ISSN 0030-1337 Vol. 69 No. 4 Pages 89-116 April 1986

JOCCA

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- Surface preparation for painting new galvanized structural steel
- An investigation into the effect of pore size in a lacquer coating on the underfilm corrosion
- Three short communications by exhibitors at Surfex 86
- ✉ Wet Adhesion

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JOURNAL of the OIL AND COLOUR CHEMISTS' ASSOCIATION

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Annual subscription to non-members: £65.00 ($120), post free by surface mail, payable in advance.

Single copies £5.50 ($12), post free by surface mail, payable in advance.

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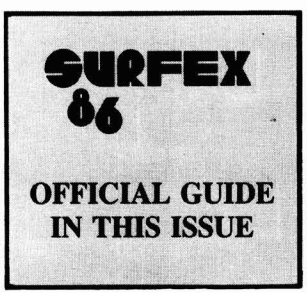


OIL AND COLOUR CHEMISTS' ASSOCIATION
Priory House, 967 Harrow Road, Wembley, Middlesex, HA0 2SF England

Surface preparation for painting new galvanized structural steel

K. G. Mottram and F. M. Petchell

Telecom Australia, Research Laboratories, 762 Blackburn Rd, Clayton North, Victoria 3168, Australia

Abstract

Galvanized steel telecommunication structures are painted for: air navigation hazard warning, corrosion protection, or both. Field painting these structures is very expensive and any reasonable measures to extend the period between recoating and painted structures would be welcomed.

In the painting of galvanized structures, experience has indicated that most recent paint failures occur by adhesion failure at the galvanizing/paint interface.

This investigation has explored three particular aspects:

1. **The effect of different abrasives on the topography of the galvanized surface and the loss of zinc during abrading.**
2. **The effect of accelerated salt fog testing on galvanized steel prepared in different ways and primed with two types of primer.**
3. **The effect of accelerated salt fog testing, accelerated weathering and natural weathering on complete paint systems with different surface preparations and primers.**

The results of natural weathering are not presented here as testing will not be completed for a number of years.

Introduction

With the widespread development of radio and television services and microwave links, Telecom Australia has a large number of steel structures exposed in a great variety of environments. Most of these structures are constructed of hot dip galvanized steel. Some of the structures are painted either for aircraft warning purposes or for corrosion protection, or for both. Many investigators have found a synergistic effect exists with painted galvanized steel[1,2]. That is, the life of painting and galvanizing on steel is greater than the life of galvanizing on steel plus the life of painting on steel.

With recent developments in paint technology it has been observed with Telecom's painted galvanized structures that the weakness in a galvanized steel/paint system is the zinc/paint interface and that failures have often occurred by loss of adhesion of the paint film from the galvanized surface.

Because the painting of structures is both difficult and labour-intensive, the cost of painting is very high. The preparation of structural steel for painting is probably the most expensive part of the paint job. The quality of surface preparation is the most important factor governing the life of the protective coating. Therefore, if the life of the complete system can be lengthened by better surface preparation, significant cost benefits can result.

A literature survey indicated that abrasive blast cleaning is considered to be markedly superior to pickling, flame cleaning or steel wire brushing for preparing structural steel for painting. Angular, sharp abrasives which have a cutting action give a greater degree of keying for the protective coatings subsequently applied. Because of hazards to health (primarily the possibility of silicosis) dry sand is considered unsafe, and copper slag or ilmenite is favoured in place of sand. Where there is a risk of a dust nuisance, structures need to be wet blasted.

There are two general approaches in controlling the roughness of the prepared surface for paint application. One is to specify the size and type of the abrasive; the other is to specify the finished profile. Different authorities have published quite varying requirements. Summaries of those examined are as follows:

Standards Association of Australia Manual MA 1.5 "Protection of Steel from Corrosion"; specifies that the blast profile from the lowest pits to the highest peaks should not exceed one-third of the dry film paint thickness. (On its structures Telecom aims for a minimum dry film paint thickness of 160 μm so that the blast profile should not exceed about 50 μm.)

British Standard 4232 "Surface Finish of Blast-Cleansed Steel for Painting"; states that the target for blast profile should be 180 μm although in some instances a value of 100 μm may be preferred. This means using particles of diameter 1.8 mm and 1.0 mm respectively.

NACE (National Association of Corrosion Engineers) recommend a blast profile of 25-50 μm using particles from 0.42 to 1.20 mm diameter.

Williamstown Naval Dockyard (Royal Australian Navy) do not specify a blast profile but do specify a maximum particle size of 1.20 mm diameter and that 85 per cent of the particles be greater than 0.70 mm diameter.

As stated earlier one aspect where Telecom differs from many other organisations in preparing structures for painting is that our structures are manufactured from galvanized steel whereas most structures are made from bare steel. On galvanized structural steel, for the size of members Telecom uses, galvanizing thicknesses of 50 to 175 μm could be expected. Because of intrinsic protection provided by galvanizing to the base steel, the objective of blasting new galvanizing should be only to roughen the surface and remove the minimum of zinc.

Investigation objectives

The objectives of this investigation were threefold. For new galvanized steel members these were:

1. To study the effect of blasting galvanized surfaces with various sizes and types of abrasive; to determine how the surface topography is altered, and to determine how much zinc is lost during abrasion.

2. Using a salt fog cabinet for accelerated testing, conduct a comparison of performance of test specimens coated with different primers on both "as-galvanized" surfaces, and galvanized surfaces blasted with selected abrasives.

3. Using accelerated salt fog testing, exposure in a Q-U-V Accelerated Weathering Tester, and exposure in an aggressive outdoor environment, conduct a comparison of samples coated with different primers on either "as-galvanized" surfaces or galvanized surfaces blasted with selective abrasives, but finished with identical intermediate coats and top coats.

Preparation of galvanized samples

In order to simulate structural practice as closely as possible, test specimens were made from mild steel plate (Grade 350 of Australian Standard 1204, "Structural Steels—Ordinary Weldable Grades"). Two sizes of test specimens were used; these were 300 mm x 150 mm x 6 mm and 150 mm x 150 mm x 6 mm (the 6 mm plate was used rather than sheet, in order to get the influence of the thicker steel substrate on the galvanizing thickness). The test specimens were individually hot dip galvanized and chromate passivated by dipping.

Using a strip and weigh technique the test specimens were determined to have an average of 836 g/m^2 of zinc. This is equivalent to a zinc thickness of 117 μm.

Effect of various abrasives on new hot dipped galvanizing

Types of abrasives

Ten abrasives were used for blasting the galvanized plates. These consisted of one grade of copper slag, one grade of ilmenite, four grades of iron grit and four grades of iron shot. Details of these abrasives are given in Table 1.

Table 1

Copper slag and ilmenite sieved to ascertain the relative proportions of particle sizes

Abrasive	Sieve aperture, mm	Percentage mass retained
Copper slag	1.65	1.4
	0.83	35.8
	0.60	57
	0.35	77
	0.25	86
Ilmenite	0.21	3.4
	0.147	82.2
	0.104	99.5

*The nominal sizes of the iron shot and grit**

Abrasive	Grade	Nominal size, mm
Grit	G66	1.68 mm
	G39	1.00 mm
	G24	0.60 mm
	G12	0.30 mm
Shot	S660	1.68 mm
	S470	1.20 mm
	S240	0.60 mm
	S120	0.30 mm

*More detail about shot and grit can be obtained from BS2451 "Chilled Iron Shot and Grit"

Blasting time

The time to blast surfaces was measured and the time varied between 10 and 20 minutes to blast one square metre of surface area. The nozzle to plate distance was approximately 100 mm and the air pressure approximately 620 kPa.

Effect of blasting on surface topography

General statement on surfaces

No surface is perfectly plain and smooth, each having its own individual, three dimensional topography. As a consequence it is difficult to quantify a surface with a single parameter.

Surfaces generally have roughness and waviness which together are the surface texture. In many machining operations such as turning or grinding it is common for the finish to have directionality, whereas a blasted surface has no directionality.

A common way to characterise a surface is to use a direct reading stylus electronic instrument. Such an instrument in essence characterises one section through the surface. It is normal practice to take the measured section at right angles to the directionality. Using stylus instruments a surface can be characterised in several ways. The most common is centre line average (Ra). This is the arithmetic average of the deviation of the profile above and below the reference curve or line (Australian Standard 1965, "The Measurement of Surface Roughness with Direct-reading Stylus Electronic Instruments").

