Design

A canoe's performance is built into its design. The dimensions and shape of the hull above and below the water line, and other variables, determine how efficient, stable, roomy, maneuverable, and seaworthy that canoe is. Of the close to 30 models of canoes in this catalog, no two perform the same. A touring canoe that's stable and easy to paddle will have a different length, width, rocker and streamlining than a performance canoe designed to go fast and glide far. Even within the same category of canoes, subtle differences in design will change their performance.

DIMENSIONS

LENGTH

Longer canoes track straighter, travel faster, and glide farther. They also hold more and perform better when loaded. Shorter canoes turn easily and are great for paddling on tight streams. Even a 6-inch difference in length can make a dramatic difference in canoe performance.

DEPTH

Adding depth to the center of the hull creates more freeboard, which adds capacity and seaworthiness. Adding depth to the bow or stern helps to fend off waves or spray.

WIDTH

A wider hull has a higher initial stability, but requires more effort to paddle. A narrow hull requires less effort to paddle, but has less initial stability. Width also increases capacity, although not as much as length.

CROSS SECTIONS SHAPE

Cross-section shape determines initial and final stability. Initial stability is how stable a canoe feels when upright in calm water. Final stability is how resistant a canoe is to capsizing even when on edge.

FLAT BOTTOM

Typical for bargain canoes. Flat-bottomed hulls have initial stability, but are unpredictable on waves or if leaned beyond a critical angle.

SHALLOW ARCH

Characteristic of well-designed hulls. Good initial and final stability. Predictable and responsive when leaned or on waves.

SHALLOW "V"

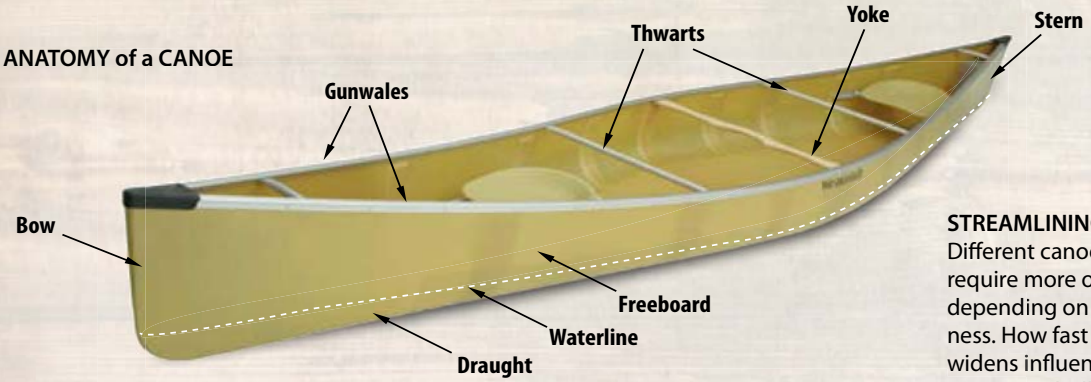
Shaped with a ridge in the center, like a keel. Stable but rides deeper and is less efficient than a shallow arch. May snag on rocks.

ROUND BOTTOM

Extremely rare, used only on canoes for calm-water racing. Very fast, but has no initial stability at all and is tricky to balance.

Mellissa Murray and Chloe at Government Beach on Lake Superior near the mouth of the Michipicoten River. James Smedley.

ANATOMY of a CANOE



FLARE

A flared hull widens out near the gunwales. It deflects waves and resists capsize.

TUMBLEHOME

Tumblehome is how the hull curves in toward the gunwales and lets the paddler paddle close to the hull.

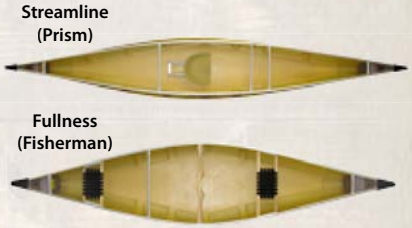
Both flare and tumblehome may be built into different parts of the same hull. Composites are the only practical material for this purpose, and even then the hull needs stout, wooden gunwales to help hold the complex shapes that combine tumblehome and flare (see the Itasca on page 30 for an example).

