

**AIREX<sup>®</sup>**

**BALTEK<sup>®</sup>**



WINTER 2006 / 2007

## **INNOVATION**

**SANDWICH  
TECHNOLOGY  
NEWS**

**AIREX<sup>®</sup> T90 product range  
optimized to its application**

**A vision, a new process and  
the right products are keys to  
success for Glasforms, Inc.  
and their customers**

**Columbia 30 – superior  
design and execution**

**The Ravin 500**

**Core Kits – a service that  
saves you money by improv-  
ing productivity**

**Temperature of a sandwich  
panel when exposed to  
sunlight**

**ACCM and Ecuadent –  
providing help to the  
children of Ecuador**

Dear Reader

As 2006 draws to a close, we fully expect this to be another record year for the Alcan Composites Core Materials Group. We certainly want to congratulate you on your obvious success in the use of cored composite structures. This is an exciting and challenging time in our industry and we are meeting these challenges in every market and territory.

What lies ahead? While the marine market segment has been adversely affected by the rise in fuel costs and interest rates, just about every other market has surged. The outlook for 2007 is excellent. That means you are all doing a great job in developing new applications and finding new markets for your products. With the recent calming of the oil market, we are hopeful of a rebound in the marine segment as well. Just what effect fluctuating oil prices might have on the double digit expansion in the alternative energy market remains to be seen.

We think you will find this new edition of INNOVATION of great interest. We are featuring a mixture of markets, applications and process information. Most people involved in the industries using structural sandwich composites think of lightweight, and therefore relatively light-duty applications. We take some pleasure in debunking that attitude. In this edition you will see highly structural marine and aircraft applications, but you will also find a feature on the ongoing success of a decidedly heavy-duty application in the truck industry.

The technical section contains an update of our AIREX® T90 core family with the addition of AIREX® T91. This more ductile, higher shear strength version of our PET foam core was tailored for markets where toughness is more important than fire performance. Another segment discusses the effect of outdoor temperatures on sandwich composite applications. Just another example of Alcan Composites' leadership role in advancing the understanding of our products and processes for the benefit of our industry.

Finally, we thank all manufacturers and users of our cored composites structures. In every market segment and geographical area, your efforts and ingenuity are our success as well. We are pleased to be your partner as we move forward to another successful year together.



Joe Pantalone  
Product Manager



Marianne Sidler  
Marketing Communications

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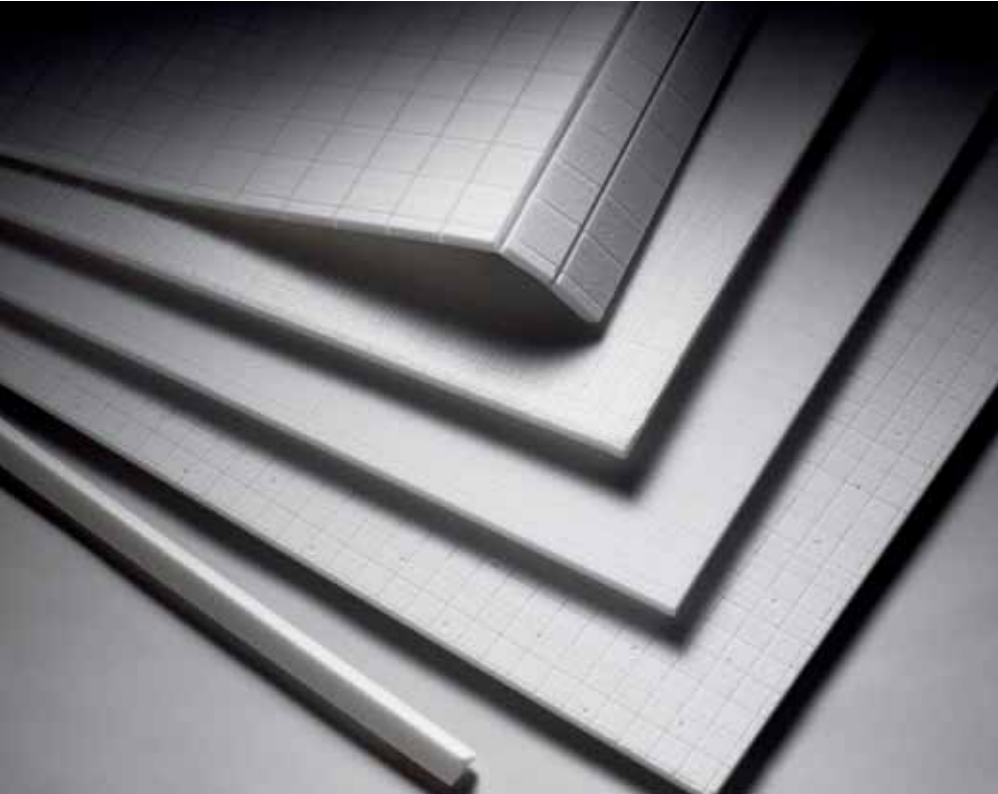
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## AIREX® T90 product range optimized to its applications



- Best thermal stability in processes up to 150°C (302°F)
- High compression strength and modulus
- Good adhesion (skin-to-core bond)
- Excellent chemical stability
- No water absorption
- No after-expansion
- Easily thermoformable

Although the above mentioned characteristics covers a very wide range of technical requirements, more specific mechanical properties were required in order to serve a bigger market.