Conditions of surface profile measurement

In measuring Ra of the surfaces, the electronic stylus instrument was set to have a traverse of 13 mm and a cut-off of 2.5 mm. Ten readings were taken on each surface and the results averaged. Because the surfaces were so irregular both a maximum and a minimum value were recorded during each traverse.

Changes in surface profile and appearance after blasting

As can be seen from the results in Table 2 the initial roughness of the hot dip galvanized zinc surface swamped the influence of any subsequent change on abrasion. As a consequence, the measurement of surface roughness is not considered a valid method for determining if a hot dip galvanized surface has been satisfactorily prepared for painting.

Although visual appearance of the surfaces was useful, the examination of the surfaces at low magnification (x30) was more revealing (see Figures 1-10). Bearing in mind that long-term outdoor weathering tests in a naturally aggressive environment are the critical ones for determining the optimum preparation conditions, the results of the low power examination suggest that blasting with ilmenite looks very promising as the whole of the surface was affected giving a fine mottled appearance. Fine iron grit and copper

ADDITIONAL INFORMATION TO THE 'OFFICIAL GUIDE' IN THE APRIL ISSUE OF (JOCCA) JOURNAL OF OIL & COLOUR CHEMISTS' ASSOCIATION, THE ORGANISERS OF THE EXHIBITION

Stand D64

Byk Chemie GmbH

BYK Chemie will be exhibiting the following new additives:

BYK 310	a polyester modified silicone with thermal stability up to 250°C giving recoatability even after overbake.
BYK 370	a polyester modified silicone containing reactive OH groups which will cure in suitable resin systems to give Anti-Graffiti properties, permanent slip and improved solvent and weather resistance.
BYK 306	a polyether modified silicone giving high slip, scratch and mar resistance in solvent based and amine neutralised water thinnable systems.
BYK 325	a polyether modified silicone which does not stabilise foam or cause "lining up" in repair paints.
Disperbyk 163	a new addition to the Disperbyk 160 family of wetting agents for organic pigments. This block copolymer is compatible with a wide range of resins giving stability to expensive organic pigment dipersions.
Anti Terra 204	a new higher molecular weight wetting agent which gives "controlled flocculation" in high PVC systems preventing settlement and imparting thixotropy, AT 204 will gel bentone in odourless white spirit.
BYK 362P/363P	new levelling aids for powder coatings.

Stand G20 (Next to Stand G15)

Colourgen Ltd

26 Wilfred Street, Buckingham Gate, London SW1E 6PL

Colorgen Inc was founded in 1982 and is located in a new industrial park in Bedford, Massachusetts, USA.

The company's principal product is the DCM-1100 Computer Colour Matching System, which analyses the colour of a paint chip or other sample and accurately calculates the mix of pigments for its exact reproduction.

The DCM-1100 works as follows:

A spectrophotometer and associated electronics designed by the company define a sample in terms of the visible light spectrum.

The company's proprietary software uses a paint manufacturer's stored pigment file to compute a custom colour match and—

An IBM-PC (or similar microcomputer) displays the paint formula on a video display unit, and—if desired—in printed form.

The DCM-1100 normally requires the operator to use only two keys on the microcomputer keyboard. It also includes a built-in diagnostic capability in the event of a system malfunction. The fact that no operator training is required, together with ease of installation and service, offers the customer considerable advantages at minimal cost.

In addition, since any colour can be mixed at the point of purchase, stores should be able to reduce stocks of pre-mixed "standard" colour paints without the need for skilled colour matchers who attempt to duplicate colours with the naked eye.

SURFEX 86

Stand D71

Eiger Engineering Ltd

35 Tatton Court, Kingsland Grange, Warrington, Cheshire WA1 4RR
Tel: 0925 818692 Telex: 629838

Eiger Engineering will be showing a cross section of machines from their wide range of direct drive horizontal bead mills ("MOTORMILLS").

In particular, Eiger will be exhibiting their new "MINI" 100 MOTORMILL. This new unit bridges the gap between existing 50 and 250 ml mills. Its specific design improvements allow the producing of very viscous bases in addition to all standard formulations. Its increased pumping power and tip speeds allow for excellent recirculation and very short grinding times.

This "MINI" 100 MOTORMILL enhances the already successful range of batch recirculation laboratory MOTORMILLS. The range now includes the "MINI" 50, "MINI" 100, "MINI" 250 and the new "MINI" 750. The range will now cover sample sizes from 50 mls up to 5 litres.

Recently added to the production range is the 110 litre MOTORMILL. This complements the production range from 5 litres to 150 litres MOTORMILLS.

A new gap separation system has been developed for use within the production range of bead mills and makes an alternative to the standard screen separation system.

Eiger offer world wide service through Eiger UK, *Eiger Machinery Inc*, USA and *Eiger Japan KK*, Japan, and have many agents throughout the industrial world.

Stand R4

Ernstroem Minerals AB

Box 1142, S-701 11 Oerebro, Sweden

With an annual production of over 400,000 tons, Ernstroem Minerals AB is the biggest dolomite manufacturer in Northern Europe. Mined in Ernstroem's own mines, the dolomite is refined on-site into filler and other industrial raw materials.

Ernstroem's wide range of dolomite filler fractions are sold under the trade name MYANIT. MYANIT's technical superiority as a filler is due to its whiteness and uniform quality, together with its crystalline form which makes it easier to disperse than kaolin or chalk.

Dependability of supply and the economic advantages in buying from Ernstroem Minerals AB are two more reasons why more and more British companies have turned to Ernstroem as a source of filler materials.

Ernstroem Minerals AB stand by their customers in other ways as well. Their long experience in the practical use of fillers, from manufacturing processes and mixing, to compounds and technical applications is a service that benefits customer and producer alike.

Stand D32

Kenroy Dispersions

Holt Mill Road, Waterfoot, Rossendale, Lancs

1986 hosts the 21st anniversary of Kenroy service to the colour consuming industries of the world. Senior staff will be available on Stand No. D32 during the entire period of SURFEX 86 to discuss your queries regarding the company and the products available.

Kenroy manufacture and supply aqueous dispersions of a wide range of organic and inorganic pigments for the colouration of a variety of water based systems.

The questions posed in the colouration of water borne systems are legion and Kenroy prides itself on having answers to most of them. Whether the questions come from the paint, ink, latex, textile or adhesive sectors Kenroy are equipped to assist you in fulfilling your colouration requirements.

Kenroy also have available other more specialised product ranges such as plasticiser and polyol dispersions which are designed for use in polyurethane foam and elastomers. Support for the foam industry is provided by a colour matching service.

Other media include phthalate, phosphate and polymeric plasticisers; alkyds solventless epoxy resins and chlorinated paraffins are available.

This wide range of media is supplemented by a custom dispersion service which can satisfy most of the more exotic requirements.

Stand G11

Paint Research Association

Waldegrave Road, Teddington, Middlesex TW11 8LD
Tel: 01-977 4427 Telex: 928720

The Paint RA will be exhibiting their new special publications

"Evaluation of Biocidal Masonry Coatings and Guide to Paint Film Biocides"

"Business Information On-Line for the Coatings Industry"

"Analytical Study of Particulate Contaminants"

"Air Pollution Audits in Industrial Paint Finishing"

together with leaflets on Paint RA information, training, analytical and technical services.

Details of the Association's 6th International Conference on "Creative Advances in the Coatings Industry" will be available.

Stand D23

Sheen Instruments Ltd

Rear of the Paint Research Association, 8 Waldegrave Road, Teddington, Middlesex TW11 8LD
Tel: 01-977 0051

Several new, test instruments will be making their public debut on the Sheen Instruments Stand at SURFEX 86. A new addition to the Sheen range of glossmeters is a dual angle glossmeter for measurements at both 60° and 20° which is combined in one compact unit. This will be supported by the complete range of Sheen glossmeters, including the popular 100 pocket glossmeter.

Also making its first public appearance is the Polygauge, an important addition to the Sheen range of coating thickness gauges. The Polygauge has been specifically designed for the measurement of thick coatings, up to 31mm, such as linings and laminates.

