

**C22 MODULAR PISTOL PROJECT**

**NIJ DUTY HOLSTER RETENTION STANDARD**  
**FOR LAW ENFORCEMENT (DRAFT)**  
**DATED APRIL 2010**

**SECTIONS 5 AND 6**



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**NOTICE**

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## 5. PERFORMANCE REQUIREMENTS

### 5.1. Acceptance Criteria

- 5.1.1. To achieve conformity with this standard, the holster shall meet all applicable performance requirements defined in this section.
- 5.1.2. High Temperature Strength and Functionality
  - 5.1.2.1. Holsters shall be tested for strength during exposure to high temperature and perform functionality test after exposure to high temperature as specified in Section 6.2, and:
    - (1) Shall allow the handgun to be seated in the holster such that each retention device can be individually engaged as originally designed by the manufacturer;
    - (2) Shall retain the handgun when subjected to the specified force in each of the six different pulling directions; and
    - (3) Following strength testing, the holster shall allow the retention devices to be disengaged and the handgun to be drawn from the holster, and shall allow the handgun to be re-seated such that all retention devices can be engaged as originally designed by the manufacturer.
- 5.1.3. Low Temperature Impact and Functionality
  - 5.1.3.1. Holsters shall be tested for impact during exposure to low temperature and perform functionality test after exposure to low temperature as specified in Section 6.3, and:
    - (1) Shall allow the handgun to be seated in the holster such that each retention device can be individually engaged if possible as originally designed by the manufacturer;
    - (2) Shall retain the handgun when subjected to the specified impact in each of the six different impact directions; and
    - (3) Following impact testing, the holster shall allow the retention devices to be disengaged and the handgun to be drawn from the holster, and shall allow the handgun to be re-seated such that all retention devices can be engaged as originally designed by the manufacturer.
- 5.1.4. Salt Spray Functionality
  - 5.1.4.1. Holsters shall be tested for functionality after exposure to salt spray as specified in Section 6.4, and:
    - (1) Shall allow the handgun to be seated in the holster such that each retention device can be individually engaged as originally designed by the manufacturer; and
    - (2) Shall allow the retention devices to be disengaged and the handgun to be drawn from the holster as originally designed by the manufacturer.
- 5.1.5. Sand Exposure Functionality
  - 5.1.5.1. Holsters shall be tested for functionality after exposure to sand as specified in Section 6.5, and:
    - (1) Shall allow the handgun to be seated in the holster such that each retention device can be individually engaged as originally designed by the manufacturer; and
    - (2) Shall allow the retention devices to be disengaged and the handgun to be drawn from the holster as originally designed by the manufacturer.

#### 5.1.6. Fresh Water Immersion Strength and Functionality

5.1.6.1. Holsters shall be tested for functionality and strength after exposure to fresh water immersion as specified in Section 6.6, and:

(1) Shall allow the handgun to be seated in the holster such that each retention device can be individually engaged as originally designed by the manufacturer;

(2) Shall retain the handgun when subjected to the specified force in each of the six different pulling directions; and

(3) Following strength testing, the holster shall allow the retention devices to be disengaged and the handgun to be drawn from the holster, and shall allow the handgun to be re-seated such that all retention devices can be engaged as originally designed by the manufacturer.

### 6. TEST METHODS

#### 6.1. General Test Requirements

6.1.1. Acceptance (pass/fail) criteria shall be as stated in Chapter 5, Performance Requirements. Test method information shall not be construed or interpreted as a performance requirement.

6.1.2. Each test shall be performed on new untested samples representative of the production model, except when specified in a test sequence.

6.1.3. All test data shall be recorded and reported.

6.1.4. Unless a performance requirement is specifically stated in terms of an average result, if any individual sample does not meet the performance requirement, the result shall be a failure.

6.1.5. In order to declare conformity for a model, all applicable tests specified for each type of duty holster shall be successfully completed, and every sample shall meet the requirements of Chapter 5.

