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Vol. 73, No. 4

JOURNAL OF THE OIL AND COLOUR CHEMISTS' ASSOCIATION

JOCCA

Official Guide

▷ SURCON 91 ◁

Developments in the Science of Surface Coatings

12 - 14 June 1991
Moat House International Hotel
Stratford-upon-Avon, England

The four topic areas to be presented at SURCON 91 will be Raw Materials, Environmental Impact, Inks and Coatings Technology and Performance Assessment. Each topic session will comprise an invited review paper and supporting papers developing the technical theme of the review.

The Technical Committee have already received a good response to their initial call for papers and are pleased to announce that the following offers of papers have been confirmed:

Mebon Ltd — United Kingdom
Servo BV, Coatings and Additives Division — The Netherlands
Strathclyde University — United Kingdom
Gebrüder Schmidt — West Germany
Coates-Lorilleux — United Kingdom
Akzo Corporation — The Netherlands
Ciba-Geigy Plastics — United Kingdom
Tioxide (UK) Ltd — United Kingdom
Ciba-Geigy Corporation, Pigments Division — USA
Cray Valley Products Ltd — United Kingdom

Herman Scopes, Principal Executive Officer, ICI Paints, will give the opening Keynote Address.

Companies and individuals who wish to present papers at SURCON 91 should contact Simon Lawrence at Ciba-Geigy Pigments, Hawkhead Road, Paisley, Renfrewshire PA2 7BG, Scotland, Tel: 041-887 1144; Fax: 041-840 2283, for further information.

Abstracts should be submitted no later than 1 August 1990 and complete papers submitted by 1 December 1990. All contributed papers will be reviewed by the Technical Committee and will be given between 15-30 minutes for presentation.

Companies wishing to be associated with SURCON 91 should contact the Honorary Conference Officer, Tony Jolly — Tel: 0928 32784, for sponsorship opportunities.

Vol. 73 No. 4 APRIL 1990

JOCCA

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Contents

Cover: Harrogate International Centre (Photo by courtesy of Harrogate Resort Services Department, Design: John Law).

Forthcoming Features: May — Can Coatings; Process Operation (PO), Storage & Handling, June—Pigments; PO, Milling, July—Printing Inks; PO Environmental Control.
Contributions are welcomed at least five weeks prior to publication date;

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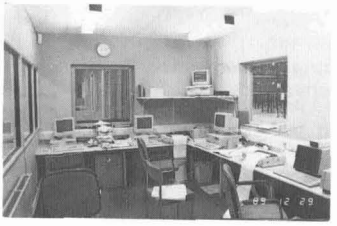
Cookson Laminox starts synthetic MIO production

Cookson Laminox Limited is to start production of synthetic micaceous iron oxide pigment during April. The first phase of a bulk manufacturing plant has been constructed over the last six months at Peterlee, Co. Durham and represents an investment of £3m. The synthetic process allows much tighter quality control over both chemical and physical properties than has previously been possible with naturally derived pigments. Two grades of pigment are being produced initially, LAMINOX S for undercoats and finishes; LAMINOX F for anticorrosive primers.

Mebon — New computer controlled warehouse



In order to cope with a substantial increase in output and enhance customer services, Mebon Limited — market leader in surface coatings technology — has invested approaching £2m in a 50,000 sq metre warehouse. Built on an 8-acre site and capable of holding around 3,000 tonnes of Mebon coatings (representing over 2.5 million litres), the warehouse uses a sophisticated computer-based stock control system, incorporating bar-coded inventory management.

Currently, less than half of the site is being used, but Mebon will store its entire finished product stock at the warehouse and still have room for expansion of up to 40%. The new warehouse is the latest example of Mebon preparing to meet its future growth requirements. Since becoming a subsidiary of BP Chemicals in 1985, Mebon has more than doubled in size and is predicting significant European and International growth in the 1990s.

New Allied Colloids Division

Allied Colloids have formed a new division specifically to reflect the growth and importance of surface coatings and speciality chemicals. The new Coatings & Specialities Division has threequarters of its business in chemical 'coatings', supplying a range of industries, including adhesives, resins, inks, lacquers and paints. The remainder covers specialised personal care and detergent products. The new division reflects more accurately the increasingly specialised nature of Allied Colloids' work in these areas.

Sales Manager of Coatings and Specialities Division is Eric Alston, David Marshall is Marketing Manager and John Clarke is Technical Manager. There are four Product Group Managers: Nigel Ambrose — Personal Care Products; Terry Penswick — Adhesives; Chris Batchelor — Inks & Lacquers and Robert Hildred — Paints & Coatings. There are also three Area Sales Managers: Ray Sloan — North East; Laurence Pyett — North West; Richard Heath — South.

UCB invests in OPP film

The UCB Group, one of the main European producers of flexible packaging materials, has decided to install a new technically advanced coating machine for the manufacture of coated biorientated polypropylene (OPP) film on the site of its subsidiary, British Sidac Limited, at Wigton, in Great Britain. This investment amounts to BF 600 million and forms part of the investment programme to increase capacity there.

Lakeland — BS5750

Lakeland Laboratories Ltd have recently received approval for BS 5750-1987 Part 2, ISO 9002-1987 and EN 29002-1987. The assessed Quality Management System is applicable to the manufacture of amphoteric surfactants, wax emulsions, phosphate esters, and imidazolines.

Volstatic expansion in China

Volstatic electrostatic powder coating equipment is being installed by a Hong Kong lighting company which is expanding its operation into China. A 5-metre Volcoater and four HP1000 automatic guns mounted on Wagglers are to be installed. Two Solidspray 90XC manual powder coating units and twin port cyclones are also included in the contract from the Slough-based company.

Samuel Banner — BS5750

Works Manager, Keith Rea and Chairman and M.D. Christopher Banner (r)

Samuel Banner & Co Ltd., one of Britain's major independent vegetable oil refiners has attained BS5750, Part 2 registration.

Keith Rea, Works Manager said "The scope of the registration covers the manufacture and supply of refined, processed and blended vegetable oils. The provision of a service of purchasing, servicing, testing, storage and distribution of vegetable oils, along with vegetable oil by-products many other than at the Liverpool premises."

"Following a programme of capital investment the Liverpool refinery is now a high speed, modern complex capable of producing refined and modified oils to customers' own specifications", commented chairman and M.D.

Christopher Banner, "Attaining the British Standard proves we have a quality system which our customers can rely on".

Plastic Coatings buy TDC Plastics

Custom finishing specialist Plastic Coatings Limited is to expand its activities in the north of England, following the acquisition of the Oldham-based metal finishing company TDC Plastics Limited. TDC Plastics employs 32 staff coating wire work and light engineering metal work.

BCDTA Diamond Awards Dinner

The inaugural BCDTA (British Chemical Distributors and Traders Association) Diamond Awards Dinner, held at the Crowne Plaza Hotel, Manchester in February, was a resounding success with the industry's top achievers toasted by over 250 members and their guests.

Chairman Jeffrey Ellwood was master of ceremonies with awards presented by the Association's Vice-President Leslie Napier.

Winner of the first 'Diamond Award' was retiring Ellis & Everard Chairman Simon Everard who delivered a speech entitled 'Towards the Millennium in Chemical Distribution and Trading.'

The 'European of the Year' title was won by Dr Enzo Beltrami, President of the Italian Association of Chemical Trade. His prize was collected by Dr Paulo Andreoli who had flown over from Italy especially for the evening.

Neil Eisberg, Editor-in-Chief of European Chemical News, won the 'Journalist of the Year' title in recognition of his excellent support of the industry during his year at the helm of ECN and previously as Editor of Manufacturing Chemist magazine.

The 'Student of the Year' title was shared by Mike West of Hays Chemicals and Mary Corkery of Ellis + Everard Chemicals, who had both attended the highly successful BCDTA 'Making People More Profitable' Training Course in November.

Keith Glover, of the Samuel Banner Group, who had attended last year's BCDTA Far East tour, was presented with the award for 'Business Initiative Traveller of the Year'.

Two special awards were also made. BSI chemical industry Certification and Assessment Manager Graham Russell was rewarded for his work in bringing quality and safety issues to the forefront of both buyers and suppliers minds.

The chairman's Special Award, which had been kept a closely guarded secret, was presented to the Association's Director and Secretary Colin Wainwright.

BCDTA Award winners (l to r): Neil Eisberg, Graham Russell, Dr Paulo Andreoli, Simon Everard, Mary Corkery, Colin Wainwright, Mike West.

US Focus

By Abel Banov
Copublisher of the
American Paint and Coatings Journal

Interest intensifying on air quality laws

Throughout the U.S.A. authorities are heating up their efforts to enact air quality rules that would meet the ever-louder demands of environmentalists. Congress is about to consider bills to reenact the Clean Air Act of 1970, and lobbying groups have been busy getting in their comments and rallying support.

Included in the interested parties a determined number of coatings industry spokesmen seeking what is known as Federal preemption, whereby one set of rules enforced by the Federal government, would eliminate the hodge podge of air quality regulations propounded by the individual states.

Inasmuch as other nations are, or will be, working on air quality rules, the activity here may be instructive. After years of relative indifference, paint companies have suddenly realized the moment of truth has arrived. Fortunately, raw material firms were farsighted, and they have been furnishing formulations, naturally using their products, that have met the needs of manufacturers in California, the toughest of all the states, where strict limits on solvent use have already forced use of high-solids trade sales products where water-reducibles are unsatisfactory, as in gloss alkyds, and in numerous industrial finishes.

Substitute solvents help cut VOC's

Volatile organic compounds (VOC's) are the villains in the eyes of air quality regulators, and solvent firms have been quick to provide suitable replacements for old favourites so that VOC's can be reduced. Dow Chemical Co., a major supplier of glycol ethers, has realigned an entire plant to make p-series glycol ethers (with propylene in the molecule instead of ethylene.) Other glycol ether

producers have also moved into p-series versions, which are performing equally well, although some minor formulation changes are often required.

Eastman Chemical and Union Carbide Corp. have been offering p-series products, but also new solvents. Eastman has ethyl ethoxy propionate, and UCC has that and pentyl propionate and butyl propionate. These are replacing various acetates and glycol ether acetates. One notable feature of pentyl and butyl propionate is their mild odours. One solvent replaced is methyl amyl ketone, a strong solvent with a strong objectionable odour.

Other strong solvents gaining acceptance

Butyralactone and methyl pyriladone are two strong solvents entered in the race to replace conventional solvents by GAF. They compete with an effective group of dibasic esters introduced with considerable success by Du Pont.

Butyralactone, in addition to being strong is also so safe that it is used in making margarine. Methyl pyralidone has considerable selling points. It is useable as a coalescing agent in latex paints. Needing as little as 4 per cent; it is an effective dispersant; and it can replace isophorone in can and coil coatings.

The dibasic esters, actually esters of glutaric, succinic, and adipic acids, are high-boiling retardant solvents with acceptable odour, so much so they are used in hand cleaners. One growing use of DBE is as a replacement for methylene chloride, which has been the object of regulatory disfavour in paint strippers. The DBE's keep paint softened longer and permit efficient removal.

Adhesion getting increased attention

Growing use of latex paint for exteriors has caused increased concern about wet adhesion, or adhesion of the water-reducible film if rain follows too soon after application, Acrylic polymers have been available with this feature, and now Alcolac Corp. of Linthicum, Md., is offering a proprietary wet adhesion monomer for producing emulsion polymers with adequate wet adhesion. It is called Sipomer WAM.

Where improved isocyanate-end-capped polyurethane sealants, adhesives, or coatings are needed. Union Carbide is now offering an organofunctional silane adhesion promoter, Y-9492, which is an amino-functional silane with a hindered secondary amino group and two silyl groups. The silyl groups enhance adhesion to dry, moist, and wet surfaces and provide a strong, weather-resistant bond. A methoxy silane ether component helps rapid attainment of bond strength.

Works Visit

Crown Inks

The opportunity to visit the newly refurbished factory of Crown Inks at Cadishead Irlam was an occasion too important to miss and came up to all expectations.

A warm welcome was given by John Boland, the director of Crown Industrial Coatings, of which Crown Inks is an integral section; who then introduced Mike Murphy, John Barton and Denise Mullen, the young lady who handled the initial P.R. arrangements. The Crown team were fully supported by Nigel Whittaker and Elizabeth Stretton of I.C.S. Texicon.

The new investment programme totalling half a million pounds includes a new ICS colour system which incorporates a spectrophotometer linked to a computer, so as to convert the mathematical data given into a formula for matching the colour. Thus when programmed initially with a set of established standards gives a recipe for making a batch of ink to match a desired colour. Crown Inks is currently the only company with the facility to measure colour on Crown Kraft for the uninitiated corrugated cardboard packaging.

This is supplemented by a colour dispensing system called a colour kitchen, fitted with a 20 head automatic dispenser which delivers the correct amount accurately down to 0.5 grammes. This £80,000 investment makes for a very tight control on quality with batch to batch accuracy. The dispensing system which is controlled by a computer allows the operator to fit a container on to a machine, press the button and start the process. The container then passes to each required colour head automatically to receive the required accurately dispensed colour.

To further the speed of production two Eiger-Torrance high speed dispensers have been incorporated, which cuts down the old process from a 2 stage operation to 1, increasing the kilo output from 200 per day to 600 per machine per day. These machines cut down noise, to the benefit of the factory floor staff, have a more effective extraction system with safety explosion panels built in which could blow away from the factory building should such a blast occur, and is COSHH approved.

In order to improve efficiency and the environment a new £30,000 portable pan cleaning system using recyclable solvent, with no caustic, ensures the pans are free from any contaminates so preventing any carry over to a new batch.

As a further benefit to customers a colour centre has been opened in Luton which gives a 24-hour delivery of the full Pantone Range.

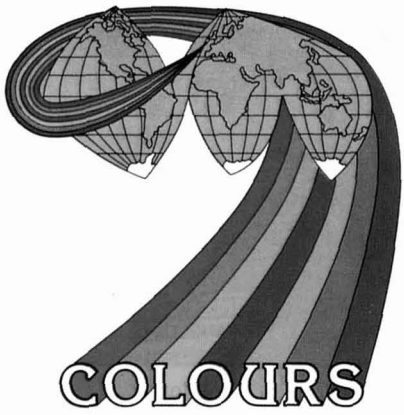
Crown are to be complimented on the completion of such a technological investment and the well planned production layout, which appears to reflect on the positive attitude and cheerful helpfulness of their staff throughout the factory.

N. H. Seymour ■

Equipment

Colour assessment cabinets

The VeriVide range of colour assessment lighting cabinets are now available from the Industrial Department of Minolta (UK) Ltd. The basic light source is the "Artificial Daylight" fluorescent tube which conforms to the international standard D65, to



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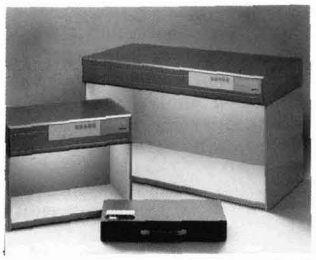
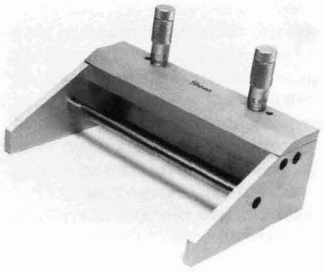
within the tolerances specified in BS950 Pt 1. Other light sources can be supplied and include TL84, $D65_2$ and Tungsten, the standard source used as a check for metamerism and UVB which will show up the presence of fluorescent dyes. The cabinets come in four different sizes and can include up to six lamp configurations, depending upon model.



For further information Enter D101

New sheen applicator

Sheen Instruments have introduced a new micrometer adjustable film applicator (MAFIA for short) which can draw down coating samples up to 13mm thick.



The new applicator has a stainless steel draw down blade and features two very precise micrometers enabling quick and accurate adjustment of film thickness in 10 micron increments with ± 2 micron tolerance. The MAFIA is available in six standard widths from 50-300mm and any non-standard film width applicator can be made if required.

For further information Enter D102

Budget clean air kit for refinishers

Following great market interest in the recently launched Binks air-fed visor kit, which provides a

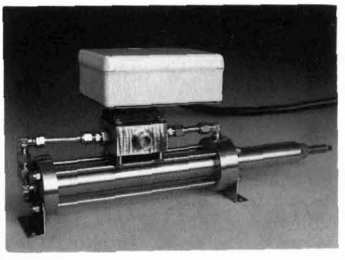
clean, fresh air supply for refinishers, a budget kit is now available. This allows all previous buyers to duplicate the supply for an additional operator.

The air-fed visor budget kit comprises a visor, belt, carbon filter and air regulator. The operator can connect his own hose to the common coalescer supplied with the original installation, which removes oil, water and all particles down to 0.01 microns.

For further information Enter D103

New Eiger electronic drive

The first of a range of "Variable Speed AC Electronic Drives" for use in Hazardous Areas has been introduced by Eiger Torrance. The unit called "EXDRIVE" features a compact, purpose designed enclosure containing an "AC Single Phase Input Inverter" with three phase output. The enclosure is a cast body to a modern design suitable for wall mounting or can be fixed from the rear to a free standing panel.



The controls include "Stop/Start" push buttons, potentiometer "Speed Control" and an optional "Run Time" control. Safety features include "Thermistor Protection" circuit for the motor and 'Overload Protection' by Electronic Current Limiting. The great advantage of the unit is that it can be mounted anywhere in the hazardous area avoding the necessity for remote mounting in safe areas.

For further information Enter D104

New in-line strainer

Russell Finex have introduced a new In-Line Strainer for enclosed straining. With its unique air operated self cleaning paddle blade assembly, the inside of the Strainer basket is continually wiped to unblock the apertures, so that pressure loss is kept to a minimum. The oversize settles in the bottom of the Strainer sump and can be removed via the discharge valve.

The unit is complete on a mobile stand which is fitted with a separate mounting plate for a diaphragm pump. Manufactured in either mild steel or stainless steel with the option of a heat jacket. Screen aperture sizes available are between 60-400 microns.

For further information Enter D105

Pipeline bandings

Pipeline identification bandings from P A T in the form of self-adhesive vinyl tapes overlaminated, with a choice from clear polypropylene or polyester, for longevity, are increased to meet BS1710.

For further information Enter D106

Meetings

13th National OCCA Symposium

The 13th National OCCA Symposium will be held on "3rd & 1st World—Coatings towards 2,000" on **3-6 October 1990** at the Lord Charles Hotel, Somerset West, Cape, South Africa. 17 papers will be presented over 2 days which include 8 overseas speakers. For further information contact: The Organising Committee, 13th National Symposium, PO Box 428, Paarden Eiland, Cape, South Africa 7420. Tel: 021 5112647, Fax 021 5119413.

Pigments/Organic Coatings

The International Conference in Organic Coatings Science and Technology will be holding the following conferences: "Science and Technology of Pigment Dispersion", Luzern, Switzerland, 5-8 June; "16th International Conference on Organic Coatings", Athens, Greece, 9-13 July. For further information contact: Dr. A V. Patsis, Institute in Materials Science, State University of New York, New Paltz, N.Y. 12561. Fax: 914 255 0978.

High Solids

The American Chemical Society Division of Polymeric Materials will hold a Symposium on High Solids Coatings on 26-31 August 1990, Washington, DC, U.S.A. For further information contact: Frank N. Jones, Polymers & Coatings Dept., North Dakota State Univ., Fargo, ND 58105, U.S.A.

Radiation curing of polymers

The N. W. England Industrial Division of the Royal Society of chemistry will hold a symposium on Radiation Curing on 12-14 September 1990 concurrent with an exhibition in Manchester. For further information call Mrs E. Wellingham on 0272 853311.

NEWCASTLE STUDENT SEMINAR
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Literature

European printing ink report

Despite ever soaring raw materials costs, vicious competition and over-production in Europe, the printing ink industry has achieved growth in line with the European economy. This is one of the conclusions reached in IAL's comprehensive report on the European printing inks market. IAL estimates the European market for printing inks in 1988 at 525,000 tonnes. The market is forecast to grow at an average of 3.3% p.a. to reach a volume of nearly 618,000 tonnes in 1993 (see tables).

The four volumes of the report cover the markets in France, Germany, the UK and in other European countries and are now available from IAL Consultants Ltd at 14 Buckingham Palace Road, London SW1W 0QP, Tel 01-828 5036, and cost £1,125 each or £4,000 for the complete report.

The 1988 European market subdivided into major ink types

Ink Type	tonnes
News Ink	95,000
Offset	132,000
Flexography	99,000
Gravure	167,000
Other plus sundries	32,000
Total	525,000

Estimated consumption of printing ink by major European countries, 1988-1993

Country	1988 tonnes	1993 tonnes	Average Growth % p.a.
Germany	167,000	192,700	3.5
UK	89,600	103,900	3.0
Italy	89,000	100,500	2.5
France	65,100	80,600	4.5
Scandinavia	37,900	44,200	3.0
Netherlands	28,700	36,600	5.0
Spain	27,000	36,400	6.0
Belgium	19,700	22,900	3.0
Total	525,000	617,800	3.3

Keynote — "Paint & Varnishes", 8th Edition-1990, Price: £155.
For further information Enter D107

PIRA Flexible Packaging Materials: An Update. Price: £60.
For further information Enter D108

Decorating Plastics. Ed. J. M. Margolis. 132pp. ISBN 3-446-14698-9 Price: US$36.80 Publ. Hanser.
For further information Enter D109

Publications Catalogue — RAPRA Technology.
For further information Enter D110

People

Yorkshire Chemicals

Dr N. **Brian Smith**, C.B.E., has been appointed a non-executive Director of Yorkshire Chemicals plc. Dr Smith, aged 61, is an industrial chemist with a distinguished management career, latterly as executive Chairman of MB Group plc.

NL key appointment

NL Industries, Inc., has appointed Dr. **Lawrence A. Wigdor** President and Chief Executive Officer of KRONOS, Inc., and chairman and Chief Executive Officer of RHEOX, Inc. KRONOS and RHEOX are both wholly owned subsidiaries of NL Industries. Most recently, Dr Wigdor served as President, chief Executive Officer and Director of Huls America, Inc., a producer of speciality chemicals and plastics headquartered in New Jersey. Dr. Wigdor holds a Bachelor of Chemical Engineering degree from New York University and an MBA and PhD in Business from City University of New York.

Properties and applications of novel fluoropolymer resins

by V. Handforth, ICI Resins UK, ICI Chemicals & Polymers Ltd, PO Box 14, The Heath, Runcorn, Cheshire WA7 4QG, UK

Introduction

Fluoropolymers are renowned for their high performance characteristics such as high heat and chemical resistance, low surface energy and refractive index, high electrical resistivity and external durability.

Fluoropolymers[1] such as polyvinylidene fluoride homopolymer (PvdF) and polyvinyl fluoride homopolymer (PVF) are generally accepted as class leaders in durability for many coatings applications. However, their use as binder resins for paints and varnishes has been restricted by the insolubility of the polymers, the need for high temperatures in their application and inability to produce high gloss coatings necessary for so many industrial painting processes. Against this background, fundamental research[2,3] has led to a new range of soluble room temperature curing fluoropolymer resins with exciting potential in high performance coatings which are extremely resistant to weathering and retain their appearance over an expected life of more than twenty years. The intrinsic properties of solvent soluble fluoropolymers enable the coatings formulators to select types based on specific application criteria and within confidence limits established by fluorocarbon technology. Their ability to resist degradation by the elements and provide consistently reliable performance across a range of surfaces are an attractive feature for supplier and end user alike. The wider use of soluble fluoropolymers in many markets is forecast as their unique properties and quality become truly recognised by the coatings manufacturers.

Structure

The advanced properties of soluble fluoropolymers can be more easily explained by examination of the molecular structure (Figure 1). The polymers are amorphous copolymers in which fluoro-olefin and vinyl ethers alternate regularly along the polymer chain where their distribution is a vital key to excellent weatherability. The chemically stable fluoro-olefin units in the alternating sequence protects the less stable vinyl ether groups from acid and base attack. Other structural features provided by choice of vinyl ether groups contribute to hardness or flexibility, compatibility with pigments and reaction partners depending upon pendant functional groups. For instance, hydroxy alkyl vinyl ether is necessary for good adhesion and reactivity with isocyanates and cyclo alkyl vinyl ether imparts good solubility in organic solvents. Within the available range, carboxylated variants give better pigment dispersion properties than non carboxylated copolymers.

Figure 1

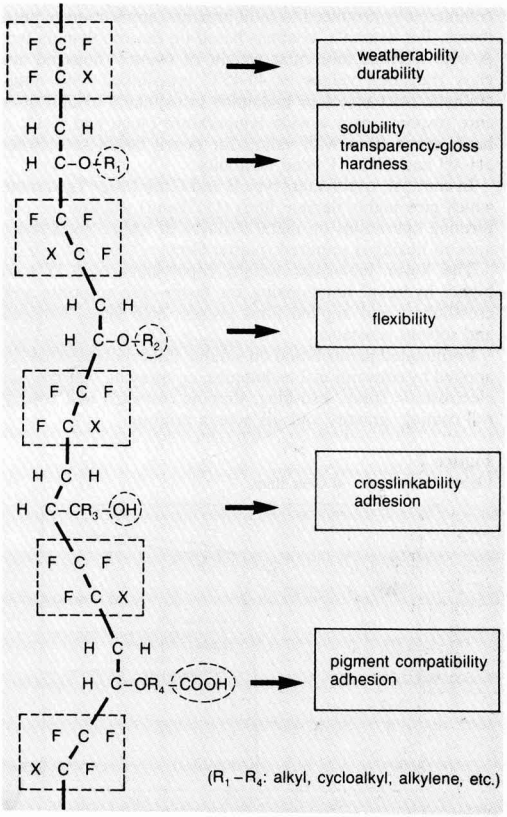


Table 1
Soluble fluoropolymers typical properties

	Applications			
	A	B	C	D
Properties	Architectural, Heavy Duty and Plastics Coatings	Coil Coatings for Steel and Aluminium	Flexible Coatings for Plastics	Automotive OEM Refinish Coatings and Aircraft Coatings
Non-volatile content	60	40	50	65
OH value mg KOH/g solution	32	21	31	59
Acid value mg KOH/g solution	0	2	—	6.5
Viscosity (CPS) (25°C)	4,000	400	650	3,000
MOL WT (MN)	20,000	20,000	20,000	6,000
Tg °C	40-45	20	3	40-45

Properties

The fundamental properties of these novel fluoropolymers are illustrated in Table 1 where by monitoring the relative ratios of vinyl ethers, the OH and COOH group content can be adjusted to suit required curing conditions and applications. These values are representative of conventional non-fluorinated resins used for two component and single pack coatings systems in conjunction with isocyanates and melamine crosslinking resins.

The molecular weight of the polymer is a major factor in determining the application characteristics of paints, and consequently, both low and high molecular weight grades are commercially produced to fulfil principal application requirements. For example, coatings based on fluoropolymers type A with average molecular weight of twenty thousand and glass transition values of 40-45°C crosslinked with either aliphatic isocyanates or melamine crosslinkers exhibit good cure response over a wide temperature range and result in hard, tough films with values for pencil hardness between 3H-4H and 2T-3T T bend flexibility.

In contrast, copolymers type B and C are lower Tg variants which give highly flexible films (OT bend) suitable for post forming operations on metal surfaces or where good resistance to flexing is required (plastic films).

The lower molecular weight copolymers type D have higher hydroxul functionality for faster cure response with crosslinkers and applied films possess high gloss, hardness and solvent resistance.

Formulated paints based on soluble fluoropolymers can be applied by conventional techniques, eg spraying – airless and electrostatic spray, brushing, dipping, forward and reverse roll coating, gravure and silk screen printing.

Figure 2
Light transmittance of clear films

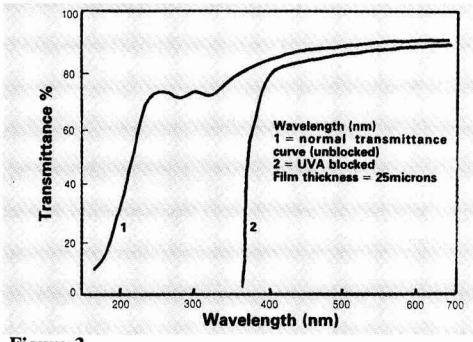


Figure 3
Accelerated weathering – molecular weight varied

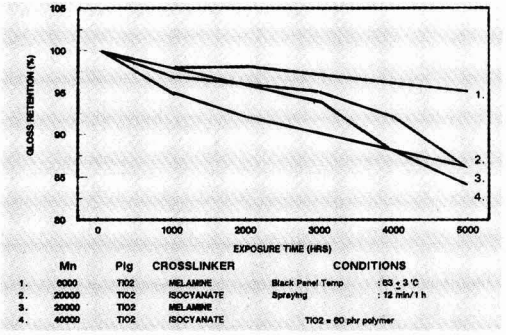


Figure 2 illustrates that fluoroethylene copolymers are highly transparent to a broad range of wavelengths in the visible and UV region. This property confers good weatherability with retention of high gloss and image clarity of the formulated product. Light transmission of the clear polymer can be prevented by utilisation of UV blocker for maximum protection of low weather-resistant base materials. These properties are important for production of metallic clear coatings, plastic overlacquers and top coats over conventional paint systems.

Figure 3 exemplifies the excellent weatherability of Titanium Dioxide pigmented fluoropolymers of different average molecular weights tested by Carbon Arc weatherometer (ASTM G23) for over 4,000 hours. The plots demonstrate some small variations in gloss retention values between the wide range of molecular weights and type of crosslinker with constant pigment type. These small differences are attributable to pigment wetting and compatibility characteristics of each type of fluoropolymer. These results are fairly constant for the range and with careful pigment selection and formulation optimisation the formulator can meet high standards of performance for a variety of applications by matching fluoropolymer with specified film properties.

Figure 4 shows the gloss and colour retention performance of various coloured pigmentations where equally high performance standards are maintained. These accelerated weathering tests have been reinforced by data obtained from EMMAQUA studies (Figure 5) which predict that soluble

Figure 4
Accelerated weathering – coloured pigmentations

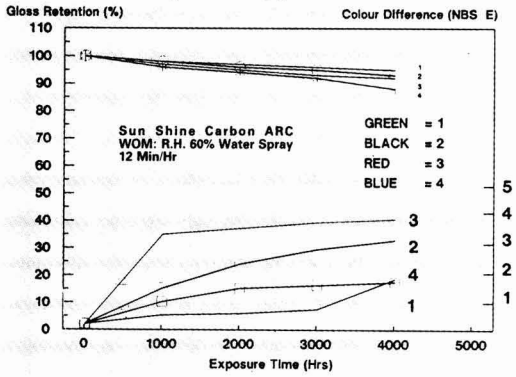
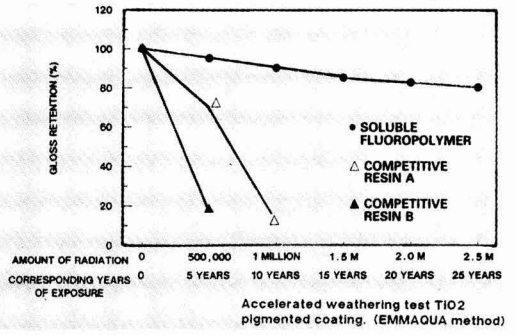


Figure 5
The accelerated weathering test using the sunlight convergence (EMMAQUA method) has revealed that soluble fluoropolymers retains 80% of its initial gloss after being exposed to radiation of 2.5 million Langleys, corresponding to 25 years of sunlight exposure



fluoropolymers retain about 80% of their initial gloss after exposure to 2.5 million Langleys, corresponding to 25 years of sunlight exposure. These results combined with real life exposure studies confirm the fundamental quality of these materials.

The versatile use of these copolymers becomes obvious from examination of their adhesion characteristics (Table 2) on a wide range of substrates, eg aluminium, copper, stainless steel, plastics such as PVC, nylon and acrylic.

Applications (Figure 6)

This innovative technology provides the coatings technologist with a range of grades suitable for many types of surface finish where superior gloss retention and colour stability are prime factors in product selection.

Although room temperature curing is a special feature of these systems, they are equally responsive to thermal curing cycles from low bake to high bake (shock curing). For example, airless spray coatings applied to Aluminium preformed cladding sheets can be force dried at 120°C peak metal temperature (pmt) for 20-30 minutes to give a hard, resilient finish ready for shipment. Alternatively, coil coating formulations applied to primed galvanised steel or aluminium cure in 30-60 seconds at 230-240°C peak metal temperature.

The durability and stain resistant features are obtained by reaction of the hydroxy groups of the fluoro-olefin with

Figure 6
Applications profile

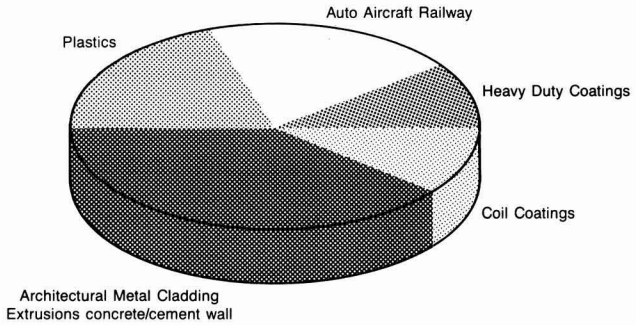


Table 2
Adhesion[1] to various substrates

	Substrate	Surface treatment	Isocyanate cured 7 days @ 25°C	Melamine cured 30 min @ 140°C	Commercial 2 pack
METAL	Galvanised steel	Phosphoric acid	100/100	50/100	100/100
	Copper	Degreased	100/100	100/100	50/100
	Aluminium	Degreased	100/100	10/100	100/100
		Chromate Pretreatment	100/100	100/100	100/100
	304 Stainless steel	Degreased[2]	50/100	10/100	10/100
		Degreased[3]	100/100	50/100	50/100
GLASS	Float	Degreased	100/100	10/100	100/100
		Silane primer	100/100	100/100	100/100
PLASTICS	Unsaturated polyester FRP	Degreased	100/100	100/100	100/100
	Epoxy	Degreased	100/100	100/100	100/100
	Polyurethane	Degreased	100/100	100/100	100/100
	Acrylic	Degreased	100/100	—	100/100
	Nylon 6	Degreased	100/100	—	100/100
	Rigid PVC	Degreased	50/100	—	50/100
		Urethane primer	100/100	—	100/100
	Polypropylene	Corona discharge	100/100	—	100/100

(1) cross hatch 10 x 10
(2) bright annealed
(3) cold rolled, acid treated

urethane of melamine crosslinkers which can be adjusted to suit manufacturers specifications. The lower molecular weight carboxylated variants contribute to good pigment dispersion and colour enhancement which provide a distinguished finish for automotive, railway and aircraft coatings.

Thanks to its unique characteristics fluoroethylene copolymers can be used in a wide variety of applications. In the Building and Construction industry, typical roof and wall cladding materials use a variety of surface finishes related to cost and performance with specifiers often demanding longer warranties and guarantees for the complete system. Fluoropolymer coatings continue to find acceptance despite their cost premium as performance requirements tighten.

On a practicable level, spraying, levelling and recoatability properties of these fluoro resin systems are consistent with industry standards allowing simple integration on production lines. When coatings manufacturers are faced with product selection demanding the highest quality and performance on concrete, steel, aluminium and other materials, soluble fluoropolymers offer engineered answers to reliable maintenance free finishes.

New applications for fluoropolymer coatings include developments in polymer technology for

- ☐ water based systems
- ☐ high solids systems
- ☐ radiation cured systems

where their enhanced weathering properties combined with other beneficial features make them an attractive option for the future.

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Current trends and developments in MF resins for surface coatings

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Synopsis

Amino resins were first used in industrial paints some 50 years ago and, therefore, it may be surprising that developments are still taking place. Throughout this time major developments in paint technology have occurred and amino resins have developed to meet the changing and ever-increasing demands made of them. That these demands have been met successfully is confirmation of the versatility of the resin chemistry and indeed this chemistry is not yet exhausted.

The paper will attempt to review developments in etherified melamine formaldehyde resins, from butylated to methylated resins, and will illustrate the use of methylated resins in high performance and high solids coatings.

More recently, it has been found possible to modify the balance of properties of melamine resins yet again by etherification with a mixture of alcohols, and the benefits to be gained by using these newer resins will be discussed.

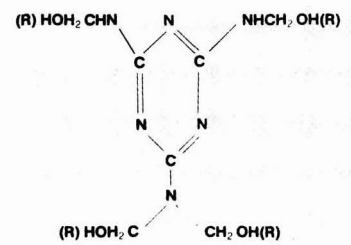
The use of melamine resins in industrial stoving finishes was established approximately 40 years ago and effectively replaced the use of nitrocellulose based paints, particularly in automotive finishes.

These resins are extremely versatile and adaptable for use with many different types of oil-modified alkyds and other film formers:

1. External plasticisers.
2. Oil modified alkyds.
3. Epoxy resins.
4. Acrylics (solution & NAD).
5. Saturated polyesters.

The reason for this can be appreciated by reference to the structure of a typical melamine resin. Consider a typical melamine resin of fixed composition, say tetra methylolmelamine as shown in Figure 1.

Figure 1
Tetramethylolmelamine



The degree of etherification may be progressively increased by substituting successive methylol groups with the butoxy radical. As this occurs the properties change in a way as shown in Figure 2. As the viscosity decreases, the degree of polymerisation increases, as does stability, consequently reactivity reduces and therefore softer paint films result. Increasing etherification gives better compatability with many polymers and with hydrocarbons and this improved compatibility will normally give better gloss. Increased flexibility and distensibility is achieved with increasing etherification, due to reduced reactivity and hardness. It can be seen that a pattern emerges when certain combinations of properties go together. The normal procedure is to select the particular property which was most important and hope the other properties were acceptable. Thus, high reactivity normally gives lower compatibility and gloss, but high viscosity. This situation was tolerable with oil-modified alkyds, but as demands for a higher film performance grew the combination of properties available was just not satisfactory. Further development work showed that it was indeed possible to change the combination of properties and today resins with high reactivity and good compatibility are available. Solvent tolerance is a useful measure of compatibility and the general relationship between reactivity and tolerance, degree of etherification, is seen in Figure 3. Resins within a family follow a well defined curve, but a major departure from standard properties is shown by BE.683, which probably demonstrated the highest reactivity and compatibility achievable from a butylated melamine resin.

Figure 2
The effect of etherification on resin and paint properties

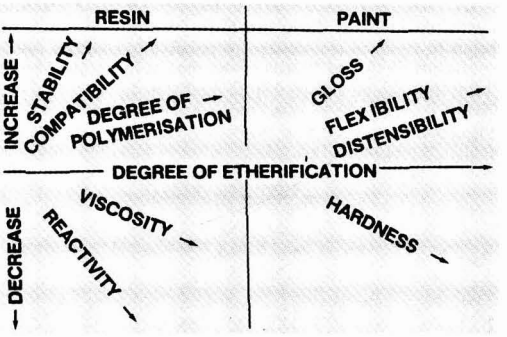
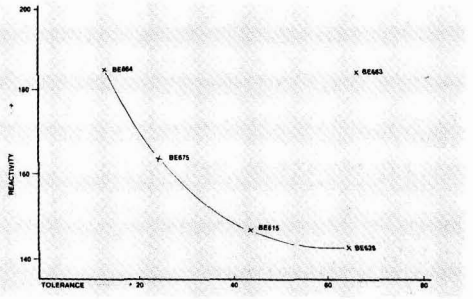


Figure 3
Comparison of reactivity against solvent tolerance



Methylated melamine resins

To extend the properties of amino resins even further requires further changes to the resin chemistry. Several years ago hexamethylated hexamethylolmelamine (HMMM) was introduced, and this represented a major breakthrough in amino resin technology. Surprisingly HMMM was first prepared in 1941, where at that time it was something of a curiosity. There was no economic process for its manufacture and no real application was identified, particularly because of the necessity to be catalysed to cure the film. HMMM was a

* Retired, BIP Contact: Mr D. L. W. Tucker.

resin looking for an outlet. This outlet eventually came with the introduction of saturated polyesters and coil coating. A family of methylated resins has developed from HMMM and these are amongst the latest developments in amino resins.

The methylated range of melamine resins have a number of advantages compared with the butylated melamines, but for the purpose of this paper I will content myself by highlighting the five main ones:

1. High solids — low viscosity.
2. Good compatibility.
3. High performance.
4. Cost effective.
5. Water miscible.
6. Stability.

(1) High solids — low viscosity

There is increasing demand for high solids paints and to achieve high solids it is essential that the viscosity of the individual components should be as low as possible. Figure 4 shows the solids/viscosity relationship for a number of resins and clearly illustrates the lower viscosity of methylated resins, compared to even the lowest viscosity butylated melamine resin. Generally the more highly methylated and methylolated resins have the lower viscosity. By diluting resins to a common viscosity it is possible to compare solids contents directly and Table 1 shows the significant increase in solids that can be achieved from methylated resins.