Prominent among the other coating thickness gauges will be the SS 100 for accurate measurement of coating thickness on either ferrous or non-ferrous substrates. It is equipped with two probes: one for measuring coatings on ferrous substrates and the other for measurements on non-ferrous substrates. Its ferrous range is 0-1000 microns and non-ferrous is 0-500 microns.

Yet another new instrument is a compact, easy-to-use colorimeter for less than £1,000. This is designed for non-continuous use in colour comparison and may be used for tristimulns measurements.

A new version of Sheen's established wet abrasion scrub tester will also be on show. This has been designed for heavy duty coatings. It is fitted with a stronger electric motor than the conventional model, which enables heavier weights to be applied to the brush-heads, thus simulating the extra wear and tear that these coatings have been formulated to withstand.

Another prominent exhibit will be the latest design of the Sheen automatic test panel paint sprayer. Microprocessor controlled, it gives a high standard of repeatability and is designed to spray test panels individually or in groups up to 600mm x 600mm. Standard computer programmes allow for variations in speed, lap distance, number of laps, number of successive coats, dwell time and spray cycle.

Stand D55/56

Kirklees Chemicals

George Street, Batley, West Yorkshire WF17 5AU
Tel: 0924 441160 Telex: 557738

Once again, Kirklees Chemicals are supporting the OCCA Exhibition in its new format "SURFEX".

The main interest on the stand this year will be Viking 100, a new polymeric dispersant for water-based compounds. Viking 100 shows particular advantages in dispersing efficiency, ease of use, gloss generation and versatility in diverse applications.

Also featured on the stand are further developments of the Viking 24-series of resins, including a range of terpolymers displaying properties of particular interest to the formulator of high performance exterior paints.

The expanding range of styrene-acrylics also featured includes many differing applications such as sealants, mastics, roofing compounds and conventional surface coatings.

Lastly, the company's recently developed range of homo-polymers for the adhesives industry is shown.

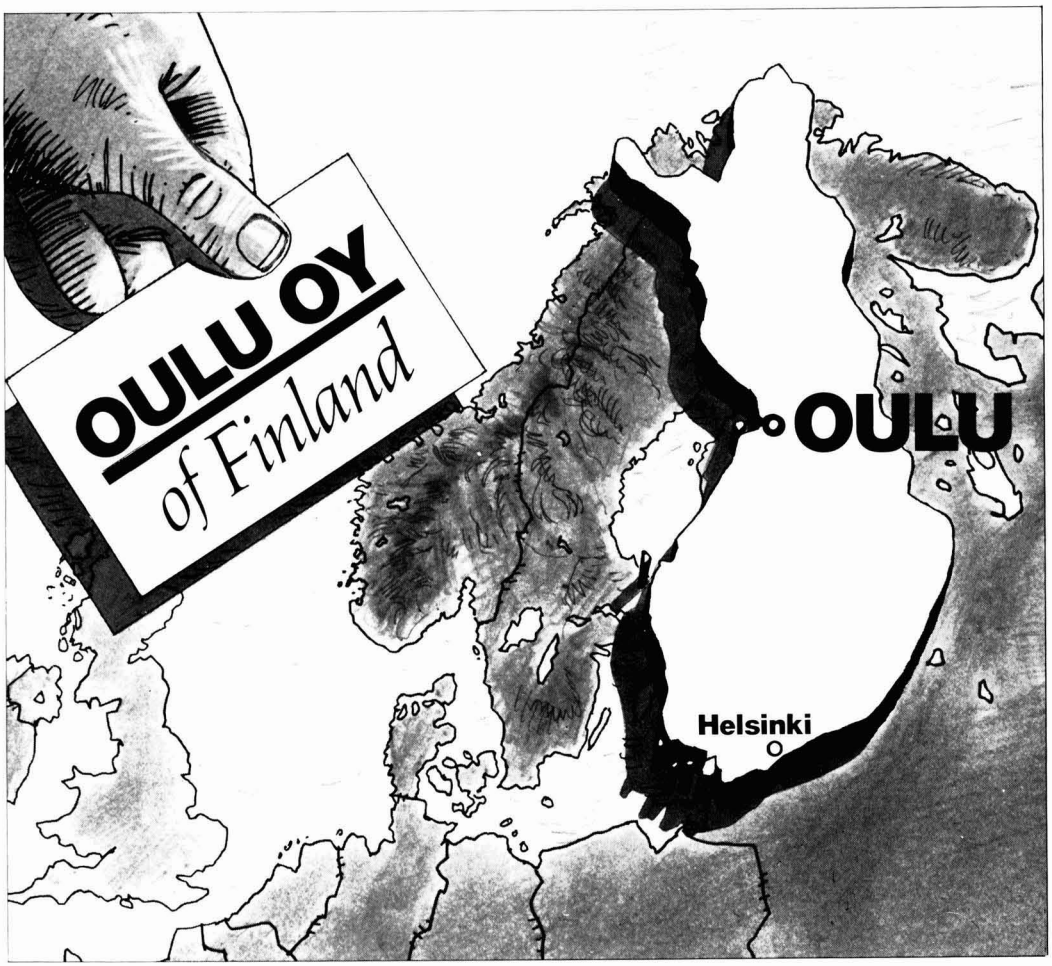
The Kirklees' Management Team, together with Sales and Technical Service Personnel, will be in attendance throughout the exhibition and they all look forward to seeing you there in order to make this first "SURFEX" a resounding success.

Stand G1/2

Red Devil Inc.

Bishop House, Britannia Road, Worcester WR1 3BQ
Tel: 0905 24901 Telex: 336783

We will be displaying a full range of paint mixing machinery together with paint tinting equipment including manual, electric and automatic operations manufactured in the USA and UK. No other company in the industry can offer a more comprehensive range of this type of equipment and our technical/marketing personnel will be available to answer any questions.



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You would like more information? Contact us. Oulu Oy. In Finland.

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P.O. Box 196, SF-90101 Oulu 10, Finland.
Tel. 358-81-221411. Telex 32125.

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CHLORINATED POLYPROPYLENE
CHLORINATED RUBBERS
etc.

APPLICATION

- Anticorrosive coatings
- Road marking paints
- Gravure printing inks
- Adhesives

ADHESIVE GRADES
(Low Chlorine Type)

CHLORINATED POLYPROPYLENE
CHLORINATED ETHYLENE VINYL ACETATE COPOLYMERS
etc.

APPLICATION

- Gravure printing inks, adhesives for untreated Polypropylenes
- Primer for plastics

SANYO-KOKUSAKU PULP CO., LTD.
CHEMICALS TRADING DEPT.
1-4-5 Marunouchi, Chiyoda-ku, Tokyo, Japan
Telex: J 24279 SK PULP
Cable: SANKOKUPA TOKYO

Table 2

Changes in surface profile and appearance after blasting

Abrasive type	Ra, μm before blasting min	Ra, μm before blasting max	Ra, μm after blasting min	Ra, μm after blasting max	Visual appearance*
Copper slag	5.6	16.8	5.5	17.0	Most of sheen removed from plates (1)
Copper slag	4.7	14.5	5.6	11.7	
Ilmenite	5.3	13.7	5.2	13.3	All sheen removed (2)
Ilmenite	4.4	11.6	4.9	11.3	
G66	5.3	12.8	6.0	15.9	Still very shiny but with dark spots on the surface (3)
G66	5.1	15.5	5.3	16.3	
G39	5.4	14.8	7.1	15.5	Slightly less shiny than G66 but no spots (4)
G39	4.4	13.7	5.7	16.5	
G24	4.8	12.8	6.2	13.7	As for G39 (5)
G24	5.4	13.5	5.7	14.6	
G12	5.1	14.5	5.4	15.6	All sheen removed; similar to ilmenite (6)
G12	4.3	13.0	5.4	13.7	
S120	5.6	14.6	5.2	17.4	Very shiny (7)
S120	4.4	11.4	4.8	11.6	
S240	5.0	13.7	5.2	13.9	A little less shiny than S120 (8)
S240	5.3	13.0	6.2	14.7	
S470	4.8	14.0	5.7	13.9	Some of sheen still apparent (9)
S470	5.0	11.5	5.5	13.5	
S660	5.3	12.0	5.5	13.1	Most of sheen removed; similar to copper slag (10)
S660	4.0	11.5	4.8	12.3	

All samples were examined and photographed at a magnification of 30 times.

