THE SECOND INTERNATIONAL 2006 - 2007

COMPOSITES DESIGN COMPETITION

FOR PROFESSIONAL DESIGNERS

W W W . C O M P O S I T E S O N T O U R - 2 . B E

composites on tour

THE JURY

Ron Arad (UK)

Adriaan Beukers (NL)

Stefano Casciani (IT)

Ignazio Crivelli-Visconti (IT)

Jure Miklavc (SI)

Carmen Rubio Palau (ES)

Philippe Picaud (FR)

Hans Robertus (NL)

Johan Valcke (BE)

Ignaas Verpoest (BE)

József Zalavári (HU)

ART. 1 CONTEXT AND OBJECTIVE OF THE COMPETITION.

The Composites-on-Tour-2 Team, a collaboration of eight European organisations (five design centres, two universities and one promotion organisation for composite materials), shall organise a series of events on "composite materials" within the context of the Science and Society programme on 'Research, Technological Development and Demonstration' of the European Commission. The general concept of the project is "bringing composites science & technology closer to the public through a global initiative linking science & design". See also www.compositesontour-2.be

ART. 2 ORGANISATION.

Design Flanders, a partner in this Composites-on-Tour-2 Team, shall co-ordinate, develop and launch the International Composites Design Competition for professional designers in cooperation with the other partners.

ART. 3 COMPOSITE MATERIALS.

In this design competition, composites shall be limited to fibre-reinforced polymers (or fibre-reinforced plastics, or FRP's), and in the following articles the term "composites" shall be understood to mean "fibre-reinforced polymers"! See reverse.

ART. 4 PARTICIPANTS.

The competition shall be open to all professional designers, groups or individuals, whether independent or internal to the firms, provided they are authorized by these firms (document is required – see Art. 10). Each participant shall be allowed to present three projects.

ART. 5 SELECTION CRITERIA.

The competition shall focus on consumer goods that exploit composite materials in an excellent and exemplary way. This means that the entries must use the material intelligently and should be both technically and "non-technically" innovative.
Two types of design objects shall be eligible:

Category 1. Products commercialised between 01/01/2003 and 01/09/2006.
Category 2. Prototypes that are experimental, but realisable.

ART. 6 AWARDS .

Two awards shall be given.

One award for category 1: seven thousand five hundred euros
One award for category 2: seven thousand five hundred euros

ART. 7 JUDGING.

The members of the jury shall be:
Ron Arad,
designer (UK)
Adriaan Beukers,
prof. of composites at Delft University of Technology (NL)
Stefano Casciani,
editorial consultant Domus (IT)
Ignazio Crivelli-Visconti,
prof. of composites at University of Naples (IT)
Jure Miklavc,
designer (SI)
Carmen Rubio Palau,
designer at Seat (ES)
Philippe Picaud,
design director at Decathlon (FR)
Hans Robertus,
senior studio designer at Philips Design (NL)
Johan Valcke,
chairman of the jury, director of Design Flanders (BE)
Ignaas Verpoest,
prof. of composites at Katholieke Universiteit Leuven (BE)
co-ordinator of the Composites-on-Tour-2 project.
József Zalavári,
designer (HU)

The jury sessions shall take place on **22 September 2006** in Brussels.

The jury shall grant two awards and make a further selection of products that will be shown first in the Design Flanders Gallery in the heart of Brussels. The number of products exhibited shall depend on their quality and the space available ($200m^2$).
All judgements shall be final. All contestants shall be notified in writing.
No requests for explanation concerning the judgements shall be accepted.

ART. 8 TRAVELLING EXHIBITION AND CATALOGUE.

The Award Ceremony shall be held during the opening of the first exhibition in the Design Flanders Gallery on 22 February 2007 at 6 pm.
The exhibition in Brussels shall be open from 23 February till 18 March 2007 in Brussels and will travel subsequently to Paris (March - April 2007), Barcelona (May 2007), Budapest (June 2007), Ljubljana (September 2007), Eindhoven (October 2007), and possibly to Korea (December 2007) and Japan (summer 2007 or January 2008).