Figure 4
Resins solids/viscosity relationships

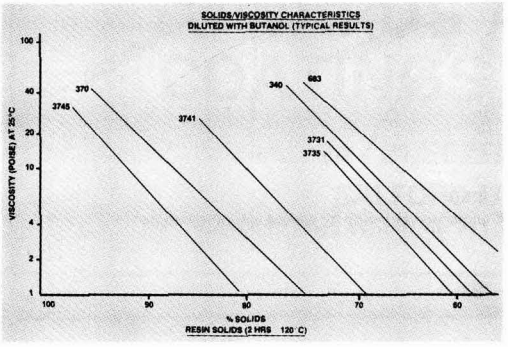


Table 1
Relative viscosities of melamine resins

		% solids at 2 poise
BE 615	Standard butylated	45
BE 683	"High solids" butylated	55
BE 340	Part-methylated	60
BE 370	Hexamethoxymethyl	75

(2) Good compatibility

Methylated resins generally show better compatibility properties than butylated resins with HMMM being outstanding, so much so that it can be added to some paints as a reactive solvent to behave like a coupling solvent. The consequences of this excellent compatibility is to increase the scope for formulating, and to give high gloss films. The reasons for the good compatibility of methylated resins is partly because the side chain is less bulky methyl compared to butyl, and also because of the particular manufacturing technique used for their preparation which results in materials with a lower degree of polymerisation.

Figure 5 shows the structure of HMMM to which commercial resins approximate, and this in contrast to Figure 6 which shows the type of molecule which is present in a typical butylated melamine resin.

Figure 5
HMMM

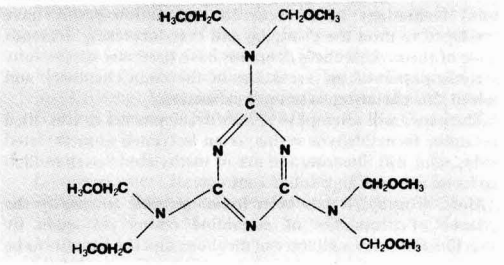
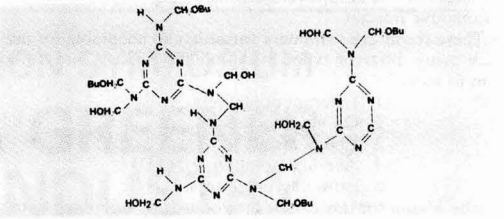


Figure 6
Type of molecule in a typical butylated melamine



(3) High performance

Film properties are developed by the formation of crosslinks involving reaction of the amino resins with reactive groups on the film-forming polymer, as shown in Figure 7. In practice resins also react with themselves to form brittle areas. Methylated resins, particularly fully methylated products, show less tendency to homo-polymerise as Figure 8 shows and, therefore, it is possible to achieve tougher, more flexible films. Where optimum chemical resistance and hardness are required it is often necessary to sacrifice flexibility when using butylated resins, but by using fully methylated resins an excellent balance of properties can be achieved.

Figure 7
Crosslinking leading to film formation

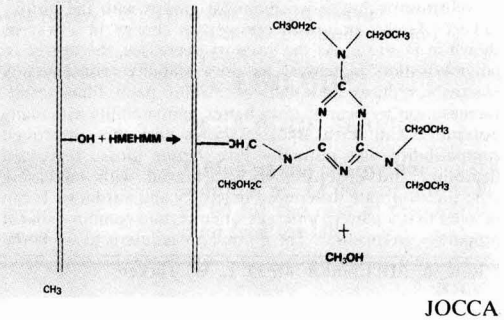
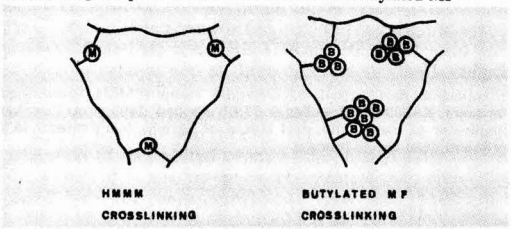


Figure 8

Crosslinking comparison between HMMM and butylated MF



(4) Stability

The methylated melamine resins currently available exhibit superior stability to the butylated types, this applies particularly to the HMMM types which of course require the addition of a catalyst, e.g. PTSA, or DNNDSA. However, even after addition of the catalyst the can stability is still good and in most cases superior to that of butylated.

(5) Cost effective

The improved technical performance of methylated resins has been illustrated and, therefore, it will be surprising to learn that methylated melamine resins are actually cheaper than butylated melamine resins. Additionally, they are more cost effective. For general industrial finishes there is often no specification for film thickness and therefore to make a paint as cheap as possible a high viscosity resin is preferred, so that the maximum amount of solvent can be added. However, where the requirement is for a specified dry film thickness, the cost effectiveness of the paint has to be assessed by establishing the cost of a unit volume of cured resin, and to do this volume solids must be measured and costed.

The cost efficiency of a methylated melamine was compared with that of a butylated resin in the following way. Simple lacquers were prepared from a saturated polyester resin in combination with both a methylated and butylated melamine resin at 70:30 solids ratio. Solvent was added to spraying viscosity. The volume solids of each lacquer was measured, using the PMA recommended method and from the results the amount of lacquer required to give 100 parts of solids by volume was calculated. For the example chosen the formulations are given in Table 2 where it can be seen that 20% less of the lacquer based on methylated resin is required. This difference is not a function of the resins' solids or viscosity difference, it is a real reduction and results from the reduced losses in condensation products when the lacquer containing methylated resin is cured. This is because methanol is much smaller than butanol (32 : 74).

Table 2

Weights of lacquers to give 100 parts cured volume solids

	Lacquer A		Lacquer B	
	(1)	(2)	(1)	(2)
BA 500	122.5	85.8	136.9	95.8
BE 3745	36.8	36.0		
BE 683			54.7	44.6
3/1X-B	39.8		48.6	
Total	199.1	121.8	240.2	140.4
Cured Vol. Solids	100		100	

(1) as supplied (2) Resins Solids (Vacuum)

(6) Water miscible

The final unique feature of methylated resins to note is their water miscibility. In some cases the resins are dilutable with water on their own, whilst others require the presence of a coupling solvent as Table 3 shows.

Table 3

Water tolerance † = infinitely dispersible

As Supplied		+I.P.A.
BE340	>100†	>100†
BE3731	>100†	>100†
BE3735	> 20	>100†
BE3741	> 4	>10.8†
BE370	>100†	>100†
BE3745	>1.3	>11.7†

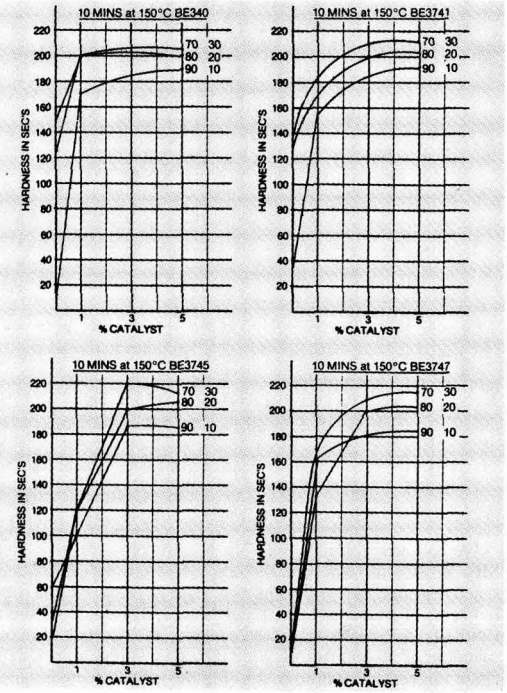
Following on the development of the HMMM resins which, because of their extremely good flexibility and distensibility properties, found and continue to find their main use in the coil coating market. There was, however, still a demand for more reactive methylated resins for use in some of the coil coating lines, where the stoving schedule may not be sufficient to obtain the best properties from an HMMM/polyester system. There is also another highly technically demanding application, can coating, which required more highly reactive resins than the HMMM types, but still retaining most of the attributes of HMMM.

So the methylated family continued to grow with the development of the part methylated range of MF resins.

The advantage of using the part-methylated MF resins was in the main their greater reactivity compared to HMMM types and the ability to obtain a good cure without the necessity of having to use a catalyst, or less catalyst than with HMMM. Figure 9a compares the film hardness of clear

Figure 9a

Comparison of film hardness of clear lacquers (see text) — curing 10 minutes at 150°C



lacquers based on a fully saturated polyester resin, at three different polyester to MF solids ratios, these were 70:30, 80:20 and 90:10, with catalysts additions of zero, 1, 3 and 5%. These lacquers were applied to a given film thickness and stoved at several different stoving schedules. For the purposes of this paper I have selected 10 minutes at 150°C. The melamine resins used were part-methylated resins BE.340 and BE.3741 and HMMM resin BE.3745 and BE.3747. The hardness of the cured films were measured using the Koenig pendulum. As you will see from the graphs all the tests exhibited a similar pattern in that the lacquers containing no catalyst, the part-methylated types, particularly at the ratios of 70:30 and 80:20, were more reactive but as the catalyst addition increased up to 3% and with the higher concentration of MF there was little to choose between the part-methylated and the fully methylated. The purpose of showing these particular graphs is twofold:

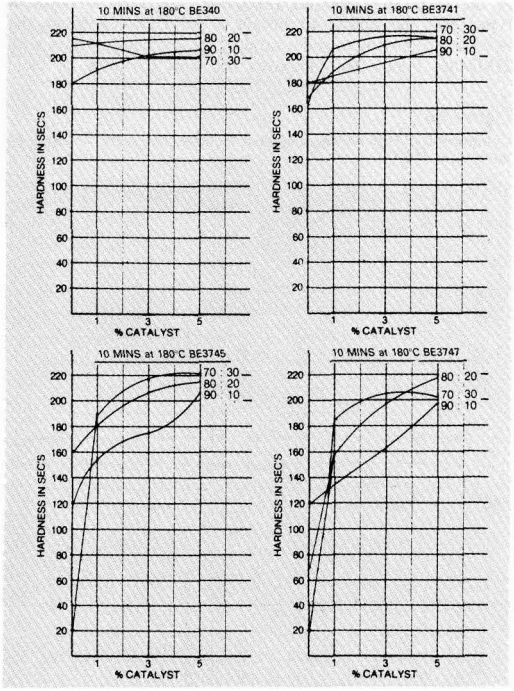
(1) to demonstrate the greater reactivity of the part-methylated resins, without catalyst additions, and

(2) to illustrate that with the use of a suitable catalyst the fully methylated MFs with films of comparative hardness and of course because of their structure the films would have superior mechanical properties.

Also shown in Figure 9b is the same lacquers curing for 10 minutes at 180°C.

Figure 9b

Comparison of film hardness of clear lacquers — curing 10 minutes at 180°C



We had now gradually built up a family of part-methylated MFs possessing different degrees of water miscibility and reactivity and the following two figures compare the film hardness of six different part methylated MFs used at a solids ratio of 75:25 with an oil free alkyd and using a stoving schedule of 30 minutes at three different temperatures. It is again interesting to note that in Figure 10, where no catalyst has been used there are very significant differences in film hardnesses, but in Figure 11 the lacquers have been catalysed and the differences in film hardnesses are not so great and the order of hardness has changed in some cases.

Figure 10

Comparison part methylated melamine resins (PMM): uncatalysed lacquers BA500/PMM solids = 75/25 applied 100μ wet film bar applicator to clean mild steel stoved at various temperatures in a gradient oven for 30 minutes

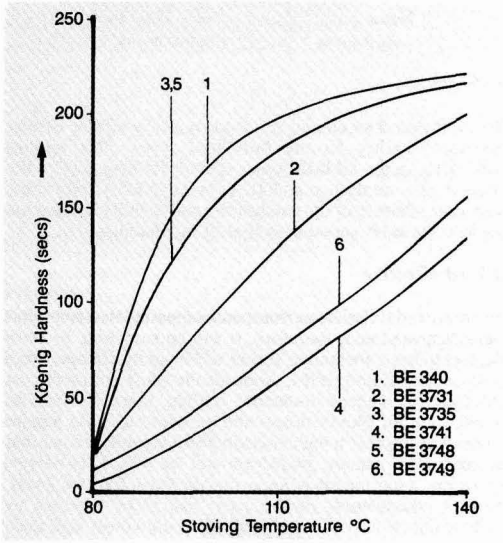
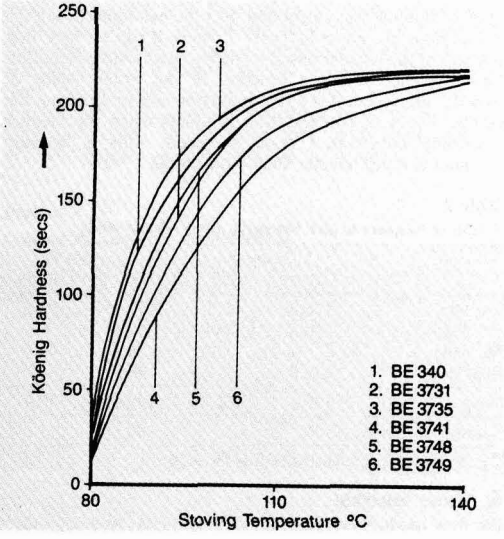


Figure 11

Comparison part methylated melamine resins (PMM): catalysed lacquers BA500/PMM solids = 75/25 applied 100μ wet film bar applicator to clean mild steel stoved at various temperatures in a gradient oven for 30 minutes



Before going on to the next generation of MF resins, it is of interest to just look at another comparison, Tables 4 and 5 which we carried out, again using an OFA as the plasticiser and a butylated MF resin BE.683 in comparing these with two part-methylated MF resins BE.3748 and BE.3749, again with an without catalyst and at three different stoving schedules and again you will see the improved performance of the methylated resins when using a catalyst.

Finally, I would just like to refer breifly to the next generation of methylated resins — the methyl/butyl ethers. This family of resins are much less reactive than either the HMMM or the part-methylated types and require the addition of a catalyst to obtain a good cure and to capitalise on the excellent properties of this type of resin. The advantages of the mixed ether resins compared to other methylated resins are:

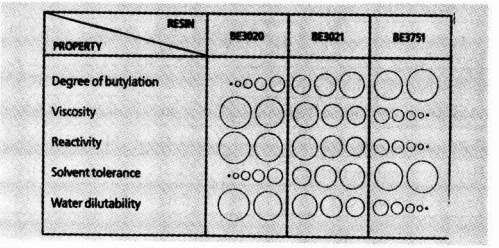
- ☐ Intercoat adhesion.
- ☐ Flow, levelling.
- ☐ Crater resistance.
- ☐ Stability.

We have developed three mixed ether resins. BE.3020, BE.3021 and BE.3751. Table 6 illustrates the difference between these resins and Table 7 details the typical properties which are obtained with the three resins under discussion.

Table 8 gives a comparison of the physical properties of HMMM resin BE.3745 and three mixed either resins, and the advantages of the solids viscosity relationship of the mixed ether resins is worthy of note.

In terms of reactivity Figure 12 demonstrates the superior reactivity of the part-methylated MF resins over the fully methylated and mixed ether resins in uncatalysed lacquers. However, as I hope I have illustrated we can once again demonstrate that by using a small addition of catalyst the superior properties of the lower reactivity resins can be capitalised on without detriment to stability.
Table 9.

Table 6
Trends in properties of mixed ether resins



Conclusions

I have tried to give a very broad outline of the evolution of amino resins over the years, with emphasis on the gradual changes that have been made to cater for new polymers as they have been introduced. The versatility of the amino resins is undoubtedly the key to their continuing success and I am confident that the changing requirement of the industry will continue to be met. Methylated resins represent the latest generation and their full potential is, I am sure, nowhere near fully exploited, particularly in high solids and water-based systems. Hybrids of butylated, methylated resins are already in use and I am sure will continue to grow and will be the basis of further developments in the future.

Table 4
Film performance — uncatalysed paints

	BA501/BE3683			BA501/BE3748			BA501/BE3749		
Stoving Temp °C									
Test	170	180	190	170	180	190	170	180	190
Film Build (microns)	25-30	25-30	25-30	25-30	25-30	25-30	25-30	25-30	25-30
Koenig Hardness (secs)	160	160	162	177	184	186	141	161	175
Gloss 60° (%)	83	72	64	93	92	90	93	83	78
Distensibility (mm)	9.50	6.10	3.90	7.10	6.20	5.60	9.70	9.10	8.00
Reverse Impact (cmKg)	<10	<10	<10	<10	<10	10-20	<10	40-50	90-100
Cross Hatch Adhesion (% Adhesion)	100	99	90	100	98	98	100	100	100
Acetone Double Rubs	12	33	63	32	69	108	9	12	50

Table 5
Film performance — catalysed paints

	BA501/BE3683			BA501/BE3748			BA501/BE3749		
				Stoving Temp °C					
Test	170	180	190	170	180	190	170	180	190
Film Build (microns)	25-30	25-30	25-30	25-30	25-30	25-30	25-30	25-30	25-30
Koenig Hardness (secs)	171	173	175	195	196	196	193	194	195
Gloss 60° (%)	87	78	76	95	90	90	94	93	89
Distensibility (mm)	5.20	4.90	4.00	6.70	6.10	6.70	6.50	6.40	6.20
Reverse Impact (cmKg)	<10	<10	<10	170-180	110-120	90-100	<200	170-180	160-170
Cross Hatch Adhesion (% Adhesion)	100	100	100	100	100	100	100	100	100
Acetone Double Rubs	180	<200	<200	<200	<200	<200	<200	<200	<200

Table 7

Typical properties of mixed ether resins

Property	Resin BE3020	BE3021	BE3751
% Solids (2hr at 120°C)	95.6	96.9	98.0
Viscosity at 25°C (poise) Brookfield	8.36	6.20	5.37
Water dilution (ml/5g)	23.4	14.3	7.5
Heptane tolerance (ml/5g)	25.5	>100	>100
Acid Value (mgKOH/g)	0.02	0.02	0.04
% Free formaldehyde	0.16	0.15	0.11

Table 8

Physical properties — mixed ethers

	BE3745	BE3020	BE3021	BE3751
Solids % 2L at 120°C	97	95.6	96.9	98
Viscosity Poise at 25°C	33	8.4	6.2	5.4
Solids % At 2 Poise	83	88	90	90
Free Hcho %	0.2	0.16	0.15	0.11

Figure 12

Comparative reactivity of methylated and mixed ether melamine resins

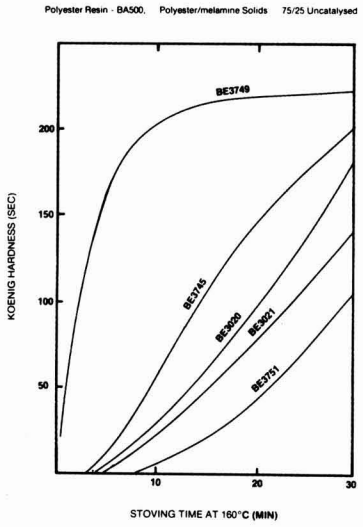


Table 9

Polyester BA500/mixed ether melamine paints for general technical applications

Paint Characteristics

Ratio solid polyester/solid melamine - 75:25
Ratio pigment/total solid binder - 0,3:1.0

Application

Spray applied to clean mild steel panels at 40lb/in^2 using a conventional gravity feed spray gun.
Spray viscosity = 30 seconds Ford No.4 cup at 20°C
Catalyst = 10% DNNSA solution at a 1.5% level on total paint
Flash off time = 15 minutes at 20°C
Stoving schedule = 15 minutes at 180°C

Typical film properties

	'Beetle' Amino Resin				
Test	BE3745	BE3749	BE3021	BE3751	BE3020
Film Build (microns)	25	25	25	25	25
Koenig hardness	200	212	193	189	197
Reverse impact (cmKg)	>200	>200	>200	>200	>200
Cross hatch adhesion (%)	100	100	100	100	100
Acetone rubs (double)	>200	>200	>200	>200	>200
Impact resistance (3 washer)	Fail	Fail	Pass	Pass	Pass

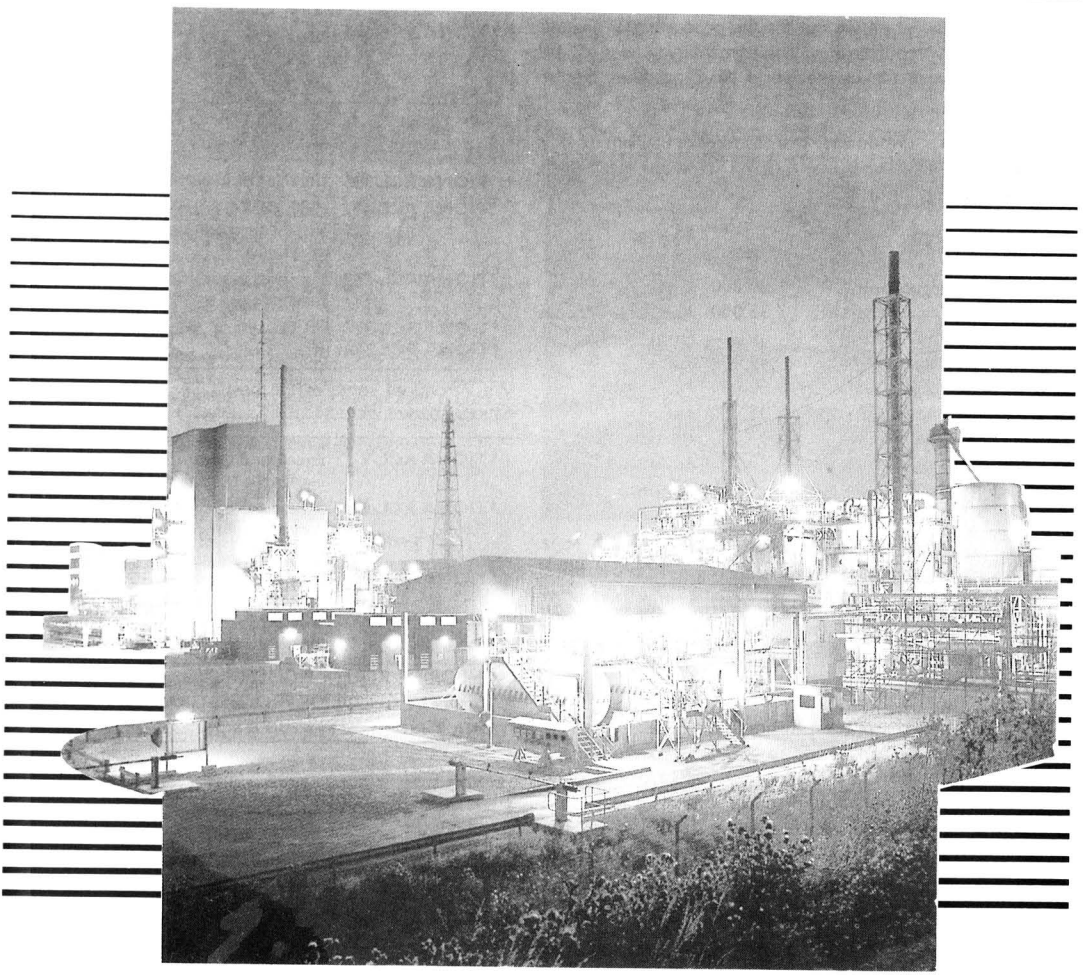
■

Paper presented at the 12th National OCCA Symposium, Sun City, South Africa.

TiONA®

YARSLEY QUALITY ASSURED FIRM BS 5750

NATIONAL ACCREDITATION OF CERTIFICATION BODIES



SCM® CHEMICALS

SETTING THE STANDARD IN TiO_2

SCM Chemicals is a major international chemical company (part of the Hanson Group) with a current world ranking of No. 3, in titanium dioxide volume. SCM Chemicals operates at the leading edge of technology through its chloride process for rutile titanium dioxide and advanced surface treatment chemistry.

All our major expansions have been into the advanced chloride process, which is the preferred route for high quality rutile titanium dioxide pigments. Our contractions have been in the sulphate process, which we use for the production of anatase pigments and vitreous enamel, non-pigmentary grades. These expansions have made us the world No.2 producer by the chloride route.

SCM Chemicals is a world-wide manufacturer of titanium dioxide pigments with eight plants operating on three continents with nameplate production capacities shown below:-

Process	Location	Volume (Tonnes)	Type
Chloride	Stallingborough UK	85,000	Rutile
Sulphate	Stallingborough UK	35,000	Anatase & Vitreous Enamel Grades
*Chloride	Ashtabula I USA	45,000	Rutile
Chloride	Ashtabula II USA	65,000	Rutile
Chloride	Baltimore USA	49,000	Rutile
Sulphate	Baltimore USA	64,000	Anatase
Chloride	Kemerton, W. Australia	70,000	Rutile
Sulphate	Bunbury, W. Australia	30,000	Anatase
* Scheduled expansions in 1991 to a further		53,000	Rutile
TOTAL PRODUCTION		**443,000 (1990) 496,000 (1991)**	
TOTAL CHLORIDE PRODUCTION		**314,000 (1990) 367,000 (1991)**	

SCM Chemicals international expansions in the preferred chloride route for rutile titanium dioxide have been successfully made possible by a combination of our high technology chloride process know-how, sophisticated surface treatment chemistry, Group resources of dedicated people and financial backing across the world. SCM Chemicals investment in its people and its product extends to its investment in protecting the environment. Further investmnent is scheduled for the environmental protection of our older sulphate processes.

The SCM Chemicals titanium dioxide achievements - 'The TiONA® Story' is one of steady and powerful growth and improvement. We brought our expansions on stream quickly and efficiently, when our customers most needed the support. During the years of titanium dioxide shortages we kept to our programme of product improvement and the introduction of new and improved products viz:-

***TiONA RCL-628**	Superdurable pigment.
***TiONA RCL-69**	Specialist plastics grade for high temperature processing.

We generated a significant performance boost to our established grade range:-

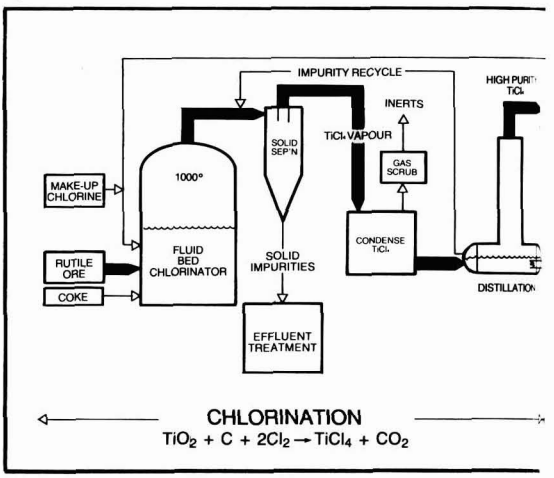
***TiONA RCL-535**	Durable multi-purpose high gloss grade.
***TiONA RCL-472**	Highly durable grade with excellent properties for powder coatings and a wide range of coating systems.
***TiONA RCL-552**	High gloss pigment (decorative and industrial systems).
***TiONA RCL-376** *TiONA RCL-388	Flat latex grades (good film cohesion and dry -hide).

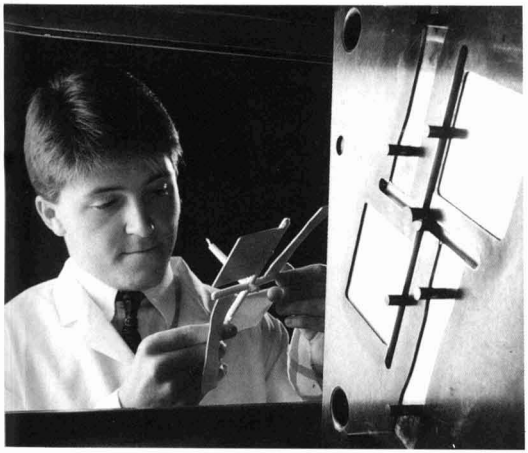
We introduced some of the best USA grades into the international market with:-

***TiONA RCL-9**	Excellent dispersion, colour opacity, widely used in the USA market.
***TiONA RCL-6**	Superdurable, multi-coated pigment for a very low photocatalytic activity in auto and coil coatings.
***TiONA RCL-4**	Specialised plastics industry grade with very high masterbatch loading and excellent all around processing properties, including high temperature processing.

*CHLORIDE ROUTE PIGMENT (N.B. All SCM TiONA rutile pigments are CHLORIDE PROCESS GRADES).

TiONA ® is a registered trade mark of **SCM Chemicals.**





During this period we significantly improved our anatase:-

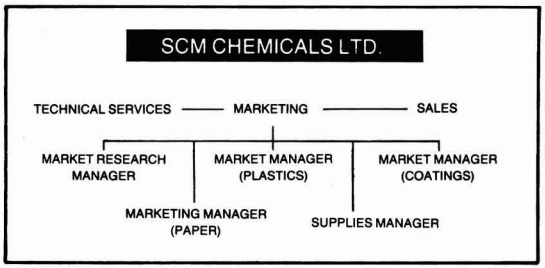
TiONA AG	**Widely approved and used in the paper and rubber industries.**
TiONA WDB	**Water dispersible anatase in the specialised BEATER BAGS for the paper industry.**
TiONA VC	**The unique SCM world leading grade for the production of Vitreous enamel frit.**

(All SCM TiONA Anatase grades are made by the Sulphate process).

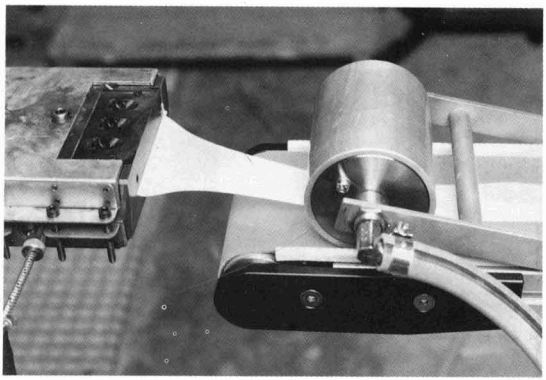
SCM Chemicals has organised its business in direct support of our customer groups. A full range of technical and service support comes built into every product and process.

The essential listening posts in SCM Chemicals are in the Marketing Department, where we can carry the customers viewpoint deep into the Company's thinking and planning. We have made new appointments and functions to serve our customers' needs and future thinking and planning viz:-

Market Manager - Surface Coatings Industries
Market Manager - Plastics Industries
Market Manager - Paper Industries



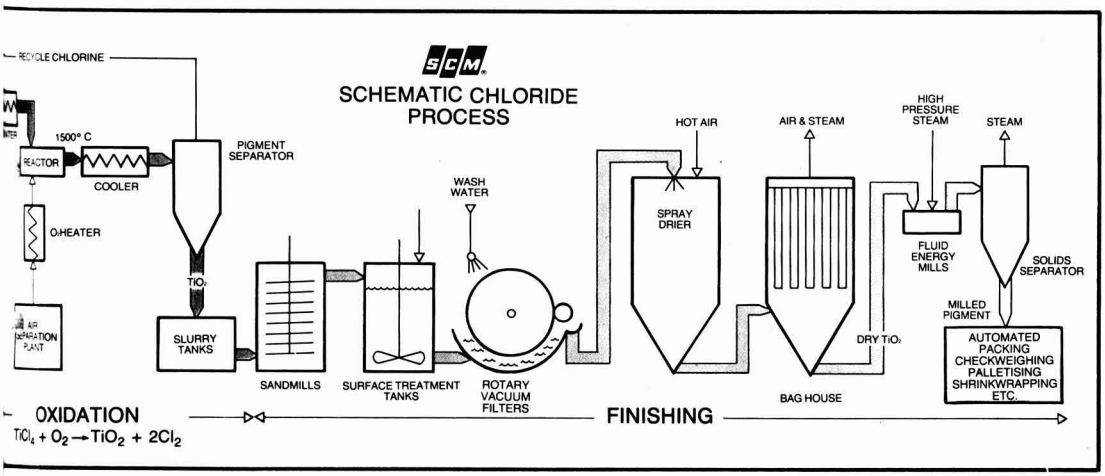
Each of these posts has direct linking with the Technical Service and laboratory support and a significant role in our strategic planning. SCM Chemicals aim is to continue the strong expansion in customer support which will bring us further growth. Much of the work we do for customer support is exclusive and confidential.



SCM Chemicals has the ***technology*** and the ***capacity*** and the ***products*** and the ***organisation***. Why not check out our ***people*** and get in touch with us.

Please help us to help you. Contact:

The Technical Services Manager,
P.O. Box 26, Grimsby, South Humberside, DN37 8DP.
Telephone: 0469 571000, Telex: 52595, Fax: 0469 571234.



SURFEX

90

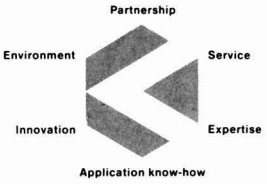
OFFICIAL GUIDE

HARROGATE INTERNATIONAL CENTRE

16 – 17 MAY 1990

Quality needs QUALITY.

But does it necessarily follow that quality needs quality? We think so. Customers who manufacture quality products need quality. Quality products + quality advice + quality service. Our customers appreciate this kind of co-operation. We offer our assistance in seeking practical solutions to special problems, a partner for your ideas. With a presence in the UK and overseas, with responsibility for the environment and for the future, the result is high grade specialities and tailor-made products – with all the qualities associated with Schering worldwide.



Quality needs quality. This is the guiding principle of Schering Industrial Chemicals Division. A principle you can count on.

Quality needs QUALITY
Schering
Industrial Chemicals

SCHERING
Industrial Chemicals

Come visit us at Surfex 90, Harrogate, 16/17th May.

SCHERING
INDUSTRIAL CHEMICALS,
Gorsey Lane,
Widnes, Cheshire,
WA8 0HE, England.
Tel No. 051 495 1989

Enter D601 on Reader Reply Card

From the Honorary Exhibitions Officer

Fred J. Morpeth

I am very pleased to introduce this Official Guide to SURFEX 90, the third in the new concept, biennial exhibitions established in 1986. Formulated after careful market study, SURFEX 86 was a cost-effective combination of the best features of theatre style and hotel bedroom shows. For the exhibitor it combined the open approachability of the one with the simplicity of the other offering a complete package of a ready-made stand inclusive of all services. For the visitor it offered a welcome return to readily accessible technical and commercial information in comfortable surroundings conducive to the renewal of old acquaintances.

The new formula has proved highly successful, each exhibition being quickly sold out to the foremost suppliers of pigments, resins, equipment and services to the surface coatings industries. SURFEX is equally popular with visitors, over 40% of whom are in senior decision making positions. The show is also an excellent opportunity for junior staff to see the breadth and diversity of the trade they have joined and to learn from contacts they would not ordinarily make.

SURFEX 90 is larger again than ever with more exhibitors and stands throughout the conference Centre and in the adjoining International Hotel. For anyone involved in development or the selection or purchase of materials, equipment and services for surface coatings I urge you not to miss the premier exhibition for your industry.

English

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Ich freue mich, ihnen einen Official Guide in SURFEX 90 geben zu können, die dritte der neuen, zwei-jährlichen Messen, die im Jahre 1986 begannen. Formuliert nach den Ergebnissen sorgfältiger Marktforschung, wurde SURFEX 86 eine preiswerke Kombination mit den besten Eigenschaften von Theater-Stil und Hotelzimmer-Ausstellung. Für den Aussteller kombiniert die Messe die offene Anpassungsfähigkeit des einen mit der Einfachheit des anderen, und bietet somit ein abgerundetes Angebot für einen Stand, der alle Dienste enthält. Für den Besucher bedeutet sie eine willkommene Rückkehr zu leicht erreichbarer technischer und geschäftlicher Information, in einer Ambienz, die es ermöglicht, alte Bekammtschaften zu erneuern.

SURFEX 90 ist auch diesmal wieder grösser als je zuvor, mit mehr Ausstellern und Ständen im Konferenzzentrum und im auschliessenden International Hotel. Für alle, die mit Entwicklung und Wahl oder Kauf von Materialien, Ausrüstungen und Dienstleistungen für Oberflächenbehandlung zu tun haben, kann ich empfehlen, diese erstklassige Industriemesse nicht zu verpassen.

German

□ □ □

J'ai le plaisir de vous présenter cette Official Guide à l'exposition SURFEX 90, qui sera la troisième des blennales nouvelle formule créers en 1986. Fruit d'une étude de marché très poussée, l'exposition SURFEX 86 a su tirer le meilleur parti de deux formules d'exposition: en hall ou en pièces individuelles. L'exposant pouvait ainsi bénéficier dé la facilité d'approche de l'une et de la simplicité de l'autre, et d' une enveloppe globale comprenant stand et services asociés. Quant au visiteur, il pouvait facilement y avoir accès á toutes les informations techniques et commerciales dans un décor agréable facilitant les reprises de contact.

L'exposition SURFEX 90 sera plus étendue que jamais, regroupant davantage d'exposants et de stands dans le Centre de Conférence et dans l'Hòtel International voisin. A tous ceux qui s'occupent du développement, de la selection ou de l'achat de matériel, équipements et services se rapportant à l'industrie des revêtements, je recommande de ne manquer à aucun prix cette exposition d'importance primordiale pour leur profession.

French

□ □ □

Me complace mucho presentar esta Official Guide de SURFEX 90, la tercera de las novedosas exposiciones bianuales establecidas en 1986. Puesta en marcha a raíz de un cuidado estudio del mercado, SURFEX 86 resultó una combinación con efectividad de coste de lo mejor de los espectáculos teatrales y de las habitaciones de un hotel. Combinaba para el expositor el enfoque abierto de unos con la sencillez de los otros y ofrecía un stand ya completo con todos los servicios. A los visitantes les ofrecía un acceso asequible a la información técnica y comercial en un ambiente cómodo, propicio para encontrarse de nuevo con conocidos de otras ocasiones.

SURFEX 90 es otra vez mayor que nunca, con más expositores y stands en todo el Centro de Conferencias, asi como en el vecino Hotel Internacional. Insto a todo el que se relacione con el desarrollo, selección o adquisición de manteriales, equipo y servicios para revestimientos de superficies a que no se pierda la exposición más importante para este tipo de industria.

Spanish

HOW TO GET TO HARROGATE

Harrogate is well placed for access by road, rail, air and sea.

By Road:

Harrogate is centrally situated within the UK. London is 200 miles to the south and Edinburgh is 200 miles to the north. The schematic map adjacent shows the major road routes to Harrogate. The West Yorkshire Road Car Company (part of the National Bus Company) provides bus and coach services to and from the Harrogate area. For coach information call (0423) 66061.

By Rail:

Harrogate is served by British Rail (Eastern Region) and trains include high speed services from Kings Cross –London to York or Leeds with local connections to Harrogate. Depending upon the connection, the journey time normally takes 2½ – 3 hours. For further information call Harrogate Station (0532) 448133.

By Air:

Leeds/Bradford Airport is situated 12 miles south of Harrogate with taxi and bus links from the airport to Harrogate. There are daily services from Amsterdam, Birmingham, Gatwick, Heathrow, Dublin and Paris to Leeds Airport.For flight information call Leeds Airport (0532) 509696.

The following air carriers operate domestic and international scheduled services:

Aer Lingus operate flights from Dublin. Enquiries (0532) 508194, Reservations (0532) 434466.

Air UK operate flights from Amsterdam, Belfast, Edinburgh, Stanstead and Paris (CDG). Enquiries (0532) 503251, Reservations (0532) 457468.

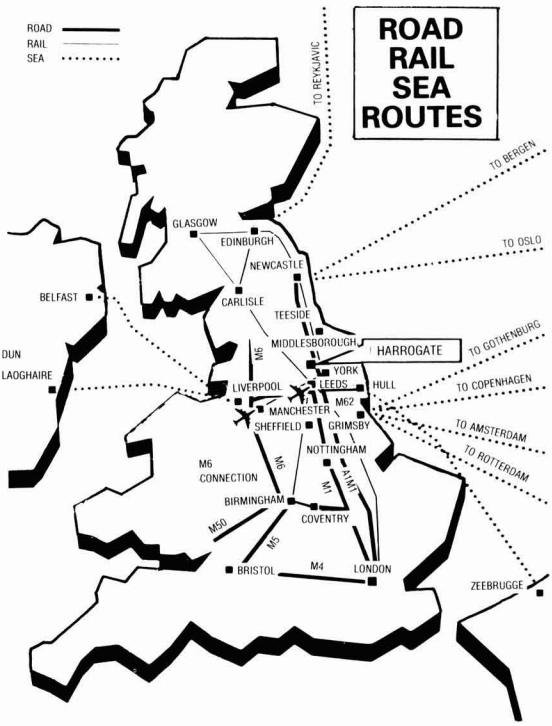
The following telephone numbers may be used when making reservations for Air UK from within Europe: France – Air France, Paris (1) 45356161, Netherlands -KLM, Amsterdam (020) 747747, Norway – SAS, Bergen (05)310950, SAS, Stavanger (04) 521566, Belgium – KLM, Brussels (02) 7207150, KLM, Antwerp (03) 2327860, West Germany – KLM, Frankfurt (069) 290401, Denmark – Cimber Air, Sondeborg (04) 422277.

