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Material Inspirations™

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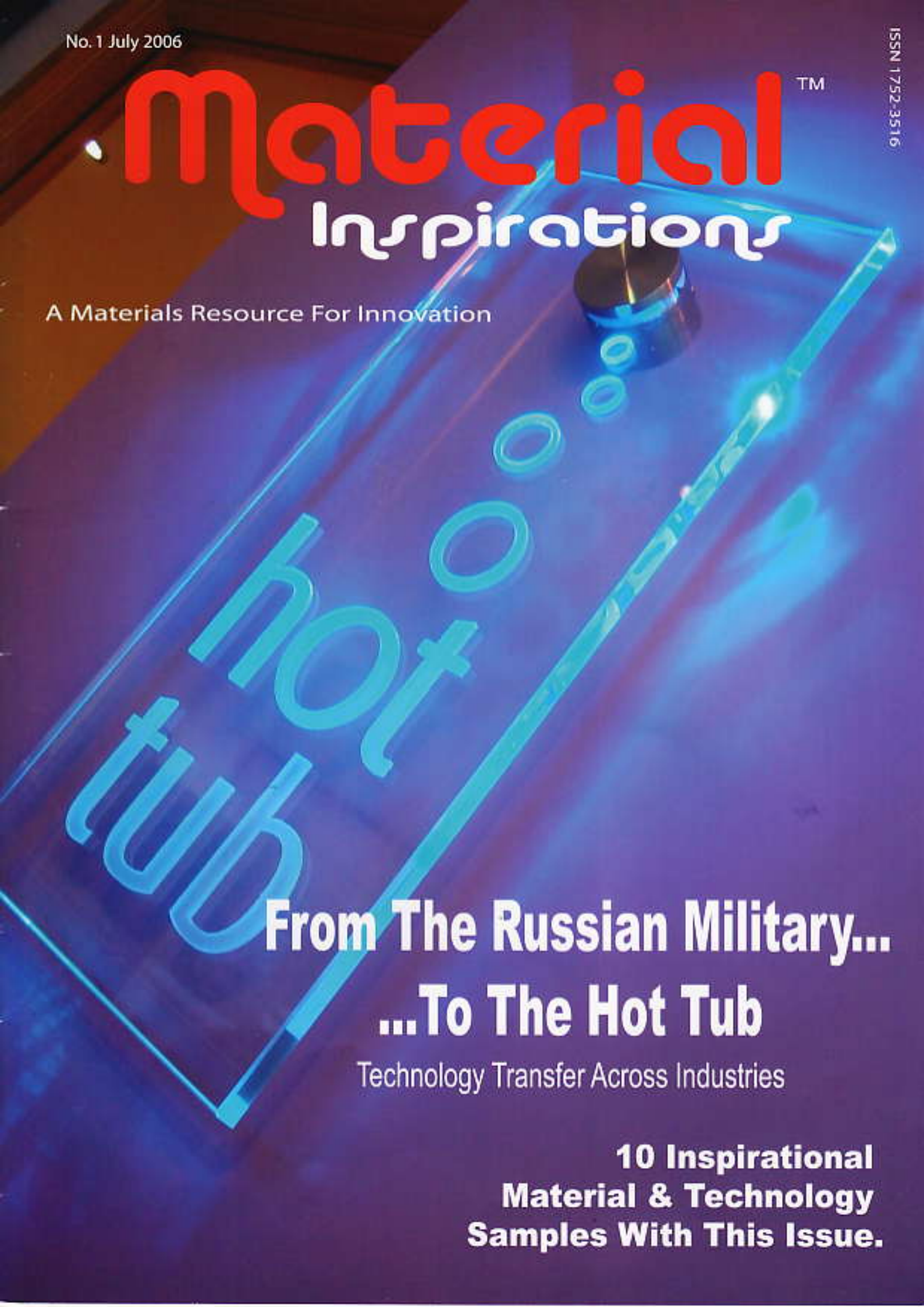
A Materials Resource For Innovation



From The Russian Military...
...To The Hot Tub

Technology Transfer Across Industries

10 Inspirational Material & Technology Samples With This Issue.

Cover Image

'Hot Tub' Sign.
Featuring Vitrics Glass.
Courtesy of Signbox Ltd.

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Material Inspirations - A quarterly publication showcasing innovative materials, processes and finishing techniques to designers, architects and product development specialists.

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This Issue's Materials

Feature.
Is it possible to judge the next material breakthrough in your field by looking at other industries - Technology Transfer may be the answer. Page 12 & 13.

Welcome to Material Inspirations.

This first edition of MI takes a broad look at 10 innovative materials and processes which have been selected on the basis of their unique properties and wide appeal. Each of the accompanying samples gives you the opportunity to experience the item, not simply read about it.

None of the items featured in this publication are there because the manufacturers have paid to have them included or offered other inducements. All have been selected on their merits, to excite and inspire.

If you want to find out more about any of the featured materials, the manufacturers or distributers contact details are listed beside each item.

Please join me in thanking the material manufacturers and distributors who have supplied samples to this quarter's issue.

Tina Rippon - Editor.

Blown Metal - Full Blown Metals

A water feature incorporating blown metal elements gives the aesthetics of soft sculptural materials with the hard wearing properties of stainless steel.

'Full Blown Metals' have developed 'Blown Metal' as an alternative to traditional metal forming processes. It's a unique patented way of forming metal that creates myriad new possibilities for metal forms. The appearance is deceptive as it transforms the cold clinical look of metals, such as stainless steel, into a softer more tactile material. The process used is similar to glass blowing except that the heat is replaced by high pressures and requires specialist equipment and a proprietary process. Blown metal products are produced exclusively in the UK.

Blown metal forms can be manufactured as either one-off's, batches or set up to be manufactured in larger numbers. The company is constantly creating new and unexpected forms and once a desired form is established it is repeatable. The best results so far have come from products made using stainless steel, however most types of metals could be used.

Each piece can be unique producing a strong yet lightweight form.

Theoretically any size is possible and currently individual blown pieces have been produced between 60mm & 4000mm, in a variety of thicknesses from 0.3mm up to 2mm. Before forming, the metal can be finished in a variety of ways including polishing, etching, embossing, texturising and colouring. After forming, even the most highly polished finishes are preserved, throughout the forming process only 1-2mm on the edge of the coloured metal is disturbed.

Material™ Inspirations

Sample 1-1

Multiple finishes are available to create innovative products

Product development costs will include prototyping development, such as CNC laser profiling and the material costs involved in physically blowing up scale model forms through to a full size version.
There are limitations to the process, very specific or complex forms may not be achievable and would therefore need to be assessed on an individual basis.

The process enables the production of eye-catching designs that combine the functionality of metals with unique aesthetics.

Blown metal is currently in use in a number of industries including interiors, architecture, furniture and consumer products.

Possible future uses include :

Interiors - furnishings, decoration, screens and radiators

Architecture - decorative elements, architectural and modular cladding for exteriors and interiors.

Product design - furniture such as tables, chairs and benches, tableware-bowls, serving-ware, lighting and mirrors.

Landscape design - outdoor seating, water features and plant display containers.

Public space - public art sculptural works, public seating.