A catalogue shall be published by Design Flanders.

All shipping to Brussels and all shipping back to the designers after the end of the travelling exhibition shall be the responsibility of the participants, including customs charges for the importation and exportation of the products.
All participants are strongly advised to insure their products during transport to Brussels and back home after the travelling exhibition.

During the travelling exhibitions the products shall be insured by the partners.

ART. 9 TIMING.

There shall be two different steps in this contest.

Registration deadline: 15 June 2006.

First we ask the participant to send (or e-mail) a letter of intent to participate to:

Design Flanders
Koloniënstraat 56, 6de verdieping
B-1000 Brussels, Belgium
fax +32 2 227 60 11 or info@compositesontour-2.be

The application shall contain:
- a letter of intent and motivation.
- the identity (see Entry form I) of the candidate.
- a C.V.
- a detailing of professional activities, plus authorization by the firm (if the person is employed internally in the firm);
  if no such document is provided, the product will be mentioned/exhibited under the name of the firm.
- the number of projects sent in.

Submission deadline: 6 September 2006.
(Postmark serves as proof)

Participants submit entries to:

Design Flanders
Koloniënstraat 56, 6de verdieping
B-1000 Brussels, Belgium
info@compositesontour-2.be

The application shall contain:
- a description of the product and motivation.
- the technical card (see Entry form II).
- a minimum of 3 photos or renderings showing different views of the object (min. 99 x 149 mm) and a minimum of 3 digital images, printing quality (JPEG 300 DPI – format A4) on CD or sent by e-mail.
- a sample of the composite material used in the design (max. 10 x 30cm).

The photos and the sample shall remain the property of the organiser.

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2006 Endorsement by
icsid IDA
International Council of Societies of Industrial Design
A Partner of the International Design Alliance

EUROPEAN SCIENCE WEEK

ENTRY FORM I

LAST NAME OF THE DESIGNER: ______
FIRST NAME: ______
NAME OF THE DESIGN BUREAU: ______
NAME OF FIRM (IF THE PERSON WORKS INTERNALLY IN A FIRM): ______
ADDRESS: ______
POSTCODE/CITY: ______
COUNTRY: ______
PHONE: ______
MOBILE PHONE: ______
FAX: ______
E-MAIL: ______
WEBSITE: ______
PLACE AND DATE OF BIRTH: ______
NATIONALITY: ______

Will participate with ____ project(s) (max. 3).

Declares
→ that he/she shall comply with the competition rules.
→ that he/she has taken note of these rules.
→ that he/she agrees that in the event the product has been selected, it will be on display from February until December 2007.

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ENTRY FORM II

LAST NAME OF THE DESIGNER: ______
FIRST NAME: ______
NAME OF THE DESIGN BUREAU: ______
COUNTRY: ______
TITLE OF THE OBJECT: ______
FUNCTION OF THE OBJECT: ______
DIMENSIONS:
LENGTH: ______
WIDTH: ______
HEIGHT: ______
WEIGHT: ______
MATERIALS USED: FIBRE TYPE(S), POLYMER MATRIX TYPE(S) ______

USED MANUFACTURING/PRODUCTION TECHNIQUES ______

ON THE MARKET SINCE: ______
NAME OF THE PRODUCTION FIRM: ______
MARKET PRICE (EXCL. VAT): ______

PROTOTYPE: ______

PHOTOS: (MIN. 3)
DIGITAL IMAGES (A4 – JPEG 300DPI) ON CD: (MIN. 3)
OR SENT BY E-MAIL TO INFO@COMPOSITESONTOUR-2.BE
SAMPLE SIZE: (MAX.10 X 30CM)

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WHAT ARE COMPOSITE MATERIALS?