#### 6.2. High Temperature Strength and Functionality Test

##### 6.2.1. Application

6.2.1.1. This test shall apply to each model of holster.

6.2.1.2. Left and right holsters shall be tested independently unless the designs are symmetrical (mirror images using same construction and materials).

##### 6.2.2. Samples

6.2.2.1. One sample holster shall be subjected to this test. The sample holster shall be in new, unused condition. The same sample shall be subjected to the entire sequence of this test.

##### 6.2.3. Apparatus

6.2.3.1. A conditioning chamber or oven shall be capable of maintaining a temperature of 180°F, +5°/-0°F, and 120°F, +5°/-0°F. The chamber or oven shall be of size large enough such that the sample when suspended in the oven is greater than 6 in. from any chamber or oven surface. The temperature shall be measured using a calibrated device.

6.2.3.2. A model specific, inert handgun for which the holster is specifically designed shall be used.

6.2.3.3. The Static Strength Fixture shown in Figure 4 and Figure 5 shall be used.

##### 6.2.4. Procedure

6.2.4.1. If at any point the grip fixture interferes with or impedes the test set up for functionality of holstering and drawing the handgun, a second inert handgun without the fixture may be substituted.

- 6.2.4.2. The inert handgun shall be inserted into the holster and all retention devices shall be engaged.
- 6.2.4.3. The holster and inert handgun shall be suspended in the conditioning chamber or oven and exposed to a temperature of 180°F, +5°/-0°F for a period of not less than 4 hours and no more than 6 hours.
- 6.2.4.4. The temperature of the conditioning chamber or oven shall then be lowered to 120°F, +5°/-0°F and allowed to stabilize for a period of not less than 30 minutes.
- 6.2.4.5. The remainder of the procedure shall occur in an environment of 120°F, +5°/-0°F.
- 6.2.4.6. The static strength grip fixture shall be attached to the inert handgun.
- 6.2.4.7. A load of 300 lbf shall be applied to the inert handgun.
- 6.2.4.7.1. Refer to Figure 1 and Figure 2 for directions of loading.
- 6.2.4.8. Repeat Section 6.2.4.7, two additional times for a total of 3 pulls in each pull direction.
- 6.2.4.9. Repeat sections 6.2.4.7 through 6.2.4.8 for the remaining pull directions. A total of six pull directions are required.
- 6.2.4.10. Following the final pull, perform the functionality test.
- 6.2.5. Report
  - 6.2.5.1. The ability of the holster to retain the handgun at high temperature during each of the six strength test pull orientations shall be recorded and reported.
  - 6.2.5.2. The results of the functionality test after strength testing shall be recorded and reported.
  - 6.2.5.3. Perform visual observation during and after the test. If any irregularities are observed, they shall be recorded and reported.
  - 6.2.5.4. At a point of any failure the test will be ended and details of the failure shall be recorded and reported.
- 6.2.6. Interpretation
  - 6.2.6.1. Any failure of the handgun to be retained during the strength test or failure of the functionality test after strength testing shall constitute failure of this test.
  - 6.2.6.2. Holster fracture, tearing, cracking, or fastener failure, by themselves do not constitute a failure, unless the holster fails the strength or functionality test.
- 6.3. Low Temperature Impact and Functionality Test
  - 6.3.1. Application
    - 6.3.1.1. This test shall apply to each model of holster.
    - 6.3.1.2. Left and right holsters shall be tested independently unless the designs are symmetrical (mirror images using same construction and materials).
  - 6.3.2. Samples
    - 6.3.2.1. One sample holster shall be subjected to this test. The sample holster shall be in new, unused condition. The same sample shall be subjected to the entire sequence of this test.
  - 6.3.3. Apparatus
    - 6.3.3.1. A Conditioning chamber capable of maintaining a temperature of -40°F, +0°/-5°F shall be used. The chamber shall be of size large enough such that the sample when suspended in the chamber is greater than 6 in. from any chamber surface. The temperature shall be measured using a calibrated device.
    - 6.3.3.2. A model specific, inert handgun for which the holster is specifically designed shall be used.
    - 6.3.3.3. The Impact Test Fixture shown in Figure 3 shall be used.
  - 6.3.4. Procedure

