LEV LOCAL EXHAUST VENTILATION 2024

10th & 11th September 2024

Hosted by BOHS British Occupational Hygiene Society

BS EN ISO 21904

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

eLEV8ed
hazel@elev8ed.co.uk

Presented by:

Hazel Griffiths, BSc (Hons), CoC (Control), LFOH(S)

Elev8ed Ltd

BOHS British Occupational Hygiene Society

professional standards authority accredited register

"If I can put everyone to sleep within the first 3 minutes,
the rest of my presentation should go pretty well."

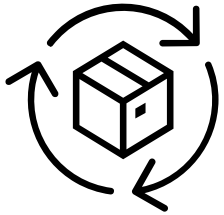
eLEV8ed
hazel@elev8ed.co.uk

- Standards and Legislation
- BS EN ISO 21904, Parts 1 to 4
- Testing and Marking
- Standards vs TExT

eLEV8ed
hazel@elev8ed.co.uk

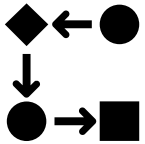
Making a product

Delivering a service



Standards: an agreed way of doing something

Managing a process



BSI is the UK national member of the standards bodies ISO, IEC, CEN, CENELEC and ETSI, enabling UK influence to ISO, IEC & EN standards.

eLEV8ed
hazel@elev8ed.co.uk

Experts or Professionals

Innovators or change makers in the field

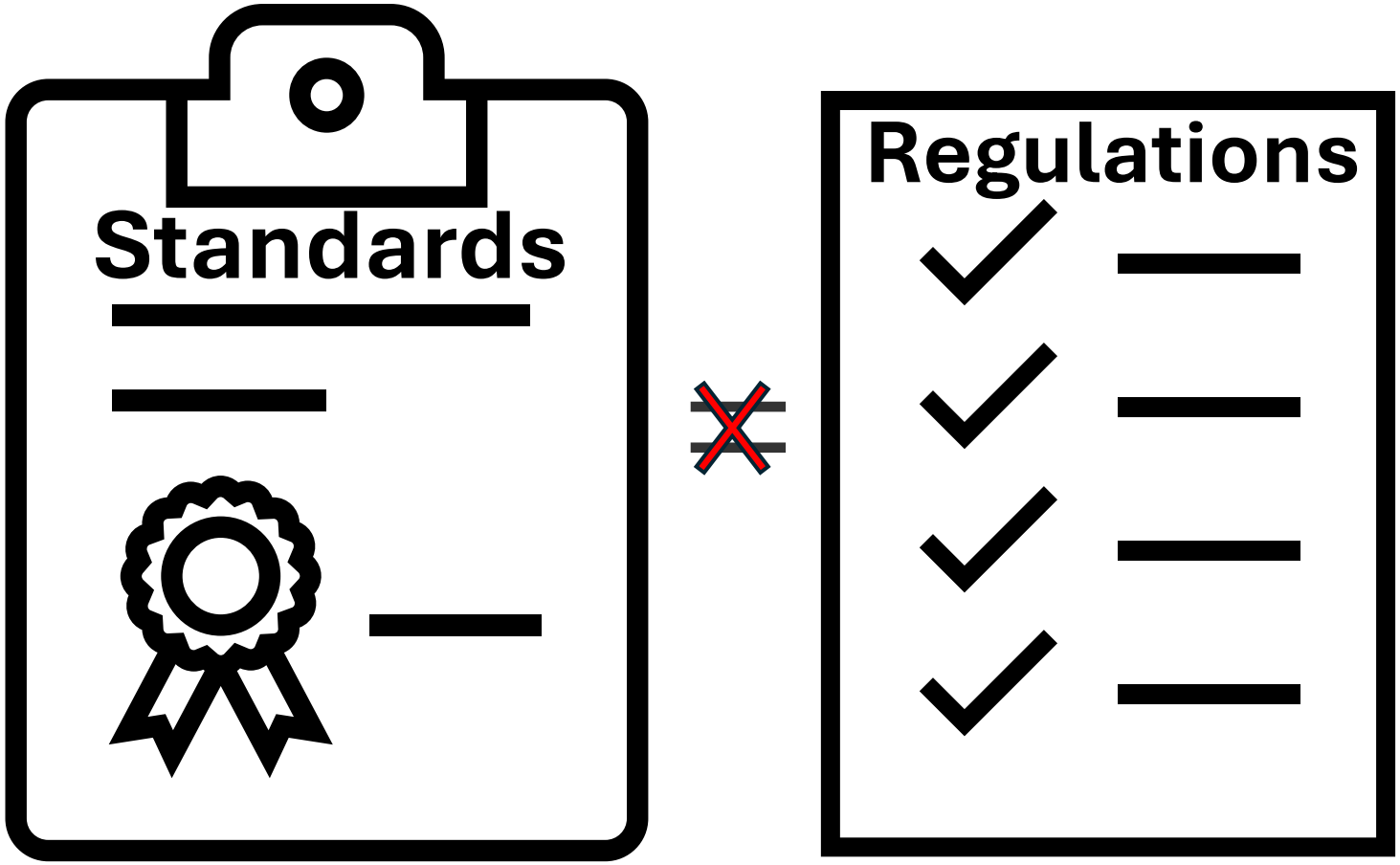
Charities or Public interest groups

Representatives of government

Professional bodies or academia

Standards:

developed by groups with interest



eLEV8ed
hazel@elev8ed.co.uk

Generally speaking, following a British standard is **not a legal requirement**.
Compliance is often taken as **evidence of due diligence.**
Standards **rarely cite law** as laws may change.
Following a standard **does not guarantee legal requirements are being met**.

Standards and Regulation

eLEV8ed
hazel@elev8ed.co.uk

The UK introduced designated standards to replace EU harmonized standards,

there is a statutory '**presumption of conformity**' that

the product meets the essential requirements set out in the GB legislation that apply to that product covered by the standard

COSHH

- Reg 2 guidance: inhalable / respirable dust definitions – BS EN 481:1993
