MIL-STD-810H

(Technical Whitepaper)

US MILITARY GRADE
MIL-STD 810H
Multiple Tests Passed

2025 July 22nd Version

ASUS NUC Overall Test Report

Disclaimer

The testing regime includes the requirements of both military-grade standards and ASUS quality/reliability tests and varies depending on device. MIL- STD-810H testing is conducted on selected ASUS products only. Note that the MIL-STD-810 testing helps to ensure the quality of ASUS products but does not indicate a particular fitness for military use. The test is performed under laboratory conditions. Any damage caused by attempts to replicate these test conditions would be considered accidental and would not be covered by the standard ASUS warranty. Additional coverage is available with ASUS Premium Care.

Selected products are tested using enhanced military-grade MIL-STD-810H durability standards, with additional functional validation testing and over 12 test methods and test procedures, to ensure extraordinary toughness. Based on ASUS internal market research using available information and testing reports from ASUS internal Quality & Reliability team to achieve industry's strictest and most extensive test regime for the MIL-STD-810H standard.

Commitment to Quality

A product’s greatness lies not only in its features but in its quality. For us, quality is not merely a step in the process—it is a fundamental design principle. Every component and detail of our NUC reflects our unwavering dedication to excellence.

To us, quality transcends being a mere value proposition—it represents a long-term investment. True value isn't just seen at launch; it is demonstrated every time the product performs flawlessly as intended.

In the evolution of the mini-PC, we've prioritized quality over compromise.

We care about quality — it’s in our DNA

From design to testing, manufacturing, and after-sales support, we meticulously focus on every detail, constantly seeking ways to enhance our products and customer experiences. This commitment ensures that NUCs offer exceptional performance, stability, and cater to the diverse needs of users in both personal and professional settings.

Engineered with cutting-edge technology, NUCs are optimized for size, performance, and energy efficiency, delivering an unparalleled user experience. They reflect NUC's commitment to quality and our relentless pursuit of excellence.

Striking a perfect balance

Our goal is to deliver ASUS NUCs that offer the highest quality at the most cost-effective total cost of ownership. We are committed to enhancing the customer experience by providing products that combine the best value, features, and pricing. The ASUS NUC portfolio strikes the ideal balance of affordability, performance, reliability, and innovative design.

Quality is a fundamental design requirement in every NUC we create. ASUS NUCs are engineered to meet the needs of businesses and individuals alike. Crafted from premium materials and backed by NUC’s renowned reliability, these compact yet powerful devices deliver exceptional performance while being easy to use and durable.

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Commitment to Quality

Performance you can trust

As part of the design process, all ASUS NUCs undergo the NUC Total Test Process (TTP) — a comprehensive series of rigorous tests and validation procedures that ensure exceptional quality and reliability across a variety of applications and environments. To ensure our NUCs are robust and dependable tools that meet the evolving needs of our customers, our testing process is continuously reviewed and enhanced.

The NUC Total Test Process reflects NUC's long-standing commitment to quality. We go to great lengths to build superior reliability into every NUC.

Our comprehensive testing program entails up to 200,000 hours of detailed, multi-tiered testing and validation for each computing platform. Following strict quality standards, the program incorporates over 20,000 test steps and guarantees compatibility with more than 200 industry-standard hardware and software products.

Before launch, NUCs are subjected to extreme conditions, including drops, vibrations, high temperatures, and intense mechanical and functional tests that simulate real-world use over the life of the product. This strong reliability translates into less downtime and a lower total cost of ownership.

Insights gained from the NUC Total Test Process drive innovations that enhance the computing experience. Customers can count on ASUS NUCs to perform at their peak when their most demanding work is on the line.

World-class design

First impressions are key to shaping the overall user experience, and ASUS NUC design engineers excel in crafting that initial impact. The integration of innovative technologies begins with a quality-focused, holistic design approach. Engineers collaborate with manufacturing teams to optimize designs for production while maintaining the highest quality standards. Each NUC design undergoes multiple builds to fine-tune manufacturability and quality before finalization.

NUC combines enterprise-class design with cutting-edge innovation, utilizing premium materials and impeccable finishes. Its sophisticated chassis, easy component access, and precise airflow improve reliability, providing an outstanding and durable user experience.