- 6.3.4.1. If at any point the grip fixture interferes with or impedes the test set up for functionality of holstering and drawing the handgun, a second inert handgun without the fixture may be substituted.
- 6.3.4.2. For all holsters the inert handgun shall be inserted into the holster and all retention devices shall be engaged.
- 6.3.4.3. The holster and inert handgun shall be suspended in the conditioning chamber and exposed to a temperature of -40°F, +0°/-5°F for a period of not less than 4 hours and no more than 6 hours.
- 6.3.4.4. The remainder of the procedure shall occur in an environment of -40°F, +0°/-5°F.
- 6.3.4.5. The impact grip fixture shall be attached to the inert handgun.
- 6.3.4.6. An impact of 15.3 Joules shall be applied to the inert handgun by dropping a 10 lb weight from a height of 13.5 in.
- 6.3.4.7. Refer to Figure 1 and Figure 2 for directions of impact.
- 6.3.4.8. Repeat Section 6.3.4.6, two additional times for a total of 3 impacts in each impact direction.
- 6.3.4.9. Repeat Sections 6.3.4.6 through 6.3.4.8 for the remaining impact orientations. A total of six impact orientations are required.
- 6.3.4.10. Following the final impact, perform the functionality test.
- 6.3.5. Report
  - 6.3.5.1. The ability of the holster to retain the handgun at low temperature during each of the six impact orientations shall be recorded and reported.
  - 6.3.5.2. The results of the functionality test after impact testing shall be recorded and reported.
  - 6.3.5.3. Perform visual observation during and after the test. If any irregularities are observed, they shall be recorded and reported.
  - 6.3.5.4. At a point of any failure the test will be ended and details of the failure shall be recorded and reported.
- 6.3.6. Interpretation
  - 6.3.6.1. Any failure of the handgun to be retained during the impact test or failure of the functionality test after impact testing shall constitute failure of this test.
  - 6.3.6.2. Holster fracture, tearing, cracking, or fastener failure, by themselves do not constitute a failure, unless the holster fails the strength or functionality test.
- 6.4. Salt Spray Functionality Test
  - 6.4.1. Application
    - 6.4.1.1. This test shall apply to each model of holster.
    - 6.4.1.2. Left and right holsters shall be tested independently unless the designs are symmetrical (mirror images using same construction and materials).
  - 6.4.2. Samples
    - 6.4.2.1. One sample holster shall be subjected to this test. The sample holster shall be in new, unused condition. The same sample shall be subjected to the entire sequence of this test.
  - 6.4.3. Apparatus
    - 6.4.3.1. A Salt spray apparatus as described in ASTM B117 shall be used.
    - 6.4.3.2. A model specific, inert handgun for which the holster is specifically designed shall be used.
  - 6.4.4. Procedure