Notes

(1) The blasted surface was much cleaner and fresher than the original surface. Many surface nicks and pieces of residual slag were visible in the surface.
(2) The surface had a fine mottled appearance with a few pieces of residual ilmenite.
(3) About 10-20% of the surface was marked with large jags but the rest of the surface was unmarked.
(4) About 30% of surface affected with smaller jags.
(5) About 40% of surface affected.
(6) 75% of surface mottled.
(7) 20% of surface cupped; rest unaffected.
(8) 50% of surface cupped.
(9) 50% of surface cupped—finer cups.
(10) 60% of surface cupped; lots of rust due to rusty shot.

slag were visually considered the next most satisfactory abrasives, although iron grit is not really practical for site use. An examination of Figures 4 to 10 shows that all sizes of iron shot and the coarser sizes of iron grit did not appear to be satisfactory in preparing galvanized surfaces for painting because only a portion of the surface was affected by blasting.

Loss of zinc on abrasion

To determine the loss of weight of zinc on blasting, plates were weighed before and after blasting. A maximum loss of 2 per cent zinc occurred with the coarse abrasives compared with a loss of 0.14 per cent zinc with ilmenite. In all cases the loss of zinc was considered minimal.

Paint film preparation and testing

Paint system

The paints used in this investigation were all purchased

Figure 1. Galvanized surface blasted with ilmenite. Magnification x30.

Figure 2. Galvanized surface blasted with copper slag. Magnification x30.

Figure 3. Galvanized surface blasted with grade G12 chilled iron grit. Magnification x30.

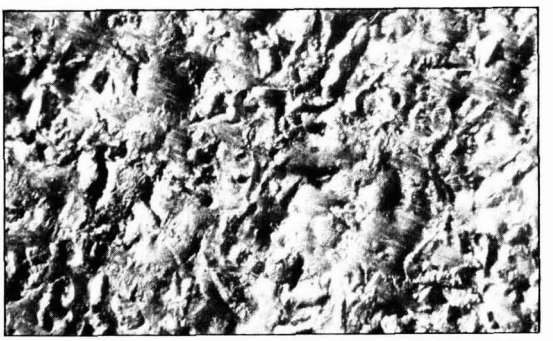

Figure 4. Galvanized surface blasted with grade G24 chilled iron grit. Magnification x30.

Figure 5. Galvanized surface blasted with grade G39 chilled iron grit. Magnification x30.

Figure 6. Galvanized surface blasted with grade G66 chilled iron grit. Magnification x30.

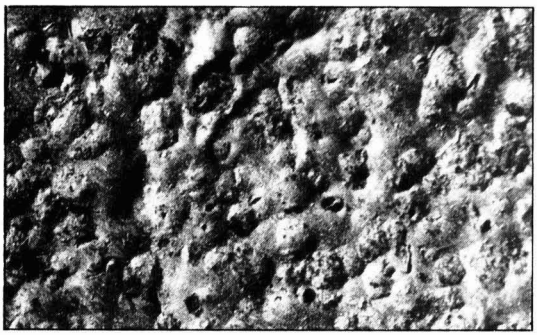

Figure 7. Galvanized surface blasted with grade S120 chilled iron shot. Magnification x30.

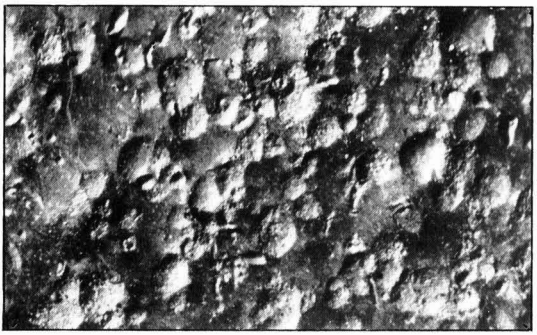

Figure 8. Galvanized surface blasted with grade S240 chilled iron shot. Magnification x30.

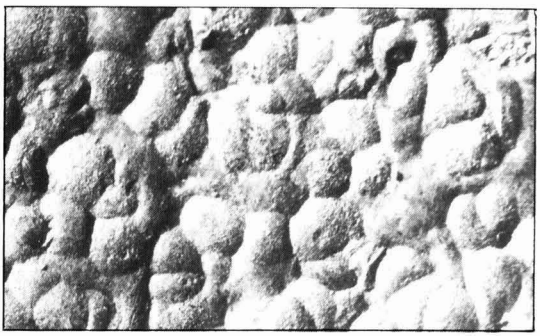

Figure 9. Galvanized surface blasted with grade S470 chilled iron shot. Magnification x30.

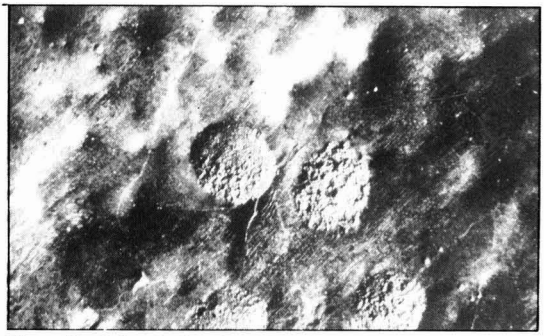

Figure 10. Galvanized surface blasted with grade S660 chilled iron shot. Magnification x30.

from Dulux Australia Ltd. The paints used and the dry film thicknesses specified by Dulux were as follows:

- Durekem 410-32721
  (a corrosion inhibiting vinyl primer) 35-45 μm
- Zinc Galv HS 812-10507
  (a chlorinated rubber-based zinc rich primer) 75-90 μm
- Dureprene M10 421-04970
  (a high build, micaceous iron oxide pigmented chlorinated rubber-based intermediate coating) 100-120 μm
- Weathershield Gloss
  (a water based acrylic top coat) 35-45 μm

In the preparation of the paint films, the paint was applied by conventional spraying techniques. In measuring the dry film thickness, 24 individual measurements were made on each sample and the results averaged. The average values measured were within the limits specified above.

Salt fog tests on primers

The test specimens prepared with each primer were exposed in a neutral salt fog cabinet to the conditions of Australian Standard 2331.3.1. "Methods of Test for Metallic and Related Coatings Part 3, Corrosion and Related Property Tests—Neutral Salt Spray (NSS) Test". The test results are presented in Figure 11.

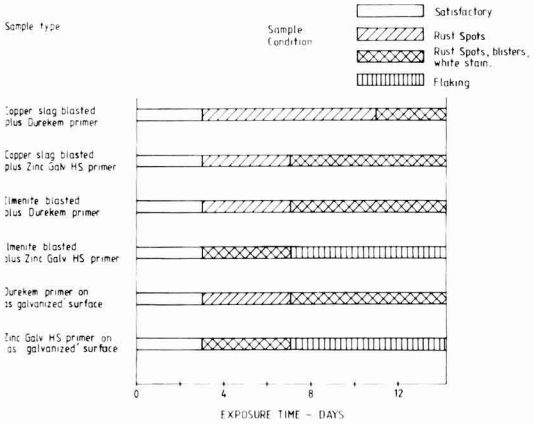

Figure 11. Specimens prepared with primer undergoing the salt fog test.

The Zinc Galv HS primed coatings blistered very quickly and were thus judged to be inferior to the Durekem primed samples. The test specimens abraded with ilmenite or copper slag performed marginally better than those with the "as-galvanized" surface.

Initially the "as-galvanized" Durekem primed test specimens performed better than those which had been abraded with either ilmenite or copper slag. However, with further exposure this was reversed and the abraded test specimens performed better. There was little to choose between the performance of test specimens abraded with copper slag or ilmenite.

The short periods of exposure to cause blistering of the primer film should be contrasted with the much longer periods obtained after salt fog testing complete paint films as reported below. This emphasizes the need to ensure that primed surfaces are not exposed to aggressive environments for too long.

Testing of complete paint films

Combinations tested

The table below gives the designations of the complete paint systems tested. The complete paint films chosen for testing were each of the combinations used in the primer testing with an additional intermediate coat of Dureprene and top coat of Weathershield gloss.

