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Dincel Construction System (DCS) is an internationally patented PVC-U based formwork that has been designed for walls and columns, which when filled with ready-mixed concrete, produces an economically strong and durable permanent structure. The inventor, Burak Dincel has his factory and offices based in Sydney, Australia where the product has seen tremendous growth over the last few years. The key to this innovation lies within the simplification of the construction process with its unique snap fitting assembly that requires little skilled labour in comparison to traditional bricks and mortar.

Walls and columns built from DCS can be assembled at lower cost and in less time than traditional fabrication. Once filled with concrete the system produces a non-brittle, waterproof structure for internal and external walls over a wide range of residential, commercial and construction buildings. This results in buildings that are strong and waterproof. Conventional structural concrete walls are generally classified for their purpose with their own unique reinforcement requirements. With DCS, reinforcement can be reduced and in some cases eliminated. This has the benefit of overall environmental savings including the reduction in the amount of reinforcing steel. Indeed Dincel studies supported by academics have shown that nearly 75 tonnes of CO₂ reduction can be achieved or the equivalent of 89 years of heating and cooling energy is saved when the principles of Dincel are adopted in the construction of an Australian 2-bedroom apartment unit.

To date over 2,000 constructions using this type of fitting have been erected in Australia and we look forward to learning more about the process from the inventor himself when he will speak at PVC 2014 in Brighton on 1-3rd April 2014.

For more information please refer to: http://www.dincelconstructionsystem.com/
In 2008, SEIKISUI SPR launched a range of market-leading products for applications in trenchless pipeline rehabilitation. Following a series of successful projects, this award winning technology has proved to dramatically cut construction time, costs and impact on the residents, society and the environment.

The basic principle of the SPR™ spiral-wound pipe process lining method is that the decayed sewer section is repaired using an endless PVC-U profile strip that is fed through an open manhole. The SPR™ RO process consists of a single strip of PVC profile that is progressively wound into the existing pipeline by a spiral winding machine. The edges of the profile are interlocked by the machine as it moves inside the deteriorated pipeline, forming a continuous watertight liner. The machine can alter the diameter as it traverses the pipeline to produce a liner of optimal diameter. As soon as one of the above-ground profile drums is empty, a new coil is joined onto it by the heated tool butt welding method. Apart from this short interruption, the SPR™ method permits continuous working and allows liners of practically any length to be created. SPR™ RO liners can structurally rehabilitate brick, concrete, glass reinforced plastic or corrugated metal sewer and storm water pipelines with diameters from 800 mm to over 1800 mm. Where required for greater stiffness, the liner can be reinforced by simultaneously winding a profiled strip of steel under the tees of the PVC profile. SPR™ ST liners can structurally rehabilitate pipelines with diameters from 450 mm to over 2500 mm.

The SPR™ method is a cutting edge version of spiral-wound pipe lining technology. It is designed for the rehabilitation of large diameter pipelines up to 5000 mm. A major advantage is its extreme flexibility in irregular cross sections - it can be used on special profiles of every conceivable type and dimension up to 5000 mm as well as on standard sized circular and egg-sized profiles. SPR™ utilizes steel reinforced interlocking PVC profile strips grouted in place with a high compressive strength grout. The reduction in diameter is compensated for with the extremely good friction coefficients of the new smooth PVC SPR™ liner. Ultimately the SPR™ liner serves only as formwork for a new concrete inner shell of the old sewer and long term it provides a reliable protective layer to shield the concrete structure from the effects of sewage and sewer atmosphere.

According to an article by Sekisui SPR Europe GmbH, special requirements of the sewer rehabilitation in the city of Ansbach, Germany, made the SPR™ product the perfect solution and proved that even exotic profiles with large nominal diameters can be rehabilitated by this method. It is also reassuring from the article that confidence in PVC has returned as evidenced by KMG Pipe Technologies, a subsidiary of Sekisui SPR. The article states that ‘in view of the obvious advantages of the system, municipal network operators have overcome their historic reservations in respect of the material PVC. In recent years the nationwide bans – some of them instigated in the 1970s – have been lifted following an updated ecological evaluation of the material, giving further rise to confidence that the certified SPR™ spiral-wound pipe lining method will consolidate its position in the sewer rehabilitation market in the near future.’

For more information please refer to: http://www.sekisuispr.com/corporate
One of the most interesting areas of research and development for sustainable fuels and other useful products is a system derived from algae grown in bio-reactors. Such fuels contain no sulphur and are biodegradable. The other advantage is that the system does not require either soil or land to grow, nor does it compete for fresh water resources.

Essentially algae are microorganisms that can photosynthesise enough organic matter from carbon dioxide and organic nutrients present in the water in which they are suspended, to double their mass several times a day. In essence, they are made from a renewable resource that is carbon neutral and are far more productive than other biofuel crops. The main challenge for future success of this process lies in scaling up the algae technology for large scale commercial viability.

