

# WPC 2014 Preview: The Evolution of the Perfumer's Palette



With a focus on value, performance, hedonics, regulatory compliance, sustainability and more, the fragrance ingredient landscape is changing rapidly.

**I**n addition to three days of talks on key issues ranging from growth markets to sustainability to perfumery, the 2014 World Perfumery Congress (WPC; [WPC.PerfumerFlavorist.com](http://WPC.PerfumerFlavorist.com)), running June 10–12 in Deauville, France, will provide attendees with the opportunity to explore the Expo Hall and connect with ingredient and fragrance manufacturers, equipment suppliers, service providers and more.

Recently, P&F discussed the changing fragrance ingredient landscape with several exhibitors. Their insights into perfumers' needs, new technologies, the regulatory landscape, sustainability and more provide a sneak peek into the expertise WPC will offer.

For a full list of exhibitors, turn to **Pages 34–35**.

—Jeb Gleason-Allured, WPC Program Director

## Linking Sustainability from R&D to Marketplace

“Chemistry and science are by tradition about innovation and can be a major growth driver for sustainable development in the flavors and fragrances industry,” says Kristina Gräper, director of SET—applied sustainability, BASF Nutrition & Health<sup>a</sup> (**WPC Stand: #609 & 709; [www.aromachemicals.basf.com](http://www.aromachemicals.basf.com)**). “A collaborative approach in between our internal R&D network, our regulatory and market experts enables new initiatives and innovative solutions that foster a promising future of the perfumer's palette.”

Gräper explains that BASF has applied a system termed *verbund* (roughly translated as “linked” or “integrated”) to its manufacturing approach in natural and synthetic ingredients.

“In this *verbund* system, chemical processes consume less energy, produce higher product yields and conserve resources,” says Gräper. “In that manner, we save on raw materials and energy, minimize emissions, cut logistics costs and exploit synergies. Our aroma ingredients also benefit from all of these advantages.”

The company operates six *verbund* sites in addition to its 378 other production sites. The *verbund* system drives what Gräper terms “intelligent interlinking of production plants, energy flows and infrastructure,” in addition to the sharing of experience and expertise throughout the workforce. This drives efficiencies from basic chemicals to high-value-added products in the value chain and yields byproducts that can be applied as starting materials for additional ingredients. Fossil raw materials feed the production systems in addition to renewable feedstock, which can be used through a mass balance approach.

<sup>a</sup>SET—applied sustainability is a trademark of BASF



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“All perfumers are looking for value.”

—Achille Riviello, PFW Aroma Chemicals

## The Power of Lifecycle Assessments

“A necessary prerequisite for talking about sustainable alternatives is to understand what is meant by a sustainable alternative?” says Gräper. “Any product can be made more sustainable along the value chain—no matter if it is organic, natural or natural identical. This can be achieved by using resources more efficiently, reducing the environmental impact or increasing output while increasing social responsibility and affordability. By searching for more sustainable alternatives, it is crucial to apply sustainability at product or ingredient level and to look at every step along the value chain—including the use of resources, ingredient production, flavors and fragrance formulation, packaging and the final use and disposal by the consumers. Only with that holistic picture—for example provided by a lifecycle assessment—can you identify the most effective levers for improvement.”

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Since 1996, says Gräper, BASF has completed more than 500 lifecycle assessments comprising 11 environmental impact categories. These have yielded an understanding of not only the use of elements such as energy, resources and water, but also of the total cost of ownership, encompassing expenses such as environmental protection, maintenance and energy. For instance, energy efficiency can in part be achieved by a more responsible use of fossil raw materials and other sources of energy.

As such, conservation can be achieved in the areas of housing and transportation, production plant power and heat energy use, and via the application of renewable raw materials in chemical product manufacturing.

“[W]e analyze the impacts along the lifecycle of the product to find the strongest lever for improvement,” Gräper says. “Looking in-depth at a wide set of environmental impacts per ingredient provides a good scientific base to understand which ingredient is more sustainable than another.”

The integration of renewable feedstock into production has been the focus of a cooperation between BASF and third-party certification body TÜV SÜD ([www.tuv-sud.com](http://www.tuv-sud.com)).

