

COBRA



IN PURSUIT OF WINDSURFING EXCELLENCE
TECHNOLOGIES FROM COBRA INTERNATIONAL



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In 1978, Cobra first began building windsurf boards. 44 years later, Cobra continues to drive technology development in the sport and manufactures around 80% of the world's composite windsurf boards.

Looking beneath the surface paint and graphics of a modern windsurf board reveals a highly sophisticated yet incredibly lightweight structure. Cobra has constantly evolved the construction and finishes of the boards that it builds, carefully balancing stiffness, comfort, weight, strength, durability, and aesthetics, always looking for improvements.

Sometimes these innovations come from within and are products of a team with hundreds of years of windsurfing experience combined, sometimes they are new developments created in partnership with customers or external raw material suppliers.



WINDSURFING EXPLODES IN POPULARITY AS COBRA PERFECTS ITS VACUUM MOULDING TECHNIQUE

Cobra's innovative combination of vacuum moulding and composite tooling has been the single most important factor in the company's success in the sport.

As the 90's saw windsurfing's popularity explode, there followed a push for performance and an acceleration in board design development. Wave, slalom and freeride boards changed every year, with each design being better than the last. The established press moulding manufacturers with expensive metal tooling simply couldn't match this pace, and as a result, the door opened for new market entrants.

At exactly this time in 1992, with customers such as Fanatic and Copello, Cobra perfected its vacuum moulding technique to build sandwich construction boards at mass production scale using composite tooling. The impact was immediate. With the new moulds being massively cheaper, suddenly the ROI was less important and minimum order quantities could be much lower.

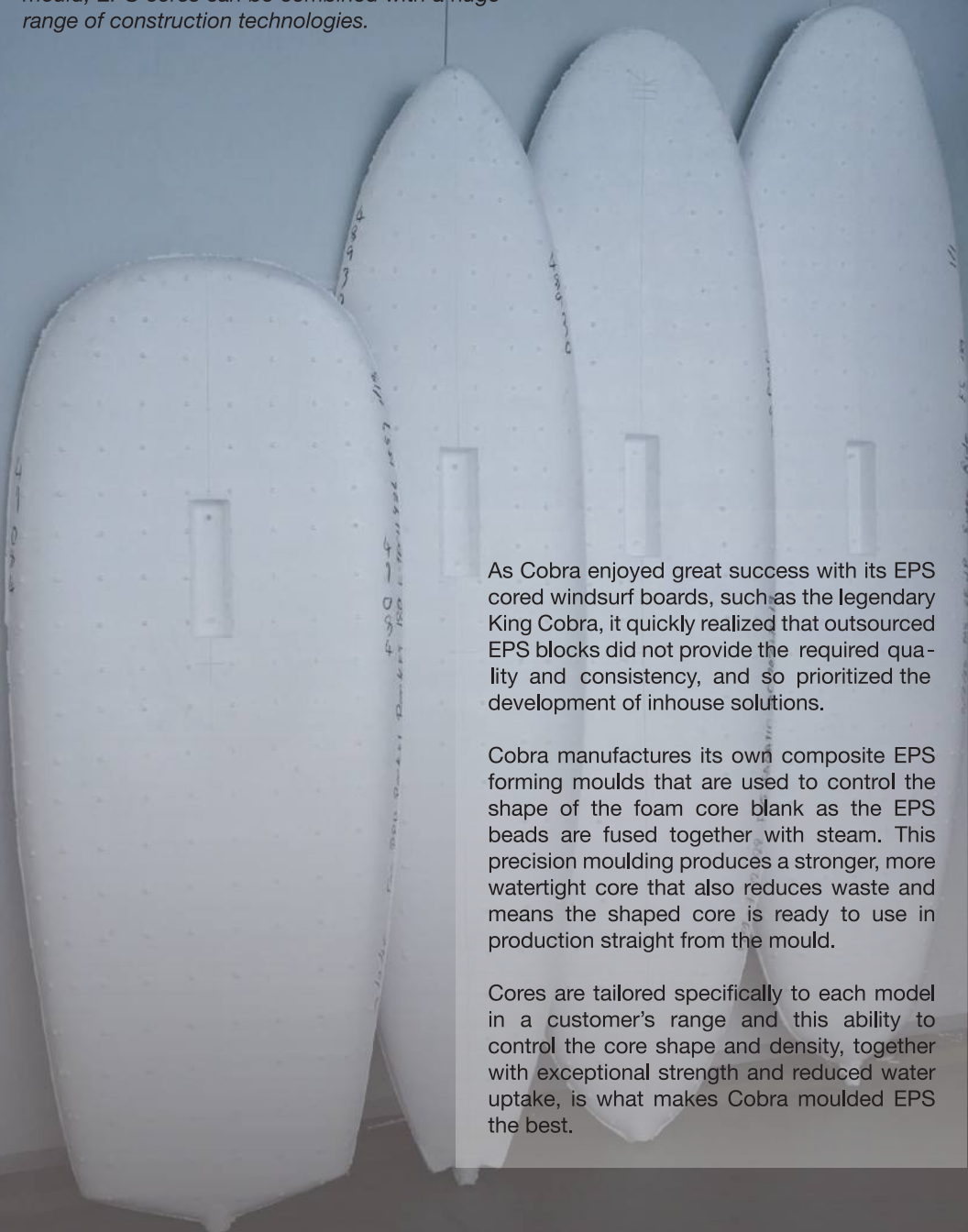
What made the Cobra solution so powerful was that it didn't just provide design flexibility, it also built better boards. A downside of the earlier, ultra-rapid, large scale, press moulding process was that boards had to use extra resin and fabric, thus increasing the board weight, and limiting performance. Cobra's technique had no such restrictions and could duplicate the fully wrapped rails of a custom board in a significantly faster and highly consistent process.