With the development of the AIREX® T91 foam, especially designed for applications where increased damage tolerance, impact resistance or flexible strength was required, Alcan Composites Core Materials is in the position to cover additional market segments.

Today the AIREX® T90 and the AIREX® T91 foam are widely used, not only in the rail industry but also in the marine and wind energy industries.

We are also confident of our ability to fulfill your needs.

For more information, contact us.

**With the rail industry looking for an alternative core material with good FST properties, Alcan Composites Core Materials introduced the new AIREX® T90 - Easy Processing Structural Foam - in 2005. In a very short time the AIREX® T90 foam was established in the market.**

The origin of this success lies in the characteristics of the AIREX® T90 foam which can be summarized as follows:

- Superior FST-properties (FAR/CS25.853; NF 16.101; DIN 5510)
- Excellent fatigue strength
- Easy to process (with all types of resin and lamination processes)
- Excellent long-term thermal stability

## A VISION, a new PROCESS and the right PRODUCTS are keys to success for Glasforms, Inc. and their customers.

**More than a decade ago, the Kenworth division of PACCAR, set out to raise the bar for long haul truck cab design. Their revolutionary concepts were melded into the now famous, top of the line, T2000 truck cab. It made the most extensive use of composites to achieve their goals of aerodynamic styling, light weight, improved hauling capacity with fuel efficiency and the highest standard in operator comfort. Tens of thousands of T2000s can be seen traveling the highways of North America after ten years of continuous production.**

One of the toughest design problems was the development of the cab floor. The conventional cab floor, a complex welded assembly of metal parts, was a target for cost savings through parts consolidation. The redesign involved a one-part, totally flat, composite floor utilizing sandwich construction to provide low weight, with stiffness, strength, sound and vibration dampening and thermal insulation. The entire cab body would be assembled onto and supported by the floor before attachment to the cab chassis. But by what process could this be achieved in a cost-effective manner and with the highest degree of quality and repeatability?

At the same time, BP was developing a new process directed at producing high quality composite shapes for the aircraft industry. This process combined the advantages of the continuous pultrusion process with the in-die resin injection of resin transfer mol-

ding. They dubbed it CRTM, continuous resin transfer molding. The rights to the process were sold to Hexcel in Kent, Washington. This process proved to be just the right combination for the production of a stiff, strong, light panel for the Kenworth truck floor. Laminate engineering and coupon testing soon proved that the most effective design incorporated woven glass fabric skins and 2" (50 mm) thick balsa core. Kenworth calls it their «ThermaCore» floor.

After a few years of production, Hexcel sold the CRTM line and its most important product, the Kenworth «ThermaCore» floor, to the pultrusion manufacturer, Glasforms Inc. of San Jose, CA. The process was a good fit

for Glasforms. Along with their Structural Profiles and Uni-Directional Reinforced Product lines, their Unique Custom Engineered Profiles line would now include cored composite structures. Their largest CRTM machine has the capacity to produce continuous composite shapes up to 108" wide and 24" thick. Glasforms relocated the CRTM unit to their then recently-built 150,000 sq. ft. facility in Birmingham, AL. That facility has since been expanded to over 225,000 sq. ft. and houses 18 pultrusion lines, 3 continuous filament winding lines, and secondary fabrication and assembly capabilities.

In 2000, the entire CRTM line had to be transferred 2600 miles from the Hexcel facility in Kent, WA. to



108" wide CRTM equipment



Kenworth T2000 long haul truck cab

Glasforms in Birmingham, AL. It took 20 truckloads of equipment and materials and a total of three months, but the transition was made without any disruption of the Kenworth T2000 production schedule. Equally essential to the smooth transition was the supply of production materials.

To accommodate the production of up to 5000 floors per year, the continuity of supply from a reliable source of quality materials was essential. From the beginning, Glasforms has depended on their supplier partners: Composites One fiberglass, Dow Chemical resins and BALTEK® end-grain balsa core. Glasforms Market Development Manager, Mike

Guglielmo, testifies to the reliability of Alcan Baltek Corporation of Alcan Composites Core Materials. «Alcan Baltek is the only company capable of providing the secure supply line necessary for an operation of this size. They have the highest quality, technical support and customer service. We appreciate their price stability and material consistency for truckload after truckload of quality BALTEK® core.»