“The process is available for many products and can be adapted to customer requirements,” says Gräper. “Based on this approach, biomass is used as a feedstock in the manufacturing of basic products in existing plants. This biomass share is then allocated to sales products according to their recipes using the new certified methodology. The quality of the products remains unchanged.”

Gräper continues, “The products mass balanced in this manner save fossil raw materials and reduce greenhouse gas emissions, thereby contributing to sustainable development. Through the mass balance approach, it could be possible to allocate up to 100% renewable feedstock to sales products. Existing plants and technologies along the value chain can continue to be used, and the customers’ formulations do not have to be adjusted.”

### Bringing New Molecules to the Perfumer’s Palette

“Firmenich typically introduces three to five new molecules every given year,” explain Julien Firmenich, product and pricing director, and Pierre-Alain Blanc, master perfumer, of Firmenich (**WPC Stand: #601 & 701**, [www.firmenich.com](http://www.firmenich.com)). “Each new introduction is a result of years of development, testing, registration and industrialization efforts.”

This year is no exception. The company has launched a new synthetic vanillin substitute that does not color in application, as well as a floral-mimosa note. Firmenich has

also introduced Clearwood<sup>b</sup>, a new woody ingredient produced from the fermentation of sugar cane.

A high-volume perfumery ingredient, Clearwood is produced by fermentation of sugar, similar to the way in which beer is brewed from saccharification of starch and fermentation of the resulting sugar. The process requires no volatile solvent

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<sup>b</sup>Clearwood is a trade name of Firmenich



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for the synthesis of this product, only Brazilian-grown sugar cane and water.

Every ingredient has its own lifecycle, say Firmenich and Blanc. While Hedione<sup>c</sup>, launched by Firmenich in 1961, remains a staple of perfumery, others are replaced on the palette more quickly.

“The evolution of chemistry, regulations, clients’ requirements and consumer trends constantly provides us with opportunities to improve our ingredients and develop new ones,” they explain. “One important challenge is the evolving regulatory environment. Lilial<sup>d</sup> and Lyrall<sup>e</sup>, for example, key ingredients found in many classic perfumes, might soon be banned or sharply restricted, and we have been working on new ingredients able to fill these voids.”

Firmenich and Blanc continue, “Firascone<sup>f</sup>, a new ingredient that will be presented at the *World Perfumery Congress* in June, is a non-sensitizing alternative to damascones and can be used in composition at higher levels than damascones. Firsantol<sup>g</sup>, presented last year, is a synthetic molecule with an olfactory profile close to natural Indian sandalwood. Finally, Clearwood, mentioned above, will allow perfumers to better address evolving consumer trends in all perfumery applications for the benefit of our clients.”

These and other ingredients reflect the evolution of ingredient development.

“Green chemistry is at the heart of our innovation model,” say Firmenich and Blanc. “Examples of our efforts to improve the sustainability of our activities include a reduction of 31% of our total water consumption by ton of finished product in the last five years and a reduction of 31.8% of our hazardous waste rates on a five year rolling basis.”

<sup>c</sup>Hedione is a trade name of Firmenich

<sup>d</sup>Lilial is a trade name of Givaudan

<sup>e</sup>Lyrall is a trade name of IFF

<sup>f</sup>Firascone is a trademark of Firmenich

<sup>g</sup>Firsantol is a trademark of Firmenich

In addition, the company undertakes vigorous assessments of the biodegradability of all ingredients in its pipeline. Firmenich and Blanc note that “only candidates that pass strict sustainability criteria with respect to environmental safety and protection qualify for further development and introduction.”

At the same time, the company is focusing on the sustainable sourcing of natural ingredients by ensuring a benefit for the local growing communities.

“Our ties with farming communities have been built over decades and many natural raw materials are concerned,” say Firmenich and Blanc. “Firmenich not only buys the product directly from these communities, but also provides technical training and financial support when necessary.”

To date, the company has pursued sustainable production of ingredients such as vetiver in Haiti, vanilla in Uganda and Madagascar, patchouli and cardamom in Guatemala, and copaiba and tonka beans in the Amazon.

## Innovating Naturals

“We have no choice but to be innovative and develop R&D to find new solutions,” says Bertrand de Preville, sales director, IFF-LMR Naturals (**WPC Stand: #501 & 509; [www.iff.com](http://www.iff.com)**).

