Shell-Case™

Material Selection Guide for Case Manufacturing

INTRODUCTION

In the fast-evolving device manufacturing industry, the right protection for your devices is critical. At Shell-Case, we understand that your innovations are not just products; they're the result of your dedication and expertise. That's why we offer more than just cases; we provide solutions that highlight your brand's commitment to quality and innovation.

It's essential to have a materials guide that reflects the latest advancements and trends in materials technology. Our guide is designed to help you navigate these choices, ensuring your medical devices are encased in quality that speaks for itself.

Choose Shell-Case, where protecting your product goes hand in hand with enhancing your brand's reputation.

THIS GUIDE COVERS

SECTION 01

POLYMERS

SECTION 02

TEXTILES

SECTION 03

METALS

ABOUT US

At Shell-Case, we understand the importance of not just meeting, but exceeding the expectations of our clients. Our commitment to innovation, quality, and protection is at the forefront of everything we do, ensuring your products are not just safeguarded, but also presented in a manner that elevates your brand.

The need for a Materials Selection Guide has never been more critical.

The landscape of manufacturing materials evolves swiftly, and staying ahead with the most advanced, durable, and compliant options ensures your medical devices remain competitive and secure.

Shell-Case™

WHY WORKING WITH SHELL-CASE SETS YOU APART

Trusted by Industry Leaders

We design and manufacture cases for global leaders in medical device manufacturing, consistently supplying them for decades. Our products meet ISO 13485 standards, earning the trust of the industry through our commitment to consistency and excellence.

Comprehensive Expertise

From the initial spark of an idea to the final product, Shell-Case is with you at every stage. Having honed our process through hundreds of projects, we've developed a four-step methodology to ensure each phase is executed flawlessly. We manage all aspects in-house, offering personalized guidance and expertise. This way, you can rest easy knowing your project is in expert hands without the need for external specialists.

Pushing the Boundaries

At Shell-Case, we're not just creating products; we're creating possibilities. By integrating a diverse array of technologies and materials into each case, we tailor solutions that do more than meet your needs—they surpass them. With us, the possibilities are limitless.

Choosing Shell-Case means partnering with a team that puts your brand and your products first. Our expertise and commitment to quality ensure that your devices are not just protected but also presented in a way that showcases their true value.

MATERIAL GROUP 1: POLYMERS

Properties and Benefits:

Polymers like Polycarbonate, ABS, Polypropylene, Polyethylene, and Polyamid (Nylon) offer a range of benefits including high impact resistance, durability, precision, cleanability and flexibility. They are lightweight, making them ideal for portable medical devices.

Another ideal benefit is that they're a great material for mass production, and they're low cost when compared to most other options and are recyclable.

Applications and Use Cases:

These materials are suited for cases that need to protect sensitive medical equipment from drops, shocks, contamination, and environmental factors.

Their versatility allows for use in a wide range of medical devices, from small portable monitors to larger diagnostic equipment.

Aesthetic options:

Polymers can be easily molded and colored, offering a wide variety of aesthetic options. This allows for customization in terms of colors, textures, and finishes to match brand identity or to differentiate products in the marketplace.

TYPES OF POLYMERS

Polycarbonate (PC): A durable material known for its high impact resistance, clarity, and Thermal resistance, making it ideal for protective cases.

ABS (Acrylonitrile Butadiene Styrene): A common thermoplastic known for its strength, rigidity, and toughness, suitable for cases requiring durability and a lower cost.

Polypropylene (PP): Known for its flexibility,chemical resistance, and toughness, polypropylene is lightweight and often used for cases that need to withstand rough handling.

Polyethylene (PE): Offers excellent durability and is resistant to moisture and chemicals. It's available in various densities, providing options from flexible to rigid cases.

Polyamid (Nylon): Distinguished by its strength, temperature resistance, and durability, nylon is used for cases that require a balance of strength and flexibility.

HELPFUL BREAKDOWN OF POLYMER OPTIONS

Material	PC (Polycarbonate)	ABS	PP (Polypropylene)	PE (Polyethylene)	Nylon (Polyamide)
Cost	High	Medium	Low	Low (varies by type)	Medium-High
Strength	very high	Medium-High	Medium	Low-Medium (varies by type)	Medium-High
Impact Resistance	Excellent	Good	Medium	Varies (HDPE is tougher)	Good
Durability	Excellent (UV sensitive)	Good (UV sensitive)	Good	Good (chem. resistance varies)	Excellent (resistance varies by type)
Weight	Medium	Medium	Low	Low-Medium	Medium
Flexibility	Rigid	Medium	Medium-High	Varies (LDPE is most flexible)	Varies

SHELL-CASE'S POLYMER EXPERTISE

It's the EMS Medical Gear Backpack

A great example of a polymer case that showcases Shell-Case's expertise is the EMS Medical Gear Backpack. This product is built from a vacuum-formed polycarbonate shell, providing superior protection for sensitive medical devices.

