

MATERIALS

MADE IN HOLLAND

Size doesn't matter // A tradition of innovation // New materials for new energy //
Polymers in your body // Dutch Olympic gold

What can the **Dutch** do
with **polymers** ?



Pioneers in international business

Does size matter?

Small doesn't always mean insignificant. The Dutch, for example, venture out from their tiny homeland with a backpack of curiosity and courage to roam the world in search of great challenges. In this quest, the beauty is often in the detail, which is certainly the case for NXP, who make the most minute, but nonetheless robust chips in the world. Their chip, which is only a few tenths of a millimetre in size, makes Internet by satellite dish possible, which is hugely beneficial for countries with a much less developed fibre-optic network than the Netherlands.



Photo: NXP Semiconductors

www.hollandtrade.com

‘World first after 25 years in development’

When a minuscule discovery leads to outstanding performance, there is little need for modesty. Developed by Stork and Delft University of Technology (TU Delft), the wafer-thin fatigue-resistant composite material GLARE is in essence so thin that it is barely recognisable on the enormous surfaces of the Airbus 380 – which makes the product even more impressive.



Airbus A380 taking off from Blagnac on test flight, photo: Airbus, H. Goussé

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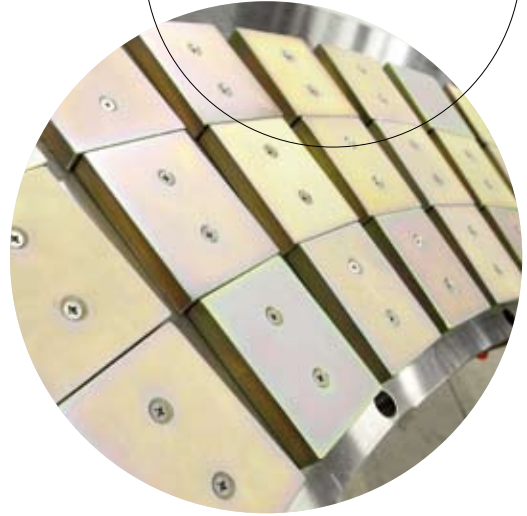
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Modernising

Partnership and innovation is in our blood People often do not realise how many Dutch materials are used to make European cars. With their innovative materials and semi-manufactured products, Dutch companies make a major contribution to innovation in both the automobile and aviation industry, and the resulting cutting-edge materials and machinery are a major boost to the global electronics industry. >> *By Erik te Roller*



The Dutch have innovation in their genes. For centuries, we have curbed the rising waters and reclaimed new land from the sea, always working together to achieve the best possible solution. If the existing metal is unsatisfactory, therefore, we develop a new metal that is not only stronger, but also lighter, or we produce the same product, but in composite or polymer form. What is especially important is that Dutch companies, universities and knowledge institutes work closely together, with the support of the government and with overall coordination provided by centres of excellence such as M2i (the Materials Innovation Institute) and the DPI (Dutch Polymer Institute).

‘Masters in alternatives’

Metals // Steel manufacturer Corus is working with several universities to conduct research into better types of steel that combine enormous strength with enormous malleability. Such a combination would make it possible to manufacture cars from thinner – and therefore lighter – steel. Of course, the cars could not compromise on safety, and therefore the steel must remain highly malleable. ASML makes machines that are used by manufacturers worldwide to make processors and memory chips. The challenge is to create integrated circuits that are no more than a few nanometres in size, without contaminating the components of the machinery, because every particle that comes loose from the material surfaces can be disastrous for production. The components of the machine must therefore meet stringent requirements, which mean major changes in metal and material processing. >>



Composites // Several Dutch companies manufacture high-quality composite products. Airborne Composites, for example, makes parts and structures from composite material for the aerospace and machine building industries, including panels for the tail wing of the new Gulfstream G650 corporate jet, which are made of carbon fibres impregnated with epoxy resin. Another Dutch material used in aviation is GLARE, which consists of a sandwich of several layers of thin aluminium around layers of glass fibre and epoxy. GLARE is used in large quantities on the fuselage of the A380, the largest passenger aircraft

‘Composite materials make Dutch trains lighter’

in the world. Manufactured by Stork Aerospace, the material is 15% to 20% lighter than aluminium, which equates to savings in weight of several tonnes for the A380. What’s more, GLARE is more crack-resistant than aluminium, which improves aircraft safety.

The company NPSP Composieten is another example: the panels they make for trains are considerably lighter and therefore more energy-efficient. NPSP Composieten also developed the Nabasco brand of hood on certain environmentally-friendly signposts (see photograph on page 40).

Polymers // The Dutch plastics industry is highly innovative, having developed many notable innovations, such as DSM’s ultra-strong Dyneema® polymer fibre and Teijin Twaron’s Twaron® (which was originally invented by AkzoNobel). >>

A photograph of a textile factory. In the foreground, a large spool of green fiber is visible, with a worker in a blue shirt operating machinery in the background. The scene is lit with bright, industrial lights.

**‘TenCate uses fibres
to make grass that is
almost real’**



One especially unusual application of polymers is artificial grass, which TenCate supplies for sports facilities in association with companies such as Edel Grass and Sekisui Alveo. This artificial grass is practically impossible to distinguish from real grass. In recent years, scores of new developments have been made in the industry. The Dutch AkzoNobel group, for example, the world's largest manufacturer of paints and coatings, is working together with other chemical companies and universities to develop new car body finishes for Nissan. These finishes include a polymer layer that can be repaired by heat treatment. Various other parties are also involved in the development of so-called functional polymers for lighting (OLEDs), flexible roll-up screens, polymer solar cells, and sensors that can measure blood

'Airborne Composites: high-quality composite products'

chemistry with an exceptional degree of precision. These larger companies are also not the only ones to develop innovations. FT Innovations, for example, is a small company intending to launch a printer that uses polymers instead of ink and works in three dimensions. This technique may well be used in due course to print conductive polymers for electronic circuits. Dutch engineers are masters at devising superior alternatives to existing materials that are lighter yet stronger, or smaller, nearly invisible to the naked eye but no less functional. It all comes from that Dutch innovative spirit we inherited from our ancestors. <<

Yoshihiro Ichii: “Inspired by the Dutch”



Photo: Rahi Rezvani

“Without our base in Amsterdam, Teijin would have missed some interesting opportunities for innovation. In terms of developing sustainable solutions for products and processes, the Netherlands is very inspiring for us. Moreover, when it comes to doing business, the Dutch are always keen to reach a consensus.

Name: Yoshihiro Ichii // **Position:** President // **Company:** Teijin Holdings Netherlands // **Nationality:** Japanese // **Company location:** Amsterdam

“Identifying new business opportunities, based on Dutch innovation”

The Netherlands has a lot of advantages for us, for example its attractive investment climate. In addition, there are daily direct flights from Amsterdam Airport Schiphol to Tokyo and Osaka, and you can get to practically any European destination and back in a single day. Another advantage is the network of business service providers, which are used to working for foreign clients, and which have a good knowledge of Dutch and European laws and regulations.”

Dutch expertise in demand for European Football Championship

Dutch companies have acquired their first contracts for the 2012 European Football Championship, which will be played in the Ukraine and Poland. As the Polish Minister of Sport Miroslav Drzewiecki says, “The Netherlands has tremendous expertise when it comes to organising large-scale football events, whether the task at hand involves grass or stadium construction.” Currently, Movares and NEA are working together on improving the railway line between the Polish border and the Ukrainian city of Lviv.