Retail & exhibition design - signage, logos, retail store fronts and point of sale displays.

A blown stainless steel ashtray that uses sink plug components to reduce smoke and odours.

Table Design formed from blown stainless steel cushion shapes with a glass top.

Blown Metal Armchair.

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Images courtesy of Full Blown Metals

SIM from Tricycle

SIM from Tricycle is Realistic Carpet Simulation.

Carpet sampling and carpet product development have huge costs both economically and environmentally. Designers, specifiers and architects typically require several rounds of carpet samples to ensure that the colour, pattern and feel is right for a project. Each of these individual samples requires 1 quart of oil (about 0.95 litres) to be produced, take up to 3 weeks to be delivered and a carpet sample usually ends up being thrown away. In the US alone the carpet industry sends out an estimated 700,000 carpet samples annually. This translates to 175,000+ gallons of oil and more than 1 million lbs (454,000 kg) of carpet that end up in landfill!

Whilst there are initiatives to address carpet recycling there has been little attempt to lessen the environmental impact of carpet development and sampling, until now. Previous attempts by the industry to use digital photography, colour fields and texture mapping were less successful due to colour inaccuracies and the basic fact that the simulations did not closely resemble carpet.

SIM was developed by Tricycle's founders - Jamie Harrison & Andy Shipman in the UK and Jonathan Bragdon & Michael Hendrix in the US. They saw a way to create a digitally modelled carpet simulation that was colour accurate, with a realistic perceived texture and significant environmental and economic benefits. A SIM sample requires zero oil, 95% less energy and water, is 100% recyclable and can be delivered within 24 hours at a greatly reduced cost.

The realistic digital manufacturing of carpet and textiles requires that the fibre colours are accurate, each colour has to be programmed in, using specific light sources by Tricycle's internal team. The way the fibre moves through a carpet manufacturing machine is also mimicked in virtual reality, as a design pattern file is applied. The result is a simulated carpet or textile that looks precisely the same as the product when manufactured. SIM is viewable online or as high quality paper prints that are colour-accurate and have a realistic textural appearance.

Material™ Inspirations

Sample 1-2

SIM gives colour accuracy and textural realism, without the huge environmental costs of waste.

Today, nine of the top ten commercial carpet manufacturers in the US use SIM for product development prototyping and/or product sampling. A list of manufacturers who currently use SIM can be seen at www.tricycleinc.com/simplify. One example of an integrated online/print SIM, where a designer can explore over 5000 pattern and colour combinations online, can be seen at www.thoughtpatterns.com - Lees Carpets.

SIM is currently being used in the commercial carpet market by architects and interior designers to reduce the number of physical samples they request before their final product selection. SIM is also being used in marketing, websites and print collateral because it doesn't suffer from the colour inaccuracies of digital photography and in architect folders to show all colour combinations alongside a single physical "feeler" sample.

Tricycle focused initially on commercial carpet but having proven the technology, they are now spreading into other markets such as residential, as well as other surfaces and materials (including wall coverings, textiles and furniture).

In 2005, Tricycle's customers in the US shipped 37,701 SIM print samples to architects and interior designers, conserving 9,425 gallons of oil, preventing 56,551 lbs of landfill waste and, in the process, saving more than $5.1 million in sampling costs. Architects and designers created 77,998 SIMs and 385,208 room scenes online, further reducing the number of physical samples ordered.

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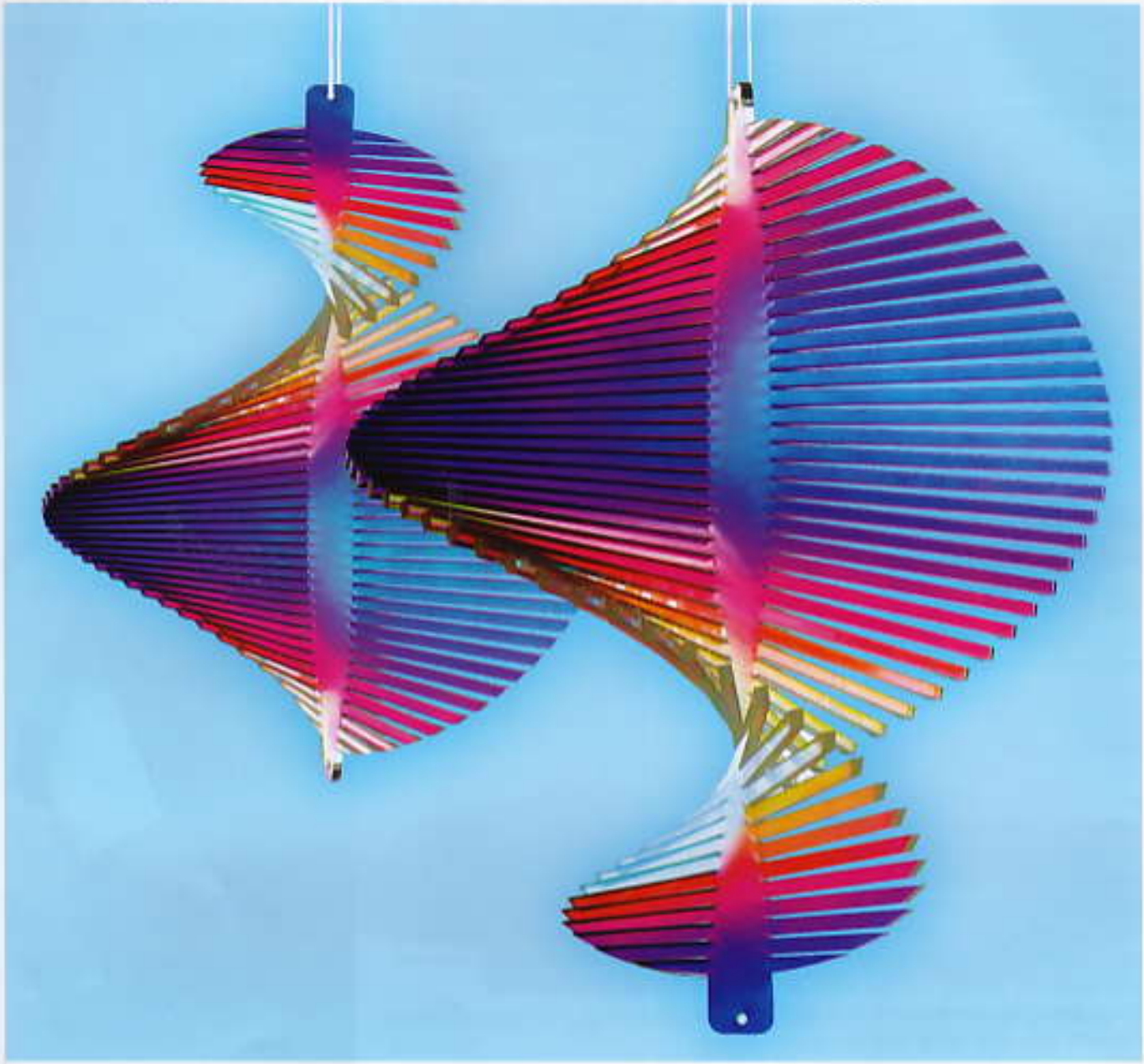
Photographs Courtesy of Tricycle.

