
ECS PRODUCT SHOWCASE
ECS
PROTECT

PROTECT

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ISO 9000 Compliant | Patents Pending | US Patent 7,537,119

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Introduction

Founded in 1954, ECS is an internationally respected designer and manufacturer of reusable containers and enclosures for equipment of all kinds. ECS is also an experienced custom molder of thermoplastic and thermoset composite parts, possessing one of the nation's largest compression molding presses. Additional techniques for molding thermoplastic materials and fabricating metal products add diversity to the company's core capabilities. The company's reputation for protecting customer equipment is maintained by the efficient use of a sophisticated manufacturing management system and by a dedicated team of employees. Headquartered in Grants Pass, Oregon, ECS maintains strict compliance with environmental quality regulations and is recognized for its service to community and country.

[MISSION]

ECS engineers and manufactures solutions to protect customers' valuable equipment. We will create any application for all packaging needs, ensuring uncompromised protection.

[PROMISE]

For customers who demand proven payload protection, ECS provides innovative custom packaging solutions backed by advanced engineering, superior materials, and manufacturing expertise for any project or in any environment.

ECS Engineering: Setting the Standard

ECS has been a recognized leader in the protective enclosure industry because of its unique engineering-based approach to container design. With a major emphasis on performance and quality, ECS continually strives to identify innovative new products and applications, thanks in large part to an imaginative and forward thinking team of engineers.

ENGINEERING CENTER CAPABILITIES

For more than 60 years, ECS has relied on its engineering and tooling expertise to address unique applications. The company set the standard in 1969 when it invented and patented the 19" Rackmount case concept, revolutionizing electronic systems deployment and operation. With many of ECS' reusable containers specifically designed for sensitive military electronic and other equipment, ECS products are explicitly designed and manufactured to meet stringent applicable military standards and specifications. The engineering and design team maximize their aptitude by performing ongoing Solidworks training and running theoretical scenarios on Finite element analysis simulation software. ECS also has an on-site testing lab that is utilized by the research and development team for environmental, vibration and drop testing.

ECS ADVANTAGE

ECS is the point of contact from start to ship. We have our own machine shop to custom manufacture all tooling, as well as families of electronic equipment enclosures, transit cases, EMI/RFI shielded products, conductive thermoplastic moldings and proprietary end-user products. We control the quality of all of our cases produced, providing the consistency expected from any product purchased. Certification and testing is available for all appropriate U.S. MIL Specs including MIL-STD-108, MIL-T-28800, MIL-C-4150, and MIL-T-3734, quality assurance system MIL-I-45208, and test procedures meeting FED-STD-101 and MIL-STD-810.

MATERIAL EXPERTISE

ECS features four product lines: Fiberglass Reinforced Polyester (FRP), Thermo-Stamped Composites (TSC), Rotationally Molded Polyethylene (Rotomold) and Vacuum Infused Process (VIP). Our team of engineers and drafters look at each application separately and decide which material will provide the optimum amount of protection.

ECS Featured Highlights

1969

ECS invents and patents the 19" Rackmount case concept, revolutionizing electronic systems deployment and operation. The original Fiberglass Reinforced Polyester composite rackmount cases begin our march toward dominance of the military rackmount case market.

US Patent Number 3,482,895

1985

Introduction of Thermo Stamped Composite (TSC) transit case material, molded on hydraulic presses up to 1,200 tons in capacity. TSC provides an unsurpassed combination of low weight and high strength/impact resistance. TSC shipping cases and rackmount cases perform at extreme temperatures, making ECS cases the preferred solution for worldwide military applications.

2000

Development of shock isolated Slide-Out-Rack rackmount cases, offering major labor savings during equipment installation, cable routing and maintenance.

"Stacking-Rack" electronic rackmount cases feature removable, sealed TSC panels on all six faces of the rackmount frames. These extremely compact rackmount cases stack and lock together when the TSC panels are removed and are fully transportable and waterproof with TSC panels installed.

2004

Introduction of Loadmaster® modular cases: Loadmaster® rotationally molded shipping cases are dimensionally integrated and employ identical molded-in stacking features. Cases of different sizes interlock when stacked together, making transportation and tactical operation of military electronic systems safe and space efficient.

US Patent 7,537,119/RE44/656

2008

Carbon Fiber Cases are introduced as the latest advancement in Rackmount and Transit case technology. The cases are manufactured by compression molding carbon fiber with enhanced thermoset resins. Carbon Fiber Rackmount and Carbon Fiber Shipping Cases are extremely light weight, with as much as a 30 percent weight reduction, and demonstrate exceptional structural rigidity.

2010

Commercial off the Shelf (COTS) line of cases become available with standardized features and rapid turnaround.

Loadmaster® Shipping Cases include Single Lid Cases, Footlocker Cases, Weapons Cases, and more. Loadmaster® Rackmount Cases are available with specialized options like I/O panels and louvered vents, for shipment within 5 to 10 business days.

