



BSS Carbon Monoxide Checks 6.4.1 – 6.4.4 – to be introduced 1 April 2019

6.4.1	If the vessel has one or more accommodation space(s), are the correct number of carbon monoxide alarms provided?	R
Identify the presence of one or more accommodation space(s). If present, check for the presence and location of carbon monoxide alarm(s).	All vessels having one or more accommodation space(s) must be provided with at least one carbon monoxide alarm. A carbon monoxide alarm must be located within 10m of any door that links accommodation spaces.	
<p>Examiner action – Examiners must refer to Section 1 of Appendix I for essential information on measuring the distance between a carbon monoxide alarm and any door that links accommodation spaces.</p> <p>Applicability – where there is only a single, open-plan accommodation space only one carbon monoxide alarm is required irrespective of the size of the space.</p> <p>Guidance for owners – this is a minimum safety requirement, intended to provide a warning that is audible throughout the boat, related to carbon monoxide entering the boat from outside sources. For the best protection from carbon monoxide entering the boat from sources outside and inside the boat follow the carbon monoxide alarm manufacturer’s or supplier’s advice about the number and placement of alarms as far as the space and nature of the boat allow. Also consider locating a carbon monoxide alarm(s) in the “breathing zone” in accommodation spaces containing berths, i.e. near to a bed head. Make sure alarms are audible to all craft occupants. More information about staying safe from carbon monoxide on boats is available at www.boatsafetyscheme.org/co.</p>		

6.4.2	If any solid fuel stoves are installed, and if the vessel has berths present within any accommodation space, is a carbon monoxide alarm provided within the same accommodation space(s) as the solid fuel stove(s)?	A
Identify the presence of any solid fuel stove <u>and</u> whether berths are present within any accommodation space. If any solid fuel stove(s) <u>and</u> berths within any accommodation space(s) are present, check for the presence and location of carbon monoxide alarm(s).	All vessels having one or more solid fuel stove(s) installed, and where berths are present within one or more accommodation space(s), must be provided with a carbon monoxide alarm within each accommodation space that contains a solid fuel stove.	
<p>Applicability – the provision of a carbon monoxide alarm(s) in support of the requirement at Check 6.4.2 does not have to be in addition to the provision at Check 6.4.1. Depending on the configuration of the accommodation spaces (see 2nd requirement at Check 6.4.1) one correctly located alarm might be all that is required to comply with Checks 6.4.1 and 6.4.2.</p> <p>Guidance for owners – ideally, where a solid fuel stove is installed, a carbon monoxide alarm should be located between 1m and 3m (on plan view) from any stove and not directly above sources of heat or steam.</p>		

6.4.3	Are carbon monoxide alarms correctly located and of a suitable type?	R
<p>Where one or more carbon monoxide alarms have been found to be necessary at Checks 6.4.1 and/or 6.4.2, check the location of each required alarm.</p> <p>Check the markings on each required carbon monoxide alarm.</p> <p>Identify the test function button on each required carbon monoxide alarm.</p>	<p>Carbon monoxide alarms must be located in open view at high level, but must be at least 150mm below the ceiling height.</p> <p>Carbon monoxide alarms must be marked as being certified by an accredited third-party certification body to BS EN 50291 or equivalent.</p> <p>Carbon monoxide alarms must be provided with a test function button.</p>	
<p>Applicability – the main accredited third-party certification bodies in the UK are BSI and LPCB. For the following makes of carbon monoxide alarm accredited third-party certification to BS EN 50291 can be assumed – Ei Electronics, Fire Hawk Alarms, Honeywell, Kidde, First Alert, Fire Angel, BRK and Dicon. For other makes, removing the alarm from its base may be necessary to view labels and approval marking on the base. Permission for removal should be sought from the owner (or representative). Documentary evidence of accredited third-party certification to BS EN 50291 is acceptable.</p> <p>Applicability – certain carbon monoxide alarms may be located outside of the range specified in the requirement (at high level, but must be at least 150mm below the ceiling height). Combined fire and carbon monoxide alarms may be ceiling mounted. In addition, examiners may accept alternative locations where the location is permitted by the alarm manufacturer and where appropriate supporting documentary evidence is available. In cases where alarms are located outside of the range specified in the requirement, examiners are recommended to make a note of the alarm make and model, and where appropriate the supporting documentation, on their checklist.</p> <p>Guidance for owners – although not a BSS requirement, carbon monoxide alarms marked to the ‘BS EN 50291-2’ are the best choice for boats. They have been tested to meet the more onerous conditions found in boats.</p> <p>Supporting information on accredited third-party certification is provided at Appendix I.</p>		