Plexiglas Radiant from Degussa AG



Plexiglas Radiant provides a rainbow of eye-catching colours.

Plexiglas Radiant is a variant of partially transparent acrylic sheet from Degussa which offers a multi-coloured effect depending on viewing angle and the ambient lighting used. Plexiglas is formable, light weight, transparent and capable of being recycled following separation from other materials in the waste stream.

'Radiant' is produced with a surface coating on one side of the acrylic sheet. This coating is responsible for the shimmering 'rainbow of colour' effect. The Radiant variant can be fabricated like other grades of Plexiglas, however there are some limitations, such as; it is only suitable for indoor use, the inability to polish scratches off the coated surface and the degree of special handling required during fabrication.

Fabrication uses the same parameters and equipment as standard acrylic sheets but the coated surface needs to be correctly positioned and handled to get the best results. The sheet is supplied 3mm thick but other custom sizes are available.

Plexiglas Radiant shapes (Below) produced from acrylic blocks by wrapping, forming and bonding the sheet to create the desired shape and radiant effect.

Plexiglas Radiant is easy to saw, mill, drill, bend and polish. The coated surface should always be positioned at the correct angle to the machining tool and cutting tools should enter via the coated surface and exit through the uncoated side. It can be thermoformed between 150°C and 160°C to achieve a variety of shapes and is also suitable for moderate stretch forming using compressed air. The coated surface should be on the side exposed to tensile stress when thermoforming or stretching and users should be aware that stretching can decrease the rainbow effect. Bonding is possible using adhesives suitable for Plexiglas, with the best results achieved on the uncoated side. If a bond is required to the coated side, removing the coating from the area to be bonded will increase the bond strength.

Radiant can be used by creative and design professionals in advertising, shopfitting, exhibition construction, for POS fixtures, signage and displays. It also offers eye-catching and interesting effects for furniture, decorative accessories, for interior design and lighting. The potential perhaps for luminous walls is an interesting one and the combination with curved components, backlighting and LEDs could be very striking.

The relatively poor scratch resistance of the coating could be addressed via a sandwich technique, with a layer of scratch resistance coating or by encapsulating the coating between two layers of the acrylic. Once the bonding and potential delamination issues were solved, this could provide a material with an interesting depth of colour effect and fewer limitations.

Plexiglas Radiant can be bent simply and quickly on standard line-bending machines with the coated side on the outer surface of the bend. Heating requirements depend on the bending radii used.

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Sample 1-3

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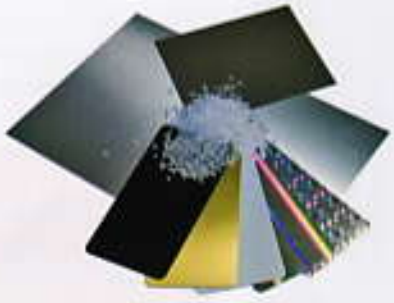
Images Courtesy of Degussa AG

Pressure Injection Forming - Corus

Pressure Injection Forming or PIF was developed within Corus Research Development and Technology. The initial starting point was a new Corus packaging material, developed for the can making industry, 'Protact', which consisted of a highly deformable low carbon steel with a few microns of polymer adhered to both sides. PIF came about when the question was raised about the possibility of adhering a thicker layer of polymer, several millimetres thick, to the same metal sheet.

Corus PIF enables designers and manufacturers to look at the potential for developing innovative and cost effective products that use steel sheets that are shaped and bonded to plastic elements within a single step, thereby eliminating several production and assembly stages. The technology uses a polymer coated metal sheet, 'Protact', inserted into an injection mould. During closing of the mould the metal sheet is shaped mechanically. When the polymer is injected a further hydrostatical deformation of the metal blank takes place, using the injection pressure of the polymer. During this phase, a physical adhesion between metal sheet and polymer is obtained so a mechanical interlock between the two materials is no longer needed. Protact materials show excellent formability



and adhesion with PP and PET and the various blends of each material, co-polymers and additives. The polymer coating on the steel protects the product from corrosion and preserves the metal gloss. Coatings can be coloured from transparent to opaque, with prints, mirror finish and holographic looks possible. They can also have functional properties including fingerprint, chemical and scratch resistance.

Corus have a dedicated PIF team with the expertise to help designers and manufacturing companies through the various stages from initial ideas to manufacture. The PIF approach should be incorporated into the product development process early on. This ensures the optimal use of both materials to integrate functions and combine their beneficial properties efficiently and cost effectively. Corus are working on new material combinations such as adhesion with PC-ABS, PBT and even ASA blends, together with functional and aesthetic improvements to the Protact family of materials.

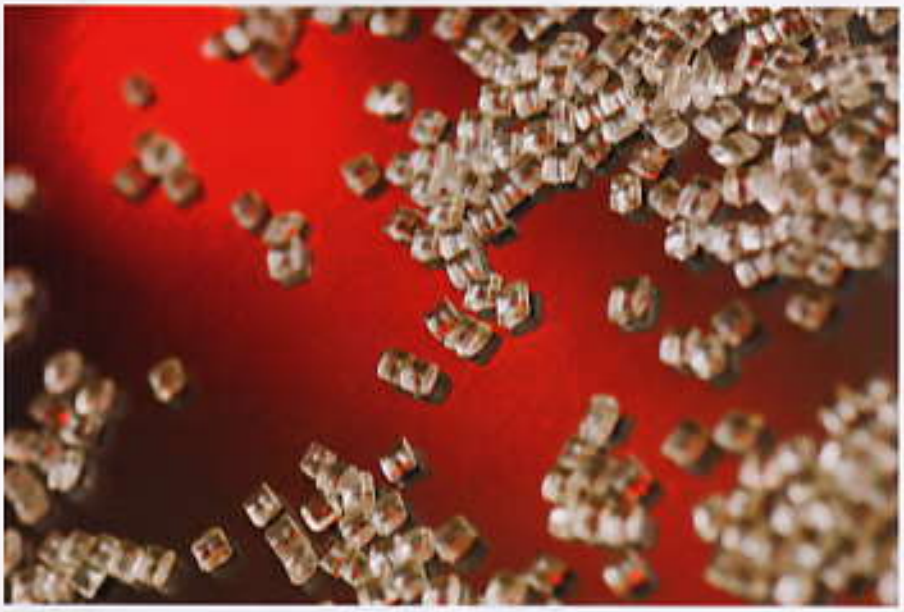
Material Inspirations Sample 1-4

Consumer electronics can benefit from stylish steel housings with EMC and electrical shielding, plus the polymer can provide enhanced assembly, integration of functions and sound dampening. Combining the structural strength of steel with the flexibility and freedom of form of polymers, brings out the best of both worlds.

There are a number of potential product improvements that this technology can help make possible. From added value to reduced production costs, product differentiation and increased functionality, to the reduction of part numbers through integration of functions, product miniaturisation and ease of assembly. With the use of PIF, polymer products can have a metal feel and the true metal properties which were previously impossible to create. Metal components can be combined with the flexibility (snaps, clamps, living hinges) of polymers. As well as the "real steel" appearance, the strength and stiffness of the metal sheet can be used to create structural parts. PIF components can also make use of the conductivity (heat, magnetic and electrical conductivity)

Domestic appliances (Bottom Left) using 'Protect Pristine' benefit from A-class surfaces in a variety of colours and designs plus the ability to incorporate useful polymer assembly and functional features.

