

Topic: Test Protocol for Type III Scaled Armor Plates

Purpose

The National Institute of Justice’s (NIJ) Compliance Testing Program (CTP) recently received a request to test a Type III stand-alone armor design that contains a layer of scaled (imbricated) tiles. After review of the design, the CTP has determined that this design falls outside the scope of the currently published NIJ STD-0101.06. The CTP has made this decision because the design creates potential weaknesses that cannot be addressed by the protocols in the standard as currently written.

NIJ STD-0101.06 does, however, provide in the Foreword:

“NIJ also reserves the right to alter or modify existing test methods and/or requirements to address perceived weaknesses in varying designs of body armor submitted for inclusion on the NIJ Compliant Products List.”

This clarification establishes a modified set of procedures that may be used to evaluate Type III stand-alone scaled armor to the intent of NIJ STD-0101.06. Such armors that are tested though the CTP to this protocol would be considered compliant with NIJ STD 0101.06.

Clarification

All armors of this type shall be tested as a Type III Hard Armor Plate as defined in NIJ STD-0101.06 with the following modifications to the identified sections. The NIJ CTP application, forms, documentation and Follow-up Inspection and Testing participation currently required of all NIJ CTP applicants would also be required.

1. **4.1.2 Hard Armors and Plate Inserts:** The plate inserts shall be subjected to a 108-shot perforation-backface signature (P-BFS) test and to a 120-shot ballistic limit (BL) test.
2. **4.1.2.1 Type III (Hard Armors and Plate Inserts):** The compliance test group shall consist of 40 armor panels. The armor panels shall be sufficiently large to allow for a minimum of six shots per panel. These requirements are outlined in Table 1 of this document. Eighteen armor panels will be used for the P-BFS testing described in Section 7. A minimum of 20 armor panels will be subjected to the BL test described in Section 7, with a minimum of 120 shots. The remaining armor panels are

- spares and will be used if necessary.
3. **7.8.1 Shot Location Marking:** The shots shall be placed on the panel in any pattern that meets the shot-to-edge and shot-to-shot spacing requirements, as well as meeting the required angles of incidence as specified by the CTP. Shots with a nonzero angle of incidence (non-orthogonal) shall be marked at the union of four discs and directed into the panel as illustrated in Figure 1. The lab shall rotate the panel on the clay block surface to achieve this direction.
4. **7.8.5 Requirements for Number of Shots and Number of Armor Samples**
Each armor plate shall be subjected to the number of fair hits specified in this modified method. The angle of incidence of the shots shall be as specified below (a modified version of Table 7). One-half (nine plates) of the sample group shall be shot with Configuration 1 and one half (nine plates) shall be shot with Configuration 2. There will be a total of 36 fair hits at 0°, 27 fair hits at 30°, 27 fair hits as 45° and 18 fair hits at 55°.
5. **7.9 Ballistic Limit (BL) Determination Test**
The appropriate number of armor samples, as defined in the modified section 4.1.2.1, shall be subjected to BL tests.

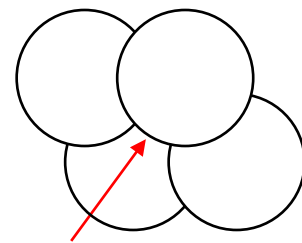


Figure 1. Location and direction of non-orthogonal impacts

Table 1. Panel Quantity and Utilization

Armor Panels	Shots/Angle Per Panel	Notes
9 Panels	2/0°, 2/30°, 1/45°, 1/55°	P-BFS Configuration 1
9 Panels	2/0°, 1/30°, 2/45°, 1/55°	P-BFS Configuration 2
20 Panels	6/0°	BL
2 Panels		Spares