Designation: D 6318 – 98

AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Calibrating a Fathometer Using a Bar Check Method[1]

This standard is issued under the fixed designation D 6318; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice provides the user with procedures used in manually calibrating the fathometer or electronic depth sounder. This narrative describes calibration terminology, describes acceptable environmental conditions for calibration, and describes the calibration procedures.

1.2 The references cited contain useful information in the construction and the correct operation of the calibration equipment.

1.3 Any references cited in this narrative to specific products or brand names are made for information only, and is intended to be descriptive, but not restrictive, of products that will perform satisfactorily.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 1129 Definition of Terms Relating to Water[2]

D 5073 Practice for Depth Measurement of Surface Water.[3]

3. Terminology

3.1 Refer to Terminology D 1129 for terms used in this guide.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *bar*—a section of metallic channel, I-beam, T-beam, pipe, plate, or ball that will reflect sound waves produced by a fathometer.

3.2.2 *bar-check*—a method for calibrating a fathometer by setting a sound or accoustic reflector (bar) below a survey vessel to a known depth below a sounding transducer.

3.2.3 *draft (transducer draft)*—the vertical distance from the bottom of the transducer to the surface of the water.

3.2.4 *fathometer*—An electronic device for registering depths of water by measuring the time required for the transmission and reflection of sound waves between a sonic transducer and the lake or river bottom.

3.2.5 *sound*—to determine the depth of water.

3.2.6 *sounding scroll*—the chart record of an underwater cross section or profile of the bottom.

3.2.7 *transducer*—a device for translating electrical energy to acoustical energy and acoustical energy back to electrical energy.

4. Significance and Use

4.1 The accuracy of depth measurements made by a fathometer or echo sounder requires a number of corrections because of the variability of sound or acoustic velocity in water with changes in temperature, salinity, and depth of water. In addition instability of the equipment can also result in significant errors. For additional information see Practice D 5073.

4.2 Calibration of echo sounding instruments is absolutely critical in assuring the adequacy of depth measurements. When an echo sounder has been accurately calibrated, any observed (recorded) depth can be related to the true depth of water. Since the intended purpose of echo sounding is to measure the "true" depth, an independent "true" reference must be used.

4.3 A bar-check is the most wide-spread, easiest to construct, and most economical mechanical method to determine corrections for instrument and velocity errors.

4.4 This procedure explains the calibration of a fathometer or electronic depth sounder using a bar-check.

4.5 Bar-checking techniques and equipment are general in nature and may need to be modified for use in specific field conditions.

5. Apparatus

5.1 The device used for bar-checking must be a sound-reflecting surface that can be lowered to a known depth below the transducer of the survey vessel. See Fig. 1. These sounding-refecting surfaces (or sounding targets) can be a bar made out of a section of metallic I-beam or T-beam, pipe, a rectangular section of sheet metal, or a section of metal screen.

5.2 Bars used in depths greater than 30 ft (10 m) should be at least 9 in. (23 cm) wide. The dimensions of the target depend on the type of survey vessel, location of the transducer, and the depth range to be covered during the survey. Usually, the length of the bar is equal to the beam or width for small survey vessels. For larger vessels, a spherical metal ball or steel plate is lowered through a well in the hull.

[1] This practice is under the jurisdiction of ASTM Committee D-19 on Water and is the direct responsibility of Subcommittee D19.07 on Sediments, Geomorphology and Open-Channel Flow.

Current edition approved Sept. 10, 1998. Published November 1998.

[2] *Annual Book of ASTM Standards*, Vol 11.01.

[3] *Annual Book of ASTM Standards*, Vol 11.02.