The first product applications are being produced, and will be launched late 2006. Potential applications include small domestic and kitchen appliances, white goods, computer housings, consumer electronics, mobile phones, automotive interiors, medical equipment, furniture, leisure and sporting goods.



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Images Courtesy of Corus

Atmosphere Purifying Wall Paint - Ecos

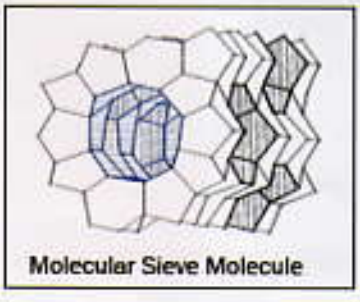
APP is an organic wall paint that offers a matt, high quality finish with intriguing properties.

APP is a unique eco-friendly wall paint system, that is completely odourless and free of solvents and VOCs (Volatile Organic Compounds). Formulated by Ecos in Lancashire to be "about 7000 times purer than their closest competitor", this novel paint system will, when dry, purify the air in the home or workplace by "mopping" up other VOCs, solvents and chemical air pollutants, including formaldehyde, from a wide variety of sources.

The air in a home or office space can be over 70 times more polluted than outdoors due to the complex cocktail of solvents and chemicals emitted from sources like carpets, furnishings, M.D.F, cleaning products and personal products like aerosols. The effect of this paint is similar to having an electrical air-purifier unit within each APP decorated room. The "magic" ingredient is a molecular sieve silicate that is added to the solvent-free paint formulation. These sieves are shaped like tiny molecular tubes with unique crystalline structures. Different types can be used to target specific molecules. The sieves used by Ecos work by trapping the VOC gas molecules and other pollutants from the surrounding airspace. Once removed, the VOCs are effectively neutralised and never re-emitted.

Tests show an overall reduction of VOCs, solvents and airborne pollution by around 98-99% down to about 1 part/million.

The product is available in 108 colours, is easy to apply by roller and produces a high quality matt finish, costs are a little higher than high end designer paints. There are some limitations as the functional effect lasts for approximately 5 years in a living room environment. This is because the reservoir of the molecular sieve material is gradually filled up and so becomes less effective over time. Maintaining the effect after 5 years therefore requires the room to be redecorated with APP. The system is not able to pick up and remove particulate pollutants such as mould spores, dust and pet hairs.



Molecular Sieve Molecule

Ecos Paints are used like normal wall paints, applied by rollers and can be applied over standard emulsions.

Environmentalism, the reduction of one's carbon footprint and 'healthy buildings, are now mainstream concepts. There is increased awareness of the effects of 'Sick Building Syndrome' and the number of people suffering from conditions like asthma, allergies and MCS (Multiple Chemical Sensitivity) exacerbated by the use of certain building and finishing materials. Some countries like Denmark, Germany and certain US states including California are legislating for these concerns. There are real and perceived benefits to those who produce, work and live in buildings that have incorporated environmentally friendly and sustainable materials and finishes such as APP.

The APP system is mainly being used in the home but has great potential for use in offices, factories, hospitals, health centres, schools, nurseries, social venues like pubs and restaurants.

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Photographs Courtesy of ECOS.

Technology Transfer.

Are other industries already making use of the next great discovery in your field?

There are thousands of examples of how technologies developed primarily for one purpose, in one industrial sector, have found their way into everyday use in others. Often, these technology transfers seem to be an obvious evolutionary step but without the benefit of hindsight, it is sometimes difficult to imagine what key factor sparked the process. The strategic management of technology can help you to identify where existing technologies in common use in other industries, can be applied in your own, significantly shortening the development timeline.

The strategic management of technology requires companies to understand their current technological position, know where they want to go and identify the way in which they are going to use technology to achieve their goals. Maintaining a competitive advantage through the use of appropriate technology is one of the key drivers for the success of any company. The basis for successful technology use is that it must help improve products, exploit new markets and most importantly add value for the consumer. Winning products carry unique benefits for the customer, they solve problems, they're innovative and superior - in the eyes of the buyer and have appropriate levels of cost and quality.

Businesses recognise that technology and technical know-how are significant assets. Many companies have developed their in-house portfolios of core competences and technologies. Their product ranges use these with ongoing improvement and quality programmes to enhance each offering. The strategic management of innovative technology means that companies have to consider the importance of retaining direct and full control of key technologies. Innovation requires companies to consider how and where new and emerging technologies are being developed and whether they need to develop in-house or acquire them externally.

Companies can look at technology assessment and development through external contract research firms, via research consortia or they can license technologies developed by other firms. They can undertake joint ventures to develop technology, acquire equity in another firm or buy another company with the prime objectives being to monitor and acquire technology. More informal methods of assessment and development of technology include reverse engineering, personnel mobility, trade shows, the internet and literature.

Technology transfer implies that a technology developed for one industry, organisation or purpose is then used in a totally different area. The European Space Agency (ESA), for example, lays claim to many examples of technology transfer. Shape Memory Alloys (SMAs) originally developed for light weight temperature controlled actuators within the ESA are now being used in the medical field to help mend bones and by dentists to help reposition teeth through SMA wire springs. The technologies used to construct the multiple layers of an astronaut's space suit (more than 10 different polymers are used) have been identified by architects as potentially helpful in the design and development of energy efficient, low cost sustainable housing.

Technology transfer can therefore be divided into two main types. The first is when an established technology is transferred from one company to another. The second is when the technology has been researched and developed within a university or research organisation and is then used in a practical way within industry.

Planning for the future is never easy but companies that recognise and identify the importance of possible future change and potentially useful technologies, tend to find it easier to make appropriate decisions.
One of the most useful planning processes is technology roadmapping. Technology roadmapping identifies and plots current, emerging and future technologies against future product requirements and customer needs. It is a useful tool for identifying existing technology strengths, weaknesses and opportunities with respect to specific markets and the acquisition of particular technologies. It can also highlight potential threats due to competition, disruptive technologies or technology gaps.

For example, some technology areas that may be highlighted during the roadmapping process for a consumer products company may be the fields of nanotechnology and smart materials. Technology roadmapping would help identify the different elements of nanotechnology and where functional or smart materials could provide improvements to the organisation's product lines and meet customer future desires.

It would then be possible to identify particular companies who have commercialised or who are in the process of developing appropriate materials and technologies and invest resources accordingly.

Case Study - Anti-Microbial Technology.
The brief was to find a way to add value to a "consumer" class 2b medical device and its associated range of products. Working with technology consultants, the design, marketing and technical departments began to build a technology roadmap, look at possible alternatives and then assess several potential technologies. The chosen technology was the use of anti-microbial additives which had not been used in this type of product previously.

Anti-microbial technology is available in different formats for use in a variety of industries and assessments of the functional and aesthetic performance of additives suitable for injection moulding from several sources were carried out. The introduction of this technology required a change of working practise and training at the moulding plant, where there was an associated learning curve. Following third party testing and an assessment of the technology offering from each supplier, an agreement was reached on the chosen method. Several million of these products are now available to the public. The chosen technology adds a tangible benefit to the consumer which they understand and for which they pay a premium.

