



Designation: C715 – 90 (Reapproved 2011)^{ε1}

Standard Test Method for Nickel on Steel for Porcelain Enameling by Photometric Analysis¹

This standard is issued under the fixed designation C715; 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.

^{ε1} NOTE—Test Method was corrected editorially in 2011

INTRODUCTION

The test is designed to give a sufficiently accurate and rapid test of the amount of nickel deposited on sheet steel for enameling plant control work via a photometric method. However, the approximations used in the method prevent its use where extremely accurate nickel determinations are required. The method is applicable to control the weight of nickel coating on the metal.

1. Scope

1.1 This test method covers the determination of the amount of nickel deposited on sheet steel during its preparation for porcelain enameling. It is a photometric method commonly used on production parts and is suitable for determining the heavier nickel deposits that may be obtained during the processing of steel for one-coat enameling.

NOTE 1—An alternative X-ray emission spectrometry method is Test Method C810.

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

C810 Test Method for Nickel on Steel for Porcelain Enameling by X-Ray Emission Spectrometry

E30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron (Withdrawn 1995)³

E60 Practice for Analysis of Metals, Ores, and Related

¹ This test method is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.12 on Materials for Porcelain Enamel and Ceramic-Metal Systems.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

Materials by Spectrophotometry

3. Significance and Use

3.1 This test method is primarily used to control the nickel dipping operation to ensure that the desired level of nickel deposition is attained. It is also used to prepare test plates used for calibration in Test Method C810.

4. Apparatus

4.1 *Photoelectric Photometer*, conforming to Practice E60.

4.2 *Weighted Rubber Ring Assembly*, required to confine stripping agents to a definite area, consisting of a molded rubber ring and a metal outer ring. The rubber ring shall have an inside diameter of 1.35 in. (34.3 mm) in order to encircle an area of 0.01 ft² (0.000929 m²), a wall configuration as shown in Fig. 1, and the lower portion beveled at a 45° angle (0.78 rad) to reduce the contact area and ensure a better seal. The metal outer ring shall weigh about 3.5 lb (1.5 kg), suitably machined to fit over the top of the rubber ring as shown in Fig. 1.

4.2.1 The exact area covered by the rubber ring will gradually increase as the rubber ring itself is consumed by the acid reagent used. In the most accurate analysis, the area etched by the rubber ring shall be calculated occasionally, factored against the prescribed area, and that number applied to the reading obtained from the graph.

4.3 *Aspirator*, consisting of a calibrated 500-mL flask, equipped with a two-hole stopper, an aspirator bulb, and a suction tube formed from 0.079-in. (2-mm) inside diameter capillary glass tubing.

5. Reagents and Materials

5.1 Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall