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JOURNAL OF THE OIL AND COLOUR CHEMISTS' ASSOCIATION

JOCCA

SURFEX 88 Review

JOURNAL OF THE OIL AND COLOUR CHEMISTS' ASSOCIATION

JOCCA

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Contents

Vol. 71 No. 8 **August 1988**

The front cover photograph shows the Reception area and Gallery spiral staircase at SURFEX 88 inside the Harrogate Internationsl Conference and Exhibition Centre. Photograph by Tennant Brown.

Oil and Colour Chemists' Association
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Editorial

SURFEX 88

SURFEX 88 Review starts on p224

As my principal function is to ensure that SURFEX is packed with premier exhibitors, I hope that the JOCCA readership will forgive me if I address my review principally to them.

SURFEX 88 has successfully answered one question: Was '86 a flash in the pan? – clearly not. The comments of exhibitors and visitors alike confirmed that, once again, good, solid business was being conducted in a congenial atmosphere. From an exhibitor's point of view, SURFEX in Harrogate is the least restrictive and most hassle-free exhibition to be found anywhere. And the visitor finds a concentration of the most important suppliers to his industry in luxurious, accessible surroundings. But success raises another query – where do we go from here?

SURFEX 88 was 30% larger than '86 and housed in four interconnected areas.

HALL D, the largest, had been laid out slightly differently from the earlier show and was occupied by 47 exhibitors. All of those questioned expressed themselves well pleased with the outcome and would like to re-book there next time though many would like larger stands. Meeting this latter demand would of course reduce the number of individual exhibitors.

The RECEPTION area accommodated more than twice as many stands this time and benefited from the development. It was much busier than '86 resulting in a significantly higher level of customer satisfaction. The re-location of the organising OCCA stand to this position was also a considerable benefit.

The GALLERY section, which had been an overspill area in '86, also worked very well, only one dissenting voice breaking the general acclamation. There is more space and consequently a more relaxed ambience in this section and indeed several exhibitors have already requested bookings in that area for SURFEX 90.

The AUDITORIUM was our overspill area this time. No-one had ever held an exhibition there before and we have learned a lot from the experience. The number of visitors to the 'gods' was less than to the ground floor areas but as it was the more interested who took the trouble to climb the extra ramp, the positive enquiry rate appears to have been higher than elsewhere. However, that assessment should not be taken as reflecting complacency. The layout of the auditorium stands was not good and the flooring and lighting were well below the standard we had expected. These aspects will be much improved next time.

So what do we do next time?

More than 80% of '88 exhibitors want to book for '90, many requiring more space, and more than 30 new exhibitors would like to join us (including some who have been regarded as notable absentees at the earlier shows). In our post exhibition survey, some exhibitors have suggested that we have already out-grown Harrogate and that it would be preferable to have all exhibitors on an equal footing in one hall. Some also call for a location which will attract more foreign visitors. Yet others applaud the architectural design which breaks up the uniformity of more conventional theatre style shows and allows a luxurious mix of bustle and quiet corners.

Exhibition venues are booked up to 3 or 4 years in advance and our plans for SURFEX 90, made in the light of a single successful performance of a new venture, perhaps appear, like the M25, too modest as actuality replaces and exceeds expectation. We did, however, investigate alternative venues in Manchester, Birmingham and London and all proved more expensive and more restrictive than Harrogate. We also consulted SURFEX 86 exhibitors, 80% of whom supported a return to the present venue.

So Harrogate for SURFEX 90 – but with some changes.

By careful redrawing, especially of the Auditorium, it will be possible to accommodate a few additional stands within existing areas without losing the open airy ambience. Should it be necessary, overspill can be accommodated, adjacent to the Gallery, in the International Hotel's Ripley suite but quality not quantity will decide. We have also taken on board all the constructive comments which arose in our survey and made our own critical assessment of improvements which are required. Steps will be taken to achieve a more even distribution of visitors to all sections of the exhibition and whilst I am sure that we will not please everyone, we will aim to further improve our present satisfaction rating.

And for the future?

SURFEX has not finished growing and the siren voices are calling for more and more expansion, bigger and bigger stands. But that is a path we have trod before and it led to decline. Yet standing still is also retrogressive. We believe that the policy of limiting stand sizes and maintaining cost-effectiveness by modular construction is an important element in a success which has frankly exceeded our expectations and now must be reviewed for a European '92 and beyond. We have consistently sought the views of our exhibitors and do not shirk the responsibility of success. We seek to achieve a more international, a more cohesive and a still more successful exhibition which maintains the blend of viability, good business and good humour which has characterised SURFEX 86 and SURFEX 88.

Fred Morpeth
Hon. Exhibitions Officer

SURFEX 90

Booking forms for SURFEX 90 will be sent to all previous exhibitors in October/November this year. Other companies wishing to participate should apply to be added to the mailing list by writing to SURFEX 90, PO Box 161, Wigan WN2 5TG, England ■

Cookson opens bid for Wolstenholme

Cookson has bid £27.8m for Wolstenholme Rink, supplier of bronze and aluminium powders and of materials to the graphic arts industry. Cookson plan to merge their printing plate company Horsell into Wolstenholme should the bid prove successful. The deal has been rejected by the Wolstenholme Board and the offer has been put to the Wolstenholme shareholders. Wolstenholme board members and families control 30% of the shares.

Ellis Jones merges with Horace Cory

Ellis Jones and Horace Cory has merged to form the new company European Colour. Each will add to the other's specialist expertise to create a more effective, stronger, but still independent, British colour maker with the new company being committed to customer service.

Heubach announce global expansion following US restructuring

Rainer Heubach, President of Heubach Inc, recently announced a major restructuring of Heubach's US investments with the Heubach family selling a 50% interest in Heubach Inc to Cookson America. Rainer Heubach states that "these transactions have opened a door to wide strategic expansions of Heubach's interests in the USA." Heubach Inc was founded in 1984 after the acquisition of Du Pont's coloured pigment business in Newark, New Jersey, and today is a major producer of organic pigments and the world's largest producer of chromate pigments. Since the beginning in 1984, Heubach Inc has doubled sales to a present level of $75m annually and has emerged as one of the major US colour makers. "With Cookson America as a partner, financial limitations for an even faster expansion of Heubach Inc no longer exist," said Bob Mitchel, Vice President – Operations, "and we now have the full financial backing to realize capital expansions close to Usdlr 10 M during 1988, which will increase our total pigment capacity from 40 MM lbs of pigments at present to 70 MM lbs coming on stream in the beginning of 1989." With the creation of additional equity, there is now a broad basis for accelerated growth in the USA and in Europe, where the Heubach Group is presently undergoing major investments in their Langelsheim and Harlingerode Facilities.

Servo Delden acquisition

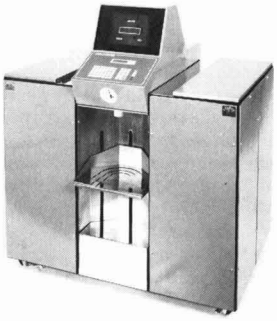
Servo Delden the Dutch manufacturer of chemical specialities has acquired Nuodex Colortrend BV of Maastricht. The company manufactures colour pastes for W. Europe. Nuodex Colortrend France SARL is also included in this acquisition.

ICI acquires Du Pont Powder Coatings Business in Spain

ICI is to acquire the Du Pont powder coatings business in Spain. This will give ICI Paints an appropriate 20% share of the powder coatings market in Spain which is worth, in total, some £20 million a year.

New paint dispensing system

OBS Machines Ltd has introduced a new low cost computerised paint dispensing system that instantly dispenses paint to any required colour or shade. The system, called the Eurotinter, is linked to a spectrophotometer, producing paint of an exact match to a fabric sample. The dispenser is aimed at the paint retailing market. It is stated to offer infinite choice of shade, instant availability in almost any qantity, stock reductions and reduced distribution costs. The Eurotinter is an accurate tint dispensing system monitored by an encoder and microprocessor. Tint pumping circuits are controlled simultaneously by the microprocessor to dispense all the required components together to give a high speed of dispense. The same processor incorporates a



Eurotinter

memory capable of storing up to 20,000 formulae. Eurotinter has wide applications in large DIY and paint and decorating stores as well as vehicle refinishing and industrial paints.

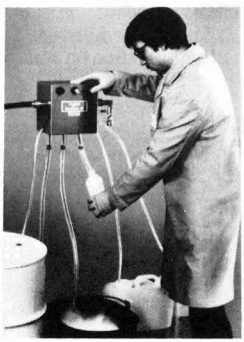
For further information Enter H101

Controllable dilution equipment

Spay Systems has introduced Omniclean proportioners designed to give automatic, non-electric dilution of cleaning chemicals. Requiring only a connection to a tap or water supply these units eliminate manual mixing which wastes chemicals and labour. The result is a saving in both time and money. Housed in a stainless steel cabinet these units provide easy control by preset dilution rates. The Omniclean proportioners are available to dispense and dilute one, two or three different chemicals and dilution rates of 2:1 to 256:1 can be easily achieved.

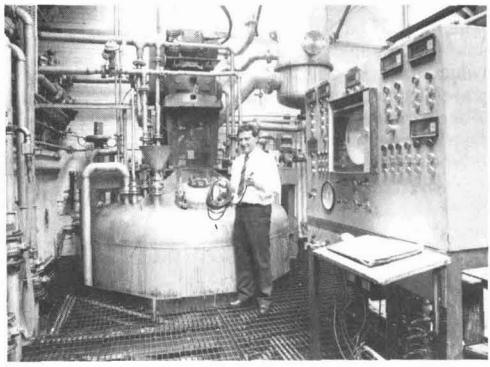
For further information Enter H102

Omniclean proportioners



Emulsion producers lick agitator downtime costs

By using a long life, non-asbestos packing in an agitator at the heart of its production process, an emulsion resin manufacturer is achieving greater productivity with significantly reduced maintenance downtime costs. At its Batley, West Yorkshire, plant, Kirklees Chemicals produces a range of chemical intermediates for the paint and adhesives industries. At the hub of Kirklees' manufacturing process, an agitator of four-inch shaft diameter operates at up to 55 rpm within a ten tonnes capacity reactor vessel to polymerise a variety of chemicals including vinyl acetate and a variety of other monomers at temperatures up to 100°C. Until April 1986 the agitator had been a source of almost incessant maintenance problems. As project manager at Kirlees Graham Duckitt explained: "We previously used a single ring of PTFE-asbestos gland packing to seal the agitator, but experienced virtually continuous leakage and frequently needed to adjust the gland. The gland packing would very quickly fail and needed changing at intervals varying from two to eighteen weeks. Instead of a situation where two men spent half a day every few months changing the packing, we now need simply to tighten the packing every six months or so, which takes one man about ten minutes" with the GFO*Fibre Gland Packing from sealant specialists WL Gore Associates.



Graham Duckitt, project engineer at Kirklees Chemicals, with a length of GFO*Fibre gland packing, as used in a 10 t capacity reactor vessel at the company's Batley plant.

For further information Enter H103

Bayer 'Paintbox' displays additives

Baysilone paint additives available from Bayer UK's Inorganic Chemicals business group are featured in a promotion kit providing a sample of all 11 types in the M, P and O series. The kits are used by the Inorganic group's small-lot distributor Hays Chemicals as a marketing information aid, together with an additives range brochure. The silicone additives are said to improve flow and smoothness or can create surface effects, reduce foam formation and accelerate manufacturing processes. The 'paintbox" style display kit gives paint company chemists information on additive type uses, additions needed and recoatability as well as a small trial bottle. *For further information Enter H104*

New Dominion low dusting pigments

The introduction of more stringent workplace health and safety regulations has led to the need for low dusting lead pigments in the North American marketplace. The Dominion Colour Company has launched its range of chrome yellow pigments evaluated for Low Dust properties. This has been achieved by careful control of the pigment particle characteristics during the manufacturing process. An accurate method for measuring the relative dusting behaviour of pigments has been developed (see Figure 1). The apparatus comprises a vibratory feeder into which is placed a 100 g sample of the test pigment. This sample is fed at a constant rate into a vertical dust generation chamber in which the pigment falls by gravity – a process similar to that which occurs in practice when dumping bags. A constant volume air sampling pump draws the air from within the dust generation chamber and any entrained dust is collected on a filter. The filter can be observed visually or, alternatively, the weight of dust collected can be determined and used to compare the relative dusting behaviour of various products. DCC's range of chrome yellow pigments was evaluated in this apparatus along with samples of competitive Low Dusting and Standard pigments.

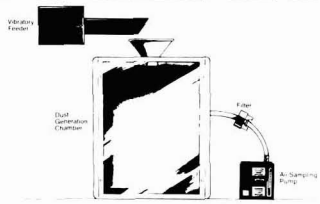


Figure 1. Dust measuring apparatus.

The Relative Dusting Index was developed by assigning the value of 1.0 to the lowest dusting product, namely DCC 1019. The Relative Dust Index indicates the relative dustiness of the other products. For example, two samples of competitive Low Dust Medium Chrome Yellow were evaluated and found, in one sample, to generate 1.3 times as much dust as DCC 1019, while the second sample generated 4.5 times as much dust as DDC 1019.

For further information Enter H105

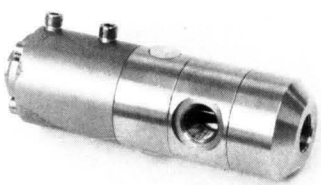
Revolutionary new coaxial valve for paint processes

KV Ltd has introduced a new type valve based on the well-known spool valve but this new component

offers much higher pressure capabilities: up to 300 bar. Typical applications include systems involved in high viscosity media, printing inks, high pressure, adhesives, pastes, sealing compounds. Designated the PLE valve, it can be 2/2 way normally closed or normally open. Users have a choice of four orifice sizes – 8, 10, 15 and 20 mm with port connections to suit. The PLE valve has a flushing facility and a connection for a limit switch. It is available in brass, aluminium or 316 stainless steel.

For further information Enter H106

PLE Valve

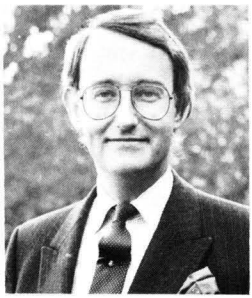


XIX FATIPEC Congress

The XIX FATIPEC Congress will be held on 18-24 September 1988 at the Eurogress, Aachen, West Germany, on the theme "The Present and Future in Science and Technology of Coatings and their Components". For further details contact the FATIPEC Sekretariat, Mrs Elvira Moeller, c/o Forschungsinstitut für Pigmente und Lacke e.V., Allmandring 37, D-7000 Stuttgart 80, West Germany.

Main Board Appointments at Colorgen Inc

Colorgen Inc, the USM traded and the US based colour matching specialist, announces the appointment of Mr Peter Wall and Mr Lew Boyd to the company's main board of directors. Peter Wall is Managing Director of Colourgen Ltd, its Warrington based UK subsidiary, and joins as an Executive Director. Lew Boyd, President of Coastal Technology



Peter Wall

Inc, and a long-term consultant to the company, joins as a Non-Executive Director. The new directors will be assisting in the continuing development of products, many originated in the UK, for world markets. Their appointment reflects the company's commitment to be truly international in outlook.

MANCHESTER OCCA 1988 SYMPOSIUM 21-22 SEPTEMBER

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SURFEX 88

A GREAT SUCCESS

The Oil & Colour Chemists Association is pleased to announce that its latest exhibition SURFEX 88 was a major success with attendance well up on SURFEX 86 and satisfaction expressed by exhibitors and visitors alike. The exhibition was held at the Harrogate International Conference and Exhibition Centre on the 15-16 June 1988. The exhibition was 30% larger than in 1986 with over 100 companies distributed between the Main Hall, the Auditorium, the Gallery, the Reception Area and the Hospitality Suites. Modular Stand Construction was used throughout providing the openess of theatre-style display coupled to using cost-effective self-assembly display units for the exhibitor.

Attendance

During the two days of the exhibition there were over 2,000 UK and overseas visitors. Visitors came from over 30 countries with a wide geographical spread: Argentina, Australia, Austria, Brazil, Belgium, Canada, China, Denmark, Egypt, Finland, France, Ghana, Holland, India, Ireland, Israel, Italy, Japan, Kenya, Malta, New Zealand, Nigeria, Norway, Pakistan, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Turkey, West Germany, and USA.

What was new and of interest at SURFEX 88

Following our June circular to exhibitors at the time of going to press we have received feedback reports from the following companies outlining what was new on their stand and what was of particular interest to visitors. Included with these reports are photographs of some of the stands showing the wide variety of products, equipment and machinery on display.

The **General Industries Division of Allied Colloids** displayed its range of additives for emulsion paints and featured particularly Rheovis CR, an associative thickening agent with good storage stability and excellent anti-splatter properties. Also of great interest to visitors was the latest addition to the Glascol range of aqueous ink and varnish vehicles. Glascol LS22P is a hard high melting point styrene acrylic co-polymer developed as a vehicle for high gloss water-based overlacquers and as a let down vehicle for high gloss inks requiring high heat resistance for use particularly on pre-print liner board.

SURFEX 88 was for **ARCO Chemical Europe** an ideal opportunity to promote Arcosolv – our propylene glycol ethers and acetate solvents for the paints and coatings industry. More than 60 visitors, mainly from the UK – but also from Denmark, Netherlands, Germany and Norway expressed their interest in our products. During the two days many commercial and technical discussions were held which will, hopefully, lead in the future to fruitful business. The main interest was shown in our Arcosolv PTB – (propylene glycol tertiary butyl-ether) for water based systems and cleaners which is an ideal substitute for butyl glycol.

Bayer's inorganic pigments, for the paint industry formulators and manufacturers, were exhibited. The **Pigments Business Group**, based in Newbury, highlighted the Bayferrox range – AC 5075 for anti-silking, the heat stable AC 5069 and Bayferrox 3950, after-treated grades. Trial products AC 5068, AC 5073 and PK 5079 for reduced flocculation, and the micronised grades which offer the benefits of easy dispersion, anti-float and high gloss. The company stand also featured the user-benefits offered by Bayertitan titanium dioxide, the yellow, blue, black and green Lightfast pigments and Baylith, a moisture scavenger suited for coatings and sealants.

The **Industrial Division of BDH Ltd** was reported to be well pleased with the two days spent at SURFEX 88, Harrogate. BDH representatives on Stand A3 reported much interest in the Merck range of Iriodin® pearl lustre pigments illustrated in the form of a car boot lid, specially treated with the material which gives a 'mother of pearl' iridescent effect to the paintwork. "We had many enquiries for the pigments specially prepared for use in water-based systems," reported a Company spokesman. Not the least of the BDH

The visiting Chinese delegation at the OCCA Stand.

Fred Morpeth, Chairman of the Exhibition committee (white shirt) and OCCA staff on the OCCA Stand.

Visitors to SURFEX Registering in the Reception area.

Allied Colloids Stand.

achievement over the two-day event was the award of 'best small stand' at SURFEX 88 – the work of the Company's in-house publicity department.

Blythe Colours Pigments Division was delighted to have the opportunity of once again welcoming so many old and new friends to its stand at SURFEX 88. Considerable interest was shown in all the products on display, but particularly in the new range of transparent iron oxides for wood finishes and automotive paints. Many enquiries were received during the two days of the exhibition, with the highest number relating to transparent iron oxides, followed by titanates, camouflage colours and cadmium pigments. Some 25% of all enquiries were for export.

On display from **BYK-Chemie** for the first time at SURFEX 88 were: General Purpose industrial tinting pastes based on Disperbyk®-163, with high pigment content and good flow. Byk®-066 a new defoamer for airless spray applied maintainance coatings especially two pack P.U.'s, Chlorinated Rubbers and Hydroxy Acrylics. New solids rich additives for use in printing inks, U.V. and solvent free systems, flow aids Byk®-302, Byk®-307 and wetting aids Anti-Terra®-U 80 and Byk®-P 105. Anti Terra-204 a new wetting additive to prevent settling and promote better film build in low to medium polar systems.

Byk®-335 a new highly active silicone which can achieve high levels of slip and flow at much lower rates of addition than previously possible.

A new development from **BYK-Labotron** the Gonio-reflectometer was also on display for the first time in the UK. This instrument enables the accurate measurement of surface haze measuring not only direct reflection but also scattered light.

Bayer Stand.

The BDH Stand – The Best Small Stand.

BYK-Chemie Stand.

Capricorn Chemicals Ltd on Stand R1 featured the product ranges of G. M. Langer & Co KG, of Western Germany, and Sterling Industrial Colours Ltd the UK producers of Daylight Fluorescent colours. Current demand for fluorescent pigment is at an all-time high, and this fact was reflected in the level of interest created by an eye-catching display of fluorescent coated articles. The special properties of Daylight Fluorescent pigment when exposed to ultra violet light was also demonstrated. Black pigment dispersions ranging from tinting pastes through conventional dispersions to the highly sophisticated flushed concentrates for automotive paints are produced by Langer & Co, and marketed under the Lanco Beit label. Such is the demonstrable quality of these products that many visitors to the stand requested further information and samples. G. M. Langer & Co are perhaps best known for their range of micronised waxes and dispersions. Enquiries about these products at SURFEX 88 demonstrated the widening of interest in waxes beyond the traditional areas of printing inks and wood finishing. The benefits that a carefully selected wax can confer on all types of surface coatings is increasingly accepted by formulators. The Lanco wax range – tried and tested over many years – can provide a suitable product for most applications. Overall, Capricorn Chemicals Ltd were encouraged by both the level and quality of enquiries received at SURFEX 88. This exhibition provided an excellent opportunity to show our product range to existing customers and new contacts.

Ciba-Geigy Pigments highlighted Irgazin DPP Red BO for automotive solid red shades, the first of a new pigment chromophore system 1,4-diketo-pyrrolo (3,4-c) pyrrole, abbreviated DPP. The first such innovative breakthrough for 30 years or more. Also featured were the new products in the Unisperse-PI range of aqueous dispersions for water based flexographic inks. Irgazin and Unisperse are Ciba-Geigy Registered Trade Names.

Colourgen Ltd featured new programs for the measurement and match prediction of paint and opaque materials and new software for handling translucent and transparent materials, all written in C and using co-processors.

The Cornelius Chemical Group Ltd attracted much interest from the display of the new Daniel Slip Ayd SL 600 dry powder slip agent and the new Cardolite NC 546 and NC 547 Cashew Nut Shell Liquid base resins. The Daniel Product Company has been well known to paint and ink companies in the UK since the early 1960s and whilst originally the speciality dispersions offered were considered to be correctives, over the years they have become regarded as 'tools of the trade' and are included in as part of a total formulation. This is particularly true of the Slip Ayd range which are precisely grouped particle size slip agents which are designed to position themselves through the top strata of the coating to give slip and mar resistance. The Slip Ayd SL 600 grade is the latest development in dry powder form for high solids and solvent free formulations and also for customers who would prefer to disperse the product themselves. The Cardolite NC 546 and 547 range are two new resins based on Cashew Nut Shell Liquid. NC 546 is a straight phenalkamine where as NC 547 is a poly glycidyl ether of a CNSL/formaldehyde novalac resin. Suggested applications for both are coatings, adhesives, encapsulations etc, and whereas NC 546 is used where low temperature cure and chemical/water resistance are required, the NC 547 is a poly functional, (epoxide functionality of 3) and imparts flexibility in cured phenolic and epoxy resins. NC 547 can also be cured with polyamines or polyamides. This is a truly multi-purpose resin. A high level of interest was shown in the well known range of Acrylic resin systems from Röhm GmbH under the Plexigum, Plexisol and Plextol references. These resins are used in all aspects of surface coating applications and continuous research and developmental work at our laboratories in Germany, ensures that our products are developed to meet every application requirement.

Cray Valley Products Ltd highlighted a new Versamid ink resin, Synolec powder coating resin additions, an extension to the range of Synocure two pack acrylic urethanes which improve performance and use, new radiation curing prepolymers.

Crosfield Chemicals featured HP64 and HP39, which have recently been added to its successful range of HP products.

HP64 has been specially developed as a high performance matting agent for nitrocellulose wood lacquers, while HP39 is designed for gloss control of radiation cured systems.