Automated balsa core trim and feed line of Glasforms Inc.

## Columbia 30 – superior design and execution



The Columbia 30 Deck being infused

**It has long been recognized that one-design racing is one of the truest tests of sailing skill. When the components of hull, keel, rig, and sails are identical, then the only difference providing that slim margin of victory is the skill and knowledge of the skipper and crew. It is not surprising then that one-design racing is the most popular form of sailboat racing today, with many long-established classes still racing, proud of their long traditions and illustrious histories. Alcan Composites Core Materials is proud to be part of a number of the more successful one-design classes at both the national and international level.**

If you are going to successfully enter this highly competitive field with a new one-design class, you need to have done your homework first. With a new

class, the boat needs to offer more than is available today. Columbia Yachts are confident that they have done just that with the new Columbia 30 Sport Yacht™ – and, considering their innovative use of material and building processes, we cannot disagree. The new Columbia 30 combines exceptional performance with a functional cruising interior that boasts full standing headroom, an enclosed head, four 8'-long berths, and galley amenities suitable for weekend cruising. Moreover, there is a real diesel sail drive installation, not the typical outboard on the transom. Add to this a retractable keel for reduced draft and ramp launching, and both transportability and cruising possibilities improve dramatically.

How does Columbia achieve this enviable combination of high speed and cruising comfort? By controlling weight and optimizing structure through proper choice of materials and careful enginee-

ring. Working with the Alcan Composites Core Materials Technical Service team, Columbia Yachts has chosen a variety of AIREX® foam cores, BALTEK® balsa GPS cores and Lantor SORIC infusion non-wovens to create an integrated hull, deck and interior structure with properties precisely engineered to accommodate the loads involved. The use of vacuum infusion technology has created exceptionally high (and precisely repeatable) laminate physical properties. That this process can replicate these exceptionally high physical properties is the key to the Columbia 30's weight and strength. With traditional hand lay-up of laminates, a design/build team has to design to the physical pro-



Deck of Columbia Post-Infusion

properties derived from the worst case scenario because of the wide variation in properties due to less than optimum glass to resin ratios. The vacuum infusion process not only eliminates these variations in resin content, but also ensures the optimum resin content – every time. This not only guarantees minimum weight, but also the maximum desired properties.

The Columbia 30 uses AIREX® C70.75 GPS\* foam cores in the hull, with Lantor SORIC SF infusion non woven in the single skin areas of the deck. The deck horizontal surfaces are infused with BALTEK® SB.50 GPS balsa core for maximum stiffness with minimum core

\* = grooved, perforated, semi-contoured (one direction)

thickness to achieve optimal interior headroom. The vertical surfaces of the deck are infused with AIREX® C70.75 GPS and SORIC SF. High density AIREX® T90.240 is used for compression strength under tracks and hardware on the deck, and in the hull around the lifting keel box. By the judicious use of materials, the Columbia 30 achieves her exceptional performance, making minimum concessions when it comes to interior amenities. This should be a winning combination on the race course and when cruising.

Columbia Yachts' owner Vince Valdes and Production Manager Steve Sharp are to be congratulated for taking the

time to properly engineer the Columbia 30 before the boat entered production. Nothing beats «doing it right – the first time». For all boats, this is desirable. For a one-design-class it is essential.

«The success of the Columbia 30 is contingent on this premise.» says Vince Valdes. «By taking the time to optimize both the material selection and the production process before the 30 went into production, we have been able to improve performance, control costs, improve production efficiency, and maintain strict control over the one-design concept».

Downwind with the Columbia



## The Ravin 500

**South Africa is a land that often surprises with the world-beaters that it produces. Talent in one field after another abounds in this beautiful country, and often from the most unlikely of sources. Out of a garage in a homestead North of Wonderboom Airport, has come one of the most exciting and lovely aircraft, simply called, the «Ravin».**

This aircraft is the brainchild of one Jan Troskie, a long-time Comanche owner, who figured that he was going to take a great aircraft and make it even better. Combining huge talent with enthusiasm, passion for flying, common sense and know-how, he has

produced a phenomenal aircraft. The Ravin comes either as a kit in different stages of production, or completely assembled and ready to fly.

Standing in isolation, the Ravin could easily be mistaken for a late Comanche model. However, the original machine is of entirely of metallic construction, whereas the Ravin is all-composite. Closer inspection of the aircraft reveals that there is not a single rivet on the airframe. The total number of composite parts in the entire airframe amounts to only one hundred and fifty. This is as opposed to the many thousands of parts in the original Comanche, where screw heads and rivets stand proud all over the air-



Ravin 500 layups being done with AIREX® Foam



frame. The Ravin is in fact slightly smaller than the Comanche all-round. The entire aircraft has been scaled down some 6% to 7%, but the cabin is still roomy enough to be very comfortable. The all-composite structure is in



fact an all-sandwich construction, which provides the necessary stiffness without adding weight. SA Ravin uses epoxy resin, glass- and carbon-fibre and rigid foam cores. The core materials of choice are AIREX® R63 and C70 rigid foams throughout the aircraft. For the wings, which have to absorb forces up to 5 'g', the unique, ductile and shock absorbing AIREX® R63 is used. For the fuselage and cabin, the choice is AIREX® C70, a cross-linked PVC foam with excellent mechanical properties. The combination of these two foam cores is certainly ideal for this application.