Photo: Hollandse Hoogte



Plastic miniatures

At Madurodam, you can see everything that the Netherlands is famous for, reproduced at a scale of 1:25 in the most precise detail, including Dutch buildings, canals and facades. Until seven years ago, everything was made of wood. In recent years, however, Madurodam has switched to lower-maintenance plastic. The wooden replica of Gouda town hall, for example, was in need of replacement, so it was recently renewed. A new plastic town hall has been put in its place, with the same eye for every detail, of course, including all the spires on the pinnacles.

info@madurodam.nl

www.madurodam.nl

Environmentally-friendly racing

Students of the HAN University of Applied Sciences in the Netherlands are building an environmentally-friendly rally car, which will be driven in the January 2010 Dakar Rally. The car will be fitted with a Kevlar/carbon composite body, which not only makes it a strong body, but also makes the car lighter as a whole. It will also be the world's first entirely CO₂-neutral rally car to complete the race. The 'green' car will run on pure vegetable oil made from the oil-rich physic nuts of the Jatropha tree. go4dakar@han.nl

www.go4dakar.com



Ultra-thin composite facade

INHolland University of Applied Sciences in Delft has developed a composite facade, which uses carbon and aramide fibres. With a combination of extremely strong aramide cables that hold the 13-metre-high facade in place and stiff glass panels, the world's thinnest, four-storey glass facade has been created. The system whereby cables are fed through the cavity between the double-glazing panels lies at the core of the innovation. Moreover, the load-bearing structure is made entirely of composite materials.

jordy.vannimwegen@INHolland.nl

www.inholland.nl



All materials under one roof

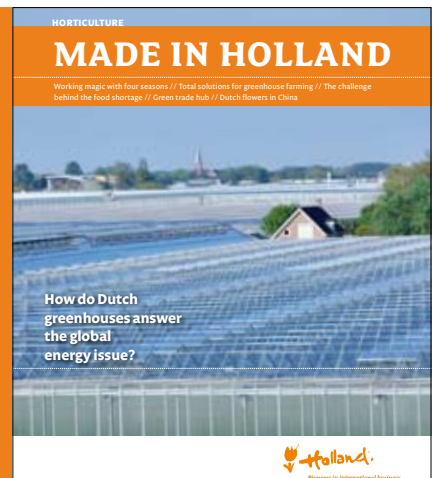
Material Matters aims to be the platform and knowledge centre in the Netherlands for materials, for the building blocks required to transform an idea into a product, with a particular focus on sustainability and the environment. Director Ton Kooymans explains, "What I would like to have here is really smart stuff, by which I mean not only tangible materials like fabrics in which electronics are woven, but also less ordinary building blocks or prototypes of those building blocks." Material Matters brings together supply and demand from design agencies, the business community, trade organisations and knowledge institutes. info@materialmatters.nl

www.materialmatters.nl

About this publication

The **Made in Holland** sector specials provide information on specific Dutch sectors, such as Delta Technology, Design and Horticulture. Centres of excellence and commercial companies are given the chance to comment on the latest developments in the sector and on their products and services. **Made in Holland** does not have regular subscribers, but instead reaches a new foreign readership with each issue. The publication is translated into multiple languages and is circulated worldwide. Additional information on this publication can be obtained from the Netherlands' diplomatic representations abroad.

www.hollandtrade.com



Research into the effects of miniaturisation

The Foundation for Fundamental Research on Matter (FOM) and M2i have funded seven research projects focusing on the properties of materials in the case of extensive miniaturisation. The results will contribute to applications in nanotechnology. The research themes were prepared in cooperation with M2i's industrial partners. These partners have subsequently been closely involved in the research and they will be able to apply the latest insights acquired from the research directly in their own product and process innovations. One of the projects involves research into metal fatigue or creep when miniature metal beams are made even smaller. info@fom.nl

www.fom.nl // www.m2i.nl



World-renowned innovator chooses the Netherlands

Michael Braungart, one of the masterminds of the 'cradle to cradle' concept, states in Flow magazine that he plans to concentrate his scientific and business activities in the Netherlands. "Akzo Nobel, AVR - Van Gansewinkel, Desso tapijt, DSM, Nike Europe and Philips, as well as Dutch ministries and municipalities would like to get started with the cradle to cradle concept," Braungart says. The philosophy involves making cycles continuous by using waste as nutrients, with nature as the example.

www.cradle2cradle.nl



Photo: Hollandse Hoogte

Lean and mean

Al Gore's ominous message continues to reverberate in the Netherlands and many branches of industry are now seeing the need to act on these warnings. Like other Dutch sectors, the rubber and plastics industry has reached an agreement to increase energy efficiency by 2% annually between 2005 and 2020. There will be a major role for 'lean and mean manufacturing', which means that energy saving opportunities will be sought both in the production process and outside the production process. It may be possible to save energy in production buildings, for example, or there might be an opportunity to arrange joint transportation with other companies. The rubber and plastics industry is now on the right path with average savings of 3.6% in 2007. info@nrk.nl

www.nrk.nl

Centre for innovation

Chemelot is opening a housing and research centre for new, fast-growing companies to encourage entrepreneurship in the chemical and new materials sectors. This Centre for Open Chemical Innovation (COCI) will assist new businesses in relation to financing, support services, coaching and networking. The expectation is that a minimum of six companies per year will undergo accelerated growth.

Chemelot is an 800-hectare industrial estate that houses around seventy companies. The companies are of different types and come from many different sectors, varying from basic chemistry to fine chemistry, from companies producing raw materials to developers of new products, and from start-ups to multinationals.

www.chemelot.com



Together

Business, science and government join forces The Netherlands is home to various leading global players in the materials industry. To remain on top, however, a company must continually invest in research. M2i brings research and business even closer together and guarantees interesting new cross-collaborations. Director Sibbe Hoekstra talks about the Dutch materials industry and the power of this partnership. >> *By Arnoud Veilbrief*

Sibbe Hoekstra earned his PhD in 1974 and you could say that his research is symbolic where the Dutch materials industry is concerned. Hoekstra studied how nickel-chrome steel can be made both more malleable and stronger, which were precisely the qualities that many Dutch industrial companies needed in the sixties and seventies. DSM is a good example. The company's full name in Dutch translates into English as 'Dutch State Mines' – hence 'DSM' – but as Hoekstra explains, "the mining industry became unprofitable in the 1960s and the mines were closed. DSM appeared to be doomed, but look at them now: only the name itself makes you think of the past, because DSM is now a world leader in the development of polymers."

The story of the Dutch materials industry is one of a journey from crude manufacturing industries to high-tech research and innovation. The Netherlands has a number of world leaders in this extremely multifaceted industry. Corus' steel factories, Ten Cate with its composites for the aerospace industry and its protective fabrics, Stork Aerospace with GLARE, Teijin Twaron with its fibres that are stronger than steel, and Akzo Nobel, of course, with its medicines and special vehicle paints are companies that have almost all reinvented themselves after a deep crisis, explains Hoekstra.

// In each other's interests

The secret that enables these companies not only to survive but to maintain their leading positions can be summed up in three words: research, research, and research. To better cement the bonds between top researchers and the business sector, the Dutch government has established a number of centres of technological excellence (known in Dutch as 'TTIs', or 'top technological institutes'). One of these is M2i, which stands for Materials Innovation Institute. However, you shouldn't expect to see laboratories and researchers in white lab coats at M2i. M2i is a 'virtual institute', explains Hoekstra, because it actually has only a small staff, a pot of money and an address book with the contact details of top researchers. "But we can do a lot with those resources."