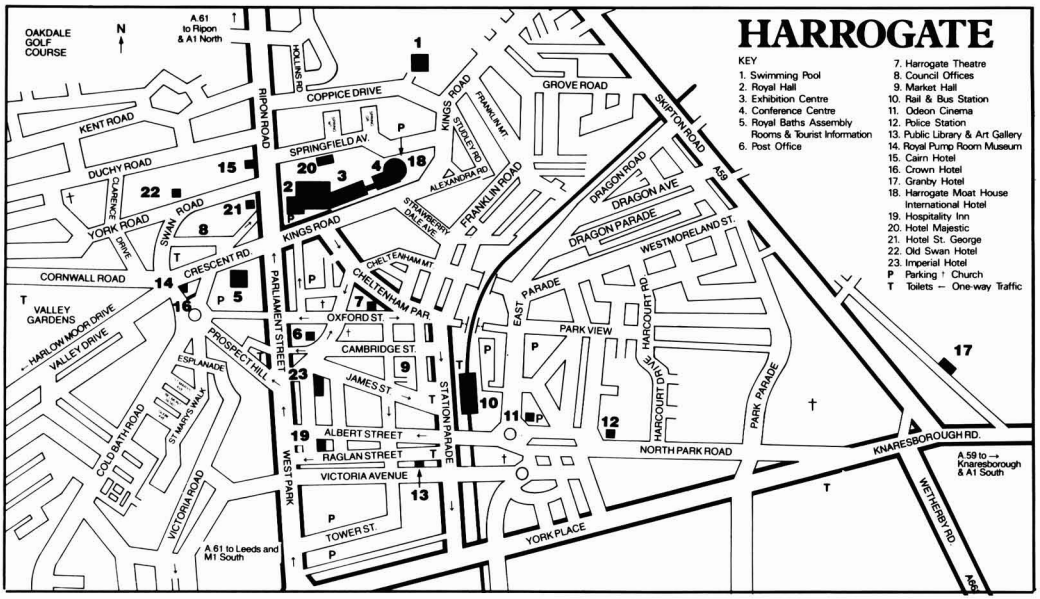
British Midland Airways operate flights from Heathrow. Enquiries (0532) 508194, Reservations (0532) 451991.

Capital operates flights from Cardiff and Glasgow. Enquiries (0532) 505650, Reservations (0532) 504992.

By Sea:

Hull is the nearest seaport to Harrogate. North Sea Ferries operate from Rotterdam (Europort) or Zeebrugge to Hull. Hull has excellent road links to Harrogate. For further information call (0482) 795141.





ACCOMMODATION IN HARROGATE

The following is a selection of the major hotels in Harrogate. All prices, which have been negotiated in conjunction with SURFEX, are per room per night and include full English breakfast, VAT and service. Bookings should be made direct with the hotel quoting the SURFEX concessionary rate.

Hotel	Tel (0423)	Dbl/Twin	Single
International	500000	75.00	54.00
Imperial	565071	65.00	55.00
Majestic	568972	70.00	50.00
Hospitality Inn	564601	70.00	60.00
Crown	567755	80.00	65.00
Old Swan	504051	82.00	65.00
Granby	566151	80.00	60.00
Fern	523866	70.00	40.00
Gibsons	522246	52.00	27.50
Langham	502179	65.00	38.00

For smaller hotels contact the Bureau (0423) 565912.

A comprehensive colour guide (50p plus p & p) to the Harrogate District, including many advertisements offering hotel accommodation, is available from the Harrogate Tourist Centre on (0423) 525666.

SURFEX DINNER

The highly successful SURFEX dinner will again feature as a major function of the Exhibition. The dinner will be held at the Majestic Hotel on Wednesday 16 May. Professor John Oakland, Bradford University will be the guest speaker. For ticket enquiries contact Peter Stanton on (0274) 308052, Fax (0274) 737058.

REGISTRATION

Enclosed with this issue is a Registration Card for SURFEX. Please complete the card and sign it prior to registration so as to avoid any delay at the registration desk. A computer-based registration system will be in operation at SURFEX.

PRIZE DRAW

As an added attraction for visitors to the Auditorium there will be a prize draw each day in the Auditorium. All visitors or exhibitors who register by 4pm each day will receive a free draw ticket. The ticket should be "posted"in the special box to qualify for the draw.

PRA SYMPOSIUM

The Paint Research Association will be holding a symposium in conjunction with the Exhibition at the International Hotel on Monday and Tuesday 14 – 15 May.The title of the symposium is "Coatings for Difficult Substrates". A registration form for the symposium is included with this issue of JOCCA.

EXHIBITOR DIRECTORY

A I Process Systems

refer to Concept to Commissioning entry

Stand D14

Abicolor Europe Ltd

PO Box 29, Birchwood,
Warrington, Cheshire WA3 7JD
Tel: 0925 765980/765039,
Fax: 0925 766747

ABICOLOR will be exhibiting for the first time at SURFEX 90.

The company, recently established in the UK is able to offer a new concept in the supply of Colour Technology to the Paint, Ink and Allied Industries.

Abicolor has developed a range of Colourants which are compatible across a wide spectrum range of resin types, giving excellent stability, colour strength, gloss and absence of surface defects. These colourants incorporate readily into bases simply by stirring and give immediate full strength colour.

Abicolor also offer Computerised Colour Matching Systems along with software "knowhow" which enables the end user to formulate their colour requirements through a pre-programmed colour computing system.

The company also markets a wide range of Mixing and Milling Equipment, which will enable the client to manufacture their own coloured bases.

Turnkey Projects are also catered for by an experienced team of project engineers.

Companies wishing to install up-to-date Colourant Plants are invited to discuss their requirements with our Technical Experts.

Stand Personnel: Alan Taylor, Walter Ollett, Nick Harkness, Hector Almazan.

Enter D421 ■

Stand G4

Akzo Chemicals Ltd

1-5 Queens Road, Hersham,
Walton-on-Thames, Surrey
KT12 5NL
Tel: 0932 247891,
Fax: 0932 231204, Tlx: 21997

The Akzo Chemicals' stand will display their full range of chemicals for coatings applications.

Main products will include Epilink® Epoxy Curing Agents where Epilink R8088 will be featured as a significant advance in water dispersible epoxy coating technology. The full range of these products can also be discussed.

Siccatol Paint Driers will also be displayed; these to include the full range of metal driers and the new Siccatol® SR range for lead free paints.

Perchem Rheological Additives will feature Perchem Easigel and Econogel; the former being a universal easy dispersing product and the latter an extremely cost effective thixotrope. The other ranges cover the conventional organoclays and hydrogenated castor oils.

Ketjensil® SM405 a precipitated amorphous hydrated aluminium silicate with a small particle size will also be displayed. This is mainly used as a filler in emulsion paints for partial replacement of titanium dioxide.

Other products of interest will include Akzo additives such as: Plasticisers, Adhesion promotors for Plastisols, Peroxides for polyester putties.

Stand Personnel: Mr C. H. Jenkins, Mr M. C. Wimpory, Mr P. M. Gould.

Enter D422 ■

Stand R1

Allied Colloids

PO Box 38, Bradford,
West Yorkshire
Tel: 0274 671267,
Fax: 0274 606499

The newly formed Coatings and Specialities Division of Allied Colloids will be featuring water-based acrylic chemistry in three major product groups: paints and coatings, inks and lacquers, and adhesives.

The Glascol range of acrylic emulsion and solution polymers has been recently extended to include new grades for use in glossy printing inks and overprint varnishes and in paints for wood finishes and furniture lacquers. The Allied Colloids range of additives for water-based paints has been strengthened recently with new grades of Dispex dispersing agents and Rheovis associative thickeners. For adhesives, the Collafix range of pre-pasting adhesives for wallcoverings will be on display.

Stand Personnel: E. Alston, D. Marshall, R. Sloan, A. L. Pyett, R. Heath, J. B. Clarke.

Enter D423 ■

Stand H2

Analogue and Digital Services Ltd

25, Newtown Road, Marlow,
Bucks SL7 1JY
Tel: 06284 73121,
Fax: 06284 73964

Analogue and Digital Services Ltd will be exhibiting the new range of hand-held colour measuring instruments from X-RITE. The products on display will include:

Model 918 – a truly portable, hand-held TRISTIMULUS COLOURIMETER designed to facilitate laboratory or in-plant control of colour standards in the processing environment. The 918 is easy to use and offers a high quality, low cost means of entry into the field of instrumental colour control, and is also the ideal tool for companies wishing to extend their colour control systems from the laboratory into the factory.

Model 948 – is a hand-held SPECTROCOLOURIMETER, with all the benefits of the model 918 and yet designed to give spectro-photometer precision, accurate tristimulus data and good instrument to instrument reproducibility.

Model 968 – is a hand-held SPECTROPHOTOMETER providing all the benefits of the 948, and in addition will output spectral data from 400 to 700nm. The 968 is a high precision instrument that will save you time and money without compromising on performance.

"Colorstart" – quality control

if you

are a manufacturer of water-based surface coatings, whether they be paints, printing inks lacquers or adhesives, we have created a new service division specifically for your market. To find out how we can help you come and see us on Stand RI at SURFEX or drop us a line.

Allied Colloids

REGISTERED FIRM

Coatings & Specialities Division

Head Office: Allied Colloids P.O. Box 38, Cleckheaton Road, Low Moor, Bradford, Yorkshire BD12 0JZ. Tel: Bradford (0274) 671267

Enter D602 on Reader Reply Card

software, and "Spectrostart" – spectral data handling software will also be available for review.

Stand Personnel: Dr M. J. Hunston, Ray Carmody and Tony Pepperell.

Enter D424 ■

Stand A18

ARCO Chemical

ARCO Chemical House, Bridge Avenue, Maidenhead, Berkshire SL6 1YP
Tel: 0628 775000,
Fax: 0628 775180, Tlx: 847436

ARCO Chemical is one of the major producers of propylene oxide and its derivatives on a worldwide scale.

The ARCOSOLV® range of propylene glycol ethers and propylene glycol ether acetate and ARCONATE® grades of propylene carbonate are part of this derivative range.

Ever growing numbers of formulators are turning to ARCOSOLV® products to replace ethylene glycol ethers and ethylene glycol ether acetate. The lower toxicity of ARCOSOLV® products make them a natural alternative.

ARCONATE® propylene carbonate is used in a diverse range of applications as a reactive diluent in urethane systems, in wood chip and foundry sand binders, as a reactive intermediate, as a dispersing agent and in replacing more hazardous or expensive products in other applications.

Formulators can also take advantage of our ARCOCOMP computer programme designed to assist in preparing solvent blends.

Stand Personnel: Stephen Lyons, Product Manager; Didier Penninck, Technical Service Co-ordinator; and representatives of ARCO Chemical UK office.

Enter D425 ■

Stand D27

Samuel Banner & Co Ltd

59/61 Sandhills Lane, Liverpool L5 9XL
Tel: 051 922 7871,
Fax: 051 922 0407

Samuel Banner is one of the UK's longest established industrial manufacturing and trading companies. Today the Company is broadly based in modern technology, manufacturing and distributing over 200 products, and growing strongly in the areas of speciality and performance products, contract packing and products specifically manufactured to individual customer requirements.

At the SURFEX exhibition we will be showing the products of our hydrocarbons, chemicals, speciality chemicals and vegetable oils Divisions. There will be particular emphasis on the ways the Company is developing with major producers to ensure the new product ranges are more environmentally acceptable. Although we have a diverse produce range our staff will be available to deal with your enquiries.

Enter D426 ■

Stand G2/3

BASF Plc

PO Box 4, Earl Road, Cheadle Hulme, Cheshire SK8 6QG
Tel: 061 485 6222,
Fax: 061 488 4620, Tlx: 669211

BASF Plc will be exhibiting products from the following Product Groups within their Parent Company, BASF Aktiengesellschaft, based in Ludwigshafen, Western Germany:

☐ Lacquer Raw Materials
☐ Pigments for Paints

The following products will be exhibited:

Lacquer Raw Materials

Laroflex LR 8829 – A further addition to the well-known Laroflex MP range with significantly lower solution viscosities than current grades enabling coatings to be formulated with solvent reductions of up to 20%. The reduction in solution viscosity has been achieved by a special polymerisation technique and not at the expense of the molecular weight. Thus the new product displays the same physical properties and levels of protection as the other grades in the range.

Luhydran LR 8808 – An aqueous polymer dispersion binder for water based anti-corrosion paints. Paints based on this product work on the barrier principal and do not require the normal anti-corrosive/pigments.

Laropal A81 – An aldehyde based hard resin with a wide range of solubilities and compatibilities. The exhibit will concentrate on the use of this product as a base for the production of pigment concentrates which can be used for tinting all types of solvent based coatings.

Luhydran A 841 S – A self cross-linking polymer dispersion for the production of water based furniture and wood lacquers. The lacquers are characterised by their outstanding resistance to moisture and normal household chemicals.

Pigments for Paints

Heliogen Blue l6895F – A recently developed phthalocyanine blue pigment with the following characteristics: high colour strength, cleanliness, transparency, neutral flip in metallics and flocculation stability.

Sicopal Yellow L1110/Paliogen Orange L3180HD – High opacity, high cleanliness pigments for use in combination with other organic pigments for the production of a range of bright, lead-free shades with good covering powers.

Paliogen Red Violet FA4104 – Transparent perylene pigment with exceptionally high colour strength. Used as an alternative to thioindigo pigments in combinations with red pigments for the production of bright red shades.

Stand Personnel: BASF Plc: I. K. D. Cameron, N. Hastings, G. W. Fowkes, J. A. Gant, BASF AG: H. Kasch, A. Haardt, G. Fischer. In addition to the above, a number of personnel from both companies will be present at the exhibition and available for discussions.

Enter D427 ■

Stand D47/48

Bayer UK Ltd

Bayer House, Strawberry Hill, Newbury, Berks RG13 1JA
Tel: 0635 39000,
Fax: 0635 39513, Tlx: 847205

Bayer's Inorganics and Pigments business groups will provide information and graphics displays on Baysilone's high quality resins, paint additives, impregnating agents, Bayertitan titanium dioxides, Baylith dessicants and moisture adsorbers, and the Bayferrox range of pigments.

Stand Personnel: D. J. Hass, N. Cabeldu, C. Morrell, R. Jones, C. Raine.

Enter D428 ■

Stand A1/2

BDH Ltd

Broom Road, Poole, Dorset
Tel: 0202 745520,
Fax: 0202 738299, Tlx: 41186

Merck/BDH will be promoting the new DAROCUR 4263 and 4265 UV Initiators for Wood Finishing Applications. It can be used in acrylated and unsaturated polyester styrene resins, even in thick layers.

Enter D521 ■

IT'S CLEAR WE CARE

ARCOSOLV®

ARCOSOLV® solvents offer a combination of strong solvating power and safety in use. ARCOSOLV® propylene glycol ethers and propylene glycol ether acetate are used in a wide range of applications including coatings, inks, cleaners and agricultural chemicals.

ARCOSOLV® solvents are chosen by formulators seeking products that offer both performance and safety without cost disadvantages.
For information on the ARCOSOLV® range and our Europe-wide distribution network please contact ARCO Chemical, Bridge Avenue, Maidenhead, Berks SL6 1YP. Telephone (0628) 775000. Telex 847436 ARCHEM G. Facsimile (0628) 775180.

ARCO Chemical

Clearly committed to quality and environmental care

Enter D605 on Reader Reply Card

SURFEX 90
Stand: A18
HARROGATE INTERNATIONAL CENTRE, ENGLAND
16-17 MAY 1990

heubach

SURFEX 90

16-17 May 1990
Stand-No. G 11 & G 12
Harrogate International Centre,
North Yorkshire, England

HEUCOPHOS®

WHITE NON-TOXIC ANTI-CORROSIVE PIGMENTS

HEUCOPHOS®

White, non toxic anti-corrosive pigments

HEUCOPHOS-pigments are modified zinc phosphates and mainly used in chromate- and leadfree primers. They are already in application for 10 years.
In general practice we have learned which type of modified phosphate pigment are suitable for which particular corrosion protective coating.
The following tables should be an up-dated point of view, which type of HEUCOPHOS one can use in which application fields resp. binder systems.

Solvent-based coatings

HEUCOPHOS®	ZPA	ZPO	ZMP	ZPZ
Alkyd resin				
Two-pack epoxy resin				
Polyurethane				
PVB/phenolic resin (1-pack-primer with phosphoric acid)				

Water-based coatings

HEUCOPHOS®	ZPA	ZPO	ZMP	ZPZ
Styrene-acrylic-copolymer				
Two-pack epoxyd resin				
Water thinnable alkyd (amine and solvent contenting)				

■ Very good corrosion resistance
■ Good corrosion resistance
□ Good when specially formulated
■ Increases adhesion on untreated aluminium

HEUCOPHOS ZPA* Aluminium zinc phosphate hydrate has excellent anti-corrosive properties in most binders like alkyds, two-pack epoxy resins (solvent- or water-based), polyurethane, polyvinylbutyrale/phenolic resins. ZPA is neutral and can be used universally because of the good paint stability.

HEUCOPHOS ZPO* Basic zinc phosphate hydrate with an organic component has very good anti corrosive properties in many binders especially in alkyds, two-pack epoxy resins and polyvinyl butyrale/phenolic resins.

HEUCOPHOS ZMP* Basic zinc molybdenum phosphate hydrate has very good anti-corrosive properties in many binders. Excellent performances could be achieved in water-based coatings based on styrene-acrylic emulsions.

HEUCOPHOS ZPZ Modified basic zinc phosphate hydrate with a special degree of solubility for the improvement of adhesion on difficult substrates.
The adhesion on untreated aluminium as well as the corrosion protection of two-pack epoxy resins is significantly better.
ZPZ also can be used very sucessfully in water-based coatings based on alkyds and styrene-acrylic-emulsions.

* HEUCOPHOS-pigments are patented.

HD 7-3.90

heubach

Heubach U.K., 216 A Bramhall Moor Lane, Hazel Grove, GB-Stockport SK7 5JJ,
Tel. 61-483-5084, Fax 61-483-6926, Tx 669003 heubac g

Headquarter: Dr. Hans Heubach GmbH & Co KG, D-3394 Langelsheim

Bevaloid

refer to Rhône-Poulenc entry

Stand G5

BIP Chemicals Ltd

PO Box 6, Popes Lane, Oldbury, Warley, West Midlands B69 4PD
Tel: 021 552 1551,
Fax: 021 544 7193, Tlx: 337261

BIP Chemicals is one of the leading European manufacturers of high quality melamine and urea resins used by major paint manufacturers throughout the world for the production of industrial surface coatings where quality and performance are of paramount importance.

The 'Beetle' range of amino resins has been developed for technically demanding applications where consistent high quality and reproducibility are essential, such as automotive, can, coil and wood finishes.

Details of the extensive range of 'Beetle' amino coating resins will be available and the display will feature the newer, high technology products including partially and fully methylated melamine and mixed ether resins. The versatility of these products will be demonstrated by showing the balance of properties which can be achieved over a wide range of application conditions. Graphs and panels will illustrate the excellent film properties conferred by 'Beetle' resins.

Sales and technical personnel from BIP Chemicals will be available to answer your queries.

BIP is registered to ISO 9002/ BS5750 for its quality systems for production of the entire resin range.

Stand Personnel: R. McD Barrett, D. L. W. Tucker, A. Baldwin, C. Costin.

Enter D429 ■

Stand R3

Blythe Colours

Cresswell, Stoke-on-Trent, Staffordshire ST11 9RD
Tel: 0782 388399,
Fax: 0782 388303

BLYTHE COLOURS will be introducing its KERA COLLECTION for the Surface Coatings Industry.

'KERAFAST' – Mixed metal oxide and spinel pigments for coil coatings, powder coatings, automotive finishes, general industrial coatings.

'KERATRANS' – Transparent red and yellow iron oxide pigments for wood stains and automotive finishes.

'KERAFLECT' – Camouflage pigments for defence and aerospace coatings.

'KERASPERSE' – Pigment dispersions for specialised applications, e.g. camouflage coated fabrics.

'KERABLEND' – Composite pigment blends matched to customer specifications.

Enter D430 ■

Stand A25

Bohlin Reologi UK Ltd

Blackstone Road, Huntingdon, Cambridgeshire PE18 6EF
Tel: 0480 411559,
Fax: 0480 413147

Bohlin Reologi continue to augment the capabilities of their product range.

On show at SURFEX 90 there will be new accessories and software for the Visco 88 portable viscometer, these will include the double gap system specifically designed for low viscosity materials and data processing software with rheological modelling.

Together with the cone and plate geometry the expanded viscosity range of the Visco 88 will enhance the application areas for both the QA and product development within the coatings industry.

Information will be available on the entire range of Bohlin equipment including the VOR and controlled stress rheometer.

Technical staff will be on hand at the exhibition to give problem solving advice

Visit us on Stand A25.

Stand Personnel: Andrew Heritage and Gary Hutchison.

Enter D431 ■

Stand G8

Boud Marketing Ltd

Unit 2B, Woodfalls Industrial Estate, Laddingford, Kent ME18 6DA
Tel: 0622 871195,
Fax: 0622 871930, Tlx: 965753

Boud Marketing Ltd will feature the following products:

SIOKAL – Micronised feldspar, an acid insoluble extender for use in protective coatings and exterior decorative coatings.

BML PIGMENTED QUARTZ AND BAUXITE – A range of resin coated pigmented quartz and bauxite for use in floor screeds and wall coatings.

CELLULOSE FIBRES – Cellulose fibres for use in textured coatings, epoxy screeds, adhesives and sealants.

BML SOLID GLASS SPHERES – Solid glass beads for use in resin systems and coatings to lower viscosity while increasing filler loadings.

BML LIGHTWEIGHT GLASS MICROSPHERES – Hollow glass microspheres for use in lightweight systems.

QUARTZ SANDS AND POWDERS – A range of quartz sands and powders ranging from maximum 10 microns to pebbles.

GENERAL MINERAL PRODUCTS – White calcined flint, calcined bauxite, crushed glass, crushed shells, lightweight fillers, talc, high whiteness dolomite, marble chippings.

Stand Personnel: Technical and commercial personnel from Boud Marketing Ltd.

Enter D432 ■

Stand D2

Bromhead & Denison Ltd

7 Stonebank, Welwyn Garden City, Herts AL8 6NQ
Tel: 0707 331031,
Fax: 0707 325012, Tlx: 261886

Bromhead & Denison Ltd are devoting their stand to K-WHITE, a high performance, non toxic corrosion-inhibiting pigment.

K-WHITE has been widely used by Japanese paint manufacturers for at least 15 years with an outstanding record, in their motor car industry, the extensive bridge projects linking the different islands, and applications where superior anti-corrosive results are required.

Since its comparatively recent introduction to UK and Europe K-WHITE sales have been growing by at least 100% each year due to its increasing usage in water-borne systems (e.g. Haloflex), chromate-free wash primers, coatings for galvanised steel, etc.

K-WHITE is produced by TAYCA CORPORATION of JAPAN, a leading Chemical Manufacturer better known for its production of Titanium Dioxide, Sulphuric Acid and a range of surfactants and speciality products.

Also available will be a related

aluminium – dihydrogen-tripolyphosphate called K-BOND which represents a new type of water glass hardener enabling the production of effective and inexpensive inorganic paints with controlled pot-life, resistance to water and flexibility coupled with hardness. K-BOND is particularly recommended for cement paints.

There is a distinct possibility that the alkali silicate based paints thus improved will exhibit their inherent advantages in new and extensive applications, such as marine coatings, nonflammable interior and exterior building coatings and heat resistant coatings, free from environmental objections.

Panels, photographs, formulations and literature demonstrating the performance of K-White and K-Bond will be available for discussion.

Stand Personnel: Dr M. Kropman.

Enter D433 ■

Stand D22/23

Buckman Laboratories Ltd

Enterprise House, Manchester Science Park, Lloyd Street North, Manchester M15 4EN
Tel: 061 226 1227,
Fax 061 227 9314, Tlx: 667258

Buckman Laboratories produce a wide range of speciality Chemicals for the Surface Coatings Industry. The following products will be displayed at the Exhibition.

The BUTROL range of anticorrosive pigments. High performance combined with low toxicity. These pigments provide an alternative to chromates in high performance anticorrosive primers.

The BUSAN range of biocides. Effective control of microorganisms across the whole range of applications--In-Can Preservation, Film Preservation, Wood Preservation, Anti-Fouling Paints and for the Preservation of Adhesives where FDA approval is required for food packaging adhesives.

The BUSPERSE range of pigment dispersants. This range includes dispersants for both solvent and water based systems. Also we produce a dispersant which is an effective viscosity dipressant for plastisols.

The BUBREAK range of defoamers. Silicone and non silicone types for water based systems and one defoamer for chlorinated rubber systems.

The BULAB range of Spray Booth chemical treatments. The applications of this range of products include biocides and detackifiers for water wash spray booths and chemicals for effluent treatment plants.

BUSAN 11M2. A multifunctional pigment which has applications in fire retardant coatings, long term film preservation, UV light stabilisation of PVC plastisols and improved adhesion for coatings to be applied to galvanised steel.

Stand Personnel: Neil Tasker, Ernest Rigby, Gerwyn Brown, Neil Crocker, Alec Vleeshouwer and Neil Russell.

Enter D434 ■

Stand D1

BYK-Chemie GmbH

Abelstrasse 14, D-4230 Wesel, W. Germany
Tel: 0281 67000,
Fax: 0281 65735

New defoamers for waterborne coatings BYK®-022, BYK®-023, BYK®-045; Wetting and dispersing additive for industrial tinters: Disperbyk®-163; Silicone flow additive for FDA approved coatings: BYK®-310; Testing equipment: gloss and colour.

Stand Personnel: Raymond Coates, Lionel Morpeth, Luc Wagter.

Enter D435 ■

Stand G15

C & W Specialist Equipment

Paytoe Lane Industrial Estate, Leintwardine, Craven Arms, Shropshire SY7 0NB
Tel: 05473 654 and 237
Fax: 05473 412, Tlx: 35784

We will have on display a selection of test cabinets from our extensive range which includes our Salt Spray Cabinets which operate to British and ASTM B117 Standards; Composite Corrosion Cabinets which provide cyclic salt spray, humidity and dry air cycles; Mebon Prohesion Cabinets and our Humidity Cabinets to BS 3900 F2 and ASTM D2247.

All these cabinets are available in the following sizes: 200, 450, 1,000 and 2,000 litres. NEW PRODUCTS in our range include Water/Salt Solution Hot Soak Cabinets, Controlled Temperature/Controlled Humidity Cabinets (Ambient to 90°C with 20% to 97% RH), Thermal Shock Chambers, Environmental Chambers (temperature range −80°C to +200°C with humidity control), and Deep Freeze Cabinets with controlled temperatures from zero to −85°C.

Details of all our range of cabinets will be available on our stand.

Stand Personnel: Nigel D. Cremer, Bob Wardle.

Enter D436 ■

Stand D5/6

C-2-C: Concept to Commissioning

Units 2/3 Stanney Ten, Mill Lane, Little Stanney, Chester CH2 4JZ
Tel: 051 356 3221,
Fax: 051 357 1585, Tlx: 627996

The C-2-C consortium will have the following exhibitors and exhibits.

UCE Developments Ltd will illustrate a full range of rotating mixers, from simple paddle units to the UCE mixer disperser which combines high speed dispersion with slow speed agitation.

Datastor Ltd provides fully automated process controlled systems to the surface coatings industry and will have units available with full plant simulation.

Knight Process Engineering Ltd will exhibit a 20 litres continuous bead mill and will also illustrate the full range of these machines from laboratory units to full production systems with process control.

Gateway Technology Ltd will feature vessel washing systems capable of handling mobile tanks up to 2,000 litres in capacity and will also discuss in-tank cleaning. Solvent recovery units will also be shown.

AI Process Systems Ltd will discuss methods of full project management on a turnkey basis and will feature examples of recently installed plant on this basis.

Additionally, the full services available from C-2-C Ltd will be illustrated including items of powder mixing and solids handling.

Stand Personnel: Alan Boulton.

Enter D437 ■

Stand R2

Capricorn Chemicals Ltd

1 Sugar House Lane, Stratford, London E15 2QN
Tel: 081 519 4933,
Fax: 081 534 2812, Tlx: 896325

Capricorn Chemicals Ltd will exhibit the product range of Messrs G. M. Langer & Co of W. Germany. Particular emphasis will be given to "Lanco" micronised waxes including the recently introduced hydrophilic waxes Lanco Wax PE W1555 and TF W1765 which are designed for use in aqueous systems. Also featured will be Lanco Glidd cold milled wax dispersions and the comprehensive range of additives and wetting agents, most of which are silicone free.

The period since SURFEX 88 has seen a dramatic increase in the use of Daylight fluorescent pigments in many surface coating applications. It is, therefore, anticipated that "FLARE" fluorescent pigments produced by Sterling Industrial Colours Ltd will be of particular interest to many visitors.

Information will also be available on the range of additives which Carpricorn Chemicals offer in UK on behalf of Paint Chemicals Inc – Chicago.

Stand Personnel: P. Gaskell, J. Deaville, K. Jansen.

Enter D438 ■

Stand A20

Carri-med Ltd

Carri-med House, Glebelands Centre, Vincent Lane, Dorking, Surrey RH4 3YX
Tel: 0306 886180,
Fax: 0306 885863, Tlx: 859115

Carri-med will be exhibiting the computer controlled CSL Rheometer: an instrument which is ideal for characterising the rheological properties of paints and coatings. Yield points can be measured directly and properties such as sagging can be readily simulated.

Stand Personnel: Mark Power.

Enter D439 ■

Stand A5

Cera Chemie BV

PO Box 535, 7400 AM Deventer, Holland
Tel: (0) 5700-33444,
Fax: (0) 5700-33471, Tlx: 49084

Cera Chemie was founded in August 1972 and is an autonomous enterprise without any ties to larger groups of companies. Being a small company of twenty employees it can act and respond quickly on behalf of customers as well as show flexibility in rapidly changing market conditions, without the constraints of mother company policies.

They specialise in the processing of waxes (the word Cera is, in fact, Latin for Wax) transforming solid waxes into dispersions and emulsions for use as performance products in industry. Commercially available waxes from many parts of the world are represented in *Ceratheque*.

Regardless of sources of supply the waxes are classified according to their properties and behaviour, thereby giving the user a good selection for this specific application.

Cera Chemie has good laboratory and pilot plant facilities to enable them to break down the wax in solvent, binder or water. A complete programme of physical, and to a lesser extent chemical, processes are available, for example, milling, emulsifying, dissolving, crystallising and homogenising. A computerised operation ensures fully reproducible batches. Specialised test equipment is available to reproduce typical test conditions in industrial fields.

The company can supply tailor-made small or large tonnages and offer a speedy response to customers' urgent requirements, even last minute tanker orders.

Stand Personnel: Mr J. Kistemaker and Mr W. Beumer (Cera Chemie BV), Mr L. Moss (Elem Chemicals UK).

Enter D440 ■

Stand G18

Chemapol UK Ltd

43/51 New North Road, London N1 6JD
Tel: 071 253 6406,
Fax: 071 251 6587

Titanium Dioxide – Rutile and Anatase; JACOR – Anticorrosive Red Iron Oxide, Lithopone 30% Red Seal, Sokrate-OUv New Range of Acrylate Dispersion Coating Compounds, Dyestuff and Pigments for a wide range of applications.

Stand Personnel: J. Kelly, A. P. Robson, P. Janecek.

Enter D441 ■

Stand D43/44

Ciba-Geigy Plastics

Duxford, Cambridge CB2 4QA
Tel: 0223 832121,
Fax 0223 838404, Tlx: 81101

Ciba-Geigy Plastics is part of the world-wide Ciba-Geigy organisation with headquarters in Basle, Switzerland, and with manufacturing facilities not only in the United Kingdom and Switzerland but also in many other countries including the USA, South America, Japan, Spain and India.

Ciba-Geigy Plastics is able to supply to the paint industry a complete range of liquid and solid resins, together with curing agents, for all surface coating applications.

Industrial resins. The Industrial Resins group supplies goods to manufacturers of surface coatings, flooring compositions, and other products suited to civil engineering. The use of Ciba-Geigy epoxy resins by these industries is due to certain key properties of the cured materials: Outstanding resistance to corrosion and to chemical attack, excellent mechanical properties, excellent adhesion to a variety of substrates.

Typical uses of the formulated products include: Coatings for chemical tanks and oil storage tanks, coatings for ships and marine structures, coatings for structural steelwork, industrial floor compositions and membranes, building adhesives, bedding and grouting compounds, automotive primers, coil coating primers, interior can and tube linings, powder coatings for domestic appliances, powder coatings for pipes and concrete reinforcing bars, as a chemical intermediate for polymer manufacture, stabilisation of PVC, decontaminatable coatings for nuclear installations, electrically insulating coatings.

Stand Personnel: Mr Dennis Pritchard.

Enter D442 ■

HyPerformers

See our Active Minerals in their true colour.

It's the colour of money – of added value, lower costs, and extra profit.

Because apart from making expensive pigments go a lot further, HyPerformers enhance the quality, consistency and performance of the finished product.

If you like the colour of money, write or phone for further information.

Dedicated to Performance.

ECC International

ECC INTERNATIONAL LTD., JOHN KEAY HOUSE, ST. AUSTELL, CORNWALL, ENGLAND PL25 4DJ.
TELEPHONE: (0726) 74482. TELEX: 45526 ECCSAU G. FAX (0726) 623019.

Enter D608 on Reader Reply Card

Stand G7

Colourgen Ltd

825 Birchwood Boulevard,
Birchwood, Warrington, Cheshire
WA3 7QZ
Tel: 0925 822577,
Fax: 0925 837087

Colourgen manufactures spectrophotometers and writes software for colour management and colour matching prediction. All the systems are IBM compatible and the most affordable on the market.

The close liaison with the Department of Colour Chemistry at Leeds University has enabled the company to develop innovative and low-cost systems for application in the coatings industry. Colourgen has been particularly successful in the ink and paint industries and many installations include direct links with dispensing equipment.

Recently the company has concluded significant sales and marketing agreements with major "blue chip" companies in the USA and Europe. These include installations in chain stores and wholesalers for the match prediction of decorative paints, industrial installations for the match prediction of inks with ink manufacturers and printers and diverse applications for the industrial paint market.

On display at SURFEX 90 are two systems complete with best-selling programs.

Stand Personnel: Peter Wall, Managing Director; Julia Baynes, Commercial Manager.

Enter D443 ■

Stand G1

Cookson Laminox Ltd

Mill Hill, North West Industrial Estate, Peterlee, Co. Durham
SR8 2HR
Tel: 091 586 0808,
Fax: 091 586 8777

Cookson Laminox announce the launch of their new LAMINOX sythetic micaceous iron oxide pigments, bulk-production of which is now coming on stream. Two grades of pigment are available for use in protective coatings.

LAMINOX S is recommended for pigmentation of weathering coats based on all types of binder. It is similar in appearance to natural MIO but has many extra advantages. The higher chemical purity and improved lamellar particle structure enables maximum performance and durability to be achieved. There are additional benefits in easier dispersion of pigment and smoother application of paint. At all times, consistent quality is assured.

LAMINOX F has a lower particle size range (below 10μm) and has been developed for use in anticorrosive primers either as the main pigment or in conjunction with inhibitive pigments to boost their corrosion resistance. This pigment is recommended for all types of metal primers including those for structural steelwork, ships' plates, industrial products and automotive components.

LAMINOX pigments are manufactured within the most stringent quality specifications.

Visit the Cookson Laminox stand for expert advice on formulating longer lasting, more cost-effective protective coatings.

Stand Personnel: Brian Baker and Eric Carter.

Enter D444 ■

Stand D16/33/34

Cornelius Chemical Co Ltd

St James's House, 27/43 Eastern Road, Romford, Essex RM1 3NN
Tel: 0708 22300,
Fax 0708 768204

MEARL Range of Pearlescent Pigments, ROEHM Acrylic Resins, CARDOLITE Resins, DANIELS Speciality Dispersions, BTL Speciality Resins.

SURFACE COATING PRODUCT RANGE:

ROEHM ACRYLIC RESINS. Including Plexigum solid grades suitable for solvent solution, Plextol pure acrylic emulsions, Plexisol solvent based acrylic solutions, Rohagit acrylate thickeners and polyelectrolytes.

ROEHM ROHAFLOC. Acrylate based polyelectrolytes suitable for retention aids in paper processing, and for water treatment in the industrial effluent and sewerage areas.

ROEHM MONOMERS. Range of acrylate and methacrylate based speciality and commodity grades, suitable for many industries, including resin manufacture, adhesives, UV cure, plastics, etc.

BTL SPECIALITY RESINS. Supplying the range of products previously obtained from Reichold Phenolics, and Bakelite Thermosets. These include products for the can lacquer, metal coating, friction, foundry and tyre industries products such as Varcum, Plyophen, Beckacite, etc.

CARDOLITE. Range of specialised phenalkamine curing agents, extenders and reactive diluents, suitable for use with epoxy resins in the coating, flooring and casting industries.

DANIEL. Speciality dispersions for paint and ink industry, including SLIP-AYD dispersed slip agents, FLAT-AYD dispersed flattening agents, DISPERSE-AYD dispersing agents, and new additions to the interfacial tension modifer range.

FINNTITAN. Titanium Dioxide pigments manufactured by Kemira Oy, Vuorikemia Division.

LENETA. Range of hiding power and opacity panels. The new range consolidates the Morest hiding power charts.

MEARL. Range of Mearlin Titanium Dioxide coated Mica Pearl Pigments, including the new high durability exterior grades, which are finding increasing interest in inks, automotive and coil coating sectors.

MIN-U-SIL. Range of micronised and classified silica powders.

OULU. Range of chemicals derived from wood, including the standard Oulu 102 Tall Oil Fatty Acid, and a range of modified tall oil rosins of interest to the printing ink and adhesives industry.

PHLOGOPITE MICA. Filler for coatings from Kemira Oy, of Finland.

WOLLASTONITE. Calcium Metasilicate low iron, high purity mineral filler, with reinforcing properties. Particularly good for anti-corrosive coatings, from Partek Oy.

ZEOLEX. Range of synthetic sodium aluminium silicate pigment/extenders for pigment spacing/pigment saving flow and control.

ZEOTHIX. Rheology control agents.

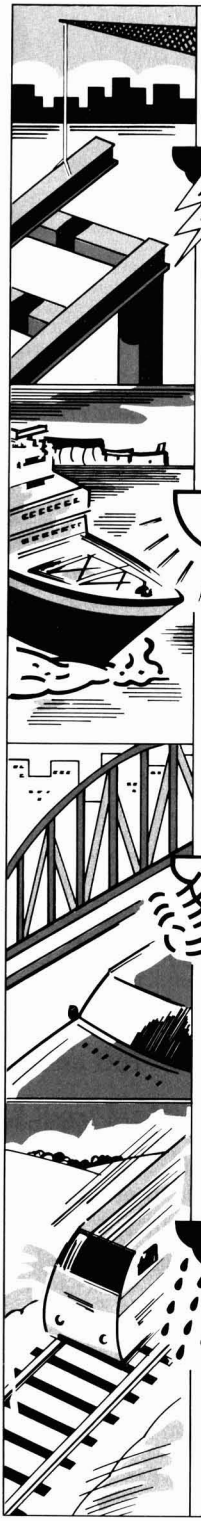
ZEOMATT. Flatting agents for surface coatings.

RITA CORPORATION. Full range of lanolins and their derivates.

MICRONISED TITANIUM DIOXIDE AND CONDUCTIVE MICA. We offer micronised Titanium Dioxide for use as a UV block for transparent wood finishes and their colouristic effect in automotive paints in conjunction with metallics, and conductive micas for specialised surface coating and ink applications.

Stand Personnel: David Brown, Neville Prior, David Taylor – Cornelius. Mr Eric van Nevel – Oerter Chemicals. Dr Rossberg and Mr Sattler – Rohm GmbH. Coert Polman – Mearl International.

Enter D445 ■



NEW LAMINOX® HI-TECH HIGH PERFORMANCE ANTI-CORROSION PIGMENTS

After extensive research and development, LAMINOX pigments are now in production. The World's first commercial synthetic micaceous iron oxides are a significant improvement on the natural products.

LAMINOX offers:-

- consistent high quality from controlled production
- long lasting, high performance protection
- easy dispersion in all binder types
- environmental acceptability

And because Cookson Laminox is part of the Cookson Group, LAMINOX comes with the superb technical support of a major international raw materials supplier.