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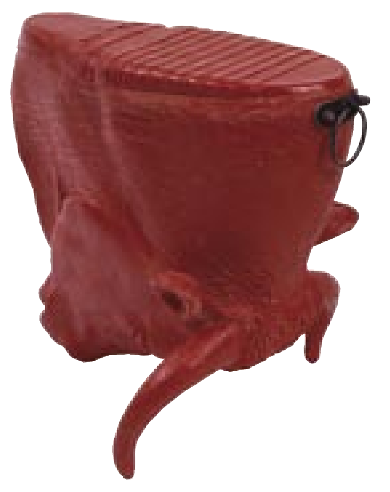
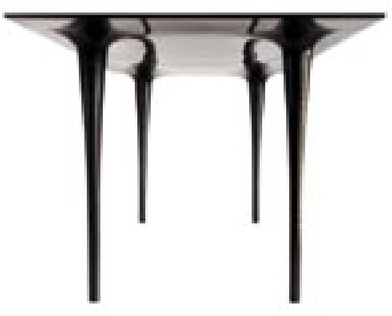


1 DEFINITION OF "COMPOSITES"

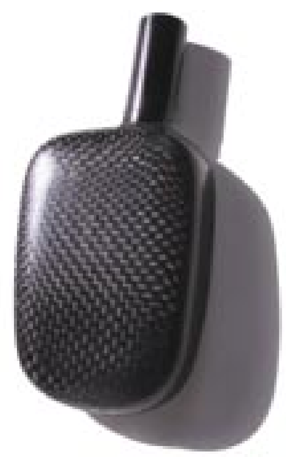
Composites are combinations of two or more materials with different, often complementary properties. They consist of a "**matrix**" phase, which can be a polymer, a metal or even a ceramic, and a reinforcing phase. **Fibrous reinforcements** are clearly predominant, though particulate and skeleton type reinforcements are also used. Similarly, by far the largest volume of composites have a **polymer** (=plastic) matrix.

Other names are often used for composites, such as "fibreglass" or "polyester". It will be shown later on that these names only refer to one part of the composite, namely either the reinforcement (e.g. glass fibre) or the matrix (e.g. polyester).



2 THE ADVANTAGES OF COMPOSITES

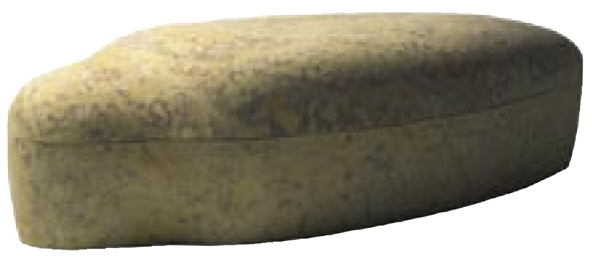
Composites are **light, stiff and strong**, and they allow both **large and small series** production at a greatly **reduced energy cost**. The lightness of composites also **increases energy efficiency when used** in transportation, machinery or sporting goods. **Natural fibres** can further enhance the environmental friendliness of composites.



3 THE MAIN TYPES OF (POLYMER) COMPOSITES

The most well known and "fashionable" are the **carbon fibre composites** (CFRP). This is because carbon fibres by themselves are almost "miracle materials": they achieve a stiffness and strength that can be double that of steel, at one-quarter the density. Carbon fibres have for a long time been rather expensive, but in recent years the price has drastically decreased (10 to 15 euro/kg), and numerous applications are now coming within reach. (They are often also called "graphite" fibres, which is not completely correct, because the inner structure of these fibres is not perfectly graphitic.)

Glass fibres (GFRP) are older (invented in the 1930s), slightly heavier and less stiff, but because of their low cost (1.5 euro/kg) they are used in numerous low cost applications.