ROCKER

Rocker describes the way some hulls curve up at the ends, like a rocking chair. Rocker plays part in a canoe's maneuverability. Longer canoes with some rocker will maneuver like much shorter canoes. Canoes with a lot of rocker turn more easily, which is why whitewater and down river canoes have steeply rockered ends. Canoes with very little rocker will track straighter.

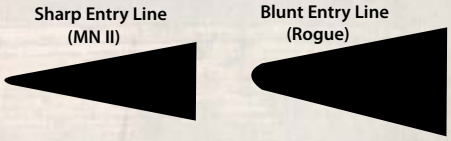
STREAMLINING AND FULLNESS

Different canoes with the same load can require more or less effort to paddle, depending on streamlining and fullness. How fast or how gradual the hull widens influences speed, capacity, and stability. A hull that widens gradually and smoothly is more efficient.

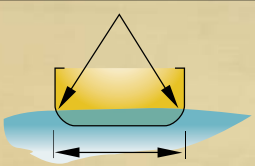


ENTRY LINE

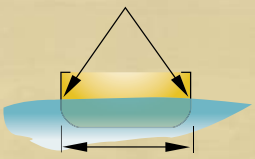
The entry line is the sharpness of the bow. Blunt entry lines resist impacts better, which is why whitewater canoes generally have blunt entry lines. Sharper entry lines improve the hull's efficiency and tracking.



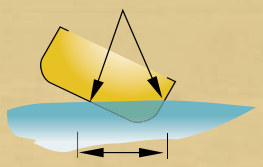
FLAT BOTTOM vs SHALLOW ARCH COMPARISON



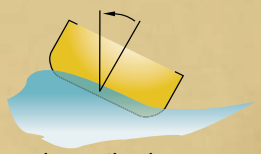
A canoe with a flat bottom hull feels steady when it's upright on calm water. Flat bottom hulls have good initial stability. Paddlers feel little oscillation because the hull's greatest possible width is in the water.



When loaded, it rides lower but has about the same shape. It will be stable as long as it is upright in calm water.

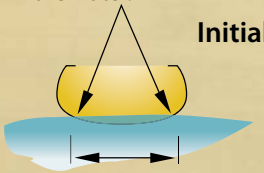


When it leans, one side of the hull lifts entirely out of the water. With less surface area submerged, paddlers must work hard to keep it from tipping over. Flat bottom hulls have less final stability.

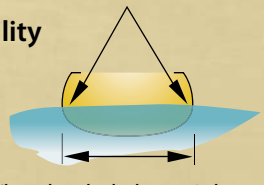


In waves that strike the canoe crosswise or at an angle, the flat bottom hull rises and falls on the surfaces of the waves. Paddlers must react fast to the rocking back and forth.

Initial Stability

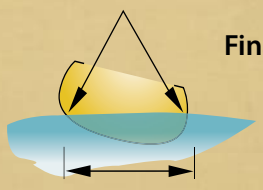


A canoe with a shallow arch hull is widest just above the waterline. Because it oscillates slightly it doesn't have the rock solid feeling of a flat hull.

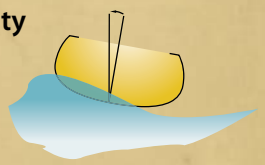


When loaded, the weight presses the widest part of the hull into the water, which makes the canoe more stable.

Final Stability



When it leans, both sides of the shallow arch hull stay in the water, making it easier for paddlers to balance.



A shallow arch hull presents less resistance to waves and rocks less. Paddlers easily maintain balance.

Materials *and Construction*

Early Native Americans built the first canoes out of materials such as cedar trees, birch bark, sinew and pine resin. They built some fine-performing canoes, but their materials limited both design and performance. In those days canoes were either fast and fragile, or strong and heavy. You couldn't have both. Adding wood strengthened them, but extra wood added weight and made them harder to paddle.

Canoe builders today use an array of new materials such as plastics, carbon fibers, Kevlar, and others that are remarkably durable, strong and light. We combine and shapes these materials using sophisticated manufacturing techniques that maximize performance. The results are light, tough, flexible, and durable canoes.