For more information on LAMINOX S for protective coatings and LAMINOX F for anti-corrosive primers, call us on (091) 586 0808

SURFEX 90 Stand G1 HARROGATE INTERNATIONAL CENTRE, ENGLAND 16-17 MAY 1990

LAMINOX®
Hi-Tech Pigments for High Performance Coatings

Cookson Laminox

Cookson Laminox Limited
Mill Hill, North West
Industrial Estate, Peterlee,
Co Durham SR8 2HR
Tel: (091) 586 0808
Fax: (091) 586 8777

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CAPRICORN CHEMICALS

SPECIALITY PRODUCTS FOR THE SURFACE COATINGS INDUSTRY

LANCO WAX

micronised and classified waxes, easily dispersed by high speed stirring, in most cases

LANCO GLIDD

wax dispersions for maximum convenience

LANCO BEIT

pigment concentrates for solvent based paints

LANCO ADDITIVES

a comprehensive range of problem solvers

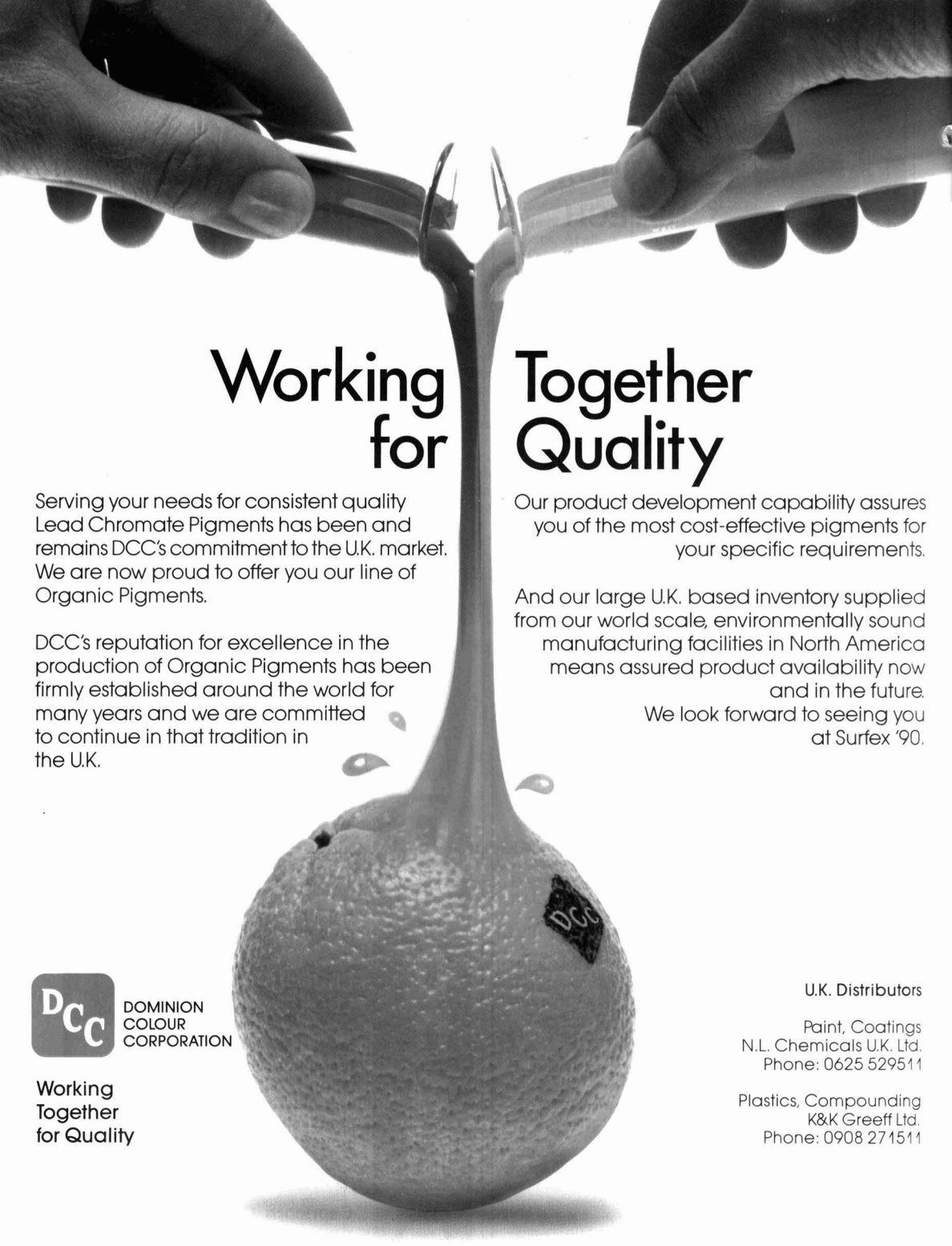
FLARE DAYLIGHT FLUORESCENT COLOURS

ranges available to meet the technical requirements of the paint, printing ink and plastics processing industries

DO IT WITH FLARE

Capricorn Chemicals Ltd
1 Sugar House Lane, London E15 2QN
Tel: 081-519 4933, Telex: 896325
Fax: 081-519 2818

Enter D610 on Reader Reply Card



Working for Together Quality

Serving your needs for consistent quality Lead Chromate Pigments has been and remains DCC's commitment to the U.K. market. We are now proud to offer you our line of Organic Pigments.

DCC's reputation for excellence in the production of Organic Pigments has been firmly established around the world for many years and we are committed to continue in that tradition in the U.K.

Our product development capability assures you of the most cost-effective pigments for your specific requirements.

And our large U.K. based inventory supplied from our world scale, environmentally sound manufacturing facilities in North America means assured product availability now and in the future.
We look forward to seeing you at Surfex '90.

DCC DOMINION COLOUR CORPORATION

Working Together for Quality

U.K. Distributors

Paint, Coatings
N.L. Chemicals U.K. Ltd.
Phone: 0625 529511

Plastics, Compounding
K&K Greeff Ltd.
Phone: 0908 271511

Enter D611 on Reader Reply Card

Stand D51/52

Craynor SNC

74-80 Rue Roque de Fillol, 92800 PUTEAUX, France
Tel: (1) 47 78 94 35,
Fax: (1) 47 74 90 39

CRAYNOR is a company recently set up as a result of a joint venture formed between CRAY VALLEY PRODUCTS, the UK based resin manufacturer, and NORSOLOR, the French acrylic acid and acrylic monomer producer.

CRAYNOR produce oligomers and monomers exclusively for the UV and EB curing industries, and has new plants located in France specially designed to produce multi functional acrylates (MFAS) and acrylic oligomers. SARTOMER, the US specialist acrylic monomer manufacturer, and CRAYNOR work in close association with each other to serve the Radcure market.

CRAYNOR will feature:

□ their wide range of CRAYNOR epoxy acrylates and urethane acrylates, as well as other oligomers for specialist applications, for example water reducible types.

□ the extensive range of SARTOMER monomers which include mono and multi functional types, water reducible grades and the highly reactive letra and penta functional acrylates.

Stand Personnel: G. Mongin, K. O'Hara and R. Zwanenburg will be available throughout the Exhibition, together with staff from CRAY VALLEY PRODUCTS, CRAYNOR'S exclusive agent in the UK.

Enter D446 ■

Stand D51/52

Cray Valley Products Ltd

Farnborough, Nr Orpington, Kent BR6 7EA
Tel: 0689 53311,
Fax: 0689 62843

SYNOCURE two-pack acrylics including types for high solids coatings, coatings for plastics, pigment dispersions and high performance transport finishes will be featured. This exhibit will also include the new SYNOCURE 890S/898SA non-isocyanate two-pack system for use in vehicle refinishing, transport and maintenance coatings.

SUPER GELKYDS are now established world-wide for use in thixotropic decorative paints, varnishes and wood stains. This technology has now been extended to industrial type resins and SUPER GELKYD 290X will be shown. This resin is suitable for use in both air drying and stoving coatings giving pigment suspension and non-sagging properties.

CVP is a major supplier of alkyds, acrylics and urethanes for all types of wood coatings. A vast amount of information accumulated over many years has now been collated into a comprehensive Technical Service Report and formularly which will form the basis of the exhibit.

Two polyester resins for powder coatings will be exhibited. SYNOLAC 4207 gives reduced stoving cycles when reacted with epoxy resins and SYNOLAC 4221 has been designed for high durability coatings when cured with TGIC.

Stand Personnel: The stands will be manned by both technical and commercial staff at all times.

Enter D447 ■

StandD29/30

Croda Colours Ltd

Brookfoot, Brighouse, West Yorkshire HD6 2QZ
Tel: 0484 714574,
Fax: 0484 717718, Tlx: 517296

Croda Colours Ltd will be exhibiting its range of Copper Ferrocyanide, PMA, SMA and PTMA Pigments primarily for Packaging Inks. This range of products, produced at the company's Milnsbridge Factory, encompasses those pigments previously manufactured by Stratford Colour Co Ltd. Croda personnel will also be available to discuss the range of Organic Pigments for Paints, Plastics, Rubber and Printing Inks, as well as Dyestuffs.

Stand Personnel: Mr. T. McKinley, Mr J. Kennedy, Mr J. T. Ratcliffe.

Enter D448 ■

Stand D53/54

Croxton + Garry Ltd

Curtis Road, Dorking, Surrey RH4 1XA
Tel: 0306 886688,
Fax: 0306 887780,
Tlx: 859567/859568

The CROXTON + GARRY stand at SURFEX 90 will feature the major products amongst their very wide range of extenders and additives for the Paint and Printing Ink Industries.

CROXTON + GARRY are the UK's major supplier of Chalk Whiting Extenders under the trade name BRITOMYA and SNOWCAL, from our BS5750 Pt. II approved plants at Melton, Steeple Morden and Swanscombe. OMYA calcites will be featured prominently, especially two new grades CALCIGLOSS and CALCIDAR IT. The KEMOLIT range of high aspect ratio Wollastonites are extenders for use in primers, powder coatings, road markings, etc.

The HAKUENKA range of surface-treated precipitated calcium carbonates are specialised extenders for printing inks.

MIOX lamellar Micaceous Iron Oxides give excellent durability. MICRONOX and SUPERFINE Red Iron Oxides can be used in a wide range of primers, undercoats and topcoats.

The range of additives supplied by CROXTON + GARRY includes such items as ESACURE photo initiators for UV curing systems, CELLOSIZE Hydroxy Ethyl Cellulose thickeners, COATEX associative thickeners and dispersants for emulsion, UVASORB ultra violet radiation absorbers, PERGOPAK matting agent, NYACOL transparent colloidal flame retardant, MOLECULAR SIEVE dessicants, COLOROL and LIPOTIN wetting and dispersing agents, FORBEST slip additives and PARAPLEX PLASTHALL polymeric plasticisers for many different coatings.

Stand Personnel: M. D. Stevens, L. R. Jennings, N. J. Stansfield.

Enter D449 ■

Datastor

refer to Concept to Commissioning entry

Stand D12

Dominion Colour Corporation

77 Browns Line, Toronto, Ontario, Canada M8W 4X9
Tel: 416 252 5351,
Fax: 416 232 0637

The Dominion Colour Corporation's exhibit will feature its high quality lead chromate pigments for paints and plastics, its azo organic pigments for inks, and its commitment to total quality control.

DDC technical and commercial personel will be available to discuss customer needs.

Stand Personnel: Mike Klein and Jeff Cox.

Enter D450 ■

Stand H6

Draiswerke GmbH

represented by sole UK agents
ORTHOS (Engineering) Ltd,
62 Coventry Road, Market Harborough, Leicestershire
LE16 9DE
Tel: 0868 64246,
Fax: 0858 34480, Tlx: 34300

We supply to many industries continuous wet grinding mills, dispersers, planetary mixers and turbulent simple or reactor mixers. These are offered as individual machines or complete multi-process systems including electrical control systems as required.

For mico-fine dispersion, the Drais Perl Mill range from laboratory to large scale production units is renowned for robust reliability, high throughput, even product particle size.

Patented hydrodynamic flat screen cartridge filters require minimal maintenance and have a self cleaning effect due to their developed shape. Cleaning and exchange of these is easily accomplished without removing any product or grinding media from the mill.

Micro wet grinding with various types of suitable media as small as 0.2mm diameter presents no problems.

We can offer to UK users a comprehensive servicing programme or service without delay in the event of a malfunction. In addition, we can offer 40 years' experience of size reduction and build up granulation processes for dry and moist products.

Stand Personnel: Len Boulton, Eric Davis, John Leach.

Enter D451 ■

Stand D17/18

DSM Resins UK Ltd

PO Box 8, Ellesmere Port, South Wirrall L65 0HB
Tel: 051 355 6170,
Fax: 051 357 1282, Tlx: 628213

DSM Resins UK Ltd, part of The Netherlands based international DSM Resins Group, will be highlighting a number of significant new developments on Stand No. D17/18 at SURFEX 90.

These include the latest technology developments in resins for industrial and decorative applications, resins for powder paints and binders for printing inks. The emphasis being very much on quality and environmental concerns.

DSM Resins UK Ltd now offer high solids, waterborne systems free from amine and low formaldehyde emitting resins for the acid curing of wood finishing systems. Technical experts will be on hand during the show to discuss product details and applications.

Products from the range detailed below will be on display.

Products:

Uradil XP253SZ, Uradil XP254SZ, Uradil SZ 251 – water dilutable stoving enamels. Uraflex XP 222 EU – elastomers for plastic. Uraflex XP 120 EU – coatings with increased solids content. Uralac XP 937 SY – for two component systems. Uracron XP 474 CY – with increased solids content. Uramex ZA 1393 U – UF resin with very low formaldehyde emission during acid curing. Uralac P3500-P5000-P5600-P5010-P4810 – Powder coating resins with improved UV resistance and tribo chargeable resins.

Stand Personnel: Tony Charles, Graham Robinson.

Enter D452 ■

Stand D42

Durham Chemicals

Birtley, Chester-le-Street,
Co. Durham, DH3 1QX
Tel: 091 410 2361/6521,
Fax: 091 410 6005, Tlx: 53618

Durham Chemicals, now part of the Harcros Chemical Group, will be celebrating its 60th anniversary of Zinc Oxide production and 50th anniversary of chemicals production at Birtley site in Country Durham.

Durham Chemicals will be exhibiting a portfolio of products designed for the surface coatings industry. These will include Zinc Dust 962, Zinc Oxide, Activox B; the complete range of Nuosyn and Cuprisec paint driers, Durocide and Fungitrol biocides; paint additives and talcs.

Also included will be product literature on radiation – curable monomers, oligomers and urethane specialities, manufactured by the Harcros Eccles Division (formerly Lankro).

Stand Personnel: Commercial and technical representatives will be available on our stand at all times to attend to your enquiries about any of our products.

Enter D453 ■

Stand D49/50

ECC International Ltd

John Keay House, St Austell,
Cornwall PL25 4DJ
Tel: 0726 74482,
Fax: 0726 623019, Tlx: 45526
Shelton New Road, Cliffe Vale,
Stoke-on-Trent ST4 7AR
Tel: 0782 747222,
Fax: 0782 747272, Tlx: 36190

ECC International is a major supplier of white minerals for the paint and allied industries. The *HyPerformers* range of products includes: *PoleStar* calcined clays, *Supreme* and *Speswhite* fine china clays, *Claytone* organo-bentonites, as well as a comprehensive range of china clay and calcium carbonate extenders and other minerals.

Although ECC International has been traditional known as a United Kingdom based producer of china clays, the company now produces its wide range of products in many locations in Europe and throughout the world. ECC has a comprehensive system of storage and distribution facilities.

Stand Personnel: ECC International will be represented at SURFEX by its Sales and Technical Service team.

Enter D454 ■

EFKA Chemicals BV

refer to Stort Chemicals entry

Stand A9/10

Eiger Torrance Ltd

Stanley House, 40 Hardwick Grance, Woolston, Warrington
WA1 4RF
Tel: 0925 818692,
Fax: 0925 828266, Tlx: 629838

SURFEX 90 will see an Eiger Torrance stand which will show the complete range of Mixing, Dispersion and Grinding equipment. Mixers and Dispersers will be a blend of original Torrance equipment, i.e. belt and hydraulic drive HSDs, Paste Mixers, Laboratory Dispersers, etc, and the more recent Eiger designs of EMDs, tinting mixers and agitators. Heading

the range of continuous grinding equipment will be the unique MOTORMILL Horizontal Bead Mill (with the Torrance belt drive Rotomill also being offered as an alternative), together with the range of batch grinding equipment such as the Batch Attrition Mills and Batch Bead Mills.

The joining together of the two companies, i.e. Eiger Engineering Ltd and Torrance and Sons, in 1989 has resulted in the ability to offer a range of equipment to the paint, ink and general surface coatings industries which is second to none. This has the added advantage that more "in-house" manufactured equipment can be used when supplying complete process plant – Turnkey Contracts.

Stand Personnel: Personnel will be available on the stand to discuss specific requirements.

Enter D455 ■

Stand A24

Elcometer Instruments Ltd

Edge Lane, Droylsden, Manchester M35 6BU
Tel: 061 370 7611,
Fax: 061 370 4999, Tlx: 668960

Elcometer Instruments Ltd of Manchester are displaying and demonstrating their range of instrumentation for testing and inspecting surface coatings.

New products on the stand include the low cost, electronic, digital coating thickness gauge for steel substrates, the Elcometer 246, the Elcometer 135 High Voltage Holiday Detector and the powerful Elcometer 300 to PC Data Transfer Software package.

Elcometer also have products for assessment of blast surfaces, wet film coating thickness gauges, climatic condition instruments for temperature and humidity, adhesion and gloss testing. Together with a comprehensive range of accessories. These products make the Elcometer stand a must for all visitors interested in any form of surface coating.

All the products on display are available for demonstration and the Elcometer personnel will be pleased to give you an assessment of any coated metal samples brought to the stand.

Stand Personnel: Mr Colin Downie, John Podvoiskis or John Fletcher or Roger Sykes.

Enter D456 ■

Elem Chemicals

refer to Cera Chemie entry

Stand G25

Ellis + Everard Specialities Ltd

46 Peckover Street, Bradford, West Yorkshire BD1 5BD
Tel: 0274 308038,
Fax: 0274 392030.

An established technical marketing company to the paint, plastic and ink industries, will be exhibiting their full range of Organic and Inorganic Pigments from ICI Colours & Fine Chemicals, Proxel & Densil Biocides from ICI Speciality Chemicals, Additives and Anti-Foam Agents from Bevaloid, a full range of Nitrocellulose damped in IPA, Meths and Plasticisers. Emphasis will be put on the full range of Phthalocyanine Blues and Greens from ICI C + FC.

Stand Personnel: Peter Stanton (UK Sales Manager); Frank Manley, Mike Serene, Dave Greenslade – Technical Sales Representatives. *Enter D457* ■

Stand G26

European Coatings Journal

UK Office: Bondway Publishing Co Ltd, 6 Cobbett Close, Pound Hill, Crawley, West Sussex RH10 3DR
Tel: 0293 882817,
Fax: 0293 884764

European Coatings Journal has copies of its latest issue available for visitors and exhibitors. The magazine is now published ten times a year and has become an accepted international partner for the industry.

Farbe + Lack, which is also published by Curt R. Vincentz Verlag, will be available.

Stand Personnel: Dr John Haim.

Enter D458 ■

Stand D56

European Colour Plc

Bankfield Street, Stockport, Cheshire SK5 7PB.
Tel: 061 480 3891,
Fax: 061 480 9852, Tlx: 669657

European Colour Plc, the merged company of Ellis Jones and Horace Cory, will be exhibiting the latest developments in their comprehensive range of azo pigments. Also on display will be selected, specialised pigments for surface coatings and plastics.

Personnel from the technical and commercial departments will be available to discuss the full product range.

Stand Personnel: P Raven, Dr J Toole, G Marshall, P Hall, H M Allen, E Giles, H Grundmann, W Houlton, A Green, P Johnson.

Enter D459 ■

Floridienne (UK)

refer to Kromachem entry

Stand R7

FMJ International Publications Ltd

Queensway House, 2 Queensway, Redhill, Surrey RH1 1QS
Tel: 0737 768611,
Fax: 0737 761685/760467,
Tlx: 948669

POLYMERS PAINT COLOUR JOURNAL – The European Paint Journal – Europe's most frequently published journal covering the manufacture of Paints, Printing Inks, Resins, Pigments, Solvents and Additives.

PAINT & INK INTERNATIONAL – The International PAINT Journal – circulated in Europe and Scandinavia to past visitors attending the Resins & Pigments Exhibition and in the Far East, Eastern Europe and North America to a specially selected list of coatings manufacturers.

EUROPEAN ADHESIVES & SEALANTS – The European Adhesives Journal – covering the manufacture and application of adhesives and sealants. Organiser of the EUROBONDEX Exhibition.

The European Paint Show – RESINS & PIGMENTS EXHIBITION – Europe's premier Exhibition of raw materials used in the manufacture of Paints and Printing Inks. Forthcoming events being held in Copenhagen November 1990, Brussels November 1991 and Singapore April 1992.

Stand Personnel: John Ward, Editor, Polymers Paint Colour Journal and European Adhesives & Sealants; Alison Bryan, News & Production Editor, Polymers Paint Colour Journal and European Adhesives & Sealants; Tom Mulligan, Editor, Paint & Ink

See us at
SURFEX 90
Stand: A 22
HARROGATE INTERNATIONAL CENTRE, ENGLAND
16-17 MAY 1990

ink-credible

Union Camp polyamide and rosin-based resins are ink-credible.

Inks need the right chemistry to yield their special properties. Union Camp polyamide and rosin-based resins offer a wide choice of properties to meet your needs. Properties such as... high gloss, color development, toughness, flexibility, hold out and more. Their reliable and versatile range of performance includes solvent specific solubility, compatability with a wide range of ink ingredients plus resistance to water, block and rub. We even have a number of developmental resins which are water dispersible. Now that's ink-credible!

Union Camp resins also cover a colorful spectrum of uses in:

◇ Publication and Packaging Gravure
◇ Flexography on paper, board and film
◇ Offset ◇ Lamination ◇ Overprint Varnishes

That's why today so many ink makers turn to Union Camp for a broad range of resins including alcohol soluble and co-solvent polyamides, solution and solid resinates, rosin modified phenolics, alcohol soluble and insoluble maleic modified rosins and specialty resins.

Union Camp has the raw materials, technology, products, manufacturing facilities and support staff to help you add quality to your inks and profitability to your bottom line.

Contact us today for more information on our polyamide and rosin-based resins... they're quite *INK-CREDIBLE.*

Union Camp
CHEMICALS (U.K.) LTD.

Vigo Lane, Chester-le-Street
County Durham DH32RB, England
Telephone (091) 4102631 • Telex: 53163

Enter D614 on Reader Reply Card

International; Richard Griffin, Advertisement Manager, Polymers Paint Colour Journal and Paint & Ink International; Andy Gibb, Advertisment Sales Executive, Polymers Paint Colour Journal and Paint & Ink International.

Enter D460 ■

Stand G6

Foscolor Ltd

Bickershaw Lane, Abram, Wigan
WN2 5TB
Tel: 0942 861215,
Fax: 0942 864650

FOSCOLOR 'Q' SERIES DISPERSIONS FOR WATER-BASED SYSTEMS.

With increasing legislative pressure restricting the emission of organic solvents into the atmosphere there is a growing demand for environmentally-friendly systems which can equal or surpass currently available inks and coatings.

Foscolor has recognised this need and harnessed the powerful forces of the pigment-chip process to produce the 'Q' series of acrylic dispersions. Each colour is formulated with the maximum pigment content providing optimum flexibility for the formulation of high-strength, thin film inks and coatings. 'Q' series dispersions are available in solid and liquid form and are compatible with a wide range of water-based polymer emulsions. Being free of additives they give good flow, high gloss and stability without side-effects.

FOSCOLOR LIQUID TINTERS AND CONCENTRATES

Following significant new investment in the latest technology, Foscolor has expended capacity for paint tinters and printing ink concentrates, tailor-made to customer's requirements.

FOSCOLOR CAB DISPERSIONS FOR AUTOMOTIVE FINISHES

Foscolor will illustrate the recently launched high-jet black. Not only of superior quality, this product is highly concentrated and cost-effective. Other colours in this range will shortly be available.

IN ADDITION Foscolor will display examples from the widest range of dispersions for liquid inks, wallpaper and flooring, shoe-finishes, powder coatings, industrial paints and lacquers, etc., etc.

Stand Personnel: F. J. Morpeth, J. S. Jones, M. S. Brett.

Enter D461 ■

Gateway Technology

refer to Concept to Commissioning entry

Stand D7

John Godrich

Pellow House, Old Street, Ludlow,
Shropshire SY8 1NU
Tel: 0584 87 3153,
Fax: 0584 87 2424, Tlx: 35275

JOHN GODRICH will be showing machines from their range of test equipment covering the Liebisch Salt Spray and Combined Corrosion Test Cabinets and Sulphur Dioxide Cabinets and from the "Credit" range of Humidity, Environmental and Refigeration Cabinets, the Salvis range of Ovens and Water Baths including the new Thermocenter Convection Oven, the Zehntner range of portable Glossmeters and the "Credit" range of Cross Hatch Cutters, Pencil Hardness Testers, Fineness of grind gauges, the "Credit" Coater, Wet Film Coating Thickness Gauges, Applicators.

Also being shown will be a sample from their range of Rotostat energy and time saving Mixers, the new Rotofoil low energy axial agitator, Rotojet Mixer, "Credit" HSD Mixer and the Chemcol Laboratory MSO Mixer.

Staff will be available to discuss the requirements for Mixer Lifting Devices, Vessels and other test equipment related to the paint and coatings industry.

Stand Personnel: J. E. Godrich and J. Maund.

Enter D461 ■

Stand D62

W. R. Grace Ltd

Davison Product Line, Northdale House, North Circular Road,
London NW10 7UH
Tel: 081 965 0611,
Fax: 081 961 8620, Tlx: 25139

Grace UK will present a wide range of speciality chemicals for the surface coatings industry. Their technical service group will review the latest developments on new and existing products within Davison Product Line.

SYLOID®: Super efficient, easy to disperse range of silica gel matting agents.

SHIELDEX®: High performance, non-toxic, anti-corrosion pigments, used in maintenance and general industrial primer systems.

SYLODEX BENTONITES®: Organically treated montmorillonite clay, used as thixotropic and thickening agent.

SYLOSIV®: Powdered molecular sieves used as moisture scavengers in water sensitive systems.

SYLOTHIX®: Fibrous, high density polyethylene fibres, used as structuring and rheological control agents.

SYLOSIL®: Fumed silicas, used for thickening/thixotropy/suspending/anti-settling/freeflow/anti-caking reinforcement properties, used in a wide variety of surface coating systems.

Stand Personnel: Messrs Ian Bickerdike, Ian Page, Tim Fletcher, Ted Valentine and Miss Carolyn Abbott.

Enter D462 ■

Stand D36/37

The Haeffner Group of Companies

St Maur, Beaufort Square,
Chepstow, Gwent NP6 5EP
Tel: 0291 625236,
Fax: 0291 625949, Tlx: 497241

Personnel from the Haeffner Group will be on hand to discuss their full range of raw materials and services for the surface coating, printing ink, plastics and construction industries. Featured products include BAYFERROX Iron Oxides, TIOXIDE Titanium Pigments, FIESTA Fluorescent Pigments and Concentrates, ACTIROX Non-Toxic Anti-Corrosive Pigments, Mineral and Cellulose Fibres, METANA Aluminium Pastes, Mixing and Dosing Machinery and Laboratory Equipment and a new range of Organic Pigments and Chip Dispersions.

Haeffner Group Companies can also provide Blended Oxides, Natural Ochres and Siennas and a full range of Rubber Grade and Colour Carbon Black Powders and Beads. All products can be batch-packed to suit individual customers' requirements and stand personnel will have full details of the products and services available.

Stand Personnel: Edward Haeffner, Chris Shaw, Jim Jarvis, Bob Sidlow, Tony Cantrill and Jean Haeffner.

Enter D463 ■

WE TRY TO BE A SHADE BETTER.

HAEFFNER GROUP OF COMPANIES

The Haeffner Group of Companies is dedicated to providing a first class service to the Surface Coating Industry.

We supply:

- Raw Materials.
- Batch Packaging of Powders & Liquids.
- Dispersions.
- Machinery.
- Laboratory Equipment.

SEE US ON STAND D37/D38 AT SURFEX '90

THE HAEFFNER GROUP OF COMPANIES
0291 625236
St Maur, Beaufort Square, Chepstow, Gwent. NP6 5EP.
Fax No. (0291) 625949
Telex No. 497241

Stand D58

Harlow Chemical Co Ltd

Templefields, Harlow, Essex
CM20 2BH
Tel: 0279 36211,
Fax: 0279 444025, Tlx: 817528

A variety of new polymers will be on exhibition, covering a wide range of applications. The high performance EMULTEX VV57 series emulsion paint binders will be featured with VV573, a truly cost effective 'universal' polymer centrestage.

EMULTEX VV568, a novel wet adhesion promoted vinyl acetate copolymer designed as a cost effective binder for wood primers, will be highlighted.

Current interest in LOV emission paints will be stimulated by the introduction of MOWILITH LDM7410, a pure acrylic emulsion with excellent film forming properties at low temperatures.

Also new is UCAR 123, a product licensed from Union Carbide Corporation, USA. This is a high solids (60%) acrylic polymer emulsion with excellent performance in the formulation of roof coatings and sealants.

Of particular interest to visitors from the Building Products industry will be the new cement additive grade, REVACRYL 388.

Harco's recent diversification into the field of antifoams with the FOAMSTOPPER range will also be represented.

Finally, the commitment of Harco to the 1990s will be featured by illustrating planned expansion through capital investment and commitment to quality, initially through BS 5750.

Stand Personnel: A. J. Maddy, C. B. Jackson, G. R. Brown, R. J. Foster, E. See, G. N. Shiels.

Enter D464 ■

Stand G10

Henkel-Nopco Ltd

Nopco House, Kirkstall Road,
Leeds LS3 1JR
Tel: 0532 457471,
Fax: 0532 445082

Henkel-Nopco is the performance chemical business centre of Henkel Chemicals Ltd.

Henkel is an international company based in Germany with a turnover of some £3.5 billion and 160 companies in 55 countries worldwide.

Formed in 1970, Henkel Chemicals Ltd is one of the fasted growing companies within the Henkel Group, it now employs approximately 700 people and has sales of some £80 million.

The Nopco company was acquired by the Henkel Group in April 1987 as part of the worldwide acquisition of Diamond Shamrock Process Chemicals Inc.

Henkel-Nopco develops, manufactures, markets and distributes performance and processing chemicals for the plastics, leather, textiles, paper, paint and general industries.

On show will be exhibits detailing Henkel's extensive range of Rheology Modifers for both solvent and water based systems.

Also featured are the new ranges of Dispersing and Non-Corrosive Anti-Settling Agents and Air-Release, Flow and Slip Additives. Of special interest is the environmentally friendly, Sovermol, product range of binders which are totally solvent free.

Come and enter our stand competition and meet our representatives Paul Bennett and Gina Walker-Popov, who will be delighted to assist you.

Stand Personnel: Paul Bennett, Gina Walker-Popov.

Enter D465 ■

Stand G11/12

Heubach Group

Heubachstr. 7, POB 11 60,
D-3394 Langelsheim, W. Germany
Tel: 5326 520,
Fax: 5326 52128,
Tlx: 957726/957716

The HEUBACH GROUP has manufacturing plants in West Germany, USA and Brazil.

HEUCOTRON: Chrome Yellow and Molybdate Red.

HEUCOTRON "LD": HEUCOTRON Low Dust Preparations.

HEUCODUR: Mixed Metal Oxide Pigments for extreme temperature and durability requirements. This pigment group will be exhibited in detail in order to show visitors its application fields, fastness properties and volume of colour variety.

HEUCOSIN: Pigment Preparations.

HEUCOSIN SPECIAL: Pigment Concentrates for Concrete Floor Coatings.

HEUCOPLAST: Low Dust PVC Pigment Compounds.

HEUCOFLOW: Solvent-based Zinc Chromate, Zinc Tetroxy-Chromate and Strontium Chromate Pastes. Water-based Lead Silicate and Strontium Chromate Pastes 75%.

KROLOR: Heat Stabilised Chrome Yellows and Molybdate Reds.

HEUCOTRON 5000: Cheap Chrome Yellows and Molybdate Reds with high heat resistance.

HEUCOROX: Micaceous Iron Oxide for coatings with long term corrosion protection.

ZINC PHOSPHATE ZP 10: Microfine Zinc Phosphate.

HEUCOPHOS ZPA/ZMP/ZPO: Modified Zinc Phosphates.

HEUCOFEX: Transparent Iron Oxide Paste for wood coating protection.

ZINC DUST: In various particle size distributions.

ZINC FLAKES: Metallic Zinc Pigments in Lamellar form, supplied as Paste.

ZINC WHITE HARZSIEGEL: Zinc Oxides (French Process).

HEUCOMIN 5: Low Dusting Red Lead.

LEAD OXIDE AND SALTS: Litharge, Red Lead, Battery Oxide (Barton- and Mill-processed), Lead Sulphates and White Lead.

DECOR PRODUCTS: Decor Chipping, Gravel and Sand.

Stand Personnel: Messrs Noack, Weigel, Gans, Gregory, Mrs Dr Ressler/Mrs Bittner.

Enter D466 ■

Stand D59/60

Hoechst Chemicals

Hoechst UK Ltd, Hoechst House,
Salisbury Road, Hounslow,
Middlesex TW4 6JH
Tel: 081 570 7712,
Fax: 071 236 5336, Tlx: 23284

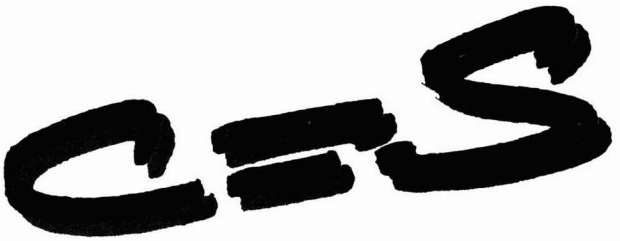
On display will be the range of Beckopox® epoxy resins and special hardeners – particularly water thinnable systems; highly elastic resins and hardeners; low temperature and phenol free hardeners; formulated epoxy-based systems for etch primers, can coatings, powder coatings with good overbake resistance.

The range of Albertol®, Alresat®, Alpex® and other hard resins for the printing ink industry will be featured together with the traditional range of Mowital®, Mowilith® and Hostaflex® polymers for inks and paints.

Mergal® biocides and fungicides will feature strongly, with their applications in water-based systems clearly demonstrated.

Flame retardants are of increasing

CRAYNOR = SARTOMER



A Highly Reactive Double Bond
has been formed specifically to meet the demands of the radiation curing industry.

The Craynor & Sartomer companies offer you on a world wide basis.

- **The Widest Product Range of Monomers and Oligomers** available anywhere.

- **The Highest Quality Products** from custom built plants in Europe & the U.S.

- **World Wide Technical Service** and advice from a number of well equipped specialist laboratories in Europe and the U.S.

- **Long Term Commitment to the Future** of the Radiation Curing Industry with internationally co-ordinated R&D programmes designed to provide you with products for the future .

FOR EUROPE AND REST OF THE WORLD CONTACT.

CRAYNOR

74/80, rue Roque de Fillol
92800 Puteaux (FRANCE)
Tél.: (1) 47 78 94 35
Fax: (1) 47 74 90 39
Tx: 616091 CVPNORS

FOR AMERICAS, ASIA AND PACIFIC RIM CONTACT.

SARTOMER

Sartomer Company
Sartomer Building
Oaklands Corporate Center
468 Thomas Jones Way
Exton - PA 19341 - U.S.A
Tel.: 19 1 215 430 22 00
Fax: 19 1 215 430 22 40
Telex: 173071 SARTO UT

Enter D619 on Reader Reply Card

The new name in specialty chemicals.

A new and independent company created from NL Chemicals to serve your needs with innovative specialty chemicals and rheological additives.

Familiar names, such as BENTONE, RHEOLATE and THIXATROL.

RHEOX products will continue to be sold through KRONOS companies and agents in our extensive international network.

Specialty chemicals to meet tomorrow's needs today.

RHEOX, Inc.
European Headquarters,
Rue de l'Hôpital 31,
B-1000 Brussels, Belgium,
Tel:(-2)5120048, Fax:(-2)5132425

*Trademarks of RHEOX, Inc.

interest and the Exolit® grades of ammonium polyphosphate are in increasing demand for use in intumescent systems.

Hoechst® waxes, Ceridust® micropowders, Hordamer® PE dispersions are already widely established in the paint and ink industries for their excellent mar and rub resistance properties.

Hoechst is also able to deliver a wide range of solvents, plasticisers, intermediates, cross-linking agents and additives.

Stand Personnel: Roy Miller, Andrew Stone, Jon Kemp, Mike Harding, Tom Brendon.

Enter D467 ■

Stand D59/60

Hoechst Pigments

Hoechst UK Ltd, Stainland Works, Holywell Green, Halifax HX4 9DL
Tel: 0422 375522,
Fax: 0422 371689, Tlx: 51619

Throughout the twentieth century there has been a history of constant technological developments in the field of organic pigments. Hoechst and its subsidiaries have a record second to none, having been responsible for important discoveries such as the Hansa® Yellows, Lake Reds, Naphtol AS® Pigments and Diaryl Yellows.

More recently they have been responsible for the introduction of perylene pigments, dioxazine violet and a wide range of Benzimidazolone colours.

The emphasis has now switched to preparing many of these pigments into a form which gives the manufacturer a product with specific properties in line with their ever more demanding requirements, such as high opacity, improved flow properties and ease of incorporation into their system.

These developments are enabling manufacturers to produce better products more efficiently. If you would like to discuss how you can profit, we look forward to seeing you on our stand.

For colour, think Hoechst.

Stand Personnel: Adrian Abel, Steve O'Brien, Brian Lomax, David Simpson.

Enter D468 ■

Stand A6/7

Hüls Aktiengesellschaft

Paul-Baumann-Straβe 1, D-4370 Marl, W. Germany
Tel: 2365/49-1,
Fax: 2365/49-4179

Hüls is represented by its wide range of binders, resins and additives. Exhibits specially highlighted will be the DYNAPOL® coating polyesters.

Under the trademark of DYNAPOL® – saturated polyesters for stoving enamels – Hüls supplies a wide range of high-molecular and medium and low-molecular polyester grades which have extended and had a major inpact on the possible applications of precoated sheets for coil-coating and can-coating purposes, and similarly effected the industrial coating sector as a whole.

Hüls's tried and tested range of polyurethane raw materials is the basis for tailor-made and trend-setting coatings.

Newly-developed LIPATON® products are aqueous dispersions for low-odour interior paints and corrosion protection purposes.

Another focus of attention are the products of Hüls's silicon chemistry section – DYNASYLAN®, DYNASIL® and metallic acid esters (titanates/ zirconates).

For the first time, Hüls is also presenting its wide range of "adhesive raw materials":

DYNAPOL® S copolyesters. An extensive range of thermoplastic hotmelt adhesives for the shoe and textile industries as well as many other fields.

VESTAMELT® copolyamides, used in powder, paste or granulate form as thermoplastic hotmelt adhesives, with emphasis on the bonding not only of textiles but also of other materials such as fuel and oil filters for combustion engines.

DYNACOLL 7000 copolyesters, used as base materials for the manufacture of moisture-curing, reactive hotmelt adhesives.

DYNACOLL A special-purpose polyesters, radiation-curable by means of terminal acrylic double bonds, are useful for the manufacture of pressure-sensitive adhesives, highly flexible coatings and films.

Enter D469 ■

Stand G21

ICI Colours and Fine Chemicals

PO Box 42, Hexagon House, Blackley, Manchester M9 3DA
Tel: 061 740 1460,
Fax: 061 795 6005, Tlx: 667841/2

A new high performance range of pigments for paints is launched by ICI Colours & Fine Chemicals at SURFEX 90, complementing the existing ICI range of 'MONASTRAL' and 'MONOLITE' pigments.

Designated 'X', the new products offer benefits to ICI customers through improvements in key areas – brightness, flow and rheology, tinctorial strength and gloss, as well as flocculation resistance.

The range of phthalocyanine 'MONASTRAL' Blue and Green pigments are suitable for all types of paints but are aimed primarily at the high quality automotive sector.

All the new products are manufactured from existing plant in Oissel, France and Grangemouth, UK, which are both ISO 90012 registered.

The range consists of: 'MONASTRAL' GREEN GBX, GLX, GNX; 'MONASTRAL' BLUE FGX.

Also introduced on the stand is 'MONASTRAL' Blue FBR – an alpha form phthalocyanine pigment for decorative paints, demonstrating excellent features and benefits.

The 'SOLSPERSE' HYPER-DISPERSANTS range of high performance wetting agents for solvent and water-based paints in all applications will form part of the ICI Colours & Fine Chemicals display.

Stand Personnel: R. Fielden, Technical Marketing, Pigments; M. Goode, Technical Marketing, Solsperse; R. Slater, Technical Marketing, Solsperse.

