

## Topic: Flexible Ballistic-resistant Body Armor Containing Two Panel Designs (such as Planar and Non-planar Panels)

### Purpose

Flexible ballistic-resistant body armor typically consists of a planar front and a back panel with the same design, but slightly different perimeters/shapes. This is generally true for all male and gender-neutral armor models.

However, female armor models are usually made using a non-planar (structured) front panel combined with a planar back panel. The non-planar panel is constructed the same as the planar panel except for additional stitching and folds added to shape the panel to conform to the wearer's body.

Conformity assessment of any single model has previously been limited to a single compliance test group (28 armors or 56 test items). For models that included both planar and non-planar panels, this resulted in a compliance test group consisting of two designs (half planar and half non-planar).

As technology, designs and the needs of criminal justice practitioners have evolved, the National Institute of Justice Compliance Testing Program (NIJ CTP) has determined that an opportunity for improvement exists within the conformity assessment process for armor models that use both a non-planar panel and a planar panel.

This administrative clarification changes the NIJ CTP's conformity assessment process for these models without changing the test methods. This revised process both improves the evaluation of armor models that include non-planar panels and facilitates manufacturers' ability to meet the needs of criminal justice practitioners.

### Clarification

All flexible panel designs submitted as part of a model to the NIJ CTP for conformity assessment shall now demonstrate compliance with NIJ Standard 0101.06 using a complete compliance test group.

A model that uses a single design for both the front and back shall require testing of a single compliance test group, much the same as in existing testing. A single design may include various options related to perimeter, shape and size.

A model that uses two different designs, one for the front panel and one for the back panel, shall require testing of an entire compliance test group for each design. A design that has previously demonstrated compliance with NIJ Standard 0101.06 (represented by the entire compliance testing group) may be referenced by the new model without being retested. The test results from the previously tested design, along with test results for the additional panel, shall be used as evidence of compliance for the new model.

### Implementation

The six months following publication of this Administrative Clarification shall be considered the transition period. The NIJ CTP shall immediately stop issuing Test IDs for test plans that include more than one design within a single compliance test group. Test results under previously issued Test IDs that do not meet the requirements of this Administrative Clarification and are not completed within the transition period shall not be accepted.

Prior to receiving NIJ approval, models that consist of a **single design** (both front and back panel) must demonstrate that the design (using a complete compliance test group) complies with NIJ Standard 0101.06. This remains unchanged from the previous NIJ CTP processes.

Prior to receiving NIJ approval, models that consist of **two different designs** (front and back panel) must demonstrate that each design (using a complete compliance test group for each design) complies with NIJ Standard 0101.06. Each design must also demonstrate compliance to the same specifications (type, shot-to-edge distance and sizes).

If an applicant would like previously completed testing to be considered in the conformity assessment of a new model (see Example 2), the applicant must clearly identify within the application the Test Identification Number of the previously completed test report(s) and demonstrate ownership or authorization to the satisfaction of the NIJ CTP. In order to avoid unnecessary delays and costs, applicants should communicate this information as soon as possible.

Previously completed test results shall only be considered in the conformity assessment of a new model if the entire compliance test group is a single design with the only differences being directly related to the size requirements contained in NIJ Standard 0101.06, Appendix C, and not consisting of both planar and non-planar panels. Those previously completed test results may already have been used for approval of an existing model.

Follow-up Inspection and Testing continues to be based on models, rather than individual panels, and Phase 1 remains unchanged. However, if a single perforation occurs during Phase 1 (and the front and back panels are different designs), then 10 panels similar to the one that experienced a perforation shall be supplied for Phase 2.

### Example 1

In order to meet a request from a criminal justice agency, a manufacturer (NIJ CTP applicant) must offer both male and female armor models that meet the same

performance requirements (Type II) and share as many design characteristics as possible.

The applicant submits an application to the NIJ CTP for a male model consisting of a single planar design used for both the front and back panels. The NIJ CTP then issues a Test Identification Number for testing 56 planar test items (Table 1 of this document) that are:

- Type II.
- Shot-to-edge distance: 2"/3".
- Sized C1 and C5 per NIJ Standard 0101.06, Appendix C.

These panels satisfactorily complete evaluation (testing and inspection by the NIJ CTP) and the male model is subsequently approved by NIJ. The process and requirements applied to this model are not changed from previous male armor submittals.

The applicant then submits a second application for a female model that will use a new non-planar front panel design and a back panel design that has previously satisfactorily completed evaluation. The NIJ CTP then issues a Test Identification Number for testing 56 non-planar test items (Table 1 of this document) that are:

- Type II.
- Shot-to-edge distance: 2"/3".
- Sized C1 and C5 per NIJ Standard 0101.06, Appendix C.

The specifications for both panels must match each other in order to be combined into a single model.

The non-planar panels satisfactorily complete evaluation. The female model is then approved by NIJ based on the satisfactory evaluations of both the planar design and the non-planar design.

Both models must have a unique model identification.

### Example 2

Similar to Example 1, however, the manufacturer (NIJ CTP Applicant) already has a male model approved by NIJ that is listed on the NIJ Compliant Product List (CPL). That model uses a single planar design for both the front and back panels.

The planar panels from the male model were tested to the following specifications:

- Type IIA.
- Shot-to-edge distance": 2"/3".
- Sized C1 and C5 per NIJ Standard 0101.06, Appendix C.

