

**LABORATORY PROCEDURAL GUIDE
FOR CERTIFYING NEWLY
MANUFACTURED FOOTBALL PLAYERS
HAND COVERINGS**

NOCSAE DOC (ND)020-10m10

Prepared By



**NATIONAL OPERATING COMMITTEE
ON STANDARDS FOR ATHLETIC EQUIPMENT**

June, 2010

TABLE OF CONTENTS

Scope	1
Referenced Documents	1
Test Equipment Required	1
Laboratory Environment	2
Sample Preparation	2
Sample Selection	2
Calibration Procedures	3
Testing Procedure for Certification	3
Peel Adhesion Test	3
Friction Test	4
Equipment Preparation and System Check	4
Glove Friction Test	5
Labeling and Packaging	6
Reports	6
JUNE, 2010 MODIFICATIONS/REVISIONS	7

1 Scope

- 1.1 This procedural guide establishes recommended practices for the certification of football players' hand coverings such as gloves and hand pads.
- 1.2 **All testing and requirements of this standard specification must be in accordance with NOCSAE DOC.001.**
- 1.3 *This recommended practice does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this recommended practice to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2 Referenced Documents

- 2.1 STANDARD DROP TEST METHOD AND EQUIPMENT USED IN EVALUATING THE PERFORMANCE CHARACTERISTICS OF PROTECTIVE HEADGEAR, NOCSAE DOC.001.
- 2.2 ASTM D1894-90 STANDARD TEST METHOD FOR STATIC AND KINETIC COEFFICIENTS OF FRICTION OF PLASTIC FILM AND SHEETING.
- 2.3 ASTM D3330 STANDARD TEST METHODS FOR PEEL ADHESION OF PRESSURE SENSITIVE TAPE AT 180-DEGREE ANGLE.

3 Test Equipment Required

- 3.1 Scale with an accuracy of at least 0.01% full scale and a resolution of at least 0.1 grams.
- 3.2 Glove Last (sled), (as shown in Figure 2, NOCSAE DOC.019).
- 3.3 Pressure Plate, A flat smooth steel 2 x 1 inch rectangular surface capable of supporting a weight of 4 lbs. (as shown in Figure 1, NOCSAE DOC.019).
- 3.4 A Universal Testing Machine capable of maintaining a uniform rate of motion of 50 ± 1.5 mm/min.
- 3.5 A Force Measuring Device, (see section 7.1, NOCSAE DOC.019).
- 3.6 A flat smooth level metal plane, a minimum of 6 x 20 inches, capable of being supported with sufficient structural strength to maintain a firm position between the moving crosshead and the force applied by the Glove Last (sled).
- 3.7 A low friction pulley, (such as a phenolic type pulley mounted in hardened steel cone bearings on a metal fork or a ball-bearing type pulley).
- 3.8 Strong flexible line with a pull strength of at least 40 lbs. with less than 3% elongation.

3.9 Miscellaneous tools, equipment and supplies

3.9.1 Clean cloth

3.9.2 91% Isopropyl Alcohol

3.9.3 Low Lint cloth wipes

3.9.4 Teflon Coated Sheets, nominal thickness 0.15”

3.9.5 Thermo-stable sheet wax approximately 1/16” thick (Freeman brand sheet wax no. 266 adhesive back)

3.9.6 Tape measure

3.9.7 Miscellaneous hand tools

3.9.8 Adhesive Tape

3.9.9 Clamps and straight edge

4 **Laboratory Environment**

4.1 See Section 12, NOCSAE DOC.001.

5 **Sample Preparation**

5.1 Samples to be tested must be moved into a Laboratory environment for conditioning at least four (4) hours prior to testing.

5.2 Carefully clean the hand covering sample prior to testing by gently wiping with a low lint cloth (such as Kimwipes®) and 91% isopropyl alcohol. Allow the hand covering sample to completely air dry leaving no visible signs of alcohol prior to testing.

5.3 Carefully review all manufacturer instructions; hand coverings must be tested both with and without any recommended or implied add-ons. Apply the add-ons prior to testing, If the manufacturer does not specify a time for use of the hand covering after applying any add-ons, then allow at least 15 minutes after application of add-ons with the gloves in ambient condition prior to testing.

6 **Sample Selection**

6.1 See Section 11, NOCSAE DOC.001.

6.2 Each certifier must test an adequate and representative sample size in order to be reasonably sure that hand covering released to use, but not actually tested, will meet the requirements as set out in NOCSAE DOC.019.

6.3 Certifiers may be faced with processing gloves manufactured from variable raw materials. Sample selection **must** be random yet demonstrate that raw material

variability's have been accounted for.

7 Calibration Procedures

- 7.1 Calibrate/verify the scale and force measuring equipment following the manufactures recommended procedure prior to use.
- 7.2 Perform a Friction Test System Check prior to hand covering testing and after hand covering testing, the pre and post-test system check values must be within 7% to validate the tests.

8 Testing Procedure for Certification

8.1 Peel Adhesion Test

- 8.1.1 Place the pattern #62 glass on a smooth flat level stone surface pebbled side up.
- 8.1.2 Clean the glass by wiping with a low lint cloth wipe and alcohol, allow the glass to dry sufficiently so that no visible alcohol remains on the glass prior to continuing.
- 8.1.3 Cut enough hand covering material to weigh as close to 4 grams as possible without exceeding 4 grams. The material should include a smooth area (no seams) of at least 1 x 2 inches.
- 8.1.4 Place the cut piece of hand covering material exterior side onto the pebbled glass.
- 8.1.5 Carefully place the 1 x 2 inch footprint of the pressure plate onto the hand covering material so that at least 2 square inches of the hand covering material is completely within the boundaries of the footprint of pressure plate.
- 8.1.6 Place enough weight onto the pressure plate so that a 2-psi force is on the hand covering material.
- 8.1.7 Note the time of day, after at least one hour has elapsed, carefully lift the pressure plate from the hand covering material being careful not to move the hand covering material and set it aside.
- 8.1.8 Carefully lift the pebbled glass and rotate it 180 degrees (within 5 seconds of removing the pressure plate) hold the glass in this position until either the hand covering material falls freely from the glass or for 90 seconds.
- 8.1.9 Note if all of the hand covering material falls off the glass or if all or some of the hand covering material remains adhered to the glass within the 90 second period.
- 8.1.10 Inspect the glass surface for evidence of transfer of hand covering material; note the glass condition after the test.