In what was a golden period for the sport, more and more brands came onto the scene, with Cobra allowing windsurfers to own an advanced composite semi-custom board, almost identical to the ones used by World Cup riders, at an affordable price.



MASTER OF EPS

Cobra believes strongly in the benefits of using expanded polystyrene (EPS) foam cores for boards. Lightweight, cost effective and easy to mould, EPS cores can be combined with a huge range of construction technologies.



As Cobra enjoyed great success with its EPS cored windsurf boards, such as the legendary King Cobra, it quickly realized that outsourced EPS blocks did not provide the required quality and consistency, and so prioritized the development of inhouse solutions.

Cobra manufactures its own composite EPS forming moulds that are used to control the shape of the foam core blank as the EPS beads are fused together with steam. This precision moulding produces a stronger, more watertight core that also reduces waste and means the shaped core is ready to use in production straight from the mould.

Cores are tailored specifically to each model in a customer's range and this ability to control the core shape and density, together with exceptional strength and reduced water uptake, is what makes Cobra moulded EPS the best.

CUSTOMIZED FIN BOX DESIGNS

As 90's boards became lighter and faster, riders could push harder and harder. Consequently, there were failures, with traditional plastic fin boxes unable to take the increased sailing loads. As the industry evolved, Cobra took the lead and was the first to customize fin box structures to a specific set of requirements.

A key factor was the definition of detailed specifications to match fin box structure to the loads each board design would experience, building stronger boards and keeping customers on the water longer.

Working alongside major brands, Cobra introduced high density PU foam blocks around the fin box and, in some cases, created PVC sandwich composite boxes for high strength and low weight. Mini Tuttle boxes for multiple fin set ups and super strong Tuttle and Deep Tuttle boxes have become standards, especially for larger race board fins.