- Reg 7 ACOP: PPE with CE marking (now UKCA)
- Reg 9 ACOP: methods validated by authorities such as HSE, BSI, ISO etc
- Reg 12 guidance: pipework is often marked in accordance with BS 1710:1984

HSG258:

Ch5 – an **'industry standard'** of LEV makes the specification process simpler, so long as it is effective.

Ch6 – certain industries have **'standard designs'** of LEV for **'standard processes'.** However, **some are ineffective**, eg, bench fan/filter for solder fume.

Ch8 – ANSI has **standards for balancing airflows** (References: ASHRAE Std 111-1998)

Ch10 **– fume cupboards and microbiological cabinets**: use appropriate BS / EN standards. (References: safety and performance standards **BS EN 14175-2:2003**)

Ch10, para 363 **– filtration of toxic particles** requires a high-performance filter, eg HEPA or absolute filter. Follow an **appropriate British, European or ISO standard to test such filters in situ.**

BS EN 21904-1:2020

eLEV8ed
hazel@elev8ed.co.uk

Part 1: General Requirements

Replaces EN ISO 15012-4:2016

Scope:
General requirements for ventilation equipment used to capture and separate fumes generated by welding and allied processes.

design and manufacture - hoods, ducts, filters, fans, alerts, workplace practices to ensure safe working with regard to exposure

BS EN 21904-2:2020

eLEV8ed
hazel@elev8ed.co.uk

Part 2: Requirements for testing and marking of separation efficiency

Supersedes EN ISO 15012-1:2013

Scope:

A method for testing equipment for the separation of welding fume in order to determine whether its separation efficiency meets specific requirements.

BS EN 21904-3:2018

eLEV8ed
hazel@elev8ed.co.uk

Part 3: Determination of the capture efficiency of on-torch welding fume extraction devices

Scope

A laboratory method for measuring the welding fume capture efficiency of on-torch extraction systems. The procedure only prescribes a methodology, leaving selection of the test parameters to the user, so that the effect of different variables can be evaluated.