Simply put, it works like this: companies can become a member of M2i and contract out a particular assignment. M2i then searches for a researcher and a university who are suitable for the assignment. The government matches the amount that the company has paid and the university provides facilities and a scientific staff free of charge. "This enables a member company to contract out its R&D at low cost," says Hoekstra. "Our services are exclusively demand-oriented. The researchers look for a solution to a specific, practical question. It's all about usable knowledge."

// In practice

A recent M2i study attracted international media attention when a researcher at Radboud University Nijmegen discovered a smart way of adding zinc to semi-conducting, indium phosphide nano-wires (tubes on an atomic scale). This creates a crystal lattice with which heat can be directly converted into electricity. The research was carried out for Philips and the results were published in the 20 November 2008 issue of the science journal Nature. M2i's combined approach goes further than capitalising on knowledge that would otherwise go unused, because bringing together scientists from entirely different disciplines takes their thinking in entirely new and unexpected directions. "More and more innovations are discovered in the areas of overlap between disciplines and not within the disciplines themselves," says Hoekstra. So, shouldn't an institute like M2i actually be working to make itself unnecessary? Hoekstra understands the question, but his answer is still no. "Obviously it's a good thing if companies and researchers can get together without our help, but the clustering together of knowledge and contacts in a single institute works extremely well, and the mix of different parties and disciplines is highly conducive to new ideas." >>

CONTACT

> M2i is a public-private partnership between industry, knowledge institutes and the Dutch government. M2i and its predecessor NIMR have built up a strong reputation in bringing science into business via knowledge application and transfer projects. This important asset has been further strengthened and widened in the M2i programme, which consists of six valorisation modules. www.m2i.nl

Photo: Airbus

‘Larger,
stronger,
lighter’

// OTHER M2I SUCCESSES RESEARCHERS DESIGNED A DOUBLE, CRASHWORTHY SHIP'S SIDE FOR LNG TANKERS. THE SHIPOWNER'S INSURANCE COMPANY GAVE PERMISSION TO SAIL WITH LARGER GAS TANKS, THEREFORE CUTTING COSTS BY 10%, WHICH IS AN INCREDIBLY HIGH PERCENTAGE IN THE SHIPPING SECTOR WHERE MARGINS ARE VERY NARROW. A LORRY BUMPER MADE OF A MATERIAL THAT IS BETTER ABLE TO ABSORB THE ENERGY FROM A COLLISION WHILE ALSO BEING LIGHTER THAN A CONVENTIONAL BUMPER, WHICH IS A MAJOR BENEFIT TO THE TRANSPORT SECTOR, WHERE EVERY KILOGRAM COUNTS TOWARDS KEEPING OPERATING COSTS AS LOW AS POSSIBLE. <<

Photo: Shell



Turbines

// A WINDMILL EACH

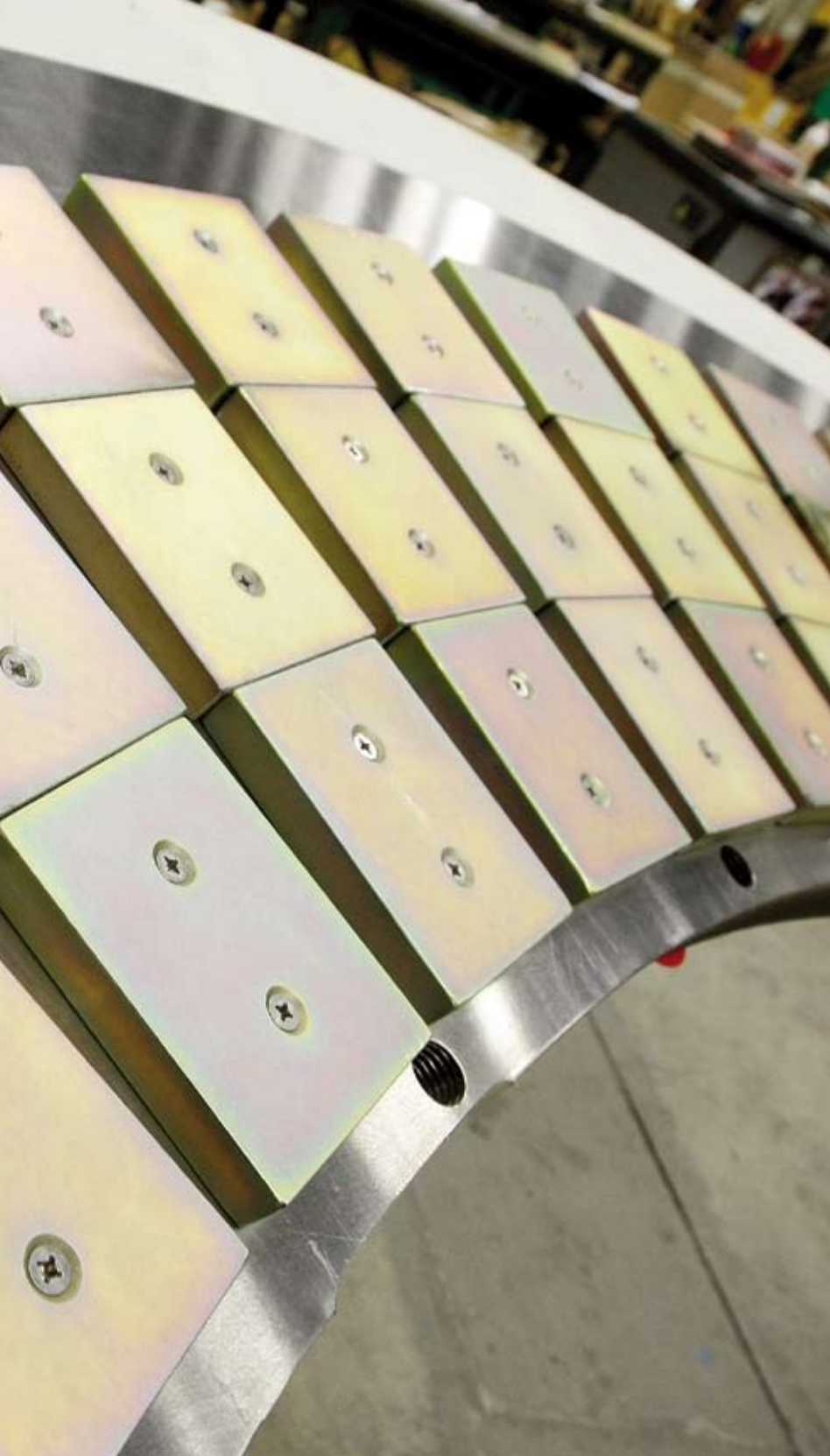
High roofs catch a lot of wind, and that wind can be used to generate clean energy. This is what ‘urban turbines’ – windmills for use in urban areas – are all about. In heavily populated Holland, where suitable open space is scarce, these windmills also need to be mini-turbines. These mini-turbines have now gone past the prototype phase and are being exported on a large scale, but there are different demands in the urban environment compared to out at sea or in the open countryside. The complex winds in the urban environment call for original designs such as the cylindrical DonQi turbine, which narrows, therefore causing the wind to flow more rapidly through the rotor blades. Another example is the Turby, which has ‘whipped cream beaters’ that make it immune to the effects of changes in wind direction. The turbine’s shape was created in close cooperation with Delft University of Technology (TU Delft). According to TU Delft, the design is much more efficient because “the principle is the same as a yacht that sails much faster across the wind, with the sail at a slight angle.”

LINKS: TU Delft conducts wind tunnel research for turbine manufacturers and provides advice in relation to aerodynamic behaviour. They have just opened their new Open Jet Facility (OJF).