Specimen Designation	Galvanized Surface Treatment	Primer	Intermediate Coat	Top Coat
A	Copper slag abrasion	Durekem	Dureprene	Weathershield
B	Copper slag abrasion	Zinc Galv HS	Dureprene	Weathershield
C	Ilmenite abrasion	Durekem	Dureprene	Weathershield
D	Ilmenite abrasion	Zinc Galv HS	Dureprene	Weathershield
E	Nil	Durekem	Dureprene	Weathershield
F	Nil	Zinc Galv HS	Dureprene	Weathershield

Salt fog testing

Test specimens were exposed in a salt fog cabinet operating in accordance with Australian Standard 2331.3.1. The results are presented in Figure 12.

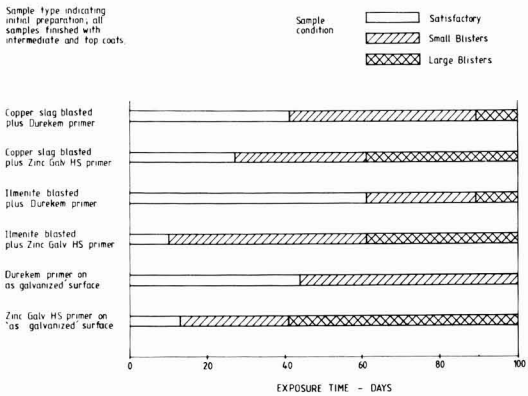

Figure 12. Specimens prepared with intermediate and topcoats undergoing the salt fog.

One way of summarising the above information is to note the time for the appearance of the first blisters for each particular system. This gives the following results:

	System	Time to first blister
Copper slag abraded	Durekem primer	41 days
Copper slag abraded	Zinc Galv HS primer	27 days
Ilmenite abraded	Durekem primer	61 days
Ilmenite abraded	Zinc Galv HS primer	10 days
As galvanized	Durekem primer	44 days
As galvanized	Zinc Galv HS primer	13 days

Those systems which had Zinc Galv HS as a primer failed much faster than those which had Durekem as a primer. From these results the ilmenite abraded surface with Durekem primer gave the longest service.

Accelerated weathering

The same combinations of complete paint systems were exposed in a Q-U-V accelerated weathering tester manufactured by the Q-Panel Coy., USA. The test specimens were exposed at a temperature of 40°C with cycles of 6h condensation, alternating with 6h of ultraviolet radiation.

The panels were assessed according to Australian Standard 1580, Method 481.1, "Assessment of Individual Defects in Exposed Films". The detailed results are given in Table 3. A summary of the results is as follows:

- Systems with Durekem primer were superior to systems with Zinc Galv HS primer at all stages of exposure.
- The nature of the surface preparation had only a minor influence on the performance of the paint systems.

Table 3

Results of accelerated weathering in a Q-U-V tester

Exposure time, hours	820						1758						2548						3365						4148					
	Panel finish																													
Panel attribute	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Degree of change in general appearance 481.1-5	9	8	9	8	9	5	8	8	8	8	8	4	9	8	9	9	9	5	7	8	7	8	8	3	8	7	8	7	8	1
Degree of colour change 481.1-16	9	9	9	8	9	9	9	9	9	9	9	9	8	8	8	8	8	6	6	7	7	7	7	8	8	8	8	8	8	
Degree of change in gloss 481.1-8	9	9	9	7	9	6	6	6	8	7	8	6	8	7	7	6	8	6	8	7	7	6	8	5	7	6	8	6	7	
Degree of chalking 481.1-15	10	10	10	10	10	10	10	10	10	10	10	10	8	8	8	8	7	8	6	6	5	5	5	6	7	7	7	7	7	
Degree of checking 481.1-10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Degree of cracking 481.1-11	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Degree of flaking and peeling 481.1-12	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Degree of blistering and blister size 481.2	10	10	10	10	10	3D	10	10	10	10	10	4C	10	10	10	10	10	5D	10	10	10	10	10	4D	10	10	10	10	10	2D
Degree of visible corrosion of zinc and steel 481.3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	

Outdoor exposure

Samples with complete paint films are being exposed at the Department of Transport and Construction site at Port Melbourne. Being subject to both industrial and marine environments, this site is naturally aggressive to paint finishes. At the time of writing the samples have been exposed for only two years. Apart from some colour and gloss change no deterioration of the paint film has occurred.

Conclusion

Due to the inherent roughness of the galvanized surface, surface texture measurements were unsatisfactory for measuring the topographical influence of various abrasives on the galvanized surface. On abrading the galvanized surface the loss of zinc was minimal and would have little effect on the total life of a member. Examination of the abraded surfaces at a magnification of 30 diameters was very revealing, and suggested that only three of the abrasives used, ilmenite, copper slag and fine steel grit were suitable for abrading galvanized steel prior to painting.

Galvanized surfaces primed with Durekem were considerably superior to those primed with Zinc Galv HS when subjected to the salt fog test. The influence of surface finish was secondary.

Similarly those test specimens of complete paint films primed with Durekem were superior to those primed with Zinc Galv HS when subject to the salt fog test and to accelerated weathering. Once again the nature of the surface preparation was of secondary importance.

In salt fog testing primed and galvanized test specimens failed much faster than those with complete paint systems, emphasising the importance of not exposing primed galvanizing to aggressive environments for too long.

Acknowledgements

The permission of the Director, Research, Telecom Australia, to publish the above paper is hereby acknowledged.

[Received 30 April 1985

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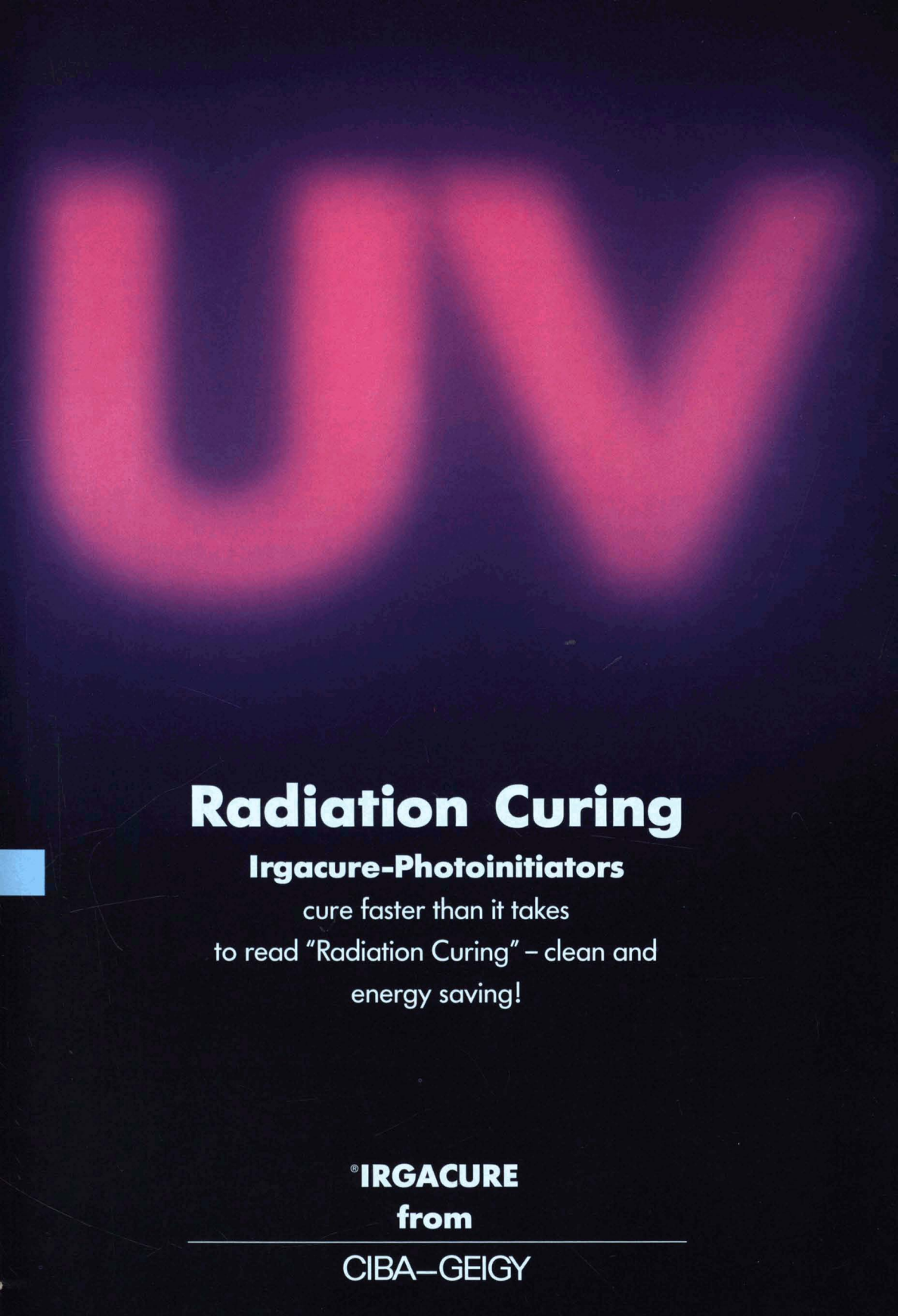
next month's issue