It's designed to be lightweight and wearable, with features that ensure quick and easy access to medical equipment, along with materials that are easily cleaned and sterilized, including visible exterior indicators for battery status and condition. This case exemplifies Shell-Case's ability to meet the critical needs of first responders with innovative design and material selection.

https://shell-case.com/project/ems-medical-gear-backpack/

EXEMPLARY CUSTOMIZATION: THE PROFESSIONAL TECHNICIAN'S CARRYING CASE

Our Custom Carrying Case is meticulously crafted for professional technicians, particularly electricians. This robust, heavy-duty plastic-injected case is designed to store, organize, and transport a comprehensive set of working tools. It features large wheels for easy maneuverability, even up stairs, expansive space to accommodate additional components, and a built-in organizer to maintain tool order efficiently. Additionally, this versatile case doubles as a stool with a height of 50 cm, equipped with foldable legs that adjust to various heights for optimal convenience. This product exemplifies Shell-Case's dedication to providing bespoke solutions that combine practicality with the highest standards of quality and safety. For more details on this project, visit Shell-Case Project Page.

https://shell-case.com/project/custom-carrying-case-for-professional-tool-case/

ARE POLYMER CASES RIGHT FOR YOU?

Choosing a polymer for your custom carrying case should be guided by the specific needs of your device. Polymers like polycarbonate are ideal for devices requiring a lightweight case with high impact resistance.

Whereas ABS offers a balance of strength and cost-efficiency, suitable for robust, everyday use cases. Polypropylene and polyethylene are excellent for lightweight, durable cases with chemical resistance.

Nylon (Polyamid) is best when high strength and flexibility are crucial. Consider the environmental conditions, durability requirements, and aesthetic desires of your product to select the most appropriate polymer.

Want to talk to a Shell-Case Team Member Right Now?

Ready to elevate your medical devices with a custom case that combines durability, functionality, and aesthetics?

Contact Shell-Case today to explore the advantages of polymer-made cases tailored to your needs, and discover how our expertly crafted solutions can protect and enhance your products.

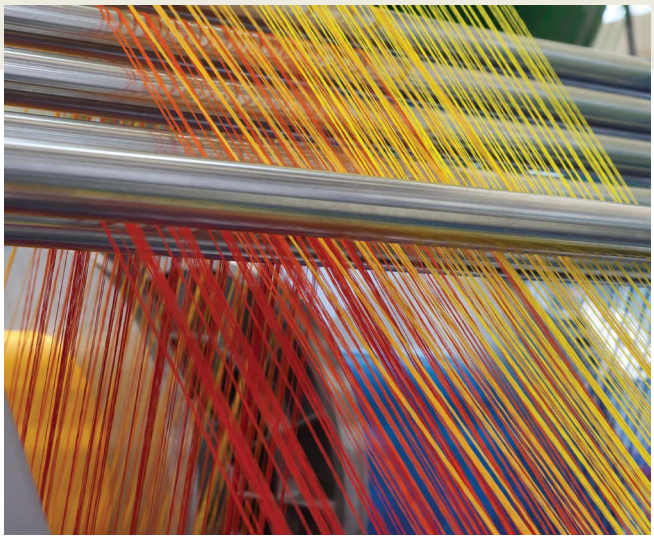
Contact Us

MATERIAL GROUP 2: TEXTILES

Properties and Benefits:

Textiles like Polyester, Polyamid (Nylon), Cotton, Polypropylene, and Linen offer unique advantages including breathability, flexibility, and lightweight properties. They are excellent for cases that need to be user-friendly, comfortable to carry, and provide a level of cushioning for the device inside. Textiles are often combined with other materials such as EVA or PU foam, this enables constructive and useful case with a soft look.

A notable additional benefit of using textiles is that it doesn't require any production tooling work. This may shorten project lead time and allow for greater flexibility in case dimensions.



Applications and Use Cases:

Textile cases are particularly suited for devices that are frequently transported or carried by users, such as portable monitors, wearable medical devices, and soft medical equipment bags. Their adaptability allows for enhanced user comfort and convenience.

Aesthetic Options:

Textiles offer a vast range of customization options in terms of colors, patterns, and textures. This versatility enables brands to align the case design closely with their corporate identity or to make the product more appealing to the end-user.

TYPES OF TEXTILES

Polyester: Durable, resistant to stretching and shrinking, and quick-drying, making it ideal for outdoor or rugged use cases.

Polyamid (Nylon): Offers excellent abrasion resistance and strength, suitable for heavy-duty applications.

Cotton: Provides a natural, soft feel, ideal for cases where comfort and breathability are key.