Enter D470 ■

Stand H3

ICS-Texicon

Kennetside Park, Newbury, Berks. RG14 5TE
Tel: 0635 32233,
Fax: 0635 37102, Tlx: 847534

ICS-Texicon will exhibit two new products at SURFEX 90:

The Super Match 6 offers the latest technology in colour measurement incorporating colour on screen; the latest spectrophotometer technology

and the full suite of ICS-Texicon software for pigments;

Spectraflash – ICS-Texicon's own spectrophotometer, built with industry in mind for use in the laboratory as well as the working enviroment. Spectra-flash can be fully integrated into ICS-Texicon's computerised Quality Control and Match Prediction systems.

Also on show will be one of the current range of Multi-user Match prediction systems – the 8 series, running software for colour measurement, colour match prediction, shade library and recipe storage.

Enter D471 ■

Stand D24

Industrial Dispersions Ltd

South Strand, Manningtree, Essex CO11 1UP
Tel: 0206 395000,
Fax: 0206 392872, Tlx: 987703

Industrial Dispersions Ltd will be emphasising their custom dispersion facilities. By working closely with the customer utilising their wide ranging expertise in dispersion techniques together with their pigment and resin technology, they are able to provide an even wider choice for the end user.

The product can vary from a range of "standard" lines of pre-dispersed pigment concentrates, products made with customer formulations and materials to complete toll manufacture including packing.

The flexible production facilities, with its varied range of dispersion and mixing equipment, can deal with aqueous and solvent products (including low flash) in large or small volumes.

Get ahead in the '90s and contact the Dispersion Force.

Stand Personnel: Barry S. Stock.

Enter D472 ■

Stand R11

JOCCA

Priory House, 967 Harrow Road, Wembley, Middlesex HA0 2SF
Tel: 081 908 1086,
Fax: 081 908 1219, Tlx: 922670

The Journal of the Oil & Chemists' Association (JOCCA) is the official Journal of the Oil & Chemists' Association. The Journal is published monthly with an average circulation of 3,420. Members of the Oil & Colour Chemists' Association (OCCA) receive the Journal as part of their membership subscription and in addition libraries and companies throughout the world subscribe to the Journal.

JOCCA is an official Journal of the Paintmakers' Association (GB) Ltd and the Society of British Printing Ink Manufacturers. The Journal carries a full editorial programme of feature items, together with important transactions and communications at the leading edge of surface coating technology. Mr J. R. Taylor, BSc, CChem, FRSC, FICorrST, FPRI, FTSC, is the Honorary Editor of the Journal, supported by senior members of the Association and headquarters staff.

Sample copies of JOCCA will be available on the stand and visitors may place subscription orders for the Journal.

Stand Personnel: Chris Pacey-Day, Yvonne Waterman, Peter Fyne, Frank Craik, Victoria Craik, Hilary Pooley, Pam Stringer.

Enter D473 ■

Stand D8/9

K & K Greeff Ltd

Argyle House, Epsom Avenue, Stanley Green Industrial Estate, Handforth, Wilmslow, Cheshire SK9 3RN
Tel: 061 488 4303,
Fax: 061 488 4148, Tlx: 666475

K. & K. Greeff Ltd will be introducing products for High Solids/Low VOC compliance which will include a new range of Polyols and Silica Gels from the USA.

For High Performance Coatings and Inks: TEFLON PTFE and DOWANOL BUTYLATED GLYCOL ETHERS will be featured. Full information will be available on the new Lead Free Drier Combination from Van Loocke and the Hilton Davis Range of Transparent Iron Oxides.

Stand Personnel: J. E. Brown, General Manager; R. J. Walton, Product Manager; M. J. Sheehan, Sales Rep; W. N. Darbyshire, Sales Rep.

Enter D474 ■

Stand D10/11

K & K Polymerics

Suffolk House, George Street, Croydon CR9 3QL
Tel: 081 681 3133,
Fax: 081 680 0901

Amongst the featured products will be Cellulose Ethers, Epoxy Resins, Latices, Surfactants, Paint Additives, Acid Catalysts and Polyester and Polyurethane Polyols.

Enter D475 ■

Stand G24

Kemira Oy

PO Box 36, SF-28201 PORI, Finland
Tel: +358 39 341 000,
Fax: +358 39 343 393, Tlx: 66248

It is not possible for any pigment manufacturer to produce the whole colour card of Nature, in the same way as it is impossible for any formulator to reproduce all the colour shades.

But now we have succeeded in capturing light – and colours – into coatings in a new way.

We are offering you our new colour world. The world, where your wildest dreams become reality, you can put more shine in your work – literally – and new opportunities for your ideas.

The shining colour is Kemira's Flonac pearlescent pigment. Flonac pigments consist of selected coated mica with the optimum amount of titanium dioxide to give a highly light-reflecting surface.

Mica originates from the phlogopite mineral, which is mined in Kemira's mine, in Finland.

Flonac is shining all over the world. It is glittering on more surfaces. Come and see our new intensive interference pigments and unique gold colours, produced without iron addition.

Stand Personnel: Mr Terry Adams, Tegan (UK), Flonac Technical Service (Kemira Oy).

Enter D476 ■

Knight Process Engineering

refer to Concept to Commissioning entry

Stand D55

Kirklees Chemicals Ltd

George Street, Batley, West Yorkshire WF17 9AU
Tel: 0924 441160,
Fax: 0924 474897, Tlx: 557738

KIRLEES CHEMICALS are featuring three major topical paint applications

ZIRCONIUM ACETATE

An acidic solution containing 22% ZrO_2 and 20% CH_3COO. Contains neutral species based on a hydroxy-bridged zirconium polymer.
Used mainly for cross-linking.
Powder form is soluble in organic solvents.
Data Sheet 321.

ZIRCONIUM ORTHOSULPHATE

An acidic solution containing 18% ZrO_2 at pH less than 1. It is an example of an anionic zirconium species. Uses include: starting material for other zirconium compounds, pigment coating and leather tanning.
Data Sheet 325.

AMMONIUM ZIRCONIUM CARBONATE (AZC)

Clear alkaline solution containing 20% ZrO_2. Contains anionic species based on a hydroxybridged zirconium polymer. Bacote 20® is the recommended stabilized form of AZC for use at elevated temperatures with improved storage.
Used as a crosslinker to insolubilize starch, protein and latex binders.
Data Sheet 322.

ZIRCONIUM PROPIONATE

A powder containing 50% ZrO_2. Soluble in ethanol, ethylacetate and isopropanol. Used to improve adhesion of solvent based printing inks.
Data Sheet 374.

POTASSIUM ZIRCONIUM HEXAFLUORIDE

A crystalline soluble powder of formula K_2ZrF_6.
Used in the manufacture of aluminum and magnesium alloys, for the flameproofing of wool, and other metallurgical applications.
Data Sheet 331.

ZIRCONIUM BASIC CARBONATE

A moist cake containing approximately 40% ZrO_2.
Used for the manufacture of zirconium salts and soaps.
Data Sheet 312.

ZIRCONIUM OXIDES

Dense white inorganic powders of a refractory nature containing typically 99% ZrO_2 and HfO_2.
Used in ceramics, electronics, gemstones and many industrial applications.
Data Sheet 300.

ZIRCONIUM OXYCHLORIDE

An acidic solution containing 20% ZrO_2 at pH less than 1. Contains cationic zirconium species.
Used as an acid catalyst and in thixotropic cements.
Data Sheet 323.

FINE ZIRCONIUM CHEMICALS FOR INNOVATIVE FORMULATIONS

Magnesium Elektron

-the innovators

Magnesium Elektron Ltd.,
Regal House, London Road, Twickenham,
Middlesex TW1 3QA, ENGLAND.
Telephone: (081) 892 4488
Telex: 8811765
Fax: (081) 891 5744

Magnesium Elektron Inc.,
500 Point Breeze, Flemington,
New Jersey 08822, USA.
Telephone: (201) 782-5800
Fax: (201) 782-7768

MEL®

Enter D621 on Reader Reply Card

this year, together with the emulsion polymers on which they are based.

Solvent free paints will be shown featuring "VIKING 3000", a totally internally plasticised polymer suitable for both vinyl silk and vinyl matt systems.

High opacity one coat decorative paints will be demonstrated based on "VIKING 2900", a high performance binder recommended for both matt and silk paints and interior or exterior use.

"VIKING 4110", a new all acrylic emulsion, will be shown in a quality exterior wood stain. This new acrylic has been specially formulated for a wide variety of more demanding paint applications.

Finally, a water resistant wood adhesive to DIN 68602 type B3.5 "VIKING 1645" will be shown as a ready to use product.

Stand Personnel: The stand will be manned by both commercial and technical staff.

Enter D477 ■

Stand R4

Kromachem Ltd

formerly Floridienne UK Ltd
Unit 10, Moor Park Ind Centre,
Tolpits Lane, Watford, Herts
WD1 8SP
Tel: 0923 223368,
Fax: 0923 39308, Tlx: 933219

Following the successful management buy-out in January, KROMACHEM LTD, formerly FLORIDIENNE (UK) LTD, will show a range of pigments which will include MICROFAST organic colours suitable for printing inks, paints and plastics, MICROTINT Aqueous Stainers produced by HAMPSTEAD COLOURS (a wholly owned subsidiary of KROMACHEM LTD): PFIZER high quality synthetic Red, Yellow and Black Iron Oxides and a range of Magnetic Iron Oxides: HITOX buff coloured rutile Titanium Dioxide: a range of Lead, Zinc, Barium and Strontium Chromates from H. M. HABICH: MICRODISPERSED Alkyd Stainers: IJFESA Bronze and Aluminium Powders and Aluminium Pastes: Madder Lakes and Security Pigments for cheques and documents from MAX MARX COLOR COMPANY.

The MICRO POWDERS INC range of micronised waxes for slip, scuff resistance, water shedding AQUABEAD™ and texturing has been augmented by the introduction of the new low cost polyethylene wax MPP 230 which allows the advantagous replacement of FT waxes in some applications. Also new is SUPERSLIP 6530 which is specially recommended for meat release can coatings. REPOLEM emulsion polymers for paint, adhesive and textile applications: FLORPLAST saturated polyester solutions as plasticiers and grinding aids for NC and UV lacquers and, new for SURFEX 90, FLORPLAST 108, a 100% NV liquid polymeric plasticiser.

Additives include the MICROCIDE biocide range of in-can and dry film preservatives: FLORSTAB UV, a unique range of in-can stabilisers giving excellent stabilities for inks and coatings without reduction of cure-speed and deepcure: RAD-START ITX photoinitiator: RAD-ACTIVE 38C and 38D, which are new developments of RAD-ACTIVE 38 giving improved flow: the FLOR range of additives for water based systems: the WACKER range of silicone fluids – from water soluble antifoam agents to solvent soluble flow and slip agents.

Enter D478 ■

Stand D41

KRONOS Ltd

St Ann's House, Wilmslow,
Cheshire SK9 1HG
Tel: 0625 529511,
Fax: 0625 533123, Tlx: 669055

KRONOS Titanium Dioxide pigments featuring the KRONOS group's considerable resources and the measures taken to conform with environmental requirements worldwide. A number of KRONOS grades will be featured, in particular the high quality chloride pigments KRONOS 2160 and KRONOS 2310.

In addition, the company distributes the Rheological Additives manufactured by its sister company RHEOX Inc and the chrome and molybdate pigments from Dominion Colour Company, Toronto.

Stand Personnel: M. J. Heavers, P. H. Turner, G. A. V. Agar, J. Kelly, G. J. Dawson, Dr R. Amberg.

Enter D479 ■

Stand A19

Lakeland Laboratories Ltd

Peel Lane, Higher Green, Astley,
Manchester M29 7FE
Tel: 0942 873555,
Fax: 0942 884409, Tlx: 67413

Lakeland's range of polyethylene waxes, LAKEWAX, for the surface coatings industry give improved water repellency and flexibility in finish texture.

Polyethylene wax emulsions are recommended above all other types for giving consistently good slip properties, even when hot; and being colourless, odourless and chemically inert, LAKEWAX products are particularly valuable in food packaging. An important property exhibited by LAKEWAX emulsions is that the wax carried becomes effective by migrating to the surface of a coating, imparting scuff or rub resistance combined with much improved slip.

Many formulations in the Printing Ink and Paint Industries are oil and solvent based, and the polyethylene wax is included in solid or powder form. However, emulsions of polyethylene wax are definitely preferred when the paint or ink is water based.

Water based products often replace oil or solvent based paint in applications where environmental and economic considerations are dominant. Wax is used in inks for Letterpress, Lithographic, Gravure and Flexographic systems, and these call for easily dispersible wax emulsions, especially where environmental considerations and economy are important.

Come and talk to us about the LAKEWAX range, their individual properties and how they can help you overcome surface coating formulation problems.

Stand Personnel: John Hess (MD), Paul Middleton (Sales Director), Derek Horner (Technical Sales), Alan Virgin (Technical Director).

Enter D480 ■

Stand D14

Lawrence Industries Plc

PO Box 3, Mitcham, Surrey
CR4 3ZD
Tel: 081 648 2272,
Fax: 081 640 9932, Tlx: 946846

Lawrence Industries welcomes you to their stand at the SURFEX 90 Exhibition. John Morris and Technical Personnel from our overseas suppliers will be pleased to discuss our range of Industrial Minerals and Anticorrosive Pigments with you.

Your questions and enquiries will be enthusiastically dealt with by Jay

Shining through.

Coating raw materials from Hüls – they are binders, crosslinkers, synthetic resins, PU raw materials, hardeners, components for powder coatings, coating powders, dispersions, solvents, plasticisers, dispersion and wetting agents, emulsifiers, catalysts and additives – a rounded programme for the paints and coating industry. Coating raw materials from Hüls – today more than ever, that means research and development for new products with higher environmental quality from an aspect of raw materials and energy conservation, searching for tailor-made formulations and realistic testing. Coating raw materials from Hüls – what also shines through is close cooperation with producers and users.

We'll make your problem our problem. Because we at Hüls want you to shine through your products. Hüls (U. K.) Ltd., 43-51, Windsor Road. Slough, Berkshire SL1 2HL.

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SURFEX 90
Stand: A 6/7
HARROGATE INTERNATIONAL CENTRE, ENGLAND
16-17 MAY 1990

hüls

Enter D645 on Reader Reply Card

Austin and John De Vaney of Halox, USA, on their range of non toxic Anticorrosive Pigments and Tannin Stain Inhibitors.

Also, Hans Roest of Engelhard Industrial Minerals will have full details of the Attagel Gelling Clays, ASP and Satintones Extender Pigments along with details of the Engelhard-Hawshaw colour range including their new high performance Meteor Plus Mixed Metal Oxide Pigments.

We will have new literature available for SUFFEX 90 including a product guide to all our raw materials for use in the Surface Coatings Industry.

Stand Personnel: Mr Jay Austin, Mr John De Vaney, Mr John Morris.

Enter D481 ■

Stand G14

3M UK plc

PO Box 1, Bracknell RG12 1JU
Tel: 0344 426726,
Fax: 0344 58278, Tlx: 849371

The Speciality Chemicals Group of 3M UK plc will be exhibiting their range of Fluorad™ Fluorochemical Surfactants and fluorochemical intermediates. These interesting and extremely active products show remarkable surface activity in both aqueous and organic systems. Capable of reducing surface tension to below 20 dynes and in some cases to as low as 15 dynes per cm. They also show extreme stability in hostile environments, some capable of resisting Chromic and Fuming Nitric acids. Graham Wingrave and Malcolm Allison will be available to discuss your applications and problems.

Stand Personnel: Graham Wingrave and Malcolm Allison.

Enter D482 ■

Stand H1

Magnesium Elektron Ltd

Regal House, London Road,
Twickenham TW1 3QA
Tel: 081 892 4488,
Fax: 081 891 5744, Tlx: 8811765

MEL is exhibiting its range of zirconium chemicals, which already make a big contribution to the surface coatings industry.

Zirconium soaps are used worldwide as paint dryers. Zirconium compounds are used as thixotropes and for coating titanium dioxide pigments to reduce degradation of paint films and to improve dispersibility. Zirconium oxide is used as a white pigment in its own right.

For the future the unique chemistry of zirconium will result in finding major applications in environmentally acceptable water based paints. Their strong crosslinking action will improve drying, adhesion and water and solvent resistance. Work is in hand to demonstrate that formulations containing zirconium crosslinkers will meet the required product standards. In similar applications in paper and board coating specially formulated zirconium compounds are proving a technical and commercial success, their use approved by the various North American and European bodies controlling health standards.

Today's world demands more of materials in terms of cost effective performance and environmental protection. These trends play to the strengths of zirconium chemicals.

MEL's stand will show the latest development in zirconium chemicals.

This year MEL will be commissioning $30m extensions to its plants to increase capacity by one-third in response to demand.'

Stand Personnel: Present on the MEL stand will be staff members from Technical and Sales Departments, including Dr Pamela Clayton, Dr Peter Moles and Derek Brockis.

Enter D483 ■

Stand D15

Mearl Corporation

refer to Cornelius Chemicals entry

Stand R5

Meta Scientific Ltd

7 Fosters Grove, Windlesham,
Surrey GU20 6JZ
Tel: 0276 75407,
Fax: 0276 72070

Thickness meters, microscopes, refractometers, gloss and colour measurement is the range of equipment from Meta Scientific Ltd.

Quality Control has become increasingly important, and using equipment which is traceable and conforms to standards is essential. Certificates are issued with all the important instruments from Meta Scientific Ltd.

The new MICROCOLOUR for colour difference is portable, easy to operate and very reproducible. The accuracy of colour measurement is ensured by the optical design which uses an integrating sphere. The instrument has nine colour programmes so the operator may select the formula of his choice.

The range of Portable Gloss Meters features the RB3 model which measures all three angles of gloss (20, 60, 85) in one single measuring head. The range of Gloss Instruments is fully approved for DIN standards and meets all international standards.

Microscopes are used extensively and a new full range of low cost instruments is available.

Thickness Measurement on Ferrous and Non Ferrous Material with a range of hand held meters is available allowing coatings and thickness of many types of material from 0-2mm measured in microns.

Refractometers provide important checks on oils and solvents in industry. A range of small portable units is available.

Stand Personnel: B. Mayhew.

Enter D484 ■

Stand A14/15

Netzsch Mastermix Ltd

Vigo Place, West Midlands
WS9 8UG
Tel: 0922 53355,
Fax: 0922 59805, Tlx: 335298

Netzsch Mastermix will be exhibiting a range of machinery for the production of, amongst other things: paint, ink and adhesives.

The PMD VC 50 pilot plant and laboratory dispersor has its first public showing at SURFEX 90. Produced as a natural accompaniment to Netzsch's production PMD's of 10,000 litre and below. The PMD concept makes a distinction between the high energy used in the shearing of the product, and the low energy bulk mixing and agitation. This clear distinction results in a lower power usage per unit volume, and a shorter processing time.

The Netzsch range of fine grinding bead mills are represented by the LME20 eccentric disc agitator mill – featuring Netzsch's patented slotted pipe separator system for unparalleled screen life, and chamber pressure reduction.

Netzsch Mastermix will also be exhibiting, again for the first time, their new volumetric filling machine, capable of filling from 5 litres and below with each stroke, and with automatic multiple dosing up to 4,995 litres. Design features include

Welcome news for anyone with a taste for strength.

If you're looking for a new standard of extra strong pigments, then the new ICI 'X' range will be to your taste.

The blues, reds and greens complement the existing ICI range and offer even greater technical performance in all types of paint. From greater brightness, flow and rheology through to increased tinctorial strength, gloss and flocculation resistance.

They represent excellent value for money, too. All of which will come as welcome news for anyone who demands the high strength pigments needed to make high quality paints.

ICI Colours & Fine Chemicals

PO Box 42, Hexagon House, Blackley, Manchester M9 3DA. Tel: 061 740 1460

Enter D625 on Reader Reply Card

Fortify every drop of your paint with HALOX SQP

HALOX® Pigments' unmatched commitment to SQP—Service, Quality, Performance—adds unique value to every one of our non-toxic inhibitive pigments. These pigments will fortify your coatings with proven resistance to corrosion or tannin stains, augmented by the special strengths of HALOX SQP. HALOX Service—from customized formulation recommendations through on-time delivery from distribution centers worldwide. HALOX Quality—with lot-to-lot, shipment-to-shipment consistency assured by employee-run SPC and SQC programs. HALOX Performance—proven in the lab, the field, and ultimately, in every mil of your applied coatings. To fortify them with HALOX SQP, call or write for detailed product data.

Advanced technology applied against corrosion

HALOX®

HALOX PIGMENTS

Lawrence Industries PLC., P.O. Box 3
Mitcham, Surrey, England, CR4 3ZD
Telephone: (44) 01-648-2272; Fax: (44) 01-640-9932
A DIVISION OF HAMMOND LEAD PRODUCTS, INC.

Enter D626 on Reader Reply Card

anti-cavitaton seals, to improve filling time and increase accuracy, and a unique pressurising system to improve filling of highly viscous inks and sealants, etc.

Stand Personnel: C. F. Bow, Y. Molloy, D. R Tomlinson, R. Evans, T Mangan.

Enter D485 ■

Stand D35

Norwegian Talc (UK) Ltd

205 Cotton Exchange Buildings, Old Hall Street, Liverpool L3 9LA
Tel: 051 236 6435,
Fax: 051 227 5903, Tlx: 627012

Norwegian Talc (UK) Ltd, further strengthened following their recent acquisition by the Ernstrom Group, will be promoting their full range of extenders and additives for the coatings, sealants and adhesives industries.

Particular emphasis will be placed on:

1. MICRODOL – pure white dolomite from our associate Companies Norwegian Talc Minerals AS (Knarrevik, Norway) and Nortalc Milling Ltd (Hartlepool, England). Technical information encompassing the full standard product range – from ultrafine powders to coarse closely graded granules – will be available. Enquiries relating to customer specified gradings can be directed to our stand personnel who look forward to discussing your requirements.
2. MICRO TALC, MICRO MICA– full product data covering this well-known and established range of ground and finely micronised speciality mineral extenders will be available on our stand.
3. SIL-CELL® – lightweight mineral additives offering low density without sacrificing colour: this range of white, high brightness micro-cellular additives will be promoted – and is available with a number of coatings for a variety of end user applications.
4. MICHEMLUBE – wax emulsions based on carnauba, paraffin, microcrystalline and polyethylene feedstocks, including blends of these types. This recent addition to the product range will be of particular interest to those involved in coatings/film/ink production, offering ultrafine and uniform particle size (0.1-0.2 micron).

Stand Personnel will include Tony Gadd, Alan McCarthy and Ray Bent.

Enter D486 ■

Stand D21

OBS Machines Ltd

Alston Drive, Bradwell Abbey, Milton Keynes MK13 9HG
Tel: 0908 322644,
Fax: 0908 313373

OBS Machines Ltd will be exhibiting details of the latest equipment available to the paint, ink and allied industry manufacturer, including the latest technology in colour dispensing systems, both in-plant and in-store. The very successful high performance Supermill Horizontal Mill, Dispersers, Filling Equipment, Can Handling, Palletising and Vessel Cleaning.

Stand Personnel: Regional Sales Engineers.

Enter D487 ■

Stand R11

OCCA

Priory House, 967 Harrow Road, Wembley, Middlesex HA0 2SF
Tel: 081 908 1086,
Fax: 081 908 1219, Tlx: 922670

The Oil & Colour Chemists' Association (OCCA), the organisers of SURFEX 90, is a leading international organisation for the surface coating industries. Based in the UK, the Association publishes JOCCA, with a world-wide circulation of 3,420, and holds conferences and symposia throughout the UK and abroad.

OCCA has a very strong regional structure, with Sections organising a full programme of technical and social activities. In addition to the ten UK Sections, there are Sections in Ireland, Ontario, South Africa, Zimbabwe and Nigeria.

Membership of the Association is open to individuals employed within the surface coating industries. Additionally, the Association maintains a Professional Grade for academically qualified and experienced members. Admission to the Professional Grade enables the members to use designatory letters after their names, indicating their proficiency in the technology of surface coatings.

Association staff will be available on the stand to advise on membership and activities provided by the Association and to accept orders for OCCA publications and other scientific manuals marketed by the Association.

Stand Personnel: Chris Pacey-Day, Yvonne Waterman, Peter Fyne, Frank Craik, Victoria Craik, Hilary Pooley, Pam Stringer.

Enter D488 ■

Orthos Engineering

refer to Draiswerke entry

Stand R10

PA-Paintmakers Association of GB Ltd

Alembic House, 93 Albert Embankment, London SE1 7TY
Tel: 071 582 1185,
Fax: 071 735 0616

The prime function of our exhibit will be to display The Distance Learning (Open Tech) Training Materials in Surface Coatings.

Ten Modules (units of study – mainly 60 hours' duration) will be on display, including the Latest Two on Powder Coatings.

Over six hundred employees have so far completed or are studying surface coating modules through the distance learning mode, and over one thousand certificates of completion have already been awarded.

Full details, objectives leaflets, application forms, etc, will be available (interested parties will be able to read the notes and listen to the commentary, as desired).

This is only one of the activities of The Paintmakers Association, therefore details of many of the others, together with publications, recent reports, membership application details, etc, will be on view.

Stand Personnel: D. H. Clement (Don), C. A. Saunders (Carol).

Enter D489 ■

Stand D63/64

Pearson Panke Equipment Ltd

1-3 Halegrove Gardens, London NW7 3LR
Tel: 081 959 3232,
Fax: 081 959 5613

The PEARSON PANKE exhibit will include the following from their extensive range of test equipment:

The latest ERICHSEN portable Mini Glossmaster with statistical facilities.

The New VISCOLOG DRV 400 – a new cost effective viscometer with computerised facilities.

The GELNORM PC for testing the viscosity and gelation time of powder coatings.

CHEMSULTANTS test equipment for pressure sensitive adhesives.

The latest ELEKTRO PHYSIK electronic coating thickness gauges for metallic substrates and the ERICHSEN Paint Borer for coating thickness on any substrate, e.g. plastics.

Enter D490 ■

Stand R10

PRA-Paint Research Association

Waldegrave Road, Teddington, Middlesex TW11 8LD
Tel: 081 977 4427,
Fax: 081 943 4705, Tlx: 928720

PRA has been the leading centre for coatings technology for some 65 years. This has meant an intimate involvement with paint and its problems on many levels. It has also resulted in a thorough understanding of the subject – underpinned by basic research, backed up by a unique information resource and extending to an independent trouble-shooting/ consultancy service.

The benefits of membership stand in direct proportion to the degree of involvement in PRA activities, but all members are entitled to:

☐ Results of research work.

☐ Opportunity of formulating and controlling research in steering committees through sponsorship of projects.

☐ Discount on PRA services.

☐ Copies of Progress Report and PRA Technical Publications summarising current research work.

☐ Participation in special interest groups or working parties, e.g. on Information or the 1992 Coatings Club.

☐ Access to PRA's library and information services.

Stand Personnel: Mr John Bernie, Mr Dip Dasgupta.

Enter D491 ■

Stand D70

Production Chemicals Ltd

Dalton Way, Middlewich Motorway Estate, Middlewich, Cheshire CW10 0HS
Tel: 0606 84 5557,
Fax: 0606 84 6408, Tlx: 667330

SÜD-CHEMIE AG, Munich, together with their UK Agent, PRODUCTION CHEMICALS LTD, will be promoting their extensive range of Gellant materials for the Surface Coating and allied industries.

The main product groups are featured:

TIXOGEL – Organoclays for solvent based systems. Several different grades have been developed to suit the polarity ranges of the various coating systems.

OPTIGEL – Hydrophilic Bentonite clays for waterborne and water reducible coatings. A number of grades are available, providing good thixotropic and anti-settling properties.

RHEOTIX, RHEOCIN & Y-25PA– Organic gellants of York Castor Oil for solvent based paints.

Especially highlighted in our exhibition this year is our grade TIXOGEL VP which, over many years, has proved to be cost effective in a very wide range of applications.

TIXOGEL VP is easy to disperse and may be added either directly as powder to the pigment grinding stock or via a conventional masterbatch.

A number of special grades of gellants have been developed for use in other areas of application, e.g. COSMETICS. TOILETRIES and PHARMACEUTICALS.

Visit us on Stand D70.

Stand Personnel: Dr H. Coutelle, Mr R. T. Leather, Mr A. Jones.

Enter D492 ■

Stand D65/66

The Q-Panel Co

102 Taylorson Street South, Ordsall, Salford M5 3EL
Tel: 061 872 1152,
Fax: 061 872 7542, Tlx: 635091

Once again, the QUV – the world's most widely used Accelerated Weathering Tester, will form the centre piece of the Q-Panel display.

This low priced tester has gained recognition in several European and American standards and is now available with spray option – enabling thermal shock to be incorporated into the test programme.

The QUV when used with the UV-A 340 light source produces the best simulation of sunlight in the critical UV region. The UV-A 340 does not produce wavelengths that are not normally found in natural sunlight.

In a few days or weeks the QUV can reproduce years of natural degradation. The tester is easy to use, requires minimal maintenance and is covered by a 5-year parts warranty.

The QCT Condensation Tester – a continuous condensation cabinet conforming to BS 3900 Part F10 will also be shown. The QCT is available as a free standing unit incorporating automatic dry-off and also as a bench top model.

A selection of the range of Q-Panels reproducible steel and aluminium test surfaces for evaluating applied coatings will also be available. Q-Panels are internationally accepted, reproducible test surfaces which reduce the effects of substrate variation, thus improving validity of test results. Q-Panels are also available in heavier gauge metal – normally used for adhesion testing.

Stand Personnel: Mr David R. Birchenough, Mr Bill Bethell.

Enter D493 ■

Stand D59/60

Resinous Chemicals Ltd

Cross Lane, Dunston, Tyne and Wear NE11 9HQ
Tel: 091 493 2525,
Fax: 091 460 6270, Tlx: 537623

Resinous Chemicals Ltd will be featuring a number of resins from the UK manufactured range. Thixotropic resins for non-drip gloss paints as well as resins for use in structuring decorative systems are shown, also resins for higher solids air dry industrial paints and high performance primers.

From the Hoechst AG range will be shown the Sag Controlled range of higher solids resins for topcoats, clear coats and primer surfacers. A full offer of water dilutable resins for air dry – spray, dip and brush applications, together with resins for water based primer surfacers. Polyesters and additives for high quality powder coating systems will also be featured. The complete powder coating range will be supported on the stand by a specialist technician from the Hoechst Technical Service laboratories.

Stand Personnel: Alan Prest (Tech

Service Mgr), Herr Claus Godali (Hoechst AG), Ion Bolam (Gen Sales Mgr), Paul Baines, Eric Wallace, Steve Sheppard, Lewis Taylor (Area Tech Reps).

Enter D494 ■

Stand R8

RHEOX Inc

c/o St Anns House, Parsonage Green, Wilmslow, Cheshire SK9 1HG
Tel: 0625 529511,
Fax: 0625 533123, Tlx: 669055

RHEOX Inc, a part of NL Industries Inc, is the world's largest producer of rheological additives for solvent-borne coatings systems. RHEOX Inc recently formed two subsidiaries – RHEOX Ltd, in the UK, and RHEOX GmbH, Germany – to handle its European activities.

The exhibit will provide an overview of the new company's organisation and its products: the well-known and established products from the M-P-A Antisettling agents; BENTONE, THIXCIN and THIXATROL Rheological Additives; NALZIN 2 Anticorrosive Pigment. The additives range has been increased further by the addition of seed-resistant developments for solvent-borne coatings – THIXATROL SR and THIXATROL SR100 rheological additives – and by the introduction of RHEOLATE 255 and RHEOLATE 278 urethane associative thickeners for emulsion coatings and other water-borne systems.

Members of RHEOX European Management and Technical Marketing will be available for discussions. Technical Sales Support for the products will be provided by the two UK sales agents – KRONOS Ltd and Steetley Minerals Ltd – on their own stands, D41 and D19/20 respectively.

Enter D495 ■

D31/32

Rhône-Poulenc Chemicals

Ashton New Road, Clayton, Manchester M11 4AT
Tel: 061 223 7100,
Fax: 061 223 7977, Tlx: 66880

Rhône-Poulenc Chemicals will be exhibiting a selection of its comprehensive range of raw materials for the Surface Coatings Industry including:

MANCHEM coupling agents, MANOSEC driers and MANALOX water repellents.

BEVALOID foam control agents. BEVALOID dispersants and BEVALOID hammer finish additives.

RHODOPAS polyvinyl acetate homo and copolymers and RHODAPAS styrene acrylic emulsions for interior and exterior paints both flat and silk.

Stand Personnel: J. Cavendish, J. Currah, D. J. Love, A. R. Musgrave, B. Shaw, D. Vine.

Enter D496 ■

Stand D39/40

Sandoz Chemicals

Calverley Lane, Horsforth, Leeds LS18 4RP, West Yorkshire
Tel: 0532 584646,
Fax: 0532 390063, Tlx: 557114

The main feature of the Sandoz stand will be the introduction of the 'Fast' range of organic pigments. This is a new series of pigments destined for lead-free industrial matching and will particularly feature two new oranges which, due to their medium price, fill a gap in this market. In addition, a new opaque yellow will also be featured. As well as lead-free matching, the fastness of this yellow enables it to reach automotive levels.

For woodstains a complete range of dyes and dye solutions are available for both water and solvent based systems.

Our Savinyl range of dyes and dye solutions are illustrated, mainly concentrating on the higher fastness end of the market.

Following our success in the market, we are promoting the technical back-up we can offer for our well-known Sandosperse range of industrial stainers. This packet includes technical assistance, data bases and colour match predictions to enable the speedy conclusion of industrial tinting problems.

Finally, we will be illustrating a number of Graphtol pigments for process inks, in particular for UV curing systems.

There will be technical and sales personnel on the stand, including a representative from our head office in France.

Stand Personnel: Bob Frost, Godfrey Alderson, Ken Atkinson, Phil Whiteley.

Enter D497 ■

Stand R9

Sawell Publications

127 Stanstead Road, Forest Hill, London SE23 1JE
Tel: 081 699 6792,
Fax: 081 699 1753

PIGMENT & RESIN TECHNOLOGY is the monthly publication aimed at the paint, printing ink and polymer industries. Editorial is written for paint technologists and chemists, technical and managerial personnel in senior positions, who have a vital interest in the formulation of paints, and allied surface coating materials and intermediates, as well as suppliers of plant and machinery for production, and laboratory testing equipment. If you are in the industry, or in the business of supplying it, PRT should be on your reading list.

Sawell Publications also publish PRODUCT FINISHING and the FINISHING HANDBOOK & DIRECTORY for the end user, and the sister publication dealing with corrosion prevention and control ANTI-CORROSION METHODS & MATERIALS.

Free specimen copies are available on request.

Stand Personnel: Terry Savage, Glenn Murray.

Enter D498 ■

Stand A16/17

Schering Industrial Chemicals

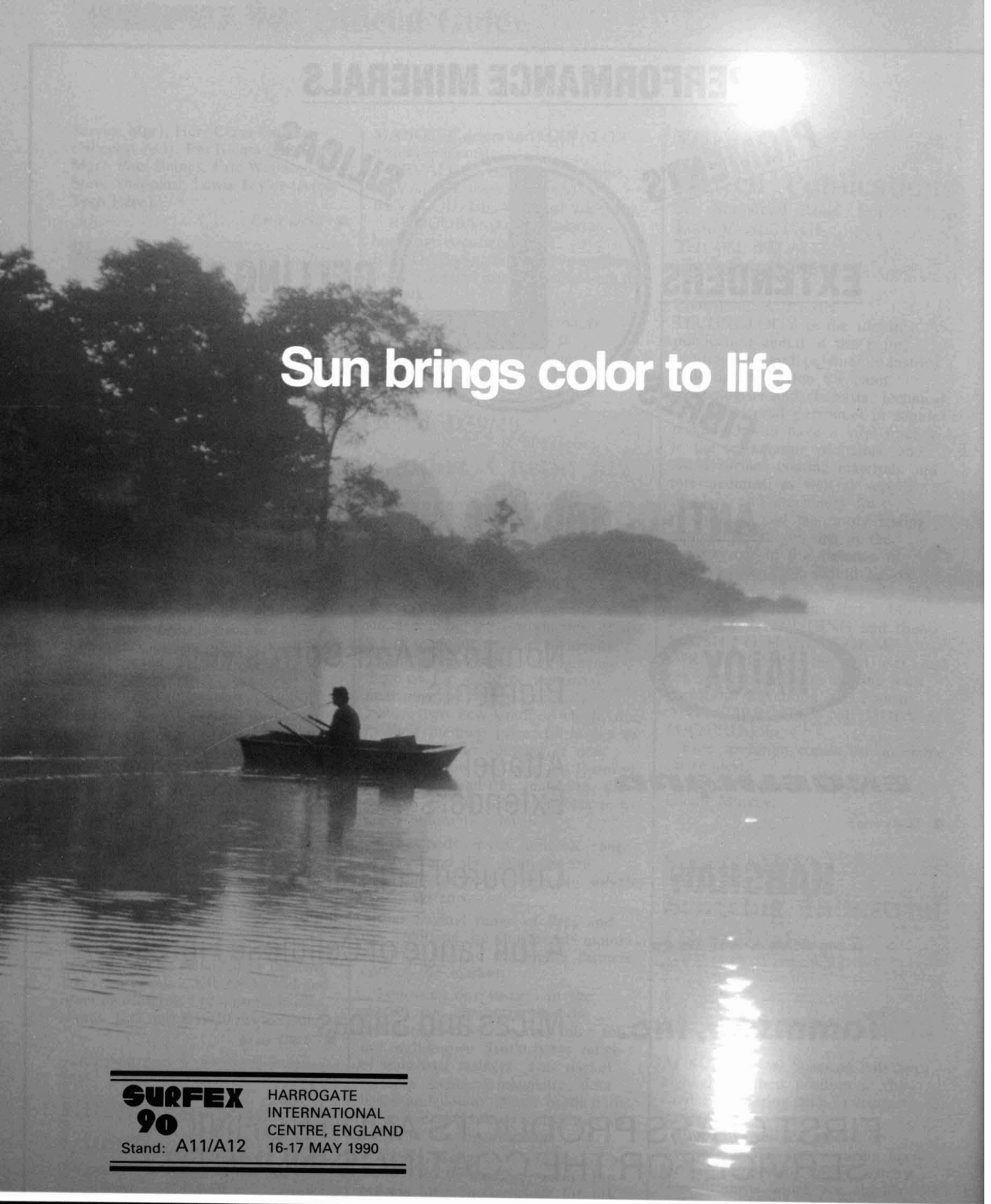
Gorsey Lane, Widnes, Cheshire WA8 0HE
Tel: 051 495 1989,
Fax: 051 495 2003

At SURFEX 90 Schering will be highlighting their position in the Civil Engineering and Coatings industries.

Emphasis will be placed on Amine and Polyamide curing agents for two-component epoxy systems. New products which are already well established in the West German markets will be strongly promoted. These include curing agents which are not based on IPD or IPD derivatives, e.g.

☐ XE 76, a polyether amine for flexible coatings.

☐ TL02123H, an adducted hardener with exceptionally good low temperature curing properties and



SURFEX 90
Stand: A11/A12

HARROGATE INTERNATIONAL CENTRE, ENGLAND
16-17 MAY 1990

Within each tide pool, the entrance in life. Above ocean, sand and river, the miracle of sunlight. Inside the delicate balance of color and form, the colorist's art.

Sun Chemical brings color to life — Our extensive range of pigments, aqueous dispersions, and colorants for ink, coatings, plastics, and cosmetics are precisely controlled for quality like the radiant precision and wonder of the sun over water.

See us at stand A11/A12 in the Auditorium.

SunChemical

Sun Chemical Export Corporation
International Operations

Enter D634 on Reader Reply Card

excellent light stability.

A new Reactive Diluent has recently been added to our already comprehensive range.

Resins and hardeners for two-component emulsion paints will also be emphasised.

In addition, Schering will be promoting:

☐ Polyamide and nitro-cellulose resins for printing inks.

☐ Polyamide, polyester and EVA resins for hot metal adhesives.

☐ Cyanoacrylate super glues.

Schering is also one of the world's leading producers of high quality blowing agents and azo-initiators sold under the trade name Genitron. Data on these products will be available.

A wide range of speciality surfactants is manufactured by Schering's subsidiary, Rewo, and data on these products will be available. In the UK Schering distribute the range of nitrocellulose resins and Hacolour pigment preparations of Hagedorn AG. Product information will be available.

Enter D499 ■

Stand G9

Scientific & Medical Products Ltd

Shirley Institute, 856 Wilmslow Road, Didsbury, Manchester M20 8RX
Tel: 061 434 3466,
Fax: 061 445 2943

Scientific & Medical Products Ltd are exhibiting the Brookfield range of Viscometers and accessories along with the Cahn DCA – Dynamic Contact Angle Analyser, for the measurement of surface wettability.

The Brookfield dial models are probably the most familiar products in the range, widely used in a variety of industries. These are also available in a digital version – the DV1, which provides a large easy-to-read digital display of the % scale and 0.10mv or 0.1v output signal to enable it to be connected to a chart recorder.

More sophisticated are the DV11 models, which automatically calculate viscosity (cps), shear stress (dynes cm^2) as well as the Brookfield % scale. The DV11 can also be linked to a computer for fast data processing, hard copy printouts and data plotting.