The Honorary Editor has accepted the following papers for publication in the May issue:
Performance testing of exterior wood primers *by M. L. Jansen, BRANZ*
The use of pressurized differential thermal analysis to study the kinetics of curing of melamine resins *by T. R. Manley, L. J. Clark and J. E. Campbell, School of Materials Engineering, Newcastle Polytechnic*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An investigation into the effect of pore size in a lacquer coating on the underfilm corrosion

K. R. Gowers* and J. D. Scantlebury

Corrosion and Protection Centre, University of Manchester, Institute of Science and Technology, Manchester M60 1QD.

Abstract

Polycarbonate membranes of fixed pore sizes were used as lacquer coatings on mild steel specimens, which were immersed in aerated 3 per cent sodium chloride solution.

Measurement of potential and AC impedance showed the existence of a critical pore size, specimens with smaller pores than the critical pore size exhibiting markedly different behaviour from specimens with larger pores than the critical pore size.

Introduction

Experiments by Mayne and co-workers[1-4] have yielded information on coating structure and uptake of species from solution. Kinsella and Mayne[1] conducted DC resistance measurements across free films of a pentaerythritol alkyd varnish, a tung oil phenol formaldehyde varnish, and a polyamide-cured epoxide varnish immersed in potassium chloride solutions of different concentrations. Two types of behaviour were observed, i.e. either the resistance increased with increasing concentration of the electrolyte or the resistance decreased with increasing concentration. These types of behaviour were referred to as inverse or I conduction and direct or D conduction. On average, about 50 per cent of the pentaerythritol alkyd and the tung oil phenol formaldehyde films exhibited D type behaviour, and about 76 per cent of the epoxy polyamide. The remaining films exhibited I type behaviour.

Experiments on I films by Maitland and Mayne[2] involved transferring the films successively between 0.001 N potassium chloride solution, 3.5 N potassium chloride solution, 0.001 N potassium chloride solution again, sucrose solution isotonic with 3.5 N potassium chloride solution, and finally to 0.001 N potassium chloride solution again. The variation in resistance was found to depend only on the water activity of the solution. This was verified by Kinsella and Mayne[1], who in addition found that the resistance of D films was dependent on salt concentration in the electrolyte, as mentioned above.

Further experiments were conducted by Kinsella and Mayne in sodium chloride solutions of different concentrations. In dilute solutions, they found that a minimum resistance value occurred for an I film at a certain concentration specific to that particular film. Below this concentration, D behaviour was observed. In solutions of low water activity, a minimum resistance value was found to occur for a D film at a certain concentration of solution specific to that film. Above this concentration, I behaviour was observed. It was therefore proposed that D and I behaviour were characteristics of degree, not of type.

The ratio of D/I areas was found to be influenced by film thickness or ventilation during drying (causing the presence or absence of degradation products or solvents). However, if the varnishes had metallic driers in them, and were stored for one month, heterogeneous films were formed. If the varnishes did not have metallic driers in them, homogeneous D films were formed. It was therefore thought that the metallic driers promoted cross-linking within the films, and that D and I behaviour was due to the degree of cross-linking.

Mayne and Scantlebury[3] made free films from the same varnishes, and immersed the films in 3.5 N and 0.001 N potassium chloride solution. DC resistance measurements were conducted to characterise D and I films. Next, measurements were made on both D and I films of water uptake, i.e. the weight gain between films exposed to dry air and air of 98 per cent humidity. Also measured were microhardness and the degree of swelling when immersed in toluene. D areas had lower resistance than I areas, greater water uptake, were softer, and swelled more in toluene. Therefore it was concluded that D areas in films were areas of low cross-link density.

Mayne and Mills[4] examined the distribution of areas of corrosion and loss of coating adhesion on mild steel sheets coated with a pentaerythritol alkyd, a phenol formaldehyde tung oil, or a polyamide cured epoxide varnish. The specimens were immersed in 3.5 M potassium chloride solution. The areas where corrosion and loss of adhesion occurred were recorded by means of tracings, the coatings stripped from the substrates using a razor blade and then cut into small squares, which were mounted in glass cells. The DC resistance was measured across the film is 3.5 M potassium chloride solution. There was found to be good correlation between the resistances of the stripped films and the distribution of corrosion. All areas where corrosion occurred had coating resistance of between 10^6 and 10^7 ohm cm^2, and exhibited D type behaviour. Where no corrosion was observed, the coatings had resistances of the order of 10^{12} ohm cm^2, and were of the I type. It was concluded that when films attached to iron were immersed in a corrosive solution, corrosion occurred at the areas of low resistance in the films. Thus, we have a concept of coating failure related to low DC resistance, which in turn is a function of low cross-link density in the coating.

Googan[5] maintains that some useful information may be derived about coating structure from impedance data. He immersed a steel specimen with an intact coating of vinyl lacquer in sea water, and this gave a purely capacitive impedance response. When the same coating was given a small pin prick, a high frequency semi-circle and a low frequency diffusion tail were observed on the Nyquist plot after six hours.

It was also found that immersion in sea water of a steel specimen coated with a cathodic electropaint lacquer not containing curing agent catalyst showed evidence of a real impedance component within a day, and a semi-circle plus diffusion tail after 60 days. A similar specimen with the

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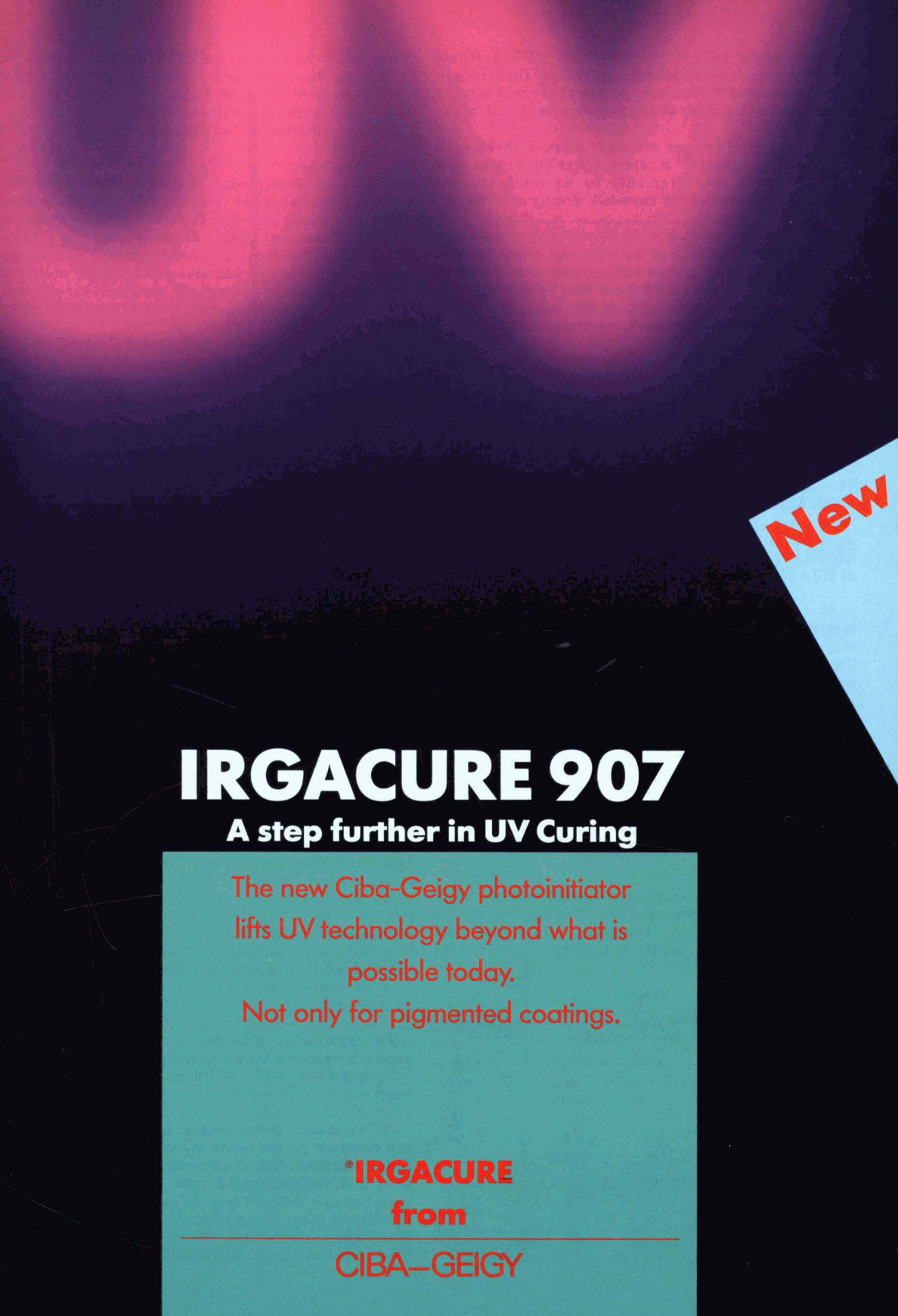
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addition of the catalyst in the coating gave a purely capacitive impedance response after 60 days. Thus Googan had demonstrated the similarity between the effect of pores in coatings and the effect of areas of low cross-link density.