TU Delft (DUWIND) www.duwind.tudelft.nl

Turby www.turby.nl, ds@turby.nl

DonQi www.donqi.nl, directie@donqi.eu



MATERIAL RESEARCH AND DELIVERY

> **Duits Engineering** // Multifaceted machine manufacturer that advised Turby (see above) about sustainable use of basic materials such as stainless and regular steel with Turby designs. www.duits.nl

> **Bakker Magnetics** // Produces permanent magnets and assemblies for direct-drive wind turbines, such as Turby, as well as for multi-MW turbines. www.bakkermagnetics.com

> **DSM Resins** // Supplies polyesters for the turbine blades and gondola heads of large turbine manufacturers and in cooperation with DonQI has now begun research into injection moulding with fibre-reinforced polyesters. www.dsm.com

> **WMC knowledge centre** // Founded by ECN (the energy research centre of the Netherlands) and Delft University of Technology for research into the strength and fatigue behaviour of wind turbines, materials and structures, such as rotor blades up to more than sixty metres in length. www.wmc.eu

> **NLR** // Computers at the National Aerospace Laboratory (NLR) are used to test turbines by simulating and predicting air flow. www.nlr.nl

In the Netherlands the high-tech materials companies operate in a business environment that is international, open and well connected to the outside world.



75%

The level of exports is 60% in the plastics industry and 50% in the metal products industry. Approximately 75% of chemical products manufactured in the Netherlands are exported.

27 of 88

Dutch businesses and research institutes were involved in 27 of the 88 Sixth Framework Projects of the European Union that related to materials.


50 billion

Turnover in the Dutch chemical industry in 2007 amounted to EUR 50 billion.



5,400

The Netherlands is the world's seventh largest recipient of direct foreign investments and is home to some 5,400 foreign businesses.





4th place

Research shows that the most productive area for the Netherlands between 2000 and 2004 was coatings with 307 patent applications, which puts the Netherlands in overall 4th place worldwide.



25

Of the 25 companies in the Netherlands with the highest levels of R&D spending in 2006, six were involved in high-tech materials.



3%

Dutch scientists account for 3% for the world's materials patent applications and 5.5% of those applied for in the EU.

Some 1,700 businesses in the Netherlands are involved in materials-related R&D.

2 billion

Together, Philips, Akzo Nobel, Shell, DSM, Stork, Corus and Teijin Twaron spent some EUR 2 billion on R&D.



Some 10% of the 1,700 businesses have R&D-related salaries exceeding EUR 100,000.

(Sources: NFIA, ABN AMRO)

Healthy

// WITH A POLYMER HEART VALVE

Sometimes, the real value of a major discovery is not understood until many years later. This was certainly the case with the scientists who hypothesised 30 years ago that they could use polymers to build tissue for the human body. At that time, they were voices in the wilderness, but now their hypothesis is almost a reality, thanks in part to the commercial spirit that developed around scientific endeavours 30 years ago, because the government has now made EUR 45 million available to promote research into biomedical materials in an initiative known as the BioMedical Materials (BMM) programme. The BMM programme is a public-private partnership between companies, universities and hospitals based on the belief that biomedical materials can repair and rebuild tissue that has been damaged by disease or trauma. A biomedical polymer implant can be used to grow new tissue, blood vessels, muscles or cartilage and maybe even entire organs. The polymer breaks down slowly as it is replaced by bodily material. Seven research projects have been approved under the BMM programme since it started in early 2008.

LINKS: BMM / Emiel Staring / info@bmm-program.nl / www.bmm-program.nl



SOME BMM PROJECTS

> **iValve** // Research into an artificial heart valve, as shown, made from a material that causes the body to grow a new, healthy heart valve.

> **SMARTCARE** // Research into strengthening the heart muscle by introducing new heart muscle cells and blood vessels.

> **IDIDAS** // Research into a replacement for the intervertebral disc. The goal is to invent a gel-like polymer in the next 10 years that is strong, while at the same time being flexible and delicate, as a solution for wear and tear of the spinal column.

> **NANTICO** // Development of biomedical coatings for implants that reduce infectious reactions or organ rejection.

1

ARE YOU SCIENTISTS OR ENTREPRENEURS AT TNO?

TNO makes scientific knowledge applicable in practice to help strengthen the innovative capacity of the Dutch business community and the government. What is unique about TNO is its combination of knowledge development, integration and application.

2

WHAT IS THE ROLE OF THE UNIVERSITIES?

Because we develop and apply knowledge, we want to constantly gain new scientific insights and attract science personnel, so we maintain close contacts with the universities. That's especially true for materials research, which is 'the mother of all inventions'.

3

WHAT DOES TNO KNOW ABOUT MATERIALS?

We have extensive knowledge of materials, such as nanomaterials, ceramics, metals, plastics, coatings, wood and concrete. We conduct most of the materials research at our Materials business unit at TNO Industry and Technology, which employs approximately 150 people. There are also other TNO business units that conduct specific materials research in relation to construction, the environment, nutrition, pharmaceuticals and defence.

4

WHO ARE YOUR CLIENTS?

We conduct materials research for both large and small companies, including ASML, a Dutch company which is a world leader as regards manufacturing machinery for making processors, memory chips and other semi-conductors. We also work under contract for solar cell manufacturers such as Scheuten Solar. The challenge is to develop solar cells that generate more kilowatts of power at a lower purchase price. We also conduct research for the truck manufacturer DAF Trucks, which focuses on subjects such as using durable coatings in new engines to extend their working life and reduce environmental pollution.

5

DO YOU WORK IN OTHER AREAS AS WELL?

We also do work for the aerospace sector as well as work on nuclear fusion. We will participate in the GAIA mission in 2011, for example, where the objective is for the GAIA satellite to precisely chart more than a billion stars in the Milky Way. For that project we are developing an instrument made entirely of the strong, stable and light ceramic material silicon carbide, which is the only material that satisfies the stringent requirements. That work obviously involves close cooperation with private companies and universities.

6

HOW ACTIVE ARE DUTCH SCIENTISTS IN THE MATERIALS SECTOR?

Dutch scientists consistently earn high marks with their scientific publications about materials, which is a direct result of the quality of the materials research.

7

WHY IS THE QUALITY SO GOOD?

The quality of Dutch materials research comes from the long history of cooperation between companies, knowledge institutes and universities, who now work together in public-private research projects, for which the business sector splits the costs with the Ministry of Economic Affairs on behalf of the Dutch government. M2i was given a huge pat on the back by the OECD for the way in which it cooperates with other parties, including TNO, in efforts to solve economic and social problems. The organisation recommends this partnership as best practice to other OECD nations.

8

CAN I CALL IN TNO?

A foreign company or government institution can certainly call us in. Currently, about 10% to 15% of our turnover comes from abroad, but we would like to increase that percentage in the years to come. We already cooperate with research institutes in Norway and Russia, and we are participating in the establishment of a packaging and assembly centre in China, where Dutch companies will soon be able to show what they have to offer as regards machine construction for the micro- and nano-electronics industry.