THERMOFORM PVC WRAP RAIL

Another breakthrough technology was the mass production of sandwich boards with thermoformed PVC foam wrapped around the rails. In 1992, Marco Copello, a genius at shaping and sailing, challenged Cobra to bring his race board construction approach to the mass production market. The Copello 260 boards that Cobra built revolutionized the sport's new freeride sector, with Cobra's build process playing a key part.

The Cobra vacuum moulding process was highly flexible and allowed more time for adjustments than the industrial short cycle press processes that it displaced. This ability to adjust the sandwich laminate for perfect coverage and alignment, wrapping around the EPS core, enabled Cobra to wrap the thermoformed PVC tightly around the rails, increasing the board strength whilst keeping it down to weight.



OPTIMIZED HEEL PAD REINFORCEMENTS

Faster boards pushed higher loads through the rider's feet and into the deck, causing dents and cracks, which could propagate and lead to board failure. Wood veneer heel area reinforcements were a novel solution and were first used at Cobra in the mid 90's, taking input from Francois German and implementing them into production boards.

Wood itself is a composite material and the lightweight veneers provided critical strengthening. Cobra developed several combinations over the years with wood and wood plus double sandwich layers all optimizing strength around the rider's heels. Eventually, the evolution of multi-density EVA foam pads allowed Cobra to integrate deck grip, branding elements and a tough heel bumper into the deck pads themselves.

IN PURSUIT OF THE LIGHTEST TECHNICAL FABRICS

A need for weight reduction and tighter production tolerances has seen Cobra challenge its suppliers to develop and optimize ultra-lightweight materials for windsurf production.



Over the past 25 years, Cobra has worked with the world's leading carbon fiber fabric producers, creating innovative alternatives when the traditional 3K fiber was unavailable, and focusing on spreading fibres into thinner plies to produce lighter and lighter biaxials. These lightweight (100-150gsm) cloths available today, were simply not possible 20 years ago, and many of these textiles saw their first real world applications at Cobra.

Cobra also pushed suppliers to add new visual aspects to their carbon, glass, aramid and Innegra textiles. These customized fabrics helped create specific brand identities without increasing weight or compromising performance.

OPTIMISED PVC FOAM

The PVC foam used in Cobra sandwich windsurf boards has been a key focus throughout the years. Initially 80kg/m³ foam was cut to 5mm ± 1mm and then calibrated to 4mm by sanding. By driving the PVC manufacturers and their processing teams to look again at the entire process, slicing and sanding technology took a huge step forward. Cobra was able to get sanded 3mm foam sheets that were produced with less wastage and saved 400gm of resin per board due to their smooth surface and lack of saw marks.

The reduction in core thickness did produce some incredibly light boards, though these were not without their durability issues. With Cobra's semi-custom mass production philosophy, build quality and a robust construction were paramount, and so a compromise was reached. 3mm foam has remained, but the density has been increased to 100kg/m³, providing the optimum balance between weight and strength.



OPTIMIZING STRENGTH, PERFORMANCE AND BEAUTY

Cobra has always driven to reduce weight and increase strength and durability, but it is equally passionate about the style of its products too. From the own brand Cobra boards in the company's first decade to the latest beginner, freeride and foil boards it crafts for global brands 40 years later, every board must look good and perform.

In 1981, the King Cobra board became an overnight success story, but it wasn't just due to the lightweight sandwich construction and innovative Klaus Simmer design. A stunning white pearlescent PU paint finish really made the boards sparkle, instantly making the boards stand out from the existing mass produced thermoplastic skinned boards and old school Windsurfers.



SCREEN PRINTED NEOPRENE DECKS AND THE DEVELOPMENT OF EVA

In the 90's, Cobra began to experiment with softer deck grip materials, moving away from non-skid particles in the paint and integrating branding and coloured designs into neoprene and EVA deck materials.

Cobra was the first mass production windsurf builder to integrate a full neoprene deck, launching this new detail in their own boards and inlaying a softer and more comfortable screen-printed neoprene deck grip panel into a moulded recess in the top of the board.