The findings of Googan obviously support the ideas of Mayne and co-workers[1-4] mentioned previously, who used DC resistance measurements to demonstrate the significance of areas of low cross-link density in coatings.

Previous work undertaken by ourselves[6] has tended to support the hypothesis that the most significant variable controlling the behaviour of lacquer-coated steel panels, during immersion in aerated 3 per cent sodium chloride solution, is the physical structure of the coating itself, with particular regard to any macroscopic defects.

To further investigate this, it was decided to run a series of experiments using coatings of controlled structure. This was done by using microporous membranes instead of making lacquer films.

Experimental

The microporous membranes, nominally for use in filtration, were supplied by Nucleopore Corporation. These were made from polycarbonate, and had fixed pore diameters of 0.015, 0.05, 0.1, 0.2 or 0.8 μm. (Variation quoted as +0 to −20 per cent.) The details of the structures of the membranes are given in Table 1.

As in the preceding experiments[6], the specimen substrates were made from 1.2 mm mild steel "Gold Seal" test panels, supplied by Pyrene Chemical Services Ltd. Twenty panels of 2.5 cm x 2.5 cm were used. These were degreased with methanol, polished to 1200 grit with carbide paper and stored in a desiccator for one week.

On each panel, a polycarbonate membrane filter was laid on the surface and attached at the edges of a 1.5 cm x 1.25 cm area, using vinyl/acrylic (2:1) lacquer as adhesive. An electrical connecting wire was attached to each panel, and each panel was then coated with beeswax and colophony resin mixture, such that only the 1.5 cm x 1.25 cm area remained unmasked. A specimen is illustrated in Figure 1.

Four specimens were constructed with membranes of each pore diameter. Specimens 1 to 4 had membranes with pore diameter 0.015 μm, specimens 5 to 8 had pore diameter 0.05 μm, specimens 9 to 12 had pore diameter 0.1 μm, specimens 13 to 16 had pore diameter 0.2 μm, and specimens 17 to 20 had pore diameter 0.8 μm. These specimens were immersed in aerated 3 per cent sodium chloride solution, which was maintained at 24°C. The pH was measured as 6.30 and the conductivity was 21.0 $mScm^{-1}$.

Table 1

Polycarbonate membrane specifications (Data supplied by Nucleopore Corporation)

Pore Diameter (μm)	Pore Density (cm^{-2})	Mass (gcm^{-2})	Thickness (μm)
0.8	3×10^7	1.0	10
0.2	3×10^8	1.0	10
0.1	3×10^8	0.5	5
0.05	6×10^8	0.5	5
0.015	Experimental material —firm specifications not established		

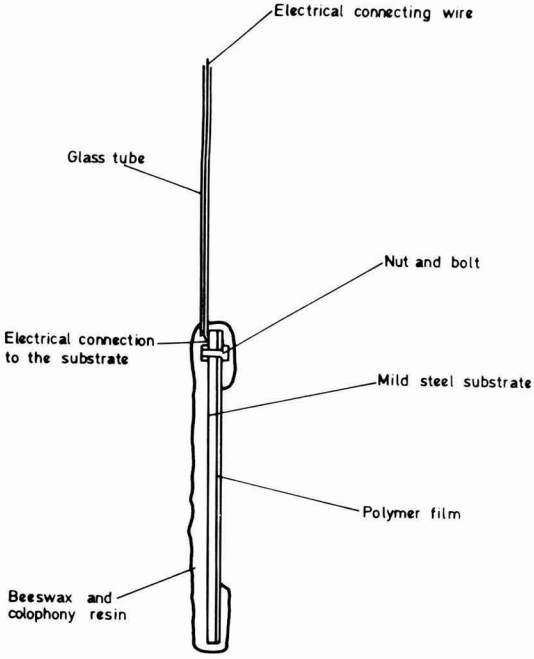

Figure 1. Specimen structure

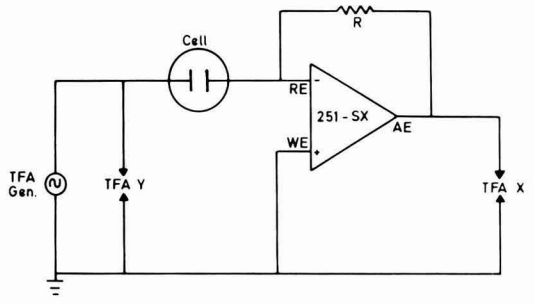

Figure 2. AC impedance circuit (two-electrode). TFA = Solartron 1174 transfer function analyser: 251−SX = Thompson Ministat 251−SX.

The specimens were monitored by measuring the potential against a saturated calomel reference electrode, using a Sinclair DM450 Multimeter, over a period of 265 hours.

AC impedance measurements were also taken, using the two electrode system shown in Figure 2, with the specimen as one electrode and an external platinum electrode 5 cm away in the solution as the other electrode.

Results

There was a noticeable difference between the behaviour of

the specimens with the smallest pores (1 to 4) and all the other specimens. Specimens 1 to 4 showed no signs of corrosion for about the first 30 minutes of immersion. Then large patches of blue coloration, which changed quickly to yellow, began to develop. After a few hours these darkened to orange.

Within 74 hours, the whole of the specimens had become covered with corrosion product, which had darkened to a mixture of brown and black. The coating tended to lift away from the substrate, giving the whole specimen surface the appearance of a large blister. Throughout the remaining immersion time, this became more pronounced, and the colour darkened slightly. On specimens 3 and 4, the coating appeared to have cracked after about 330 hours.

The potential of these specimens fell from about −630 mV, 1½ hours after immersion to about −670 mV, 24 hours after immersion (Figure 3). Thereafter the potential remained reasonably constant, being about −680 mV after 265 hours.

Specimens 5 to 20 started to corrode immediately after immersion. Parts of the specimens turned brown, whilst other parts remained bright metal. The whole specimens were covered with a mixture of brown and black corrosion products after 74 hours, and brown corrosion product was visible on the outside of the coating.

After 1½ hours, the potentials measured were between −540 and −600 mV, and a decrease had occurred to approximately between −690 and −700 mV after 24 hours (Figure 4). Thereafter, the potentials remained relatively constant, but showed a slight gradual rise to about −680 mV between 24 and 265 hours after immersion.

What was remarkable was the reproducibility of the potential/time curves for each group of four specimens of a given membrane pore size.