The Rheoset programmable viscometer is the latest arrival in the Brookfield product range. The Rheoset viscometer system is a PC driven laboratory viscometer which enables the operator to produce flow curves and viscosity curves through the menu driven software.

The Rheoset can be programmed from 0.1 rpm to 250 rpm in steps as small at 0.1 rpm. This produces 2,500 different shear rates for any defined geometry system selected. Measurement programmes can be made in ascending, descending or both ascending and descending speed formats and set in geometric or non geometric increments. All data is continuously recorded and displayed during operation.

Stand Personnel: Nigel Dixon and John Booth.

Enter D500 ■

Stand D45/46

SCM Chemicals Ltd

PO Box 26, Grimsby, South Humberside DN37 8DP
Tel: 0469 571000,
Fax: 0469 571234, Tlx: 52595

SCM Chemicals, the world's second largest producer of titanium dioxide by the environmentally preferred chloride process, will be featuring information on the comprehensive range of TiONA pigments, in particular:

RCL-628, a specialist grade of TiO_2 for high performance coatings, where outstanding durability, high opacity and exceptional gloss are demanded.

RCL-535, a unique multipurpose grade of TiO_2 designed to be used in a wide range of applications, without compromising on performance.

RCL-69, a readily dispersing, blue tone grade of TiO_2, designed to meet the requirements of the plastic industry.

SCM Chemicals will also be displaying information on its commitment to Total Quality Control.

Stand Personnel: Technical & Commercial Staff.

Enter D501 ■

Stand A4

Scott Bader Co

Wollaston, Wellingborough, Northamptonshire NN9 7RL
Tel: 0933 663100,
Fax: 0933 664592, Tlx: 312642

SCOTT BADER CO will be exhibiting two new acrylic copolymer emulsions designed for wood coating and high durability exterior paints.

TEXICRYL 13-777 is a cellulosic colloid stabilised latex, imparting a self gelling or thixotropic characteristic and has specific wet adhesion to both wood and alkyd substrates.

TEXICRYL 13-666 also benefits from specific wet adhesion to wood and alkyd surfaces, but also has exceptionally low water uptake, and a particle size distribution down to 40 nanometres which can stabilise unsound substrates.

Also featured is ECOBINDER – a special development giving a new generation of environmentally-friendly products designed for the manufacture of essentially non-polluting water based paints. Ecobinder is based on novel polymer technology which gives improved film hardness and pigment binding in a low Tg polymer. Paints based on Ecobinder are able to form well integrated films at low temperature, without the addition of external coalescing aids and do not contain a detectable level of unreacted monomor, thereby minimising total odour.

In line with the overall ecological theme, Scott Bader will display samples of their resins for Powder Coatings – the ultimate solvent free resins.

The opportunity will be taken to exhibit many other products which include a water reducible alkyd, saturated polyester resins and vinyl modified alkyds.

Stand Personnel: Phil Cox, Technical Manger; Roy Wilkinson, Manager, Solvent Based Resins; Mike Palmer, Manager, Emulsion Polymers.

Enter D502 ■

Stand D61

The Shear Co Ltd

The Old Foundry, Hall Street, Long Melford, Sudbury, Suffolk CO10 9JG
Tel: 0787 77418,
Fax: 0787 75991, Tlx: 987018

The Shear Co Ltd will be showing examples of our specialised range of High Performance Pigment Dispersions for the Automotive Paint Industry and our new range of High Strength Transparent Iron Oxide Dispersions for Wood Decorating application. We will also be showing our complete range of Printing Ink Additives including our new High Rub-Resistance Wax Compounds for both Heat-Set and Sheet-Fed Inks.

Stand Personnel: B. K. Hood, V. J. Hood, C. M. Hood, J. Elsden, J. Dunn.

Enter D503 ■

Stand D25/26

Sheen Instruments Ltd

8 Waldegrave Road, Teddington, Middlesex TW11 8LD
Tel: 081 977 0051,
Fax: 081 977 0855, Tlx: 268281

Sheen Instruments, manufacturer of Paint and Surface Quality Control Instrumentation, will be featuring the highly successful fully Pneumatic Panel Sprayer Ref 4700 and Auto Film Applicator.

A wide range of Glossmeters, Viscometers, Coating Thickness Meters and Physical Testing Apparatus will also be on display.

Stand Personnel: Mr Michael O'Shea.

Enter D504 ■

Stand D3

Shell Chemicals

Heronbridge House, Chester Business Park, Wrexham Road, Chester CH4 9QA
Tel: 0244 685678,
Fax: 0244 685010

A £10m investment in Shell UK's Epoxy manufacturing facilities which, using improved purity feedstocks, will produce consistent quality customer-tailored Epikote resins.

Stand Personnel: Reps – Andy Golder, Jim Seward and Colin Dixon; Technical Service Manager – Haydn Phoenix.

Enter D505 ■

Stand D69

Silberline Ltd

Banbeath Industrial Estate, Leven, Fife, Scotland KY8 5HD
Tel: 0333 24734,
Fax: 0333 21369

Silberline Ltd, manufacturers of non-leafing Alu-Pigments for automotive finishes, will be exhibiting its full range of the highly successful, classical SPARKLE SILVER™ ALU-PIGMENTS as well as HYDROPASTES™ and AQUAPASTES™ for waterborne systems.

Also on display will be a range of granulated, solvent-free Masterbatches in various binders for printing inks, powder coatings and plastics.

Literature will be available in English, German, French, Spanish and Italian.

Stand Personnel: Visitors will be welcomed by Dr D King and Alwin Baumann. *Enter D506* ■

Stand D19/20

Steetley Minerals Ltd

PO Box 2, Retford Road, Worksop, Notts S81 8AF
Tel: 0909 475511,
Fax: 0909 473343, Tlx: 547901

Steetley Minerals will feature the full range of BENTONE Rheological Additives from RHEOX Inc at SURFEX 90. These will include the now well established easy-dispersing SD range, products based on RHEOX's unique Hectorite clay and rheological additives for water-based systems.

Also displayed will be the LOVEL® range of flatting agents from PPG Inc, especially the highly efficient LOVEL HSF and LOVEL 275.

Steetley Minerals Ltd continued to emphasise its position as the supplier of a wide variety of functional fillers aimed at the coatings industry. The MINFIL WD range of high brightness white dolomites is now complemented by the addition of MINFIL WD10 which is a fine particle size micronised product. Where weight saving is required DICAPERL hollow glass microspheres or fillers from the DICALITE Perlite range are recommended.

Other speciality chemicals available from Steetley Minerals include products from the Fratelli Lamberti comprehensive range of paint auxiliaries Tannic Acid for use in rust conversion coatings, the STECAT range of cationic surfactants, RAYBO paint additives, KOLON hydrocarbon resins, INHIBISIL® anti-corrosive pigment and HISIL semi-reinforcing fillers.

For a complete listing of all Steetley Minerals products for the coatings industry visit Frank Kenna and his colleagues on Stand D19/20.

Stand Personnel: F. W. Kenna, M. H. Cowan, T. Cleary.

Enter D507 ■

Stand D38

Stort Chemicals Ltd/EFKA Chemicals BV

22 Hockerill Street, Bishop's Stortford, Herts CM23 2DW
Tel: 0279 755151,
Fax: 0279 755246, Tlx: 818131

Stort Chemicals Ltd, as the exclusive UK agent for EFKA Chemicals BV, Hillegom, Holland, will feature the following products:

EFKA 46/EFKA Polymer 401

The development of high molecular weight dispersants such as EFKA 46 and EFKA Polymer 401 has led to the introduction of genuine universal pigment concentrates for the production of solvent based industrial finishes. These concentrates contain minimal quantities of foreign resin (less than 2.5%), and lead to the highly efficient and cost effective production of industrial paints. EFKA know-how in this area has been widely accepted throughout Europe.

EFKA Polymer 400 and 401

High molecular weight dispersants specially designed to stabilise opaque organic pigment, thereby enhancing the gloss of all high performance industrial finishes.

EFKA Polymer LP7980

EFKA Polymer LP7980 is a recently developed high molecular weight dispersant for aqueous coatings. It is based on a modified polyacrylate with self-emulsifying properties.

EFKA LP7980 contains primary hydroxyl groups which allow it to crosslink with amino resins under stoving conditions.

Details will also be available on the range of Wacker Pioloform PVB resins, together with the unique rheology modifying products Ircogel 905 and 906 from Lubrizol – both ranges of products distributed by Stort Chemicals Ltd in the UK.

Information on the range of Rohm & Hass Paraloid resins, distributed in the UK by Stort Chemicals associate company Chemacryl Ltd, will also be available.

Stand Personnel: J. Devine, I. Holmes, R. Ficken, K. Gilkes and P. Quednau (EFKA Chemicals BV).

Enter D508 ■

Stand A21

Strastint (UK) Ltd

Delta House, 264 Monkmoor Road, Shrewsbury SY2 5ST
Tel: 0743 271993,
Fax: 0743 236328

Strastint (UK) Ltd is the British subsidiary of Strastint International Pty Ltd of Australia, a major manufacturer of colourant dispensing systems for the tinting of paint. Strastint machines feature pump strokes from 2 ounces to 20 ounces and the unique double pump system allows volumes down to 1/256th ounces to be dispensed accurately.

Larger machines have bottom stirred canisters, are solvent proof for use with industrial paints and can optionally have explosion proof electrics. Strastint (UK) Ltd is showing a range of its dispensing machines plus a new computer colour matching system based upon the Milton Roy ColorMate spectrophotometer.

A ColorMate QC system starts at £7,800 and features Xenon flash illumination, grating monochromator, diode array and double beam geometry with no moving parts. With the addition of an IBM PS2 computer and the most modern colour matching programmes, a ColorMate system can predict and correct colour formulations either for point of sale dispensing or laboratory matching. A new matrix mathematics combines an unsurpassed accuracy of matching with speed, secure colourant selection, control of metamerism and ease of use by the operator.

For the proper mixing of paint tinted in the can, Strastint offers the FAST range of mixers including the 20 litre flameproof M16/396F.

Stand Personnel: Mr John Brice, Managing Director, Australia; Mr Hayden Williams, Managing Director, UK; Mr Alan Murphy, Colour Software Specialist.

Enter D509 ■

Süd-Chemie

refer to Production Chemicals entry

Stand A11/12

Sun Chemical Pigments Ltd

46 Tanners Drive, Blakelands, Milton Keynes MK14 5BW
Tel: 0908 614141,
Fax: 0908 613518

This year the Colour Group of Sun Chemical Corporation will concentrate on three product areas.

First of these is a presentation of High Performance Pigments for Automotive Coatings in multiple physical forms. These include Sun Chemical's unique standardised High Solids Press Cakes and Sunsperse® dispersions, both of intense interest for development of water borne aesthetically styled colours. In the same way flushed versions of the same pigments will show the styling opportunities of this form of pigment.

Secondly, the company will show its new Perylene Red 179 which has already created extensive interest in Japan and the United States because of its unique combination of attractive styling possibilities and low rheology.

Thirdly, the company will again feature its ranges of selected pigments Flexiverse® and Sunsperse® 6000 aqueous dispersions for the rapidly expanding environmentally friendly aqueous printing inks.

Stand Personnel: I. J. Peters, M. S. Taylor, P. Ludwig, P. Burrow, D. Graham, Dr P. Lewis.

Enter D510 ■

Stand R6

Thomas Swan & Co Ltd

Crookhall, Consett, Co Durham DH8 7ND
Tel: 0207 505131,
Fax: 0207 590467, Tlx: 53565

Thomas Swan & Co Ltd will be featuring a new range of CASAMID matt epoxy powder curing agents. A new development is an extensible epoxy resin particularly for floorings, etc, to widen the range of CASAREZ epoxy resins. The range of CASAMID polyamide resins for printing ink lacquers continues to expand and latest developments include resins resistant to gelation at sub-zero temperatures. Swans continue their support of the printing ink industry by launching a new range of CASATHANE polyurethane resins designed for flexographic ink applications. This complements the CASATHANE range of polyester and polyether urethane prepolymers specifically designed for hot cast applications. MOCCA is also available as CASACURE M.

The N121 UV Curetester for comparing rates of cure under standardised conditions using substrates and coating weights used in practice will be shown. The N121 is much enhanced on the original N101, containing integral nitrogen purge, computer connector and improved stylus mechanism.

In addition, access to Swan's wide Trading and Distribution network including USA and USSR and the extensive and flexible custom and toll manufacturing facilities will be available.

Stand Personnel will include David Best and Peter Oldring.

Enter D511 ■

Stand G16/17

Tego Chemie Service

Tego House, Victoria Road, Ruislip, Middlesex HA4 0YL
Tel: 081 422 7788,
Fax: 081 864 8159, Tlx: 923146

The Tego Chemie Service range of surface tension modifying additives for paints and inks and high temperature resistant silicone resins are featured.

New products include an extension to the range of Tego Foamex defoamers and Tego Airex deaeraters. A table showing the most effective defoamer for a wide range of systems will be present. In addition plastic wallcharts depicting the entire range of additives and where they can best be used will be available.

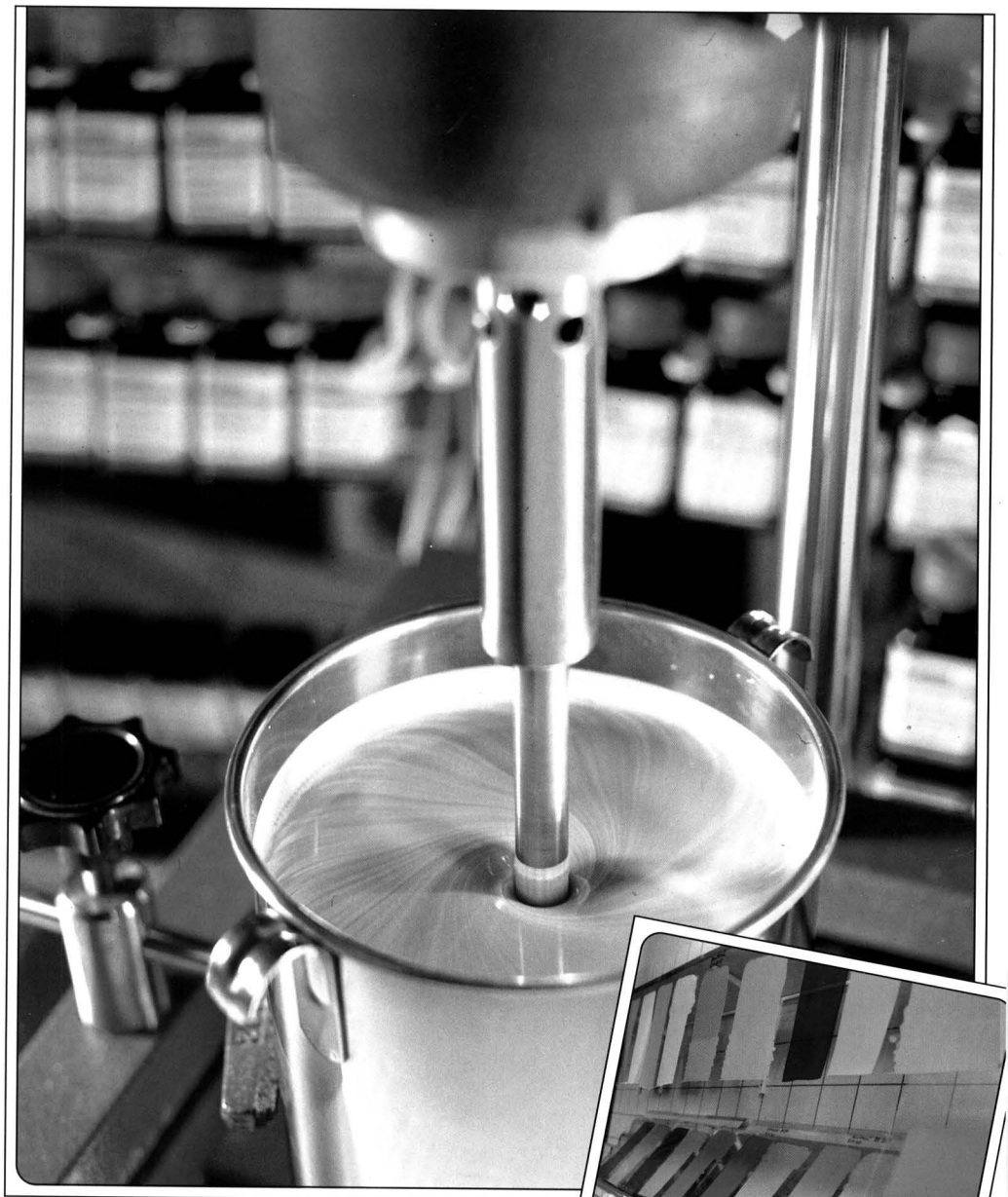
Additionally, an introduction to the theory of slip/mar resistance will be given because the Tego Glide range of additives represents a further important product group.

Finally, the well-known Silikoftal series of silicone modified polyester resins for decorative coatings and Silikophen range of pure silicone resins for industrial applications will be on show.

Stand Personnel: A. L. Smith, T. B. Ratcliffe, Herr Vltavsky.

Enter D512 ■

Trend setting



Quality is something we know all about. With wetting and dispersing additives from Byk-Chemie, you can be sure that your pigment pastes and coatings will always achieve the right shade. Exact shades, freedom from floating or flooding stability – the crucial quality criteria – are unmatched.

R & D, Technical Application and Production profit from analysis and comparisons. And our customers benefit most of all from the reproducible quality.

BYK Chemie

Additive + Instrumente

Tested quality is the best formulation.

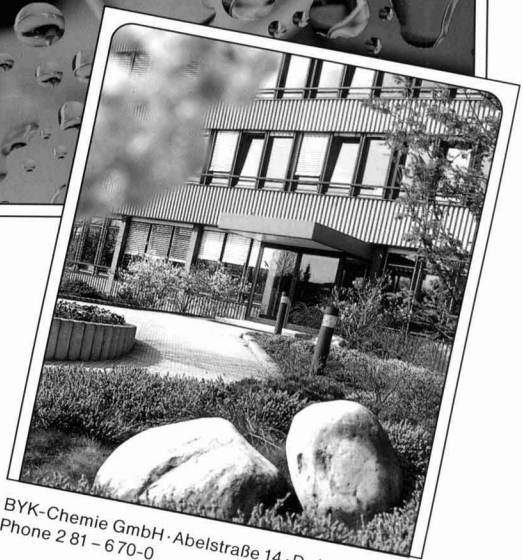
Disperbyk®-163
Polymeric wetting and dispersing additive for solvent-containing coating systems.

The ever increasing use of pigment pastes in the production of solvent-containing industrial coating systems requires not only the best formulation but also the best ingredients, or rather additives.
In this context the polymeric wetting and dispersing additive Disperbyk®-163 from Byk-Chemie has undoubtedly proved its value.
It helps you to prepare the pigment paste more easily, and the paste remains stable for longer and thus has a longer shelf life.

Disperbyk®-163 – Quality that can bear comparison:

– Top-class stabilisation of organic and inorganic pigments.
– Reliably prevents reflocculation of pigment mixtures.
– Imparts positive charge to all pigments.

Disperbyk®-163 – so that you can always prepare stable, non-floating, non-flooding coatings and pigment pastes easily and productively.



Experience the quality of the Byk-Chemie wetting and dispersing additives for yourself. We will send you samples and our detailed brochure „Additives for pigment pastes" with model formulations on request.

BYK Chemie
Additive + Instrumente

BYK-Chemie GmbH · Abelstraße 14 · D-4230 Wesel 1
Phone 2 81 – 6 70-0

SILBERLINE

ALUMINIUM PIGMENTS

For over 45 years ***Silberline*** *has been setting new standards of excellence in the Aluminium pigment industry.*

Today, as the world's leading supplier of non-leafing pigments for metallic automotive paints, ***Silberline*** *has become the first Alu-pigment producer to be accredited and achieve recognition to* ***BS 5750:*** *part 2 and* ***ISO 9002:*** *1987 through it's European operation, Silberline Ltd in Scotland.*

Silberline Ltd *is successfully implementing corporate quality–, service–, and innovation–strategies which led to the Queen's Awards for Export Achievements in 1981 and 1986 and now the recognition to* ***BS 5750/ISO 9002.***

With a major share in the European automotive metallic pigment market, ***Silberline Ltd*** *produces a wide range of non-leafing pigments* ***(Sparkle Silver*** *and* ***Sparkle Silver Premier Grades)*** *solvent-free grades* ***(Silvet*** *and* ***Silvex)*** *and super quality leafing grades for printing inks.*

The newest additions to the range are ***Hydropaste*** *and* ***Aquapaste*** *for environment-friendly water based paints.*

All products are covered by the certification under these quality standards.

Step outside the ***Silberline*** *plant at* ***Leven, Scotland*** *and you will find an area of outstanding beauty, world renowned for it's golf and cultural heritage.*

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Stand G19/20

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Charles Tennant & Co (London) Ltd on behalf of its Principals will be exhibiting the following:

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Du Pont de Nemours International SA: Several new products from the range of ELVACITE bead, aqueous dispersion and water soluble acrylics together with the ELVERON functional resins.

Propinave Industrias Quimicas SA: The range of phenolic, maleic and esterified rosin esters for the coating and adhesive industries including extremely pale ester gums designed for the adhesives industry.

Tennant-KVK Ltd on behalf of its Principals will be exhibiting the following:

Kemisk Vaerk Koege A/S: Offset Yellows, Rubines and Blues pigments. New pigment developments in liquid ink Yellows, Reds and Rubines complementing their well established products; Highlighting four colour process printing for liquid inks using the PREDISOL dispersions; Preparations for powder coatings; Aqueous pastes + dispersions for liquid inks suitable for transparent, non-absorbent substrates; Hyperdispersants.

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Cabot Carbon: Range of carbon black and fumed silicas for all surface coating applications.

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Additionally, Tennant-KVK Ltd will be displaying their recently launched range of Tennafast and Tennalake pigments along with pigmented dispersions suitable for high alkali-resistant coatings and general industrial paints.

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Stand G22/23

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Thor Chemicals (UK) Ltd will have details available of their new biocides introduced since last year's exhibition which will include a latex grade biocide ACTICIDE LG. This product was specifically manufactured with minimal levels of multivalent ions to improve the shear stability of emulsion polymer systems.

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Stand Personnel: Bill Garrard, Managing Director; David Wood, Product Manager; Chris Priestley, Regional Sales Manager (North); Paul Wood, Regional Sales Manager (South); John Gillatt, Technical Manager; plus Technical Sales Executives.

Enter D514 ■

Stand D67/68

Troy Chemical Company BV

Haringbuisweg 35, 3133 KP
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Staff will be available to respond to any enquiries regarding the Troy range of coatings additives and biocides. Marketed under the Troysan, Troysol, Troykyd and Troythix trade names is a comprehensive range of remedial products to assist the coatings formulator.

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You are most welcome to visit us at our exhibition Stand D67/68 on the ground floor.

Stand Personnel: Mr Geoffrey Ince, Mr Johan van Oosterom, Mrs Mandy Verbaan and Mrs Mira Kwakkelstein.

Enter D515 ■

UCE Developments

refer to Concept to Commissioning entry

Stand A22

Union Camp Chemicals (UK) Ltd

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Union Camp Chemicals (UK) Ltd is one of the four business groups within the Chemical Products Division of the USA based Union Camp Corporation.

Union Camp's Chemical Products Division has three manufacturing sites in the USA and two in the North East of England.

The main UK plant at Chester-le-Street, Co Durham, manufactures tall oil fatty acids, rosin and rosin based tackifiers and in May will commission a new dimer acid manufacturing plant.

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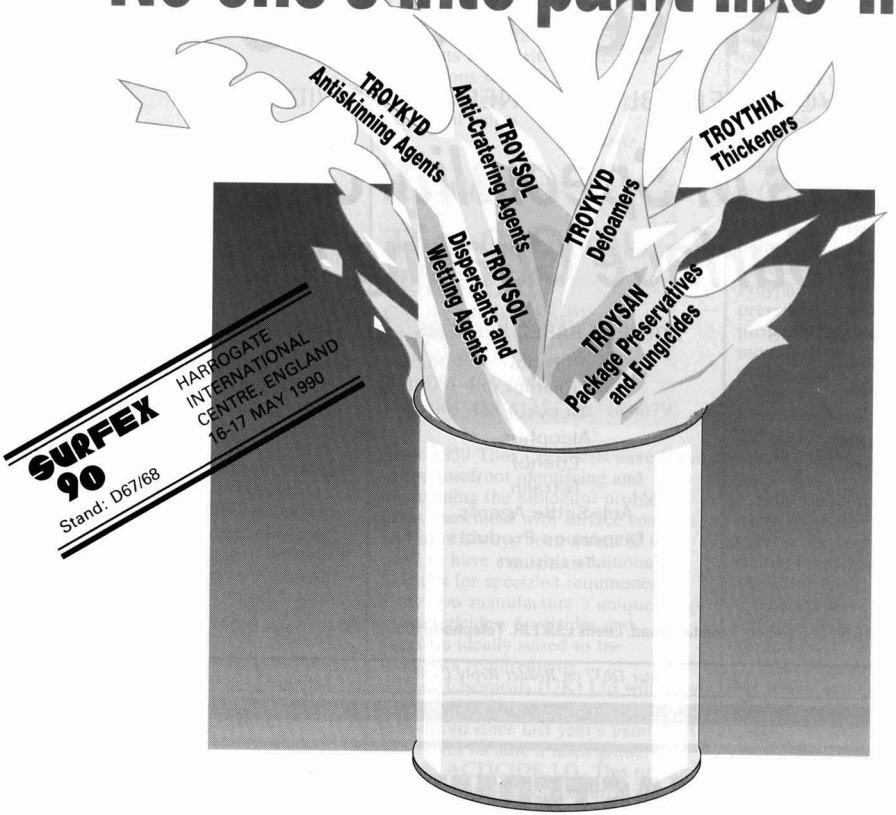

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At Bedlington, Northumberland, the Company manufactures a range of polyamides for use in the manufacture of inks and adhesives and for the curing of epoxy resins.

Also produced at Bedlington are plasticisers for PVC and a range of oilfield chemicals.

The polyamide business will be underpinned with dimer acid from the new Chester-le-Street facility making Union Camp Chemicals (UK) Ltd the only integrated producer of polyamides in Europe.

Stand Personnel: Dr R. Lofthouse, European Sales Manager; Mr A. Donnelly, Sales Services Manager; Mr J. R. Roberts, UK Field Services Manager; Mr R. S. Johnson, Polyamide Sales.

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Stand A8

Vinamul

Mill Lane, Carshalton, Surrey SM5 2JU
Tel: 081 669 4422,
Fax: 081 669 4422, Tlx: 266264

Vinamul is leading the way in the development of advanced binders designed for high technical performance in a wide range of paints. The latest ethylene-vinyl acetate terpolymers combine formulation efficiency with unrivalled environmental benefits.

Anticipating increased European demand for solvent free paints, Vinamul is expanding its 3600 range of soft binders and now offers a choice of systems suitable for formulating paints free from coalescing solvent.

Among recent additions to the VINAMUL 3600 series is a binder developed specifically for solvent free matt paints. In correct formulations the binder gives paints which can film form at 5°C without any coalescing solvent. Levels of residual monomer have also been significantly reduced.

The soft polymer technology of the 3600 series is now being exploited in a functional, highly flexible binder system for tough, water-resistant roofing applications and exterior paints.

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Enter D517 ■

Stand D28

Wengain Ltd

254 Finney Lane, Heald Green, Cheadle, Cheshire SK8 3QD
Tel: 061 436 3966,
Fax: 061 499 0651, Tlx: 666318

WENGAIN Sales staff will be on hand to give visitors to their stand information on all the latest additions to their product range.

These include the following:

* MAGRUDER COLOR CO, USA: Heatset, Sheetfed and Newsink flushed pigments, plus toners and organic pigments for Liquid inks. New at SURFEX 90: Soyabean flushes and Aquaflo acrylic chips.

* WAARDALS, NORWAY: Zinc Phosphate and Zinc Chromates for paints, Zinc Borate for paints and plastics. New at SURFEX 90: WACOR non toxic anticorrosive pigment.

* LEAD CHROME COLOURS, UK: Lead chromates for all surface coatings. New at SURFEX 90: Heat stable grades for plastics.

* LEON FRENKEL, UK: Alkyd and Hard Resins for paints, inks and adhesives. New at SURFEX 90: Phenolic Resins for ink varnishes.

* CAFFARO, ITALY: Clortex chlorinated rubbers for paints and adhesives. New at SURFEX 90: Cloparin chlorinated paraffins.

Stand Personnel: John Stooke, Andrew Foster, Bryan Clementson, plus representatives from the above companies.

Enter D518 ■

Stand A21

Westlairds Ltd

North Green, Datchet, Slough, Berks SL3 9JH
Tel: 0753 45726,
Fax: 0753 49933, Tlx: 848094

WESTLAIRDS will present the range of colour measuring systems manufactured by BYK-Gardner Inc USA (formerly Pacific Scientific Instrument Division). Of special interest will be the Color Machine, a versatile array spectrophotometer which combines current generation computer hardware, optimised software, to provide the user with a spectrophotometer to perform virtually any application.

A selection of physical test instruments manufactured by BYK-Gardner GmbH, West Germany, will also be shown.

Stand Personnel: Messrs A. L. Batty, T. McPhillips, G. Cauchois.

Enter D519 ■

X-Rite

refer to Analogue and Digital Services entry

Stand A3

Yorkshire Colour Systems Ltd

Albion Mills, Greengates, Bradford, West Yorkshire BD10 9TQ
Tel: 0274 611633,
Fax: 0274 610488, Tlx: 51570

Datacolor AG of Switzerland are one of the world's leading manufacturers of industrial colour matching/colour control systems.

As Datacolor's UK and Eire agents, Yorkshire Colour Systems will be exhibiting the Datacolor "Pigmenta" match prediction system which utilises the 3890 spectrophotometer.

Lowest cost matches are obtained instantly on up to 6 pigment combinations. The sequence in which recipes are presented is determined by weighting price and/or metamerism as key criteria.

The system has options for transparent, translucent and opaque media and will predict the pigmentation level required to just hide at a given coating thickness, or to produce a required degree of opacity.

Also on show will be the most widely used metallics control system in the world: the Datacolor MMK 111. This system measures at three angles simultaneously and is used by all the major European car and metallic paint finish manufacturers.

Stand Personnel: John Spode, Peter Luck, David Woodworth, Ms Robin Waxman.

Enter D520 ■

Surface Coatings-1, 2

Edited by **Alan D. Wilson, John W. Nicholson,** Laboratory of the Government Chemist, Department of Trade and Industry, London, UK, and **Harvard J. Prosser,** Warren Spring Laboratory, Department of Trade and Industry, Stevenage, UK

Part 1 is the first of a new series, *Modern Surface Coatings,* designed to review a wide selection of the most exciting and significant recent developments in the area of surface coatings.

Part 1 begins with a general overview of the entire topic, noting the remarkably wide range of uses to which coatings of one kind or another are put. These include not only decoration but also protection from chemical corrosion, from biological attack, and from high temperatures. The chapters which follow are designed to appeal to a wide audience, including chemists, physicists and materials scientists working in both fundamental research and product development.

Topics comprise a survey of recent developments in organotin antifouling paints including a review of the steps being undertaken to reduce the problems of pollution; environmental concern also underlies a comprehensive examination of the new and growing technology of high-solids coatings; there is a review of recent developments in the important topic of artificial weathering; an account of the use of the sophisticated instrumental technique of X-ray photoelectron spectroscopy for illuminating problems of adhesion and coatings failure; an in-depth discussion of adhesion and methods available to enhancing it; and, finally, the fundamental question of molecular relaxations occuring during the process of film formation is examined.

CONTENTS: 1. The widening world of surface coatings (*J. W. Nicholson, A. D. Wilson and H. J. Prosser*). 2. Organotin-based antifouling systems (*S. J. Blunden and R. Hill*). 3. High solids coatings (*R. F. Storey*). 4. Recent developments in the artificial weathering of coatings using plasma erosion (*N. A. R. Falla*). 5. The use of X-ray photoelectron spectroscopy for the analysis of organic coatings systems (*J. F. Watts*). 6. Adhesion promoters (*P. Walker*). 7. Molecular relaxation processes during film formation (*C. J. Knauss*). Index.

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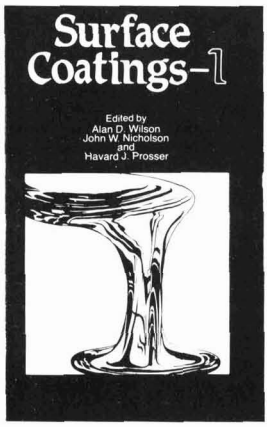
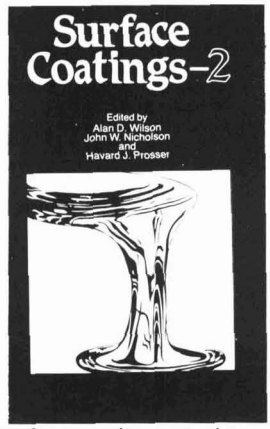


Part 2 is the second in the series designed to give an overview of the major recent developments in the field of surface coatings. As in Part 1, a wide range of topics is presented.

Two of the chapters describe aspects of waterborne coatings, materials which are undergoing continuing development. One chapter reviews recent progress in the technology, while the other describes advances in the coatings application technique of electrodeposition. Since an important constituent of organic coatings is the pigment, one chapter is devoted to the widely used material, titanium dioxide. The importance of organic coatings in their role of preventing corrosion is emphasised by two chapters—one on organic coatings for corrosion protection, and another on the application of galvanized reinforcing bars in concrete. Finally, the book includes a chapter on the recently developed technique of acoustic emission for evaluating coatings.



CONTENTS: 1. Waterborne coatings (*J. W. Nicholson*). 2. Electrodeposition of paints (*H.-J. Streitberger and R. P. Osterloh*). 3. Acoustic emission testing of coatings (*R. D. Rawlings*). 4. Organic coatings in corrosion protection (*W. Funke*). 5. Galvanised reinforcements in concrete (*M. C. Andrade and A. Macias*). 6. Titanium dioxide for surface coatings (*The late T. Entwistle*). Index.

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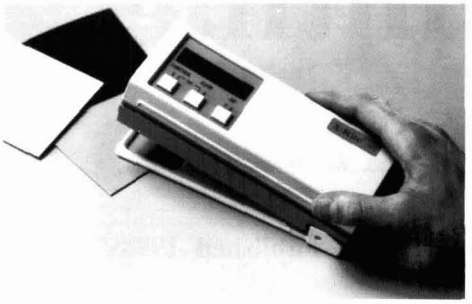

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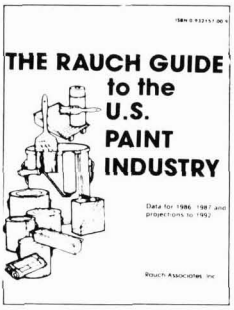

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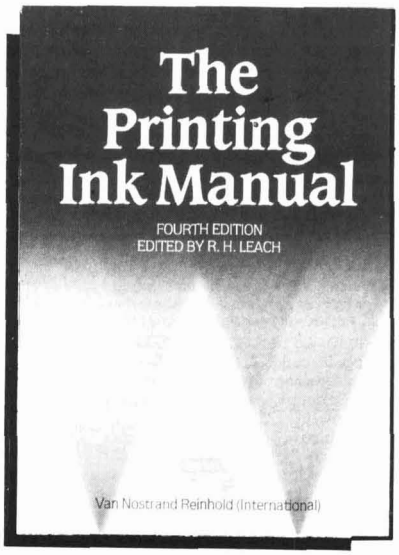

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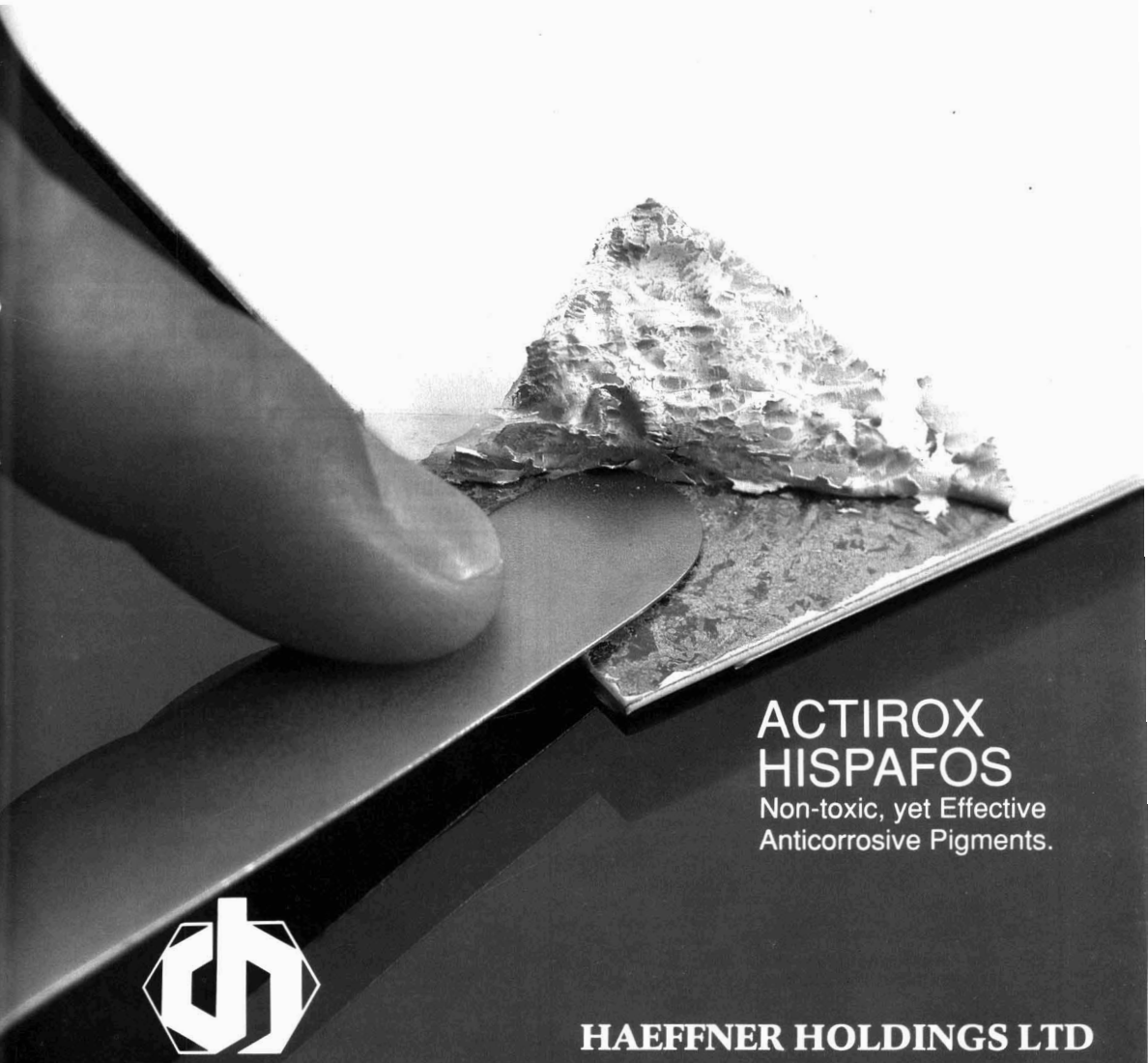

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High performance, high solids coatings using solution vinyl resins

by W. P. Mayer, Union Carbide Corporation, PO Box 670, Bound Brook, NJ 08805, USA

Abstract

Low molecular weight solution-polymerized vinyl resins have broad utility in high solids coatings. They combine the advantages of traditional high molecular weight vinyls – hydrolytic stability, high glass transition temperature, and chemical resistance – with low solution viscosity, broad compatibility and adhesion to many substrates.

New types of low-bake amino-cured coatings for wood, plastic and metal have been formulated by blending these vinyls with other high solids resins and intermediates. One of these is a high performance "superlacquer" finish for wood with exceptional chemical resistance and mechanical properties combined with fast cure and long pot life.

A method for efficiently screening and optimizing such hybrid coatings has been developed. The method employs a computer spreadsheet to quickly identify compositions which meet specific solids and stoichiometric constraints.

Introduction

High molecular weight solution polymerized vinyl resins have been used for over fifty years in maintenance and marine coatings, industrial product finishes, and coatings and adhesives for rigid and flexible packaging. In these applications vinyls have earned a reputation for durability, chemical resistance and excellent mechanical properties.

The availability of solution-polymerized vinyls in low molecular weight grades has expanded their range of utility and created new options for formulating many types of high solids coatings. These vinyls are commercially used as modifers for alkyds, polyesters, acrylics and two-part epoxies. They are used in both urethanes and amino cured systems, and in some cases as thermoplastic binders.