The Ravin combines high speed and performance with delightful handling characteristics throughout its speed

regime. The controls are light and extremely responsive, not only while cruising, but also during take-off, approach and landing.

The Ravin has been demonstrated at the Ermelo, EAA and Rand Airshows. The aircraft showed off its capability in the rolling plane by flying fast, super-slow and hesitation rolls. All of this in a four-seater cabin class machine!

The Ravin is simply and undoubtedly one of the most exciting and exhilarating cabin class aircrafts. It combines grace, beauty, exceptional handling qualities and unusually high cruising speeds with good load carrying capability over long distances.



Inside the Ravin 500

## Core Kits – a service that saves you money by improving productivity

**Some builders find it difficult to pay someone else to perform a service that can be done «in house», or to pay more for a finished product than what they pay for the raw materials in that product. That is the basic dilemma that all builders face when confronted with the choice of whether to incorporate finished Core Kits into their production process. However, more and more boat builders and wind blade manufacturers are opting to use prefabricated Core Kits either delivered directly from Alcan Baltek (KitKore™) or from one of the many core converters associated with Alcan Airex. Let's take a closer look at the advantages that prefabricated kits provide to these builders.**

### 1. Accuracy and Consistency –

Prefabricated kits are cut by specialists using either permanent patterns or CNC routers and band saws. Each kit for a specific model is identical to the last one. This allows builders to be confident that there will be zero time spent in correcting the fit of the kit by cutting or trimming pieces to the proper shape. If modifications need to be made to further improve the accuracy of a specific kit, these can be incorporated into the revised pattern or the revised kit cutting program. All required edges have fillets already cut, and all cut-outs are already incorporated. A properly patterned prefabricated core kit is consistently complete and accurate every time.

**2. Wider Choice of Materials –** A prefabricated core kit can incorporate

several different core types, densities, and thicknesses to specifically meet the core requirement in that particular area of the part. All too often, builders will try and utilize one core type, density, thickness and cut configuration in order to simplify their ordering and inventory requirements. Indeed, the wind energy business has already embraced the whole concept of «Hybrid Kits» which use a variety of different core types and configurations to suit the requirements of specific portions of the blade. The use of prefabricated core kits allows builders and engineers much greater latitude in developing the optimum, most cost-effective solution to a core installation.

### 3. Reduced Sheet Goods Inventory –

By accepting the delivery of a prefabricated kit, the builder can substantially reduce or even eliminate his required inventory of sheet good materials. This greatly reduces the amount of invento-

ry required and frees up space for other uses.

**4. Just in Time Delivery –** If purchased from an authorized distributor, the prefabricated kits can be delivered on a bi-weekly basis exactly as required to meet the builder's production schedule. This again reduces inventory and improves the company's bottom line.

**5. Improved Productivity –** Because the kit is accurate and fits every time, «right out of the box», the lamination of the part proceeds quickly with no slowdowns to fit the pieces of core properly or to fillet the edges. Parts are produced in substantially less time with greater accuracy and fewer voids.

**6. Improved Quality and Reduced Warranty –** A consistent proper fitting core greatly reduces the number of voids in the laminate, especially between pieces of core and at the edges



KitKore™ usage

of the core. Voids can cause stress concentrations in the laminate and can accumulate and transmit water through the laminate. These potential warranty claims are greatly reduced by using properly fitted core kits.

**7. Reduced Waste** – Cutting and fitting your own core installations, often one at a time, and often right on the part,

