

A-24 CARBON MONOXIDE DETECTION SYSTEMS

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Based on ABYC's assessment of the existing technology, and the problems associated with achieving the goals of this standard, ABYC recommends compliance with this standard for all boats, associated equipment, and systems manufactured after July 31, 2008.

24.1 PURPOSE

These standards are guides for the design, construction, and installation of carbon monoxide detection systems on boats.

24.2 SCOPE

These standards apply to carbon monoxide detection systems on boats.

24.3 REFERENCED ORGANIZATIONS

ABYC – American Boat & Yacht Council, Inc., 613 Third St., Suite 10, Annapolis, MD 21403. Phone: (410) 990-4460. Fax: (410) 990-4466. Web site: www.abycinc.org.

UL – Underwriters Laboratories, 333 Pfingsten Road, Northbrook, IL 60062-2096. Obtain standards from Global Engineering Documents, Inc., 15 Inverness Way East, Englewood, CO 80112. Phone: (800) 854-7179 (US and Canada), (303) 397-7956 (outside US and Canada), Fax: (303) 397-2740. Website: www.ul.com.

24.4 DEFINITIONS

" β " (Beta) – an arbitrary variable name chosen to represent the mathematical calculation of the absolute worst case predicted %COHb levels in a typical individual exposed to the factors (parts per million of carbon monoxide level and minutes of exposure to that CO level) used in that calculation. For purposes of this standard, " β " is calculated from the following expression:

$$" \beta " = [218 (0.0003 + P/1316)] [1 - e^{-T/96.8792}]$$

where P = CO concentration in PPM,
e = base natural logarithm approx. = 2.71828
T = time of exposure in minutes

NOTE: For reference purposes, the " β " (Beta) equation solved for T or P is as follows:

$$P = \frac{6.0367 \beta}{1 - e^{-T/96.8792}} - 0.3948$$

$$T = -96.8792 \ln [1 - \beta / (0.0654 + 0.166 P)]$$

CO – An abbreviation for carbon monoxide. For purposes of this standard, the CO level is always expressed in terms of parts per million (PPM) total volume of CO in air.

Carboxyhemoglobin – Abbreviated as COHb; also called Carbonmonoxyhemoglobin, CO-Hemoglobin, blood-COHb, and blood-CO – a stable combination of carbon monoxide and hemoglobin formed in the blood when carbon monoxide is inhaled.

%COHb – The degree to which the oxygen carrying capacity of blood is impeded by the union of carbon monoxide to the hemoglobin in the blood expressed as a percentage.