US Patent 7,537,119/RE44/656

2011

Outdoor Cases, Rifle Cases, and Gear Boxes are introduced. The Loadmaster® Half Rack Case is also launched providing full protection for smaller electronic gear. Slide-out 9.5-inch racks allow unlimited access to electronic equipment during installation, integration, and maintenance. Half Rack Cases provide maximum sway space inside the smallest, lightest, toughest rackmount enclosures available anywhere

Patents Pending

2013

VIP is unveiled in a new frontier of custom cases. The VIP containers are large, uniquely crafted systems designed to provide the ultimate protection for storing and shipping oversized equipment. This new product line is especially suited for container systems that are 4'x4'x4' and larger for use in markets including UAV, aerospace, military, mining, and construction.

Patents Pending

2017

With a strong push toward ultra-light weight, stow-and-go for communication equipment, ATA VIP Carbon Fiber Cases are developed. These cases were designed for stowing in overhead compartments of most commercial airlines, as well as surviving in the unforgiving conditions of austere environments.

Patents Pending

2018

The drive toward small - form - factor, prompts ECS to create the Fusion Third Rack System. The Fusion Third Rack is platform independent and interchangeable in our Loadmaster® Rackmount Cases, Carbon Fiber toteable ATA cases, or supported in our Loadmaster® Rotomold Cases.

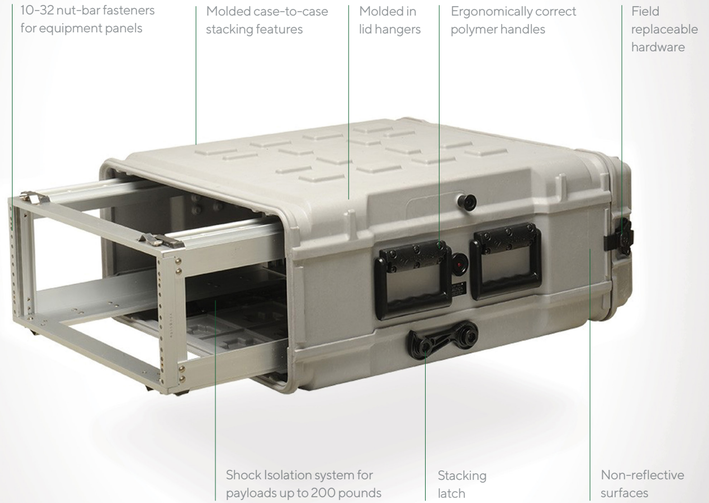
Patents Pending

Three Generations of Engineering the Most Innovative, Ruggedized Packaging Solutions.

For even more about ECS, visit **ecscase.com**

Rackmount

[CASES]



Rackmount Features

- Performance verification to MIL-STD 810G
- Modular case-to-case stacking with Loadmaster® Rackmount or rotomold cases made by ECS
- Ergonomically correct polymer handles
- Molded-in lid hangers (on full size units only)
- Nesting lids
- Field replaceable hardware
- Slide or fixed mounted lightweight aluminum frame
- 10-32 nut-bar fasteners for equipment panels
- Slides and quick-release fasteners allow CEA compliant rack to be easily removed from and securely - reinstalled into center body
- One automatic air pressure relief valve and butterfly latches
- Loadmaster® Rackmount and Half Racks usually ship within 10 business days.

PRODUCT ADVANTAGES:

- High impact, light weight, comparable to Kevlar laminates.
- The closure may be molded in, eliminating aluminum extrusion bending and gluing operations.
- Inserts and special features can be molded into the case minimizing the need for penetrating fasteners.
- Rapid molding cycles - 1 to 3 minutes.
- Low material shrink rate permits wall thickness variations with minimum sink.

Rackmount Protection

ECS Rackmount cases are the toughest, lightest, most protective, portable military electronic enclosures anywhere. They are extremely durable in any environment. The slide-out rack can be unlatched and removed from the outer case when the rack is empty or when it is filled with electronic equipment. Slide-out, 19-inch racks allow unlimited access to electronic equipment during installation, integration, and maintenance. Ruggedized ECS Rackmount Cases have been the choice of American warfighters for more than 50 years.

Rackmount cases are manufactured from ECS' incredibly strong and durable TSC (Thermo Stamped Composite) material. Using compression molding presses up to 1,200 tons in capacity, ECS manufactures these cases of the same composite materials used for car bumpers and military truck components. TSC case shells provide extraordinary impact resistance and rugged durability at temperatures which exceed a range of -65° F to +185° F.

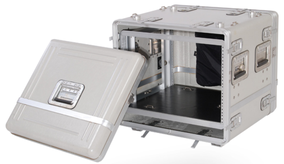
MATERIALS AND MOLDING PROCESS

TSC is a fiberglass reinforced thermoplastic polypropylene composite. The composite is available with 30, 40, 42 and 49 percent (by weight) reinforcements of continuous strand fiberglass. It is compression molded using matched metal tooling. The material offers performance characteristics similar to FRP but is lighter in weight and utilizes different compression molding techniques and tooling. The TSC process allows closures, fasteners, and other features to be molded into the finished case. Some part flexibility can be "designed in" but tools are typically dedicated to a single part size/configuration. Two molds are usually required for case applications where the top and bottom have unequal depths and the resulting parts can seldom be modified for other applications. Like FRP, the pigment is an integral part of the material.