LGem was one of the first Dutch companies to use closed PBRs to produce microalgae on a commercial scale. Up until recently state-of-the-art algae growth technologies based on tubular PBRs have had to rely on expensive, off the shelf transparent tubing materials like PMMA and glass. In 2009, Georg Fischer Piping Systems (GF Piping Systems) joined the LGem development team, and the combination of their experience with transparent PVC piping systems in very demanding applications and their understanding of the specific requirements of the algae industry has meant that tubular PBR technology has evolved into a cleverly designed system with low installation and operating costs.

“Microalgae need to receive enough light to grow properly,” explains Dr Stephan Schüßler, Technical Manager of Research & Development at GF Piping Systems. Working together with partners in the United States, LGem and the Technical University in Wildau in Germany, GF Piping has developed various innovative solutions. For example, based on its unique cost-performance ratio, transparent PVC was identified as the most attractive material concept for the fabrication of PBR components. According to Dr Schüßler, the PVC pipes used for the PBRs are extremely UV-resistant, which helps to promote the production of biomass through photosynthesis. With its very attractive cost-performance ratio tubular PBRs made of such a PVC formulation offer additional advantages:

- all piping-components are based on the same formulation;
- pipe jointing is simple and can be from push-fit, welding to standard solvent cemented or flange connections;
- can produce customised further improvement of the UV-protection to enable durable outdoor performance;
- customised modification of the basic formulation by optical functional additives.

GF Piping Systems’ achievement in implementing PVC pipes effectively and creatively for the common good was recognized by the Gold SolVin Award 2010.

Professor Wildenauer, from the Technical University in Wildau, Germany believes the potential of the new technology is enormous, but so are the investments needed. The researcher predicts that “in ten years we should be ready to go into mass production.”

For more information please refer to: http://www.piping.georgfischer.com
Under the terms of the European Union Directive 2004/18/EC public bodies are required to buy products with the lowest whole life costs that are fit for purpose. The intention of the Directive is to ensure that public bodies across the EU are getting best value from expenditure of public money.

In the UK, Directive 2004/18/EC has been transposed into UK law as the Public Contracts Regulations 2006. INEOS ChlorVinyls has searched for procurement case studies in the UK that have demonstrated compliance with the best value requirements by making positive procurement choices in favour of PVC products. Here are some leading examples (in alphabetical order of the responsible procurement body):

- “The aim of the Decent Homes programme is to improve the quality of customer’s life…If a property has metal or timber framed windows we will replace them with PVC-U double glazed windows. If the property is identified for window replacement, it will also receive replacement PVC guttering and rainwater goods…”
  
  **Birmingham City Council**

- PVC windows, guttering, floors and cables save £30 million in housing & works programme and £1.2 million in the annual maintenance budget.
  
  **Brighton and Hove City Council**

- Installation of PVC-U windows, doors, fascias, soffits and rainwater goods for 1,620 residential properties. Recycling of 400 first generation PVC-U windows per week.
  
  **Camarthenshire County Council**

- “If we had stuck with timber, we would have had repainting programmes every five years and we would have had to replace the windows twice more between 1985 and 2006. In terms of sustainability, there’s no contest – PVC wins, hands down.”
  
  **Chesterfield Borough Council**

- ‘A’ energy rated PVC-U windows are helping new council homes to achieve ‘code level 4’ standard (code for sustainable homes).
  
  **East Riding of Yorkshire Council**

- “We were able to create a ground-breaking specification that offers major fuel savings, reduced CO₂ emissions, zero waste and environmentally friendly PVC-U windows that are lighter and stronger than ever before. The new window installations will bring estimated fuel savings for a three bedroom house to £286 per year.”
  
  **Fife Council**

- Homes achieving ‘Passivhaus’ standard by installing triple glazed PVC-U windows.
  
  **Hafod Housing Association**

- Installation of ‘A’ energy rated PVC-U windows. “LMH project officer Jodie Powell said residents had remarked on how the new windows have made their homes much warmer and improved the external appearance of the properties.”
  
  **Liverpool Mutual Homes (LMH)**

- More than 142,000 sq.m of PVC tensile fabric at main Olympic venues. More than 63,000 sq.m of PVC flooring in Olympic park. Numerous cables, pipes and high performance sports surfaces.
  
  “There are cases where for health and safety reasons the only solution is a PVC based material”.
  
  **Learning Legacy, London 2012 Olympic Delivery Authority**

- National recycling award for installation of energy efficient PVC-U windows with 98% recycled content.
  
  **Northwards Housing, Manchester City Councils ‘Arms Length Management Organisation’**

(CONTINUED ON PAGE 7)
Major refurbishment programme to bring over 5,000 council properties up to the Government’s ‘Decent Homes’ standard by installing PVC-U windows and doors.