- 6.4.4.1. The empty holster shall be placed in the salt spray apparatus and exposed to conditions in accordance with ASTM B117 for a period of 24 hours with the following modifications:
  - 6.4.4.1.1. The holster shall be oriented in a normal carry position.
- 6.4.4.2. At the completion of the 24-hour exposure, the holster shall be removed from the chamber and air-dried for 24 hours at a temperature of 72°+3°F with a relative humidity of 50%.
- 6.4.4.3. At the completion of the 24-hour drying cycle, perform the functionality test.
- 6.4.5. Report
  - 6.4.5.1. The ability of the handgun to be holstered and the ability of each retention device to be engaged after salt spray exposure shall be recorded and reported.
  - 6.4.5.2. The ability of each retention device to be disengaged and the ability of the handgun to be removed from the holster after salt spray exposure shall be recorded and reported.
- 6.4.6. Interpretation
  - 6.4.6.1. Any failure of the holster during functionality test shall constitute failure of this test.
- 6.5. Sand Exposure Functionality Test
  - 6.5.1. Application
    - 6.5.1.1. This test shall apply to each model of holster.
    - 6.5.1.2. Left and right holsters shall be tested independently unless the designs are symmetrical (mirror images using same construction and materials).
  - 6.5.2. Samples
    - 6.5.2.1. The same sample holster used in Section 6.4 shall be subjected to this test. The sample shall be subjected to the entire sequence of this test without cleaning or modification from the previous test.
  - 6.5.3. Apparatus
    - 6.5.3.1. 5-Gallon painter-style bucket with lid.
    - 6.5.3.2. Commercial-grade playground sand. Model specific, inert handgun for which the holster is specifically designed.
  - 6.5.4. Procedure
    - 6.5.4.1. For all holsters the inert handgun shall be inserted into the holster and all retention devices shall be engaged.
    - 6.5.4.2. The holster with the inert handgun shall be placed in the into a 5-gallon painter-style bucket. The bucket shall then be filled half-way with commercial-grade playground sand. The lid shall then be sealed onto the top of the bucket.
    - 6.5.4.3. The bucket shall be placed on its bottom and rotated (flipped) from bottom to lid and back 5 times with momentary pauses at each position to allow the sand to settle. At the completion of the sequence, the bucket shall be placed in an upright position and the lid shall be removed. The holster with the inert handgun shall be removed from the sand and the functionality test should be performed.
  - 6.5.5. Report
    - 6.5.5.1. The ability of each retention device to be disengaged and the ability of the handgun to be removed from the holster after sand exposure shall be recorded and reported.
    - 6.5.5.2. The ability of the handgun to be re-holstered and the ability of each retention device to be engaged after sand exposure shall be recorded and reported.
  - 6.5.6. Interpretation

- 6.5.6.1. Any failure of the holster during functionality test after sand exposure shall constitute failure of this test.
- 6.6. Fresh Water Immersion Strength and Functionality Test
  - 6.6.1. Application
    - 6.6.1.1. This test shall apply to each model of holster.
    - 6.6.1.2. Left and right holsters shall be tested independently unless the designs are symmetrical (mirror images using same construction and materials).
  - 6.6.2. Samples
    - 6.6.2.1. The same sample holster used in Section 6.4 and Section 6.5 shall be subjected to this test. The sample shall be subjected to the entire sequence of this test without cleaning or modification from the previous test.
  - 6.6.3. Apparatus
    - 6.6.3.1. 5-Gallon container.
    - 6.6.3.2. Type IV or deionized water.
    - 6.6.3.3. A model specific, inert handgun for which the holster is specifically designed.
    - 6.6.3.4. The Static Strength Fixture shown in Figure 4 and Figure 5 shall be used.
  - 6.6.4. Procedure
    - 6.6.4.1. For all holsters the inert handgun shall be inserted into the holster and all retention devices shall be engaged.
    - 6.6.4.2. The holster with the inert handgun shall be completely submerged into the 5-gallon container filled with Type IV or deionized water at room temperature (72°+3°F) for a period of 4 hours.
    - 6.6.4.3. After the 4 hour exposure, the holster with the inert handgun shall be removed from the container. Retention devices shall be released and the handgun shall be drawn from the holster.
    - 6.6.4.4. The handgun shall then be re-holstered and all retention devices shall be engaged.
    - 6.6.4.5. Perform Section 6.2.4.6 to Section 6.2.4.10
  - 6.6.5. Report
    - 6.6.5.1. The ability of the holster to retain the handgun after fresh water immersion for each of the six strength test pull orientations shall be recorded and reported.
    - 6.6.5.2. The results of the functionality test shall be recorded and reported.
    - 6.6.5.3. Perform visual observation during and after the test. If any irregularities are observed, they shall be recorded and reported.
    - 6.6.5.4. At a point of any failure the test will be ended and details of the failure shall be recorded and reported.
  - 6.6.6. Interpretation
    - 6.6.6.1. Any failure of the handgun to be retained during the strength test or failure of the functionality test after strength testing shall constitute failure of this test.
    - 6.6.6.2. Holster fracture, tearing, cracking, or fastener failure, by themselves do not constitute a failure, unless the holster fails the strength or functionality test.