The TSC manufacturing process is done in three steps: 1) Molding. The TSC process uses different compression molding techniques than FRP. Matched metal molds are needed and consist of a core, which is mounted on a stationary (lower) press platen and a cavity which is mounted on the moving (upper) platen. This molding process generally requires steel tools, but ECS has developed a mold design that uses less expensive aluminum tooling. The material is cut into predesigned configurations and sent through an oven and heated until the material fluffs. The hot material is then placed on top of the tool and the cavity is lowered to preset tonnage/pressure specifications. 2) Assembly. The hardware is added to the case along with any foam cushion work or customization. ECS has developed hardware for TSC cases that eliminates the need for rivets or other penetrating fastener. 3) Quality Assurance. Inspections are made to ensure finished products meet or exceed customer requirements.

Rackmount

[CASES]



Custom FRP Rackmount

Custom Rackmount cases provide a balance of rugged durability, sizing options, and effective shock and vibration protection. The FRP material used in these Rackmount cases allows great design flexibility for military and industrial electronic applications. Compression molded FRP parts have 65% glass fiber reinforcement in a thermoset polyester resin base, and they are extremely impact resistant. These ruggedized Rackmount cases provide unparalleled design flexibility and can be configured for nearly any scenario. Watertight Rackmount cases provide protection from moisture, salt spray, sand and dust throughout the world's climate extremes. Impervious to fuels, oils and solvents, they can also be decontaminated if exposed to chemical warfare agents.

- *FRP Composite material*
- *Hermetically sealed*
- *Extremely temperature resistant, exceeds range of -65°F to +185°F*
- *Exceeds drop, transportation vibration, and cargo bounce tests*
- *CEA-310 Rack*
- *Recessed, stainless steel hardware*
- *Two removable covers to allow electronic equipment to be accessed from front or back*
- *Optional case-to-case stacking rails*

Carbon Fiber Rackmount

ECS manufactures these lightweight cases by compression molding carbon fiber reinforcement materials with enhanced thermoset resins. Carbon Fiber Rackmount Cases are ultra lightweight and demonstrate exceptional structural rigidity.

Carbon Fiber rackmount cases are available in three styles. 2000 Series rackmount cases have rigidly mounted racks, without shock mounts. 4000 Series and 5000 Series rackmount case styles have shock mounts. 4000 Series compact rackmount cases have multi-axis shock/vibration mounts. 5000 Series full-size rackmount cases provide a balance of compact size and effective shock and vibration protection. 3000 Series is ideal for large payloads and have the largest range of sizes. The 6000 Series offers a shock system for highly fragile equipment.

Carbon Fiber Rackmount Cases can be compression molded in a variety of wall thicknesses to meet unique performance/weight requirements for military equipment. Additional layers of carbon fiber and/or optional ballistic reinforcement materials can provide enhanced performance characteristics for challenging applications.

Carbon fiber cases can be made with a variety of extruded aluminum closures and hardware. These design alternatives allow us to supply extremely lightweight, nearly indestructible versions of the same case sizes that have provided excellent service to warfighters since 1954.

Loadmaster® Rackmount

Loadmaster® Rackmount Cases are manufactured using incredibly durable TSC reinforced composite materials. Our engineers couple superior design with durable materials to make the most ruggedized, portable Rackmount case available.

The molded Loadmaster® stacking feature allows for complete stackability with previously fielded standard TSC portable Rackmount cases as well as any Loadmaster® rotationally molded shipping case.

- *Compact, lightweight design*
- *Field replaceable hardware*
- *Ergonomically correct polymer handles*
- *Modular case-to-case Loadmaster® stacking with standard rackmount or rotomold cases made by ECS*
- *Molded-in lid hangers and nesting lids for organized storage*
- *Shock isolation system for payloads up to 100 pounds, contact us for payloads exceeding 100 pounds.*
- *Stacking latches*
- *Slide or fixed mounted rackmount frame*
- *10-32 nut-bar fasteners for equipment panels*
- *Slides and quick-release fasteners allow CEA compliant rack to be easily removed and securely reinstalled*
- *Automatic pressure relief valve*
- *Watertight gasket*
- *Available 3-20U*

Available Colors

Contact your ECS representative for custom color options.

Loadmaster® Half Rack

ECS engineers couple superior design with durable TSC reinforced composite materials to make the most durable Half Rack Case available. Fully ruggedized protection for smaller electronic equipment.

The molded Loadmaster® stacking feature allows for stackability with previously fielded TSC Rackmount cases as well as Loadmaster® rotationally molded shipping case.

Also, available in a tote-able version inclusive of edge casters in rear lid resulting in enhanced ease of mobility, telescoping tote handle offering flexibility and ergonomic efficiency and lower wrap offering maximum internal usable space.

- *4 to 10 units height with 14" slide-out Rackmount frame*
- *Lids 3" deep, center body 18" length*
- *Outside Case Dimensions: 24"L x 15.7"W x 13.5"H*
- ● *Loadmaster® Stacking Pattern*
- ● *Stacking latches*
- ● *Hermetically sealed*
- ● *Shock and vibe resistant*
- ● *Automatic air pressure relief valve*

Available Colors

Contact your ECS representative for custom color options.

ECS SHOCK MOUNT

Shock mounts or foam cushions normally provide the majority of the shock attenuation of the container. The basic objective of a shock attenuation system is to allow the enclosed equipment to move. At the moment of impact, the container will flex toward the equipment and the enclosed equipment will begin to flex the cushion system as it moves toward the container's point of impact. The basic idea is to allow full utilization of the space between the equipment and the container (i.e. the sway space) for flexing the shock attenuation system.

