

SVENSK STANDARD

SS-EN ISO 21904-1:2020

Hälsa och säkerhet vid svetsning och besläktade förfaranden –
Utrustning för infångning och avskiljning av svetsrök –
Del 1: Allmänna krav (ISO 21904-1:2020)

Health and safety in welding and allied processes – Equipment
for capture and separation of welding fume –
Part 1: General requirements (ISO 21904-1:2020)



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Europastandarden EN ISO 21904-1:2020 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 21904-1:2020.

Denna standard ersätter SS-EN ISO 15012-1:2013, utgåva 2 och SS-EN ISO 15012-4:2016, utgåva 1

The European Standard EN ISO 21904-1:2020 has the status of a Swedish Standard. This document contains the official version of EN ISO 21904-1:2020.

This standard supersedes the SS-EN ISO 15012-1:2013, edition 2 and SS-EN ISO 15012-4:2016, edition 1

EUROPEAN STANDARD

EN ISO 21904-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Supersedes EN ISO 15012-4:2016

English Version

**Health and safety in welding and allied processes -
Equipment for capture and separation of welding fume -
Part 1: General requirements (ISO 21904-1:2020)**

Hygiène et sécurité en soudage et techniques
connexes - Equipements de captage et de
filtration des fumées - Partie 1: Exigences
générales (ISO 21904-1:2020)

Arbeits- und Gesundheitsschutz beim Schweißen
und bei verwandten Verfahren - Einrichtungen zum
Erfassen und Abscheiden von Schweißrauch - Teil
1: Allgemeine Anforderungen (ISO 21904-1:2020)

This European Standard was approved by CEN on 31 January 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents		Page
European foreword		vii
Introduction		viii
1	Scope	9
2	Normative references	9
3	Terms and definitions	10
4	Significant hazards	12
5	Requirements and verifications	12
5.1	General	12
5.2	Extraction devices	16
5.3	Ducting properties	22
5.4	Filters, related components and handling	24
6	Instructions for use	28
6.1	General	28
6.2	Extraction devices	29
6.2.1	Captor hoods and nozzles.....	29
6.2.2	On-torch extraction systems	29
7	Marking	30
7.1	General marking.....	30
7.2	Marking of separation efficiency.....	30
7.3	Marking of captor hoods and nozzles.....	30
7.4	Marking of on-torch extraction systems.....	31
Annex A (informative) Malfunctions and determination of minimum airflow		32
Annex B (normative) Label for welding fume separation equipment		33
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC aimed to be covered		34
Bibliography		35

European foreword

This document (EN ISO 21904-1:2020) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding and allied processes" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

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

This document supersedes EN ISO 15012-4:2016.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 21904-1:2020 has been approved by CEN as EN ISO 21904-1:2020 without any modification.

Introduction

Welding and allied processes generate fumes and gases which, if inhaled, can be harmful to human health. Therefore, control of the fumes and gases generated is to be exercised to minimize worker exposure.

The most effective method of control is to capture the fumes and gases close to their source before they enter a worker's breathing zone or the general workplace environment.

Ventilation equipment used to capture the fumes and gases is to be fit for purpose because inefficient capture can result in high exposure and can be detrimental to workers' health. Therefore, it is important that it adheres to defined manufacturing, materials and design requirements and gives warning of malfunction.

This document is a type-C standard as stated in ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organisations, market surveillance etc.);

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e. g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

In addition, this document is intended for standardization bodies elaborating type-C standards.

The requirements of this document can be supplemented or modified by a type-C standard.

For machines which are covered by the scope of a type-C standard and which have been designed and built according to the requirements of that standard, the requirements of that type-C standard take precedence.

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

Part 1: General requirements

1 Scope

This document defines the general requirements for ventilation equipment used to capture and separate fumes generated by welding and allied processes, e.g. arc welding and thermal cutting.

This document also specifies the test data to be marked on the capture devices.

It applies to the design and manufacture of parts of the equipment including hoods for welding, ducting, filter units, air movers, systems that inform of unsafe operation and workplace practices to ensure safe working with regard to exposure.

Significant hazards are listed in [Clause 4](#). It does not cover electrical, mechanical and pneumatic hazards.

This document is applicable to:

- local exhaust ventilation systems (LEV) excluding draught tables;
- mobile and stationary equipment;
- separation equipment used for welding and allied processes;

This document is not applicable to:

- general ventilation, air make up or air movement systems;
- air conditioning systems;
- grinding dust.

This document applies to systems designed and manufactured after its publication.

NOTE Specific safety requirements for thermal cutting machines are defined in ISO 17916.