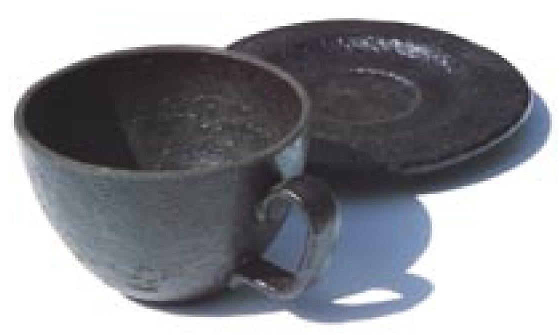
Recently, we have witnessed a strongly growing interest in **natural fibres** (flax, hemp, sisal, jute, silk, etc.) because they offer the possibility of using CO_2-neutral materials. They compare in density with carbon fibres and in stiffness with glass fibres.

Two types of polymer matrices exist: **thermoplastic and thermoset**. Polyester, epoxy and phenolic resins are widely used as thermoset matrices. Before being cured (or crosslinked) during the composite production process, they are very liquid, and hence easy to impregnate into the fibrous preforms.

Thermoplastics like polypropylene, polyamide (nylon), polyethylene etc. are much more viscous, and hence require different processing techniques (see further). Because thermoplastics can be remolten, and thermosets cannot, recycling is easier with thermoplastics than with thermosets.

Both thermoplastic and thermoset polymers are oil derivatives, but only 3% of the world's crude oil is used for making polymers, the rest being used for heating and transportation. Recently, **bioplastics** have been developed and become commercially available. Bioplastics are made from renewable resources like soja or linseed oil, and hence are CO_2-neutral materials.

A last distinction concerns the **biodegradability**. When left as waste in nature, some polymers will be destroyed by micro-organisms and concerted into biomass, minerals and humus. Both oil-based polymers and bioplastics can be biodegradable.



The Kyoto Convention encourages all countries to use "sustainable" technologies, which have no negative impact on our environment. Composite materials can in many ways contribute to realising this goal. The light, stiff and strong composite materials enable us to realise very energy efficient products, hence reducing the energy consumption of cars, trucks, airplanes etc.... Composite materials are very durable, and extend the lifetime of e.g. large windmill blades. And finally, when using natural fibres in a bioplastic or biodegradable matrix, fully CO_2-neutral high performant composite products come within reach!

4 MANY WAYS OF MANUFACTURING COMPOSITE PRODUCTS...

The mixing of fibres with polymers can be done in different ways. The production of "**short fibre reinforced plastics**" follows closest to the normal polymer processing routes: up to 30 weight percent of chopped fibres can be mixed with (mostly) thermoplastic polymers and processed in the usual way (injection moulding, compression moulding). The resulting properties of the composite, however, are not as good as when long or continuous fibres are used. This is why **continuous fibres** should be used for products which need better performance.

Continuous fibres are sometimes used as "unidirectional tapes" (strips of parallel fibres), but more often they are woven, knitted, braided, etc. into a **textile** structure. These fibre preforms are then impregnated with the polymer and processed into the final product. For thermoset resins, a variety of techniques are used, including hand layup, spray-up, resin injection (RTM, VARI, ...), compression moulding, autoclave, filament winding, etc. For thermoplastic composites, mainly compression moulding techniques are used.

The common characteristic of all these production processes is that they are **highly energy efficient** when compared to the production of metals (with which they compete in properties!), and that they result in **superior products** compared to those made out of pure (non-reinforced) polymers. Moreover, some of the production processes are rather easy: no high temperatures or pressures required, easy handling of the reinforcing textiles and the impregnation with a liquid matrix, etc. They also do not require big investments in production equipment.

For all these reasons, composites have always been very attractive materials for designers and product innovators!

design flanders — www.designflanders.be

JEC Group — www.jeccomposites.com

Design Platform Eindhoven — www.designplatformeindhoven.nl

Hungarian Design Council MFT — www.mft.org.hu

Műegyetem 1782 — www.pt.bme.hu

bio — www.bio.si

BCD Barcelona Centre de Disseny — www.bcd.es

Katholieke Universiteit Leuven — http://www.mtm.kuleuven.ac.be/Research/C2/poly/index.htm

Science Week — http://www.cordis.lu/scienceweek/