It is mandatory that the shock mount system be stiff enough to prevent the internal impacting of the equipment and the container. As the shock mount or cushion system allows greater displacement (i.e. the allowable distance of movement within the container) for the equipment, the equipment will feel lower peak deceleration (i.e. shock) for an impact of any given magnitude. By way of example: the concept is quite similar to uniformly decelerating (i.e. braking) an automobile from a speed of 100 miles per hour to a stop. If the car is stopped in a distance of 1000 feet, the driver will experience a low deceleration force, but he/she will experience that force for a long period of time as the car is slowing to a stop. If the car is stopped in 100 feet, the average force of deceleration will be 10 times greater, but it will only be felt for one tenth as long. If the car is stopped in 10 feet, the average force will be 100 times as great, and the duration of the shock will be one one-hundredth as long. If the car impacts a solid wall at 100 mph, the force of deceleration will approach infinity, but the duration will be reduced to nearly instantaneous.

The container designer will seek to provide adequate sway space to protect the enclosed equipment from peak deceleration forces that would exceed the known fragility (i.e. the mechanical point of breakage) of the equipment. As the fragility of the equipment is reduced (i.e. if it is more fragile), the container must increase in size to allow for greater distance in which to dissipate the force of expected impacts. Therefore, equipment fragility is a primary determinant of container size and the cost of manufacturing that container.

"At the moment of impact, the container will flex toward the equipment and the enclosed equipment will begin to flex the cushion system as it moves toward the container's point of impact."

Shock mounts are available in a wide variety of materials, from elastomers and rubber compounds to coiled steel cable assemblies. Each material and configuration has distinct shock absorption characteristics. Some materials perform more efficiently over a broad range of temperatures than other materials. Some have more efficient vibration damping capabilities. Because there is such a wide range of choices, the selection of a shock mount system should be accomplished in consultation with the ECS Engineering and Product Management Department.

Loadmaster® Transit

[CASES]

Loadmaster® Features

- *Ergonomic polymer handles*
- *Field replaceable hardware*
- *Molded-in inserts to eliminate leak paths.*
- *Perfect 90 degree angle walls which maximize interior volume and stacking efficiency*
- *Recessed hardware*
- *Performance tested to MIL-STD 810G*
- *Custom options include edge casters, fire retardant resin, various colors, foam liners, and tote handles*

PRODUCT ADVANTAGES:

- *The closure and some fasteners can be molded in.*
- *Generally less expensive than FRP and TSC.*
- *Material is flexible and will seldom break due to impact or rough handling.*
- *Thanks to Loadmaster® stacking pattern, cases can stack securely. Ideal for a 463L military pallet.*

Loadmaster® Protection

Patented Loadmaster® Transit Cases are completely modular in all dimensions. Transit cases of different sizes securely stack and interlock in any grouping for maximum stacking efficiency. Case dimensions change length and width in 4.2-inch increments and height in 4-inch increments.

For the first time a truly user-friendly set of case sizes is available for military and commercial users. Rugged, cutting edge and built of high quality materials for lasting performance. We manufacture all of our tooling, molds and cushions for cases we build. ECS is family owned and proudly made in America.

Loadmaster® Transit Cases are ideal for use on 463L military pallets as well as compatible with JMIC shipping containers.

MATERIALS AND MOLDING PROCESS

Rotomold is a rotationally molded, extremely durable linear low density polyethylene resin. The resin is baked in a rotational arm. These cases are non-reinforced plastic containers that cannot compete with the FRP and TSC products lines in terms of strength and resistance. These cases are completely modular in all dimensions. Shipping cases of different sizes securely stack and interlock in any grouping for maximum stacking efficiency.

The rotomold manufacturing process is done in three steps: 1) Molding. Resin is poured into a tool size requested by the customer. The resin is baked and the shell of the lid and body is formed. Once removed, the shells are cooled and excessive material is removed. 2) Assembly. The hardware is added to the case along with any foam cushion work or customization. Rotomold cases have external hardware, making it field-replaceable. 3) Quality Assurance. Inspections are made to ensure finished products meet or exceed customer requirements.

Loadmaster® Transit

[CASES]

Loadmaster® Single Lid Cases

Modular Loadmaster® rotationally molded single lid cases are completely modular in all dimensions. The first of their kind, these patented cases offer superior performance and the world's most advanced modular stackability. All Loadmaster® Single Lid Cases have modular dimensions and unique stacking features molded into the top and bottom surfaces allowing these cases to securely interlock when stacked. Molded-in inserts eliminate leak paths, keeping equipment protected from the outside elements. This feature also helps prevent corrosion, as well as the collection of hazardous materials. All cases feature molded-in inserts which allow external hardware to be easily changed with a screwdriver. Stainless steel fasteners and molded-in inserts provide the strongest hardware attachments available today. Loadmaster® Single Lid Cases have perfect 90° angle walls which maximizes interior volume and stacking efficiency.