Before making the final decision to introduce a new technology the company therefore needs to assess the technology and market, it's own state of readiness and ensure the right policies and business conditions are in place. Once a technology has been acquired it needs to be absorbed and implemented. This depends on the learning and developmental capability of the company. Technology transfer is rarely plug in and play. Having acquired the basic hardware and knowledge the company needs to ensure sufficient resources are available to implement the technology successfully.

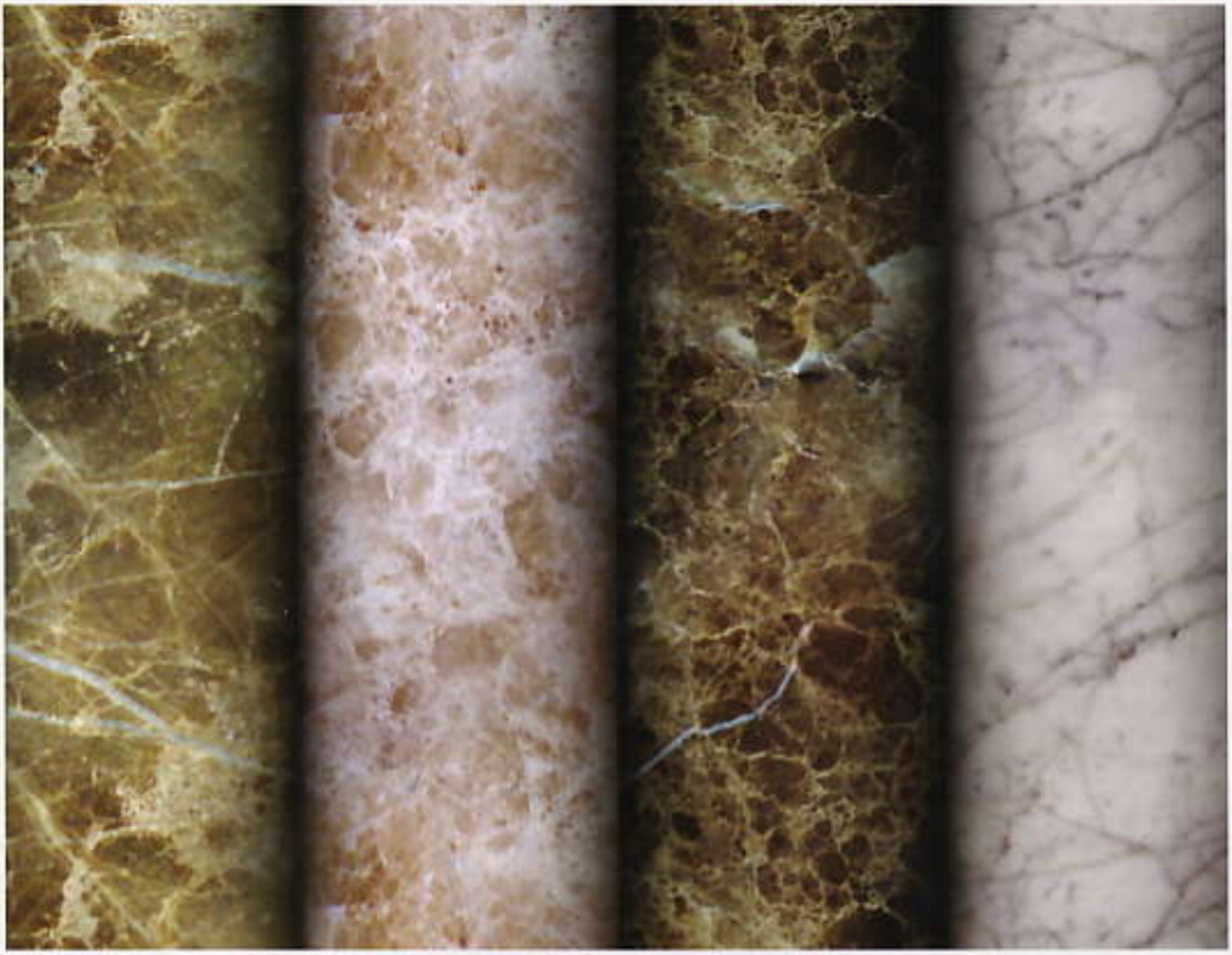
The advantages of technology transfer include the ability to shorten product development times and decrease time to market. It can also reduce risk and up-front capital costs. Technology transfers provide the potential to gain competitive advantage by increasing the barriers to entry for competitors and ensure exclusivity on certain markets or geographical sectors.

A creative designer works on not only the form and function of their design but also experiments with and compares those technologies and materials that can meet their product vision to find the best overall solution. The strategic use of technology roadmapping and technology transfer can provide designers, architects and manufacturers with the information and knowledge to make informed tactical decisions about technology assessments, transfers and investments, to provide superior products with improved aesthetic appeal and functionality.

BT's timeline,
www.btplc.com/Innovation/News/timeline/index.htm, is an imaginative and thought provoking starting point for developing your own technology roadmap.

MI Editorial Team.

Liquid Marble - Modern Marble Ltd



Liquid Marble, product and process.

Liquid Marble is a process that allows the simulation of complex marble and stone finishes in a novel, fast, efficient and cost effective way. The product was developed by Amanda Dyche, an artist and interiors specialist, who looked at traditional marbling techniques and their associated costs in interiors (often £100 per square metre or more depending on the contractors ability) and decided to develop an alternative process and associated products.

Liquid Marble was launched at the National Painting and Decorating show in September 2005 where it promptly sold out. Demand was so high that additional investment and manufacturing capacity were sought. Tennants Inks & Coating Supplies Ltd. have now provided facilities to enable Modern Marble to scale up production to ensure future demand can be met.

The Liquid Marble colourants consist of fine particles of organic and inorganic pigments dispersed in a specialist medium. The liquid marble colourant is poured into a spraying apparatus (a simple trigger spray bottle works well) (Right) and sprayed onto the surface to be decorated. The volatile component 'flashes off' on contact and leaves pigment behind creating 'watermarks' reminiscent of stone/marble on a majority of substrates. The pigments 'sink' into the surface and then can be continually activated with "Liquid Marble Extender", worked and blended together in order to attain the desired effect. Working the pigments pushes colours together thus creating striking colour combinations and the characteristic veining of natural marble or stone.

Marble and stone effects produced from the current range of Liquid Marble colourants and the Liquid Marble Extender.

Liquid Marble is best applied to a surface with some resistance and a slight key, such as satin emulsion on walls or etched glass. Liquid Marble has been applied to a variety of finishes including those with matt, satin and gloss base coats, the final finish will depend upon the surface to which the Liquid Marble is applied. A matt base gives a look akin to polished plaster whereas a satin or gloss basecoat will give an effect similar to polished stone.

Amanda Dyche, company founder, has demonstrated that from walls and art to furniture and lighting Liquid Marble is an extremely versatile product.