Applicable to on-torch and discrete extraction attached to the welding torch close to the arc area. Suitable with all continuous wire welding processes, all material types and all welding parameters

eLEV8ed
hazel@elev8ed.co.uk

BS EN ISO 21904-3, introduction

vs

EN ISO 15012-2

POROSITY

HSE RR 683

BS EN 21904-4:2020

eLEV8ed
hazel@elev8ed.co.uk

Part 4: Determination of the minimum air volume flowrate of capture devices

Supersedes EN ISO 15012-2:2008

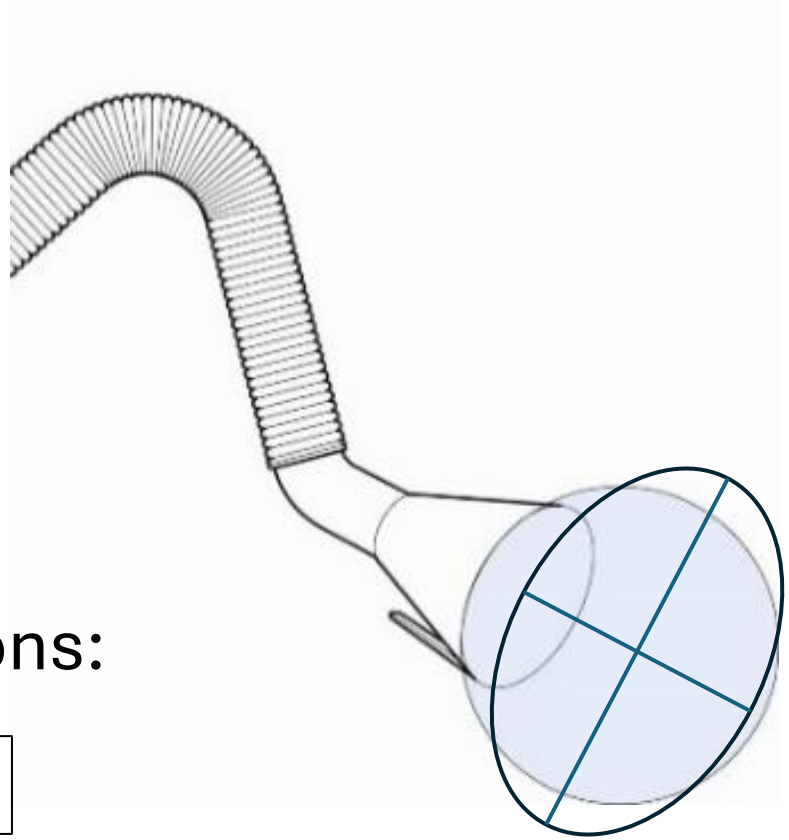
Specifies two methods for establishing the minimum air volume flowrate. One for use with capture hoods, nozzles and slot nozzles with a ratio of slot length to hose diameter of 8:1 or less. The other method is dedicated for use with on-gun extraction devices.

(Not applicable to downdraft tables)

BS EN 21904-4:2020

eLEV8ed
hazel@elev8ed.co.uk

Part 4 vs TExT



Fletchers Equations:

$$V_H = V_C\,(0.93 + 8.58\alpha^2)$$

$$\alpha = \frac{x}{\sqrt{A}}\left(\frac{W}{L}\right)^{-\beta}$$

$$\beta = 0.2\left(\frac{x}{\sqrt{A}}\right)^{-\frac{1}{3}}$$

Testing and certification

The Test and Certification Body of the Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung

IFA

(Institute for occupational safety and health of the German Social Accident Insurance)

What are the manufacturers doing?

eLEV8ed
hazel@elev8ed.co.uk

Nederman

KEMPER®

What does this mean for LEV Thorough Examination and Test (TExT)?

eLEV8ed
hazel@elev8ed.co.uk

Should LEV testers be working to BS EN 21904?

Benefits

Concerns

Summary

eLEV8ed
hazel@elev8ed.co.uk

- Product testing requires specialist equipment / IFA certification (currently a long wait time)
- Not fully adopted in the UK but some suppliers are working towards this standard
- Benefits could include: filter minimum efficiency 99% (but is this enough for carc.?) (or class L to atmosphere), suitable hood/duct materials, fans can be checked for direction, filters removed and bins emptied safely, alarms for low flow and filter faults.
- Limitations – flowrates and capture distance not to HSG258, no onsite testing method / standard.