In aligning natural product R&D with customer demands, he says, IFF-LMR works closely with IFF perfumers to determine customer and market needs. Today, says de Preville, natural products must be unique, high-performing, affordable, sustainable and ethically sourced through a clean supply chain. As a result, IFF-LMR is focused on developing new products from

nature that are cost-effective and in compliance with the increasingly complex global regulatory environment. The R&D programs dedicated to addressing these needs are new botanical development, supply chain improvement

via agricultural best practices (regeneration, propagation, cultivation, harvesting, etc.) for improved yields and cost innovations, and new extraction and refinement techniques to optimize olfactory profiles, create new specialties and meet regulatory requirements.

One such material, Rose Water Essential<sup>h</sup>, was launched during the 2012 WPC. The ingredient comprises the olfactory elements of rose essence and rosewater in a highly concentrated mixture without the presence of water. The ingredient, which can be applied as a natural fragrance, moisturizer or cosmetic ingredient, is energy- and transportation-efficient and bacteriologically stable. Rose Water Essential was a FiFi Technology Award finalist and recipient of the Organic Monitor Sustainable Beauty Award for Sustainable Ingredients.

<sup>h</sup>Rose Water Essential is a trademark of IFF-LMR

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IFF-LMR is also working with producers in Egypt to cultivate a new specimen of geranium that can provide a larger yield compared to conventional leaves. The result, says de Preville, is geranium oil produced at a far more affordable cost. The company previously created programs for orris and blackcurrant.

“Any development of new products should be sustainable,” says de Preville.

This mission, he says, dates back to the work of LMR founder Monique Rémy, who started the company in 1983 (LMR was acquired by IFF in 2000). At that time, Rémy embedded the sustainable development of natural products into the DNA of her company, though the term “sustainability” was not yet in vogue. This mission, says de Preville, continues to this day and focuses not just on short-term inventory management to secure raw materials, but also viability for the next 50 years.

R&D that centers on minimizing costs allows all stakeholders, including farmers, to benefit. This is a crucial issue as cost of living continues to escalate in many growing regions.

Meanwhile, functional and fine fragrance perfumers alike are able to use IFF-LMR as an “in-house naturals company” from which to source *haute couture* ingredients for consumer product projects, explains Judith Gross, global marketing director, naturals and R&D, IFF-LMR.

### **Addressing the Gaps in the Perfumer’s Palette**

“New, differentiating and superior-performing molecules are the lifeblood of a successful fragrance business,” says Ahmet Baydar, senior vice president of research and development at IFF. “Historically, fragrance molecules were synthesized for odor profile requirements. Today, performance of a molecule, such as diffusivity, substantivity, compatibility in delivery systems and customer bases are equally important.” IFF recently expanded its ingredients capabilities with the acquisition of Aromor Flavors & Fragrances, which produces specialty synthetic molecules, in addition to natural and nature-identical materials.

“Our research portfolio for fragrance ingredients is derived from an in-depth understanding of our customers’ and consumers’ needs,” says Baydar. “New molecules are developed to address the needs of different product categories and geographies with special emphasis on emerging markets. Today, we use performance modeling in our new molecule programs. This approach leads to a more

targeted odor profile and performance. At any given time, our innovation portfolio has ingredients in various stages of development to provide a continuous pipeline of differentiating new molecules to our perfumers’ palette.”

He adds, “Beyond new molecule development, innovation in new delivery systems has become an integral part of our R&D portfolio, given its importance in fragrance performance. After our successful launch of this important technology, we have continued to expand our innovation efforts and applications.”

### **Green Chemistry in Practice**

“IFF has adopted the ‘12 Principles of Green Chemistry,’ which were originally proposed by Paul Anastas and John Warner in

'Green Chemistry: Theory and Practice' (Oxford University Press, New York, 1998<sup>1</sup>)," says Kip Cleverley, director of global sustainability at IFF.

"Those 12 principles apply both to our products and our processes," he continues. "Using renewable feedstocks, preventing waste, increasing energy efficiency and designing chemicals to degrade after use—all fit well into what we've already been doing. They're very practical and make sense from a chemistry standpoint."

