

---

---

**Stationary source emissions —  
Determination of the mass concentration  
of dinitrogen monoxide (N<sub>2</sub>O) —  
Reference method: Non-dispersive  
infrared method**

*Émissions de sources fixes — Détermination de la concentration  
massique de protoxyde d'azote (N<sub>2</sub>O) — Méthode de référence:  
Méthode infrarouge non dispersive*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2010

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword .....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Symbols and abbreviated terms .....	5
5 Principle.....	6
6 Description of the automated measuring equipment .....	6
6.1 General .....	6
6.2 Sampling line components .....	7
6.3 Analyser equipment .....	8
6.4 Responsibilities .....	8
7 Performance criteria and determination of the performance characteristics .....	9
7.1 Performance criteria.....	9
7.2 Determination of the performance characteristics and measurement uncertainty .....	10
7.3 Establishment of the uncertainty budget.....	10
8 Measurement procedure.....	11
8.1 Sampling location.....	11
8.2 Sampling point(s) .....	11
8.3 Choice of the measuring system .....	11
8.4 Setting of the analyser on site .....	12
9 Ongoing quality control .....	13
9.1 General .....	13
9.2 Frequency of checks .....	13
10 Evaluation of the method in the field .....	14
11 Expression of results .....	14
12 Test report.....	15
Annex A (informative) Schematic diagram of a typical analyser .....	16
Annex B (normative) Procedures for determination of the performance characteristics during the general performance test.....	17
Annex C (informative) Example of assessment of compliance of NDIR method for N <sub>2</sub> O with requirements on emission measurements .....	20
Annex D (informative) Results of comparison tests.....	27
Annex E (informative) Leak test procedures .....	30
Bibliography .....	32

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21258 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

## Introduction

Dinitrogen monoxide ( $\text{N}_2\text{O}$ , also known as nitrous oxide) is an important greenhouse gas with a global warming potential 310 times that of carbon dioxide ( $\text{CO}_2$ ).  $\text{N}_2\text{O}$  is of both natural and anthropogenic origin. Increased emissions of  $\text{N}_2\text{O}$  have been observed, for example, in the exhaust gas of combustion processes using nitrogenous fuels at temperatures below 900 °C, and in the reduction of  $\text{NO}_x$  using the selective non-catalytic reduction (SNCR) process, in particular when urea is used. There is considerable uncertainty over current  $\text{N}_2\text{O}$  emissions, which is reflected in the wide range of emission factors cited. The largest uncertainties are for emissions from natural and agricultural sources, which are difficult to measure accurately. In the past, emissions from stationary sources such as coal-fired plants and industry were overestimated due to a serious artefact in the grab-sampling methodology used to measure emissions.  $\text{N}_2\text{O}$  is involved in the EU emission trading scheme along with  $\text{CO}_2$  and methane ( $\text{CH}_4$ ).

Improved measurement techniques are helping to reduce uncertainties in emission estimates. Improved measurement techniques are also a prerequisite for accurate information on  $\text{N}_2\text{O}$  and its potential role in the enhanced greenhouse effect.

This document is a preview generated by EVS

# Stationary source emissions — Determination of the mass concentration of dinitrogen monoxide (N<sub>2</sub>O) — Reference method: Non-dispersive infrared method

## 1 Scope

This International Standard specifies a method for sampling, sample conditioning and determination of dinitrogen monoxide (N<sub>2</sub>O) content in the flue gas emitted from ducts and stacks to atmosphere. It sets out the non-dispersive infrared (NDIR) analytical technique, including the sampling system and sample gas conditioning system.

This International Standard is a reference method for periodic monitoring and for calibration, adjustment or control of automatic monitoring systems permanently installed on a stack.

This reference method has been successfully tested on a sewage sludge incinerator where the N<sub>2</sub>O concentration in the flue gas was up to about 200 mg/m<sup>3</sup>.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9169:2006, *Air quality — Definition and determination of performance characteristics of an automatic measuring system*

ISO 14956, *Air quality — Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **influence quantity**

quantity that is not the measurand but that affects the result of the measurement

[ISO/IEC Guide 98-3:2008, B.2.10]

### 3.2

#### **interference**

negative or positive effect upon the response of the measuring system, due to a component of the sample that is not the measurand