FOOTBALL HELMET STANDARDS OVERVIEW

NOCSAE, the National Operating Committee on Standards for Athletic Equipment, is an independent and nonprofit standards development body with the sole mission to enhance athlete safety through scientific research and the creation of feasible performance standards for protective equipment. Formed in 1969, NOCSAE is a leading force in the effort to improve athletic equipment and, as a result, reduce injuries. NOCSAE efforts include the development of performance and test standards for football helmets, gloves and facemasks, baseball and softball batter’s and catcher’s helmets, baseballs and softballs, ice hockey helmets, soccer shin guards, lacrosse helmets and facemasks and polo helmets.

New Helmet Certification
“Meets NOCSAE Standard”

In 2015 NOCSAE will begin requiring third-party certification for athletic equipment to meet NOCSAE standards, in accordance with ANSI /ISO international guidelines. Under the new requirement, manufacturers will contract with an independent agency to test, validate and audit their equipment to meet NOCSAE standards.

Certification of compliance with the NOCSAE standard will be done by the Safety Equipment Institute (SEI), an independent ANSI/ISO 17065 accredited certifying body. SEI will oversee the NOCSAE standards certification process through several accredited, independent laboratories that will be responsible for testing to determine if products meet NOCSAE standards. SEI also will conduct regular product testing and quality assurance audits to assure continued compliance.

Manufacturers seeking to have their products certified to the NOCSAE standard will need to submit necessary testing fees, product testing samples, product labels, quality program manuals and other required materials to SEI. Manufacturers also will participate in a quality audit and review protocols for responding to customer complaints regarding product performance.

Setting the Standard

NOCSAE helmet performance standards are based on accepted and recognized scientific data. By bringing together physicians, academic researchers, coaches, certified trainers, manufacturers and leading scientific experts, NOCSAE established standards that require testing football helmet performance across all levels of impact. Helmets either pass or fail the standard based on their ability to reduce impact forces to the head as measured by a Severity Index (SI) value. Because of the very high level of quality assurance required, to pass the test, helmets must score substantially less than 1200 SI for all impacts. NOCSAE standards are performance-based and are design neutral so that manufacturers are not restricted in design or engineering, allowing innovation in design.

Pneumatic Ram Impactor
Proposed Additional Test

In 2004 NOCSAE drafted a proposed revision to its helmet-testing standard that would allow helmets to be hit in additional directions and with different speeds, which NOCSAE believes will be necessary if scientists are able to identify a concussion specific threshold. This proposed standard has been revised for 2014. This new impactor is an air-powered ram that was built from plans developed by the NFL and given to NOCSAE in a cooperative effort. It has undergone significant validation and performance testing over the last few years across six different laboratories.
How Football Helmets Are Tested

The NOCSAE helmet testing standards utilize a twin-wire drop impactor that relies on gravity to accelerate the headform and helmet combination to the required impact speeds. The headform is a biofidelic and variable mass headform scientifically instrumented with triaxial accelerometers at the center of gravity to measure headform accelerations in three different directions. The test involves mounting a football helmet on an appropriately sized and mass-specific headform. The headform and helmet combination is then dropped at specific speeds onto a steel anvil covered with a ½ inch hard rubber pad. Each helmet being tested is impacted a total of 29 times, including 16 impacts at 12.2 mph on six different locations and one random location, as well as four impacts on two different locations at high temperature. Additionally, there are 2 impacts at 10.9 mph and 2 at 9.5 mph. For these 20 impacts, each impact measurement must be substantially below 1200 SI. Finally, each helmet is impacted at 7.7 mph on 7 different locations. For each of these lowest speed impacts, the tested helmets must score less than 300 SI.

Recertification of Reconditioned Helmets

When NOCSAE published new football helmet standards in 1973, All American Reconditioning began to test helmets they were reconditioning and found that 84 percent of all helmets currently in use and made before 1973 could not pass the NOCSAE test. As a result, NOCSAE established standards to retest and recertify football helmets that are being reconditioned so the original certification under the new standard could be maintained through the reconditioning process. There are currently 23 reconditioners nationally that are licensed by NOCSAE to recertify football helmets.

Recertification Requirements under the NOCSAE Standard

The NOCSAE recertification standards and recertification license agreement require the following:

The Facility: The testing laboratory at each reconditioning facility must be in a separate room apart from the general reconditioning work. The room must be temperature controlled at a specified range. Compliance also requires a written quality control protocol that includes issues such as sample selection and responses to test failures.

The Sample: Helmets selected for testing must be a statistically significant sample of the helmets that particular facility will be recertifying. The helmets selected for testing must be tested prior to any reconditioning or repair work being done; in other words, they are tested in the condition they are in as they get off the bus from high school. Once the helmet is selected, it is tagged, tested and followed through the entire recertification process. That exact helmet is then tested again after it has finished the reconditioning process. No helmets that are represented by that sample may be recertified and returned to a school or club until the samples have passed the post-reconditioning testing.

The Test: Reconditioners use the same drop-testing equipment for recertification as is required for newly manufactured helmets. The entire testing process and protocol is controlled by NOCSAE computer software specifically designed to ensure that the recertification testing data is done correctly and that the testing data is valid and reliable. The software:

- Requires successful equipment calibration and recalibration both before and after helmets are tested; if the post-test calibration and validation fails, helmet tests cannot be used for recertification, and they must be redone after calibration issues are corrected
- Dumps all invalid test data generated as a result of a non-calibrated or invalid test into a special file for review by the NOCSAE technical advisor
- Collects all valid and verified testing data – including date; time of day; temperature; SI results; helmet make and model, age and size; and the last year reconditioned – and stores it in a separate encrypted file, accessible only by specific personnel in the laboratory of the NOCSAE technical advisor
**Reconditioning:** Once the pre-reconditioning test is complete, the helmet begins the reconditioning process. Reconditioning includes the complete disassembly of all helmet parts, cleaning, sanitizing, replacement of worn parts and shell inspection. Helmets also may be repainted and have the faceguard, jaw pad and chin strap replaced. Once the helmet has finished the reconditioning process, the shell may be the only original part of the helmet that remains. In a helmet older than five years that has been regularly reconditioned, the only part of the helmet that is actually five years old is probably the shell. Helmet shells may not be replaced as part of the reconditioning process.

**Recertification:** When the sample helmets have passed the recertification tests, a recertification label is placed on the inside of the helmet with the current year’s recertification date and a statement that the helmet has been recertified to the NOCSAE standard.

**Round Robin:** Reconditioners also must submit the testing system to a round-robin calibration program to validate that each reconditioning and recertification laboratory test rig is properly tuned and assembled. The data from round-robin calibration tests is submitted to the NOCSAE technical director in an encrypted file, where the data is examined for consistency and internal validation.

**Additional Requirements:** Licensed reconditioners are required to maintain a database of information detailing how helmets have been maintained, as well as provide testing data results to NOCSAE on a monthly basis – and in some cases weekly basis – during reconditioning season. NOCSAE analyzes this data and maintains a database of all recertification tests performed from all reconditioners licensed to recertify helmets. This data has been submitted by NOCSAE to independent statisticians for evaluation on matters such as sample relevancy, consistency and trend development.