– Black field-replaceable hardware
– Ergonomic polymer handles
– Automatic pressure relief valve
– Watertight gasket
– Modular interlocking stacking features

Loadmaster® Footlocker

Hermetically sealed and watertight, these cases are also designed for adventure. Footlocker Cases are ideal for military and outdoor applications which require uncompromised protection from moisture, dust, sand and battlefield contaminants. Water tight cases provide protection from moisture, salt spray, sand and dust throughout the world's climate extremes. Each case has a water-proof gasket and an automatic air pressure relief valve. Impervious to fuels, oils and solvents, they can also be decontaminated if exposed to chemical warfare agents. The Footlockers also feature two heavy-duty reinforced removable trays for added storage.

– Sturdy, reinforced removable trays
– Large lower storage area
– Padlock-ready security hasp
– Field replaceable casters included on all large footlockers (33")
– Ergonomic field replaceable polymer handles
– Watertight gasket
– Black oxide stainless steel field-replaceable hardware
– Automatic pressure relief valve

Loadmaster® Tote Cases

Wheels and telescoping handles make these single lid cases ideal for moving equipment with ease. Watertight Loadmaster® Tote cases provide protection from moisture, salt spray, sand and dust throughout the world's climate extremes. Impervious to fuels, oils and solvents, they can also be decontaminated if exposed to chemical warfare agents. Loadmaster® cases are completely modular in length, width and depth dimensions. Unique stacking features molded into the top and bottom surfaces of Loadmaster® cases allow them to securely interlock when stacked.

– Ruggedized watertight design
– Field replaceable hardware
– Ergonomic polymer handles
– Interlocking modular stackability
– Molded aluminum tie down system for securing different cargo loads rapidly
– Integrated threaded inserts reducing leak paths

Loadmaster® Drawer Cases

Since 2008, the Drawer cases have been providing solutions for not only Military users, but also medical personnel and mechanics. These heavy-duty Drawer cases are the perfect solution for storing tools and other supplies.

An optional table top conversion kit turns lid into a portable work station.

– Slide-mounted aluminum drawer
– Edge casters allow for easy transport
– Black field replaceable hardware
– Ergonomic polymer handles
– Automatic pressure relief valve
– Watertight gasket
– Modular interlocking stacking features allow Loadmaster® transit cases to be stacked on other size Loadmaster® transit cases

Loadmaster® Inverted Case

The Inverted case was designed with the purpose of protecting heavy-duty equipment that needs a different type of enforcement. The Inverted case is just that – it's designed with a removable lid that is taller than the base allowing for equipment operation in the base of the case and easy removal of oversized or heavy payloads. The Inverted Case can also house the Shock Mounted Platform, which is a complete shock isolation system adaptable for equipment weights.

– Field replaceable hardware
– Ergonomic polymer handles
– Automatic pressure relief valve
– Watertight gasket
– Modular interlocking stacking features allow any Loadmaster® transit case to be stacked on any other size Loadmaster® transit case

"I have experience using ECS Cases while in the Marine Corps over two deployments. Now, as an avid adventurer, I have been able to locate and re-purpose a few ECS Cases of my own. The quality and protection is unsurpassed."

– DEFCONBRIX

Available Colors

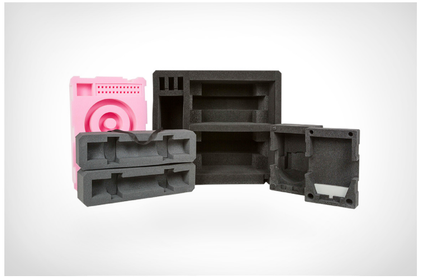
Contact your ECS representative for custom color options.

Custom Cushions:
Endless Range of Protection

ECS designs and fabricates a variety of foam cushion materials that are available for shock and vibration attenuation in reusable containers. These materials can be cut, formed and/or molded into an almost endless variety of configurations.

Most of our foam cushioning materials are manufactured from polyethylene, polyurethane, or polystyrene substrates and are widely used for commercial containers and continue to be specified for use in military transit cases.

We design our cushions in-house with state of the art machinery, including a water jet, to allow ECS to cut the foam to conform to the equipment inside the container.



ECS Foams Material
- Polyethylene
- Polyurethane
- Expanded Polystyrene Substrates (EPS)

ECS Advantage
- In-House Design and Fabrication
- Shock and Vibration Attenuation
- Endless Variety of Configurations

Custom
[CASES]

Custom Features

- *Ergonomic polymer handles*
- *Field replaceable hardware*
- *Molded-in inserts to eliminate leak paths.*
- *Perfect 90 degree angle walls which maximize interior volume and stacking efficiency*
- *Recessed hardware*
- *Performance tested to MIL-STD 810G as well as other extreme tests*
- *Custom options include edge casters, fire retardant resin, various colors, foam liners and tote handles*

PRODUCT ADVANTAGES:

- *More than 150 mold sizes available. Mold flexibility permits the manufacture of thousands of sizes from existing tooling.*
- *New mold sizes are available at relatively low cost.*
- *Exceptionally high strength-to-weight ratio.*
- *Light-weight (typically 10 to 15%) lighter than aluminum.*
- *Shell wall thickness can be varied from .06 inch to .12 inch in most mold sizes. Thicknesses from .16 to .20 inch are possible in larger molds.*
- *The laminate can be modified to provide EMI/RFI shielding.*
- *Shells can be pigmented in a wide variety of colors.*
- *Cases will not dent and there is no paint to chip or peel away.*
- *Material are non-corrosive and typically non-conductive.*
- *Hardware options are virtually unlimited.*

Custom Protection

ECS uses a proprietary compression molding process to create cases with unparalleled structural rigidity. High impact, lightweight, FRP composite components are epoxy bonded to heavy-duty aluminum extrusions. This fabrication method allows ECS to create cases in a huge range of sizes and configurations. The proprietary ECS process results in FRP composites which are 10 -15 % lighter than metallic products, have an unbeatable tensile strength and tensile modulus combination and will not corrode or oxidize.