Liquid marble is currently being used in interior design for walls, doors, kitchen cabinetry, accessories and lighting in residential and hospitality areas. The finish that can be achieved can provide bespoke interiors for offices, health spas and gyms, hotels, restaurants and public areas. It can also, with appropriate base and top coats, be used for exterior applications.

It would also provide the potential for customisation of consumer products from mobile phones, decorative accessories and lamps to furniture. The product is currently designed for hand application however; there is the possibility for semi-automation. Potential applications can also be envisaged within the high-end automotive, marine and aircraft interiors industries.

Extra colours can be added and the colours blended together with brushes, sponges or rags to create the desired stone or marble effect.

Material Inspirations

Sample 1-6

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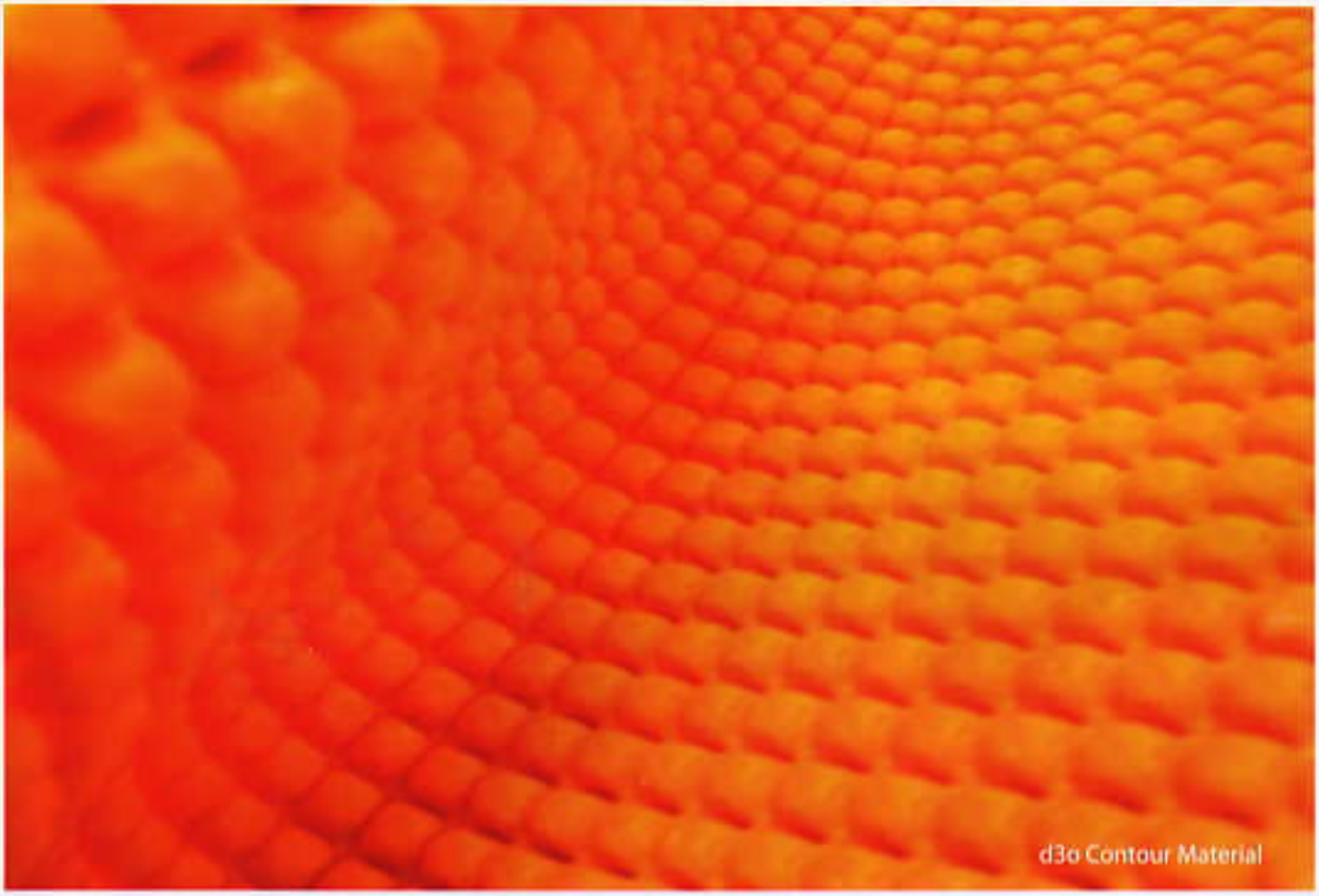
Images Courtesy of Modern Marble Ltd

d3o from d3o Lab



d3o Contour Material

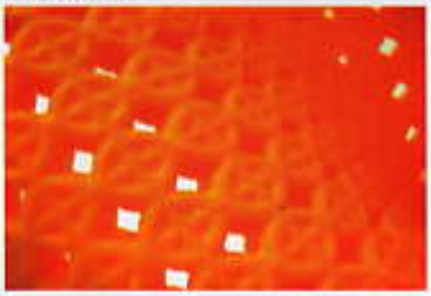
d3o is a specially engineered, patented material, made with 'intelligent' molecules. They flow with you as you move but on shock or impact they lock together to absorb the energy and form a protective barrier.

The original concept for d3o came from the now CEO of the company, Richard Palmer. He recognised that there were technical opportunities inherent in certain sheer thickening fluids. Over five years of research d3o lab have found innovative ways these properties can be introduced into elastic materials, thereby creating the current range of d3o materials and components.

Material Inspirations

Sample 1-7

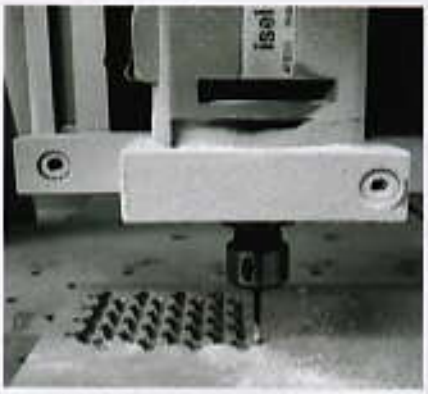
d3o Mesh (Below) is a perforated textured sheet specifically designed for comfort, flexibility, breathability and medium levels of shock absorption.



It was discovered that this new lightweight reactive composite had revolutionary properties. When movement is slow, or natural, the molecules are free flowing, making the material soft & flexible, allowing excellent freedom of movement and body fit. As soon as the material begins to experience impact however, the molecules lock, absorbing the impact force and providing high shock absorption. Then, as soon as the impact is over, the molecules return to their natural free flowing state without adverse effects on the material's properties. All this happens in just a fraction of a second. These revolutionary properties open up many possibilities for improving current products and creating new solutions to customer needs. The initial design pathway d3o lab chose to take was in the impact protection sportswear market, particularly for bony parts of the body such as the elbow, knee, shoulder and coccyx areas.

'Icon' Skateboarding shoe from Globe uses d3o mesh components

d3o Lab has excellent facilities for working with designers and client companies to help them incorporate d3o into their designs. They can provide standard products that come in sheet form, or components for body shapes. They can also provide bespoke shapes in-house through their design, CAD, CNC machining and casting facilities. (Below)



d3o Lab also works with development athletes, who are experts in their field, to ensure that d3o components can be designed and tested specifically for each sport.