Polypropylene: Known for its lightweight, resistant properties, perfect for easy-to-clean cases.

Linen: Offers a distinctive natural texture and high durability, suitable for eco-friendly case solutions.

HELPFUL BREAKDOWN OF TEXTILES OPTIONS

Property	Polyester	Polyamide (Nylon)	Cotton	Polypropylene	Linen
Source	Synthetic (petroleum based)	Synthetic (petroleum based)	Natural (plant-based)	Synthetic (petroleum based)	Natural (plant-based flax fibers)
Strength	High	Excellent	Moderate	High	Moderate
Durability	Very good	Excellent	Good	Good	Good
Abrasion Resistance	Very good	Excellent	Moderate	Good	Moderate
Moisture Wicking	Excellent	Good	Excellent	Excellent	Excellent
Wrinkle Resistance	Excellent	Good	Poor	Moderate	Poor
Softness	Moderate (can vary)	Moderate (can vary)	Very soft	Moderate	Soft, but can feel rough
Breathability	Moderate	Moderate	Excellent	Moderate	Excellent
Warmth	Can provide insulation	Can provide insulation	Moderate Insulation	Can provide insulation	Lightweight poor insulation
Stretchiness	Some stretch	Some stretch	Minimal stretch	Minimal stretch	Minimal stretch
Cost	Inexpensive	Moderate	Moderate	Inexpensive	Relatively Expensive

SHELL-CASE'S
TEXTILES SOLUTIONS

Grab-and-go carrying case made from reinforced textile

Shell-Case showcases its expertise and innovative use of textile materials through two remarkable projects. One great example is the Carrying Case for Portable Ultrasound Device.

This project involved creating a grab-and-go carrying case made from reinforced textile, utilizing sewing technologies. Shell-Case developed a unique honeycomb construction from lightweight polycarbonate to provide lightweight construction , ensuring the case maintains its shape and protective properties.

The stitched interior includes multiple compartments for clever organization and easy access to the device and its accessories, demonstrating Shell-Case's ability to blend functionality with smart design.

https://shell-case.com/project/portableultrasound-device-carrying-case/

Medical Device Backpack

A second use case that really showcase's textiles' potential is the Medical Device Backpack for Everyday Use.

Designed for devices used by patients 24/7, this backpack addresses the challenge of preventing device overheating while ensuring the carrying solution is stylish, comfortable and discreet.

Shell-Case used advanced textile fabrics with passive ventilation capabilities to deliver a cooling effect, making the backpack functional yet fashionable. The fabrics selected are easy to clean and designed to blend with a variety of outfits, maintaining patient privacy and dignity.

https://shell-case.com/project/medical-device-backpack-for-everyday-use/

ARE TEXTILES CASES RIGHT FOR YOU?

Choosing a textile for your custom carrying case should be influenced by the need for comfort, lightweight, and a user-friendly design.

Consider the textile's durability, ease of maintenance, and how well it can be tailored to fit the aesthetic and functional needs of your medical device.

Want to talk to a Shell-Case Team Member Right Now?

Discover how Shell-Case's custom textile solutions can enhance the portability and user experience of your medical devices. Contact Shell-Case to discuss how our innovative, tailor-made textile cases can meet your specific needs with style and functionality

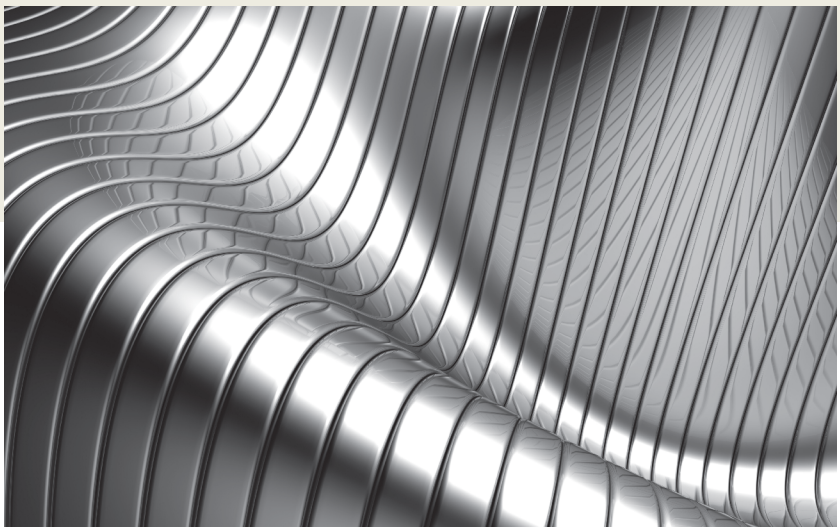
Contact Us

MATERIAL GROUP 3: METALS

Properties and Benefits:

Metals such as Aluminium, Steel, Zinc, Brass, and Magnesium offer exceptional durability, strength, and resistance to environmental conditions.