Since 1961 ECS has used FRP composites for shipping solutions ranging from portable test sets, to EMI shielded workstations to one-of-a-kind oversized enclosures for special equipment. ECS made FRP case shells have exceptional impact and puncture resistance. They are extremely durable to extreme temperatures which exceed a range of -65° F to 185° F. They are available with an endless combination of latches, external hardware and internal shock absorbing systems, engineered to protect the contents.

MATERIALS AND MANUFACTURING

FRP is a 65% (by weight) long strand, fiberglass reinforced, polyester thermoset laminate. The material is compression molded using a unique molding process. Cases from this process have no side wall taper, which means top and bottom shells with unequal depths can be manufactured from the same mold. Shells/Cases can also be heightened or lengthened (not both) using a process called H-Sectioning.

FRP Cases receive an extruded aluminum closure to provide a tongue-in-groove interface between the cover and body. The aluminum closure is epoxy bonded to the laminated shells and typically contains a tubular gasket, which hermetically seals the case. Hardware can be riveted directly to the densely compressed laminate without adding metal backup plates. ECS FRP products exhibit extremely high impact resistance and boast a high strength-to-weight ratio. The color is pigmented throughout the laminate and does not chip or peel away. Almost all of the materials used are fungus-inert and resistant to acids, alkalis, solvents, and petroleum products.

Custom Solutions

[CASES]

Custom FRP Transit Case

FRP Shipping Cases are designed and manufactured in extreme sizes and case configurations, removable lid designs, and hinged clam-shell designs. FRP Shipping Cases and containers are manufactured using proprietary FRP compression molding technology. High impact, light weight, FRP composite components are epoxy bonded to heavy-duty aluminum extrusions. This fabrication method allows ECS to create an extremely large number of case depths from standard compression molding tools.

– Cases are 10-15% lighter than metallic products, heavy commercial and industrial applications
– FRP has an unbeatable tensile strength and tensile modulus combination, making it the most ruggedized transit case material available
– Exhibits unrivaled puncture resistance compared to non-composite materials
– A textured internal surface gives FRP superior heat dissipation
– Does not dent or permanently deform
– Does not corrode or oxidize.

Custom TSC Transit Case

TSC is a fiberglass reinforced thermoplastic polypropylene composite. The composite is available with 30, 40, 42 and 49 percent (by weight) reinforcements of continuous strand fiberglass. It is compression molded using matched metal tooling. The material offers performance characteristics similar to FRP, but is lighter in weight and utilizes different compression molding techniques and tooling. The TSC process allows closures, fasteners, and other features to be molded into the finished case. Some part flexibility can be "designed in," but tools are typically dedicated to a single case size/configuration. Two molds are usually required for case applications where the top and bottom have unequal depths and the resulting parts can seldom be modified for other applications. Like FRP, the pigment is an integral part of the material.

- High impact, light weight, comparable to Kevlar laminates
- The closure may be molded in, eliminating aluminum extrusion bending and gluing operations
- Inserts and special features can be molded into the part minimizing the need for penetrating fasteners
- Rapid molding cycles - 1 to 3 minutes
- Sonic and electromagnetic welding capability
- Low material shrink rate permits wall thickness variations with minimum

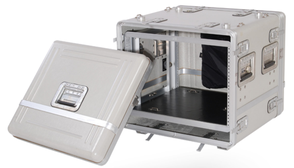
Carbon Fiber Transit Case

ECS Carbon Fiber Shipping Cases have become the standard of excellence and performance for ultra lightweight shipping cases and storage cases required for high value payloads. We are able to supply extremely lightweight and nearly indestructible shipping cases in virtually any size while offering a large selection of optional extruded aluminum closures and hardware.

Carbon Fiber Shipping Cases are available in most of the same sizes as FRP Composite Standard Shipping Cases and FRP Composite Custom Cases. Carbon fiber transit cases weigh approximately 10-15 percent less than FRP Composite shipping cases of the same size.

Carbon Fiber Cases can be made with a variety of extruded aluminum closures and hardware. These design alternatives allow us to supply ultra lightweight, nearly indestructible versions of the same case sizes that have provided excellent service to warfighters for four decades.

The unique appearance of woven Carbon Fiber composite surfaces clearly identify these transit and Rackmount cases as ECS originals. Additionally, our Carbon Fiber Cases are offered with advanced electromagnetic shielding. Innovation continues.



Custom FRP Rackmount

Custom Rackmount cases provide a balance of rugged durability, sizing options and effective shock and vibration protection. The FRP material used in these Rackmount cases allows great design flexibility for military and industrial electronic applications. Compression molded FRP parts have 65% glass fiber reinforcement in a thermoset polyester resin base, and they are extremely impact resistant. These ruggedized Rackmount cases provide unparalleled design flexibility and can be configured for nearly any scenario. Watertight Rackmount cases provide protection from moisture, salt spray, sand and dust throughout the world's climate extremes. Impervious to fuels, oils and solvents, they can also be decontaminated if exposed to chemical warfare agents.