Croxton+Garry's new products highlighted at SURFEX included the Diamelia range of micronised barytes high whiteness extenders for undercoats and primers, the Vertal range of fine floated talcs and new additions to the Esacure range of photoinitiators.

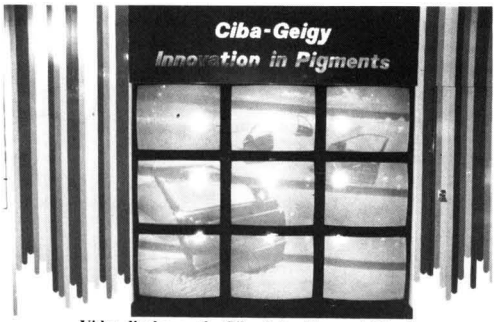
The Dominion Colour Company (represented in the UK by NL Chemicals UK Ltd for Paint, Ink, Coatings and K & K Greef Ltd for Plastic/Compounding) featured its comprehensive range of lead chrome products with particular emphasis placed on its "5000 Series" pigments. Products forming this group exhibit a combination of superior performance characteristics including Stir-In quality (pigments capable of achieving enamel quality dispersions with the aid of high speed dispersers), Sulphur Dioxide resistant, Low Dusting, Low Soluble Lead and Predarkened grades exhibiting superior heat stability and lightfastness.

For **Durham Chemicals Ltd** the Harrogate Conference and Exhibition Centre again proved to be a convenient venue for SURFEX 88 and we were well pleased with both the number and quality of the vistors to our stand. The facilities during setting-up and while the exhibition was in progress as well as the services provided proved to be very satisfactory. Considerable interest was shown in our range of biocides. The use of Nuodex 87 as a fungal/algal wall and path wash prompted numerous enquiries. Overall, SURFEX 88 was considered to have been a successful exhibition for Durham Chemicals.

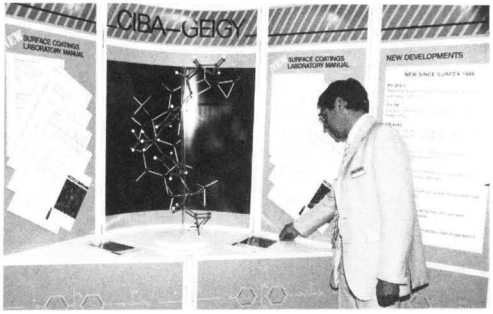
Dyno Industrier featured a new linear polyester resin Dynotal 0-20-Hn suitable for deep drawing and sterilization and a new non-drying synthetic fatty acid based alkyd Dynotal N-45-Ba designed for acid curing systems imparting extremely good colour and colour retention properties.

EFKA Chemicals BV (represented by Stort Chemicals Ltd in the UK) showed details of their products, particularly those developed for the production of universal solvent-based pigment concentrates. EFKA Polymer 400 – a film forming dispersing agent for both organic and inorganic pigments. EFKA Polymer 100 – a high molecular weight for stabilising minimal-resin universal pigment concentrates. Also featured was EFKA Uvalink ADP, a unique liquid U.V. absorber, developed specially for use in wood-stains and varnishes.

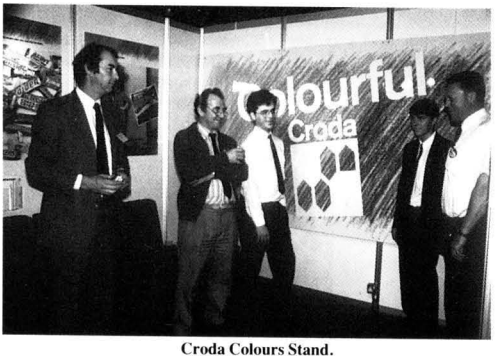
Eiger Engineering Ltd featured at SURFEX the new Eiger Mixer Disperser whose main feature is the combination of slow speed agitation



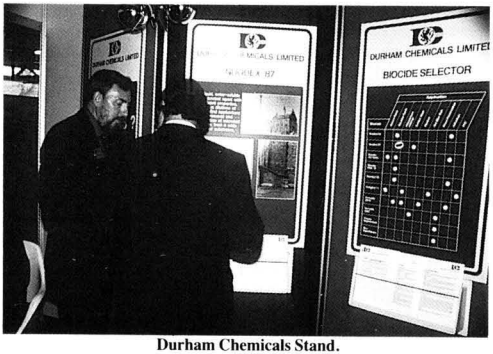
Video display on the Ciba Geigy Pigments Stand.



Ciba Geigy Resins Stand.



Croda Colours Stand.

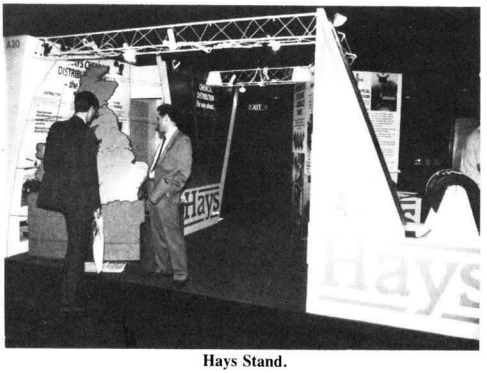


Durham Chemicals Stand.

Eiger Engineering Stand.

Ellis Jones Stand.

Haeffner Stand.



Hays Stand.

Hoescht Chemicals Stand.

ICI Chemicals & Polymers Stand.

with scrapers, and high speed dispersion with raise and lower facility. Also featured was the new range of high torque change-plan mixers.

Ellis Jones's informative exhibit brought together in one display the overall picture of the manufacture and end uses of their azo pigments. An illustrated flow diagram of manufacturing stages was linked with examples of finished articles from the printing, paint, plastics and artists' colour industries coloured with EJ pigments. Following the exhibition Ellis Jones and Horace Cory have merged to form European Colour (see News).

John Godrich showed at SURFEX their new "Credit" laboratory coating machine designed for the coating of hiding power charts. This comes complete with vacuum plate, vacuum pump and smooth drive mechanism. Also shown for the first time were the "Credit" Hegman gauges and Cross Hatch Cutters, and the "Credit" Impact Testers.

Heraeus used the SURFEX Exhibition for the UK launch of its newest exposure and weathering tester, the Suntest CPS Table Model Unit, to the paints and resin industry. This unit is a redesign of the long established Suntest instrument and now offers a controlled power system for operator selection of the irradiance level required with the ability to maintain that at constant level throughout the duration of the test; irrespective of the time required. The unit met with considerable interest, as did its complementary model the Xenotest 150S; the well known Xenon Arc unit specified in current British Standards. Both of these units were in turn complemented by the Radialux U.V. and Global Energy Monitor which offers the ability to monitor either momentary irradiance or the total irradiant energy test samples receive, either in natural or accelerated exposure conditions. These units were further complemented by models from the Heraeus range of both environmental cabinets and laboratory ovens, which provided a general overview of the capability of Heraeus to meet a whole range of testing needs for both the research development and quality control lab.

The Chemicals Division of Hoechst UK showed their complete range of products for the Surface Coating Industry classified under the broad headings of commodities, specialities and performance chemicals. In the commodity area the Chemicals Division is a major supplier of oxygenated solvents such as acetone, ethyl acetate, etc, whilst in addition DOP and chlorinated paraffins are of interest as general purpose plasticisers. Products for application in resins production were exhibited and included neopentyl glycol, PTBBA, vinyl acetate monomer, thiourea, benzo guanamine etc.

The **Pigments Division of Hoechst UK** highlighted at SURFEX pigments developed for alcohol based packaging inks, colours for aqueous inks, multi-purpose pastes, colanyl and classical pigments.

ICI Colours and Fine Chemicals featured the introduction of two new speciality dispersing resins offering the paintmaker even greater production flexibility and scope for cost saving. Using the appropriate combination of "Solsperse" hyperdispersants and resin allows the production of highly pigmented dispersions at low viscosity. The "Solsperse" resin enhances the stability of the dispersion and provides excellent compatibility with a wide range of film-forming resins, making it possible to formulate multi-media tinters which may be added directly to tint a large variety of coatings.

Industrial Dispersions emphasised at SURFEX their Custom Dispersion Facilities and introduced two new product ranges. The Multi Functional Dispersion (MFD's) will find their main applications in the Industrial Paint Field, being compatible with most Resin systems except those based on White Spirit, Distillates or Alcohols. The Second Range, a Surfactant Free Aqueous System AQ(SF) opens up a number of new areas in the aqueous field such as Printing Inks, where surfactants (or Glycols) are unacceptable.

New products on show from the **Mearl Corporation** were the Mearlin Exterior 'Super' colours which complement the existing range of Mearlin Exterior Lustre pigments, developed primarily for the automotive industry. The 'Super' colours exhibit a very high intensity of colour as a result of very tight particle size control. Interest in the Mearl range of lustre pigments came from a wide range of potential and existing customers, covering automotive paint, general industrial and decorative paint, water based systems, radiation cured systems, coil and can coating and many different types of ink users.

For **Meta Scientific Ltd** considerable interest was shown in the Dr Lange GmbH products for colour and gloss instruments. The gloss instruments are the only reflectometers to carry the DIN kite mark and are certified to meet the European DIN standards. The model RB3 is unique as a portable instrument having all three angles of "normal" gloss in one small measuring head. Several people were interested to hear about the new liquid transmission colour measurement instrument and literature was available at SURFEX. Designed in collaboration with Hoechst AG, it is a new quality control colour instrument for the transmission of liquids, thin films and sheeting.

SURFEX 88 Review

Paint makers' Stand. Don Clement, PA Training & Technical Manager with the Open Tech Module display.

PRA Stand. John Bernie, PRA Managing Director, with the Coatings Selector in the centre.

Sandoz Stand.

SCM Stand.

MPLC Laboratories Ltd featured synthetic micaceous iron oxide, an outstanding new advance in pigment technology. The synthetic process makes it possible to optimise particle characteristics to achieve superior performance in coatings. Two grades are to be manufactured, Laminox S for weathering coats and Laminox F for metal primers.

The **Paint Research Association** (PRA) of the UK, in conjunction with the Coatings Research Institute (CoRI) in Belgium, EOLAS – the Irish Science and Technology Agency in Dublin, and the Technological Institute Copenhagen (TIC) in Denmark launched, with considerable interest shown, their Coating Selector, a decision-support system on floppy disc, at SURFEX. The Selector does more than just suggest suitable coatings – covering also cleaning/pretreatment, application methods and cure – and relates these to available in-house facilities. It aims to advise on specific problems, providing a fund of "dos" and "don'ts" which help finishers to avoid potential pitfalls. In short, it is intended as a guide to good practice on steel substrates typically found in general industrial finishing.

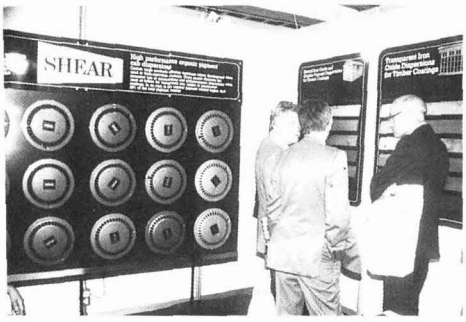
Pearson Panke report a successful exhibition at SURFEX. Considerable interest was shown in the following new instruments displayed: Erichsen Gloss-master 507 Statistical – this new addition to the range produces statistical data for a number of gloss values; the Pearson Panke Fatigue Tester; the ATI Portable Distinctness of Image Meter – the handheld portable ATI Distinctness of reflected Image meter is designed to measure the sharpness of reflected image from high gloss; the Pearson Panke Automatic Applicator Drives.

Resulting from an excellent exhibition for **Sandoz Chemicals** the major interest from all our ranges exhibited came from the Sandosperse W range and the new Graphtol Fast Red 2GLD. The Sandosperse W range are surfactant and glycol free water based dispersions which can be used for industrial paint or printing ink. The use in the printing ink industry aroused interest, especially water based printing of plastic film and aluminium foil. The new Graphtol Fast Red 2GLD, which is CI Pigment Red 253 was by far the most requested product for samples and data. This bright red organic is not only suitable for masstone application for deep shades but its excellent durability allows it to be used as a tinting pigment. The pigment is available as a powder, Sandosperse solvent based multi-purpose tinters, Sandosperse W water based dispersions and Sandalkyd dispersions for decorative alkyds.

Sartomer International Inc introduced a new range of aliphatic and aromatic urethane acrylate oligomers for radiation curable inks and coatings.

At the exhibition **SCM** promoted Tiona RCL-535 as the multipurpose grade of titanium dioxide for use in a wide range of surface coating application areas. Many people expressed interest in the unique combination of colour, gloss potential, durability and stability that we had achieved with this grade. SCM also promoted a super durable grade (to be released under the name of Tiona RCL-628) of titanium dioxide designed to be used in long life coatings, with excellent

SURFEX 88 Review



Shear Group Stand.

Sheen Instruments Stand.

opacity and gloss development. Samples were requested by several interested parties. The remainder of the SCM exhibition centred on the quality control aspects of our titanium dioxide manufacture and demonstrated SCM's commitment towards BS5750.

SURFEX 88 was considered a success by the **Shear Company Ltd.** Our stand was visited by a wide cross-section of our customers and prosepctive customers from home and overseas. The centrepiece of our display was a colourful collection of wheel-hubs demonstrating the bright styling effects that can be achieved using well dispersed transparent iron oxide and organic pigments in pearlescent paints. Examples of our dispersions for wood finishes and printing inks were also shown.

Sheen Instruments enjoyed one of the best exhibitions they have ever attended. The product which attracted most attention was the 155 Microglossmeter. Sheen describe this small compact instrument as the "ultimate glossmeter" in that it will measure gloss at 60 degree and 20 degree angles, provide full statistical analysis (maximum, minimum, average and standard deviation readings) at the touch of a button. Optional printer attachment provides hard copy of all gloss measurements, separating batches of readings automatically. The 155 is also available in 85 degree version for specialised low gloss applications and a 75 degree model (to TAPPI specification) is available for the paper industry. Other instruments which attracted the most attention were the new Wet Abrasion Scrubbability tester which has been developed in conjunction with several leading British paint manufacturers, a re-designed electrostatic coating diagnostic kit for use on wet or dry (powder) installations, the Autovisc automatic flow cup timer and the low cost Bench Top Panel Sprayer.

Shell Chemicals UK Ltd featured enhanced quality "Epikote" resins. These will be available in 1989 following the investment currently being carried out at Pernis in Holland in Diphenylol Propane and Epichlorohydrin manufacturing plants. The new purer feedstocks will be used to produce "Epikote" resins in the UK, Holland, Germany and Spain with new levels of consistency that will become increasingly important to customers in the 1990s. As a further demonstration of its commitment to the market Shell has recently opened a new laboratory complex at Louvain la Neuve in Belgium that will provide customers with technical service and product development in polymers. A new range of "Epikote" resins based upon Bisphenol F and blends with Bisphenol A was introduced at SURFEX. These products will enable the formulator to benefit from their low viscosity without crystallisation tendencies at low temperatures. Considerable interest was aroused by the "Cariflex" and "Kreton" G range of thermoplastic rubbers for use in the surface coatings industry. Enquiries were forthcoming from customers in the UK as well as India and the Far East. Recent developments in "Veova" 9 and 10 in latices for indoor paints with high pigment volume concentration (of the order of 80%) were featured. Interest was shown by potential customers from home and abroad in "Cardura" E10, the glycidyl ether of "Versatic" 10 acid, used as reactive diluent in epoxy resins and as a component in acrylic and alkyd formulations. The latter are particularly suitable for the automotive coatings market. New literature giving details of the typical properties of the Shell range of hydrocarbon solvents was available at SURFEX and was in great demand, particularly for information on the dearomatised solvents. Shell Chemicals was very happy with the interest shown and the obvious success of the second SURFEX and looks forward to participating in future exhibitions.

Tego Chemie Service UK report the main highlights of their stand were the Tego Airex deaeraters and Tego Dispers pigment wetting and dispersing additives for solvent based coatings. Both attracted a great deal of attention as did our high performance silicone resins. The visitors to our stand were invited to complete a form with their name and address which was then put into a transparent drum. On four occasions during the exhibition, a draw was made and the four winners each received a golf club. Two of the winners were not golfers but declared their intention to put that matter right with immediate effect.

The **Tioxide** stand at SURFEX 88 was devoted to the launch of an innovative new grade of Tioxide pigment: Tioxide TR92. Tioxide TR92 is a highly significant development for Tioxide's customers worldwide; it will ultimately be produced in every country where the Tioxide Group has factories, and represents a new World Standard for titanium dioxide pigment. In the widest variety of decorative, industrial and other coating systems, Tioxide TR92 develops outstanding performance over the whole range of physical properties: dispersibility and dispersion flexibility, flocculation resistance and durability. Its optical properties in these systems exhibit a similarly high level of excellence; the opacity and gloss development of Tioxide TR92 being of the highest order, with impressively clean tone and whiteness. This outstanding versatility offers the coating formulator an unrivalled opportunity to rationalise titanium pigment usage to the maximum degree – through the use of Tioxide TR92. Tioxide have chosen an image to symbolise Tioxide TR92: the Snow Leopard. This unique and resilient creature survives majestically over a wide spectrum of habitats, from rain-drenched Himalayan slopes to the arid Gobi Desert. This mirrors the versatility and resilience of Tioxide

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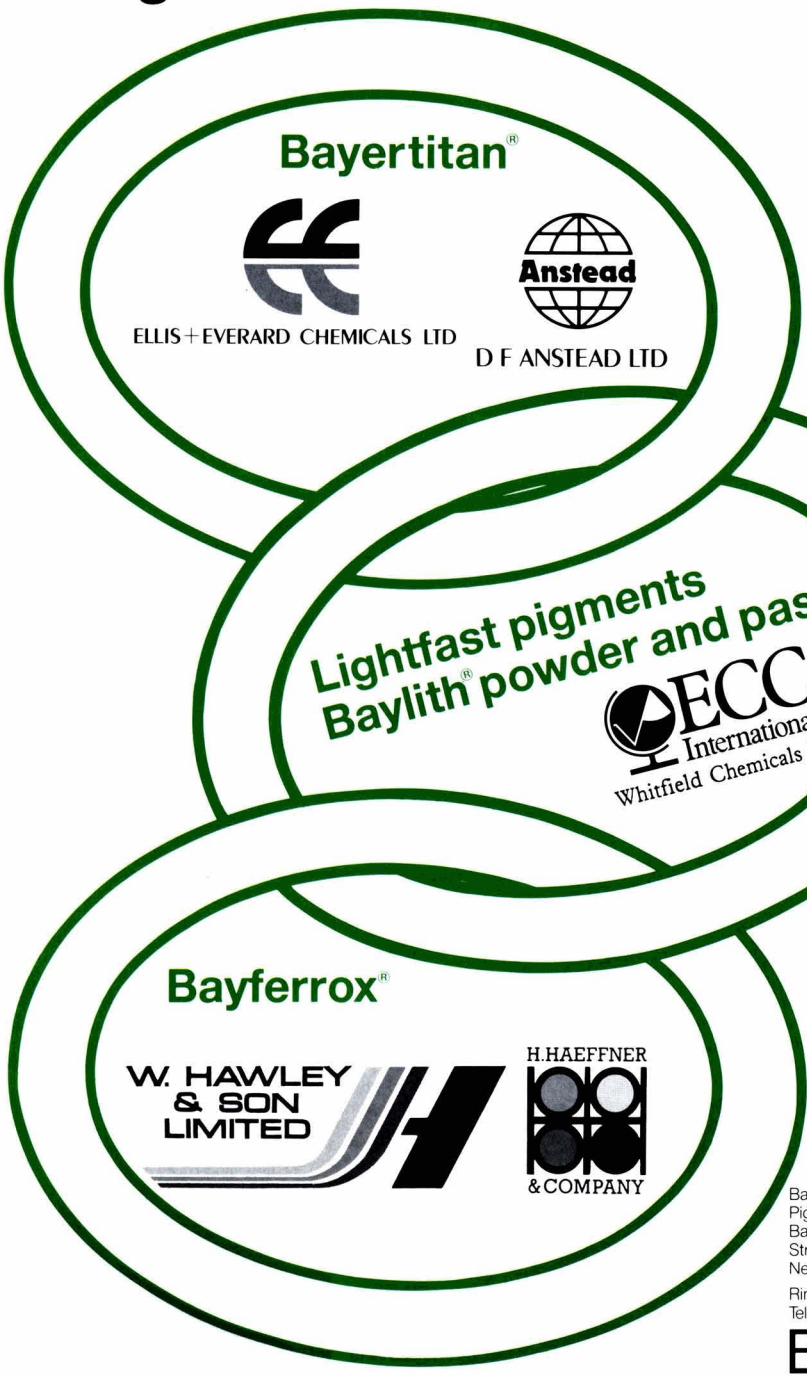
Strong links with reliable distributors



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SURFEX 88 Review

Two views of the Tioxide Stand – The Best Large Stand.

TR92, under even the most difficult service conditions. The Snow Leopard personifies qualities of strength and ruggedness, capability and perfection: all of which can be readily related to the all-round abilities and the in-depth dependability of Tioxide TR92. The culmination of a process of over ten years' evolution, development and testing, Tioxide TR92 has been designed to give optical performance across the widest possible range of uses. Just as the Snow Leopard is perfectly adapted to its habitat, so Tioxide TR92 is perfectly suited to its many and diverse applications. Tioxide TR92 is The Natural Selection – truly a titanium pigment for the twenty-first century.

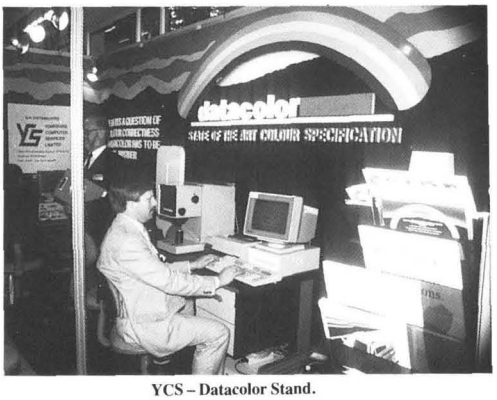
Tioxide entertainment with performances from the Theatre of Paint.

On the Tioxide stand at SURFEX 88, the virtues of Tioxide TR92 were outlined. Dominating the stand was the Snow Leopard motif, the symbol chosen to represent Tioxide TR92. A central sculpture showed the wide range of applications across which Tioxide TR92 gives its outstanding performance, from 'conventional' solvent-based airdrying alkyd gloss paint to thermosetting powder coatings. This display also enabled demonstration of the range of gloss and surface effects achievable with Tioxide TR92. A large proportion of the stand area was given over to technical displays depicting the superb gloss, durability, flocculation resistance, dispersion flexibility and opacity performance of Tioxide TR92. A prize draw competition requested competitors to rank the seven pigmentary properties of: dispersion/dispersion flexibility, durability, flocculation resistance, gloss, opacity and whiteness. Two lucky winners per day were thus able to enjoy a magnum of "bubbly" – a fitting champagne launch for Tioxide TR92 – the new World Standard titanium pigment from Tioxide. There was no "correct" answer to the ranking exercise, as Tioxide TR92 is ideal, whatever order of performance one may feel is applicable for these various properties!

The launch of Tioxide TR92 was an event of such importance that it demanded a permanent record on film. A leading company Chameleon Communications, based in Leeds, spent two days at Harrogate filming every aspect of Tioxide's presence at SURFEX 88.

As an extension to the technical stand, Tioxide also offered visitors to SURFEX 88 a novel and diverting entertainment in the Exhibition Centre's Charter Suite. Using mime the "Theatre of Paint" explored the inter-relationship between six of the properties most crucial for all white pigments. Dispersion, stability, opacity, gloss, and durability were initially explored, with the subsequent introduction of whiteness. From a situation in which there are many pigments; each one strong in only one, or at most two properties, all-round excellence is almost impossible to achieve and frustration results. Whiteness performs a central role in the struggle to achieve perfection, but in conjunction with the other five properties. After a lengthy period of evolution Tioxide TR92 is developed. All six properties are in harmony and no single property dominates. The mime artists then depicted the versatility of Tioxide TR92 across a range of applications, culminating in a celebration of TR92's genesis –

The golf club draw on the Tego-Chemie Stand.

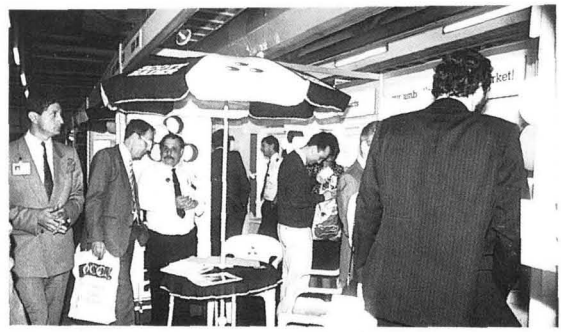


YCS – Datacolor Stand.

signalling a bright, new beginning for the coatings industry – through Tioxide TR92.

Vinamul Limited featured the following new products at SURFEX: Vinamul 3469, a 55% ethylene-vinyl chloride-vinyl acetate "pressure polymer" emulsion for vinyl-silk and semi-gloss emulsion paints. It not only provides a high level of sheen; there is very little drop in gloss subsequently – appearance after drying is retained virtually unimpaired. The emulsion ensures an excellent finish, with good levelling; it also provides a high level of pigment binding and wet scrub resistance characteristic of this general polymer type. Vinamul 3485 a novel, 50% ethylene-vinyl chloride-vinyl acetate "pressure polymer" emulsion base for ceramic tile adhesives. It readily meets the performance requirements of BS 5980:1980 for bond strength, including "hot wall" performance. Vinamul 3485 also gives adhesives with outstanding non-slip properties, so that tiling can be carried out "from the top down" if preferred, for example in order to avoid an unpleasant pattern-break at ceiling level.

Yorkshire Computer Services UK and Eire agents for Datacolor AG of Switzerland were exhibiting the "Pigmenta" colour control/match prediction system. Interest was high and the exhibitors were delighted with the level of response from visitors. Of particular interest to many visitors was the ability of the system to predict the pigment loading required to produce "just hiding" matches at a given coating thickness or a desired opacity level. "Pigmenta" also offers yellowness and whiteness programmes and can measure whiteness according to GANZ due to its unique UV calibration (0-200%) ability, compared to the usual UV in or UV out option. Without exception visitors to the stand were highly impressed with the standard of the software both in terms of the graphics and the degree of user friendliness. The literature for Datacolor's new MMK metallics system as used by VW-Audi and BMW was available for the first time in the UK. This aroused considerable interest in many visitors on metallics. The system measure reflectance at 512 wavelengths for each of three angles simultaneously to take into account the angle of the metal flakes in the coating.



The Umbrella game (photo top right) on the Scott Bader Stand (above).

Netzsch Mastermix Stand.

A SINGLE GRADE FOR

TR92
THE NEW WORLD-STANDARD FOR THE COATINGS INDUSTRY.

◆

A PRODUCT OF MORE THAN 10 YEARS RESEARCH, TESTING AND EVALUATION AND NOW IN REGULAR PRODUCTION.

◆

A NEW PIGMENT THAT MAXIMISES PERFORMANCE IN THE WIDEST POSSIBLE RANGE OF COATINGS.

◆

TIOXIDE TR92 IS AN INNOVATION THAT CREATES THE BEST OPPORTUNITY FOR RATIONALISATION EVER PRESENTED TO THE INDUSTRY.

Tioxide

A BRIGHTER FUTURE

Exhibition Dinner

On the evening of the first day, the Exhibition Dinner, organised by the West Riding Section of the Association, was held at the Majestic Hotel with over 500 people attending. Mr J. Hemmings, Chairman of the West Riding Section was Toast Master for the evening and the President, Mr J. R. Bourne, proposed the Loyal toast.

The Chairman of the Exhibition Committee, Mr F. Morpeth, welcomed exhibitors, their guests and visitors, extending a special welcome to the Guest Speaker Mr B. Dineen, Mr and Mrs Harland (President of the PA), Mr Keaton (immediate Past President of the Soc. of Dyers and Colourists), Mr and Mrs Mitchell (President of the BPVLC) and Mr and Mrs R. Woodbridge (President of the PRA). Mr Morpeth also welcomed past Presidents and Honorary Members.

Stand Design Awards

Mr Morpeth announced the awards of an inscribed plaque for the best large and small stands at SURFEX 88 which had been judged to have made a most effective use of their display area. The awards were as follows:
Best Small Stand – BDH Ltd
Best Large Stand – Tioxide Group PLC

Mr Morpeth expressed particular thanks to Mr Godfrey Alderson of the West Riding Section for organising the dinner, and the SURFEX organising committee – Mr J. R. Bourne, Mr J. Hemmings and Mr L. Morpeth.

The guest speaker, Mr B. Dineen, Business Editor of the *Yorkshire Evening Post* entertained the company with a speech full of humorous stories and reflections on his experiences. Mr Dineen concluded his speech stressing the important contribution the North of England provides to UK industry and business activities.

SURFEX 90

SURFEX 90 will again be held at the Harrogate Exhibition Centre on 15-16 May 1990; further details are given in the Editorial on p218.

SURFEX Dinner (L to R): Mr J. Hemmings, Chairman West Riding Section; Mr B. Dineen, Guest Speaker; Mr J. R. Bourne, President, and Mrs Bourne; Mr F. Morpeth, Chairman of the Exhibition Committee.

John Rackham (left), European Technical Service Manager of Tioxide receiving the plaque for the Best Large Stand from Hilary Bourne (centre) and Fred Morpeth, Chairman of the Exhibition Committee.

Bill Holmes (centre), Manager of BDH Industrial Division receiving the plaque for the Best Small Stand from Chris Pacey-Day (on the right), General Secretary and Fred Morpeth, Chairman of the Exhibition Committee ■

Powder coatings

by M. Hoppe PhD, EMS-Chemie AG, Ch-7013, Domat/EMS, Switzerland

Surface protection by electrostatic powder painting has increased sharply in significance in recent years, not the least of the reasons is the tightening up of legislation concerning emissions, and the heightened environmental consciousness. The term powder coatings is applicable to powdery coating compositions which are totally free of solvents, and which are composed of binder, pigment, flow control additives and optionally filler. Non-porous coatings are obtained by use of various methods of application, preferably by means of electrostatic spray processes. The superiority of powder coating, versus conventional methods of painting, makes a special impact both for environmental compatibility and for high efficiency. Up to about 98% of the amount of paint can be used up in modern coating plants.

Powder paints are classed as thermosetting or thermoplastic according to the type of binder.

Under the influence of heat above their melting point, thermoplastic powder coatings form a film on the underlying substrate, which sets on cooling to a non-porous coating. The disadvantages of thermoplastic coating compositions lie in the limited heat performance, conditioned by the softening range of the binder, and in the necessity of using an adhesion promoter in most cases. Further disadvantages in relation to thermosetting powder coatings include higher costs, by reason of the more expensive milling processes and the greater coating thickness. Nowadays the main application of thermoplastic powder paint lies in the whirl-sintering field.

Thermosetting powder paints, generally called thermoset plastics, are chemically cross-linked by the application of heat, after sintering on the object to be coated. They thereby lose their initial thermoplastic properties and cannot be remelted by a subsequent application of heat. The excellent adhesion of thermosetting powder coatings on the most diverse substrates renders unnecessary the incorporation of adhesion promoters.

Some examples of binders in use for thermoplastic powder coatings are as follows: nylon 11; nylon 12, PVC; polyethylene; ethylenevinyl alcohol copolymer; polyesters; celluloseacetatebutyrate; cellulose-acetatepropionate; polyvinylidene chloride; polyvinylidene fluoride.

Well-proven systems for thermosetting powder coatings are as follows: epoxy-resin/polyester hybrid powder coatings, pure epoxy-resin powder coatings; polyester/triglycidyl isocyanurate (TGIC)- and polyester/isocyanate (PUR)-systems.

The following list summarises the special properties obtained on using a powder coating of epoxy/polyester, pure epoxies and polyester/TGIC-systems:

○ Favourable softening range, as well as relatively narrow and well reproducible molecular weight distribution.

○ Friability in the non-cross-linked state, leading to simple and economical milling processes.

○ Excellent storage stability of resin/hardener mixes at room temperature, with short hardening times at elevated temperatures.

○ Relatively short hardening temperatures are feasible (about 130-200°C).

○ Desirable melt viscosity at the usual hardening temperatures, accordingly good wetting of the substrate and very good surface quality.

○ Hardening conditions and technical paint properties controllable over a wide range of temperatures and times by selection of the hardener systems.

○ Hardening takes place virtually in the absence of elimination of volatile substances, hence any thickness of film possible.

○ The ability to accept electrostatic charge is very good, and the spray properties are facile.

○ Very good adhesion after curing, excellent coating properties, good chemical and corrosion resistance together with outstanding dielectric properties.

By way of contrast to these properties, pure epoxy powder coatings and epoxy/polyester systems present the disadvantage of limited gloss retention and limited yellowing resistance in exterior exposure. The virtue of pure epoxy powder coatings lies in the outstanding chemical resistance, especially against aqueous acids and alkalis, in addition to organic solvents. On the other hand, epoxy/polyester powder coatings are the preferred coatings for decorative interior use.

Where weathering resistance is required, as in exterior applications, polyester/TGIC- and polyester/isocyanate (PUR)-systems have been used with success for several years. The advantage of polyester/TGIC powder coatings versus polyester/isocyanate (PUR)-systems lies in the lower curing temperatures and in shorter curing times, in cross-linking without splitting out volatile substances and in the better film coverage of edges.

Other weather-resistant powder coatings, based on acrylics or polyurethane-acrylics, for example, have found only limited outlets in Europe, or no market at all, on the grounds of specific performance disadvantages.

Raw materials and cross-linking reactions

Epoxy resins of interest for the preparation of powder paints are

exclusively solid types, with a melting range about 60-80°C (Kofler). Those concerned are the condensation products of Bisphenol-A and epichlorhydrin as shown in Figure 1.

For particularly exacting chemical or thermal applications, coatings based on polyfunctional epoxy-novolacs are also used.

The properties of epoxy powder coatings are affected decisively by the hardener component present. Preferred substances in use are modified or substituted dicyandiamide, substituted imidazoline, polyphenols and the low molecular-weight esters of polycarboxylic acids.

The crosslinking of epoxy resins with dicyandiamide, and especially with accelerated or modified basic types, is a polyaddition reaction in the first place, with formation of N-alkylcyanguanidines as shown in Figure 2.

At higher temperatures, a further anionically catalysed polymerisation reaction can take place between epoxide groups, with formation of ether bridges, as well as an addition of hydroxyl groups to nitrile triple bonds. Crosslinking with substituted imidazoline proceeds by a similar mechanism, through an addition and anionically catalysed polymerisation reaction.

The crosslinking reaction with carboxylic acid anhydride takes place in two steps. In the first there is attached an anhydride group to a hydroxyl group and a half-ester is formed. Therefore the formed carboxylic group reacts with an epoxide group, forming an ester and a hydroxyl group.

Among side-reactions occurring during the crosslinking reaction, through the presence of carboxyl groups and also due to the relatively high temperatures, are a cationic polymersisation of epoxide groups and the addition of hydroxyl groups to epoxide groups.

Crosslinking with polyphenols proceeds essentially via a polyaddition reaction.

The molecules of polyester resins suitable for the preparation of epoxy/polyester hybrid powder coatings contain a sufficient number of free terminal carboxyl or anhydride groups to facilitate three-dimensional crosslinking by combination with epoxy resins. Crosslinking occurs by the addition of carboxyl groups to epoxide groups, with formation of ester and hydroxyl groups as shown in Figure 3.

Polyester resins containing free carboxyl or anhydride groups have proved to be excellent for the preparation of weather-resistant powder coatings, in combination with triglycidyl isocyanurate (TGIC). Crosslinking between the acid polyester resins and TGIC occurs by the same reaction sequence as has already been described for epoxy-resin/polyester hybrid powder coatings.

