

**LABORATORY PROCEDURAL GUIDE
FOR CERTIFYING NEWLY
MANUFACTURED HOCKEY HELMETS**

NOCSAE DOC (ND) 031- 04m11

Prepared By



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

Modified February 2011

TABLE OF CONTENTS

Scope	1
Referenced Documents	1
Test Equipment Required	1
Mechanical Set-up	2
Laboratory Environment	2
Helmet Preparation	2
Sample Selection	2
Calibration Procedures	3
Testing Procedure for Certification	3
Reports.....	3
FEBRUARY, 2011 MODIFICATIONS/REVISIONS	4

1 Scope

- 1.1 This procedural guide establishes recommended practices for the certification of hockey helmets.
- 1.2 **All testing and requirements of this standard specification must be in accordance with NOCSAE DOC.001, NOCSAE DOC.021, NOCSAE DOC.030 and NOCSAE DOC.101-96.**
- 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 STANDARD PROJECTILE IMPACT TEST METHOD AND EQUIPMENT USED IN EVALUATING THE PERFORMANCE CHARACTERISTICS OF PROTECTIVE HEADGEAR/PROJECTILES, NOCSAE DOC.021
- 2.3 STANDARD PERFORMANCE SPECIFICATIONS FOR NEWLY MANUFACTURED HOCKEY HELMETS, NOCSAE DOC.030
- 2.4 EQUIPMENT CALIBRATION PROCEDURES - KME 200, NOCSAE DOC.101

3 Test Equipment Required

- 3.1 Twin-wire Guide Assembly (as shown in Figure 3, NOCSAE DOC.001).
- 3.2 Projectile Propelling Device (as shown in Figure 1, NOCSAE DOC.021).
- 3.3 Appropriate NOCSAE headforms (see Section 13 and 15.5, NOCSAE DOC.001).
- 3.4 Appropriate MEP pads (see Section 15.2, NOCSAE DOC.001).
- 3.5 PCB Triaxial Accelerometers, #354MO3, #356A66 or equivalent.
- 3.6 KME Series 200 Data Analyzer (or any analog/digital equivalent that can be demonstrated to correctly calculate SI from a given input signal)¹

¹ The portion of this procedural guide that is specific to data acquisition equipment use and calibration is for the KME Series 200 only. Users of other data acquisition systems should refer to the specific manual for that system for differences in system operation.

3.7 Miscellaneous tools and equipment -

- 3.7.1 Digital voltmeter (DVM), 3 ½ digit, 1mv resolution, ±0.5% accuracy and connecting cables.
- 3.7.2 Torque wrench, range to 200 in/lb minimum, 5 % accuracy.
- 3.7.3 Appropriate electrical connectors (banana clips).
- 3.7.4 Tape measure or appropriate drop height gauges.
- 3.7.5 Non-conducting glass/plastic jeweler's screwdriver (tweaking tool)
- 3.7.6 Miscellaneous hand tools.

4 Mechanical Set-up

All components of each assembly (i.e., the headform, headform adjuster, headform rotator stem, headform collar, etc.) must be rigidly connected. Any looseness or play will cause spurious signals (false SI results).

5 Laboratory Environment

See Section 12, NOCSAE DOC.001.

6 Helmet Preparation

- 6.1 See Section 5, NOCSAE DOC.030.
- 6.2 Helmets to be tested must be moved into a Laboratory environment for conditioning at least four (4) hours prior to impacting.

7 Sample Selection

- 7.1 See Section 11, NOCSAE DOC.001.
- 7.2 Each certifier must test an adequate and representative sample size in order to be reasonably sure that helmets released to use, but not actually tested, will meet the requirements as set out in NOCSAE DOC.001 and NOCSAE DOC.030.
- 7.3 Certifiers may be faced with processing helmets manufactured from variable raw materials. Sample selection **must** be random yet demonstrate that raw material variability's have been accounted for.

8 Calibration Procedures

See NOCSAE DOC.101

9 Testing Procedure for Certification

- 9.1 Calibrate your system.
- 9.2 Exchange the MEP pad used for calibration for the MEP pad used for testing and perform pre-testing system check.
- 9.3 Helmets selected for testing must be tested in all locations and all drop heights as specified in Section 5, NOCSAE DOC.030.
 - 9.3.1 Testing may begin in any location after retention and stability testing are complete. Except for the high and low temperature impacts, all impacts must be completed before moving to a new location. It is not necessary to complete all testing on a given helmet before removing the helmet from the test rig, however each location must be tested from the lowest to the highest drop heights before removing the helmet from the test rig. Observe time limits between impacts on a given location. See note in Sec.12 of NOCSAE Doc. 001 for conditioned helmets.
 - 9.3.2 Helmets selected for high or low temperature testing must have already been impacted at ambient temperature.
- 9.4 When using KME equipment, immediately after impact record the SI results and the peak g's. Any delay greater than 30 seconds can result in erroneous data.
- 9.5 Periodically, post-testing calibration checks need to be run to assure that the system being used has remained correctly calibrated (see Sections 18, NOCSAE DOC.001).

10 Reports

- 10.1 All reports must comply with Section 14, NOCSAE DOC.001.

FEBRUARY, 2011 MODIFICATIONS/REVISIONS

- Added additional accelerometer options in section 3.4
- Specified resolution and tolerance for DVM and Torque Wrench Updated footnote on page 1 to remove reference to “blue box” and GHI obsolete data acquisition systems.