WOOD AND ALUMINUM CANOES

A fine wood canoe is a work of art. Wood canoes can be made from edge-glued cedar strips or a wood frame covered with a fabric skin. Both are heavy and a bit fragile. They may perform well, but they require intensive maintenance.

Aluminum was a great advance over wood, but the material and the manufacturing process severely cramp the design. It's impossible to form the complex curves needed to create a sleek yet stable hull. Aluminum canoes are durable, but heavy and slow. They are still being made, but they appeal mainly to outfitters who don't paddle or portage the canoes themselves.

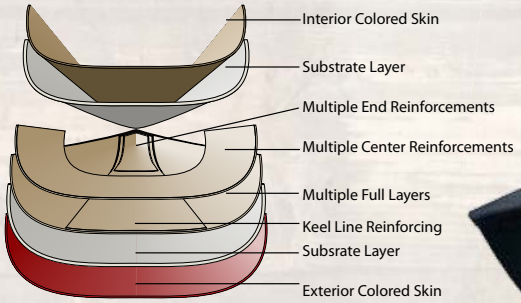
POLYETHYLENE CANOES

Polyethylene canoes have improved in recent years with the advance of new materials and manufacturing techniques. We manufacture our polyethylene Northfork canoe using a three-phase oven molding process. Polyethylene molding technologies make some of the most durable and tough canoes, but limit design and are among the heaviest construction methods. Our Northfork canoe represents the latest in three-phase polyethylene manufacturing technologies with a superior design.

ROYALEX® CANOES

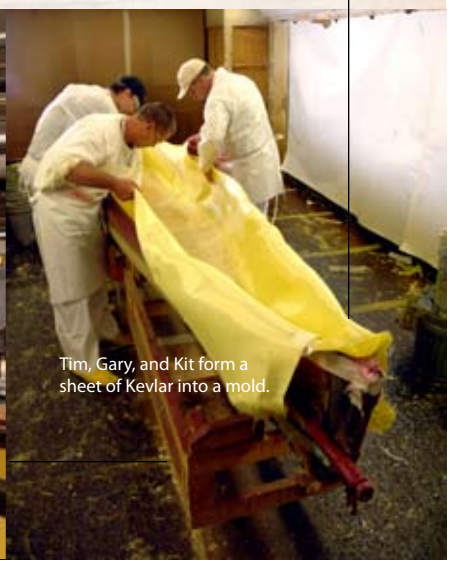
Royalex® canoes are manufactured from multi-laminate sheets, painstakingly designed specifically for each model. All include a closed-cell, rigid foam core providing structure and buoyancy.

Royalex® canoes are tough and rugged. They are the ideal choice for whitewater canoes and wherever durability is paramount. These canoes are much lighter than polyethylene canoes and can be built in nearly limitless designs. We offer many models in Royalex®, ranging from cost-conscious touring and sport canoes, to robust whitewater assault canoes.



Frank hand finishing the wood trim on an Itasca.

Ray installing the serial number on a Wee Lassie.



Tim, Gary, and Kit form a sheet of Kevlar into a mold.

"Unbelievable craftsmanship, unbelievable boat. My Kevlar® MN II will likely be the last canoe I ever buy."
-Dan Sodeberg, WI

COMPOSITE CANOES

The term "composites" simply means multiple materials bonded together. In composite canoes, fibers are shaped in a mold and bonded with resins. Any combination of fibers and resin is a composite, but there are a wide variety of materials and methods.

The best-known composite canoes are "fiberglass," although the term is often incorrectly applied to all composite hulls. Fiberglass is an economical, light and strong material. Some canoe manufacturers use fiberglass alone, spraying the loose fibers in a mold. We employ a more effective technique using a combination of materials and carefully hand-fit many layers of strategically-cut, woven fabrics into the mold, before bonding them with resin. Many hours of skilled labor are required.

We make our composite canoes from other fabrics, including Kevlar®, Tuf-weave® and Graphite, which are stronger and lighter than fiberglass alone. They can be used alone, in combination, or with fiberglass.

Good composite canoes can be pricey, but their lightness, toughness, and performance make them the best value. At Wenonah Canoe we use only the best composite materials to make the finest canoes, designing them carefully to deliver excellent performance and handling.