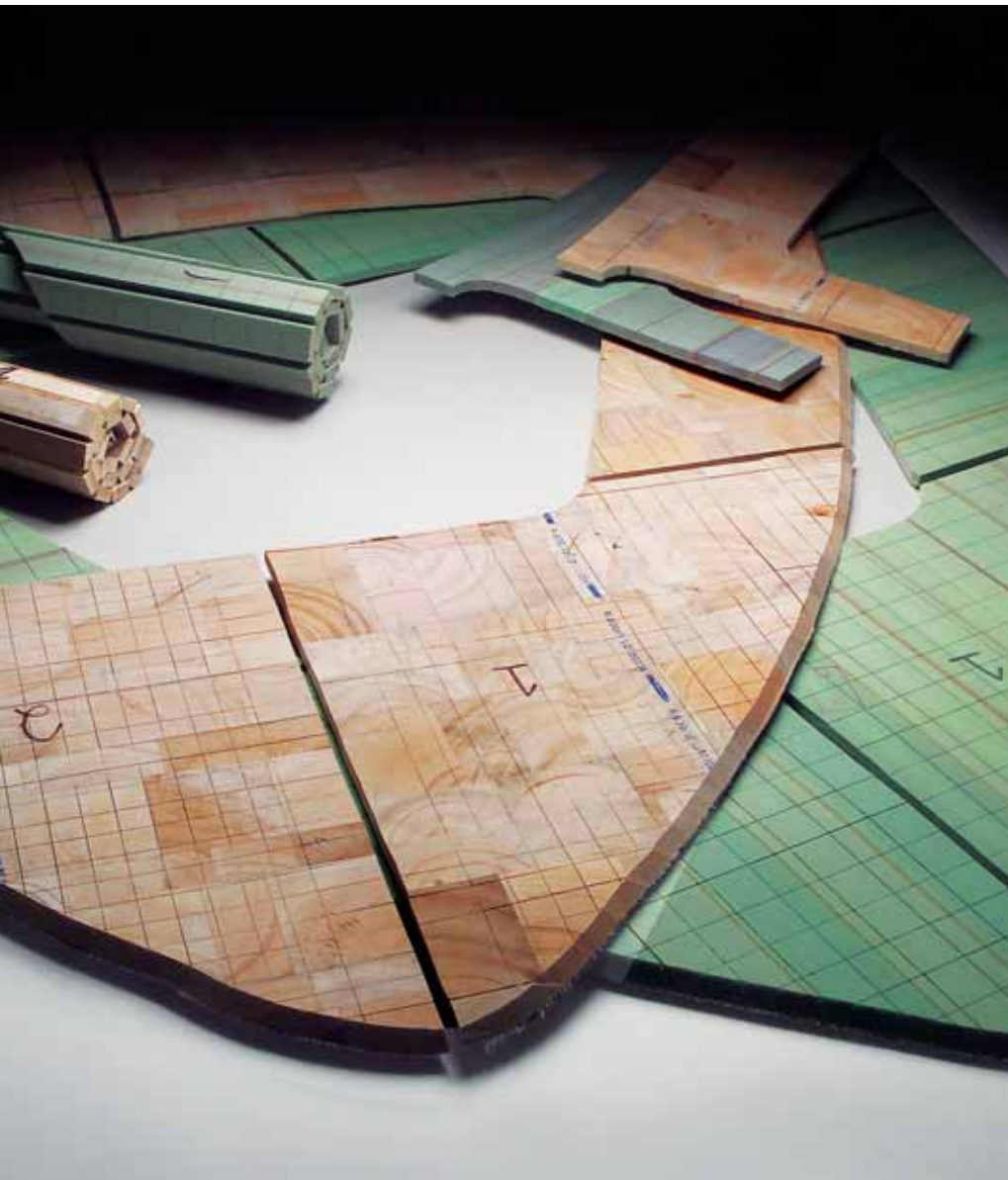
can generate a substantial amount of waste core. A precut core can take advantage of sophisticated nesting software or even professional experience to reduce waste and utilize any excess material in smaller kit pieces.

**8. A must for Infused laminates** – More and more boat builders and a high percentage of wind blade manufacturers

have made the transition to vacuum infusion. Vacuum infusion demands tight-fitting, accurate and consistent core installations. Poor fitting cores will result in voids leading to hot spots, excessive shrinkage and «Pace tracking» of the resin flow. Precut core kits eliminate all these problems, resulting in a perfect part every time.

Therefore, despite the higher price for the precut core kit compared to the equivalent amount of sheet goods, and the fact that you are paying an outside supplier to perform a function that you think can be performed «in house» more inexpensively, almost all builders who have examined the question in detail opt for the use of precut core kits to achieve the very real savings and advantages listed above.

For more information on how you too can reap the substantial benefits that core kits generate, please contact us.



KitKore™ Structural Core Kits



KitKore™ usage

## Temperature of a sandwich panel when exposed to sunlight

**It is well known that material will heat up when exposed to sunlight. Black surfaces will become hotter than white ones. No one is surprised that people in Mediterranean countries will paint their homes white or that in summer time we like to wear light-colored shirts and sailing boats are usually painted white. However, after the success of the Alinghi in the last Americas Cup in New Zealand in 2005, boats with dark colors became trendy and some boat-owners demanded a dark colored sailing boat.**

What about these surface temperatures anyway? How hot will a dark painted panel be, when exposed to direct sunlight? How different are the surface temperatures of a white and a black painted surface? What temperatures will I find in the core material? To answer all these questions a panel was made with incorporated thermo-

couples to determine the temperature of the panel surface and the core material. On both sides of a 40 mm thick foam core (AIREX® C70.75) a 2 mm-thick glass fiber reinforced skin was hand laminated. One side was painted black and the other white. A cross section of the panel and position of the thermocouples is shown in figure 1. The cut through the panel is shown in figure 2.