MIL-STD-810 Test Background

The MIL-STD-810 test method standard, created by the U.S. government, is designed to help organizations develop environmental tests to assess how well equipment performs in the field. This standard includes numerous test methods, each linked to a specific environmental stressor, such as vibration, moisture, dust, extreme temperatures, or humidity. For instance, Method 500.5 covers Low Pressure (Altitude) testing, while Method 501.5 addresses High Temperature testing. Although there is no mandated list of tests for device categories, most major PC vendors typically conduct between 5 and 8 test methods. Each test method includes multiple procedures; for example, Method 501.5 outlines Procedure I (Storage) and Procedure II (Operation). Procedure I evaluates the effects of high temperature storage on a business PC's subsequent performance, while Procedure II assesses the impact of high temperature during operation.

Test Scenarios

ASUS inc. tested the durability of the ASUS NUC Business models using procedures tailored from MIL-STD-810. NUC used the MIL-STD-810 test menu to select tests that closely reflect the challenges faced by today's professionals.

Altitude Test (Method 500.6-Procedure I & II)

Purpose: Use low pressure (altitude) tests to determine if materiel can withstand and/or operate in a low-pressure environment and/or withstand rapid pressure changes.

a. Procedure I - Storage/Air Transport. Procedure I is appropriate if the materiel is to be transported or stored at high ground elevations or transported by air in its shipping/storage configuration. Evaluate the materiel with respect to known effects of low pressure (paragraph 2.1.1) and the LCEP (Part One, paragraph 4.2.2.3.1) to determine if this procedure is appropriate.

b. Procedure II - Operation/Air Carriage. Use Procedure II to determine the performance of the materiel under low pressure conditions. It may be preceded by Procedure I. If there are no low-pressure storage, rapid, or explosive decompression requirements, this procedure can stand alone.

Low-Temperature Test (Method 502.7- Procedure I & II)

Purpose: Use low temperature tests to obtain data to help evaluate effects of low temperature conditions on materiel safety, integrity, and performance during storage, operation, and manipulation.

a. Procedure I - Storage. Use Procedure I to investigate how low temperatures during storage affect materiel safety during and after storage, and performance after storage.

MIL-STD-810 Test Background

b. Procedure II – Operation. Use Procedure II to investigate how well the materiel operates in low temperature environments. For the purpose of this document, operation is defined as excitation of the materiel with a minimum of contact by personnel. It does not exclude handling (manipulation).

High-Temperature Test (501.7 High Temperature Method 501.7-Procedure I & II)
Purpose: Use high temperature tests to obtain data to help evaluate effects of high temperature conditions on materiel safety, integrity, and performance.

a. Procedure I – Storage. Use this procedure to examine how high storage temperatures impact the material's integrity, safety, and performance. The test involves exposing the item to high temperatures (and low humidity, if applicable) that it might encounter during storage, followed by an operational test at ambient conditions. For materials inside an enclosure exposed to solar heating, consider using Method 505.7, Procedure I to determine the heating level caused by solar loading

b. Procedure II - Operation. Use Procedure II to investigate how high ambient temperatures may affect materiel performance while it is operating. There are two ways to perform Procedure II:

(1) Expose the test item to cyclic chamber conditions with the test item operating either continuously or during the period of maximum response (highest item temperature).

(2) Expose the test item to a constant temperature and operate the test item when its temperature stabilizes. (To be used only for items situated in close proximity to heat-producing equipment or when it is necessary to verify operation of an item at a specified constant temperature.)

MIL-STD-810 Test Background

Vibration Test (Method 514.8- Procedure I, Category 4)
Purpose: The purpose of this Method is to provide guidance for defining vibration environments materiel may be exposed to throughout a life cycle and to provide guidance for the conduct of laboratory vibration tests. Vibration tests are performed to:

a. Develop materiel to function in and withstand the vibration exposures of a life cycle including synergistic effects of other environmental factors, materiel duty cycle, and maintenance.
b. Verify that materiel will function in and withstand the vibration exposures of a life cycle.

Shock Test (Method 516.8- Procedure VI)
Purpose: Shock tests are performed to:
a. Provide a degree of confidence that materiel can physically and functionally withstand the shocks encountered in handling, transportation, and service environments. This may include an assessment of the overall materiel system integrity for safety purposes in any one or all of the handling, transportation, and service environments.

b. Determine the materiel's fragility level, in order that packaging, stowage, or mounting configurations may be designed to protect the materiel's physical and functional integrity.
c. Test the strength of devices that attach materiel to platforms that may be involved in a crash situation and verify that the material itself does not create a hazard or that parts of the materiel are not ejected during a crash situation.