Standard Knee Component

There is enormous potential for d3o in a wide variety of industries. d3o Lab's initial work has been primarily focused in the sportswear market, providing impact protection solutions in areas as diverse as snow sports, polo, mountain biking, skateboarding and football. In apparel you can incorporate flexibility as well as protection, thereby potentially enhancing performance. American alpine skiers Julia Mancuso and Ted Ligety won gold at the Turin Olympics wearing Spyder skiwear which incorporates d3o at strategic locations in their race suits.

Spyder Skiwear Incorporating d3o

d3o has been utilised as a protective feature in a new range of ski race wear by Spyder, in ski apparel such as the 'Protector S 2+' & 'Protector' pants by Schoffel, in garments made by Kjus, in 'Unshok' ski and snowboard gloves by Reusch and in the Ribcap, a soft hat made with d3o.

d3o is not penetration resistant, if this property is needed it must be used with either a hard shell, penetration resistant fabric and/or materials like Kevlar. Military applications such as ballistic protection could therefore utilise d3o in conjunction with other materials.

Footwear applications have shown great potential for the material, the company have had excellent independent test results showing high energy return AND high shock absorption.

Other potential uses include: Within prosthetic limb development, emergency services' protective apparel, automotive interiors, vibration isolation and industrial applications.

Testing Facility

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Photographs Courtesy Of d3o Labs

Easicard from Easibind International

At first glance polypropylene may not appear to be the most unusual material to showcase but when a company is able to do as much with it as Easibind, it becomes a very different prospect. Easibind have commercially developed 'Easicard' as a high performance and innovative graphic card, produced from polypropylene, as an alternative to traditional paper and fibre based materials.

Easicard is stronger and more durable than any conventional card based material. It is lightweight, waterproof, hygienic, colourfast, lightfast, recyclable and will not tear. Polypropylene can be difficult to print onto but Easibind has developed in-house techniques enabling the use of the latest high definition print technologies and finishing processes including uv litho, silk screen and digital. Additional techniques, like colour engraving, enable depth and texture to be stamped into the material and can include metallic and holographic foils where required. Distinctive special effects can be achieved using exclusive printing techniques such as 'Moving Pictures in Print', which is based on existing Lenticular technology. The sample swatch pack gives some indication of the variety of colour choices, vibrant graphics, finishes and material weights that are available.

Moving Pictures (Right) - part of the range of techniques offered by Easibind, helping designers to differentiate products. It has been shown that 3D print has 5 times the stopping power when compared to conventional 2D print.

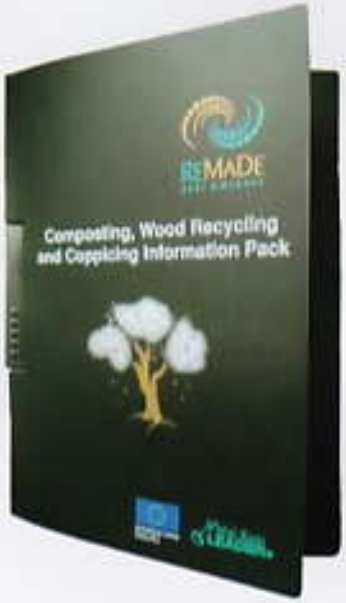
Easibind won a Starpack Award for their innovative Wrap design for Kent hairbrushes. The Wrap offers minimalist packaging with maximum protection, which reduces material wastage and lowers cost.

The material is used within many different industries including automotive, health and beauty, education, financial services, publishing and stationery amongst others. It can contribute to the professional look of presentations and reports and is particularly useful for packaging and promotional items. Easicard's visual and textural appeal ensures the product or event is memorable and stands out from the crowd.

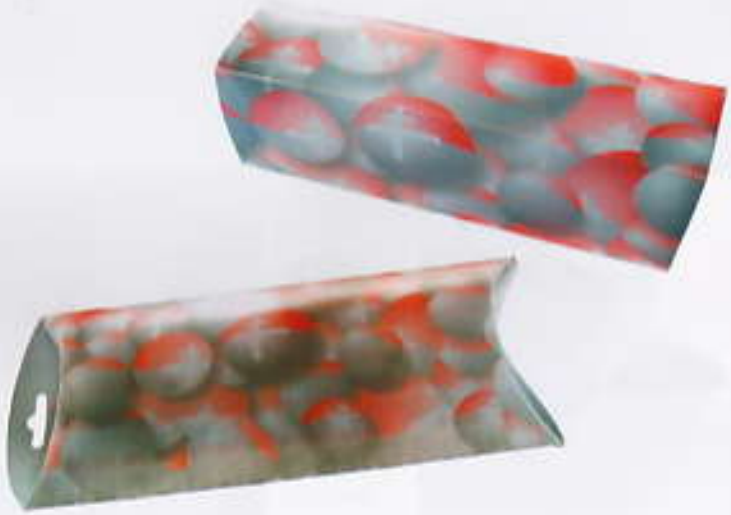
Easicard is currently used for over 6000 library forme products as well as a multitude of bespoke items. Easicard could also be used in consumer products - perhaps those that require some self- assembly such as storage boxes, display accessories, furniture or even lighting, with suitable finishes and design features. Easibind offers brand consistency across any packaging, promotion or presentation requirement and offer a one-stop shop for print, design and manufacture.

Material Inspirations

Sample 1-8



An example of Easicard used for promotional packaging, products shown are the Pillow Pack and Theme Sleeve.



Some current uses of Easicard, including Wiro-bound stationery items, MiniCards and 100% recycled black material.

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Images Courtesy of Easibind

Auracell & Tenite from Eastman

Tenite pebbles (Above) developed for Eastman by The Brewery, London, showcase the sensory capabilities of cellulosics, intense clarity, a finish that's glossy yet warm to the touch and the ability to encapsulate evocative fragrances.

Auracell scented natural polymer is the brand name for scent-encapsulated cellulosics. Rotuba has an exclusive licensing agreement with Eastman to market Auracell which is derived from Tenite cellulosics and was launched in 2005. Designers are now re-discovering the excellent aesthetic, sensory appeal and environmental qualities of Tenite. Eastman's cellulosics are derived from a renewable resource - the pulp of cottonwood trees from managed forests. Tenite is a premium-priced material.

Cellulosics - scented or unscented - lend themselves to applications that take advantage of their sensory capabilities, it's a material that really

handles well. It's tough, with excellent chemical resistance as demonstrated in it's use in toothbrushes and eyeglass frames. It's also capable of delivering antimicrobials extremely effectively. Cellulosics are ideal for caps and closures but they lack the barrier properties required for most containers. The material also has excellent acoustic properties and has been successfully used in guitar manufacture.

From floral scents to those that evoke the senses and memories or relax and energise the body - there are thousands of potential fragrances which can be used in Auracell.