Besides polyester/TGIC powder coatings, PUR powder coatings are still in use, although to a lesser extent. PUR powder coatings are based on polyester resins containing free hydroxyl groups, which react with weather-resistant blocked isocyanates, preferably isophorone diisocyanate, and are thereby cross-linked. Elimination of the blocking agent, caprolactam for example, occurs at elevated temperatures, and the OH-groups react with the isocyanate groups, forming urethane bridges.

Disadvantages of PUR powder coatings are the relatively high curing temperatures necessary (at least about 180°C), the splitting-out of the blocking agent, limited film

Figure 1

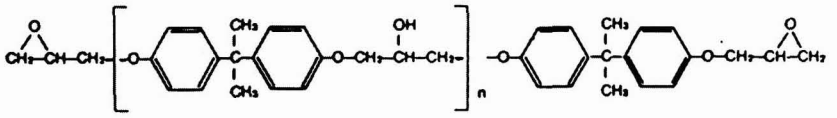


Figure 2

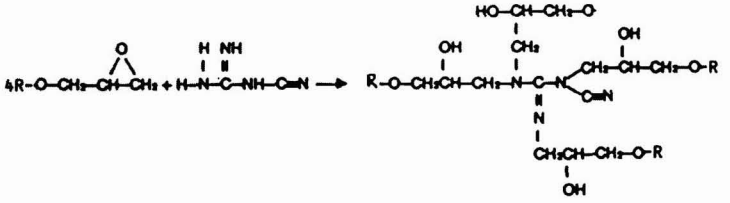


Figure 3

thickness and inadequate edge cover.

Preparation of powder coatings

The binder content of the final formulations of thermosetting powder coatings is usually in the range 45-70% by weight, depending on end-use. The pigments, dyestuffs and fillers used must be absolutely dry and stable to temperatures of about 220°C. The most favourable properties for white shades are achieved by using titanium dioxide solely, preferably chloride types, especially in exterior applications. In addition unpigmented transparent powder paints are used for special applications, such as finishing coats or coatings for wheel rims.

The addition of flow control additives is necessary for attaining perfect surface behaviour, without pinholes or the formation of craters. Polyacrylate esters provide good results, the addition needed lying between 0.3 and 1% by weight based on the total formulation, preferably about 0.5%. The addition of about 0.5% by weight of benzoin is also recommended, in order to prevent pinhole formation.

To improve edge cover, or to achieve greater film thickness, the use of thixotropic agents is recommended, such as Aerosil, Syloid etc. Examples of such applications are in the electrical industry, or for pipeline and other functional coatings.

The curing conditions in common industrial use at the present time render necessary the production of powder coatings in appropriate plant, which guarantees excellent dispersion within a short dwell-time, in a continuous process. Twin screw extruders and Ko-kneaders have gained acceptance. Product temperatures lie between about 90 and 120°C for a maximum dwell-time of 2 minutes, and preferably about 50 seconds. Under these conditions powder coatings can be produced which are capable of complete cure within about 20 minutes at temperatures above 140°C.

Powder coating production plants operate in general according to the principles shown in Figure 4. Separate storage vessels are used to store various raw materials (1), such as resin, hardener, pigment, dyestuff, filler, flow control additive etc. The ingredients are charged to a mixing vessel (4), with the aid of a conveyer screw (2) and via an automatic weighing device (3), or by means of separate batch weighings. Intensive mixing is carried out in inut (5). This vessel is then positioned above the charging hopper of the extruder or Ko-kneader.

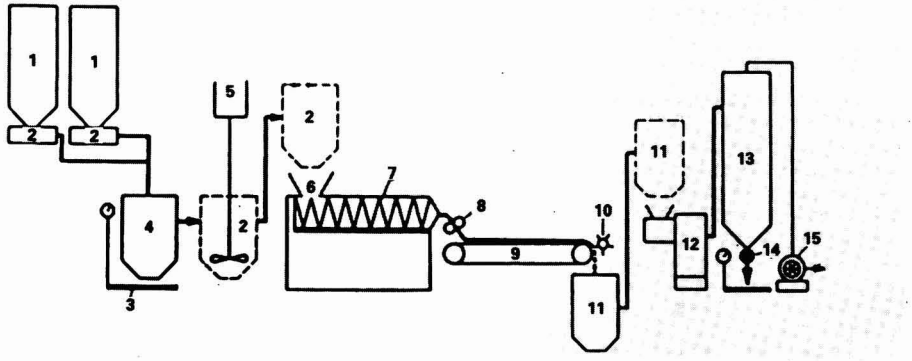
The pre-mixed batch is introduced into the extruder or Ko-kneader, plasticised and dispersed. Optimum dispersion properties are reached using controlled heating or cooling of the screw and its jacket.

The material extruded from the end-nozzle of the extruder or Ko-kneader is rolled into a ribbon by means of cooled rollers (8). The ribbon is cooled on a cooling belt (9), and then coarsely broken up in a crusher (10). The coarse fragments are then ground in a sifting mill (12), for example, and the desired grain size controlled by means of the principles of air classification. The mill is cooled by air from fan (15), and the finished powder coating arrives at the sacking point via refiner (13).

Applicational methods

Essential criteria for good corrosion protection are adhesion of the protective layer and passivation of the substrate. Should these not be perfect, even the best and most chemically resistant coatings will fail through the slightest mechanical damage. In order to achieve perfect corrosion protection, painstaking treatment of the substrate is indispensable, even though epoxy/polyester-hybrid powder coatings, pure epoxy-powder coatings and polyester/TGIC systems possess extraordinarily good adhesion to a variety of substrates. Chemical degreasing of clean metal surfaces suffices only for components with simple shapes, without edges or angles, demanding interior applications exclusively. For items having complicated shapes and for exterior applications, pretreatment of steel with ferric phosphate, or still better, with zinc phosphate, has proved of value. Transparent or yellow chromatisation is well proven for plated or galvanised steel, while for aluminium or its alloys, yellow or green

Figure 4



chromatisation is recommended.

A variety of processes is available for applying powder coatings, corona or triboelectric powder spraying, whirl-sintering, electrostatic whirl-sintering etc. Although whirl-sintering methods were introduced into the industry long before electrostatic powder spraying, the former is far less significant. Thermosetting powder coatings are processed nowadays almost exclusively by electrostatic powder spray methods. Exceptions are special applications, for example in the electrical industry, where the whirl-sintering, or even the electrostatic whirl-sintering methods are in use. For coating articles having complicated shapes, with indentations or cavities, triboelectrostatic powder spray equipment is being used more and more in recent times, in order to overcome the Faraday cage effect.

In electrostatic powder spray processes, the powder coating, having been charged either negative or positive by means of corona discharge or by friction, is conveyed by air and sprayed on to the object to be coated. The article concerned is at earth potential. Good adhesion of the powder and good throwing power (wrap-around) are important. Curing follows in circulating air ovens, which are heated either directly or indirectly. By this process film thicknesses of about 30-200 microns are attainable in a single operational cycle. Any powder coating which does not adhere to the substrate is returned via recovery units with integral filters. The degree of consumption attainable nowadays in conventional plants is around 98%.

End uses

Since powder coatings demand a chemical crosslinking reaction at temperatures above about 140°C, end uses are confined to industrial finishing, that is, to coating articles of industrial origin, for which the necessary stoving ovens etc. are available. The present most important end uses for powder paints cover the following:

☐ Domestic machines (refrigerators, deep-freezers, washing machines, cookers and kitchen equipments, lamps etc).

☐ Building industry (facings, window and door profiles, ceiling panels, shower cabinets, fittings, mountings, reinforcing bars etc).

☐ Garden and camping furniture.

☐ Gardening tools (lawn mowers etc).

☐ Steel furniture including warehouse and store fitting.

☐ Radiators.

☐ Automobile and utility vehicle industries (bumpers, fenders, engine blocks, wheel rims, window frames, windscreen wipers etc).

☐ Farm vehicles, equipment and machinery.

☐ Bicycle industries (motor-cycles, pedal cycles etc).

☐ Engineering and electrical industries (housings, insulation etc).

☐ Protection against severe corrosion (pipelines, drinking and waste pipes, fittings etc).

☐ Packing.

Market growth

Although the total production of paints in Europe has been to a large extent stagnant in the last 5 years, the growth in the Federal Republic of Germany amounting to about 0.2% over the period, the annual growth rate registered for powder coatings averages about 12-14%. The production of powder coatings in the Federal Republic in 1987 amounted to about 24,000 tons, the total production in Europe amounting to about 80-85,000 tons in the same year.

Taking into account the fact that powder coatings are completely solvent-free, and that the degree of utilisation attainable is around 98%, the quantities cited above already represent a proportion of about 13% of the European market for industrial finishes. It may therefore be deduced that the growth rate for powder coatings over the next decade will realise over 10% per annum, by reason of the trend towards environmentally compatible coating materials, and the steady increase in the enforcement of official regulations which can be expected in the future. ■

The effect of the chemical composition of unpigmented organic coatings on the corrosion protection of steel

Part 1: Preparation of novel coating resins

by D. E. A. Williams-Wynn, Department of Applied Chemistry, University of Natal, King George V Avenue, Durban, South Africa

Abstract

Details are given of the end-group modification of epoxy resins with reagents selected in such a way that the effects of changes in molecular geometry could be studied whilst essentially retaining the chemical composition and molecular size of the resins. Also, the influence of varying the bond type while maintaining the molecular geometry and size was examined. These resins were intended for use in heat curable epoxy coatings by cross-linking with urea-formaldehyde resins.

The products were excessively hard and brittle so a degree of internal plasticisation as well as reduced hydroxyl reactivity of the epoxy resins were obtained by a post-esterification processes using long chain fatty acids. The procedures used for monitoring the reactions and characterising the products are given.

Introduction

Publications dealing with one or more aspects of the protection of metals by coatings appear regularly and frequently in the technical and scientific literature. It is clear that mainly two factors influence the corrosion of coated steel: adhesion of the coating to the substrate, and the permeation of the film by electrolyte[1]. In a scientific study of the effect of the chemical composition of coatings on the corrosion protection of steel it is important to measure both of these parameters in addition to the assessment of corrosion resistance by conventional methods.

The performance and properties of polymeric materials are linked to the nature of the polymers under the conditions of use or exposure[2]. The chemical composition of resins used in surface coatings not only determines the chemical reactivity and susceptibility in aggressive environments, but also influences the physical and mechanical properties. Since modified epoxy resins feature prominently in primers for steel this study included an investigation of end-group modification of epoxy resins (mainly Epikote 1004), and the partial post-esterification of a selection of the modified epoxy resins with tall oil fatty acid when these resins were incorporated into finish formulations.

Plan of the Experiment

A. Modification of terminal glycidyl groups of epoxy resins:
A1: tall oil fatty acid modification of Epikote 1004.
A2: p-*tert*-butyl benzoic acid modification of Epikote 1004.
A3: p-*tert*-butyl phenol modification of Epikote 1004.
A4: p-phenyl phenol modification of Epikote 1004.
A5: diethanolamine modification of Epikote 1004.
A6: diphenylol propane modification of Epikote 880.

B. Esterification of selected resins from group A:
B1: resin A2 esterified with 2 moles of tall oil fatty acid.
B2: resin A2 esterified with 4 moles of tall oil fatty acid.
B3: resin A3 esterified with 2 moles of tall oil fatty acid.
B4: resin A3 esterified with 4 moles of tall oil fatty acid.
B5: resin A5 esterified with 2 moles of tall oil fatty acid.
B6: resin A5 esterified with 4 moles of tall oil fatty acid.
B7: resin A5 esterified with 6 moles of tall oil fatty acid.
B8: resin A5 esterified with 8 moles of tall oil fatty acid.

Experimental

The modified epoxy resins were all made by reacting commercial epoxy resins, usually Epikote 1004, with the reagents stated in A of the plan of the experiment.

Epikote 1004 has the idealised Formula F1.

Reaction of the glycidyl groups with mainly monofunctional reagents produced products of the type shown in Reaction Scheme R1.

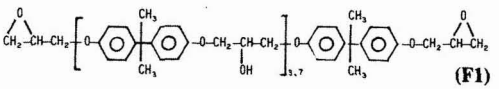
The bond formed and the conformation of the terminal R′– groups depend on the nature of the reagent used to react with the di-epoxide.