## APPENDIX: FIGURES

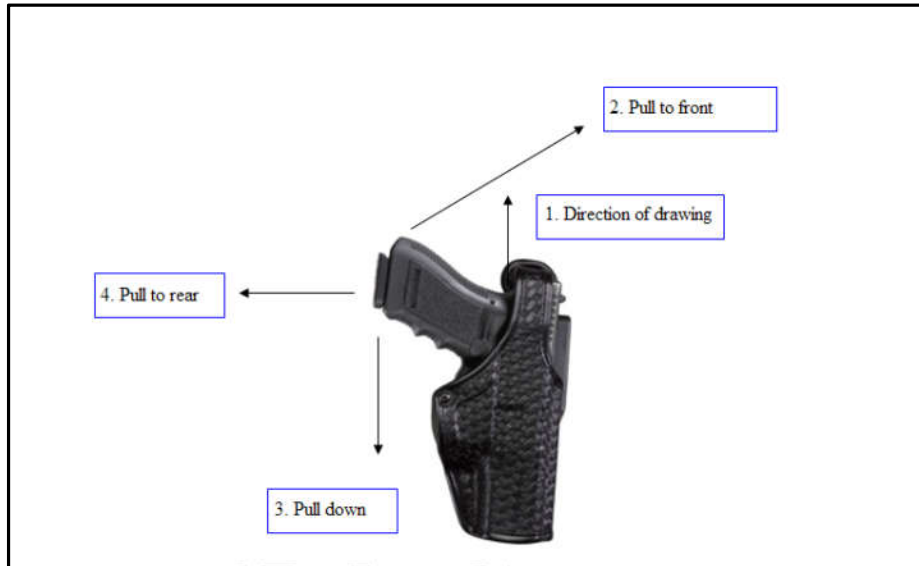


Figure 1: Directions of Loading and Impact Testing

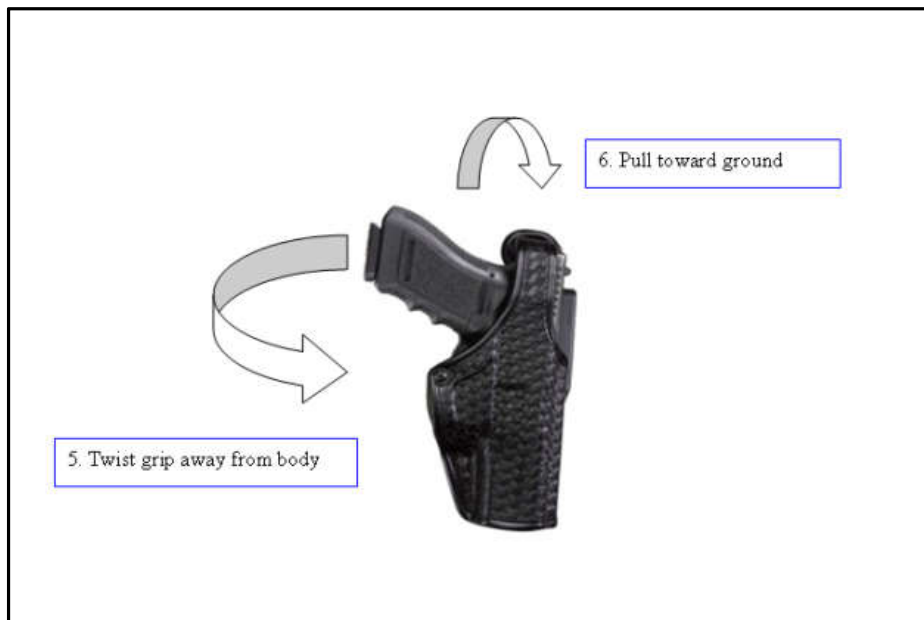


Figure 2: Additional Directions of Loading and Impact Testing