8.2 Friction Test

8.2.1 Equipment Preparation and System Check

- 8.2.1.1 Secure the pattern #62 glass on the flat smooth level metal plane that is firmly mounted below the crosshead of the Universal Testing Machine pebbled side up.
- 8.2.1.2 Connect the flexible cable from the bottom of the load cell through the low-friction pulley to the Glove Last.
- 8.2.1.3 Insure that the flexible cable is perpendicular to the glass surface from the bottom of the load cell to the edge of the pulley when pulled tight; adjust the pulley either forward or backward until the cable is as perpendicular as possible.
- 8.2.1.4 Insure that the flexible cable is parallel along the glass surface when pulled tight; adjust the pulley either up or down until the cable is as parallel as possible.
- 8.2.1.5 Position the cross head so that the cable length allows the Glove Last to be positioned at least in the center and no more than 3 inches from the outer edge of the glass surface.
- 8.2.1.6 Move the Glove Last forward so that there is slack in the flexible cable, insure that the flexible cable does not come free of the pulley but there must be no tension on the flexible cable.
- 8.2.1.7 Secure the straight edge across the end of the glass so that the front edge of the Glove Last comes into contact with it, there should be enough room between the straight edge and the glass so that a piece of Teflon Coated Sheet will slide freely between them.
- 8.2.1.8 Clean the glass by wiping with a clean cloth and alcohol, allow the glass to dry sufficiently so that no alcohol remains on the glass prior to continuing.
- 8.2.1.9 Attach an approximate $\frac{1}{2}$ " x 4" piece of 1/16" thick thermo-stable sheet wax onto the Glove Last, make certain that the wax is smooth along the bottom flat surface of the Glove Last.
- 8.2.1.10 Note the weight of the entire Glove Last assembly with wax and retention screw.
- 8.2.1.11 Place the Glove Last with wax on a suitable size of a Teflon Coated Sheet; center the Glove Last along pull force vector.
- 8.2.1.12 Slowly with constant motion, slide the Teflon Coated Sheet out from under the Glove Last.

- 8.2.1.13 Start the crosshead motion so that from the time of first contact of wax material to glass to the time of forward motion of the Glove Last is 60 +0/-15 seconds.
- 8.2.1.14 The time of first contact of wax material to glass to the time of forward motion of the Glove Last for each successive pull shall take place no longer than ± 5 s of the time taken for the first pull.
- 8.2.1.15 Note the peak force required to start motion of the Glove Last assembly against the glass surface.
- 8.2.1.16 Compute the Static Coefficient of Friction by dividing the force noted in step 8.2.1.15 by total weight of the Glove Last assembly.
- 8.2.1.17 The system check shall be performed three times with 75 \pm 15 seconds between each successive pull test, the average of the three pulls shall be taken to determine the Static Coefficient of Friction value for the wax to glass surface.

8.2.2 Glove Friction Test

- 8.2.2.1 Equipment should be prepared as above prior to use.
- 8.2.2.2 Cut enough hand covering material to cover the entire length and width of the Glove Last, place the hand covering material onto the Glove Last and secure the retention screw through the end of the glove or hand covering material.
- 8.2.2.3 Make certain that the hand covering material is as smooth as possible along the flat surface of the Glove Last.
- 8.2.2.4 Note the weight of the entire cut hand covering material, Glove Last and retention screw assembly.
- 8.2.2.5 Place a Teflon Coated Sheet of sufficient size under the entire Glove Last assembly positioned on the glass so that the back of the last rests against the straight edge and enough of the Teflon Coated Sheet protrudes under the straight edge to pull on, center the Glove Last along the pull force vector.
- 8.2.2.6 Slowly with constant motion, slide the Teflon Coated Sheet out from under the Glove Last.
- 8.2.2.7 Start the crosshead motion so that from the time of first contact of hand covering material to glass to the time of forward motion of the Glove Last is 60 +0/-15 seconds.
- 8.2.2.8 The time of first contact of hand covering material to glass to the time of forward motion of the Glove Last for each successive pull shall take place no longer than ± 5 s of the time taken for the first pull.

- 8.2.2.9 Note the peak force required to start motion of the Glove Last assembly against the glass surface.
- 8.2.2.10 Compute the Static Coefficient of Friction by dividing the force noted in step 9.2.2.8 by total weight of the Glove Last assembly.
- 8.2.2.11 Each hand covering shall be tested three times with 75 ± 15 seconds between each successive pull test, the average of the three pulls shall be taken to determine the Static Coefficient of Friction value for the hand covering.

8.3 **Labeling and Packaging**

- 8.3.1 Review the gloves/hand pads, packaging and/or literature that accompany the gloves/hand pads for compliance to Section 11 NOCSAE DOC.019.

9 **Reports**

- 9.1 All reports must comply with Section 10, NOCSAE DOC.019.

JUNE, 2010 MODIFICATIONS/REVISIONS

- **Revision** - Added cleaning of samples procedure, added time length of peel adhesion test requirement, changed weight of pressure plate requirement.