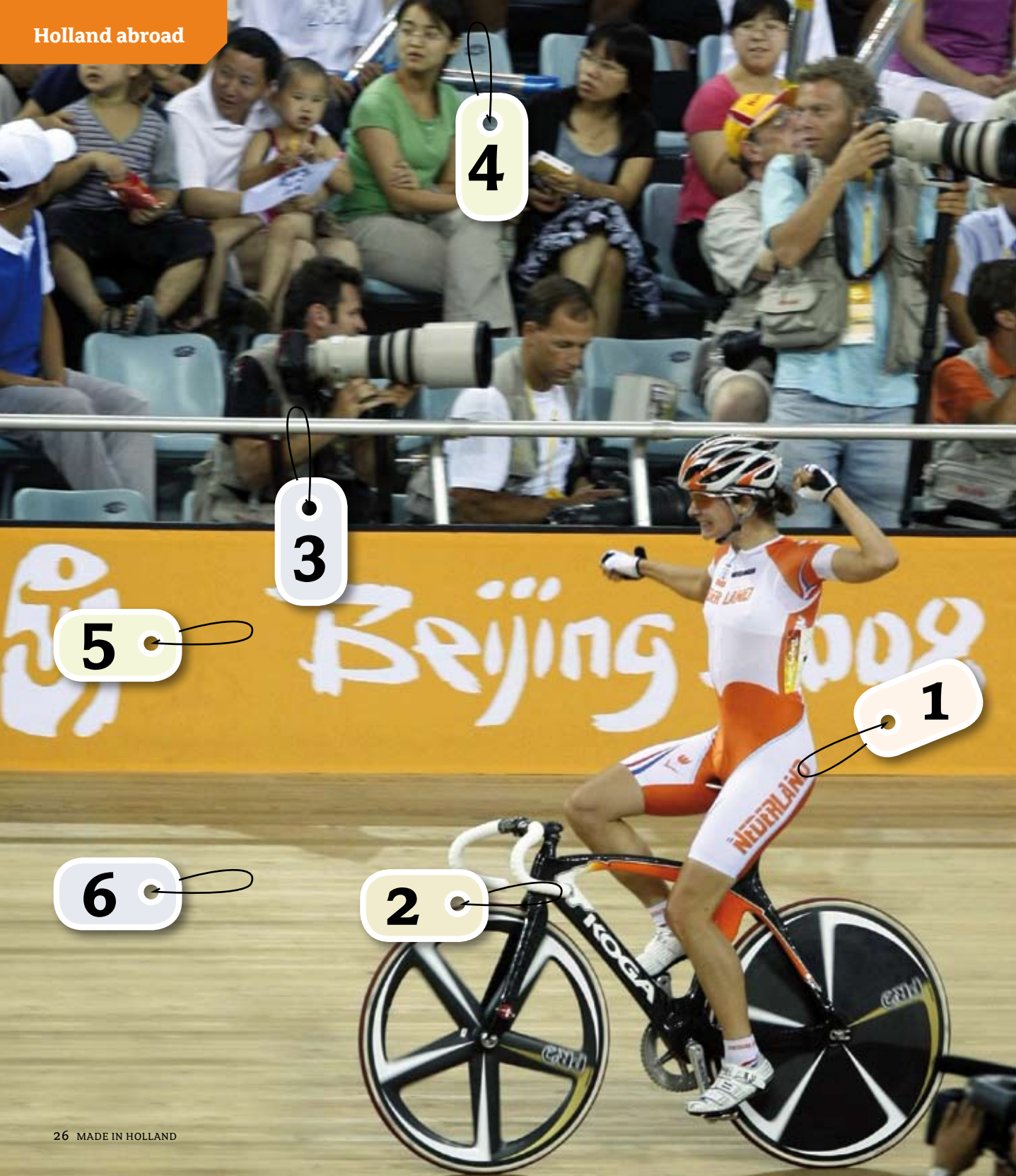
CONTACT

> TNO is an independent organisation that conducts research under contract from the government and the business community. TNO is especially active in relation to industry and technology, quality of life, construction and the subsurface, defence and security, and ICT.

Dr. Ir. L.J.M.G. (Ardi) Dortmans
ardi.dortmans@tno.nl
www.tno.nl

Challenge

Solar cells that generate more kilowatts of power at a lower purchase price For years, TNO's Ardi Dortmans has been active in relation to materials and he is currently coordinating material research at TNO. For the past year, he has also been Chairman of the Bond voor Materiaalkennis (Dutch association for material knowledge).



4

3

5

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2



Materials of Olympic standard

Ranging from the grip of a tennis court, to the weight of a racing bike and proper ventilation for sports clothes, nowhere are the limitations and possibilities of materials as immediately apparent as they are in the world of sport. That is why those few people who reach the very top also demand the best of the best when it comes to materials. Take a look at the products with the label 'Made in Holland' that you can expect to see at the 2012 Olympic Games in London.

1 // Koga Kimera

Dutch cyclist Marianne Vos was on the Kimera, the racing bike with the world's strongest and also fastest frame, when she won gold at the Beijing Olympics in 2008. In the coming years, Koga will continue to improve the Kimera for the Dutch cycling team in order to develop a variant that is even better suited to the endurance levels required in the sport.

2 // Infinious

Engineering firm Infinious specialises in developing lightweight products made of fibre-reinforced plastics (composites). During the development of the Kimera, Infinious provided support for the research into optimum rigidity for the lightest possible frame.

3 // DSM

DSM developed the new Olympic yacht (470) for 2008 silver medallists Marcelien de Koning and Lobke Berkhout. The composite materials used to make the yacht ensure a rigid structure and minimum weight, and the Dyneema plastic fibres provide the world's strongest sailing lines.

4 // Bestcon

Bestcon specialises in prefabricated structures for MMC (modern methods of construction) in the construction sector, such as complete walls with doors and facade cladding. Bestcon also provided advice regarding how to use prefabricated construction materials to build the Olympic village, which has to be constructed at lightning speed on a small piece of ground. They hope to win the contract to construct the buildings in the near future.

5 // Trespa

Trespa offers sustainable, colourfast and free-form panels to enable architects to achieve their ideal indoor and outdoor designs. They supplied panels for stands, walls, sanitary installations and facades for Wembley Stadium, Wimbledon and the Olympic Water Cube in Beijing.

6 // Ten Cate

TenCate Grass provides high-quality artificial grass components – such as fibres and backing – that were also used at the Athens and Beijing Olympic Games. The concept, developed in cooperation with Australian Sports Technology International, offers superior shock absorption and water drainage to ensure optimum physical protection for the athletes.

Marianne Vos winning gold at the 2008 Beijing Olympics. Photo: Cor Vos

The Netherlands and England are neighbours across the North Sea, so it's not so strange that Dutch companies can frequently be found in London in the run-up to the 2012 Olympic Games. But the close proximity is not the only reason for the Dutch to head to London – the expertise they have to offer and the way they do business are both unique selling points in the battle of the fittest that is being waged among potential Olympic Games suppliers.

// Good neighbour

“The UK is the Netherlands’ third largest trading partner, with annual exports of approximately EUR 30 billion,” explains Jochem Geheinau, UK Director of the Netherlands British Chamber of Commerce (NBCC). From the Viktor & Rolf exhibition at the Barbican to Dutch architecture and building methods, the ‘Dutch way’ is in great demand in the UK. This can also be seen in the run-up to the 2012 Olympic Games, because Dutch construction companies have won a large number of contracts: Arcadis is advising on the construction of the Olympic Stadium, BAM and Heijmans Blackwell are decontaminating the ground, and Dutch architects are designing the Olympic park and making plans for how the site will be used after the Games.

// Best of both cultures

All of this is the result of a good match between supply and demand, but what is the secret behind that good match? As Geheinau says, “Along with excellent technical knowledge in certain sectors, the secret is mainly good communication and cooperation. The Dutch method of communication is to-the-point, which is very useful when it comes to making clear agreements, and joint projects between the Brits and the Dutch are often very successful.”