Rotherham Metropolitan Borough Council

“Replacing old windows with modern PVC-U double glazing can reduce heat losses through windows by half, save around £110 per year on fuel bills, and around 720 kg CO2. It is both a popular and effective measure…”

Scottish Government Report

“PVC-U windows are durable with low maintenance requirement. This provides considerable social benefits in terms of allowing more ‘free time’ for the owner and user of the product whilst also reducing or eliminating the need for potentially hazardous maintenance operations…”

Stockton on Tees Council

769 properties in district upgraded to ‘Decent Homes Standard’ by installing PVC windows and doors.

Tower Hamlets Council

25,000 ‘A’ energy rated PVC-U windows installed. “The programme could help the Trust cut CO₂ emissions by up to 76,500 tonnes over a ten year period.”

Watford Community Housing Trust

A housing development won ‘House builder award’ for achieving ‘Code for Sustainable Homes level 5’ by installing ‘A’ energy rated PVC-U windows.

Woking Borough Homes

INEOS ChlorVinyls is now leading a major communication project via the British Plastics Federation, supported by VinylPlus. The project will promote the achievement of best value in public procurement by reference to these positive case studies by leaders in public procurement.

‘12 good reasons to Specify PVC products’ can be downloaded from: www.ineos.com/en/businesses/INEOS-ChlorVinyls/Products/#Customer-Publications
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Our previous articles on the subject of the REACH regulation have generally covered the registration phase and described the first two deadlines of substance registration in 2010 and 2013. The REACH process however has just reached another important milestone as the first substance authorisation applications are received and a new set of substances are being evaluated for inclusion in the next part of the authorisation process. Ingredients in some PVC formulations are included under both parts of this process.

Whilst any substance manufactured in, or imported into, the European Union in quantities above one tonne per year need to be registered, the critical part of the regulation, and the activities of the new European Chemicals Agency, were always thought to be around the restriction and authorisation parts since both of these processes had the greatest potential to affect substances on the EU market. The processes are important since safe use, particularly in the authorisation scheme, is not necessarily an adequate defence or reason for continued use.

The Agency responded to political pressure in the autumn of 2012 by fast tracking 54 substances onto the candidate list of substances of very high concern (SVHC). This is a holding list from which substances may then be transferred onto Annex XIV of the REACH regulation for which companies will require an authorisation from the European Commission for continued use. The 54 fast tracked substances included the first set of substances that are defined by the definition of “substances of equivalent concern” to those classified as carcinogenic, mutagenic or reprotoxic or persistent, bioaccumulative and toxic. These substances of equivalent concern include several substances that are classified as respiratory sensitisers: substances that have the potential to induce occupational asthma. The list included azodicarbonamide (ADCA).

The very first candidate list included di-2-ethylhexyl phthalates (DEHP) and this was also on the first Annex XIV entry. The date for authorisation applications has now passed and the European Commission is now studying the authorisation applications that it has received for continued use of DEHP. Whilst the share of the plasticiser market for DEHP has reduced significantly owing to its reprotoxicity classification and the REACH authorisation process, some companies have concluded that it is still a necessary part of its products and can be used safely. This is the basis of their authorisation application.

The inclusion of ADCA in the REACH candidate list introduces some interesting points. As a foaming agent used in the manufacture of PVC flooring, PVC wallcovering and foamed profiles, the mode of action for it is a decomposition with the liberation of gas. (CONTINUED ON PAGE 8)
Therefore the addition level of ADCA will be significantly higher than the level of ADCA in the finished article. The key threshold level of REACH consideration is 0.1% w/w, whereby above this level the presence of a candidate list substance must be communicated down the supply chain. The fact that ADCA is used with the intention of decomposition is not something that is immediately recognised in the REACH process. In considering whether to move a substance from the candidate list to Annex XIV, the agency takes into consideration various parameters and scores them. The overall scores for the proposed substances are then compared and the substances with the highest scores are then placed on Annex XIV. The consideration of ADCA showed a relatively low score for annual volume in use but high scores for the number of sites where it is used and a high score for the fact that it is used in consumer articles. Here however the process becomes difficult since an addition level of 1% in the PVC compound or plastisol does not equate to 1% in the final article, owing to the fact that the substance decomposes.