Then the panel was exposed to the light intensity of 12 bulbs with 150 Watt power each and the temperature of the panel recorded as a function of time (Figure 3). By varying the distance of the panels to the bulbs different light intensities were simulated. Afterwards the panel was exposed to the real sunlight outside of the lab to confirm the measurements gathered so far. The panel was put in a 45° angle to the ground, exposed to the south outside of the lab building. These tests were done in October 2006 in

Switzerland. The results of the test are summarized in Table 1. The list shows the maximum temperature measured for the different intensities. For the maximum intensity of 1.18 kW/m<sup>2</sup> the tests were cancelled after one hour without having reached a constant temperature. All other tests were held until a uniform temperature was reached in the panel.

The intensity of approximately 1 kW/m<sup>2</sup> simulates the sun intensity at the equator around midday. A value of 230 W/m<sup>2</sup> represents, on many places of the oceans, a mean value of sun intensity throughout the year. The outdoor test done in Switzerland also represented mean value for Switzerland. From Table 1 it is obvious that the temperature rise in the panels due to sunlight exposure is quite remarkable. Even with a rather low intensity of 230 W/m<sup>2</sup> the black panel showed a temperature of 85°C just below the surface skin, while the white side only reached 73°C. For both panels the temperature inside (opposite the sun) became 32° and 34°C. And the center of the foam core was 57°C and 58°C respectively.

These measurements show that, due to sunlight exposure, the temperatures of a foam core material will reach relatively high values. Depending on the intensity of exposure and whether the panel is painted white or dark. A white paint will reduce the surface temperature by up to 20°C. Furthermore, white panels react more slowly to intensity changes than black panels, which also reduce the temperature rise in the foam core material. This is clearly demonstrated by the outdoor experi-

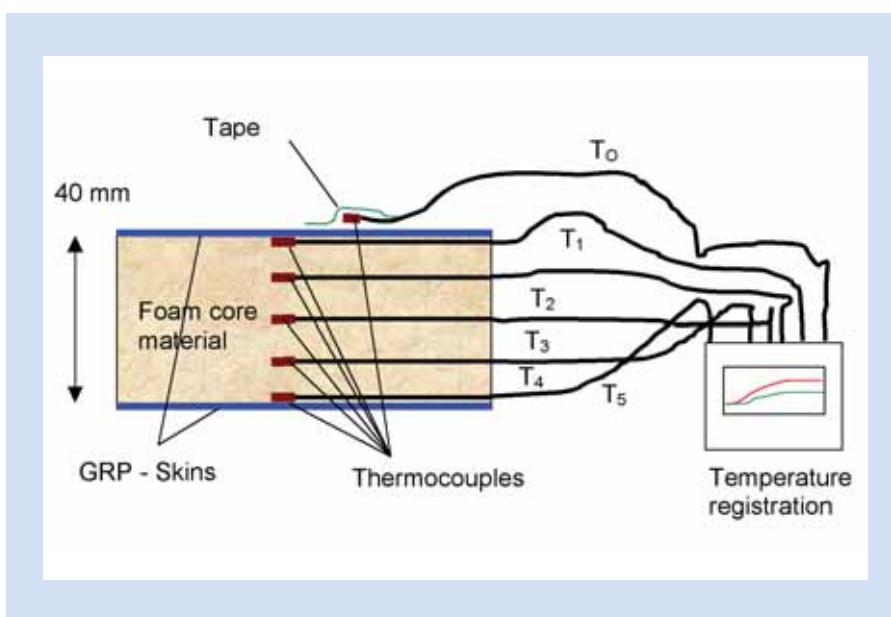


Fig. 1: Schematic drawing of the cross section of the panel and the position of the thermocouples in the foam.

ments. The white side showed a maximum surface temperature of 55°C, but the temperature just below the skin was only 47°C, because the sunlight exposure was too short to heat the panel to higher temperatures. When the sun was covered by clouds the surface temperature dropped immediately, whereas the temperature below the skin dropped very slowly. Bearing these temperatures in mind and remembering that the mechanical properties of foam core material will decrease with increasing temperatures certainly makes us think about the painting of our boat and the maximum allowable stresses in the panel. AIREX® C70, for instance, shows a 20% decrease in mechanical strength at 60°C and a 60% decrease at 80°C. This fact must be accounted for when designing a boat. Additionally, the panel position must be thought of. Side walls will surely see less sunlight intensity than a deck panel or the superstructure.