They are ideal for high-end medical devices requiring maximum protection, electromagnetic immunity , and auto-claving sterilization.



Applications and Use Cases:

Metal cases are primarily used for high-value medical equipment that demands robust protection and security. They're suitable for sensitive devices like surgical instruments, and diagnostic equipment that require shielding from external elements or autoclaving sterilization.

Metals, due to their strength, are also an ideal selection for specific case components such as robust handles and shoulder straps connections.

Aesthetic options:

Metals provide a premium look and feel, with options for anodized finishes, powder coating, and brushed or polished surfaces.

This allows for customization in appearance to uphold brand prestige or for devices to stand out in a clinical setting.

TYPES OF METALS

Aluminum: Lightweight yet strong, offering excellent protection and heat dissipation qualities. It's often used for cases that need to be portable yet protective.

Steel: Known for its unmatched strength and durability, ideal for cases that require the utmost protection against physical and environmental stress.

Zinc: Offers great corrosion resistance and is typically used in die-casting for complex shapes and durable components.

Brass: Not only corrosion-resistant but also antimicrobial, making it suitable for medical environments. It's used for specialized medical equipment cases.

Magnesium: The lightest of all structural metals, providing significant strength without adding weight. It's used for lightweight, durable cases.

HELPFUL BREAKDOWN OF METALS OPTIONS

Property	Aluminium	Steel	Zinc	Brass	Magnesium
Density (g/cm^3)	2.7	7.8	7.1	8.5	1.7
Strength	Moderate to High	High	Moderate	Moderate to High	High (for its weight)
Corrosion Resistance	Excellent	Varies (needs coatings)	Good (needs coating)	Good	Poor (needs coatings)
Ductility/ Malleability	Very good	Varies	Brittle (at room temp)	Good	Moderate
Thermal Conductivity	Excellent	Moderate	Moderate	Good	Good
Electrical Conductivity	Excellent	Moderate	Moderate	Good	Good
Cost	Moderate to High	Low to Moderate	Moderate	Moderate to High	High

SHELL-CASE SHINES WITH METALS

High End Charging Carrying Case For Electronics

Another excellent example is the Sennheiser case - the handle is made of die cast Aluminium to provide a luxury look yet rigid handle to secure the case while carrying it from place to place.

EMS Medical Gear Backpack

The stainless steel connectors are used to secure the connections of the straps to the case while using it in harsh environment.

ARE METAL CASES RIGHT FOR YOU?

Selecting a metal for your custom carrying case hinges on the need for supreme durability, security, and protection from external elements.

Aluminum and magnesium are perfect for lightweight, portable cases, while steel, zinc, and brass offer additional strength and protection for stationary or sensitive devices.

Consider the level of protection, thermal management, and electromagnetic interference shielding required for your device to determine the most suitable metal.

Want to talk to a Shell-Case Team Member Right Now?

Elevate the protection and presentation of your devices with a custom metal case designed to meet the highest standards of durability and aesthetics.

Reach out to Shell-Case today to learn how our bespoke metal solutions can safeguard your products with unmatched quality and style.

Contact Us

SELECTING THE RIGHT MATERIALS FOR YOUR PROJECT

Choosing the right material for your medical device melds practicality with vision, striking a balance between functional requirements and the aspirations you hold for your product.

Consider key factors such as weight, durability against impacts, resistance to chemicals, and environmental resilience.

Our role is to guide you through this decision-making process, ensuring the materials selected not only meet your device's technical needs but also align with the broader goals you envision for your product's success.

Matching Your Needs to the Right Materials

As we delve into the specifics, it becomes clear that the choice of material—from the durability of metals and the adaptability of polymers to the comfort of textiles—
plays a pivotal role in your product's market positioning.

We're here to provide insights into how different materials can meet your device's unique requirements, focusing on attributes like strength, flexibility, and aesthetics.

Our goal is to empower you with knowledge, enabling informed decisions that enhance your device's performance and market appeal, while maintaining a professional yet approachable demeanor in our guidance.

DON'T FORGET THESE THREE CONSIDERATIONS

Compliance and Standards: navigating the complexities of industry standards and compliance, including ISO13485, REACH, ROHS, CAL65, and Biocompatibility Standards.

1. Manufacturability: How the choice of material affects the manufacturing process, costs, and scalability.
2. Brand Representation: Selecting materials that align with your brand's image and values.
3. Shell-Case's commitment to innovation, quality, and partnership ensures that your medical devices are not only protected but also perfectly presented.

Ready to learn more about how Shell-Case can help you?

Contact Us

Shell-Case™