6.4.4	Are carbon monoxide alarms in good condition?	R
<p>Where one or more carbon monoxide alarms have been found to be necessary at Checks 6.4.1 and/or 6.4.2, visually check the condition of each required carbon monoxide alarm.</p> <p>Operate the test function button on each required carbon monoxide alarm.</p>	<p>Carbon monoxide alarms must be in good general condition, and must not show signs of any of the following indicators of poor condition:</p> <ul style="list-style-type: none"> • damage or deterioration to the body of the alarm or the fixing mechanism; • having passed any manufacturer’s express replacement date; • failing the test function test. 	
<p>Applicability – examiners are not required to open up alarms to check for internal damage or deterioration or for manufacturer’s express replacement dates.</p>		

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Extract from Draft BSS Examination Checking Procedures Appendix I

Section 1

1.2 Carbon monoxide alarms – essential material – measuring the distance between a carbon monoxide alarm and any door that links accommodation spaces

The second requirement at Check 6.4.1 specifies that on boats with two or more accommodation spaces a carbon monoxide (CO) alarm must be located within 10m of any door that links the accommodation spaces. Where there are a number of accommodation spaces (e.g. separate cabins) the sound of an alarm will be deadened by the separating boat structures including closed cabin doors. By requiring an alarm to be located within 10m of each door that links accommodation spaces there is an assurance that wherever someone is located within the interior of a boat they are likely to be able to hear an activated alarm.

The following two diagrams help explain the distance measurement requirements for different accommodation space configurations –

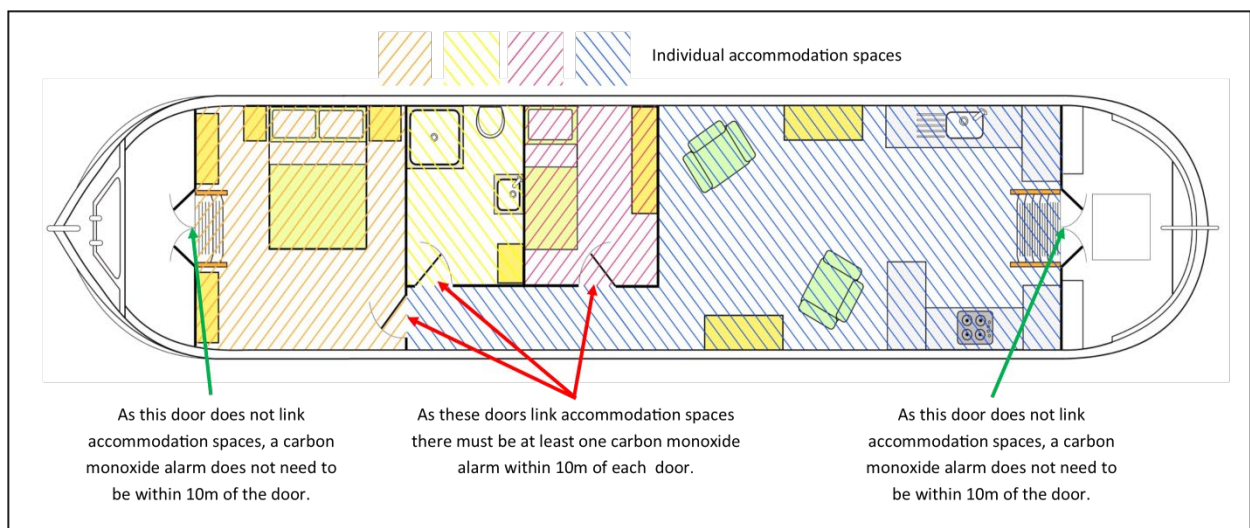


Fig 1. To be compliant at Check 6.4.1 one carbon monoxide alarm must be located within 10m of the three doors that link accommodation spaces.

