



National Standards Authority of Ireland

IRISH STANDARD

I.S. ENV 13999-3:2002

ICS 83.180

**ADHESIVES - SHORT TERM METHOD FOR
MEASURING THE EMISSION PROPERTIES
OF LOW-SOLVENT OR SOLVENT-FREE
ADHESIVES AFTER APPLICATION - PART 3:
DETERMINATION OF VOLATILE ALDEHYDES**

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English version

Adhesives - Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application - Part 3: Determination of volatile aldehydes

Adhésifs - Méthode de courte durée de mesurage des propriétés d'émission des adhésifs à faible teneur en solvants ou exempts de solvants après application - Partie 3: Dosage des aldéhydes volatils

Klebstoffe - Kurzzeit-Verfahren zum Messen der Emissionseigenschaften von lösemittelfreien oder lösemittelfreien Klebstoffen nach der Applikation - Teil 3: Bestimmung flüchtiger Aldehyde

This European Prestandard (ENV) was approved by CEN on 16 October 2002 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

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ENV 13999-3:2002 (E)

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Foreword

This document ENV 13999-3:2002 has been prepared by Technical Committee CEN/TC 193, "Adhesives", the secretariat of which is held by AENOR.

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard : Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

ENV 13999-3:2002 (E)

1 Scope

This European Prestandard specifies a procedure for the determination of volatile aldehydes (esp. formaldehyde and acetaldehyde) in the exhaust air of an emission test chamber after application of an adhesive.

The method is based on chemisorption of volatile aldehydes with 2,4-dinitrophenylhydrazine (in the following: DNPH) impregnated silica tubes or cartridges with subsequent solvent desorption, clean-up and liquid chromatographic analysis. The method permits measurement of several aldehydes including formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, valeraldehyde, isovaleraldehyde, hexanal, benzaldehyde, 2,5-dimethylbenzaldehyde, o-tolualdehyde, m-tolualdehyde, p-tolualdehyde, crotonaldehyde in the concentration range of approximately 10 µg/m³ to 1 mg/m³ (see ISO 16000-3).

2 Normative references

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1232, *Workplace atmospheres - Pumps for personal sampling of chemical agents - Requirements and test methods*.

ENV 13999-1, *Adhesives - Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application - Part 1: General procedure*.

ENV 13419-1, *Building products - Determination of the emission of volatile organic compounds - Part 1: Emission test chamber method*.

ISO 16000-3, *Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds - Active sampling method*.

3 Principle

An emission test chamber as described in ENV 13999-1 or ENV 13419-1 shall be used.

A sufficient volume of test chamber air is drawn with an appropriate flow through silicagel tubes or cartridges impregnated with 2,4-dinitrophenylhydrazine (DNPH) reagent. Any organic aldehydes and other carbonyl compounds present will react to form non-volatile dinitrophenylhydrazones. Desorption is done with acetonitrile. The resultant solution is concentrated and analysed by high performance liquid chromatography (HPLC) with ultraviolet (UV) detection. Dinitrophenylhydrazone peaks from formaldehyde, acetaldehyde and other aldehydes are identified on the basis of both their respective retention times and their UV responses at more than one wavelength and/or by diode array detection (DAD) and comparison with a derivative product (where available) or standard. Quantification is done by comparison with a relevant aldehyde or a dinitrophenylhydrazone standard.

4 Safety

This Prestandard does not purport to address all of the safety concerns, if any associated with its use. The user of this Prestandard should be familiar with common laboratory practice including general safety measures. It is the responsibility of the user of this Prestandard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

If the user decides not to use commercially available DNPH coated tubes or cartridges but to prepare the tubes or cartridges in the laboratory then the safety measures described in ISO 16000-3 shall be considered carefully.

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