KEVLAR

Kevlar®, the fiber used for aerospace, body armor and bulletproof vests, is amazingly light and strong. We've used it for more than 30 years to construct extremely light, tough, and quiet canoes. Wenonah Canoe is the world's largest maker of Kevlar® canoes.

TUF-WEAVE®

Wenonah's Tuf-weave® material is an interwoven fabric made of 50% polyester and 50% fiberglass that outperforms either material alone. We use it to build tough, light hulls (although not quite as light as Kevlar® or Graphite). Tuf-weave® is much stronger than other fabrics, yet costs no more.

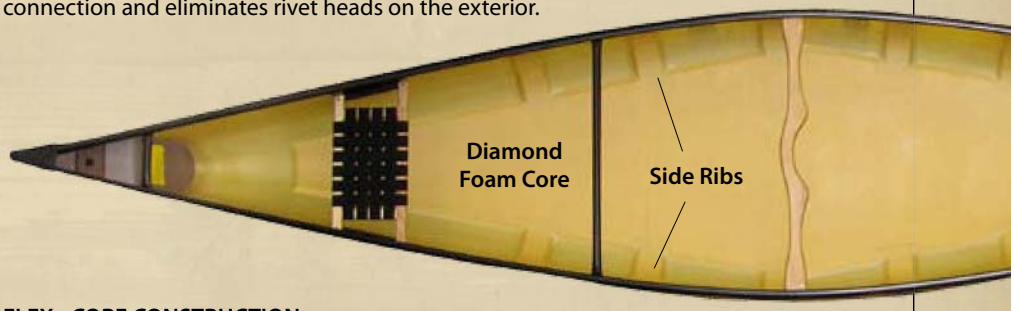
COMPOSITE CONSTRUCTION METHODS

ULTRA - LIGHT CORE CONSTRUCTION

Ultra-light hulls are stiff, light and are ideal for speed and distance paddling and for all people or conditions that demand the lightest gear.

A structural-foam core is laminated into the bilge, and foam ribs are laminated internally to the sides. We add extra fabric layers to strengthen specific targeted areas, and vacuum-cure these hulls to get the highest ratio of strength to weight.

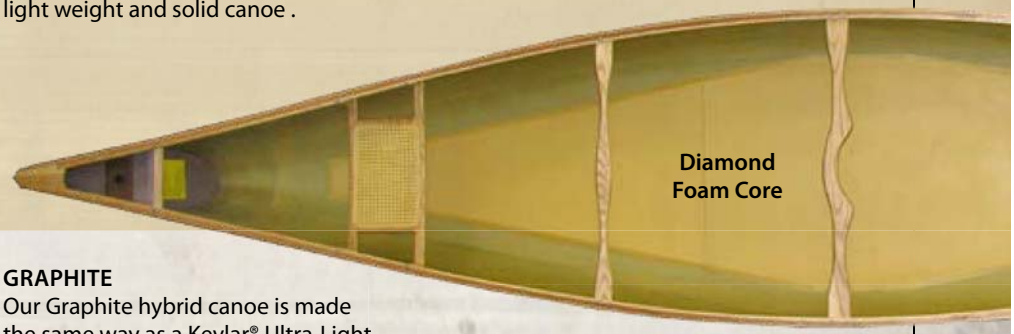
Seats or a foot brace are side-riveted to the hull, aluminum plates are laminated into the side-rib, and hardware is riveted through the plate into the rib. This gives a very secure connection and eliminates rivet heads on the exterior.



FLEX - CORE CONSTRUCTION

Flex-core construction creates a more rugged canoe than our Ultra-light core, and is meant for general paddling on all but extreme waters.

A structural-foam core is laminated into the bilge, orienting the composite fibers carefully to distribute loads. **We add an extra fabric layer to the whole hull.** Side ribs are not needed because Flex-core distributes more material throughout the hull. We then vacuum-cure these hulls to get the highest ratio of strength to weight. The result is a light weight and solid canoe .



GRAPHITE

Our Graphite hybrid canoe is made the same way as a Kevlar® Ultra-Light, but with Graphite as the outer layer. It's ideal for paddlers who desire more stiffness in their composite canoe or simply enjoy the aesthetic appeal of a black graphite canoe.