1. Analytical procedures for control and characterisation of resins

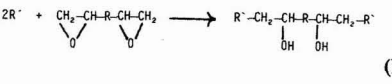
During the manufacture of the resins the extent of reaction was monitored using expoxide equivalent weight and/or acid value and the completed resin was characterised using the above techniques as well as determining the molecular weight distribution using gel permeation chromatography.

(a) Method for determining epoxide value/epoxide equivalent weight

Accurately weigh approximately 1g of resin into 250ml of 1,2-dichloroethane, warming if necessary but cooling to room temperature before diluting with 50ml of glacial acetic acid. When mixed, add 2g of alkylmethyl ammonium bromide solid and swirl to dissolve. Add 5 drops of methyl violet indicator and titrate immediately with 0.1N perchloric acid in glacial acetic acid to a bottle green end-point.



(F1)



(R1)

$$EV = \frac{\text{ml 0·1 N perchloric acid} \times F \times 5{\cdot}61}{\text{mass of resin} \times \% \text{ solids}}$$

$$EEW = \frac{\text{mass of resin} \times \% \text{ solids} \times 10000}{\text{ml 0·1 N perchloric acid} \times F}$$

Where the sample is thought or known to contain amine (e.g. catalyst) the analytical procedure can be modified not only to eliminate the interference but also to determine the amount of amine present. Thus, dissolve the weighed resin in 1,2-dichloroethane and glacial acetic acid as before and titrate this solution to the bottle green end-point of the added methyl violet indicator with the 0·1 N perchloric acid solution. This titre is a measure of the amine present. Add to this solution 2g of solid alkylmethyl ammonium bromide, swirl to dissolve and continue the titration to the same end-point. This volume used in the second equation above gives the **corrected epoxide equivalent** weight.

(b) Method for determining acid values of resin solutions

Use standard procedures as given e.g. in ASTM D1639-70.

(c) Method for determining solids content of resin solutions

Use standard procedures as given e.g. in ASTM D1259-61.

2. Modification of epoxy resins

The reactions were carried out in the presence of a reflux solvent, 4-methyl-2-pentanone (MIBK), to control the temperature since the melt process, which is suitable for some reactions, resulted in gel formation when p-*tert*-butyl benzoic acid was used as the modifying reagent.

Having determined the epoxy equivalent weight of the batch of epoxy resin to be used, an appropriate amount of the resin was weighed into the reaction vessel (5l Quickfit flange flask fitted with stirrer, thermometer, sampling tube/inert gas bleed, reflux condenser, and feed port) containing about 30% of MIBK reflux solvent based on the mass of resin plus modifying reagent to be added. The resin was dissolved by heating with stirring then the stoichiometric amount of modifying reagent to react with the glycidyl groups was added and the temperature raised to reflux and, where appropriate, to dehydrate the system before adding the catalyst. The reflux temperature was maintained between 130 and 150°C by adjusting the mass of reflux solvent present although in some cases a vigorous exotherm occurred causing the temperature to rise temporarily above the top limit when the catalyst (1% of dimethyl benzylamine) was added. The contents of the flask were maintained at reflux temperature until a sample had a corrected epoxide equivalent weight approaching infinity. Where the modifying reagents were acids an acid value of the resin was determined.

When the reaction was deemed to be complete sufficient additional MIBK was added to give a final product with about 70% non-volatiles and the hot solution filter pressed into a closed container, using 0·25% of Celite 560 as filter aid. The clarified resin solution was analysed for per cent non-volatile, corrected epoxide equivalent weight and, where appropriate, acid value.

A.1 Tall oil fatty acid modified Epikote 1004.

The glycidyl groups of epoxy resins can be ring-opened by carboxylic acids to produce a terminally modified resin as shown in Reaction Scheme R2.

In the case of the tall oil fatty acid modifiction the R′ represents a chain of approximately C_{18}. These end-groups are attached by means of ester linkages and two extra OH groups are introduced into the molecule making a total of about 6 OH groups for further reaction.

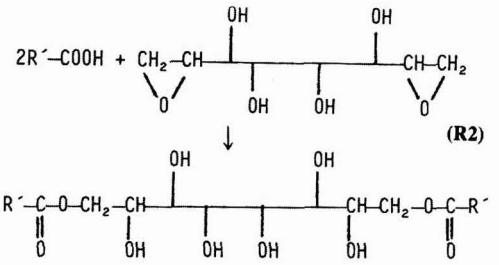
A.2 p-*Tert*-butyl benzoic acid modified Epikote 1004.

As with the tall oil fatty acid modification the p-*tert*-butyl benzoic acid reacts with the glycidyl groups to form ester linkages to produce a molecule which can be represented by Formula F2.

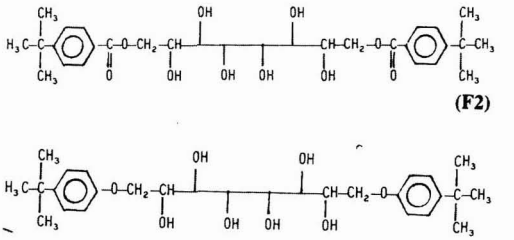
Again there is a total of about 6 OH groups available for further reaction.

A.3 p-*Tert*-butyl phenol modified Epikote 1004

Phenolic groups also react with



(R2)



(F2)

glycidyl groups of epoxy resins but the bond formed is an ether linkage; an extra OH group is introduced with each bond formed. Thus with p-*tert*-butyl phenol the product formed with Epikote 1004 can be represented by Formula F3.

A.4 p-Phenyl phenol modified Epikote 1004

This reaction is similar to that shown above but the end-groups are all aromatic. The molecule therefore has the structure represented by Formula F4.

As with the p-*tert*-butyl phenol modification, the reaction of p-phenyl phenol with Epikote 1004 results in a molecule with about 6 OH groups.

A.5 Diethanolamine modified Epikote 1004

Amine reactions with glycidyl groups require no catalyst; in fact the reaction of diethanolamine with Epikote 1004 is spontaneous and results in an exotherm and in this modification the starting temperature was at 65°C.

The reaction product was not soluble in MIBK and because of the risk of a ketone forming an enamine with the secondary amine group of diethanolamine[3] the reaction was carried out in 2-ethoxy ethanol (ethylene glycol monoethyl ether).

The rise in temperature due to the exotherm was not sufficient to cause the system to boil so the temperature was raised and the solvent mass adjusted to a reflux temperature of 140°C, and the reaction was found to be complete.

The amine reaction with each of the glycidyl groups also produces an extra OH group on the epoxy moiety and these together with the OH groups on the diethanolamine reagent results in a product with 10 OH groups on each molecule as represented by Formula F5. In any subsequent reaction the primary OH groups are likely to react before the secondary.

A.6 Diphenylol propane modified Epikote 880

Difunctional epoxy resins can be reacted with difunctional phenolic molecules to give phenolic terminated resins. However because of the probability of chain extension it is not feasible merely to add e.g. diphenylol propane to Epikote 1004 and retain the same general molecular size. Even if stoichiometric amounts are used the products in Reaction Scheme R3 are obtained.

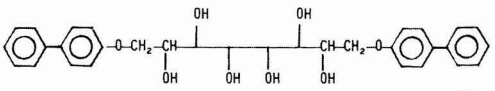
All three of these can interact to build up very large molecules. Obviously 1 will predominate but the presence of 2 and 3 will produce undesirably large molecular species.

To reduce (but not eliminate) the incidence of large molecules, it is necessary to build up to the desired molecular size by starting with smaller diglycidyl units such as Epikote 880. By reacting 4 moles of diphenylol propane with 3 moles of Epikote 880 the dominant species will be the result of linking three diglycidyl units with diphenylol propane and terminating each end of the molecule with diphenylol propane. Thus the molecule produced in Reaction Scheme R4 is similar in size to modified Epikote 1004.

The liquid Epikote 880 was dehydrated by heating under reflux in MIBK which was subsequently vacuum stripped. The diphenylol propane was added and the temperature raised to 150°C to effect dissolution when 0.3% of the dimethyl benzylamine catalyst was added. Even with complete removal of heat the exotherm resulted in a peak temperature of 216°C. When the temperature had fallen to 160°C addition of the remainder (0·7%) of the catalyst caused no further exotherm and analysis showed that the reaction was essentially complete.

3. Esterification of selected modified resins

Coatings made from the above experimental resins were found to be rather brittle. To introduce a plasticising effect and to reduce the hydroxyl functionality of the resins the selected resins (A2, A3 and A5)



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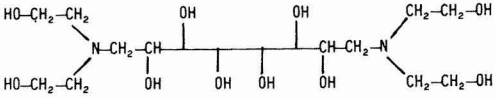

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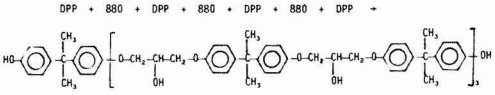
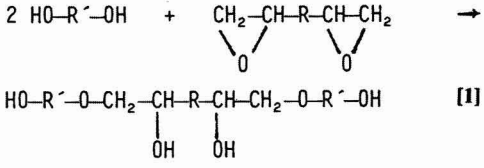
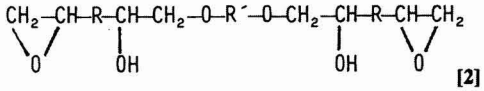


(R4)



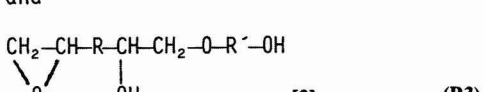
[1]

as well as some



[2]

and



[3] **(R3)**

were esterified with tall oil fatty acids, the first two with 2 or 4 moles of the fatty acid/mole of resin whereas the diethanolamine modified resin was esterified with 2, 4, 6 or 8 moles of fatty acid.

Esterification of the p-*tert*-butyl benzoic acid, and p-*tert*-butyl phenol modified Epikote 1004 resins was effected in MIBK solution under reflux at 220°C. The higher levels of esterification took considerably longer (x2) to achieve an adequate degree of reaction. The high levels of esterification of the diethanolamine modified Epikote 1004 (6 and 8 moles/mole of resin) had to be effected at 230-235°C to bring the acid value to below 10 in less than 12 hours. This caused some darkening of the resin. All esterified resins were made approximately 75% in MIBK.

B.1/2 Esterification of the p-*tert*-butyl benzoic acid modified Epikote 1004

The modified epoxy resin was approximately 70% non-volatile in MIBK. On addition of the appropriate amounts of tall oil fatty acid (B.1, 2 moles or B.2, 4 moles/mole of resin) the reflux temperature was only about 125°C, too low for esterification to occur. Thus solvent was removed until an adequate rate of reaction was noted and the reflux temperature (220°C) maintained to complete the esterification in under nine hours.

B.3/4 Esterification of the p-*tert*-butyl phenol modified Epikote 1004

The unesterified resin was also approximately 70% non-volatile in MIBK. Thus solvent was removed so that the reaction mixtures refluxed at 220°C. At this temperature the esterification reactions were completed in between five and eight hours.

B.5/8 Esterification of the diethanolamine modified Epikote 1004

This modified epoxy resin has approximately 10 OH groups on each molecule, four primary and six secondary. Of these the primary OH groups are the more reactive and therefore react preferentially to the secondary OH groups. Thus low levels of esterification are likely to be effected easily and quickly, and this is what was noted.

However before esterification could be initiated it was essential to remove completely the 2-ethoxy ethanol in which the modified resin was dissolved since the solvent is a primary alcohol and would compete with the resin for reaction with the fatty acid if it remained. Thus the solvent was vacuum stripped and when complete about 5% of xylene was used as a reflux and water entrainer solvent for the esterification process.

The low levels of esterification were effected in 2 to 3 hours at 220°C. When esterification with 6 or 8 moles of tall oil fatty acid/mole of resin was attempted the final reaction was slow and could be brought to a satisfactory level only by raising the temperature to 230° to 235°C. Even then the reaction time needed for the high level of esterification was 11 hours.