This used to be different in the Golden Age, when an Anglo-Dutch combination was generally associated with the rivalry at sea between the two nations. However, that rivalry has been replaced over the last few centuries with a friendlier, almost close bond. Geheinau: “The creative and resourceful manner in which the Dutch tackle a problem is a perfect fit with

the British businesslike and commercial attitude, as is demonstrated by the enormous success of partnerships such as Unilever, Shell and Reed Elsevier. These ‘new Anglo-Dutch’ combinations bring out the best in both cultures.”

// Orange tent pegs

The orange tent pegs at the Olympic site in Stratford, East London, therefore didn't fall from the sky. As Geheinau says, “In addition to environmental technology, construction and infrastructure, a lot more is also needed: from energy and security to building materials, paint, artificial grass fields and pitches, etc., not to mention everything for the athletes themselves, such as equipment, sports clothes, measuring systems and security systems. All of that work will start in the course of 2009. Together with the Dutch Embassy, we are therefore doing everything we can to raise the profiles of Dutch businesses with the Olympic Delivery Authority (ODA) and the London Organising Committee (LOCOG).” Henk Jan Bakker, Head of the Economic Department at the Dutch Embassy, says, “That joint effort is working. In the second half of 2009, for example, we are organising a follow-up event to last year's highly successful Olympic discussion day together with the NBCC, the ODA and Think London. That will bring the ODA and Think London into personal contact with Dutch companies and their products and services, which provides an excellent chance for them to assess Dutch expertise and working methods from close up.”

Geheinau is full of confidence: “The Netherlands is also a specialist with an extensive track record in these other areas as well.” Indeed, looking back on the Olympic Games in Beijing (and the Games in Athens), Akzo Nobel supplied paint for the ‘Bird's Nest’ and the ‘Water Cube’, Trespa was responsible for the walls in the swimming pool, the cooling vests were from DSM, the swimming pool lighting was from Philips, the fibres for sails and hockey fields were from Gamma and TenCate, gymnastics equipment came from Janssen-Fritsen, and coloured asphalt was provided by Latexfalt – all of it ‘Made in Holland’ and worth its weight in gold. Just ask track cyclist Marianne Vos. >>

CONTACT

>The Netherlands Embassy and the Netherlands British Chamber of Commerce (NBCC) support Dutch companies on the British market.

Netherlands Embassy
henkjan.bakker@minbuza.nl
www.netherlands-embassy.org.uk

NBCC
jgeheinau@nbcc.co.uk
www.nbcc.co.uk

Companies

1 // KOGA B.V.

Frank van Rooijen
+31 (0)513630143
+31 (0)651589390

f.van.rooijen@koga.com
www.koga.com
www.koga-signature.com

2 // Infinious

Kasper Snijder
+31 (0)614516368

kasper.snijder@infinious.com
www.infinious.com

3 // DSM

Babette Nelissen
+31 (0)455782421

babette.nelissen@dsm.com
www.dsm.com

4 // Bestcon

Rob Jansen
+31 (0)4993663 00
+31 (0)652016618

rjansen2@heijmans.nl
www.bestcon.nl

5 // Tresa International BV

Aart Jan van der Meijden
+31 (0)495458566

a.van.der.meijden@tresa.com
www.tresa.com

6 // TenCate Grass

+31 (0)548633944

grass@tencate.com
www.tencate.com



Prototype Koga Kimera Track bicycle
Photo: Koga/NHL

Persistence pays

A flexible attitude, informal relationships and a practical outlook are absolutely essential in international business. We Dutch like to get down to business, even if that mentality is born of the necessity to look past our own national borders. Ceratec's power lies in niche markets, in discussing possibilities with customers and finding total solutions. However, Ceratec Technical Ceramics also conducts business internationally in other European countries and with the superpower that is China. But that hasn't always been the case. I have to smile when I think back to my early years, 25 years ago. I was a devout believer in the properties of technical ceramics – hardness, durability and rigidity – and in the applications for the products, but I was a voice in the wilderness. I didn't earn a cent in the first five years, and it took a lot of struggling to build up a market.

Kees Visser is the Director of Ceratec, a company that has specialised since 1983 in ceramic components for use in industry. Ceratec's range of high-quality products includes parts for the automobile and aerospace industries as well as medical components. For a small business, the company is especially successful in attracting large customers. In 2006, Kees Visser was named most creative entrepreneur of the year by the Netherlands Chamber of Commerce.

www.ceratec.nl, k.visser@ceratec.nl



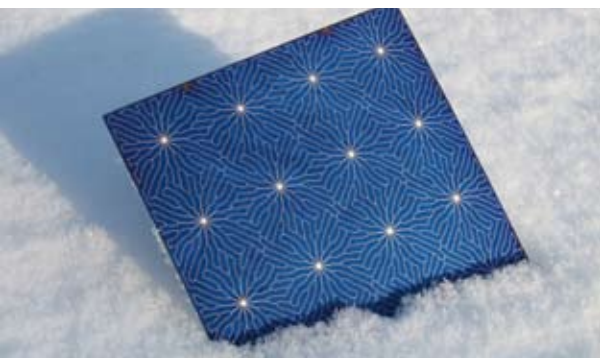
That's hard to imagine now when you consider that Ceratec averages 15% annual growth and customers come to us based on recommendations, even though global competition is increasing. Moreover, the added value of technical ceramics is not news any more – the product has proven itself time and again, in the medical sector and in the aerospace, automobile and chemical industries. What a contrast compared with my pioneering days!

The challenge is to maintain our technological lead, and that will take hard work and demands innovation, ongoing training and renewal year on year. It also means that we have to do everything possible to avoid giving no for an answer. Although, if plastic proves to be better than technical ceramics, then that's fine! There's a good reason why my slogan is always 'ceramics in the right place.' I will never take for granted the success, the commercial advantage or our numerous customers. I know the road that I've travelled, and it's wonderful that my age-old message about ceramics is now being heard far and wide at the international level.

Well-protected fibre optics

DeSolite® is a protective coating produced by DSM that makes fibre-optic cables more durable. The first soft layer protects the vulnerable optical fibre against the slightest bending and damping, whilst the second harder layer provides mechanical protection and a smooth, workable surface. babette.nelissen@dsm.com

www.dsm.com



Get 9 per cent more from the sun

Solland Solar has launched its new Sunweb Solar cell that was developed in cooperation with ECN (the energy research centre of the Netherlands). By concentrating the generated energy at the back of the cell, Sunweb has created a larger surface area and therefore a 2% higher output per cell. With the processing and the connection within a solar module, the output even increases to 9%.

jhanssen@sollandsolar.com

www.sollandsolar.com

Protection for firefighters

With its layered system, TenCate Protective Fabrics offers optimum protection against thermal stress, fire, chemicals, water and other risks to which firefighters are exposed. The carefully selected combination of the various layers – which include meta-aramides and para-aramides – provides maximum protection without sacrificing comfort. s.veenhoven@tencate.com

www.tencate.com



At home in the office

Interior design specialist Ahrend was awarded the 2007 Red Dot best of the best award for the Ahrend 800. The Ahrend 800, a desk and table system designed for both home and office, won the prize thanks mainly to the innovative use of materials, such as stainless steel instead of regular steel, coloured and imprinted safety glass and plastic with the look of glass. rvanrijn@ahrend.com

www.ahrend.com



Nanotechnology for everyday use

Kriya focuses on high-end optical coatings for everyday applications using the company's proprietary nano-dispersion technology. The technology is used in coating materials for electronic and film applications, such as the LCD and touch panel industry and heat-stop coatings for car windows to better regulate the temperature in cars. info@kriya-materials.com

www.kriya-materials.com

Composite bridge

As part of a Dutch consortium, Lightweight Structures built a 44-metre-long composite pedestrian bridge in Delft. The composite material makes the bridge 20 times lighter than its current concrete version. The main advantages are the fast delivery, low maintenance costs and the use of the existing foundation with only minimum adjustments. aldert.verheus@lightweight-structures.com

www.lightweight-structures.com



Fuel-efficient trains

NPSP Composieten produces the front and rear panels for Dutch trains. The light fibre-reinforced plastic structure and innovative production method used to make the panels ensure considerable savings as regards weight – and therefore also energy – and costs.

