

# How do you optimize case design for stackable storage?

Optimising case design for stackable storage is all about striking the perfect balance between functionality, protection and space efficiency. Strategic design allows you to maximise storage capacity without compromising the protection of your valuable equipment. The right choice of materials, weight distribution and modular construction are essential here. Let's take a closer look at how you can optimise the design of your cases for stackable storage.

## What are the basic principles of stackable case design?

Stackable case design is based on three fundamental principles: structural integrity, load capacity and stability. Structural integrity ensures that cases do not deform under pressure, which is important for long-term stacking. Load capacity determines how much weight a case can carry without collapsing. Stability prevents stacked cases from shifting or falling during transport or storage.

For an optimal stackable design, it is important to pay attention to:

- **Reinforced corners and edges** that can absorb the impact of stacking
- Flat, sturdy top and bottom that provide a stable contact surface
- Interlocking mechanisms such as protruding edges or recessed parts that interlock
- Uniform dimensions that fit standard means of transport and storage spaces

The ergonomics of the design also play an important role. Handles should be positioned so that they do not interfere with stacking but remain accessible. When designing stackable cases, it is important to consider the entire life cycle of the product – from production and transport to use and storage.

## Which materials perform best for stackable storage?

The choice of material for stackable cases is crucial for both durability and functionality. Different materials offer specific advantages depending on the application, environment and protection requirements.

For industrial stackable storage, these materials perform best:

- **Rotation-moulded plastic** – offers an excellent combination of lightweight strength, durability and weather resistance
- **Aluminium** – ideal for applications where weight reduction is important without compromising on strength
- **Wood** – traditional material that still performs excellently for heavy loads and specific military applications
- **Composite materials** – offer superior strength-to-weight ratio for specialist applications

When selecting materials for stackable cases, you need to consider factors such as temperature resistance, chemical resistance and electrostatic properties. High-tech equipment or defence applications often require specific materials that meet strict standards such as MIL-STAN certifications.

The choice of material also directly influences stacking properties. Materials with high rigidity ensure less deformation under load, which is essential for safe long-term stacking.

# How does weight distribution affect the stackability of cases?

Weight distribution is one of the most underestimated but critical aspects of stackable case design. An uneven weight distribution can lead to instability, increased wear and tear, and even dangerous situations during transport and storage.

For optimal stackability, you should pay attention to:

- **Centre of gravity calculation** – the centre of gravity should be as central as possible for maximum stability
- Even distribution of contents across the bottom of the case
- Strategic placement of heavy components closer to the bottom
- Compartmentalisation that prevents shifting of contents during transport

When designing cases for stackable storage, it is important to take into account both the empty weight and the filled weight. A case that is perfectly stackable when empty can still become unstable if loaded incorrectly.

Internal structures such as dividers or custom-made foam interiors not only help to protect the contents, but also contribute to better weight distribution. These interiors ensure that equipment stays in place and the centre of gravity remains consistent, even during rough handling.

## What are the advantages of modular case designs?

Modular case designs offer significant advantages in terms of logistical efficiency and storage flexibility. By choosing a modular system, you create a standardised approach that is both practical and cost-effective.

The main advantages of modular case designs are:

- **Maximum space utilisation** in warehouses and during transport
- Flexibility to create different configurations for a variety of products
- Simpler inventory management thanks to standardised dimensions
- Improved logistics planning due to predictable volumes
- Possibility to expand or adapt the system as needs change

Modular systems work with standardised basic dimensions that are coordinated with each other. This allows you to stack different sizes of cases perfectly without wasting space. This principle is often seen in the defence industry, where efficient use of space during transport is crucial.

A good modular design also takes future needs into account. By choosing a modular system now, you can easily expand later without compatibility issues. This makes modular case designs not only practical, but also a sustainable choice for defence and security applications where equipment is regularly upgraded or modified.

## When should you opt for custom foam interiors?

Custom foam interiors are a valuable investment when transporting and storing fragile, expensive or precision equipment. These tailor-made interiors not only offer superior protection, but also contribute to the stackability of your cases.

You should opt for custom foam interiors in the following situations:

- When transporting high-quality electronic equipment that is sensitive to shocks

- For precision instruments that must remain precisely calibrated
- **For irregularly shaped items** that are difficult to secure with standard solutions
- When different components need to be organised in a single case
- For equipment that needs to be protected against electrostatic discharge

Custom foam interiors contribute to better stackability by:

1. Securing the contents so that the centre of gravity remains stable
2. Absorbing shocks and vibrations that would otherwise disrupt the stacking structure
3. Preventing the contents from shifting during transport
4. Distributing pressure evenly across the entire bottom of the upper case

Custom foam interiors are often indispensable for defence applications. They can be designed according to specific military standards and provide the necessary protection for sensitive equipment under extreme conditions.

## Conclusion

Optimising case design for stackable storage requires a thoughtful approach that takes into account structural integrity, material selection, weight distribution and modular compatibility. By carefully weighing these factors, you can create a storage system that is not only space-efficient, but also provides maximum protection for your valuable equipment.

At Faes, we understand that every sector has its own unique challenges when it comes to packaging, transporting and storing equipment. Whether it's high-tech components, medical equipment or defence equipment, we design and develop packaging solutions that perfectly match your specific needs. Our expertise in stackable case design helps you not only to optimally protect your products, but also to streamline your logistics processes.

## Frequently Asked Questions

### **What are the most important factors when choosing closures for stackable cases?**

When choosing closures for stackable cases, you should consider durability, ease of use and stacking compatibility.

Opt for recessed closures that do not protrude during stacking, robust locking mechanisms that cannot open spontaneously during transport, and closures that are resistant to vibration. For demanding environments, butterfly closures or rotational locks are recommended due to their superior resistance to shock and vibration.

### **How can I modify my existing cases for better stackability?**

Existing cases can be improved by installing stacking aids such as corner protectors with stacking features, anti-slip mats on the top and bottom, or by retrofitting stacking corners. For cases without an interlocking system, you can use aftermarket stacking connectors or tension straps. Also consider rearranging the internal space with customised foam to optimise weight distribution, which significantly improves stacking stability.

### **Which certifications are important for stackable cases in the defence industry?**

Various certifications are crucial for the defence industry: MIL-STD-810 for environmental resistance, DEF-STAN 81-41 for rough handling, IP67/IP68 for water and dust resistance, and STANAG 4340 for compatibility with NATO standards. In addition, ATA-300 is important for air transport, and UN certification for the transport of hazardous substances. These certifications guarantee that the cases retain their stackable properties under extreme conditions and adequately protect their contents.