The company worked with Michael Cann, distinguished professor of chemistry and co-director of environmental science at the University of Scranton (Scranton, Pennsylvania), to adapt the 12 principles specifically for the production of flavor and fragrance ingredients. In 2013, virtually the entire R&D team at IFF's Union Beach facility participated in workshops designed to train them in the application of the steps.

As a result, R&D is improving sustainability by increasing the company's focus on renewable raw materials, creating more efficient chemical pathways and designing molecules that are more biodegradable.

Specifically, IFF's R&D has been using green engineering technologies such as flow chemistry, micro-reactors and catalysis for the manufacture of new ingredients. The company is also using these and other green chemistry processes and technologies to change the way it manufactures its existing molecule portfolio.

## Biotechnology: Here to Stay

In 2013, IFF and Amyris announced a partnership for the creation of renewable fragrance ingredients. The companies are jointly developing sustainable, cost-effective and reliable sources of "key fragrance ingredients," according to an official announcement. The Amyris collaboration is IFF's second major partnership in the biotechnology realm, following an earlier collaboration with Evolva for its flavor business.

"Anything that exists in nature can theoretically be produced via biotechnology," says Baydar.

He stresses that biotechnology is not replacing chemistry, but will play a collaborative role in the production of fragrance materials.

"The unique features that this technology offers can give us a competitive edge, especially in conjunction with our organic chemistry expertise and industry knowledge," says Baydar. "In the future, as biotechnology becomes more mainstream, it will become another tool in our innovation toolkit."

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—Julien Firmenich and Pierre-Alain Blanc,  
Firmenich

## Seeking Value in Fragrance Ingredients

"All perfumers are looking for value," says Achille Riviello, perfumer at PFW Aroma Chemicals (**WPC Stand: #309; [www.pfw.nl](http://www.pfw.nl)**). "They're looking for materials that give them a reason to put them in the palette. They have to have a *raison d'être*. Something can

smell interesting, but if it's too costly as a line item, its value's just not there. The perfumer is not going to use it."

Such calculations are more sophisticated than cost per kilo. Instead, perfumers must look at the actual value and impact of individual items.

Riviello says, "When I put this fragrance [material] in my formula, I have to ask what's its line-item contribution?" And even if the perfumer smells a difference with the new ingredient, they must ask themselves: "What does that difference cost?"

In addition to hedonics, perfumers must consider the stability, performance, etc.

Riviello adds, "The price pressure's getting worse. We have to be more creative and bring more value out of our formula. We're all in the same boat there."

Meanwhile, he says, "There are of course also the regulatory concerns, such as: Is the material registered worldwide?"

This is particularly a concern for any company serving multinational accounts. As the U.S. Toxic Substances Control Act continues to put regulatory pressure on key fragrance ingredients, Riviello describes the current environment as "extremely difficult for new molecules."

As PFW parent company S.H Kelkar constructs its manufacturing facility in India, the company is focusing on expanding capacity and capability through installation of modern equipment and automated control systems, and implementing process improvements and efficiencies to minimize waste streams.

PFW has long been known for its radiant, powerful and musky Tonalid<sup>1</sup> ingredient, and now it is diversifying its R&D



<sup>1</sup>Tonalid, Cyclomyral, Isojasmone T, Dihydro Isojasmonate, Orinox, Tropicate, Sagecete and Iriswood are trade names of PFW Aroma Chemicals

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<sup>1</sup>[www.epa.gov/sciencematters/june2011/principles.htm](http://www.epa.gov/sciencematters/june2011/principles.htm)



*"Anything that exists in nature can theoretically be produced via biotechnology," says IFF's Ahmet Baydar.*

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**"We have no choice but to be innovative and develop R&D to find new solutions."**

**—Bertrand de Preville, IFF-LMR Naturals**

and expanding its palette. PFW is also repromoting some of its classic "forgotten gems" like Cyclomyral (CAS# 68991-97-9; marine, floral, green, ozone), Isojasmone T (CAS# 95-41-0; herbal, floral, fruity, sweet), Dihydro Isojasmonate (CAS# 37172-53-5; floral, jasmine, muguet, rose), Orinox (CAS# 2040-10-0; woody, musk, orange flower, sweet), Tropicate (CAS# 14352-61-5; full-bodied, fruity, tropical, banana, mango, pineapple honey undertone), Sagecete (CAS# 131766-73-9; herbal, floral, fruity, clary sage, plum and chamomile) and Iriswood (CAS# 4736-45-2; diffusive woody-orrisy, powdery, ambery).

