

**SLOVENSKI STANDARD**  
**oSIST prEN ISO 21904-4:2019**  
**01-marec-2019**

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**Zdravje in varnost pri varjenju in sorodnih tehnikah - Oprema za zajem in ločevanje varilnega dima - 4. del: Določanje najmanjšega volumenskega pretoka zraka skozi odsesovalne naprave (ISO/DIS 21904-4:2019)**

Health and safety in welding and allied processes - Equipment for capture and separation of welding fume - Part 4: Determination of the minimum air volume flow rate of capture devices (ISO/DIS 21904-4:2019)

Arbeits- und Gesundheitsschutz beim Schweißen und bei verwandten Verfahren - Einrichtungen zum Erfassen und Abscheiden von Schweißrauch - Teil 4: Bestimmen des Mindestluftvolumenstromes von Absaugeinrichtungen (ISO/DIS 21904-4:2019)

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Hygiène et sécurité en soudage et techniques connexes - Équipements de captage et de filtration des fumées - Partie 4: Détermination du débit volumique minimal d'air des dispositifs de captage (ISO/DIS 21904-4:2019)

**Ta slovenski standard je istoveten z: prEN ISO 21904-4**

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**ICS:**

13.040.40	Emisije nepremičnih virov	Stationary source emissions
13.100	Varnost pri delu. Industrijska higiena	Occupational safety. Industrial hygiene
25.160.30	Varilna oprema	Welding equipment

**oSIST prEN ISO 21904-4:2019**

**en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 21904-4

ISO/TC 44/SC 9

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### Health and safety in welding and allied processes — Equipment for capture and separation of welding fume — Part 4: Determination of the minimum air volume flow rate of capture devices

ICS: 13.100; 25.160.30

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## ISO/DIS 21904-4:2019(E)

### Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 9, *Health and safety*.

A list of all parts in the ISO 21904-series can be found on the ISO website.

Requests for official interpretations of any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 9 via your national standards body. A complete listing of these bodies can be found at [www.iso.org](http://www.iso.org).

## Introduction

Welding and allied processes generate fume and gases, which, if inhaled, can be harmful to human health. Control is often required to maintain exposure at acceptable levels and this can be achieved by capturing the fume and gases using local exhaust ventilation.

For a particular capture device, the air velocity to capture welding fume can only be achieved by applying a minimum air volume flow rate. Consequently, capture devices need to be used with exhaust systems that provide, at least, the minimum air volume flow rate.

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# Health and safety in welding and allied processes — Equipment for capture and separation of welding fume —

## Part 4:

# Determination of the minimum air volume flow rate of capture devices

## 1 Scope

This part of ISO 21904 specifies two methods for establishing the minimum air volume flow rate. One method is dedicated for use with captor hoods, nozzles and slot nozzles with a ratio of slot length to hose diameter of 8:1 or less. The other method is dedicated for use with on-gun extraction devices.

Neither method is applicable to down draught tables.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 and ISO 21904-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

## 4 Captor hoods, nozzles and slot nozzles

### 4.1 Principle

Tests are performed to determine the minimum air volume flow rate to provide a suction field of given dimensions and air velocity at a measured distance perpendicular to the hood. The required velocity in the suction field as specified in ISO 21904-1, Clause 5.2 and the required dimensions are at least 1,5 D long and at least 1 D wide at a distance of 1,5 D, where D is the internal diameter of the extraction duct. It can be achieved by the measurement described in [Clause 4.3](#) or by numerical simulation (Computational Fluid Dynamics, CFD).

### 4.2 Equipment

**4.2.1 Anemometer**, non-directional, suitable for measuring air velocities in the range 0,2 m/s to 0,5 m/s with a maximum uncertainty of  $\pm 0,02$  m/s and having a calibration that is traceable to national standards if available.

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**4.2.2 Measure**, suitable for measuring distances with an uncertainty of  $\pm 1$  mm.

**4.2.3** Equipment for measuring flow rates in ducts, pressure differential devices such as a venturi nozzle or an orifice plate with an uncertainty of  $\pm 5$  % are suitable.

**4.2.4** Equipment for generating an adjustable flow rate, e.g. a fan with a frequency converter or an in-line valve.

### 4.3 Test method

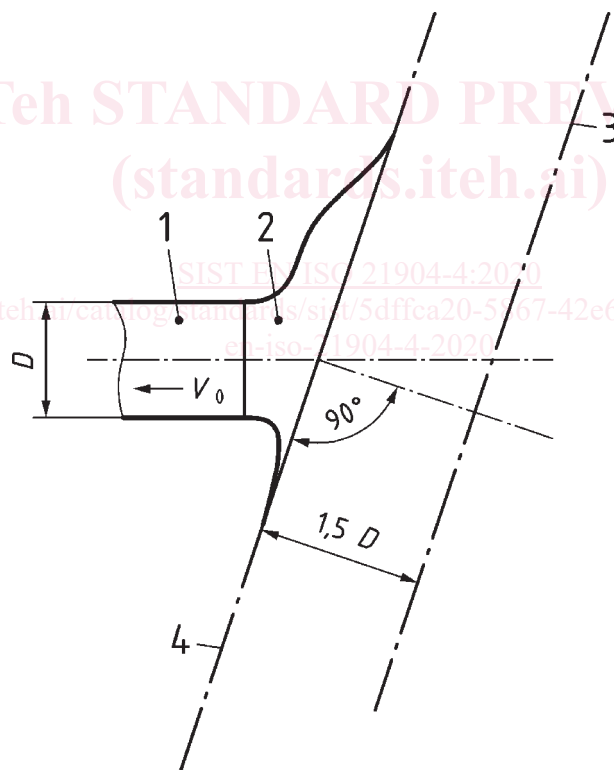
#### 4.3.1 Test setup

Position the hood or nozzle so that it is free standing and sited away from any obstructions. Ensure that any disturbing air draughts in the immediate test area average less than 0,1 m/s in a 5 minute test period.

The anemometer shall be moveable in the measurement plane.

#### 4.3.2 Determination of the position of the entry and the measurement plane

Determine the position of the entry plane according to Figure 1.



#### Key

- 1 duct
- 2 hood
- 3 measurement plane
- 4 entry plane

**Figure 1 — Test setup**

The measurement plane shall be parallel to and 1,5 D distant from the entry plane.

Where  $D$  is the internal diameter of the extraction duct.