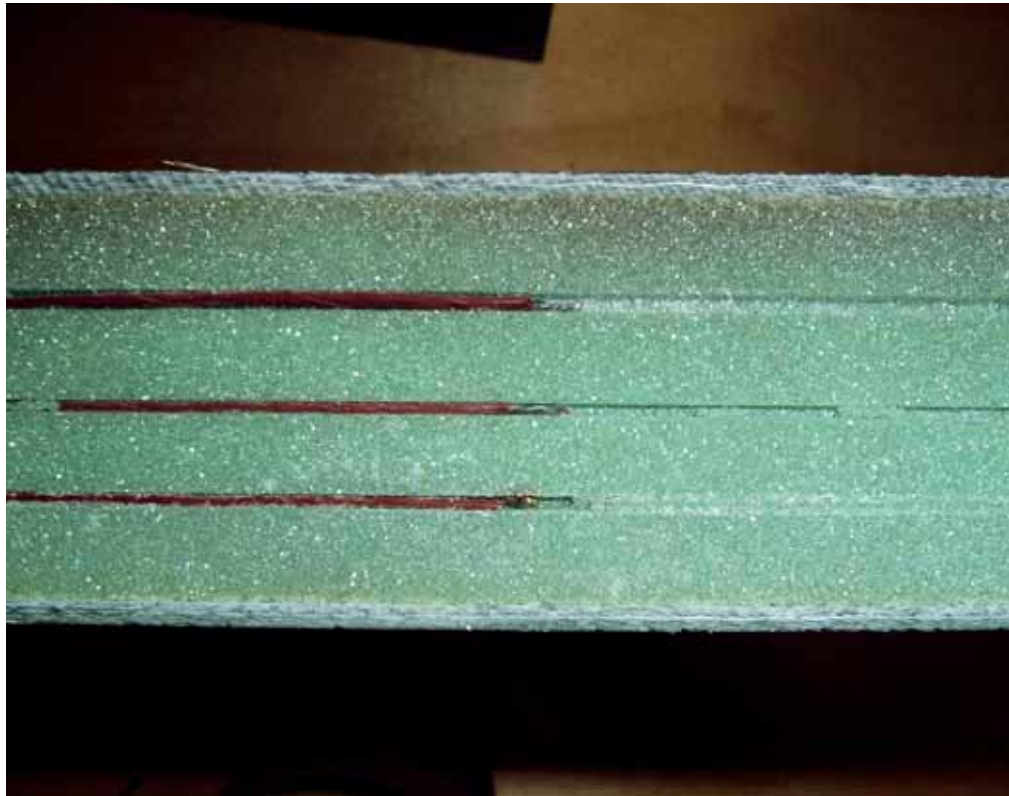


Fig. 2: Picture of the position of the thermocouples in the foam core. The top is the dark skin the bottom the white skin. The thermocouples are 10 mm apart from each other.



Fig. 3: Test equipment. The panel with the thermocouples is put underneath 10 bulbs of 150 Watt power each. After lighting the bulbs, the temperature of the panel as a function of time is recorded. The sunlight intensity may be varied by varying the distance between bulbs and panel.

**Table 1: Maximum temperature at given sunlight intensity. T<sub>0</sub> surface temperature, T<sub>1</sub> temperature directly under the skin, T<sub>2</sub> 10 mm below skin, T<sub>3</sub> 20 mm below skin, T<sub>4</sub> 30 mm below skin, T<sub>5</sub> 40 mm below skin (= directly below second skin)**

| Intensity             |                    | T <sub>0</sub> | T <sub>1</sub> | T <sub>2</sub> | T <sub>3</sub> | T <sub>4</sub> | T <sub>5</sub> |
|-----------------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1184 W/m <sup>2</sup> | black              | 103            | 126            | 107            | 85             | 65             | 41             |
|                       | white              | 98             | 107            | 95             | 77             | 58             | 40             |
| 516 W/m <sup>2</sup>  | black              | 88             | 110            | 92             | 72             | 54             | 35             |
|                       | white              | 89             | 96             | 88             | 74             | 57             | 39             |
| 230 W/m <sup>2</sup>  | black              | 74             | 85             | 72             | 58             | 45             | 32             |
|                       | white              | 66             | 73             | 69             | 57             | 45             | 34             |
| Outdoor test          | black <sup>1</sup> | 65             | 74             | 65             | 53             | 43             | 32             |
|                       | white <sup>2</sup> | 55             | 47             | 45             | 40             | 35             | 30             |

<sup>1</sup> Date 30. 9. 2006. Maximum ambient temperature 22°C, approx. 6 sun hours

<sup>2</sup> Date 9. 10. 2006, Maximum ambient temperature 15°C, approx. 4 sun hours

