

# Toshiba notebooks - Tried and tested

Toshiba engineers are well known for their long history of testing systems thoroughly. With the introduction of the new notebooks featuring Toshiba EasyGuard for unprecedented mobility, enhanced data security, easy connectivity and advanced system protection, this characteristic has become more important than ever. Can they actually prove that these new technologies work as they claim they do?

This article aims at describing each of the tests performed internally by Toshiba engineers as well as the drop and spill tests performed by an external group, the TÜV Rheinland Group, an international technical services company specialising in product testing. All tests described here were performed on selected Toshiba notebooks units at design QA (Quality Assurance) time to confirm durability and reliability.

## Electronic shock test

Have you ever touched your car door handle and received an electric shock? If so, you have experienced electrostatic discharge, which is the static electricity released when two objects come into contact. Electrostatic discharge can also be released when you rest your hands on your notebook or from computer components touching each other.

The Toshiba electronic shock tests check for potential damage to the notebook after the models are subjected to a certain level of electrostatic aerial and contact discharge. Even after 4kV of contact and 8kV of aerial discharge, which is higher than the level normally encountered, the system work fine.

## TÜV Tests: - Spill and Drop

Not content to rely on its own internal testing, Toshiba asked for a second opinion. The TÜV Rheinland Group performed a quality criteria check on the Toshiba Portégé M300, including drop and spill-resistance tests.

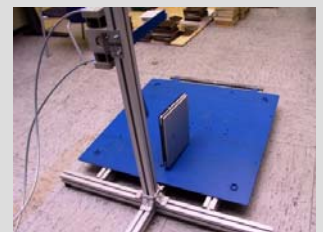
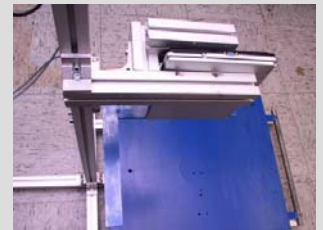
During the drop test, as the name implies, the notebook was dropped onto each of its 4 sides — right, left, back and front — from a height of 72 cm  $\pm$ 0,5 cm (the typical height of a desk) and from 90 cm  $\pm$ 0,5 cm onto a steel plate. The test was repeated three times for each height and side, and during each run the notebook was turned off and the LCD panel was closed.

After each trial, the notebook was turned on and the booting process evaluated: thanks to the advanced shock protection

system of the new notebooks, each run was successful, meaning that the LCD was intact and the operating system (Windows XP) started properly.

During the spill test, the notebook was turned on and connected to the power cord.

5 tests were performed with 10 ml, 20 ml, 30 ml, 40 ml and 50 ml ( $\pm$ 0,2 ml) of water spilled on the notebook between keys 'G' and 'H' — the middle of the keyboard. After each trial, the system was left running for three minutes — more than enough time to save all data and shut down the system. After the three minutes, the notebook was turned off, wiped with a dry paper towel or a cloth and left to dry for 24 hours. The computer booted successfully after each test run proving that a spill-resistant keyboard is no longer a myth.



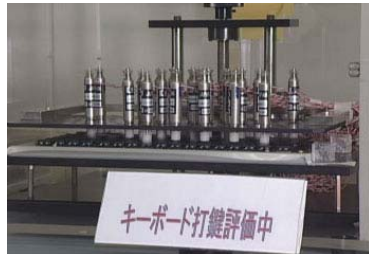
*Photos of drop test by TÜV on Portégé M300.*



*Photos of spill test by TÜV on Portégé M300.*

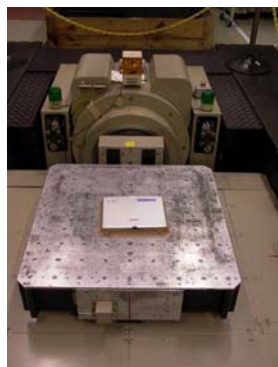
### Keyboard endurance and pressure test

For up to 8 hours a day, five days a week, the notebook's keyboard endures significant pressure from human fingers. During the keyboard endurance trials, Toshiba engineers test selected models by using keys would return to their previous position in a timely manner. As both tests are performed under conditions simulating more significant pressure than the kind experienced in a standard office setting, and the keyboards work fine after all trials, you can rest assured that your keyboard will not give out on you before your fingers do.



### HDD shock and vibration test

This test is meant to simulate an environment where your notebook would be subjected to continuous movement, such as in a car or on your knees. During the tests, for approximately 30 minutes, the system is placed on a floor that is vibrating at 500Hz — 500 vibrations per second. Although the notebook is turned on for the duration of the test and subjected to much higher vibrations than normally expected, there is no damage to the HDD (hard drive disk) and the stored data is not affected.



### Display open/shut durability test

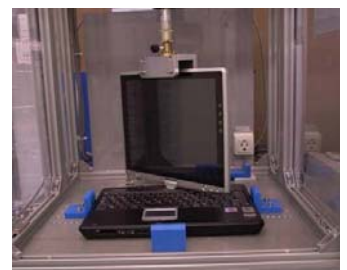
When you are on the go, you pick up your notebook numerous times throughout the day — and every time you open or close your display without paying much attention to it. A robust design needs to ensure that this process does indeed remain unnoticed.

The open/shut tests are based on the assumption that during 5 years the display is opened and closed not more than 20,000 times: 20 times per each of the 200 working days in a year. The torque strength is checked after test completion and the results indicated that even after 20,000 times, the open/close process is as inconspicuous as ever.



### Hinge open/close endurance test

Not only is the hinge utilized when the LCD is open and shut, but it is also subjected to considerable handling when the display is rotated. Based on 30% of the 20,000 times calculated above, the expected tablet rotation rate is 6,000 times. The results of this test have shown that the torque strength had not significantly changed even after 35,000 times — many more than a standard notebook will have to endure.



## Drop test

Heaving your notebook around increases the drop risk. As a result, Toshiba performs drop tests from a height of 30 cm for models over 1.5 kg and 40 cm for models less than 40cm.

During the drop, the LCD panel is closed and the notebook is turned off. The outcome

confirms the testing criteria: there is no damage to any of the notebook's hardware and software components after a drop on each of its 4 side surfaces and the HDD cover.

After a free fall from a one meter height, the results attested the Toshiba safety and boot requirements: other than slight body dents, the computer can be booted without problems and the LCD is intact.



## Pin-point pressure test

Although it generally alludes notice, notebooks endure significant daily pressure from palms and fingers. Toshiba test selected models for damage incurred as a result of pin-point pressure: 15 kg on a 16mm area simulating finger pressure; 25 kg on a 20mm x 60mm area simulating palm pressure on the HDD cover; and 25 kg on a 30 mm diameter area simulating pressure exerted as result of a person pushing down on an open LCD cover.

Although these estimates are much higher than the actual weight a system would be subjected to in a real setting, the models work fine after test completion, indicating that the new robust Toshiba notebooks take the worry out of the workday.