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 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 21904-2:2020, *Health and safety in welding and allied processes — Equipment for capture and separation of welding fume — Part 2: Requirements for testing and marking of separation efficiency*

ISO 21904-4:2020, *Health and safety in welding and allied processes — Requirements, testing and marking of equipment for air filtration — Part 4: Determination of the minimum air volume flow rate of captor hoods and nozzles*

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

SS-EN ISO 21904-1:2020 (E)

IEC 60335-2-69:2012, *Household and similar electrical appliances — Safety — Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use*

IEC 60695-2-12:2010+A1:2014, *Fire hazard testing — Part 2-12: Glowing/hot-wire based test methods — Glow-wire flammability index (GWFI) test method for materials*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010 and the following apply.

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

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

3.1 welding fume separation equipment
air filtration equipment, the purpose of which is to separate particles generated by welding and allied processes from workplace atmosphere

Note 1 to entry: Some separation equipment is designed to also remove gases generated by welding, but the ISO 21904 series does not address the efficiency of gas separation.

3.2 filter cleaning system
system designed to clean the filter of *welding fume separation equipment* (3.1) in order to restore the air flow rate through the filter when it is reduced by an accumulation of *welding fume* (3.13) particles

3.3 on-line filter cleaning system
filter cleaning system, either automatically or manually initiated, operating while *welding fume separation equipment* (3.1) is running

3.4 off-line filter cleaning system
filter cleaning system, either automatically or manually initiated, operating after the air mover of the filtration equipment is switched off

3.5 separation efficiency by mass
ratio of the mass of particles retained by *welding fume separation equipment* (3.1) to the mass of particles entering the equipment during a given period

Note 1 to entry: General information on test methods for determination of separation efficiency is described in EN 1093-6 and EN 1093-7.

3.6 local exhaust ventilation
LEV
use of extraction to remove contaminated air at or near to its source

3.7 filter protector
device normally positioned at the intake of the *welding fume separation equipment* (3.1), used to minimize the possibility of damaging impacts of sparks or large particles on filter media

Note 1 to entry: Filter media can also be protected against sparks and large particles by the internal design of the welding fume separation equipment.

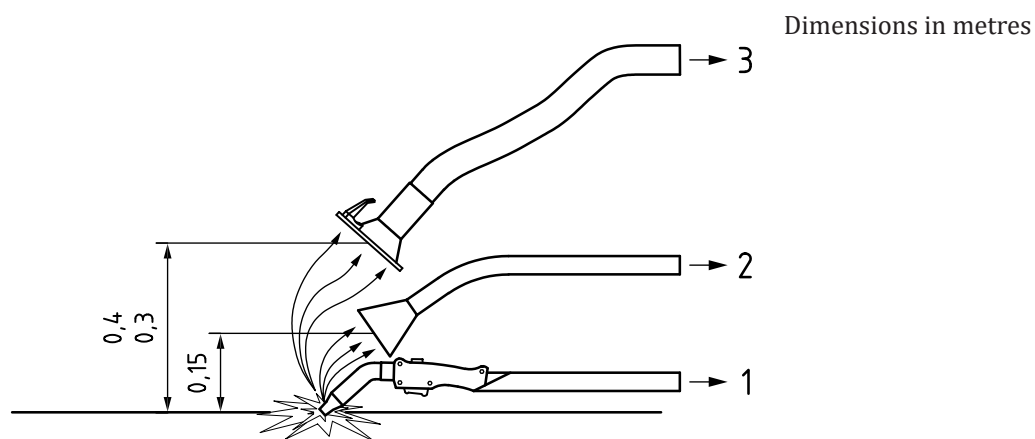
Note 2 to entry: Examples of filter protectors are cyclones, spin separators, baffles or sieves. A filter protector may be designed to also protect against flame damage.

3.8 on-torch extraction device on-gun extraction device

equipment, integrated or attached, on torch used for capturing *welding fume* (3.13), when connected to an extraction source

Note 1 to entry: Due to the state of the art, on-torch extraction devices for TIG welding are not covered by this definition.

Note 2 to entry: For an overview of the different extraction devices, see [Figure 1](#).



Key

- 1 on-torch extraction (3.8), 50 m³/h to 100 m³/h, 5 kPa to 18 kPa
- 2 high vacuum extraction (3.9), 100 m³/h to 150 m³/h, 5 kPa to 10 kPa
- 3 low vacuum extraction (3.9), 700 m³/h to 1500 m³/h, 800 Pa to 2 000 Pa

Figure 1 — Overview of extraction devices and common air volume flow rates and pressure

3.9 captor hood captor nozzle

equipment, movable or static, used for capturing *welding fume* (3.13), when connected to an extraction source

Note 1 to entry: For an overview of the different extraction devices, see [Figure 1](#).

3.10 receiving hood canopy

equipment, movable or static, normally positioned above a hot process, where the contaminated air is propelled into it by process-induced air movement

3.11 enclosure chamber

fully or partially enclosed space where the process takes place, designed to contain and prevent the escape of hazardous substances into the workshop air

3.12 suction equipment

unit with air mover and with or without a filter