

Standard Guide for Conducting Small Boat Stability Test (Deadweight Survey and Air Inclining Experiment) to Determine Lightcraft Weight and Centers of Gravity of a Small Craft¹

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INTRODUCTION

Small craft operators, builders, buyers, accident investigators and others may be required to determine the centers of gravity for their craft in order to apply stability criteria or perform other analyses. The conventional in-water stability test can be difficult to perform accurately on small craft, so an in-air inclining experiment may be specified. However, there are no guidelines available to help standardize and explain the process.

This guide provides the marine industry with an understanding of an Air-Incline stability test for small craft. It contains procedures to ensure that valid results are obtained with precision at a minimal cost to owners, shipyards and the government. The guide is not intended to direct a person(s) in the actual calculations of the lightcraft weight and centers of gravity, but to be a guide to the recommended procedures required to gather accurate data for use in the calculation of the lightcraft characteristics.

A complete understanding and documentation of proper procedures to conduct a stability test is paramount to confirm that the results gathered during the test can be examined for accuracy, especially by third parties subsequently reviewing the data. This guide is recommended to be used for all small craft capable of being lifted safely with forward and aft pick points capable of enduring additional inclining weights to be used for the stability test.

1. Scope

1.1 This guide covers the determination of a small boat's lightcraft characteristics. The air incline stability test can be considered two separate tasks; a deadweight survey and an air-inclining experiment. The stability test is recommended, but not required, for all small craft upon their construction completion and/or after major conversions where stability information is required. It is typically conducted indoors and an enclosed facility to protect the vessels from unprotected environmental conditions.

1.2 *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:*²

F1321 Guide for Conducting a Stability Test (Lightweight Survey and Inclining Experiment) to Determine the Light Ship Displacement and Centers of Gravity of a Vessel

3. Terminology

3.1 *Definitions:*

3.1.1 *inclining experiment*—comprises moving a series of known weights in a transverse direction and then measuring the resulting change in the equilibrium heel angle of the craft. This information is used to calculate the vessel's vertical center of gravity.

3.1.2 *lightcraft*—a small craft, or boat in the lightest condition ("Condition 1") is a boat complete in all respects without consumables, stores, cargo crew and effects and without any

¹ This practice is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.01 on Structures.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.