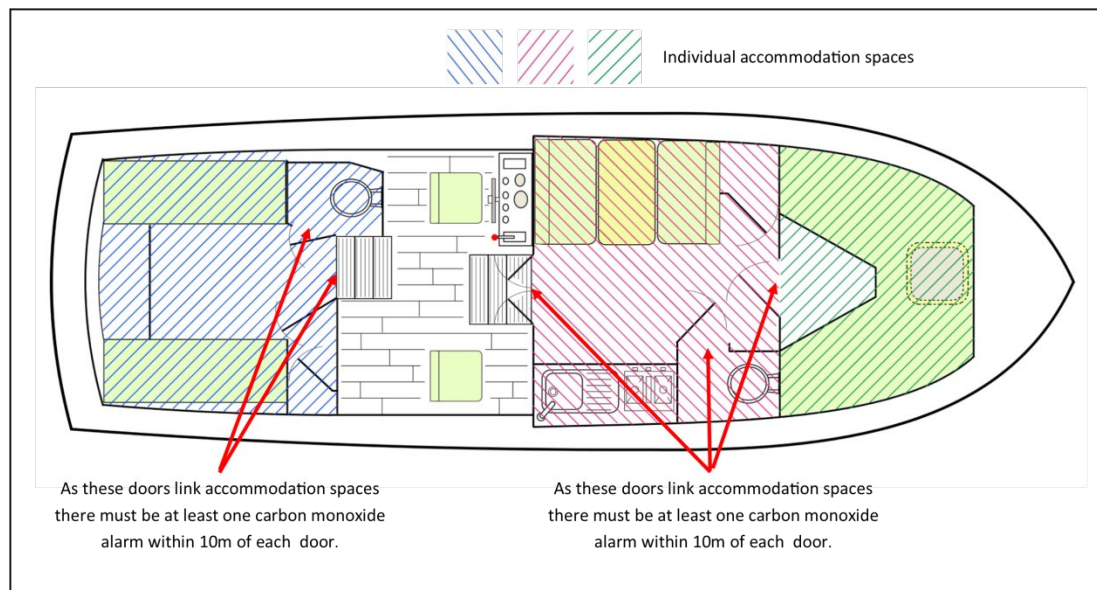


Fig 2. To be compliant at Check 6.4.1 one carbon monoxide alarm must be located within 10m of the five doors that link accommodation spaces.

Section 2

2.12 Carbon monoxide poisoning – reference material

The BSS awareness leaflet 'Carbon Monoxide Safety on Boats' should be considered as authoritative and as containing crucial underpinning knowledge for Examiners, as well as boat owners.

Additional safety information and guidance is available on the BSS website at [https://www.boatsafety.com/stay-safe/carbon-monoxide-\(co\)/](https://www.boatsafety.com/stay-safe/carbon-monoxide-(co)/).

2.13 Carbon monoxide – the BSS requirements

The requirement at Check 6.4.1 that all boats having one or more accommodation space(s) must be provided with at least one carbon monoxide (CO) alarm addresses the third-party risk presented by carbon monoxide entering from sources outside the boat. CO entering from outside a boat can quickly build up to dangerous levels as the enclosed nature of accommodation spaces means that it is not easily dissipated or vented.

The Advice check (for privately owned and managed boats) at 6.4.2 addresses the first-party risk presented by CO emissions from solid fuel stoves. Although otherwise the BSS requirements do not address the first-party risks associated with CO sources within a boat, solid fuel stoves are considered an exception because they are such high risk. Flue gases from solid fuel stoves operating normally can have up to 100 times the concentrations of CO found in gas hob burners with problems.

In cases where a boat with a solid fuel stove and an accommodation space(s) containing berths does not have a CO alarm in the same accommodation spaces as the solid fuel stoves, Examiners must explain the nature of the risk to the boat owner to ensure they understand the possible consequences.

In the event the owner of a privately owned or managed boat decides not to make their boat compliant with Check 6.4.2 Examiners must ensure that the non-compliance is reported in writing in a robust manner through Salesforce.

Boat owners are recommended to provide the best protection from CO sources both outside and inside the boat by following the carbon monoxide alarm manufacturer's or supplier's advice about the number and placement of alarms as far as the space and nature of the boat allow, and by reviewing the BSS awareness leaflet 'Carbon Monoxide Safety on Boats'.

Boat owners are also recommended keep possible sources of CO from within the boat to a minimum by ensuring all liquid and solid fuel appliances are maintained and serviced as recommended by the manufacturer, and that such appliances are kept compliant with flue and exhaust requirements at Checks 8.10.1 to 8.10.5 at all times.

2.14 Carbon monoxide alarms - manufacturing standards and accredited third-party certification

At Check 6.4.3 carbon monoxide alarms (CO) alarms must be marked as being certified by an accredited third-party certification body to the manufacturing standard BS EN 50291 (or equivalent). The principles behind the certification of CO alarms are the same as those for portable fire extinguishers. In the UK the main certification bodies for CO alarms are BSI and LPCB (examiners should be familiar with these body's certification marks from Appendix I, section 1.1). However, where it is apparent that a CO alarm has been manufactured by any one of the following companies, Examiners are not required to establish the accredited third-party certification mark - Ei Electronics, Fire Hawk Alarms, Honeywell, Kidde, First Alert, Fire Angel, BRK and Dicon. This approach is acceptable because these companies only make CO alarms to BS EN 50291 and all their alarms are certified by an accredited third-party certification body.