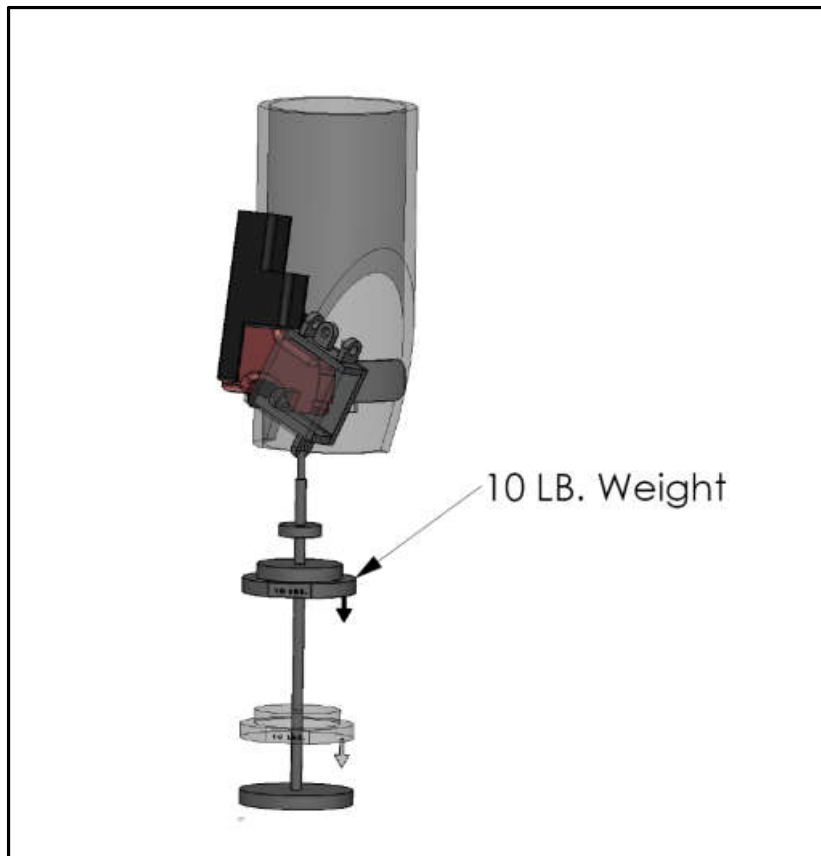


Figure 3: Impact Test Fixture

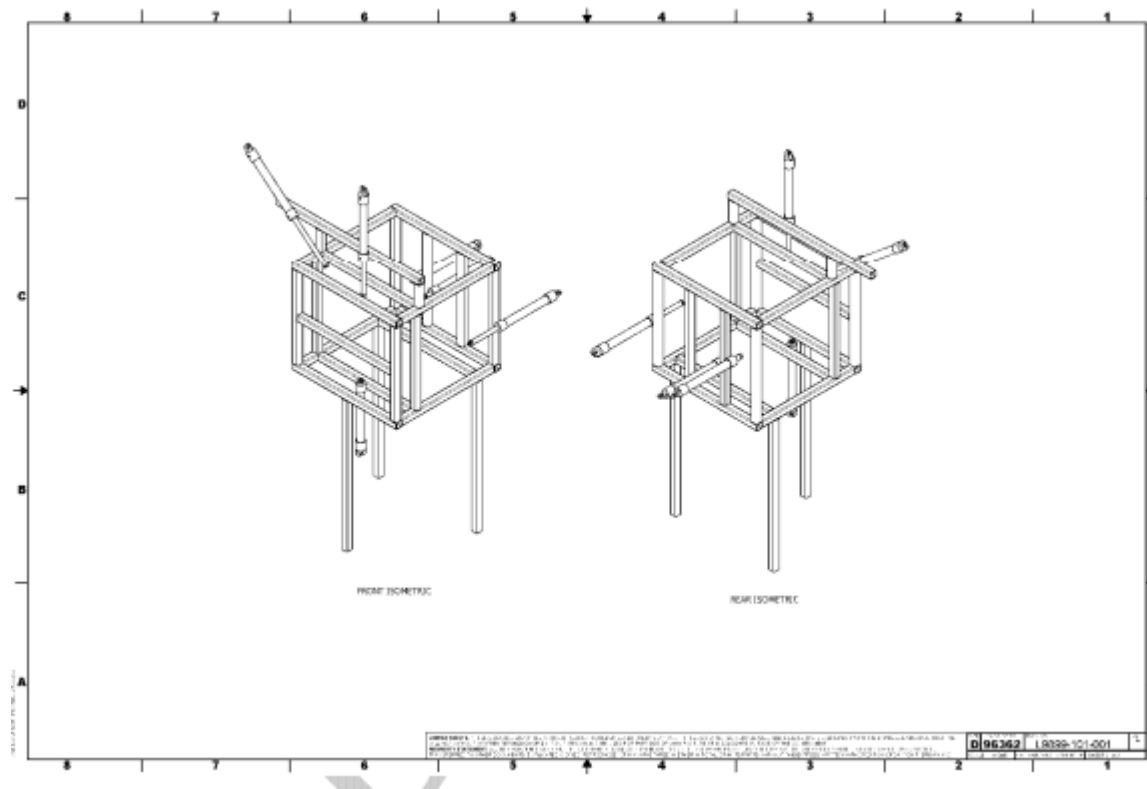


Figure 4: Static Strength Fixture

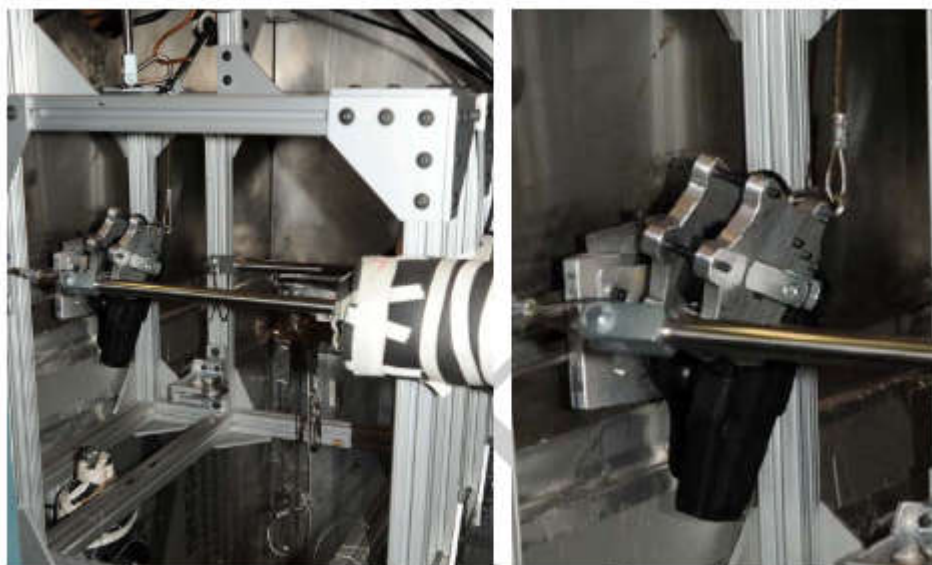


Figure 5: Examples of Static Strength Fixture

Example of Static Fixture demonstrating the direction of loading and impact testing (See Figure 1)



Example of Static Fixture demonstrating all directions of loading and impact testing (See Figure 1 and Figure 2)