As the EVA foam industry developed, Cobra also developed new deck grip formats with this innovative new foam. Initially used for soft, durable full coverage decks on beginner and school boards, more complex designs became possible as different foam densities and colour options became available. Today, Cobra's accessories division converts tens of thousands of square metres of EVA foam per year, buying in flat sheets and combining colours and densities before CNC machining grip patterns for deck pads or integrated bumpers on wave boards. With EVA decks, board brands can colour match pads with paint and continue their logos or styling elements through the pads.



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SEAMLESS RAILS

Cobra preferred to build windsurf boards with smoothly profiled rails and no visible seam between the deck and bottom of the board. As well as being more attractive, this seamless construction also improves performance.

Unconstrained by welded ASA thermoplastic sheet joins or other molded seams, and with highly efficient finishing processes in place for the seamless look, Cobra has implemented this detail since the King Cobra days. Firmly committed to the seamless approach, Cobra boards are as close to custom as mass production allows.

UNFINISHED PAINT BOARDS

The most unusual surface finish seen on Cobra windsurf boards is its unfinished paint aesthetic. Quite the opposite of unfinished, these boards are painted first, before delicate hand sanding by Cobra artisans removes a percentage of the paint coating revealing the weave or fiber patterns in the structural laminate beneath. First pioneered on performance boards, unfinished paint reduced weight and provided an exceptionally smooth surface as well as unique new style.

Cobra now offers unfinished paint in three levels of transparency for its OEM's, removing 25%, 50% or even 75% of the paint for a super unfinished paint effect. Unfinished paint is just one example of how production efficiency and innovative approach leads to customer success too. By developing new solutions with customers, and protecting IP details, Cobra enables the brands it builds to remain unique and maintain their individuality even as it manufactures around 80% of the world's windsurf boards.





UNDERWATER DECALS ENSURE INDIVIDUAL STYLE

Cobra was the first board maker to apply large format water decals in the watersports market and has invested heavily in printing technology. Like a temporary tattoo, decals are printed onto a transfer paper with two different glue formulations. On the paper side, a soft water-soluble glue easily releases from the transfer paper when the decal is positioned and the surface soaked with water, whilst the other, stronger glue system permanently binds the decal to the board.

Typically applied to the underwater sections of a windsurf board, and protected by the final clear coat surface layer, decals provide near

limitless colour and branding options and can be easily customized with the latest digital printers.

An interesting benefit of a full surface underwater decal is the ability to ensure one-design race board compliance. By incorporating a complex graphic print, officials can check that one-design boards such as the Olympic RS:X have not been altered, as the super thin decal would be destroyed by any outlawed sanding or refinishing.

VOLUME MANUFACTURING ENABLES WINDSURF FOILING TREND

Windsurf foiling as a sport has developed in the last decade, with carbon foils and new board designs making foiling easier and accessible.

Cobra has been heavily involved in the development of this new equipment, supporting manufacturers with the turnover of new board designs, and providing high volume manufacturing capacity for the finest prepreg carbon foils.

With the ultra-stiff masts that support the foils measuring up to 1m in length, modern windsurf foiling boards have to withstand huge loads at the fin box. Cobra has created high-strength composite fin boxes to take these increased loads and transfer them into the board.

As the sport grows, Cobra supplies many leading brands with the highest quality windsurf foiling boards such as the Phantom Iris R series and the new 2024 Summer Olympic equipment, Starboard's iQFoil 95.

Cobra is also leading the way in the production of prepreg foils, leveraging expertise from other group business units to enhance the raw materials used in foils, including high modulus fibres that significantly reduce flex and torsion.

Cobra has also recently introduced a new prepreg compression production line specifically for foils and other hollow or light cored parts. The new process is ultra-rapid, removing the need for a traditional multi-layer clear coat and enabling highly structural parts with the required surface finish straight from the mould.





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