Until 2010 BS EN 50291 was a single standard, but in 2010 it was divided into two parts (BS EN 50291-1 and BS EN 50291-2). The requirement at Check 6.4.3 is simply that CO alarms must be certified to BS EN 50291, and therefore compliant CO alarms may have been certified to BS EN 50291, BS EN 50291-1, or BS EN 50291-2. However, as the life expectancy of a CO alarm is usually 7-10 years it is unlikely that Examiners will come across many CO alarms manufactured to the original BS EN 50291.

Although the BSS accepts CO alarms certified to BS EN 50291, BS EN 50291-1, or BS EN 50291-2, alarms to BS EN 50291-2 are actually best suited for boats. The '-2' edition of the BS EN means that the units will have been tested to meet additional performance standards specifically relevant to boat installation - namely, shock, static orientation, dynamic orientation and steady-state acceleration. Therefore, although not a BSS requirement, at the point of selection boat owners are guided to choose '-2' units. The BSS website has a list of '-2' alarms recommended by the makers as suitable for use in boats [https://www.boatsafetyscheme.org/stay-safe/carbon-monoxide-\(co\)/co-alarms-save-lives/](https://www.boatsafetyscheme.org/stay-safe/carbon-monoxide-(co)/co-alarms-save-lives/).

CO alarms manufactured outside of the British Isles may not be marked 'BS EN 50291' and may just be marked 'EN 50291' or 'xx EN 50291'

The Requirement at Check 6.4.3 states that accredited third-party certification can be to BS EN 50291 or equivalent. At this time the BSS is not aware of an equivalent standard to BS EN 50291 and so any claims of equivalence should be reported to the BSS office.

Dual alarms (for example smoke/CO alarms) can be accepted provided the CO alarm aspect has accredited third-party certification to BS EN 50291.

Only CO alarms deemed a suitable type at Check 6.4.3 should be trusted to provide protection from CO poisoning. If CO alarms of an unsuitable type are found the boat owner should be advised to remove the unit from the boat.

2.15 Carbon monoxide alarms – placement at least 150mm below ceiling height

Carbon monoxide (CO) alarms must be located in open view at high level, but must be at least 150mm below the ceiling height. Where ceilings are cambered the distance to be measured to is the highest point of the ceiling.

As CO spills into and moves about within an accommodation space it may not easily penetrate into tight corners, so the 150mm below ceiling height requirement helps to ensure CO alarms are not located in possible 'dead' spots.

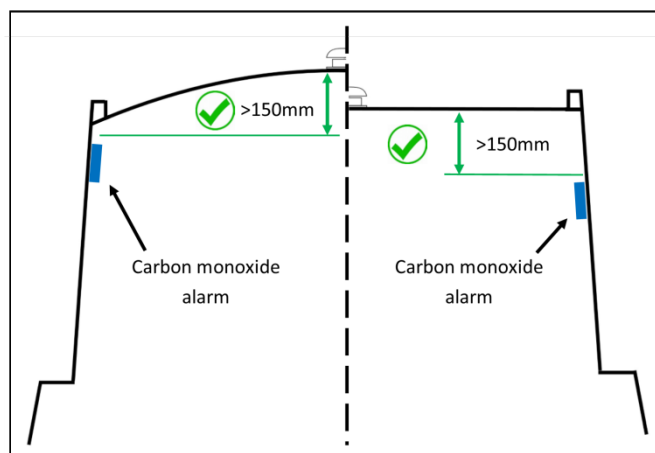


Fig 6. – Compliant CO alarm locations

As an exception to the 150mm requirement, combined fire and carbon monoxide alarms may be ceiling mounted. In addition, examiners may accept alternative locations to that specified in the requirement where the location is permitted by the alarm manufacturer and where appropriate supporting documentary evidence is available.

Mounting the CO alarm using the provided mounting bracket is recommended but not required to pass the BSS Check at 6.4.3. It is acceptable for CO alarms to be located on a shelf at the time of the BSS examination. It is not unusual for example, that occupants staying aboard to move the alarm to the sleeping area at night to optimise the protection.