The Applicant then submits an application for a female model that will use a new non-planar front panel and a back panel design that has previously satisfactorily completed evaluation. The NIJ CTP then issues a Test Identification Number for testing 56 non-planar test items (Table 1 of this document) that are:

- Type IIA.
- Shot-to-edge distance: 2"/3".
- Sized C1 and C5 per NIJ Standard 0101.06, Appendix C.

The specifications for both panels must match each other in order to be combined into a single model.

The non-planar panels satisfactorily complete evaluation. The female model is then approved by NIJ based on the satisfactory evaluations of both the planar design and the non-planar design.

Both models must have a unique model identification.

| Table 1: Test Item Allocation Chart (Part 1) |                  |                               |                                 |             |                 |                 |                           |                           |                      |                               |                            |                            |
|--|------------------|-------------------------------|---------------------------------|-------------|-----------------|-----------------|---------------------------|---------------------------|----------------------|-------------------------------|----------------------------|----------------------------|
|  | Test Bullet      | New Armor Test Velocity (m/s) | Cond. Armor Test Velocity (m/s) | Test Method | Fair Hits (min) | Fair Hits (max) | Shots per Test Item (min) | Shots per Test Item (max) | Number of Test Items | Number of Test Items per Test | Number of Extra Test Items | Total Number of Test Items |
| Flexible IIA                                 | 9 mm, FMJ RN     | 373                           |                                 | New P-BFS   | 48              | 48              | 6                         | 8                         | 8                    | 4S + 4L                       | 4L                         | 6S + 22L                   |
|  |                  |                               | 355                             | Cond. P-BFS | 24              | 24              | 6                         | 8                         | 4                    | 2S + 2L                       |                            |                            |
|  |                  | 373                           |                                 | New BL      | 120             | 120             | 12                        |                           | 10                   | 10L                           |                            |                            |
|  |                  |                               | 355                             | Cond. BL    | 24              | 24              | 12                        |                           | 2                    | 2L                            |                            |                            |
|  | .40 S&W, FMJ     | 352                           |                                 | New P-BFS   | * 44            | 48              | * 6 / 5                   | 8                         | 8                    | 4S + 4L                       | 4L                         | 6S + 22L                   |
|  |                  |                               | 325                             | Cond. P-BFS | * 22            | 24              | * 6 / 5                   | 8                         | 4                    | 2S + 2L                       |                            |                            |
|  |                  | 352                           |                                 | New BL      | 120             | 120             | 12                        |                           | 10                   | 10L                           |                            |                            |
|  |                  |                               | 325                             | Cond. BL    | 24              | 24              | 12                        |                           | 2                    | 2L                            |                            |                            |
| Flexible II                                  | 9 mm, FMJ RN     | 398                           |                                 | New P-BFS   | 48              | 48              | 6                         | 8                         | 8                    | 4S + 4L                       | 4L                         | 6S + 22L                   |
|  |                  |                               | 379                             | Cond. P-BFS | 24              | 24              | 6                         | 8                         | 4                    | 2S + 2L                       |                            |                            |
|  |                  | 398                           |                                 | New BL      | 120             | 120             | 12                        |                           | 10                   | 10L                           |                            |                            |
|  |                  |                               | 379                             | Cond. BL    | 24              | 24              | 12                        |                           | 2                    | 2L                            |                            |                            |
|  | .357 Magnum, JSP | 436                           |                                 | New P-BFS   | * 44            | 48              | * 6 / 5                   | 8                         | 8                    | 4S + 4L                       | 4L                         | 6S + 22L                   |
|  |                  |                               | 408                             | Cond. P-BFS | * 22            | 24              | * 6 / 5                   | 8                         | 4                    | 2S + 2L                       |                            |                            |
|  |                  | 436                           |                                 | New BL      | 120             | 120             | 12                        |                           | 10                   | 10L                           |                            |                            |
|  |                  |                               | 408                             | Cond. BL    | 24              | 24              | 12                        |                           | 2                    | 2L                            |                            |                            |
| Flexible IIIA                                | .357 SIG, FMJ FN | 448                           |                                 | New P-BFS   | 48              | 48              | 6                         | 8                         | 8                    | 4S + 4L                       | 4L                         | 6S + 22L                   |
|  |                  |                               | 430                             | Cond. P-BFS | 24              | 24              | 6                         | 8                         | 4                    | 2S + 2L                       |                            |                            |
|  |                  | 448                           |                                 | New BL      | 120             | 120             | 12                        |                           | 10                   | 10L                           |                            |                            |
|  |                  |                               | 430                             | Cond. BL    | 24              | 24              | 12                        |                           | 2                    | 2L                            |                            |                            |
|  | .44 Magnum, SJHP | 436                           |                                 | New P-BFS   | * 44            | 48              | * 6 / 5                   | 8                         | 8                    | 4S + 4L                       | 4L                         | 6S + 22L                   |
|  |                  |                               | 408                             | Cond. P-BFS | * 22            | 24              | * 6 / 5                   | 8                         | 4                    | 2S + 2L                       |                            |                            |
|  |                  | 436                           |                                 | New BL      | 120             | 120             | 12                        |                           | 10                   | 10L                           |                            |                            |
|  |                  |                               | 408                             | Cond. BL    | 24              | 24              | 12                        |                           | 2                    | 2L                            |                            |                            |

\* NIJ Standard-0101.06, Sub Clause 7.8.1 allows only five shots to be taken on Size C1 test item for threat 2 **only if** "space limitations prevent taking six shots."