willem.bottger@npsp.nl

www.npsp.nl

Glued facades

Tweha develops innovative, single-component hybrid polymer glue systems for construction and industry that do not require a binding primer. This makes the systems environmentally friendly and efficient because no pre-treatment is needed. One of Tweha's largest projects was the Cheapside project in London. info@tweha.nl

www.tweha.nl





Steel with a protective layer

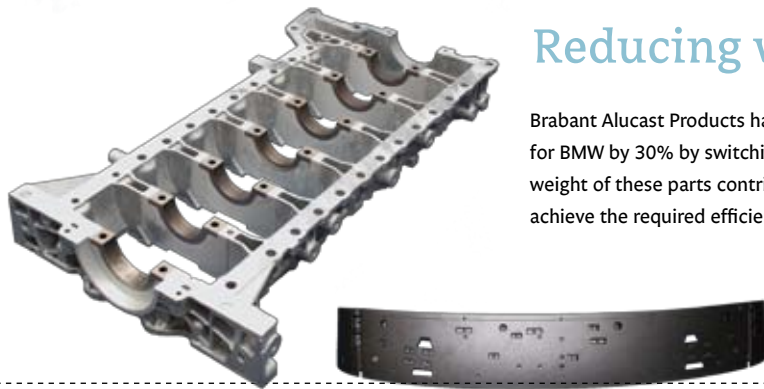
Protact® from Corus is packaging steel with a protective plastic layer, which combines the traditional strength of the packaging with the protection afforded by plastic against rust and aggressive substances. Protact® is currently used for packaging for paint and chemicals in spray cans and tins. info@coruspackaging.com

www.coruspackaging.com

Composite pipes for the oil industry

Airborne develops and produces composite products for high-end markets, such as aircraft construction, aerospace, astronomy, machine construction and energy. One of the company's latest developments is the continuous thermoplast composite pipe technology for the oil and gas industry that enables users to explore fields that cannot be explored using conventional technology. m.vansanten@airborne.nl

www.airborne.nl



Reducing weight for Audi and BMW

Brabant Alucast Products has reduced the weight of a roof system for Audi and a bedplate for BMW by 30% by switching from aluminium to magnesium pressure die-casting. The light weight of these parts contributes to the increased fuel efficiency of these premium brands to achieve the required efficiency for medium-sized cars. h.schuitema@bai.nl

www.brabantalucast.com

Optimised rims and wheels

Fontijne Grotnes developed a flow-forming process and designed the fastest machine for this application in the world to optimise the weight of rims and wheels. The Flow Former can be integrated into either new rim profiling lines or existing rim lines and as a process within one-piece production systems.

info@fontijnegrotnes.com

www.fontijnegrotnes.com



Lightning fast

From innovation to end product Cooperation can result in more products, more knowledge, dynamic coalitions and accelerated development of new products. >> *By Marc Mijer*

Photo: AKZONobel Polymer Chemicals,
SEM image of Perkalite® platelets



“The power behind Perkalite® is broad-based supply-chain cooperation”

Photo: DPI

// PERKALITE® A RESOUNDING SUCCESS PERKALITE®, WHICH IS AN AKZO NOBEL PRODUCT, IS A SYNTHETIC ORGANIC CLAY THAT ACTS AS A FLAME RETARDANT IN APPLICATIONS SUCH AS WIRES AND CABLES USED IN CONSTRUCTION. PERKALITE® ALSO INCREASES THE STRENGTH OF PACKAGING MATERIALS AND IS USED IN APPLICATIONS SUCH AS CAR TYRES. THE DPI VALUE CENTRE AND NRK ARE PUTTING IN PLACE A VERY BROAD-BASED COLLABORATIVE VENTURE INVOLVING PLAYERS THROUGHOUT THE SUPPLY CHAIN TO DEVELOP PERKALITE.

From flowerpots to medical implants, Dutch polymers have more than demonstrated their value in relation to a wide range of products. A major change occurred ten years ago when the Dutch Polymer Institute (DPI) was established. As at M2i, there is also closer cooperation between companies, knowledge institutes and government at the DPI, but at the DPI the collaboration relates specifically to polymers. This has led to a significant improvement in the knowledge infrastructure in the Netherlands, with many new projects being implemented, the knowledge level increasing and the Netherlands proving to be an attractive location for businesses.

The DPI Value Centre was established in September 2007 to reinforce cooperation with smaller companies and start-ups. “We are still a relatively new organisation, but business has developed like a rocket,” reports DPI Director Arie Brouwer. “We have assisted some sixty SMEs, including in joint ventures

with large corporations, and we were able to offer support to fifteen start-ups. We have also started various projects with companies who came to us with a specific question.”

// New technology

The DPI Value Centre has the right network at its disposal, because the network consists not only of companies, but also trade organisations such as the NRK (Dutch rubber and plastics federation) and innovative service providers such as Syntens and SenterNovem (the latter coordinates financial support on behalf of the government). The DPI Value Centre combines this network with substantive knowledge of polymers, which can result in the centre providing practical help, for example in finding locations to continue analyses and pursue ongoing developments. “However, that’s not all we do, because we also set up major joint projects involving both large and small companies,” says Brouwer. “A large company’s >>



“Large and small companies come together”

Photo: DPI

// THE DUTCH POLYMER SECTOR HAS THREE LAYERS: RAW MATERIAL PRODUCERS (SUCH AS AKZO, DOW AND DSM), PROCESSING COMPANIES (SUCH AS WAVIN AND ALSO OTHER SMALLER COMPANIES), AND COMPANIES OF ALL DIFFERENT SIZES FROM THE VARIOUS SECTORS THAT USE POLYMERS IN MANY DIFFERENT PRODUCTS, INCLUDING LARGE COMPANIES SUCH AS PHILIPS AND OCÉ, AS WELL AS A RANGE OF SMALL AND MEDIUM-SIZED COMPANIES. PARTIES FROM ALL THESE LAYERS AND GROUPS WORK TOGETHER.

innovation is then further developed within the project in cooperation with small companies. There are advantages for everyone involved, including a shorter development time from innovation to production, and rapid insight into multiple applications on a wide range of markets. This means that the larger company has more commercial opportunities at an earlier stage. The smaller companies in turn are given the chance to play a role in the development of a new product, which for them means access to new technology at an early stage in its development.” The products where this approach has led to concrete results include AkzoNobel’s Perkalite®.

// ‘Chemelot’

Despite its flying start, the DPI Value Centre does not intend to rest on its laurels. The broad-based supply-chain approach used with Perkalite® is now also being applied in the case of a DSM innovation called Allinco.

