (normative) Verification of spectrometer performance		37
Annex I (informative) Reference gases		41
Annex J (informative) Calibration methods		47
Annex K (informative) Recording reference spectra and building a calibration set		50
Annex L (informative) Repeatability and reproducibility		54
Annex M (informative) Examples of equipment and parameters		55
Bibliography		66