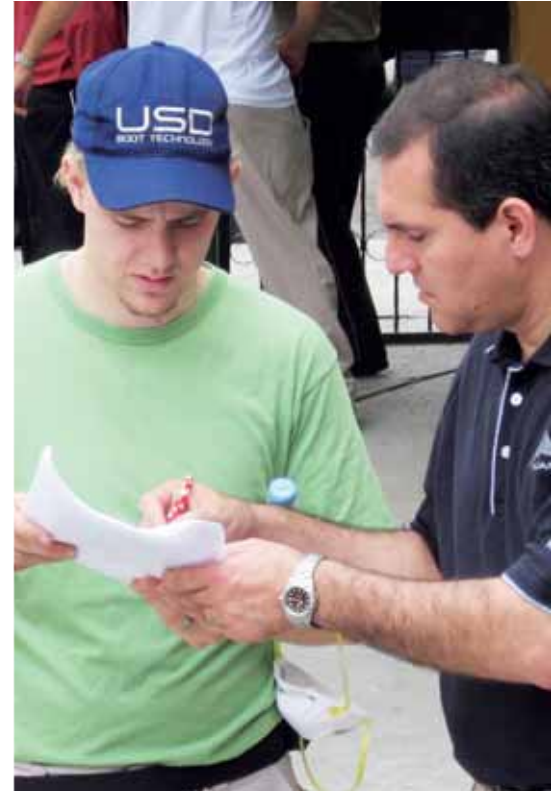
## ACCM and Ecuadent – providing help to the children of Ecuador

**Alcan Composites Core Materials has been in the balsa business for over 60 years. Since the vast majority of the world's balsa supply comes from the little country of Ecuador in South America, Alcan Composites Core Materials has also had a very close relationship with the people of Ecuador for those same 60 years. That commitment to Ecuador has evolved to the point of operating four permanent manufacturing facilities, with the ownership of over 18,000 acres of balsa plantations, throughout the country. Therefore, when Alcan Composites Core Materials was looking for a community service project, it was only logical to focus that project on the people of**

**Ecuador. Thus started Alcan Composites Core Materials' involvement with Tammy Fesche and the Ecuadent Foundation.**

Ecuadent is a non-profit organization founded by Tammy Fesche in 1990 to provide free medical and dental care to the needy children of Ecuador. This service is provided by volunteer health-care professionals from the United States who travel at their own expense to impoverished villages in Ecuador to provide desperately needed treatment, from cleft lip and palate surgery to difficult dental extractions. Alcan Composites Core Materials is proud to help Ecuadent and support their efforts to help the children of Ecuador.

Raphael Studer (left) and Mauricio Valdivieso (right) discussing the paint plan.





Alcan regularly contributes to the Ecuadent Foundation through monetary donations, toys, clothing, and school supply drives. Over the years Ecuadent has regularly selected one of the neediest and most neglected orphanages in its mission area to provide dental and medical care. When Alcan Composites Core Materials held their Annual Sales Meeting in Guayaquil, Ecuador this summer it was only fitting that they tried to provide more immediate and direct assistance to Ecuadent. Last year, Tammy Fesche, executive director of Ecuadent, and Marc Anderson, Director of Sales and Marketing for Alcan Baltek Corporation, proposed to Derek Lamb, General Manager of Alcan Composites Baltek Ecuador, to help by repainting the Infante Juvenile de Varones. This

orphanage provides food and shelter and a safe learning environment for abandoned and orphaned children from the city, some of whom have special needs. This establishment, which is consistently underfunded, was falling into disrepair and was in desperate need of a face-lift. Fortunately the international sales meeting of Alcan Composites Core materials scheduled for July in Ecuador coincided with Ecuadent's medical mission to Esmeraldas, and the renovation project was made possible.

Organized by Tammy with help from Mauricio Valdivieso, Raphael Studer and Tanya Peñalosa of Alcan Composite Core Materials Ecuador, the sales team gathered at the Orphanage on the morning of July 18th. After don-

ning gloves and masks (EHS First!) they started in with rollers and brushes to repaint the entire interior and much of the exterior of this fifteen-room-concrete structure. Pausing only for lunch, the 25 strong ACCM work force finished their painting at 4 PM. The transformation between walls of dull browns and peeling paint in the morning to walls of clean vibrant blues, greens, and yellows in the afternoon was amazing.

Alcan is proud of its long relationship with the people of Ecuador and is pleased with the assistance that they could provide to the neediest members of that society through the efforts of Ecuadent.

If you would like to help these orphaned children, Ecuadent Foundation regularly collects children's clothing/underwear, toys, school supplies and, nowadays, used computers. Ecuadent is hoping to receive enough of these donations to fill a sea container bound for Ecuador around the December holidays.

**Contact:**  
**Ecuadent Foundation,**  
**Phone: +1 410 561 1800,**  
**e-mail: [ecuadent@gmail.com](mailto:ecuadent@gmail.com)**



Mauricio Valdivieso giving the final instructions before the Alcan Composites Core Material Crew can start to paint.