A joint project – with political support – is also in the pipeline with a number of organisations from Germany and Belgium. In fact, Brouwer certainly cannot complain about a lack of international interest across the board: “We welcome delegations from various different countries here – Switzerland, Finland, the United States, Taiwan – they’re all interested to find out how we precisely implement the collaboration between government, business and knowledge institutes. That power to collaborate is a real success factor for the Dutch polymer sector.” This dynamic will remain in full flow in the polymer sector for the foreseeable future. For example, the first Centre for Open Chemical Innovation (COCI) is set to open soon in Geleen, a town in the southern province of Limburg. Under the name ‘Chemelot,’ this campus will offer space for companies and knowledge institutes that work with chemicals and materials such as polymers. It almost goes without saying that the DPI Value Centre will open its second branch on the campus.



Photo: DPI

// THE NEED TO REDUCE ITS USE OF FOSSIL FUELS HAS ALSO BEEN RECOGNISED BY THE DUTCH POLYMER SECTOR. THE GOAL IS TO HALVE FOSSIL FUEL USE BY 2032, WHICH THE SECTOR AIMS TO ACHIEVE BY REPLACING FOSSIL FUELS WITH RENEWABLE RESOURCES, AS WELL AS BY MAKING PROCESSES MORE EFFICIENT, USING GREEN ENERGY, REDUCING WASTE AND EMISSIONS AND REUSING PLASTICS.

// C2C

Another major development is the growing focus on environmental issues. Together with SenterNovem, the DPI Value Centre supports a specific knowledge network in the polymers sector that is geared to implementing the Cradle to Cradle (C2C) approach in practice. C2C is a concept in environmentally-friendly manufacturing, in which used materials are fed back into the biological cycle or – with no loss of quality – into the technical cycle. Throughout their life cycle, the products release no harmful emissions and are beneficial to the environment.

The C2C polymers network has been under construction since January 2009. As an initial step, the demand from the business community in the polymer sector will be determined, after which the network will organise a number of network meetings every year. These meetings are intended to exchange practical information and to bring a large group of companies into contact with each

other. There will also be time given to so-called problem-solving sessions during which a small group of companies will gather to consider possible solutions to specific problems. The target group for this network includes both leading companies and aspiring companies in the polymers sector that are implementing C2C for their product or process. Although the emphasis is on small and medium-sized enterprises (SMEs), larger companies are also welcome. Membership is open to experts and interested parties from the polymers sector and other parties in the supply chain. These parties include raw material suppliers, processors, producers, users, collectors and recyclers, as well as designers and producers in related sectors who are interested in polymers. <<

CONTACT

DPI Value Centre:

info@dpivaluecentre.nl

www.dpivaluecentre.nl

Dutch Polymer

Institute (DPI):

www.polymers.nl

info@polymers.nl

'Better City, Better Life'



// 1 MAY 2010 – 1 OCTOBER 2010, WORLD EXPO SHANGHAI, CHINA

The Dutch pavilion at the World Expo will be called 'Happy Street'. Designer John Körmeling will have this 350-metre-long street run like a rollercoaster to a height of 13.3 metres. The display will include the latest Dutch scientific, artistic and technical inventions and materials. www.holland-expo2010.nl

www.hollandtrade.com

13-17 APRIL 2009

2009 MRS SPRING MEETING, SAN FRANCISCO, UNITED STATES

The scientific sessions at the 2009 MRS Spring Meeting will include new and developing areas of materials research as well as some well-established and popular topics. www.mrs.org

4-5 MAY 2009

T.I.M.M. MESSE, NIEDERRHEIN, RHEINBERG, GERMANY

Trade show for the metal processing and engineering industries. www.technische-fachmesse.de



13-14 MAY 2009

MATERIALS ENGINEERING, EINDHOVEN, THE NETHERLANDS

The latest developments in materials engineering will be on display. www.materialsengineering.nl

18-21 MAY 2009

SAMPE '09, BALTIMORE, UNITED STATES

The SAMPE '09 Conference will feature a highly developed programme encompassing developments in materials and process technology. www.sampe.org

22-26 JUNE 2009

NPE2009, CHICAGO, UNITED STATES

Trade show for the plastics and rubber industry. www.npe.org



8-10 JULY 2009

ADVANCES IN POLYMER SCIENCE AND TECHNOLOGY (APST) 1, LINZ, AUSTRIA

This conference focuses on polyolefins and polymelamines. APST 1 will aim to facilitate the communication between industry and academia, cover recent developments and future targets and consider global trends and events. www.apst.at

12-17 JULY 2009

EUROPEAN POLYMER CONGRESS 2009, GRAZ, AUSTRIA

The European Polymer Congress is a biannual event covering all aspects of polymer science. www.epf09.org

27-31 JULY 2009

THE 18TH INTERNATIONAL CONFERENCE ON COMPOSITE MATERIALS, EDINBURGH, UNITED KINGDOM

International conference on composite materials. www.iccm-central.org

7-9 OCTOBER 2009

EUROFINISH 2009, GHENT, BELGIUM

Trade fair for surface technologies. www.eurofinish.be

14-18 OCTOBER 2009

FAKUMA, FRIEDRICHSHAFEN, GERMANY

International trade fair for plastics processing. www.fakuma-messe.de

27-29 OCTOBER 2009

COMPOSITES EUROPE, STUTTGART, GERMANY

Composites Europe represents the value chain of reinforced plastics from raw materials to finished products in combination with the latest processing and manufacturing technologies. www.composites-europe.com

17-18 NOVEMBER 2009

DPI'S ANNUAL MEETING 2009, EINDHOVEN, THE NETHERLANDS

DPI organises the Annual Meeting, a two-day event, of which the first day is for the DPI community only and the second is open to anyone who is interested. www.polymers.nl





FME-CWM

is dedicated to strengthening the position of the technological/industrial sector in the economy, thus helping to enhance the competitiveness of its members. To achieve these goals, FME seeks to maximise its influence on political and other social processes that are important to the sector for the benefit of its members. www.fme.nl

SenterNovem

is part of the Dutch Ministry of Economic Affairs and offers a large number of schemes and programmes in relation to sustainability and innovations on the government's behalf. These schemes are intended to support companies, government bodies, knowledge institutes and, in certain cases, consumers in sustainable and innovative projects. www.senternovem.nl

NFIA

The specific purpose of the Netherlands Foreign Investment Agency (NFIA) is to help and advise foreign companies that wish to take advantage of the Dutch

business environment and set up an office in the Netherlands as a strategic base for the rest of Europe. The NFIA provides information and practical assistance free of charge and on a confidential basis. The NFIA is an operational unit of the EVD, the agency for international business and cooperation, which in turn is part of the Dutch Ministry of Economic Affairs. www.nfia.nl

Metaalunie

is the largest employers' organisation, with more than 13,000 members, for small and medium-sized enterprises (SMEs) in the metal industry and focuses on metal companies with up to 100 employees in diverse sectors. www.metaalunie.nl

TNO

The Netherlands Organisation for Applied Scientific Research (TNO) is a publicly funded research institute. It is also the only organisation whose activities span the entire spectrum of consultancy and research services for clients and research partners, covering everything from safety

and health promotion to registration and technology. TNO succeeds both in providing the missing piece of a puzzle and in participating in the entire process from strategy determination to execution. www.tno.nl

NRK

The Dutch Rubber and Plastics Federation (NRK) represents the rubber and plastics industry and promotes the interests of the Dutch rubber, glue, recycling and plastics industry. www.nrk.nl

VKCN

VKCN is an association for the synthetic composites industry in the Netherlands, which is dedicated to clustering the powers of the plastics and composites industry, facilitating and supporting member companies, promoting sensible applications for plastic composites, promoting the industry's interests to government bodies and other stakeholders and fostering knowledge transfer and information exchange. www.vkcn.nl