– FRP Composite material
– Hermetically sealed
– Extremely temperature resistant, exceeds range of -65°F to +185°F
– Exceeds drop, transportation vibration, and cargo bounce tests
– CEA-310 Rack
– Recessed, stainless steel hardware
– Two removable covers to allow electronic equipment to be accessed from front or back
– Optional case-to-case stacking rails

Carbon Fiber ATA Case

Ultra-light weight, durability, mobility and resistance to harsh environments are demanded by our customers. Protect your valuable equipment, be it in the overhead compartment of a commercial airliner, or where ever your travels take you, with our Carbon Fiber ATA Transit Case.

– Rigid fixed internal aluminum frame designed to mount the ECS Fusion Third Rack with your rugged modular networking, embedded computing equipment- operational and in transit.
– Dual lid configuration enabling equipment access and operation.
– 3 stage, ruggedized, single grip light weight, carbon fiber tote handle
– Molded in stacking features
– Durable, ergonomic nylon handle for easy lifting when engaged and magnetically recoils when not
– Designed to receive a custom cushion when your payload requires shock isolation

Performance Tested in Accordance With MIL-STD-810G

High and Low Temperature
Proven performance in temperature extremes ranging from -65° F to +185° F.

Drop Testing
Able to withstand the rigors of deployment – drop tested from a height of 61 to 121 centimeters. Impacts conducted on all corners, flat surfaces and edges for a total of 26 drops.

Basic Transportation Vibration
Built to move, ECS cases show no damage when exposed to vibration environments for a duration of 30 minutes per mutually perpendicular axis.

Loose Cargo Bounce
Upright and with the covers in place, ECS cases show no damage and/or degradation when exposed to Loose Cargo Transportation environments for 30 minutes.

Water Submersion / Wind Blown Rain
ECS cases show no evidence of water intrusion and/or damage as a result of exposure to 40 mph wind blown rain conditions.

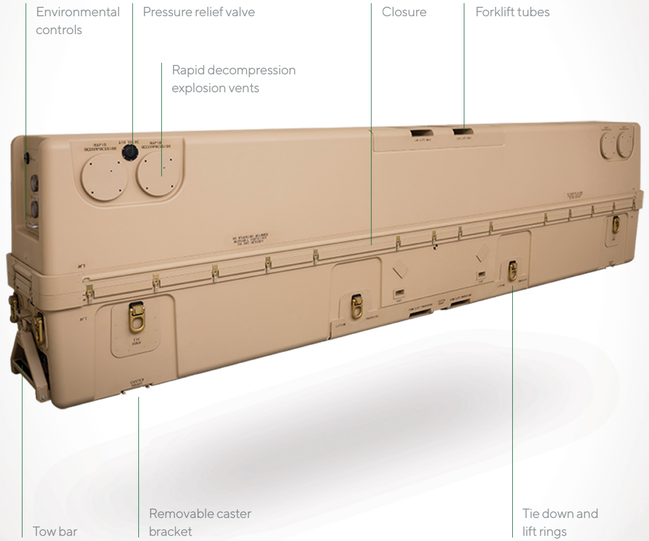
Wind Blown Sand and Dust
ECS cases are desert ready and show no evidence of damage and/or sand or dust intrusion.

Fungus Growth
ECS case materials will not support fungus growth.

Low Pressure
ECS cases show no damage and/or degraded when exposed to low pressure environments.

Custom VIP Solutions

[CASES]



VIP Features

- *Light – high glass ratio, reduced excess resin*
- *Thickness Control – increased laminate compression during cure*
- *Thickness – Wall thickness up to 1.18"*
- *Flexibility – More flexible than aluminum*
- *Reinforced – Reinforcement features can be molded into shells*
- *Custom Pigment – Shells can be pigmented and silkscreened to customer specifications*
- *Field repairable*
- *Transportability/Dual point lifting*
- *Hermetically sealed*
- *Corrosion, chemical, fuel and UV resistant*

PRODUCT ADVANTAGES:

- *Stronger composite laminates*
- *Repeatability and consistency between parts (weight and dimensional properties)*
- *Superior application of core materials*
- *Accurate bill of materials*
- *Lower tooling costs than other closed mold processes.*
- *Higher fiber-to-resin ratio (up to 70% fibers by weight)*
- *Higher strength and stiffness*
- *No resin entrapped air/ very low voids*
- *Very consistent laminate with great process control (less human errors)*
- *Minimal part shrinkage with good surface profile and accuracy*
- *Efficient to laminate complex fiber layers, ribs, inserts, and cores*
- *Cleaner process with no VOC air pollution*

Unlimited Possibilities

VIP (Vacuum Infusion Process) containers are very large and uniquely crafted closure systems designed to provide the ultimate protection supporting oversized equipment for storage and shipping. Our VIP containers are custom engineered vacuum assisted resin transfer molded composites designed with unparalleled attention to detail. The process is a technique used to manufacture high performance, void free composites and is especially suitable for large or complicated molds that are 4'x4'x4' and larger in markets including UAV, aerospace, military, mining, and construction. The product features a revolutionary new closure system, is corrosion resistant and reflects unparalleled attention to detail.