Procedure VI - Bench Handling. Procedure VI is intended for materiel that may typically experience bench handling, bench maintenance, or packaging. It is used to determine the ability of the materiel to withstand representative levels of shock encountered during such environments. This procedure is appropriate for materiel out of its transit or combination case. Such shocks might occur during materiel repair. This procedure may include testing for materiel with protrusions that may be easily damaged without regard to gross shock on the total material. The nature of such testing must be performed on a case-by-case basis, noting the configuration of the materiel protrusions, and the case scenarios for damage during such activities as bench handling, maintenance, and packaging.

Humidity Test (Method 507.6- Procedure II)
Purpose: The purpose of this Method is to determine the resistance of material to the effects of a warm, humid atmosphere.

Procedure II – Aggravated. Procedure II exposes the test item to more extreme temperature and humidity levels than those found in nature (without contributing degrading elements), but for shorter durations. Its advantage is that it produces results quickly, i.e., it may, generally, exhibit temperature-humidity effects sooner than in the natural or induced procedures. Its disadvantage is that the effects may not accurately represent those that will be encountered in actual service. Be careful when interpreting results. This procedure is used to identify potential problem areas, and the test levels are fixed.

Test Results

The tables below summarize the NUC Essential MIL-STD-810 test methods performed by an independent third party and their results.

NUC Essential:

Test Tested Under	MIL-STD-810H	NUC 14 Essential
Altitude	**Method 500.6-Procedure I**	Passed
Altitude	**Method 500.6-Procedure II**	Passed
Low-Temperature	**Method 502.7- Procedure I**	Passed
Low-Temperature	**Method 502.7- Procedure II**	Passed
High-Temperature	**501.7 High Temperature Method 501.7-Procedure I**	Passed
High-Temperature	**Method 501.7-Procedure II**	Passed
Vibration	**Method 514.8- Procedure I, Category 4**	Passed
Shock	**Method 516.8- Procedure VI**	Passed
Humidity	**Method 507.6- Procedure II**	Passed

Test Results

NUC Pro:

Test Tested Under	MIL-STD-810H	NUC 13 Pro	NUC 15 Pro	NUC 14 Pro AI
Altitude	**Method 500.6-Procedure I**	Passed	Passed	Passed
Altitude	**Method 500.6-Procedure II**	Passed	Passed	Passed
Low-Temperature	**Method 502.7-Procedure I**	Passed	Passed	Passed
Low-Temperature	**Method 502.7-Procedure II**	Passed	Passed	Passed
High-Temperature	**501.7 High Temperature Method 501.7-Procedure I**	Passed	Passed	Passed
High-Temperature	**Method 501.7-Procedure II**	Passed	Passed	Passed
Vibration	**Method 514.8-Procedure I, Category 4**	Passed	Passed	Passed
Shock	**Method 516.8-Procedure VI**	Passed	Passed	Passed
Humidity	**Method 507.6-Procedure II**	Passed	Passed	Passed

Test Results

NUC Pro+:

Test Tested Under	MIL-STD-810H	NUC 15 Pro+	NUC 14 Pro AI+
Altitude	**Method 500.6-Procedure I**	Passed	Passed
Altitude	**Method 500.6-Procedure II**	Passed	Passed
Low-Temperature	**Method 502.7- Procedure I**	Passed	Passed
Low-Temperature	**Method 502.7- Procedure II**	Passed	Passed
High-Temperature	**501.7 High Temperature Method 501.7-Procedure I**	Passed	Passed
High-Temperature	**Method 501.7-Procedure II**	Passed	Passed
Vibration	**Method 514.8- Procedure I, Category 4**	Passed	Passed
Shock	**Method 516.8- Procedure VI**	Passed	Passed
Humidity	**Method 507.6- Procedure II**	Passed	Passed

Test Results

NUC Performance:

Test Tested Under	MIL-STD-810H	NUC 15 Performance	ROG NUC (2025)
Altitude	**Method 500.6-Procedure I**	Passed	Passed
Altitude	**Method 500.6-Procedure II**	Passed	Passed
Low-Temperature	**Method 502.7- Procedure I**	Passed	Passed
Low-Temperature	**Method 502.7- Procedure II**	Passed	Passed
High-Temperature	**501.7 High Temperature Method 501.7-Procedure I**	Passed	Passed
High-Temperature	**Method 501.7-Procedure II**	Passed	Passed
Vibration	**Method 514.8- Procedure I, Category 4**	Passed	Passed
Shock	**Method 516.8- Procedure VI**	Passed	Passed
Humidity	**Method 507.6- Procedure II**	Passed	Passed