The company is also bringing more S.H. Kelkar products sold in India to the global stage, including phenethyl phenyl acetate (CAS# 102-20-5), phenyl ethyl methyl ether (CAS# 3558-60-9) and phenyl ethyl isoamyl ether (CAS# 56011-02-0).

Riviello notes that as new and existing ingredients are introduced to perfumers, the focus continues to be how they may be used and what value they deliver in fragrances.

*To see more about the 2014 WPC speakers and exhibitors, or to register, visit [wpc.perfumerflavorist.com](http://wpc.perfumerflavorist.com).*

## 2014 World Perfumery Congress Exhibitors

*Exhibitors confirmed as of February 2014.*

**A. Fakhry & Co.;** Stand: #414, [www.afakhry.com](http://www.afakhry.com)

**A.C.S. International, GmbH;** Stand: #520, [www.acsint.com](http://www.acsint.com)

**Agrumaria Corleone SpA;** Stand: #734, [www.agrumariacorleone.com](http://www.agrumariacorleone.com)

**Al-Can Exports Pvt. Ltd.;** Stand: #535, [www.al-can.com](http://www.al-can.com)

**Anhui Primechem Co., Ltd.;** Stand: #722, [www.ahprimechem.com](http://www.ahprimechem.com)

**BASF SE;** Stand: #609 & 709, [www.aroma-ingredients.basf.com/Home.aspx](http://www.aroma-ingredients.basf.com/Home.aspx)



**Bedoukian Research Inc.;** Stand: #321, [www.bedoukian.com](http://www.bedoukian.com)

**Berjé Inc.;** Stand: #514, [www.berjeinc.com](http://www.berjeinc.com)

**Biolandes;** Stand: #521, [www.biolandes.com](http://www.biolandes.com)

**Bontoux;** Stand: #420, [www.bontoux.com](http://www.bontoux.com)

**British Society of Perfumers;** Stand: #240, [www.bsp.org.uk/](http://www.bsp.org.uk/)

**BW Confidential Magazine;** Stand: #439, [www.bwconfidential.com](http://www.bwconfidential.com)

**Capua 1880 Srl;** Stand: #215, [www.webcapua.com](http://www.webcapua.com)

**Cilione Srl;** Stand: #426, [www.cilione.com](http://www.cilione.com)

**Contexa SA;** Stand: #627, [www.contexa.ch](http://www.contexa.ch)

**DRT;** Stand: #429, [www.drt.fr](http://www.drt.fr)

**DSM Nutritional Products Ltd.;** Stand: #409, [www.dsmnutritionalproducts.com](http://www.dsmnutritionalproducts.com)

**Düllberg Konzentra GmbH & Co. KG;** Stand: #620, [www.duellberg-konzentra.com](http://www.duellberg-konzentra.com)

**Emerald Kalama Chemical;** Stand: #628, [www.kalama.emeraldmaterials.com](http://www.kalama.emeraldmaterials.com)

**Encapsys Microencapsulation—A Division of Appvion, Inc.;** Stand: #430, [www.encapsys.com](http://www.encapsys.com)

**Ernesto Ventós, S.A.;** Stand: #614, [www.ventos.com](http://www.ventos.com)

## 2014 World Perfumery Congress Exhibitors (Cont.)

**Expression Cosmétique Magazine;** Stand: #239,  
[www.expression-cosmetique.fr](http://www.expression-cosmetique.fr)

**Firmenich;** Stand: #601 & 701,  
[www.firmenich.com](http://www.firmenich.com)

**Firmenich**

**Floral Concept;** Stand: #315, [www.floral-concept.com](http://www.floral-concept.com)

**Fragrance Du Bois;** Stand: #727,  
[www.fragrancedubois.com](http://www.fragrancedubois.com)

**Fricke Abfülltechnik GmbH & Co. KG;** Stand: #721,  
[www.frickedosing.com](http://www.frickedosing.com)

**Givaudan;** Stand: #200 & 201,  
[www.givaudan.com](http://www.givaudan.com)

**Givaudan**

**Global Essence UK Ltd.;** Stand: #320,  
[www.globalescence.com](http://www.globalescence.com)

**Indesso Aroma, PT;** Stand: #726, [www.indesso.com](http://www.indesso.com)

**Indo World Trading Corporation;** Stand: #435,  
[www.indo-world.com](http://www.indo-world.com)

**Indukern F&F Ingredients Division;** Stand: #529,  
[www.indukern-ffingredients.com](http://www.indukern-ffingredients.com)