The polymer industry has been involved in a very large study programme to evaluate the use of ADCA, its exposure and the level of residual ADCA in final products. The results have been submitted to the Agency as part of its consultation programme. In general the results show that ADCA levels in finished articles are below 0.1% w/w although there are some exceptions. It has also shown exposure measurements that reveal that use is carried out with exposure below the general occupational exposure limits in place in the community. However, given the nature of the candidate list and Annex XIV process – a hazard based rather than risk based process - these facts may not be sufficient. The Agency may decide that the justification of safe use should be presented as part of an authorisation application. If ADCA is placed on Annex XIV companies must seek authorisation from the European Commission for its continued use. An authorisation application costs €53,000 per use and must present data on safe use, where applicable, a detailed presentation on available alternatives and a socio-economic case for continued use if there are no clear alternatives. The only common alternatives to ADCA are sulphohydrazide agents and sodium bicarbonate (i.e. baking powder). The sulphohydrazides decompose at much lower temperatures, which makes them currently not a viable alternative for the existing technology. Sodium bicarbonate decomposes with a much lower degree of gas generation and results in much less uniform foam structures.

The polymer processing industry has come together to produce a large dossier of information to submit to the Agency to give reasons why the study of ADCA under the standard REACH parameters should not apply to ADCA. The alliance between EUPC (plastics processors) and national plastics associations and ADCA distributors has been impressive. The latest proposal is to develop a voluntary commitment (which bears similarities to VinylPlus) to ensure that ADCA exposure levels are kept well below the occupation exposure limits and that residual ADCA in articles is kept below the REACH threshold of 0.1% w/w. The case will be heard in Helsinki in the week of 9th December and it is hoped that the Agency and member states will realise that using REACH to control ADCA exposure is analogous to using a sledgehammer to crack a nut.

‘...using REACH to control ADCA exposure is analogous to using a sledgehammer to crack a nut’
The triennial global PVC conference will once again take centre stage at Brighton from the 1-3 April 2014. The event will see the return of the Conference to the former Metropole Hotel.

PVC 2014 will continue to focus on presenting a full and varied programme of original papers covering all aspects of PVC, from formulation through to recovery and recycling. Emphasis will be given to how PVC continues to develop, meeting the challenges of business and sustainability and aiming to inspire innovation across its vast range of applications.

The plenary session on Day 1 promises to be one of the most prestigious in the history of the conference including the following confirmed speakers:

**Jonathon Porritt CBE** and Founder and Director of ‘Forum for the Future’ will provide the keynote address based around the launch of his new book *Sustainable Futures: Re-Making the World*. Following his universally acclaimed keynote presentation at the PVC Brighton conference in 2002, Jonathon will present the journey so far and where we need to be headed.

**Sajjad Karim, MEP** for North West England and is also the European Parliament’s representative on the VinylPlus Monitoring Committee, will deliver a keynote address *Regulations - meeting targets and easing the burden.*

**Henry Warren**, the Senior Analyst with IHS, a leading provider of information in the global market and economy, will discuss *Global Vinyls: Past, Present and Future* by examining some of the changes in ‘global vinyls’ and present a detailed look into the future. Some of the topics to be covered will include a brief overview of the global economic outlook, as well as implications for world oil and gas prices in the coming years; the latest analysis of the state of the global construction industry and forecast; a global overview of the shifts in supply/demand parameters of PVC since 2008; and how IHS see these changing in the years to come. The mercury to membrane debate will also be featured.

In a session entitled *What’s Happening in My Market* leading experts in their area have so far confirmed that they will cover the latest market situation; issues being faced and strategies for the future in the European Suspension and Paste Resin businesses; the PVC Industries in Japan, India and North America; and the Asian picture with a particular focus on Chinese Carbide PVC process supply position.

*The Contribution of the VinylPlus programme to the sustainability of the PVC Industry* will be highlighted by **Dr Brigitte Dero**, General Manager of the European Council of Vinyl Manufacturers and VinylPlus. With the purpose of VinylPlus being to enhance the sustainability of PVC and PVC products throughout their life cycle, this paper will describe the programme, the challenges, and the results obtained so far.

**Burak Dincel** of Dincel Construction System will address *The Developing and Innovative Usage of PVC in Building Applications*. Dincel Construction System produces an internationally patented permanent PVC polymer-based construction formwork designed for walls and columns that, when filled with ready mixed concrete, produces a sustainable, economical, strong and durable structure that reduces CO₂ emissions. The end product is also the solution to many currently known concrete problems.

**Sustainability: Shaping the Evolution of PVC Stabilisers** is the focus of the paper from **Alain Cavallero** from the European Stabiliser Producers Association where he will brush a picture of the evolution and trends for the next years, in an integrated approach with VinylPlus, the new 10-year programme of the PVC value-chain.

**Laura Shields** has also agreed to deliver a paper *Risk communication: what works and what doesn’t* examining the pitfalls that people working in science-based, technical industries often encounter when trying to put the public at ease about health or environmental worries. Laura previously worked for the BBC and CNN and now runs the Brussels office of The Media Coach.

Full details can be obtained from: [http://pvc2014.org/home](http://pvc2014.org/home)