The low molecular weight resins to be discussed are UCAR® Solution Vinyl Resin VYES-4 and UCAR Vinyl Polyol VP-200. Their properties are described in Table 1. Both resins are terpolymers of vinyl chloride, vinyl acetate and a hydroxy acrylate. The latter monomer provides hydroxy groups for crosslinking reactions.

Table 1
Typical properties of low molecular weight solution vinyl resins

	UCAR® Solution Vinyl Resin	
	VYES-4	VP-200
Molecular Weight $\overline{Mn}$	4000	2000
Hydroxyl Equivalent Weight	600	470
% Vinyl Chloride	70	58
Tg°C	53	43
Form as Supplied	Pellets	Solution 74% NV in MEK

Special feature of low molecular weight vinyls

The low molecular weight vinyls have glass transition temperatures (Tg) above room temperature. This allows them to dry to non-tacky films in the uncrosslinked state. In contrast, many high solids polyester and alkyd resins have glass transition temperatures well below room temperature, which causes them to remain tacky and subject to sagging until they become sufficiently crosslinked to raise the Tg above the surrounding temperature. Accordingly, when these vinyls are blended with polyesters or alkyds, they raise the Tg of the blend and impart "lacquer dry" characteristics.

The vinyl chloride groups in the polymer contribute to good water and chemical resistance. For this reason vinyls are commonly blended with other generic polymers such as alkyds or nitrocellulose to upgrade stain or water resistance.

Vinyls have excellent hydrolytic stability as result of their highly stable carbon-carbon structure. As a consequence, high solids vinyls can develop chemical resistance and durability at lower levels of crosslinking than their high solids polyester and alkyd counterparts. In fact, the 4000 molecular weight vinyl has shown good exterior durability in pigmented topcoats on primed steel with no crosslinking at all, unusual performance for such a low molecular weight polymer.

New vinyl/amino coatings for wood

A great deal of research activity is currently being directed at the development of improved industrial coatings for furniture. Nitocellulose suffers from low application solids and poor chemical resistance. Urethanes, widely used in Europe and Asia, have good chemical resistance and higher application solids, but have limited pot life. The faster curing types based on aromatic isocyanates tend to be brittle and prone to yellowing. UV cure systems provide high solids and good durability, but they have limited versatility and require specialized cure equipment. Polyester/urea systems have raised concerns over formaldehyde emissions.

Recently a new class of high solids vinyl/amino "superlacquer" wood finish has been gaining commercial acceptance. This system is based principally on UCAR VYES-4 and Resimene 2040, a resinous polyol-modified amino resin available from Monsanto.

The features of this system are:

- ☐ Fast cure at low bake temperatures or, optionally, overnight cure at ambient temperature
- ☐ Long pot life, up to two weeks
- ☐ High application solids for high film build in two or three coats
- ☐ Excellent chemical and stain resistance
- ☐ Hardness with excellent flexibility and mar resistance
- ☐ Excellent sanding, rubbing and polishing properties
- ☐ High gloss and clarity
- ☐ Good recoatability and repair capability
- ☐ Ability to be applied under humid conditions without bubble formation
- ☐ Adhesion to dense oily woods such as teak and rosewood
- ☐ Resistance to charring by a burning cigarette
- ☐ Low formaldehyde content

A typical "superlacquer" formulation is shown in Table 2. General coating properties are summarized in Table 3.

The "superlacquer" is far superior to nitrocellulose lacquer in resistance to household chemicals and solvents, and is both harder and tougher. When compared to a polyester urethane system used on furniture, the "superlacquer" has much longer pot life, better adhesion and chip resistance, better color stability and lower cost.

Color stability

The "superlacquer" is superior to other wood finishing vehicles tested in resistance to yellowing under the influence of heat or ultraviolet light.

Color stability of the "superlacquer" on exposure in

a QUV weatherometer was compared with that of two urethane systems and a nitrocellulose lacquer. The results are shown in Figure 1. The graph shows relative yellowness as measured by "b" values on the Hunter L,a,b scale using a Hunterlab colorimeter. Samples having "b" value less than about 6 have insignificant yellowness for most wood coating applications; a rating of 8 is a pale yellow and 15 is medium yellow.

Figure 1
UV resistance of wood coatings

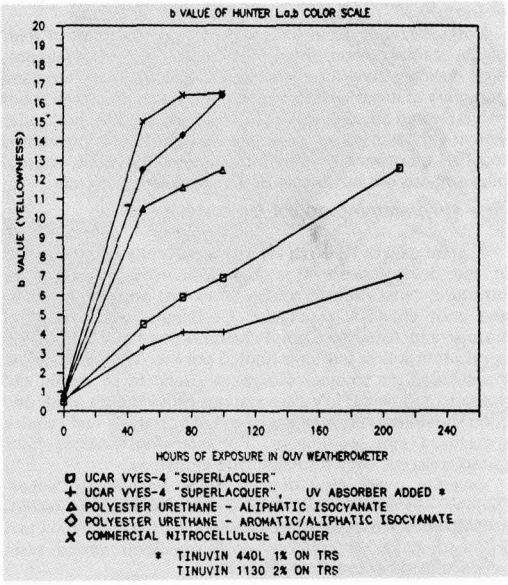


Table 2
"Superlacquer" Furniture Coating

	NV Pounds	Total Pounds	Pounds/ 100 Gal
UCAR® VYES-4	44.80	44.80	146.66
BECKOSOL 12-005 50% NV (1)	11.20	22.40	73.33
RESIMENE 2040 85% NV (2)	44.00	51.76	169.46
MIBK		54.90	179.72
Toluene		54.90	179.72
n-Butanol		11.20	36.66
BYK 070 (3)	0.03	0.40	1.31
K-CURE 129-B 50% ACT'V (4)	2.40	4.80	15.71
Totals	102.43	245.16	802.57
%NV VY WT	41.9		
Sec No. 4 Ford Cup	16.6		

Mixing Procedure

Charge solvent to a vessel with a high shear mixing blade.
Add BYK 070 anti-foam; mix well.
Add VYES-4 pellets slowly in several increments with good agitation. Allow pellets to dissolve completely.
Add Resimene 2040 and alkyd solution.
Add catalyst with good agitation.

(1) Short Oil Soya Alkyd – Reichhold
(2) Resinous Polyol Modified Methylated Melamine Resin – Monsanto
(3) Defoamer – BYK Chemie
(4) Catalyst – King Industries

Table 3
Coating properties of "superlacquer" wood finish

Stain Resistance		
Agent	Contact Time @ RT	Effect
50% Ethanol	6 Hrs.	No Effect
Mustard	1 Hr.	No Effect
Boiling Water	30 Min.	No Effect
Hot Coffee	(1)	Faint Ring (2)
Nail Polish Remover	——	Pass >50 Double Rubs
Lipstick	24 Hrs.	No Effect
Mechanical Properties		
Buchholz Hardness		71
Nickel Scratch		No Cracking
Sanding/Polishing		Excellent
Tape Adhesion/Cross Hatch		Pass
Cold Check (−5 to 120°F) ASTM D1211-74		Pass >28 Cycles
Application Properties		
Resistant to lifting on recoating after 1.6 Hrs. or 24 Hrs.		No lifting

(1) 2-hour contact under glass; dried on; washed with water
(2) No effect after two-week post cure at room temperature
Dry Film Thickness: 3 mils on Birch
Cure: 30 min 60° + 4 days at RT

The coatings were tested on white glass to eliminate the possibility of color changes in the substrate. A QFS-40 light source was used. The test cycle was 8-hours of light at 60°C and 4-hours of condensing humidity at 40°C.

Slightly yellowing of the "superlacquer" in extended exposure is significantly reduced by addition of a UV absorber.

The "superlacquer" also has relatively good color stability on exposure to dry heat at temperatures up to at least 60°C. Test results shown in Figure 2 compare heat stability of the "superlacquer" with that of a conventional high molecular weight vinyl/alkyd/urea kitchen cabinet finish and a polyester urethane cured with an aliphatic isocyanate.

Cure rate and pot life

Cure of the "Superlacquer" is accelerated by an acid catalyst such as p-toluene sulfonic acid (p-TSA). Slightly faster cures are obtained with a stronger sulfonic acid such as King Industries' K-CURE 129-B. The latter is especially effective when ambient cure conditions or short bake cycles are used.

The fast cure rate of the "superlacquer" is accompanied by unusually long pot life when stored at normal room temperature. Figure 3 shows viscosity versus storage time of a "superlacquer" formulation containing various levels of K-CURE 129-B. The formula used in this example is shown in Table 2. The formulations were still functional after two weeks at all catalyst levels tested. Viscosities were slightly lower using equivalent concentrations of p-TSA.

Cure cycles for high production speed

The fast cure response of the vinyl "superlacquer" lends itself to high speed production finishing operations. One of

the key requirements in such applications is rapid hardness development, allowing coated parts to be stacked or packaged immediately after leaving the bake oven.

Figure 2
Effect of thermal ageing on colour

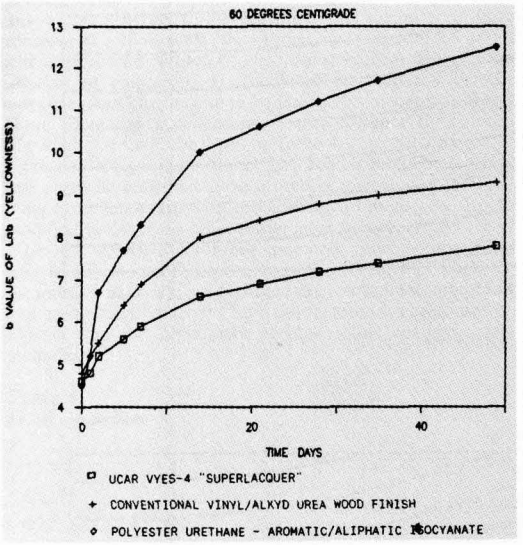
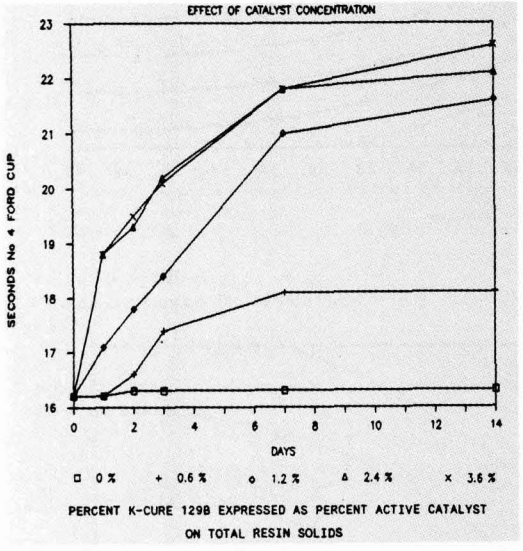


Figure 3
Pot life at 23°C



Several parameters were found to affect the hardness of the "superlacquer": bake time, bake temperature, catalyst concentration and film thickness. The effects of bake time and temperature on hardness are shown at three film thicknesses in Figures 4, 5 and 6. The hardness values shown are measured at room temperature one hour after the bake.

It is clear from the contour plots that thinner coatings and hotter bakes produce higher hardness. Less obvious is the fact that thick coatings do not respond to a higher baking temperature. The relationship between film thickness and bake temperature is shown in Figure 7. Thick films baked at high temperature cure from the surface down, forming a skin which traps solvent in the coating.

The catalyst concentration used in the foregoing contour plots was 3.8% on total resin solids, expressed as the pure acid. That catalyst level was determined to give the fastest rate of hardness development. A lower catalyst concentration of 2.4% gave only a slightly lower hardness, and is generally recommended as a starting point. If high catalyst levels are used, the effects on coating durability should be checked.

In these studies hardness was measured by an indentation method using a PIG Universal tester available from BYK Chemie. Coatings having a Buchholz hardness of 55 usually passed a 5-psi print test, which is an indication the coating is probably hard enough to package. As a reference, fully dried nitrocellulose lacquer had a Buchholz hardness of about 65.

The "superlacquer" coatings continued to harden on ageing at ambient temperature subsequent to the bake. Highest ultimate hardness was noted in coatings applied at a dry film thickness of approximately 1.5 mils per coat. These coatings had hardness values of 110 two months after the bake.

Composition/property relationships

Ternary diagrams offer a convenient way of visualizing the relationship between formula compositions and their properties. The circled point in Figure 8 represents the solids ratio of the three resin components in the "superlacquer" formulation shown in Table 2. Each point on the solid line represents a single ratio of the three components having a stoichiometric balance of amino resin to hydroxyl groups.

The diagram shows that the "superlacquer" formulation shown in Table 2 has less than a stoichiometric level of amino resin, actually about 82% of stoichiometric.

Evaluation of other compositions within the area bounded by the dashed lines shows the effects of changing the ratio of the three resin components. For example, reducing the level of amino resin leads to coatings that remain more flexible after accelerated heat ageing. Increasing the alkyd content lowers cost at the expense of reduced stain resistance, slower hardness development and poorer polishing properties.

Formulating high solids vinyl/amino systems for metals and plastics

High solids vinyl/amino systems provide great versatility in formulating coatings with special requirements such as hardness and flexibility, low bake temperature and adhesion to plastics.

However, screening and optimizing such formulations is time consuming because one needs to simultaneously track stoichiometric balance and the relationship between viscosity and solids.

This process can be greatly simplified by the use of an elementary computer spreadsheet such as the example shown in Table 4. To use the spreadsheet, one types the weight of solids for each component into column D and the spreadsheet calculates the following constants: the solids content of the total formula at a fixed viscosity, the VOC, the stoichiometric ratio and the pigment to binder ratio.

In this example a TONE TM diol is used in combination with the vinyl and amino resin to illustrate the formulating process and describe some properties of these systems. The TONE diols are used because of their very low viscosity at 100% solids and their ability to increase flexibility and impact resistance while maintaining hardness.

TONE diols having two molecular weights are used in the system; TONE 0201 has a molecular weight of 530, and

Figure 4
Buchholz hardness: Dry film thickness – 1.5 mils

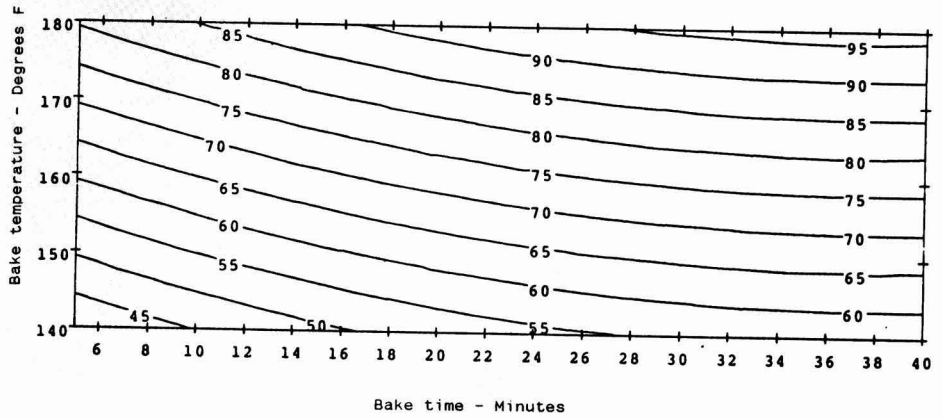


Figure 5
Buchholz hardness: Dry film thickness – 3 mils

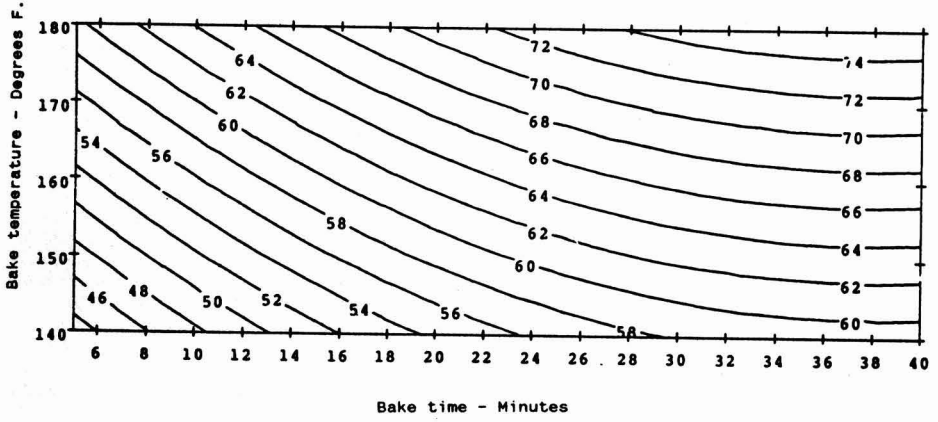
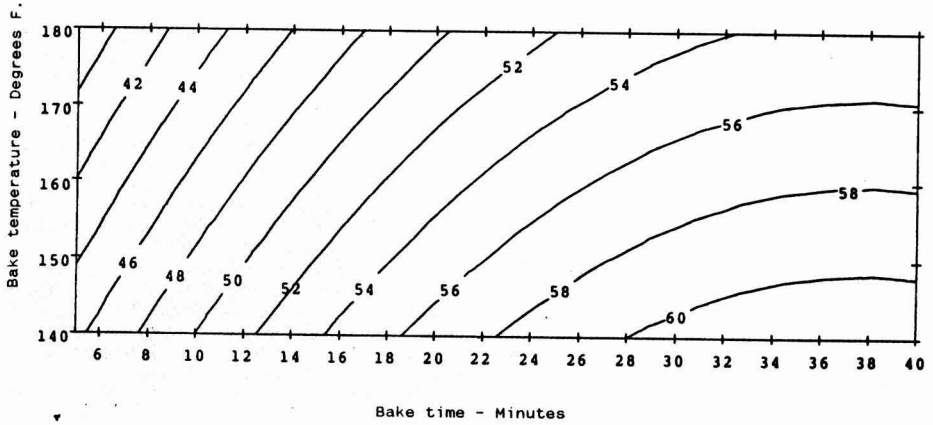


Figure 6
Buchholz hardness: Dry film thickness – 4.5 mils



TONE 0231 has a molecular weight of 1250. Both have one primary hydroxyl at each end of the molecule.

Generating the spreadsheet

The first step in generating the spreadsheet is to plot the viscosity versus solids of each resin component in a standard solvent blend. The solids at which the viscosity of each component is 20 seconds No. 4 Ford Cup is read off the graph and inserted into column C. Next the specific gravity of each solution in column C is calculated and entered on the corresponding line in column F. The values in columns E and G are calculated by the computer using formulas in the cells. The formulas used are listed in Table 4.

Once a simple spreadsheet has been constructed, other resins can be added to allow a greater diversity of formulations to be analyzed. The spreadsheet formulas can also be modified to calculate other parameters such as cost.

In this example all non-pigmented resin compositions entered in column D have a constant viscosity of about 20 seconds No. 4 Ford Cup, provided the components are of low molecular weight and have little interaction with one another. This is true for a majority of high solids coatings intermediates.

Figure 7

Buchholz hardness: Bake time – 23 minutes, Bake temperature range: 140 to 180°F, Thickness range: 1.5 to 4.5 mils

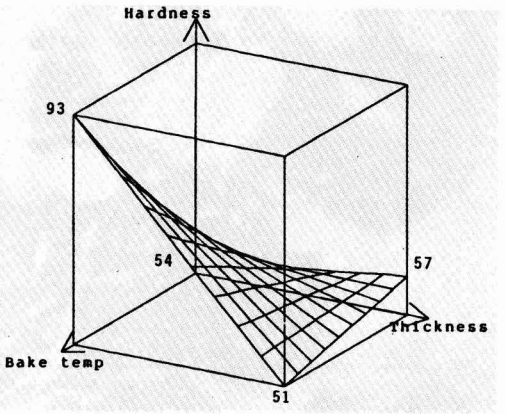


Table 4
Model spreadsheet

	B	C	D	E	F	G
	Component	% NV @ 20 sec # 4 Ford Cup*	Enter Weight of Solids	Total Lbs	Lb/Gal	Gal
8	UCAR VP-200	46.0	0.00	0.00	8.58	0.00
9	UCAR VYES-4	36.5	20.00	54.79	8.36	6.55
10	TONE 0201	83.0	20.00	24.10	8.60	2.80
11	TONE 0231	67.5	0.00	0.00	8.28	0.00
12	RESIMENE 2040	65.0	60.00	92.31	8.63	10.69
13						
14	CYCAT 4040	40.0	2.20	5.50	8.00	0.69
15						
16	TiO2		80.00	80.00	33.3	2.40
17						
18			182.20	256.70		23.14
19						
20						
21	% NV (WT)	= 70.98		VOC	= 3.22	Lbs/Gal
22						
23	% OF STOIC	= 100.0		P/B	= 0.8	

* Formula components diluted with blend of Butyl Acetate/MIBK/MEK 40/30/30 to solids indicated in column C (20 Sec No. 4 Ford Cup)

Density of solvent blend is 8.94 Lb/Gal

Cell Formulas

E9=D9/C9*100
G9=E9/F9
C21=D18/E18*100
F21=(E18-D18)/G18
C23=D12*100/(1.17*D8+0.92*D9+2.08*D10+0.88*D11)
F23=D16/@SUM(D8..D12)

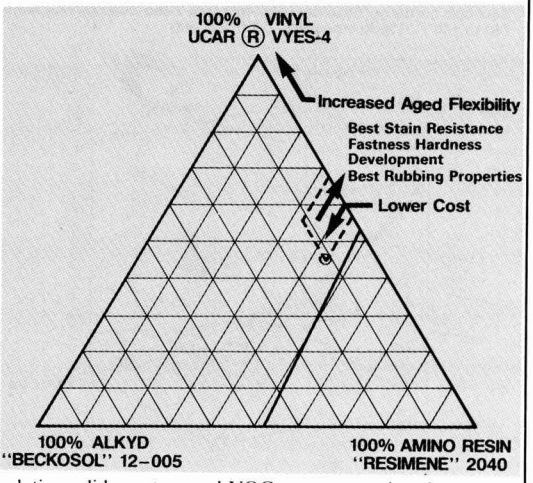
When a pigment is added the viscosity will be higher than 20 seconds, but it will still be essentially constant for any ratio of resin components.

The viscosity of pigmented systems will be affected by parameters such as the pigment level, type and particle size, and the presence of surfactants. However, as long as these parameters are held constant and there are no unusual resin/pigment interactions, the spreadsheet can be used to predict the effect of resin composition on formulated coating solids at a fixed viscosity.

Designing and screening formulations

Using the spreadsheet we identified a range of pigmented compositions based on each of the two vinyls in blends with Resimene 2040 and TONE 0201, and determined their

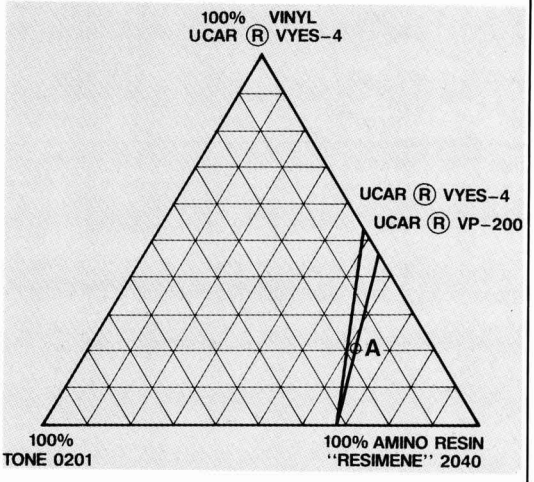
Figure 8
Vehicle solids ratio for VYES-4 "superlacquers"



relative solids content and VOC at constant viscosity. These compositions are plotted in the ternary diagram show in Figure 9. All compositions on the solid lines have a stoichiometric level of amino resin to hydroxyl.

The first objective was to define a composition with a VOC of 2.9 pounds per gallon. The composition defined by point A, containing equal parts of UCAR VP-200 and TONE 0201 meets that requirement.

Figure 9
Vehicle solids ratio



A complete formulation based on composition A is shown in the Appendix. Its properties are shown in Table 5.

When catalyzed with p-TSA and cured for 20 minutes at 160°F, Formula A gives hard, tough, glossy coatings with excellent adhesion to steel and plastics such as ABS and polycarbonate. When catalyzed with dinonyl napthalene disulfonic acid and cured for 20 minutes at 250°F on phosphatized steel, the coatings show good mechanical properties and resistance to boiling water.

Effect of TONE diol molecular weight

Other ternary compositions containing UCAR VYES-4 and Resimene 2040 in combination with each of two TONE diols having different molecular weights are shown in Figure 10. The properties of these systems cured at low temperature are summarized in Table 6.

Figure 10

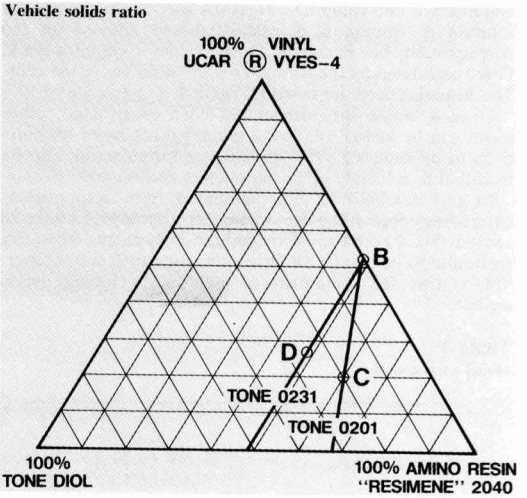


Table 5
Physical properties of 2.9 VOC Formulation

Formulation	A			
Vehicle Solids Ratio*				
UCAR VP-200	20.7			
TONE 0201	17.9			
RESIMENE 2040	61.4			
TiO_2	80.0			
VOC Lb/Gal	2.90			
% NV (Wt)	74.4			
Viscosity				
Sec. No. 4 Ford Cup	31			
Properties				
Cure Time 290 Min.				
Cure Temp.°F	160	180	225	250
Catalyst	(1)	(1)	(2)	(2)
Pencil Hardness	H	3H	3H	5H
Direct Impact In-Lb	120	100	80	60
Conical Mandrel In	PASS	PASS	PASS	0.25
MEK Rubs to Dull	>100	>100	>100	>100
Stain Resistance	78	88	86	89
Gloss 60°	93	92	85	82

(1) 5.5 CYCAT 4040 on TRS (40% p-TSA) – American Cyanamid
(2) 2% NACURE 155 on TRS (55% Dinonyl Napthalene Disulfonic Acid) – King Industries
Stoichiometric Amino Content
0.8 P/B
Dry Film Thickness – 1 Mil
* The complete formulation is shown in the Appendix

Continued on p.170

Developments in the field of industrial solvents

by E. M. van Acker and C. L. M. Vrouwenvelder, Koninklijke/Shell-Laboratorium, Amsterdam (Shell Research B.V.) Badhuisweg 3, 1031 CM Amsterdam, The Netherlands.

Abstract

The chemical industry is continuously adapting to change. This also holds true for the solvents industry, which has long been considered a "mature" industry with few new developments. New and modified products are needed to fulfil changing demands in applications, due to the development of new technologies, and meet increasingly stringent environmental requirements.

In this paper two areas involving new developments will be discussed:

1. The development of improved or completely new solvents, which are more suited to the complex demands of technical, toxicological and environmental performance.

2. Support of the industry with the application of new products.

Both of these aspects will be illustrated by examples.

Introduction

The chemical industry is continuously adapting to change and this also holds for solvent producer and the user industries. Changes induced by new legislation, development of new technologies and environmental concern constitute a challenge to the industry to develop new industrial solvents and to improve the techniques for, on the one hand, selecting the most suitable products for a given application and, on the other, putting new products to effective use.

Looking at the complicated requirements that have to be met by solvents or solvent blends, it will be clear that many factors have to be taken into consideration when new industrial solvents are being developed.

Solutions to the requirements of the environment, new legislation and developing technologies can be found through:

- improving existing products, particularly in those respects where they no longer meet today's and future requirements
- the development of completely new products which better match technological developments or environmental requirements
- the developments of tools to support the industry, enabling it to apply new solvents in the most effective way.

In this paper developments in these areas will be discussed.

Product improvements

One large group of solvents is the hydrocarbons, which are essentially distillate fractions of crude oil, selected according to boiling range for various applications. For many years, customers' needs in terms of product quality have been met by selection of feedstocks, cutting of various fractions, blending and even by direct synthesis of the required molecules, such as the isoparaffins.

Examples of product improvement can be found in this range of hydrocarbon solvents. Many of these products contain significant amounts of aromatic components. Aromatics serve a good purpose in enhancing the solvent power of these solvents, but have the drawback of affecting their odour. Moreover, there is growing concern about the presence of some aromatic components which are undesirable for toxicity and environmental reasons. They may also interfere with disposal techniques. The toxicity aspects of products containing such components may require special precautions, and may also affect labelling and transport classification.

Improvement of such products with respect to technical and environmental characteristics can be achieved by selective removal of the aromatic components. For many years extraction processes with, for example, sulfolane or SO_3 as the extractant have been used to achieve this goal. A much better manufacturing route has been developed, in which the aromatic components are no longer removed but are converted to naphthenes (cycloaliphatics) by hydrogenation. Products from this new route have the advantage over extracted grades of a lower level of residual aromatics as well as other impurities such as unsaturates, which renders them suitable for more critical applications. The hydrogenated products also have an increased naphthenes content, which reduces the loss of solvent power caused by the reduction of the level of aromatics.

The effects of hydrogenation are demonstrated in Table 1, where properties of white spirit are compared with those of its hydrogenated equivalent SHELLSOL D40. The results show that the solvent power of SHELLSOL D40 is slightly reduced (witness the somewhat lower Kauri-Butanol value and the higher aniline point), but that the residual aromatics content is very low, resulting in a more acceptable (lower) odour level. Differences between sulfolane-extracted and hydrogenated grades are obviously smaller (see Table 2); the advantage of the hydrogenated material over the extracted products in terms of solvent power, though slight, is clearly evident.

It is now possible, by selecting a range of feedstocks, to tailor a family of very low-odour/low aromatic solvents to suit various end-use needs (see Table 3).

Development of new products

For chemical solvents, which in most cases consist of one type of molecule, significant improvement in their properties means modification of the molecule and thus the development of a new product. Good examples of products that have

Table 1

Typical properties of SHELLSOL D40 and Low Aromatic White Spirit (LAWS)

PROPERTY	SHELLSOL D40	LAWS
Density at 15°C, kg/l	0.770	0.779
Distillation range, °C:		
– initial boiling point	162	160
– final boiling point	197	198
Flash point, °C	40	38
Kauri-Butanol (KB) value	33	36
Aniline point, °C	67	55
Relative evaporation rate	0.19	0.19
Aromatic content, % m/m	< 0.02	17
Odour	low	typical

been developed as substitutes for products that have become difficult or hazardous to use for toxicity reasons are methoxypropanol and its acetate (Methyl PROXITOL and Methyl PROXITOL acetate).

The ethylene-glycol-based products methoxy- and ethoxy-ethanol and their acetates are well-known in the industry for their combination of attractive properties such as:

- ☐ high solvent power
- ☐ excellent miscibility with water as well as with hydrocarbon solvents
- ☐ relatively low evaporation rate
- ☐ good coupling properties, i.e. improvement of miscibility of mutually immiscible solvents.

This combination of properties, which is the result of their specific chemical structure, not only renders these products very suitable for applications such as water-based paints and coatings, but also means they are very difficult to replace. In view of the toxic properties of these materials and the resulting drop in their threshold limit values, however, replacement has become unavoidable.

Table 2
Comparison of a sulfolane-extracted and a hydrogenated SBP 140/165 hydrocarbon solvent

	SBP 140/165	
PROPERTY	sulfolane extracted	hydrogenated
Density at 15°C, kg/l	0.742	0.742
Distillation range, °C:		
– initial boiling point	144	142
– dry point	165	155
Flash point, °C	25	27
Kauri-Butanol (KB) value	30	31
Aniline point, °C	67	65
Relative evaporation rate	0.68	0.64
Aromatic content, % m/m	0.03	0.005

Research into suitable alternatives has led to the development of products with similar structures, but now based on propylene glycol. In Table 4 the properties are presented of ethoxyethanol (OXITOL) and methoxypropanol (Methyl PROXITOL), from which it can be seen that the latter product also shows some of the important glycol ether characteristics such as complete miscibility with both water and hydrocarbon solvents and a high solvent power. This holds even more strongly for the characeristics of Methyl PROXITOL acetate, which approach those of OXITOL acetate even more closely, as is shown by the data in Table 5.

From these data it is clear that the PROXITOLs, although not exactly matching the performance of the OXITOLs in all respects, can be considered as toxicologically and technically attractive alternatives to the ethylene-glycol-based products for many applications.

Computer reformulation of solvent blends

Development activities on solvents should not stop at the introduction of new products. An equally important task is the implementation of these new products in practical formulations. Such practical formulations are usually based not on single solvents but rather on blends, which have to fulfil a complicated set of requirements in terms of:

- ☐ solvent power
- ☐ evaporation rate
- ☐ solvent balance during evaporation
- ☐ flash point
- ☐ non-toxicity
- ☐ environmental aspects
- ☐ economic aspects.

For this reason, replacement of one or more components of such a blend is usually a difficult task, requiring much know-how and often a significant experimental effort.

An important reduction of this effort can be achieved by using modern "tools" such as computers. A series of pro-

Table 3
Properties of hydrogenated hydrocarbon solvents

	SHELLSOL				
PROPERTY	D40	D60	D70	D90	D100
Density at 15°C, kg/l	0.770	0.793	0.798	0.805	0.805
Distillation range, °C:					
– initial boiling point	162	187	195	220	240
– final boiling point	197	211	245	270	270
Flash point, °C	40	66	72	95	102
Kauri-Butanol (KB) value	33	30	30	28	24
Aniline point, °C	67	71	71	78	81
Relative evaporation rate	0.19	0.04	0.01	<0.01	0.003
Aromatic content, % m/m	<0.02	<0.02	<0.03	<0.1	<0.1

Table 4
Properties of OXITOLs and PROXITOLs

PROPERTY	Ethyl OXITOL	Methyl PROXITOL
Molecular weight	90.1	90.1
Density at 20°C, kg/l	0.931	0.919
Boiling point, °C	135	121
Flash point, °C	40	40
Vapour pressure at 25°C, mbar	7.0	14.5
Relative evaporation rate	0.38	0.75
Hildebrand solubility parameter	9.9	9.0
Miscibility at 25°C:		
– water	∞	∞
– heptane	∞	∞

grams has been developed, in which the "know-how" of many years of solvents research has been incorporated to assist in the characterisation and reformulation of solvent blends. Utilisation of these programs results not only in significant reduction of the effort required for reformulation, but in most cases also in direct cost saving through optimisation of the formulations in terms of cost as well as technical aspects.

The series of programs consists of several individual programs (see Table 6) and a database. The database contains a number of relevant properties of about 120 chemical and hydrocarbon solvents and has capacity for a total of 250 products, allowing new products to be added. It is obvious that the reliability and accuracy of the calculations depend on the database. For this reason continuous attention is paid to this aspect, particularly as regards keeping the databalse up to date.

For the reformulation of a solvent blend the programs LMPROP and LMREF are the main ones. LMPROP is used to characterise an existing solvent blend by calculating a number of important properties and the evaporation behaviour. Properties calculated are:

- ☐ Solubility parameters HSP, HBI and FP (see below)
- ☐ Density
- ☐ Viscosity
- ☐ Evaporation time
- ☐ Cost.

The solubility parameters used in these programs to characterise the solvent power of a solvent or blend are the Hildebrand solubility parameter (HSP), the hydrogen bonding index (HBI) and the fractional polarity (FP), a three parameter system developed by Nelson, Hemwall and Edwards[1], based on the principles of Hildebrand[2,3]. More detailed information on their use is described in Shell Technical Bulletin "Solubility Parameters"[4].

The evaporation rate, R(t), and from this the evaporation time, is calculated according to Equation (1), in which the parameters X_i, γ_i and T_{sol} are adjusted to the changing

Table 5
Properties of OXITOL and PROXITOL esters

PROPERTY	Ethyl OXITOL acetate	Methyl PROXITOL acetate
Molecular weight	132.2	132.2
Density at 20°C, kg/l	0.972	0.966
Boiling point, °C	156	146
Flash point, °C	54	45
Vapour pressure at 25°C, mbar	3.0	6.5
Relative evaporation rate	0.20	0.32
Hildebrand solubility parameter	8.7	8.5
Miscibility at 25°C, %m/m:		
– heptane	∞	∞
– water in solvent	3.6	5.6
– solvent in water	24	24

Table 6
"MENU" of Shell solvent computer programs

*** Shell Solvent Computer Programs (Version PC 2.11) ***		
No.	Name	Description
1	LMUPDT	Update the solvent property data files
2	LMLIST	Listing of solvent properties
3	LMPROP	Blend evaporation and balance
4	LMREF	Blend cost optimisation/reformulation
5	LMVISAQ	Aqueous blend viscosity calculation
6	LMFLASH	Flash point of blends
Type number of program to be executed followed by ENTER		
(Execution of each of these programs is stopped by entering HX)		

Table 7
Predicted and experimental solvent blend evaporation times

	% WEIGHT EVAPORATED				
EVAPORATION TIME, s	10	30	50	70	90
Blend A:					
– predicted	17	55	97	147	205
– experimental	15	52	96	145	201
Blend B:					
– predicted	210	633	1075	1701	3042
– experimental	168	576	1080	1852	3100

Composition blend A	%v	Composition blend B	%v
Acetone	8	n-Butyl OXITOL	46
Methyl isobutyl ketone	2	Very Low Aromatic	
Propanol-2	15	White Spirit (VLAWS)	54
n-Butyl acetate	10		
Toluene	65		

composition.

$$R(t) = \sum_{i=1}^{n} x_i(t)\gamma_i(t,T_{sol})r_i^0(T_{sol}/T_{min})^{1/2} \quad (1)$$

In this formula:
$x_i(t)$ = molar fraction of component i at time t.
$\gamma_i(t,T_{sol})$ = activity coefficient of component i at time t at the actual temperature of the blend during the evaporation
T_{sol} = actual temperature of the blend during the evaporation
r_i^0 = evaporation rate of the pure component i at its evaporation temperature T_{min}

In addition to calculating the properties of the starting blend, the program recalculates its composition during evaporation in steps of 5% and the same set of properties in steps of 10% evaporation. This results in an accurate and detailed "picture" of the behaviour of a solvent blend during evaporation. An example of the results of a calculation is presented in Tables 7 and 8, where calculated values are compared with experimental data on composition and evaporation times, and in Figure 1, which shows graphically the changes of the composition of a blend during evaporation.

On the basis of this detailed picture of the properties and behaviour of an existing blend, criteria can be set for reformation of the blend to give matching performance or, if required, different performance.

The reformulation is performed using the program LMREF. A maximum of nine technical criteria or constraints can be set, which have to be fulfilled by the reformulated blend. The number and type of solvents from which the program selects the blend components can be limited by entering a list of selectable products. The program then calculates a blend that meets the required criteria, and has the additional option of calculating what blend matches the criteria at lowest cost. It should be mentioned that, to obtain a "sensible" formulation, sensible criteria have to be selected; therefore, a certain level of solvent expertise is required to operate these programs successfully.

Although some major properties are calculated for the reformulation of the blend to give matching performance or, more complete picture of its performance can, and should, be obtained by re-running the program LMPROP, which will allow a detailed comparison of the reformulated blend with major aspects of the original formulation.

One parameter of a solvent formulation which is important for labelling and transport classification is the flash point. The prediction/calculation of this parameter will aid a faster selection of suitable products. For this reason, a program has been included in the series which is based on the principles developed by Gmeling and Rasmussen[5], and which can make accurate predictions of the flash point of multicomponent solvent blends. This program, LMFLASH, calculates flash points with a high accuracy, even for "difficult" systems, such as those containing both a hydrocarbon solvent and a strongly

Figure 1
Prediction of solvent blend evaporation

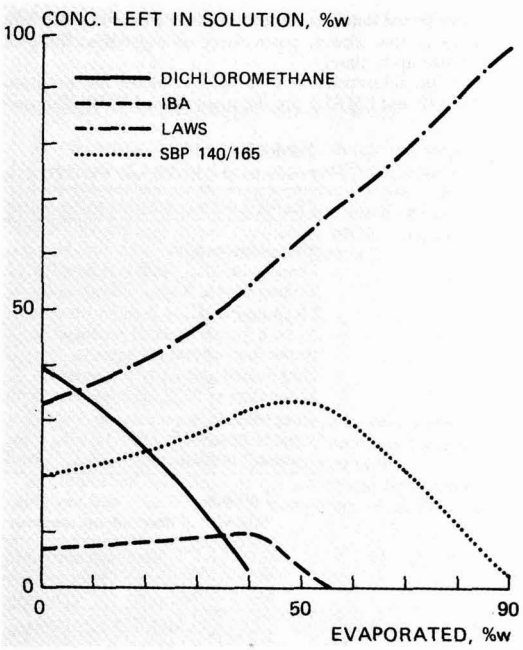


Table 8
Predicted and experimental solvent blend composition during evaporation

SOLVENT BLEND COMPOSITION, % w	% WEIGHT EVAPORATED 0	25	50	70	80
SHELLSOL 100/140					
– predicted	—	27.8	23.6	14.2	2.2
– experimental	30.5	30.2	28.6	17.2	9.3
Isopropyl alcohol					
– predicted	—	8.1	4.5	0.1	0.0
– experimental	9.7	6.4	1.7	0.0	0.0
Methy ethyl ketone					
– predicted	—	14.7	7.3	0.3	0.0
– experimental	19.7	14.7	6.7	0.4	0.0
Toluene					
– predicted	—	14.4	15.0	11.0	3.4
– experimental	13.2	14.8	16.2	13.2	8.3
Xylene					
– predicted	—	11.2	15.2	20.4	20.6
– experimental	8.9	10.7	14.5	19.4	19.8
OXITOL acetate					
– predicted	—	23.7	34.5	54.0	73.8
– experimental	17.9	23.2	32.4	49.8	62.6

hydrogen bonding solvent such as an alcohol, as can be seen from Figures 2 and 3. Even for blends of flammable and non-flammable materials good predictions can be obtained, as can be concluded from the data presented in Figure 4, where experimental values of the flash point are compared with calculated ones.

