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English Version

**Workplace exposure - Measurement of chemical agents  
complying with the requirements given in EN 482 and  
either one of EN 838, EN 1076, EN 13205, EN 13890 and  
EN 13936 - Choice of procedures**

Exposition sur les lieux de travail - Mesurage des  
agents chimiques conformément aux exigences  
spécifiées dans l'EN 482 et dans l'une des normes EN  
838, EN 1076, EN 13205, EN 13890 et EN 13936 -  
Choix des modes opératoires

Exposition am Arbeitsplatz - Messung von chemischen  
Arbeitsstoffen, welche die Anforderungen nach EN 482  
sowie nach einer von EN 838, EN 1076, EN 13205, EN  
13890 und EN 13936 erfüllen - Auswahl von Verfahren

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## European foreword

This document (CEN/TR 17055:2017) has been prepared by Technical Committee CEN/TC 137 “Assessment of workplace exposure to chemical and biological agents”, the secretariat of which is held by DIN.

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## Introduction

Article 3 (10) of the Chemical Agents Directive 98/24/EC [1] called for suitable analytical methods for hazardous substances in workplace atmospheres. However, CEN/TC 137 has adopted a significantly different strategy of standardization which has not involved preparation of separate European Standards for measuring procedures. Instead, CEN/TC 137 has developed several European Standards that present general requirements for measuring procedures and which are used to test whether measuring procedures meet these requirements. A measuring procedure that fulfils these requirements is suitable for the measurement of hazardous substances in workplace atmospheres in the sense of Directive 98/24/EC. To fulfil the demand of Directive 98/24/EC it is necessary to find out whether measuring procedures are available that meet the requirements of the European Standards elaborated by CEN/TC 137.

Several EU Members have committees or organisations which issue measuring procedures. Furthermore, for example, the US National Institute for Occupational Safety and Health (NIOSH) and other institutions of Non-EU-Members publish suitable measuring procedures. The main aim of this CEN Technical Report is to check whether these measuring procedures fulfil the requirements of EN 482.

EN 482 is one of the basic standards elaborated by CEN/TC 137. Whereas, its first edition was already published in 1994, the second edition was published in 2006 subsequent to a major revision that took the principles on laid down in ISO/IEC Guide 98-3 (GUM). As consequence of the issue of the revised EN 482 in 2006 its “daughter standards” EN 838, EN 1076, EN 13890 and EN 13936 needed to be revised fundamentally, too. In 2012, a third edition of EN 482 was published taking into account the changes introduced to its daughter standards during their revisions. In 2015, EN 482 has been amended by introducing a new sub-clause dealing with chemical agents with low limit values and republished as fourth edition of EN 482 consolidated with its Amendment 1.

The “major revision” of EN 482 was one main task of the European project “Analytical methods for chemical agents” funded by the Commission under the Mandate BC/CEN/EN/TR 000/2002-16. The second part of this project was the selection and examination of existing measuring procedures.

The European project report comprises measuring procedures for 126 high profile hazardous substances. The measuring procedures were listed in “methods sheets” and selected (analytical) methods were rated with regard to the requirements of the first edition of EN 482 published in 1994. To make these lists and method sheets easily accessible, a database was established and made publicly available on the IFA homepage designated as “GESTIS - Analytical methods” [2].

From today's point of view, the lists and method sheets are no longer up to date. For some chemical agents the occupational exposure limit values have changed in recent years. Additionally, in the meantime several new measuring procedures have been published which base on the requirements of subsequent editions of EN 482.

For those reasons, it was decided to update the database “Analytical methods for chemical agents” accordingly.

## 1 Scope

This CEN Technical Report describes how the measuring procedures for chemical agents complying with the requirements given in EN 482 and either one of EN 838, EN 1076, EN 13890, EN 13936 and/or the EN 13205 series, as far as applicable, have been chosen.

This document refers on the selection of chemical agents and related substance groups and the establishment of corresponding method lists. It describes the evaluation of available measuring procedures in order to select for a particular chemical agent the most appropriate one.

This document is also intended to:

- provide a means to compare for a given chemical agent a new measuring procedure with those listed in the database GESTIS Analytical methods [2];
- to evaluate and rate a given measuring procedure (from an accepted source) for a given chemical agent not yet selected in the database GESTIS Analytical methods [2].

## 2 Measuring procedures

### 2.1 General

Measuring procedures (“analytical methods”) for chemical agents in workplace atmospheres are available from many sources. In Europe, for example in France, Germany, Spain and UK “official” measuring procedures for workplace atmospheres are published. Furthermore, a number of International Standards have been promulgated the use in this field, but the most important sources of measuring procedures from countries outside Europe are those published by OSHA and NIOSH.

### 2.2 Selection of chemical agents

Further surveys show that there are about 2000 different chemical agents, mixtures and preparations with existing limit values in Europe [3]. Beyond, many so called “derived no-effect levels” (DNEL's) have been published by the European Chemical Agency (ECHA) since 2010 [4]. It is far beyond the application range of the database to select measuring procedures for all chemical agents with a limit value. In any case for many chemical agents no measuring procedure exists. Furthermore, due to the very specific problems of fibre measurements and measurements of nanoparticles, no procedures for these chemical agents are listed.

The selection of chemical agents is based mainly on the number of measurements carried out in France and Germany. Both countries have similar databases for measurements in workplace atmospheres, and in both countries several hundred thousand measurements have been performed since the early 1970s [5], [6]. These databases give a very good overview about chemical agents of high priority. The chemical agents for the method lists are mainly selected from that group of chemical agents which remained more or less unchanged since 2006, and a few other criteria:

- high number of measurements;
- high profile substances (e.g. diesel fume);
- EU limit value and a reasonable number of measurements;
- limit values in most countries of the EU.