



Standard Test Method for Measuring Cut Resistance of Materials Used in Protective Clothing with CPP Test Equipment¹

This standard is issued under the fixed designation F1790/F1790M; 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.

INTRODUCTION

Cut resistance is an important property for protective clothing and equipment, and several standard testing devices have been adopted across different industries to measure this property. A common practice in cut resistance testing is to subject a material specimen to a transversely moving blade under an applied load and measure the distance of blade travel required to cut through the specimen. This test method calculates the load required to cut through different specimens at 25.4 mm [1 in.] blade travel. This calculated load, defined as the calculated cutting load, can be used to compare the cut resistance of materials.

The original F1790-97 test method defined a commercially-available apparatus known as the Cut Protection Performance Tester (CPP). In an attempt to harmonize F1790/F1790M with ISO 13997 (another international testing standard for measuring cut resistance) and improve the test method, the scope of the test method was changed in F1790-05 to allow the use of other cut testing equipment, specifically the Tomodynamometer (TDM-100) and a modification to the CPP arm called the Modified CPP (mCPP). The revision addressed issues related to measurement of high frictional coefficient materials like elastomers, specimen mounting, calculated cutting load determination, and other procedures to harmonize with ISO 13997:1999. After further round-robin evaluation by the subcommittee, it was demonstrated that the revisions to the test method result in a bias between the original F1790-97 test method and the revised F1790-05 test method when using the CPP. F1790-05 was not widely adopted in North America because of this bias and large amount of data and experience accumulated with F1790-97. F1790-97 continues to be the test method predominately practiced when using the CPP device. To reduce confusion for end-users of F1790/F1790M and to allow for differences between testing devices, the subcommittee has decided to limit the scope of F1790/F1790M to include only the CPP device and created a separate test method for use of the TDM-100 (Test Method **F2992/F2992M**).

1. Scope

1.1 This test method covers the measurement of the cut resistance of a material when mounted on a mandrel and subjected to a cutting edge under a specified load using the Cut Protection Performance (CPP) Tester.

1.1.1 This procedure is not valid for high-porosity materials which allow cutting edge contact with the mounting surface prior to cutting.

1.1.2 Test apparatus may have limitations in testing materials with a thickness greater than 3 mm or having a high frictional coefficient such as elastomers.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 *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.*

¹ This test method is under the jurisdiction of ASTM Committee F23 on Personal Protective Clothing and Equipment and is the direct responsibility of Subcommittee F23.20 on Physical.

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