The program LMVISAQ is a completely independent part of the series, this may be helpful for those formulating aqueous paints. This program calculates the viscosities of blends of organic solvents with water (water content at least 50%w) according to a modified Katti equation[6], as described by Rocklin and Barnes[7]. For water-borne coating systems with low solids content good predictions of the system viscosity are possible.

These computer programs can certainly be useful as an aid to the fast, efficient implementation of new or improved types of solvents in many formulations. It must be borne in mind, however, that the calculations are based on models, which, however accurate they may be, can never completely replace experimental effort and data. If these programs enable the effort to be directed towards providing the "proof of the pudding" rather than being expended on testing large series of blends, we believe that they will prove to be a most useful tool in the solvents industry.

Conclusions

The examples presented in this paper cover only a small part of the developments in the field of industrial solvents. They serve to demonstrate that the solvents industry, which has long been regarded as mature, with few development activities, is in fact committed to ongoing developments to meet the ever changing needs.

This is evident not only in further novel products that are under study, but also in a continuous effort to manufacture

Figure 2
Experimental and predicted flash points for methyl ethyl ketone (MEK)/SHELLSOL D70 blends

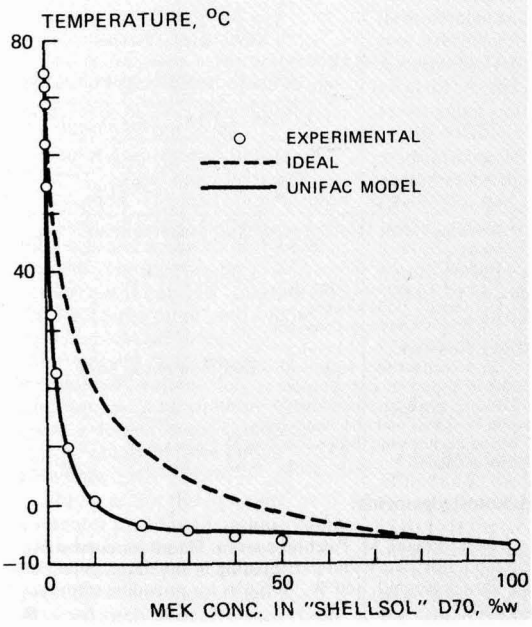


Figure 3
Experimental and predicted flash points for propanol-2/SHELLSOL D70 blends

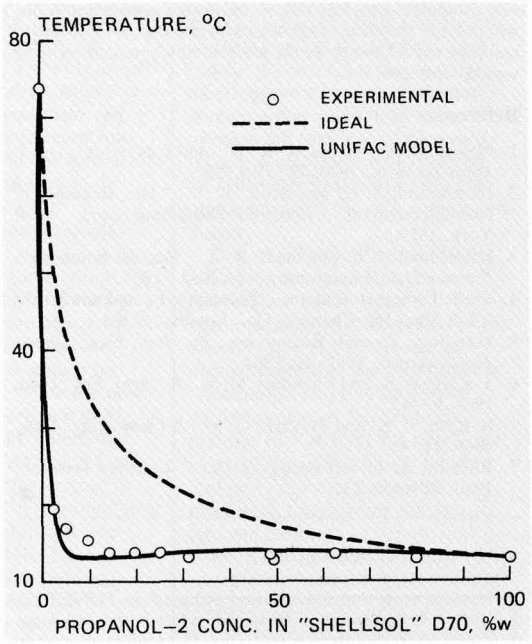
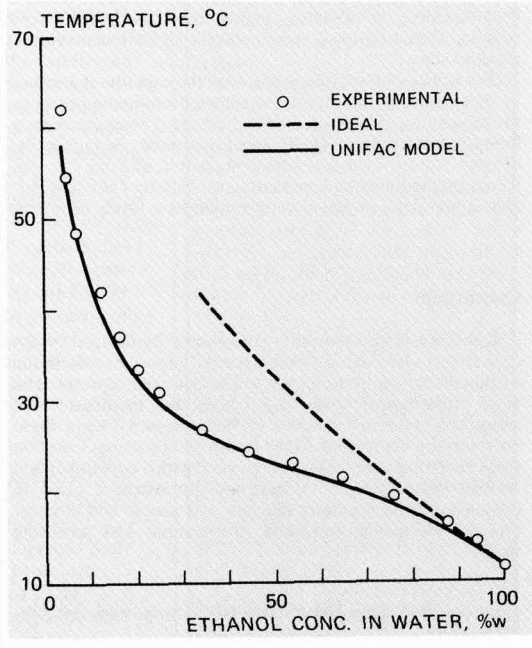


Figure 4
Experimental and predicted flash points for ethanol/water blends



solvents of the highest quality with a high degree of consistency.

These activities, together with continuing development of our computer programs into sophisticated application tools, will provide the means enabling users of industrial solvents to continue to find and make the most suitable products for their various end-uses.

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W. P. Mayer, Continued from p.164

The data show that Formulation D based on TONE 0231 delivers a better balance of hardness/flexibility and stain resistance than Formulation C, but it requires a slightly higher cure temperature.

Stain resistance was measured by applying an aggressive felt tip marking ink over a two-square-inch area of the coated panel. The sample was dried for 30 minutes at room temperature and washed with isopropyl alcohol. The degree of residual stain was measured by reading the Hunter L value in a Gardner colorimeter, higher readings indicate less staining. Panels having L values of 90 or higher had no visible residual stain.

One can emphasize one property at the expense of another by moving around the ternary diagram. Formulating close to the stoichiometric line gives the best stain resistance when high concentrations of TONE diol are present. At high levels of vinyl, stain resistance is inherently better, and one can gain increased flexibility by formulating to the left of the stoichiometric line, i.e., at less than stoichiometric levels of amino resin.

Conclusions

Low molecular weight solution polymerized vinyl copolymers are playing an increasingly important role in the worldwide transition to higher solids industrial coatings. The vinyl "superlacquer" and the TONE diol modified vinyl/amino systems are examples of the innovative ways these polymers are being used. Many commercial coatings based on these vinyls consist of alloys of the vinyl with a crosslinker and another generic resin. A computer spreadsheet, used in conjunction with a ternary diagram, is a simple and efficient tool for identifying candidate formulations and screening them.

Paper presented at the 12th National OCCA Symposium, Sun City, South Africa.

Table 6
Physical Properties of UCAR VYES-4/TONE/RESIMENE 2040 coatings

Formulation	B	C	D		
Vehicle Solids Ratio*					
UCAR VYES-4	52.09	20.00	26.30		
TONE 0201		20.00			
TONE 0231			26.30		
RESIMENE 2040	47.91	60.00	47.40		
TiO_2	80.00	80.00	80.00		
VOC Lb/Gal	4.13	3.20	3.48		
% NV (Wt)	60.3	71.0	67.6		
Viscosity Sec. No. 4 Ford Cup	33	33	34		
Cure Time 20 Min.					
Cure Temp °F	170	170	170	190	200
Pencil Hardness	H	H	H	H	2H
Direct Impact In-Lb	20	40	60	60	40
Conical Mandrel In	2.7	PASS	PASS	PASS	0.4
MEK Rubs to Dull	>100	>100	>100	>100	>100
Stain Resistance	90	74	62	77	81
Gloss 60°	89	98	92		

Stoichiometric Amino Content
5.5% CYCAT 4040 on TRS (40% p-TSA)
0.8 p/b WITH TiO_2
* Complete formulations are shown in the Appendix

Appendix

Vinyl/TONE Diol/Amino Formulations

	Pounds per 100 Gallons			
Formulation	A	B	C	D
UCAR VYES-4		178.08	85.43	104.30
UCAR VP-200 (74% NV)	128.06			
TONE 0201	81.94		85.43	
TONE 0231				104.30
RESIMENE 2040 (85% NV) (1)	330.69	192.69	301.52	221.15
Titanium Dioxide R-960 (2)	366.23	273.50	341.72	317.26
Toluene	81.26	169.23	123.87	138.80
Butyl Acetate	81.26	169.23	123.87	138.80
Methyl Amyl Ketone	28.84	13.67	12.81	12.69
n-Butanol		20.51		11.90
GAFAC RE-610 (3)	3.66	2.73	3.42	3.17
BYK 070 (4)	1.83	1.37	1.71	1.59
CYAT 4040 (40% p-TSA) (5)	25.18	18.80	23.49	21.81
Totals	1,128.95	1,039.81	1,103.27	1,075.77
% NV by WT	74.4	60.3	71.0	67.6
% NV by VOL	58.7	42.4	55.1	51.3
VOC – Lbs/Gal	2.9	4.1	3.2	3.5

(1) Resinous Polyol Modified Methylated Melamine Resin – Monsanto
(2) DuPont
(3) Pigment Dispersant – BASF
(4) Defoamer – BYK Chemie
(5) Catalyst – American Cyanamid

Mixing Procedure:
Charge solvents to a vessel with a high shear mixing blade
Mix in dispersant and defoamer
Dissolve vinyl component fully
Mix in TONE diol and amino resin
Stir in pigment and disperse to 7 on Hegman gauge
Mix in catalyst

Acknowledgements

I wish to thank M. Paleologo and J. Gacek for conducting the laboratory work and participating in the development of the data presented, and W. A. Sachs for providing statistical support. ■

SURFEX 90

This issue of JOCCA contains the Official Guide to SURFEX 90 Once again the Exhibition has completely sold out, ensuring that visitors will have the opportunity to view and discuss the products and services provided by most of the raw material suppliers, equipment manufacturers and service companies within the UK sector. 30,000 invitation cards have been distributed to exhibitors, visitors to previous SURFEX exhibitions, through JOCCA and other UK and European surface coating journals and to the many telephone enquiries for information. If you are one of the very few people who have not received your personal invitation to SURFEX, do not despair, come to Harrogate in any case, and complete your registration card on arrival!

The Association's own stand will be found in the Reception area and once again we are pleased to share the stand with our sister organisations, the Paintmakers Association and Paint Research Association. The latter organisation is organising a back to back technical meeting with SURFEX and this year the two day conference is entitled "Coatings for Difficult Substrates" and will be held in the Moat House International Hotel which immediately adjoins the Conference and Exhibition Centre. Further details on the Conference may be obtained from Dip Dasgupta on 01-977 4427.

This year, for the first time, a computer based registration system has been introduced and we hope this will simplify registration procedures and should enable a detailed analysis of all visitors to be produced very soon after the Exhibition closes. The other novel feature for the Exhibition will be a daily prize draw to be held in the Auditorium for a major prize.

All visitors to the Exhibition will receive a free prize draw ticket on registration. The prize draw will take place in the Auditorium and we hope that this will encourage all visitors to make their way to the Auditorium and view the interesting stands and products on display there.

The Exhibition Management Committee of Fred Morpeth, Jim Hemmings and Lionel Morpeth, have carried out an extensive survey of alternative venues for future Exhibitions. When the new style Exhibitions were first started it was the intention of Council that the Exhibition should be held in different locations throughout the country. However, in response to a strong lead from exhibitors and visitors, all three SURFEX Exhibitions have been held at Harrogate. The Exhibition Management committee were concerned that the growth of SURFEX would mean that the exhibition space available at Harrogate would not be able to accommodate a larger exhibition in 1992 without having to move into the older, less attractive exhibition halls within the Harrogate complex. It is now probable that additional high quality exhibition space will be available to the Association at the Harrogate Centre in 1992. This, coupled with a variety of problems associated with other venues examined by the Committee, lead Council to take the decision that the 1992 Exhibition will again be held in Harrogate on 29 and 30 April, a month earlier than SURFEX 90 and chosen so as not to clash with a European surface coating exhibition taking place that summer.

SBPIM

The Association has now been affiliated to the Society of British Printing Ink Manufacturers (SBPIM) for two years and both organisations have found the affiliation agreement to be beneficial. The principal benefit of the affiliation has been the organisation of the major "Printing Inks for the 90's" Symposium which took place in Birmingham on 22 March and will be fully reported in a future issue of the Journal. Over 160 people attended this one day meeting and it is quite clear that there is a demand within the printing ink sector for high quality technical meetings, which can be met through joint promotion and organisation by the Association and Society.

One of the other fruits of the affiliation has been that the Association has now been nominated an official journal of the Society. JOCCA is already an official journal of the Paintmakers Association and this additional recognition adds further to the prestige of JOCCA. We now hope to carry regular technical articles and news items of particular interest to the printing ink sector and will continue to devote one issue of the Journal each year specifically to printing ink matters.

Call for papers

JOCCA is seeking technical papers for possible publication in the October 1990 issue on **Physical Testing**

Papers which discuss and compare the destructive and non destructive methods of measuring the physical performance of coating systems would be considered as very suitable for this feature.

The comparison of laboratory results of physical testing with the actual performance under practical conditions of use or exposure would also be of interest.

The need for quality control tests and their effect on the formulation of a surface coating provokes the question "are physical and chemical tests in customers specifications always relevant in the measurement of performance?"

Papers should be a maximum of ten pages (in double-spaced lines) and may include up to ten tables and graphs (combined total). To be considered please send a 50-word abstract or brief outline by 1 July 1990 to the Honorary Editor, John Taylor, BSc, CChem, FRSC, FICorrSt, FPRI, FTSC, The Wolds, 51A Porth-y-Castell, Barry, S Glamorgan CF6 8QD. Deadline for the October issue is 15 August 1990.

For further information contact Dr Peter Fyne Tel: 081-908 1086; Fax: 081-908 1219.

Hull Section

Emulsion polymers

The third technical meeting of the session was held on Monday, 8 January, 1990 at the Duke of Cumberland Hotel, Cottingham starting at 7.00pm. Twenty members and guests heard Mr Brian Widdop of Kirklees Chemicals give a talk entitled Future Trends In Emulsion Polymers.

Mr Widdop began with a review of the fundamentals of emulsion polymers, listing typical components and common monomers and outlining flow diagrams covering preparation. The review continued with a consideration of wet-state parameters, among them particle size, free monomer content and stability to electrolyte and dry state properties such as UV resistance, water absorption and specific permeability.

The speaker went on to identify the main producers of over 1 million tonnes of E.P. produced annually in Western Europe together with the main user industries; paint, adhesives, textiles and paper coatings which together accounted for over 90% of the total. Over 60% was vinyl acetate based with over 35% based on acrylate. Paint was the largest user but with substantial proportions taken by the other industries mentioned. It was predicted that usage in paint and adhesives would grow but new technology such as thermal bonding could lead to reductions in textiles.

After giving a similar breakdown of usage in the U.K., 200,000 tonnes of E.P. about half of which was used in paint, Mr Widdop reviewed E.P. use in individual user industries in W.E.

In the paint industry, building paints utilise the major portion of polymer, two thirds being based on P.V.A. copolymer and about one third on acrylics. Adhesives tended to be categorised as light, medium and heavy, E.P. falling into the middle category. These were P.V.A. homopolymers and acrylics, the former easily predominating. In textiles, E.P. were used for fibre bonding, coating, impregnating and material binding, e.g. carpet backing. Most E.P. used in paper coating was acrylic based with about 30% of the total, P.V.A.

The speaker then moved on to factors influencing the future of E.P., citing economic constraints, technical development, changes in user industries, European/global influences and legislation, briefly discussing each in turn. Progress from market awareness through research and development to effective customer sales was traced and the opinion expressed that development would be user driven rather than through internal innovation.

Future trends in paints were next discussed. Considering binders used in percentage terms, V.A. polymers would increase from 44 to 52%, alkyds would fall from 25 to 10% and acrylics would improve from 18 to 25% in the period 1986-1996. Main determining factors were economics, environment and fashion and main potentials for E.P. would be in factory applied joinery coatings, coil coating, automotives, can coatings and marine paints.

After predicting the likely effect on paint of test standards in the U.K. and Europe Mr Widdop went on to look at future trends in adhesives. He saw faster setting packaging adhesives, improved hot-melt, one part water resistant wood adhesive, pressure senstives with improved performance in aggressive environments and high performance water based products to combat solvent abuse.

In textiles, elimination of toxic, combustible materials would be progressed and improved reactivity, producing better cross-linking properties, would be achieved. As mentioned earlier in the talk, thermal bonding could adversely affect polymer usage.

In emulsion polymers themselves, continued process refinement would yield more effective polymers or improved cost effectiveness in new market areas. Improved alternative feed-stocks and/or novel monomers from petro-chemicals were likely. New E.P. with either a broader spectrum of performance or increased specificity would be developed.

The speaker also saw a further increase in co-operation and joint programmes between industrial research associations and academic institutions. Progress in the concept of multicomponent polymer particles was likely along with innovative polymer design with potential for producing self-stratifying coatings. Finally, industry would become more selective in E.P. components with regard to health and safety and fire retardant aspects.

After ably dealing with a variety of questions from the audience concerning the loop process, his opinion on the rate of change from solvent to aqueous systems, electro-deposition (still solutions) and high solids emulsions, Mr Widdop received a vote of thanks, proposed by Terry Lander and enthusiastically endorsed by the audience.

D. Robinson ■

NEWCASTLE STUDENT SEMINAR
PAINT MANUFACTURE 24 APRIL

London Section

Newspaper inks

The fifth technical meeting of the 1989/90 programme was held on Thursday, 15 February, 1990 at the Naval Club, Hill Street, Mayfair. Mr Gerry Burdall, Technical Director of Usher-Walker presented a paper entitled "Newspaper Inks — the 1990's Technology".

The presenter began by outlining the origins and history of newspaper production with particular emphasis on recent trends. The most important of which has been the decline of Fleet Street and the relocation of the national daily newspapers to new sites.

The main printing processes were discussed in some detail. These are the traditional rotary letterpress, flexography and lithography. The latter represents approximately 60% of the market and this reflects the large investment recently in this printing process. Mr Burdall thought that in the future flexography, currently with 10% market share, would become increasingly more important.

The current newspaper titles with circulations and trends were illustrated and the influence of advertising upon these figures was considered of importance.

Mr Burdall concluded his presentation with the requirements for the future. Ink will be needed that will set and dry fast, current offset technology allows 80,000 presses an hour of ink that sets but does not dry. Environmental issues are of increasing concern and the implications of COSHH will influence changes in technology. The requirement for higher quality colour inks that offer improved rub resistance also exists.

The paper was followed by a lengthy question time which was indicative of the interest the audience had in the lecture. The vote of thanks proposed by Mr Bert Armstrong was followed by a buffet sponsored by Usher-Walker.

G. J. Steven ■

Manchester Section

Architectural coatings

On Monday, 15 February, 1990, a paper entitled "The European Architectural Coatings Market", was presented to Manchester Section, by Mr D. C. Sykes of Rohm and Haas (UK) Ltd. fifty members and guests attended the meeting, which was held at the Mechanics Institute, Manchester, the

talk being preceeded by a buffet, sponsored by Rohm and Haas.

The paper was split into three sections, these being:
(a) A description of current market segments
(b) External Pressures
(c) New Developments

The lecturer taking each one in turn.

The market split within the different countries in Europe was outlined, with the balance between water based, and solvent based coatings indicated. There are wide variations from country to country and the reasons for this were outlined. The UK has the highest proportion of DIY in the market, with the large DIY chains now being big enough to launch their own developments.

External pressures on the decorative field are, environmental pressures, harmonisation of standards, and mergers. Environmental pressures vary from country to country, and region to region, and these differences were illustrated. Some countries have a complete ban on solvents for interior paints, whereas in others, there are no regulations at all. There are two working groups in Europe, looking at harmonising standards, for both wood and masonry systems. This is proving difficult, and unlikely to come about for a long time. However, COSHH type regulations and environmental labelling regulations, are likely to become standard throughout Europe. Mergers and acquisitions (4 already in 1990) are likely to have a considerable effect, with raw material and formulation rationalisation across Europe, being likely in multinationals.

New developments in architectural coatings are likely to be towards replacing alkyd/solvent systems, by water based dispersion types, with high hiding power and fewer coats being envisaged, the prime areas where water based systems are likely to be used being outlined.

Mr Sykes completed his talk, by indicating their will be many pressures on the coatings industry in the 1990's, and both paint and raw material suppliers, will have to work together, to solve the problems they will create.

The lecture was followed by a short question and answer session, and the vote of thanks was proposed by Roger Nicholls.

M. G. Langdon ■

Radiation curing

On Monday, February 19, 1990, 38 members and guests, attended the Manchester Section meeting, held at the Silver Birch, Birchwood Centre, Warrington. A paper, entitled "Radiation Curing — Saints or Sinners" was presented by Mr. M. Johnson (head of applications laboratory) and Mr. M. Phillips (R&D Manager) of Radicure Specialities SA, the lecture being preceded by a buffet and bar sponsored by U.C.B. (Chemicals) Ltd.

The first part of the paper, primarily concerned with the chemistry of radiation curing, was presented by Mr. Johnson. The term radiation curing, in effect, means curing by U.V. or electron beam radiation. The earliest applications of U.V. curing, were investigated in Europe in the late 1960's, and electron beam curing, was first introduced in the U.S.A., in the early 1970's. The evolution of this new technology was outlined, and both advantages and disadvantages of the technique illustrated.

Radiation curing is primarily a free radicle polymerisation process, and the basic reaction mechanism was outlined. The different types of functionality which can be used, and their comparative reaction rates were described. Oxygen inhibition of the reaction can occur, and the amino synergistic effect which is used to reduce this, was indicated.

The various constituents making up a radiation curable system were outlined in detail, the properties of each described, and the reasons for selecting the various types of raw material indicated.

The lecture continued with Mr. Phillips outlining the various fields in which radiation cured materials could be used, coating, inks, adhesives and a number of specialist uses being described, and future trends being illustrated.

Health and Safety is now an important factor, and the general non-toxic nature of the raw materials was illustrated, although some of the products can be sensitisers, and normal handling procedures to prevent skin contact would be required. One of the possible problems with radiation curing, is residual toxic components after curing. Experimentation indicated there were either only very low or even no traces of post cure extractables remaining in the film, and the toxicity, odour, heat loss, and taste evaluation test results were presented, indicating no health and safety risk from this aspect.

The lecture was followed by an extensive and lively question and answer session, and to conclude the evening, the vote of thanks was proposed by Mike Nixon.

M. G. Langdon ■

Natal Section

Should one be able to copy other ideas?

Mr Ian Morrison, a patent attorney, posed the question to an OCCA Natal meeting on 31 January, 1990.

Yes . . . basically man has been doing this for aeons — if something is common.

No . . . it is not fair if the ideas are original, new and patentable.

Mr Morrison went on to discuss the rules governing what can be protected and what cannot be protected in terms of legislation of the country. Infringements can lead to damages enforced by court of law. He used examples to explain what is permissible.

An interesting point is when an article is protected say by a patent and the patent holder is unable to supply, is an alternative supplier infringing the patent if he supplies the article? Also computer software is not patentable but the courts allow the software to be copyrighted.

After answering a number of questions, a vote of thanks was proposed by Mr Lou Müller and carried by the meeting.

E. Puterman ■

Newcastle Section

Biocides

Thirty-three members and guests assembled on 1 February 1990 at St Mary's College, University of Durham, to hear a talk entitled "A day in the life of a Microbiologist" given by Miss Angela Stones of Durham Chemicals.

Miss Stones set the scene by showing a table of biocides sold by Durham Chemicals and the scope of their use in nine different possible areas. Technical support work, in production as well as sales, forms a significant part of her overall work load. Asceptice techniques must be employed always, to avoid airborne contamination and laminar airflow cabinets with sterile air supply are mandatory for manipulative work. Slides showing such a cabinet and various testing methods were shown. Laboratory algicidal testing may be carried out in a cabinet maintained at high relative humidity, with constant temperature, and test panels placed inside are inoculated with specific algae. Alternatively, inoculated masterboard test panels may be placed in a plastic sandwich-box containing a sterilized verminulate layer in sterile water and

exposed to natural daylight. A simple fishtank with heaters and sterile water has been employed as a humidity cabinet for biocide testing. Originally test tubes externally coated with plaster of paris were used as test substrates for paints and suspended in the tank vapour. Nowadays plasterboard panels are used as test substrates and a moist vermiculite layer is used as the base. Various coloured slides demonstrated these various techniques in use, testing the activity spectra of various biocides against fungi (*Aspergillus Niger* and blue-stain types) and algae.

Investigative work involves tests for a large range of organisms and for the presence, or absence, of biocides e.g. Nuosept 95 (in-can preservative) can be tested for by using a distinctive purple colour test. The isolation of individual organisms when investigating spoilage is essential to identify each species and its concentration. Plating out on Agar and further streaking-out from this on to separate plates is possible where obvious colour differences exist. A rapid identification test available nowadays involves suspension of spores in specific media, followed by spreading on proprietary test plates. The difficulty of measuring very concentrated fungal growth can be overcome by serial dilution with plating-out on agar at each stage, eventually giving a readable plate count which can be multiplied back to the original concentration. Miss Stones emphasised the need always to check for anaerobic organisms, even though the vast majority of problems met must involve aerobic types.

Whilst giving examples of complaint investigations, she made the point that not all staining problems are fungal or algal in origin and illustrated the point with a slide showing discoloured wallpaper from the Far East. Here, the wallpaper adhesive was blamed. the suggestion being that the adhesive preservative had been ineffective. Tests on the wallpaper failed to reveal serious fungal spoilage. The discolouration was subsequently shown to be sulphide staining of a lead-based vinyl wallpaper stabilizer, from a nearby stagnant lake. As a humorous aside she remarked that in an area of South West England where a surface wash compound was sold successfully to maintain cottage exteriors white, a request had been received for a green coloured wash for new extensions of old cottages to match the new exterior walls to the older algae-stained walls. Laboratory test work aims to mimic field conditions e.g. exterior paints containing biocides are weathered, naturally or artificially, before inoculation and growth testing. In addition, sampling of fungal/algal growth from walls and other contaminated surfaces, as well as yeasts/bacteria from in-can materials, maintains laboratory supplies and provides more variety of challenge organisms.

Photomicrographs of fungal growth on agar illustrated the physical differences used for identification. Slides showed the colour and form of fruiting bodies and mycelial growth typical of each: *Aspergillus Niger, Penicillium Purpurogenum, Alternaria Alternata, Aureobasidium Pullulans, Cladosporium, Chaetonium Globosum* and *Fusarium.* Miss Stones pointed out the differences noting the substrates they are each liable to infect: paint, bread, aviation fuel, wet wood etc. A photograph of a laboratory window sill showed a creamy-orange fungal growth and black stain identified as a mixture of *Chaetonium Globasa, Coniophora Puteana* (white Rot) and *Coriolus Versicolor.* To further the variety of her work she showed slides of algicide field tests on an old stone building (Ryhope Pumping Station) and discussed batch testing of metallic stearates, manufactured to BP standard, for possible bacterial spoilage.

Although much work has been done over the past forty years on fungal attack of paints, until recently no standard test existed. Now, as a result of collaborative work within IBRG, a new BS standard, BS3900 Part G6, has been developed. Miss Stones concluded her talk by defining an ideal preservative as having:

1. a broad spectrum of activity against the relevant organisms-fungi, bacteria etc.
2. compatibility with the material(s) requiring preservation.
3. low mammalian toxicity.
4. stability in concentrated and dilute form.
5. water solubility/insolubility according to need.
6. low odour.
7. low corrosivity.
8. resistance to discolouration.
9. economy of use.

In question time afterwards the cost of new biocide development was highlighted. Other topics included the differing susceptibilities to biocides of gram-negative and gram-positive organisms, practical cleaning of contaminated surfaces, correlation of lab and field trials, judgement of effective bacteriacidal life from lab and field trials and effective treatment of severe fungal infections.

The vote of thanks was given by the Chairman, Mr David Neal, after which an excellent buffet with additional refreshments was provided by Durham Chemicals.

J. Bravey ■

Ontario Section

SPC: A fresh approach to quality

At the first meeting of the calendar year on 24 January, 1990, Mr Bill Walters of Sinclair & Valentine gave an interesting and practical presentation on the topic, "Statistical Process Control".

The speaker began by asking why we need a special system for control of quality. Much of the answer lies in the cost to the firm of not having such a system. The cost of returned goods and re-work is evident but perhaps not compelling; the significant cost is in loss of good will, customer confidence and overall reputation. Further, more and more customers are demanding that suppliers have an SPC system in place as a condition of doing business with them.

Mr Walters discussed what quality is and how we should define it. Conformance to specifications and product consistency are certainly important aspects; more important, however, is the idea that quality consists of meeting the customer's wants, or perceived needs, in such a way that your product develops and maintains an image of *excellence.* A properly instituted SPC programme can meet all such requirements.

A complete SPC system will include a Q.C. manual, flow charts, calibration, documentation, raw material testing, training and employee involvement. However, the "statistical" part should be one of the last parts to be put in place. The first and most important component is the commitment of management at the highest level to give up outdated methods (such as giving orders and demanding compliance), and to embark on a new philosophy of management which embraces these concepts:

- ☐ The achievement of quality is a long-term process, not a quick fix;
- ☐ Management at all levels must support the philosophy, and must earn the trust of employees;
- ☐ Blaming must be replaced by consultation; 85% of problems are caused by processes — the way things are done — rather than by actual machine, manpower or material faults;
- ☐ Problems derive from systems, and can be eliminated only by improving

those systems;
□ The people who know a particular job best, and know what can be improved, are the people who are doing that job;
□ People can solve problems in their lives; with the proper training and encouragement they can also solve problems on the job — including quality problems.

The new philosophy requires management to open up communication, both vertically (down *and up* the hierarchy) and horizontally (across departments and disciplines). Instead of demanding, managers must listen; instead of giving orders, they must lead and coach; instead of being secretive, they must be sure that information is openly available. It must be understood throughout the company that every employee is a valuable part of the organization and an important contributor to the process of improvement.

Only after the need for quality has been established and the need for a new style of management has been accepted can a system be put in place and the quality improvement process be started.

One workable system calls for task force groups, whose members work on the problems of their own department or area. A more effective system uses employee involvement teams; these are made up of volunteers from all departments who work together to solve problems and improve quality. This encourages departments to find solutions that will suit them all rather than blaming others or shifting responsibility.

Instead of looking for vast improvements overnight, both managers and workers should concentrate on quality improvement goals that are reasonable and achievable, and that are specific and measurable rather than general. When a problem is identified, an improvement is agreed upon, assessed, amended if necessary, and finally standardized. When that procedure is being adhered to and its results have been analyzed, a new goal can be set. The aim is to achieve a progression of small improvements that build on each other towards the achievement of quality.

The training that is required is not in how to do the job but in how to work together to solve problems. This is an ongoing process. It usually calls for a trainer, sometimes known as a facilitator or champion. His or her functions are to train the volunteers in problem-solving skills as they are ready to learn, to keep the groups working toward their goals, to ensure that management gives an open-minded hearing and a prompt, reasonable response to all suggested solutions, and to keep the whole programme within the company on track.

When the philosophy is fully accepted and the team system is in place, statistics can be introduced. These are used to measure quality and quality improvements. Useful data can be obtained from raw material tests, output product tests, re-work ratios, inventory records, customer surveys, suppliers certification compliance and other sources.

Mr Walters concluded his talk by stating that, in his view and his experience, Statistical Process Control is not 'about' statistics or measurements; it is about employee involvement and participatory problem solving, and about a completely new philosophy of management.

After ably answering questions from the floor, Mr Walters was thanked on behalf of the section by Chairman Doug Pratt, and was presented with a framed certificate of appreciation.

J. F. Ambury ■

Trent Valley Branch

Instrumental colour

*F*orty three members and guests attended the inaugural Sefton Hawley Memorial Lecture entitled "Instrumental colour measurement of metallic coatings — Fact or fiction" by Colourgen.

The opening address was given by Peter Wall, Managing Director, who explained the background of his young company, which was formed in 1986 as the European subsidiary of Colourgen Inc. of Boston, Massachusets.

The Colourgen concept was to tackle the problem and develop a system suitable for colour match prediction for inks and translucent materials. He then handed over to Dr J Nobbs, their Technical Director, who began by explaining the behaviour of light on glossy surfaces where the pigmentation was metallic flake.

Skilfully using familiar descriptive materials like colour swatch cards, cigarette packets, and speciality pigments, supported by simplified diagrams he discussed the needs of the sensing apparatus required. This he then interpreted into the needs of the colour measuring head of the spectrometer having a 6" integrating sphere.

In the summing up, Dr. Nobbs was able to satisfy the audience that it was practical for instrumental colour measurement of metallic coatings to be undertaken.

After a short question and answer session the vote of thanks was given by Jeremy Hawley, who took the opportunity to both thank our speakers, and the many friends and business colleagues of his father, who had attended.

Afterwards members of the audience were able in conjunction with Colourgen personnel to enjoy a demonstration of a model DCM 1100 sytstem which had been set up for the purpose.

D. J. Grantham ■

West Riding Section

Alkyd based decorative paints

M J. S. Bridle, BSc of Cray Valley Products gave the November lecture to the West Riding Section of the OCCA. Once again the venue was the Rounday Mansion Hotel in Leeds where 48 people, again including many young and lady members, were treated to a lecture entitled "The Development of Modern Alkyd Based Decorative Paints". Mr Bridle started his career in the industry at Morgan Crucible in 1957 after National Service in the RAF. In 1959 he joined Hunterseal, specialists in Marine, Decorative and Industrial paints, where he spent eight years before joining CVP in 1964.

The first part of the Lecture concerned the early history of Alkyds starting in 1847 with Tartaric/Glycerol types. Large companies picked up on the idea around 1912 to 1927, by which time Phthalic/Glycerol alkyds were available. Alkyds were first oil modified in the 1920's with little success. The idea of oil modified alkyds finally being commercialized by ICI in 1935/36.

Moving on to technical matters Mr Bridle outlined, in simple terms, the chemistry of Alkyds. The raw materials were discussed in turn, including Polyol type oils & fatty acids emphasising the effect of unsaturation and oil type on the Alkyd produced. Carrying on the technical theme the Lecturer moved on to modified Alkyds starting with Urethane types. TDI was the first urethane used to produce Urethane Alkyds with improved hardness. These were followed by IPDI based Urethane Alkyds which tended to be expensive. Age embrittlement was said to be a problem with Urethane Alkyds. Siloxane was the next modification discussed, these not being produced by

CVP. The speaker briefly outlined the improvements in heat resistance, hardness – colour retention shown by such Alkyds. Once again these are expensive and tend to be considered specialities. Mr Bridle suggested essential reading including Solomon, Martin, Temple & Pattern and many others.

The main Alkyd was discussed, this being a Glycerol Penta Phthalic type. Isophthalic types were mentioned as being of value but not widely used. Mr Bridle went on to pose the question "Why tamper with the Alkyd?" The main reason given was the exterior difficulties in wood finishing. The reasons for failure on exterior wood substrates was discussed. Such substrates are directionally unstable in high humidity, this coupled with biological factors and poor joinery, (End grain is 100 times more likely to increase moisture content than face), were highlighted as the reasons for failure. Water-Crack resistance improvements are the reasons for tampering with the Alkyd.

Mr Bridle outlined the effect of Microporosity of coatings to reduce extremes of moisture in wood substrates Microporosity was shown to be of little value unless coupled with extensibility/flexibility. The possible methods of modification to produce a satisfactory Alkyd were discussed. CVP started work in this area in the late seventies and by the mid eighties 3 or 4 companies had arrived at the same answer.

The lecture was concluded by a collection of slides to demonstrate the performance of Alkyds and modified Alkyds, including work on drier systems. Synolac 6005W was shown to produce good results after 5 years. Systems based on flexible Alkyds to resist cracking and "hang on" around end joints were also shown. The use of Polymeric modifiers were discussed briefly this being based on plastics technology.

After a brief discussion on the effect of environmental pressures raised by a member of the audience a vote of thanks was proposed by Richard Bradley, the audience giving the customary round of applause. All were then treated to a sponsored Bar & Buffet courtesy of CVP.

S. Birkett ■

OCCA AGM

Thursday 14 June 1990
Naval Club, Hill Street,
London, 4.45pm

OCCA News

News of Members

Top photographic award

Doug Fidler, former Bristol Section Hon. Secretary and recipient of an OCCA Commendation Award, has won one of the UK's toughest international photographic exhibitions, "The Smethwick International". Mr Fidler, a member of the Cardiff Camera Club and Fellow of the Bath-based Royal Photographic Society, was presented with the Photographic Society of America Gold Medal for outstanding quality in his colour print work.

Obituary

William McWaters

Mr L. J. Brooke writes:

William McWaters died at the end of January 1990. 'Mac' as he was affectionally known to his many friends in OCCA was Hon. Treasurer of the Bristol Section from 1948 to 1969 and assisted in the formation of the Irish Branch in 1961, which has since achieved Section status. It was this loyal service that prompted the Bristol Section to enquire if such service could be officially recognised by the Association. This resulted in Council instituting the Commendation Award for outstanding and long service to the Association, particularly at Section level. Mac was the first recipient of the award and it was presented to him at the Bristol Section Dinner Dance on February 20th 1969 by Mr. L. J. Brooke — a Vice President at that time. Mac served as a Vice President 1970-71. On retiring as Hon. Treasurer, Mac continued to help the Section by being Hon. Auditor until 1981.

During World War 2 Mac served as an officer in the R.A.F. and on demob represented the firm of Morris Ashby in the West of England and was a well-known figure in the area.

When he retired he was able to spend more time with his favourite pastime — golf. Just before his death he had been made an Honorary Member of his local golf club which was a mark of esteem he held with his club members.

Mac was a widower, his wife Edie having died two years ago.

Professional Grade

At the meeting of the Professional Grade Committee held on 15 February 1990 the following were admitted:

Admitted to Fellowship — Upgraded from Associateship

Berberi, Anwar *(General Overseas — Lebanon)*
Fisher, Leslie Alexander *(Natal)*

Admitted to Associateship

Nixon, Michael *(Manchester)*
Purohit, Shailesh Chandra *(Midlands — Trent Valley Branch)*

Admitted to Licentiateship

Lam, Edward *(Manchester)*

New Members

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

Ordinary Members

Addicott, M. J. (*Bristol*)
Barnett, K. G., MSc, PhD (*General Overseas — Taiwan*)
Bebington, D. A., BSc (*Transvaal*)
Bieber, M. C., PhD (*Ontario*)
Brown, G. R. (*Scotland*)
Chapman, T. M. (*Bristol*)
Davies, J. A. (*Thames Valley*)
Eveleigh, S. M. (*Natal*)
James, R. (*Ontario*)
Jilek, J. H., PhD (*General Overseas — Austria*)
Keith, J. S., BSc (*Midlands*)
Patel, G, BSc (*General Overseas — India*)
Pillay, V, BSc. (*Natal*)
Postle, S. R., DPhil (*Thames Valley*)

Associate Members

Brander, A. (*Scotland*)
Di Risio, T. (*Midlands — Trent Valley*)
Green, D. A. (*Natal*)
Hart, D. I. (*Transvaal*)

Registered Students

Beattie, J. M. (*Manchester*)
Clegg, E. H. (*Thames Valley*)
Patterson, M. (*Newcastle* ■

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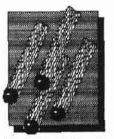

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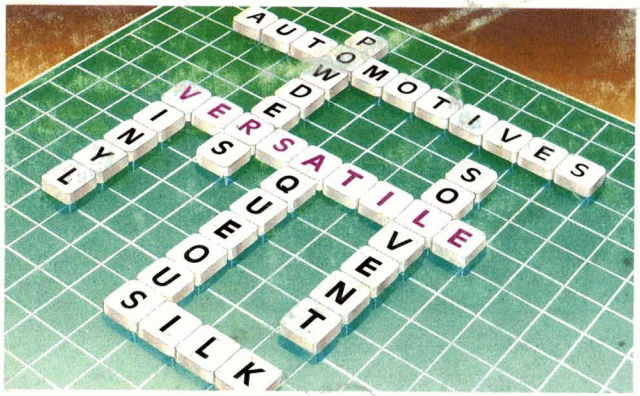

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