

Which drop tests are mandatory for professional transport cases?

Transport cases must be able to withstand the shocks, drops and impacts that can occur during transport. That is why they are subjected to drop tests that test their resistance. These tests vary depending on the sector, application and international standards. Strict requirements often apply to defence, medical equipment or valuable technical instruments. In this article, we discuss which drop tests are mandatory, which standards apply and what the consequences are if your transport cases do not pass these tests.

What are drop tests for professional transport cases?

Drop tests are standardised tests in which transport cases are dropped from different heights and in different positions to determine whether they offer sufficient protection to their contents. The primary purpose of these tests is to evaluate the structural integrity of the case and its ability to protect the contents from shocks that may occur during transport. These tests simulate the realistic conditions to which transport cases are exposed during transport, such as falling from a loading platform, careless handling by personnel, or shocks during transport by road, air or sea. By simulating these conditions, manufacturers and users can be sure that their valuable or sensitive equipment will remain safe, regardless of the transport conditions. Drop tests examine various aspects:

- **Structural integrity** – Does the case remain intact after a fall?
- Closure mechanisms – Do the closures remain closed after impact?
- Watertightness – Does the case remain watertight after a fall?
- Protection of contents – Does the interior (such as foam) prevent the contents from being damaged?
- Reusability – Can the case still be used for its intended purpose after a fall?

For professional sectors such as defence, emergency services and the medical world, these tests are not only important, but often mandatory. The results determine whether a transport case is suitable for protecting mission-critical equipment that must function under challenging conditions.

Which international standards determine mandatory drop tests?

Various international standards prescribe specific drop test requirements. Which standards apply depends on the industry, the type of product and the method of transport. The following are the most important standards that prescribe drop tests for transport cases:

- **ISTA (International Safe Transit Association)** – This organisation has developed various test procedures, including the ISTA 3A and 3B procedures, which involve drop tests for transport packaging. These tests are particularly relevant for the logistics sector and e-commerce.
- **ASTM (American Society for Testing and Materials)** – Standards such as ASTM D5276 specify methods for drop tests of filled transport packaging.
- **ISO 2248** – This international standard describes vertical impact tests for transport packaging.
- **UN/DOT Hazardous Materials Regulations** – Strict drop test requirements apply to the transport of hazardous materials, whereby cases and containers must be able to fall from a height of 1.2 to 1.8 metres without being damaged.
- **IP ratings (Ingress Protection)** – Although primarily focused on protection against dust and water, some IP test procedures also include drop tests to test robustness.

Additional standards apply to specific industries:

- **Medical sector** – Standards such as ISO 11607 and ISO 13485 set requirements for packaging for medical devices, including drop tests.

- Aviation – IATA (International Air Transport Association) has specific requirements for packaging transported by air freight.
- Defence – MIL-STD-810 contains comprehensive drop test procedures for military equipment and packaging.

It is important to know which standards apply to your specific application, as non-compliance can lead to product rejection, transport problems or even liability in the event of damage.

How are mandatory drop tests carried out in practice?

Drop tests are carried out in specialised test facilities according to strictly defined procedures. The exact implementation varies depending on the applicable standard, but most drop tests follow a similar pattern:

1. **Preparation** – The transport case is filled with either the actual product or a simulation thereof with a similar weight and centre of gravity. The case is then closed as it would be during normal use.
2. **Conditioning** – In some cases, the cases are pre-conditioned at specific temperatures or humidity levels to simulate extreme conditions.
3. **Determining drop height** – Depending on the standard, the drop height usually varies between 70 cm and 1.8 metres. Higher drop heights may be required for military applications.
4. **Selecting drop positions** – Most test protocols require drops in different orientations:
 - Flat drop on bottom
 - Flat drop on lid/top
 - Drop on corners (often the most vulnerable points)
 - Fall on edges
 - Fall on closures or handles
5. **Performing the test** – The case is raised to the specified height and then released to fall freely onto a hard, non-resilient surface (usually concrete or steel).
6. **Inspection and assessment** – After each drop, the case is inspected for damage to the exterior, closure mechanisms and watertightness. The case is then opened to check the condition of the contents.
7. **Documentation** – All test results are documented, including photographs of any damage and measurements of deformation.

Modern test facilities often use high-speed cameras to record the exact behaviour of the case during impact. This helps to identify weaknesses in the design that can be improved. Some tests also use accelerometers in the case to measure the G-forces transmitted to the contents. A transport case passes the test if, after the drop series, it still fulfils its protective function, the contents remain undamaged, and the case itself is still usable according to the criteria of the relevant standard.

When do military drop test standards apply?