Results

Chemical characterisation of the resins was carried out during the manufacture of the resins and immediately after clarification. This was done to assess completeness of reaction. Thus in the case of the modification of the epoxy resins reaction was continued until the epoxide equivalent weight approached infinity. When acid reagents were used as was the case with tall oil fatty acid modification or esterification, reaction was continued until the acid value was reduced to less than 10mg KOH/gram of nonvolatile matter.

All of the experimentally produced resins were checked for molecular weight distribution using gel permeation chromatography. The results are summarised in Table 1.

It is clear that in the majority of cases the resins consist of one major component. The exceptions are:

a) the resin produced by the interaction of four moles of diphenylol propane with three moles of Epikote 880 where the major component was the desired product. There is evidence of minor proportions of low molecular weight species, and
b) the highly esterified resins in which not all of the esterifying tall oil fatty acid had been consumed.

Table 1

Molecular weight by gel permeation chromotography

Resin	Mw	Mn	Polydispersity
A1 TOFA/Epikote 1004	**6838**	**2131**	**3.22**
A2 PTBBA/Epikote 1004	**6261**	**2082**	**3.01**
A3 PTBP/Epikote 1004	**5903**	**1893**	**3.12**
A4 PPP/Epikote 1004	**5354**	**1502**	**3.56**
A5 DEA/Epikote 1004	**3887**	**1101**	**3.53**
A6 DPP/Epikote 880	**5182**	**1529**	**3.39**
B1 2 TOFA/A2	**8208**	**2476**	**3.32**
B2 4 TOFA/A2	**9581**	**2639**	**3.63**
B3 2 TOFA/A3	**7902**	**2268**	**3.48**
B4 4 TOFA/A3	**9540**	**2375**	**4.02**
B5 2 TOFA/A5	**6611**	**1918**	**3.45**
B6 4 TOFA/A5	**9237**	**2971**	**3.11**
B7 6 TOFA/A5	**9975**	**3063**	**3.26**
B8 8 TOFA/A5	**12057**	**2960**	**4.07**

Conclusions

Epoxy resins present unlimited opportunities for preparing resins of different molecular geometry but otherwise of similar size and chemical composition, as well as resins of similar molecular shape and size but incorporating different bonds. For example, the reaction of the epoxy resin with tall oil fatty acid introduced a long hydrocarbon chain linked by an ester group, whereas the reaction with p-*tert*-butyl benzoic acid introduced a more compact end-group. The latter modification which introduces ester groups can be compared with the p-*tert*-butyl phenol modification which introduces a similar end-group but via an ether link.

Apart from the long chain fatty acid end-group modification, these resins tended to produce excessively hard and brittle coatings when they were incorporated into heat curable systems with urea-formaldehyde resins. To introduce a degree of flexibility a selected group of modified resins was post-esterified with tall oil fatty acid to varying degrees. This not only introduced a degree of internal plasticisation, but also reduced the hydroxyl content and hence also the water sensitivity of the coatings. The high levels of esterification were difficult to achieve but could be attained by 'forcing' the reactions.

These modifications are important for interpreting the results of measurements of adhesion, corrosion resistance, water penetration and other physical properties such as hardness and glass transition temperature of coatings incorporating these resins.

Acknowledgements

The author wishes to acknowledge with thanks, study leave granted by the University of Natal, the assistance give by AECI Paints, South Africa and the facilities provided by ICI Paints Division for carrying out this work.

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Letters

CAPCIS

Dear Sir,

I refer to the article on "Coatings Technology at CAPCIS", June *JOCCA* p.165, and would like to clarify that enquiries concerning the Corrosion and Protection Centre Industrial Services (CAPCIS) should be addressed to CAPCIS/UMIST, Bainbridge House, Granby Row, Manchester M1 2PW. Telephone number 061-236 6573. Enquiries concerning the Corrosion and Protection Centre Short Courses on mid career training and annual course in Corrosion Engineering at UMIST in April, should be addressed to the academic side of the organisation whose contact is Dr Scantlebury.

Yours faithfully,
Dr Jim Breakell,
Group Manager,
Coatings and Non Metallics

27 June 1988

Born to the purple

Dear Sir,

I am much obliged to Dr J. W. Nicholson, ATSC (a member of the Committee of the Historical Group of the Royal Society of Chemistry), who has kindly pointed out that, in my notes on Sir William Perkin (*JOCCA*, 1988, 71 (5), 144), inadvertently I transposed the order of seniority of two of his three sons.

Sir William's *second* son was Professor of Colour Chemistry at Leeds University and his *youngest* son was our Association's first President. I shall be pleased if you will publish this correction.

104 Vivian Avenue,
Wembley,
Middlesex HA9 6RU

Yours faithfully,
R. H. Hamblin
2 June 1988 ■

Chester Conference Column

Some of you will be reading this item for the first time having been referred to it by the full page advert. To you I would say look back at this column in previous issues of *JOCCA* and you will be informed of the details of the papers, the social programme, the conference HQ and even details on how to get to Chester.

It is important to state categorically that the papers will be technical ones and appeal to members but WILL NOT include subjects that are purely of academic interest with no likelihood of commercial exploitation. Authors are being requested to place their papers in a realistic marketable setting. Even the Health & Safety paper will deal with the factors in the market to which technologists in R & D should address themselves to avoid, as so often happens, a newly introduced product having to be modified to gain its full marketing potential.

Cost-effective technology, being that which arises from the technologists first examining all of the market strictures for the potential development BEFORE spending time and energy on personal work, will be evident by the attractiveness to the industry of the subject matter contained in the paper.

As will be seen from previous columns, we have the majority of the papers already agreed to. However, apart from getting the authors' photographs and synopses in as soon as possible, Simon Lawrence would be interested to hear from one or two additional authors.

Finally, some sad news! Despite contacting the Paintmakers' Association in April 1986 in order to avoid yet another clash with our respective conferences, they have found it necessary to fix theirs yet again to coincide with ours. Unfortunately, we only found out very recently. However, Bill Junner, their President, has undertaken to "plug" our conference on his visits around his sections persuading his members to send as many as they can of their technical, marketing and even purchasing and financial staff to Chester, whilst they themselves go to Gleneagles. He has also promised to endeavour to see that history does not repeat itself again. For our part we will definitely avoid "the Paintmakers" dates for 1991 when fixing our Cambridge Conference.

A. C. Jolly ■

New members

The sections to which new members are attached are shown in italics together with the country, where applicable.

Ordinary members

Ashraf, A., BSc *(General Overseas – Egypt)*
Enfield, R. A. *(Manchester)*
Fong, D., MSc *(Ontario)*
Goldsmith, A. *(London)*
Grierson, W., PhD, BSc *(Scottish)*
Haim, J. E., BSc, PhD *(London)*
Hood, D. J., BSc *(Manchester)*
Horne, L. J. *(Transvaal)*
Newsham, B., BSc *(Cape)*
Prior, N. D., BSc, MA, PhD *(London)*
Rauch, R., BSc *(Newcastle)*
Routs, S. A. F., MA *(Thames Valley)*

Associate members

Batty, A. L. *(Thames Valley)*
Lowe, R. *(Cape)*
Martin, G. *(Transvaal)*
Schubert, H. *(Cape)* ■

Newcastle Golf Day

The Newcastle Golf Day once again kindly sponsored by Tioxide UK was held on Friday, 13 May 1988 at the Bishop Aukland Golf Club. Twenty-three members and guests enjoyed a pleasant afternoon followed by dinner and the prizegiving (as shown in the photos) in the clubhouse.

L. Morpeth

David Neil, Vice Chairman, Newcastle Section, presenting the British Titan Cup to Alan Laws (right) of Resinous Chemicals for the best round by a section member.

David Neil presenting a replica trophy to Dave Thomas of Crown Paints for the best round by a visitor. ■

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RESEARCH CHEMISTS

Coates Brothers plc requires Research Chemists for its recently established Group Research Department at St. Mary Cray, Kent.

This new department has been established to support an international speciality chemical group serving the graphic arts and surface coatings industries. Staff are now required for the Research Analysis and Radiation Coating sections. There is also a position for a Rheologist, ideally someone with a background in Colloid Science.

It is expected that suitable candidates possess a degree or equivalent academic qualification, will be aged between 20 and 30 years and be familiar with modern industrial techniques. Preference will be given to candidates with a knowledge of the surface coatings industry.

Salaries will be negotiable and assistance with relocation will be given where appropriate.

Applications should be in writing will full personal and career details to:

Divisional Director of Personnel, Coates Brothers plc, Waterloo Works, Machen, Newport, Gwent NP1 8YN

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DEVELOPMENT COLOURISTS

BEE CHEMICAL, an important subsidiary of a large international group, manufacturers paints and dispersions, for UK and European markets.

The continued expansion and development of the company depends on a superior level of customer service. To promote this further, we need a Development Colourist for each of our 'Injecta Color' Liquid Colourants and Surface Coatings Divisions.

Both positions report to the Technical Manager and carry responsibility for colour matching to customers immediate requirements plus some quality control of work batches.

Injecta Color

When colour matching in various thermoplastic materials, you will be involved in selecting, blending and testing, using an injection moulding machine plus other laboratory equipment.

Surface Coatings

Your colour matching work will be within our various paint systems entailing selection and blending of approved ingredients and evaluation using standard paint making and testing equipment.

As a members of a small dynamic team there is every opportunity for involvement in all technical aspects: career opportunities will be in the wider sphere of Bee Chemical and associate companies.

Candidates male or female, will ideally have 'A' level/ONC. Previous laboratory experience in pigments, paints or plastics would be preferable. As training wil be given a willingness to learn is a genuine alternative.

Salary will reflect experience offered. Benefits include 25 days annual holiday, contributory pension scheme, free life insurance and subsidised canteen.

Please apply with full details including present salary to:- George Croft, Personnel Manager, Bee Chemical, Greville House, Hibernia Road, Hounslow, Middlesex TW3 3RX.

Research and Quality Control Manager

ROYAL SOVEREIGN

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Royal Sovereign is a rapidly expanding manufacturer and supplier of equipment and materials to the Graphic Arts industry.

The company is looking to appoint a suitably qualified chemist to head up the Research and Development Department based at Wood Green. The department carries out basic research and develops new formulations and products for areas such as inks, adhesives, etc. A good depth of understanding and working knowledge of colour chemistry and preferably of development in a similar or associated manufacturing environment is required.

The position offers tremendous scope for personal development and job satisfaction through both defining and developing new applications and areas.

Applications in writing, please, with full c.v. to:

Mr. G. King, Operations Director, Royal Sovereign Limited, 38-46 Station Road, London N22 4TX

Classified Advertisements

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Kalon Group PLC, the leading independent paint Company in the UK currently has vacancies for the following:

SENIOR TECHNOLOGIST

Ref: D20/ST

This post, reporting to the Development Laboratory Manager, will be responsible for carrying out allocated research and development programmes.

Ideally, we are looking for someone with a number of years general experience in Decorative Paints Development and educated to HTEC or equivalent.

TECHNOLOGIST

Ref: D20/T

This is a new position which will involve the successful candidate in carrying out day-to-day projects with minimum supervision.

Applicants must be educated to TEC/HTEC or equivalent together with relevant laboratory experience.

Both positions offer a competitive salary together with other benefits normally associated with a progressive Company.

Interested applicants should write for an application form or send a full CV quoting the appropriate reference.

Yvonne Woulds
Personnel Manager
KALON GROUP PLC
Huddersfield Road,
Birstall, Batley,
West Yorkshire WF17 9XA
No Agencies Please

KALON

MANDERS RESIN DIVISION

RESIN DEVELOPMENT CHEMISTS

Due to planned expansion of our Resin Division, vacancies have arisen for Resin Chemists with experience in polymer development for use in the paint and printing ink industries. All applicants should be suitably qualified in either Chemistry or Polymer Technology and have a knowledge of the surface coatings field.

Applications in the first instance to Personnel Manager, Mander Brothers Limited, P.O. Box 186, Old Heath Road, Heath Town, Wolverhampton WV1 2QT.

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Associated with the conference will be a Mini-Exhibition, for information on this, contact Chris Pacey-Day on 01-908 1086

A full social programme has been arranged including a Golf Competition, Tour of Llangollen, Chester City Tour and Ale Trail, and Evening (Dinner on the River organised by A. C. Jolly.)

For further information see the regular conference column in this issue on page 246.

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