VIP MATERIALS, PROCESS, AND FLEXIBILITY

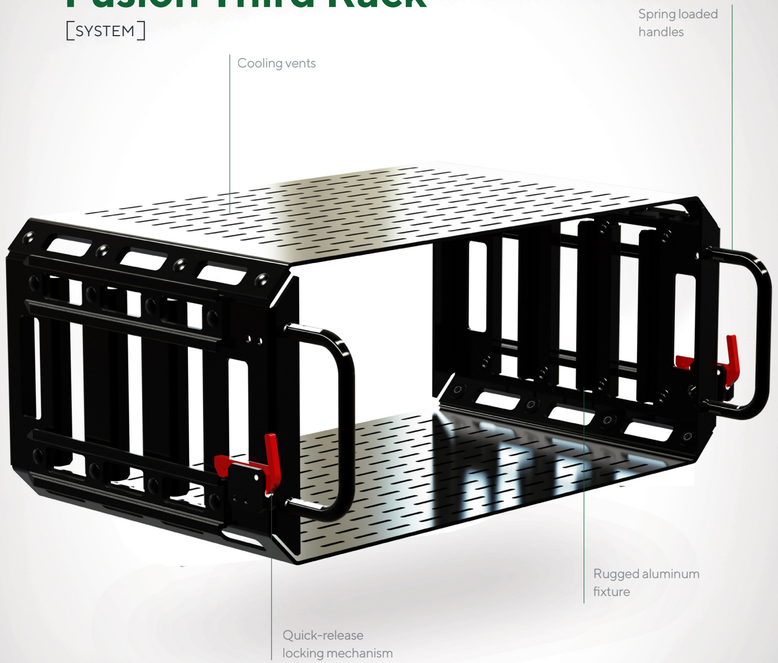
VIP is one of many closed mold processes. It distinguishes itself by being the only process that utilizes only atmospheric pressure to push the resin into the mold cavity. The mold cavity can be a one-sided mold with bagging film being utilized for the "B" side, a two-sided mold, or even a soft "envelope" bag. The process is highly controllable. This means that there are only three variables affecting the flow of the resin: (1) permeability of the laminate, (2) viscosity of the resin, and (3) pressure differential in the cavity in relation to atmospheric pressure. If all three of these variables are unchanged, then the infusion process will consistently flow the same way with every injection for a given part. This also equates to a very accurate bill of material for a given part since the resin and fiberglass usage will not change.

VIP brings all of the environmental advantages of a closed mold process, where styrene emissions are minimized due to the resin curing in a closed environment. It also provides an excellent glass-to-resin ratio with minimal to no voids in the finished laminate. This allows for one of the strongest ways of building a composite laminate.

"ECS is an engineering-based company. Our main intent is to provide protection to the enclosed equipment...period. Protection is the only reason a customer buys a case. Our engineers look at each application separately and design the product that will provide the optimum amount of protection."

Fusion Third Rack

[SYSTEM]



Fusion Third Rack Features

- Overall size to accommodate your modular equipment
- Mounting hole arrangements offering enabling mounting location flexibility
- Cooling vents for thorough and efficient air flow without compromising strength.
- Spring loaded handles for easy transition from one platform or configuration to another
- Innovative Quick-release locking mechanism to easily disengage the Fusion Third Rack and your equipment from one platform or configuration,and robust enough to endure shock, vibe and drop scenarios
- Slides for easy alignment

PRODUCT ADVANTAGES:

- Light weight
- Platform independent
- Interoperability
- Flexible in accommodating modular systems in just about any configuration or requirement
- Tool-less slide out capability

Platform Independent

ECS is proud to unveil its latest innovation: the Fusion Third Rack System. As modular equipment and embedded computing becomes smaller, coupled with the need for light weight protectiveness and ruggedness in transportation, operation and storage, the Fusion Rack is the answer. The Fusion Rack offers the same rugged support as our 19" Rackmount inner frames, and the Half Rack inner frames, yet are flexible in accommodating modular systems, in just about any configuration or requirement. The Fusion Rack is platform independent - whether it is mounted in our Loadmaster® Rackmount Cases, Carbon Fiber tote-able ATA cases, or supported in our Loadmaster® Transit Cases.

FUSION THIRD RACK SYSTEM, PROCESS, AND FLEXIBILITY

The Fusion Third Rack System is a group of cases and accessories that accommodate a new slide-out rack and is designed to fit the latest package size for portable electronics. The package size of these new modules are roughly one-third the width of a standard 19" rack. The Fusion Third Rack is sized so that modules of this size are oriented on their side with the ~6.3" dimension being measured vertically.

The Fusion Third Rack is easily removed from one case and installed into another. The Fusion Third Rack is platform independent and interchangeable - whether it is mounted and protected in:

- Carbon Fiber ATA Transit Case

- Carbon Fiber ATA Operating Case

- Backpack

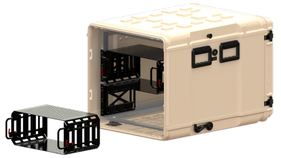
- 19" Loadmaster® Rackmount Case

- Loadmaster® Single Lid Case

Interchangeable With:

ATA Carbon Fiber Operating Case

ATA Carbon Fiber Transit Case



19" Loadmaster® Rackmount Case

Loadmaster® Single Lid Case

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