**International Flavors & Fragrances Inc.;**  
Stand: #501 & 509, [www.iff.com](http://www.iff.com)

**IFF**

**Jiangsu Green Source Fine Chemical Co., Ltd.;** Stand: #216,  
[www.jsgreensource.com](http://www.jsgreensource.com)

**Lansdowne Aromatics;** Stand: #622,  
[www.lansdownearomatics.com](http://www.lansdownearomatics.com)

**Lluch Essence;** Stand: #427, [www.lluche.com](http://www.lluche.com)

**Mane;** Stand: #401, [www.mane.com](http://www.mane.com)

**MANE**

**MG Gülçiçek International Fragrance Company;** Stand: #419,  
[www.gulcicek.com](http://www.gulcicek.com)

**Müller Ltd Packaging;** Stand: #621, [www.muellerdrums.com](http://www.muellerdrums.com)

**Nactis Synarome;** Stand: #316, [www.nactis.fr](http://www.nactis.fr)

**Padmini Aromatics Pvt. Ltd.;** Stand: #214, [www.padmini.com](http://www.padmini.com)

**Parfumis;** Stand: #729, [www.parfumis.com.au](http://www.parfumis.com.au)

**Payan Bertrand S.A.;** Stand: #515, [www.payanbertrand.com](http://www.payanbertrand.com)

**PFW Aroma Chemicals B.V.;**  
Stand: #309, [www.pfw.nl](http://www.pfw.nl)

**PFW**

**Provence Naturals;** Stand: #530, [www.censo-lavande.fr](http://www.censo-lavande.fr)

**Rakesh Sandal Industries;** Stand: #416, [www.rakeshin.com](http://www.rakeshin.com)

**Robertet Inc.;** Stand: #615 & 715,  
[www.robertet.com](http://www.robertet.com)

**ROBERTET**

**SAFISIS;** Stand: #222, [www.safisis.fr](http://www.safisis.fr)

**Sensient Fragrances S.A.;** Stand: #527,  
[www.sensientfragrances.com](http://www.sensientfragrances.com)

**SEPAWA;** Stand: #438, [www.sepawa.com](http://www.sepawa.com)

**Shanghai Wanxiang Flavors & Fragrances Co. Ltd.;**  
Stand: #338, [www.wxintl.com](http://www.wxintl.com)

**Simone Gatto srl;** Stand: #335, [www.simonegatto.com](http://www.simonegatto.com)

**Soap, Perfumery & Cosmetics Magazine;** Stand: #339,  
[www.cosmeticsbusiness.com/Category/SPC](http://www.cosmeticsbusiness.com/Category/SPC)

**Société Française des Parfumeurs;** Stand: #440,  
[www.parfumeurs-createurs.org](http://www.parfumeurs-createurs.org)

**Sud Graphic;** Stand: #517, [www.sudgraphic.com](http://www.sudgraphic.com)

**Symrise AG;** Stand: #301,  
[www.symrise.com](http://www.symrise.com)

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**Takasago International Corp.;**  
Stand: #208 & 209, [www.takasago.com](http://www.takasago.com)

**TAKASAGO**

**TFS Corporation;** Stand: #519, [www.tfsltd.com.au](http://www.tfsltd.com.au)

**Tournaire S.A.;** Stand: #526, [www.tournaire.fr](http://www.tournaire.fr)

**Urum & Co. Plc.;** Stand: #618,

**Vanwyk Systems;** Stand: #326, [www.vanwyk.nl](http://www.vanwyk.nl)

**Wictive;** Stand: #631, [www.wictive.com](http://www.wictive.com)

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