Military drop test standards, particularly MIL-STD-810 (Military Standard 810), apply when transport cases are used for defence purposes or when equipment must function under extreme conditions. These standards are considerably more stringent than commercial standards due to the demanding environments in which military equipment is deployed. MIL-STD-810 is mandatory in the following situations:

- **Defence contracts** – When supplying defence organisations such as the Ministry of Defence, equipment and associated packaging must often comply with MIL-STD-810 specifications.
- **Military applications** – For equipment used in combat situations, field operations or tactical environments.
- **Critical mission equipment** – For equipment whose failure could endanger lives or compromise missions.
- **International defence programmes** – When collaborating with NATO partners or other international defence organisations.

The MIL-STD-810 drop test procedure (Method 516.8) differs from commercial standards in several respects:

- Higher drop heights – Often 1.2 metres to 2.1 metres, depending on weight and application.
- More drop positions – Up to 26 different drop orientations may be required.
- Stricter evaluation criteria – Even minor damage that does not directly affect functionality can lead to rejection.
- Sequential tests – Drop tests are often combined with other tests such as vibration, temperature fluctuations and water resistance tests.
- Repeated drops – Some procedures require multiple drops in the same position to test material fatigue.

In addition to MIL-STD-810, other military standards may also apply, such as DEF-STAN (UK Defence Standards) or STANAG (NATO Standardisation Agreements). For [defence-specific packaging solutions](#), it is essential to determine in advance which military standards apply and to draw up a test protocol that complies with them. The certification process for military standards is often more extensive and requires more documentation than commercial certification. It is advisable to take these requirements into account early in the design process to avoid costly redesigns.

What are the consequences of failing to comply with mandatory drop tests?

Ignoring or failing mandatory drop tests can have far-reaching consequences, both in the short and long term. The risks range from financial losses to legal liability:

1. **Product damage and financial losses** – The most immediate consequence is damage to the transported equipment. For expensive medical, military or high-tech equipment, the costs of repair or replacement can be considerable.
2. Customer rejection – Professional customers, especially in regulated sectors such as defence and healthcare, often require certificates proving that transport cases comply with the relevant standards. Without these certificates, orders may be rejected.
3. Supply chain delays – Damaged products lead to delays, redelivery and possible production time loss for the end user.
4. Reputational damage – Repeated problems with transport damage can seriously damage confidence in your brand, especially in professional markets where reliability is crucial.
5. Legal liability – If damage to equipment leads to safety risks or if defective equipment is used without the damage being noticed, this can lead to liability claims.
6. Loss of certifications – In some industries, failure to comply with packaging standards can lead to the revocation of product or company certifications.
7. Higher insurance costs – Transport insurers may charge higher premiums or reject claims if packaging does not meet industry standards.

For defence applications, the consequences are even more serious. Equipment that is damaged during transport can fail in critical situations, potentially putting lives at risk. In addition, defence contracts can be revoked if a supplier is found not to comply with the required packaging standards. It is therefore important not to view drop tests as a bureaucratic hurdle, but as an essential part of quality assurance. By investing in transport cases that meet the relevant standards, you are not only protecting your products, but also your reputation, customer relationships and, ultimately, your bottom line.

Conclusion

Drop tests are an important part of quality assurance for professional transport cases. They guarantee that your valuable or sensitive equipment arrives safely at its destination, regardless of the challenges encountered during transport. Depending on your sector and application, various international standards apply, from ISTA and UN/DOT to the strict military MIL-STD-810 standard. Failure to comply with these standards can lead to product damage, customer rejection, legal problems and reputational damage. That is why it is wise to take drop tests seriously and invest in transport cases that offer proven protection. At Faes, we understand the complexity of these standards and the unique challenges of different sectors. Our packaging experts are

happy to help you determine the right drop test requirements for your specific application and develop transport solutions that meet all relevant standards. This way, you can be sure that your equipment will always arrive at its destination safely and ready for use.

Frequently Asked Questions

What is the difference between commercial and military drop tests?

Military drop tests (such as MIL-STD-810) are significantly more stringent than commercial tests. They require higher drop heights (1.2-2.1 metres vs. 70 cm-1.8 metres), more drop positions (up to 26 different orientations), stricter evaluation criteria, and often sequential or repeated tests. Military tests simulate extreme conditions and are designed for equipment that must function in demanding environments.

How do I prepare my transport case for a drop test?

Proper preparation is essential for optimal drop test results. Ensure adequate internal protection, such as custom foam inlays that support the equipment at multiple points. Place heavier items in the centre of the case, not at the edges. Test with the actual weight and centre of gravity of your equipment. Before the test, check that all closures are functioning properly and that the case is closed according to specifications.

Which materials offer the best protection against drop impact?

High-quality transport cases usually combine different materials for optimal protection. Rotation-moulded polyethylene offers excellent shock absorption and durability. Closed-cell polyethylene foam and polyurethane foam with different densities are ideal for internal protection. Some cases also contain elastomer corner protectors or shock absorbers that can significantly reduce G-forces and protect critical components.