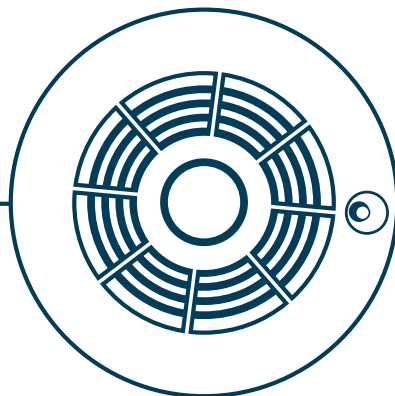


**Fact File 91**



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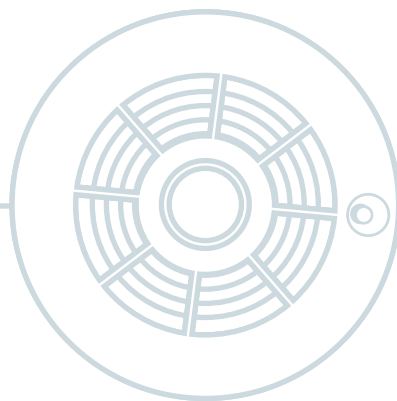
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**FIA Fact File –  
Carbon Monoxide Alarms / Detection**

# FIA Fact File – Carbon Monoxide Alarms / Detection

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## 1. FOREWORD

This fact file is intended to clarify the standards pertaining to the detection of Carbon Monoxide (CO), both in relation to its toxicity and in terms of it being a useful indicator for other purposes such as fire detection. Furthermore, this guide clarifies the distinction between the domestic, industrial, and wearable applications for CO toxicity monitoring.

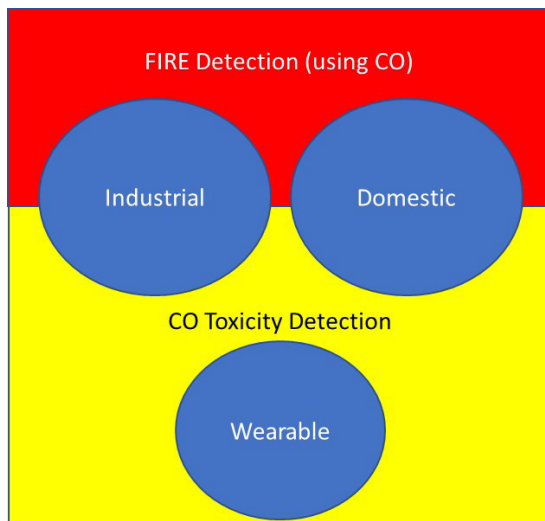
## 2. INTRODUCTION

It is widely recognised that Carbon Monoxide is a toxic gas which is poisonous to Humans.

As such CO detectors which monitor for the presence of CO in high or prolonged concentrations to alert persons in the vicinity to the impending danger to their health are widely available. These carbon monoxide detectors may be used in domestic premises, industrial premises or may be wearable by individuals. Domestic devices are required to incorporate an alarm to alert residents and are commonly referred to as Carbon Monoxide Alarms. Industrial CO detectors are typically connected to other systems to communicate the alarm and are thus not required to incorporate an alarm.

Separate to the toxicity of CO – excess concentrations are frequently used as a good indicator of fire – particularly in situations where oxygen starved combustion or precombustion is occurring (limiting the opportunity for full combustion of fuels to form carbon dioxide – CO<sub>2</sub>). In these applications a small increase in CO is used – often in association with other phenomena such as heat or smoke – as an indication of a likely fire condition and thus used to trigger a fire alarm.

These applications are summarised in the diagram below:



**Note:** This guidance does not cover details regarding wearable devices but it is clear that Domestic CO alarms should not be used as substitutes for wearable CO toxicity monitors.

### 3. STANDARDS

For the UK domestic market, CO toxicity detection (i.e. Carbon Monoxide Alarms) are in the EN 50291 series.

Specifically:

**BS EN 50291-1:2018** – Gas Detectors – Electrical apparatus for the detection of carbon monoxide in domestic premises. Part 1: Test methods and performance requirements.

**BS EN 50291-2:2019** – Gas Detectors – Electrical apparatus for the detection of carbon monoxide in domestic premises. Part 2: Electrical apparatus for continuous operation in a fixed installation in recreational vehicles and similar premises including recreational craft – Additional test methods and performance requirements.

These standards provide requirements for the detection of CO in terms of short or prolonged presence of the gas. They also include requirements for the sounding of an alarm.

For industrial applications, CO toxicity detection is dealt with in the EN 45544 series.

Specifically:

**BS EN 45544-1:2015** – Workplace atmospheres. Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours. General requirements and test methods.

**BS EN 45544-2:2015** – Workplace atmospheres. Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours. Performance requirements for apparatus used for exposure measurement.

**BS EN 45544-3:2015** – Workplace atmospheres. Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours. Performance requirements for apparatus used for general gas detection.

Where CO is used as an indication of a Fire condition in industrial applications, the EN 54 series of standards includes several standards as follows:

**EN 54-26:2015** – Fire detection and fire alarm systems – Part 26: Carbon monoxide detectors – Point detectors.

**EN 54-30:2015** – Fire detection and fire alarm systems – Part 30: Multi-sensor fire detectors – Point detectors using a combination of carbon monoxide and heat sensors.

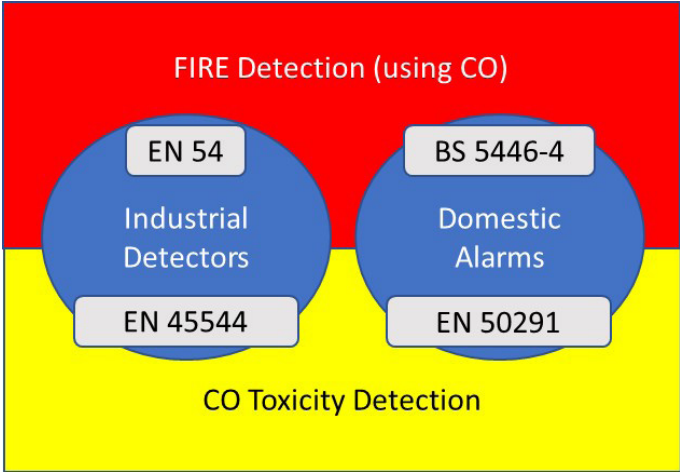
**EN 54-31:2014** – Fire detection and fire alarm systems – Part 31: Multi-sensor fire detectors – Point detectors using a combination of smoke, carbon monoxide and optionally heat sensors.

For domestic fire alarms using CO there is no EN standard, this is essentially a combination of the requirements for the industrial devices (see EN 54 above) and the requirements for domestic smoke alarms – as given in EN 14604.

Specifically:

**BS 5446-4:2020** – Fire detection and fire alarm devices for dwellings — Part 4: Specification for multi-sensor fire alarms using any combination of smoke, heat, and carbon monoxide sensors.

This information is summarised in the diagram below:



**DISCLAIMER**

*The information set out in this document is believed to be correct in the light of information currently available but it is not guaranteed and neither the Fire Industry Association nor its officers can accept any responsibility in respect of the contents or any events arising from use of the information contained within this document.*



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