U.S. Field Standard Weight Classification

Specification and Tolerances for Field Standard Weights (NIST Handbook 105-1, Class F, Revised 1990)

These specifications and tolerances are minimum requirements for standards used primarily to test weighing devices.
Key words: Field standard weights, specifications, test weights, tolerances, weights and measures inspection.

Introduction

A Class F field standard weight (after this, called "weight") is intended to be used primarily to test commercial weighing devices for compliance with the requirements of NIST Handbook 44[1]. Class F weights may be used to test most accuracy Class[2] III scales, all scales of Class IIIL or IIII, and scales not marked with a class designation.

A weight shall be verified to be within-tolerance prior to use. The within-tolerance status of a weight shall be rechecked as often as regulations or circumstances require, especially when damage to it is known or suspected.

General

These specifications apply to new weights placed in service after the publication of this standard; the tolerances apply to all weights in service.

A weight in service prior to the publication of this standard that has maintained Class F tolerances between verification tests shall continue to be acceptable.

The specifications permit the use of a weight at its nominal value in normal testing operations, where the tolerance on the item under test is at least three times as great as the tolerance of the weight[3].

A partial list of specifications from Handbook 105-1

1. Material

1.1 A weight made of brass or a fabricated weight (such as a laminated weight or a weight of nonuniform density) shall not be placed in service after the publication date of this standard (1990).

1.2 A weight smaller than 5 grams/0.01 lb shall be constructed of stainless steel, tantalum, nickel-chromium alloy, aluminum alloy, or other material sufficiently resistant to corrosion and oxidation that the surface need not be protected or coated.

1.3 A weight of 5 grams/0.01 lb up to and including 5 kg/10 lb shall be constructed of material having a hardness of Rockwell B 80 or greater (such as 300-series stainless steel), and be resistant to abrasion, corrosion, denting, and chipping.

1.4 A weight larger than 5 kg/10 lb shall be constructed of materials such as iron, steel, or stainless steel, have a hardness of Rockwell B 80 or greater, and be resistant to abrasion, corrosion, denting, and chipping. Cast iron may be used for weights 10 kg/20 lb and larger. Body filler (e.g., fiberglass, putty, or plaster) shall not be used to correct a poor casting or finish.

2. Finish

2.1 The surface finish of a new weight machined from round bar stock shall have a roughness average of 0.80 micrometers (32 microinches) or better, determined by use of a hand-held surface roughness indicator (available from several manufacturers) or more accurate method, and be free of scratches, dents, and chipped corners or edges, determined by visual examination. A beaded or blasted finish (with roughness average 1.25 micrometers (50 microinches) or better) is acceptable on a cube weight to facilitate gripping.

2.2 A weight 5 kg/10 lb or less shall not have a surface coating.

2.3 A weight larger than 5 kg/10 lb constructed of materials susceptible to corrosion or tarnishing shall have a protective surface coating. A light coat of sprayed-on flat aluminum paint is recommended. Lacquer is also acceptable. Epoxy paint or plated surfaces are not acceptable. A coating is recommended for the bottom of a weight, particularly if the bottom is recessed. If paint or lacquer is used, it shall be hard and resistant to chipping. Cast metric and avoirdupois field standards shall be color coded (i.e. gold for metric and silver for avoirdupois) to differentiate the weights.

[1] NIST Handbook 44, Specifications Tolerances, and Other Technical Requirements for Weighing and Measuring Devices. (See current edition.)

[2] See Handbook 44, Section 2, Scales Code.

[3] See Handbook 44, Appendix A, par. 3.2.