Material™ Inspirations

Sample 1-9

Smart Source Shelf Talk POP Display with a Tropical smell

Cellulosics have superior scent encapsulation and delivery properties because of their ability, through the action of air and moisture, to continuously release fragrance. Scents within cellulosics also have longevity. Rotuba has a moulded rose that still, after twenty years, smells like a rose. Rotuba works with Givaudan, who are renown for their expertise in fragrance creation, to deliver suitable scent and colour Auracell combinations for each application. The cost of Auracell scented natural polymer can vary widely depending on the cost of the fragrance encapsulated in the material. Cellulosics are available in intense or translucent colours and can be produced in rich variegated, marble and tortoiseshell-like colourways. They are extremely versatile being relatively easy to process and, typically, do not require special tooling. They can be injection moulded, extruded, made into sheet and film products. Secondary processing can also include polishing, painting, embossing and bonding onto other tactile materials like wood, copper or elastomers.

Tenite cellulosics are widely used in handle applications from screwdrivers to toothbrushes and eyeglass frames. Recent applications include RKS Guitars' award-winning open architecture guitar, customized purses from 'z becky brown' and the head of the Frankly Golf putter.

Since its 2005 introduction Auracell has been used in POP displays, cosmetics and mobile phones, for example, LG Electronics white chocolate cell phone with a lavender scented keypad.

Other industries where Auracell could be used include; automotive and transport, components could maintain that 'new car' smell or the aroma of rich leather.

For gifts and jewellery, scents can be an extra USP, there is a high end scented costume jewellery range currently being developed.

Fragrant packaging to enhance the product within, could include cosmetic caps, closures and packaging film. There are also promotional displays that use scent as an added enticement to the consumer to look at the products.

Toys could also benefit from using the product, for example a product might both look and smell like an apple thereby helping to enhance learning.

There is also the potential for home decorative accessories for the bathroom, bedroom or kitchen with appropriate fragrances.

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Photographs Courtesy Of Eastmaninnovationlab.com

Vitrics from Sky Design

Vitrics is the trademark of Sky Design's 3D laser engraved glass.

Sky Design uses the latest laser technology to engrave within glass panels, creating unique custom pieces.

The company, based near Paris, is owned by English design entrepreneur, Jeremy Buckland.

The technology was originally developed by the Russians for military purposes and it is said that it was used to engrave crosshairs inside the windshields of fighter aircraft. This is an excellent example of how a technology developed for one industry is being used in numerous others, providing 3D engraved glass components for designers, architects and manufacturers.

The technology enables Sky Design to engrave inside glass, to a chosen depth in 3D, whilst leaving the exterior of the glass untouched.

The laser beam enters the glass and creates fractures at its focal point. The beam has a fixed focus and the laser head moves in three axes following the design that has been programmed. Even a small design measuring just 300 x 60 x 60 mm can comprise of around three million individual fractures.

There are three different file formats which can be used to create Vitrics glass. 2D black and white images at a chosen depth can be created using jpegs and tiff files. Vectorised files enable Sky Design to extrude the design into three dimensions and give the required depth effect. True 3D images can also be produced using CAD files.

Vitrics is created in untoughened glass and laminated afterwards if required. The technology works with glass from a minimum thickness of 3mm up to 160mm, 1450mm wide and currently a maximum length of 2000mm. New equipment is being installed in October 2006 which will allow the potential length of designs to be increased significantly.

There are numerous ways to achieve designs on glass including; deep engraving, painting and printing however Vitrics offers architects and designers the potential for true "walk around" 3D engraving.

3D ruler created in a block of glass.

The glass surface remains smooth, easing any maintenance needs and impervious to pollution and UV rays. Costs are dependent on the size, type of glass, complexity of the design and quantity, they start at 800 Euros per square metre.

Sky Design works in partnership with product designers, architects, interior designers, glaziers, sign manufacturers and organisations across Europe and the USA to design as well as produce the Vitrics 3D laser engraved installations and products.

Current applications are varied and include;

The renovated chapel at Sandhurst military academy features Vitrics glass embedded at the end of each pew, illustrating the various regimental crests in 3 dimensions. (Above)

This Issue's cover image: Illuminated "Hot Tub" sign.

Fine detail can be enhanced with the correct level of illumination.

Signage - Tower 42, the City of London's tallest building, is using Vitrics glass for its internal signage. Signage specialists, Signbox Ltd, worked with Sky Design to incorporate their 3D engraved glass into 110 signs over the 42 floors.

Designers - like Arik Levy who incorporated the 3D engraved glass into a table design featured at the Paris Furniture Show in 2005.

Future applications within the architectural and design fields include glass wall partitions, POS units and corporate reception areas. The capability to apply light enhances the engraved designs as the light reflects off the internal fractures within the glass. This gives extra emphasis to signage, both internal and external,and can be used to create unusual effects within lighting installations. There is also the potential for product and furniture manufacturers to enhance their designs using Vitrics glass components.

3D Candlestick Object.

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Photographs Courtesy of Sky Design.

In The Pipeline....

The University of Toldeo is working on developing a new type of bullet and bomb proof glass for Army vehicles. Experiments are focussing on transparent reinforcing nanofibres that will be blended with polymers, like polycarbonate, to create windshields. An interesting concept for architects and automotive designers to consider for the future.
http://www.toledoblade.com/apps/pbcs.dll/article?AID=/20060406/NEWS34/604060383

Scientists from California and Michigan have developed a white organic light emitting device (OLED) that can potentially be incorporated into any flat or curved surface including walls, ceilings and tables. The researchers have licensed their work to Universal Display Corporation, a New Jersey based manufacturer of OLEDs used in flat panel displays and other applications.
http://www.universaldisplay.com/

Luna Innovations, has developed a patented flame retardant technology based on inorganic materials which do not raise the same environmental and toxicity concerns as halogenated flame retardants. The superabsorbent polymer (SAP) particles can be incorporated into resin systems used in coatings, adhesives, plastics and composites. Potential uses include marine vessels, housing, electronics, aircraft, automobiles and textiles.
http://www.lunainnovations.com/research/flame_retardant.htm

Researchers at the Institute of Polymer Research, Teltow and the German Institute of Polymers, Darmstadt, have developed a novel shape shifting polymer that changes shape when a suitable magnetic field is applied. There are some interesting potential applications in the medical field such as 'smart implants' for on-demand drug delivery and remote controlled instruments.
http://www.cerncourier.com/main/article/46/4/9

Researchers at Helsinki University of Technology are investigating the potential for cellulose based nanofibres, made from wood fibre, to produce strong, ultra-light biomaterials that could be used in car manufacture particularly for interior panelling.
http://www.technologyhorizons.co.uk/industry_sectors.cfm?faarea1=customWidgets.contentitem_displaypage&cit_id=2290

Element Six, Ascot, England, has acquired the assets and intellectual property to fabricate a new unique cemented diamond-silicon carbide compound ScD. The material can be used in the manufacture of thermal management systems in servers and industrial PCs. It can also be made into 3D components for complex wear parts, mining apparatus and even medical prosthetics such as hip joints.
www.e6.com

Looking forward to next quarter's issue.

The mission of this publication is to keep its subscribers informed of up to the minute developments in the materials field. This means that some of the items which will be featured in next quarter's issue are still to be released to the market, however here is a selection of some of those confirmed for inclusion :

A EMR (electromagnetic radiation) and ELF (electrical field) shielding paint system suitable for residential and commercial use.

Additives designed to produce the maximum impact for packaging and consumer products.

A reactive colour technology that offers some intriguing benefits for personal and industrial uses.

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