



Football Helmet Standards Overview

NOCSAE, the National Operating Committee on Standards for Athletic Equipment, is an independent and nonprofit standard-setting body with the sole mission to enhance athletic safety through scientific research and the creation of 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 and facemasks, baseball and softball batters and catchers helmets, baseballs and softballs, ice hockey helmets, soccer shinguards, lacrosse helmets and facemasks and polo helmets.

New Helmet Certification

“Meets NOCSAE Standards”

Helmet manufacturers that want to certify that their helmet “Meets NOCSAE Standards” must enter into a contract with NOCSAE that obligates that company to:

- ✓ Test their helmets in accordance with NOCSAE performance and testing standards
- ✓ Provide data that demonstrates that their testing equipment is calibrated and functioning properly and to participate in a round-robin test system verification program
- ✓ Have a written quality control program regarding the NOCSAE protocol and data acquisition and analysis and maintain certification testing data for review by NOCSAE
- ✓ Annually submit their certified helmets to a third-party laboratory, specially accredited to international laboratory standards, for verification that their helmets in fact meet the NOCSAE standard as certified and to submit these third-party laboratory validation reports directly to NOCSAE



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. To pass the test, helmets must score less than 1200 SI at 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.

How Football Helmets Are Tested

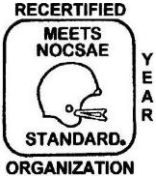
NOCSAE's testing standards incorporate variable mass head forms and are the only helmet standards in the world to do so. The NOCSAE test standard involves mounting a football helmet on one of three different size and mass biofidelic head models that has been specially instrumented to measure the impact forces on the head, then dropping the helmet and headform onto a steel covered anvil with a ½-inch hard rubber pad. The helmet is dropped a total of 20 times, including: two drops from a height of 60 inches onto seven different locations, including one random location; two drops from 60 inches at high temperatures; and two drops each from 36 inches and 48 inches. A 60-inch drop is approximately the equivalent of a player running at 17.9 feet per second – more than 12 miles per hour – and hitting the helmet into a flat surface that stops the head in less than ¼ inch. Impact force measurements are recorded by the test software to determine if the helmet passes the SI threshold and can be certified to the NOCSAE Football Helmet Standard.

Linear 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 addition to the NOCSAE standard. This “linear impactor” is an air-powered ram that was built from plans developed by the NFL and given to NOCSAE in a cooperative effort. Six prototype impactors are currently being tested in various laboratories around the country to establish repeatability and validity, which must be done before it can be included in the testing standards.



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 relevant 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:

- ✓ Forces equipment calibration and recalibration both before and after helmets are tested. If the post-test calibration and validation fails, those helmet tests cannot be used for recertification, and they must be redone.
- ✓ 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.