The meaning of potential measurements of coated metals is not entirely clear, but a visual comparison of the different specimens after eight hours showed that specimens having large pores tended to have a smaller corroded area to bright metal area ratio, indicating a smaller anode cathode area ratio. The specimens with large pores also tended to have higher potentials. Particularly, specimen 17 was found to have a significantly smaller corroded area to bright metal area ratio, and a significantly higher potential of −641.4 mV than the other specimens at that time. This supports Mayne's theory that potential is an indication of the ratio of anodic to cathodic areas[7].

The Nyquist AC impedance plots of all specimens showed a diffusion controlled mechanism after 3 and 26 hours, as did specimens 5 to 20 after 101 and 219 hours (Figure 5). However, specimens 1 to 4 exhibited a high-frequency semi-circle after 101 and 219 hours (Figure 6). This became a diffusion controlled response for specimens 3 and 4 for measurements taken after 350 hours, after cracking of the coating.

Using the AC impedance measurements to plot Z-real against pore diameter and Z-imaginary against pore diameter at one frequency showed that the response given by specimens with pore diameter greater than or equal to 0.05 μm (i.e. specimens 5 to 20) was very similar, but that of the specimens with pore diameter 0.015 μm (i.e. specimens

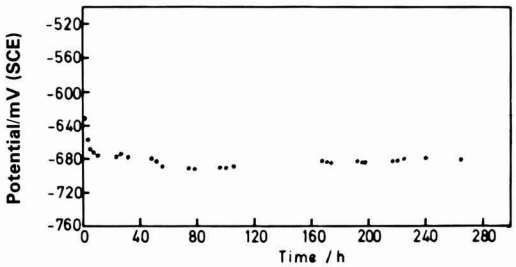

Figure 3. Potential/time relationship for specimen 4 in 3 per cent sodium chloride solution (coating pore diameter =0.015 μm)

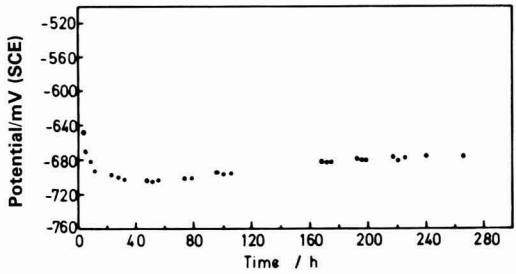

Figure 4. Potential/time relationship for specimen 8 in 3 per cent sodium chloride solution (coating pore diameter =0.05 μm)

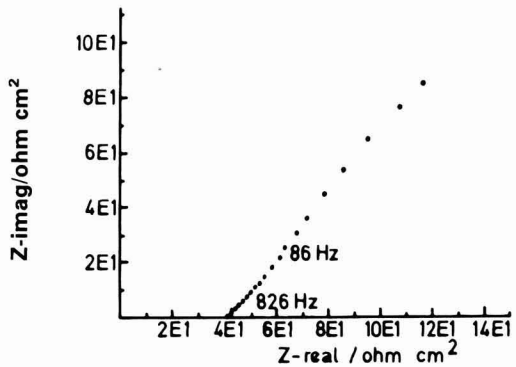

Figure 5. Nyquist plot for specimen 7 (coating pore daimeter =0.05 μm) after 101 hours in 3 per cent sodium chloride solution

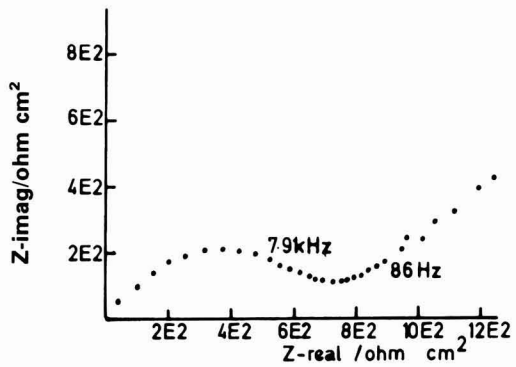

Figure 6. Nyquist plot for specimen 3 (coating pore diameter =0.015 μm) after 101 hours in 3 per cent sodium chloride solution

1 to 4) gave a larger real and imaginary impedance, both at frequencies of 3 kHz and 12 Hz, as may be seen from figures 7 and 8. Similar Z-real/pore diameter and Z-imaginary/pore diameter relationships were observed after 3, 26, 101 and 219 hours.

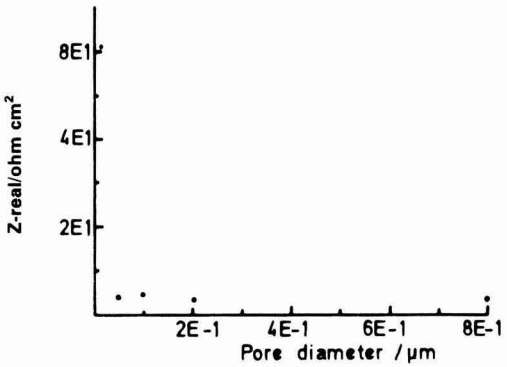

Figure 7. Real impedance component against coating pore diameter after 101 hours (Frequency 3 kHz)

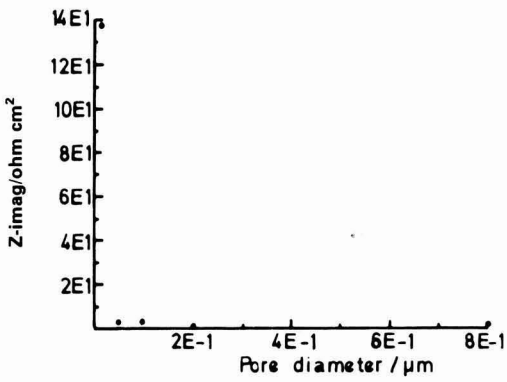

Figure 8. Imaginary impedance component against coating pore diameter after 101 hours (Frequency 3 kHz)

Discussion

The series of experiments has shown that behaviour of coated metals is largely dependent upon the physical structure of the coatings, particularly the size of pores through the coating.

The concept of a critical pore diameter was found to occur (between 0.015 and 0.05 μm). Specimens having pores of various diameter larger than this were almost identical in visual appearance, and gave almost identical potential and AC impedance measurements.

The specimens with pores of diameter smaller than the critical pore diameter were almost identical to each other in visual appearance, but markedly different from the specimens with pores of diameter larger than the critical pore diameter. Their potential/time and AC impedance behaviour, although similar to that of each other, was noticeably different from that of the other specimens.

Acknowledgements

We wish to thank Professor G. C. Wood for provision of laboratory facilities, and also the Science and Engineering Research Council Marine Technology Directorate for providing a research studentship.

[Received 1 August 1985

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short communications

The following three short communications have been received from exhibitors at the Association's Exhibition— SURFEX 86 (14-15 May 1986, at the Harrogate International Conference and Exhibition Centre)

Recent developments in micaceous iron oxide (MIO) coatings

Eric Carter

MIOX Limited, 33A Grosvenor Road, Tunbridge Wells, Kent TN1 2AN.

MIO paints based on oil modified phenolic, alkyd and chlorinated rubber binders are well known and have a good record for long-term protection of steelwork. More recently there have been several new developments with MIO in more advanced types of coatings and a few examples are given here.

Vinyl Copolymers

Vinyl chloride-vinyl isobutylether copolymers can be used in paints for protecting both ferrous and non-ferrous metals. MIO pigmented coatings based on these copolymers have an excellent record on galvanised pylons,

aerial masts, lighting columns and similar structures. They have good chemical and weather resistance, adhere well to zinc, remain flexible under fluctuating temperature conditions and are easily re-coatable when subsequent maintenance is required. They form ideal "one-coat" systems for structures such as electricity transmission towers and railway gantries where "down-time" must be reduced to a minimum.

PVC levels of 25-30 per cent are recommended for normal atmospheric exposure conditions but higher values can be used to increase film build and improve application properties.

Typical Properties

Volume solids 40-55%
Drying time .....2-6 hours
DFT..... 75-120 microns

Epoxies

Epoxy-based coatings have exceptional chemical resistance and are invaluable for protecting steelwork exposed to severe conditions. Because they cure to such a hard state they are well suited for painting fabrications in the workshop as they resist damage from handling and storage. A disadvantage with conventionally pigmented epoxy coatings is that they have to be overcoated within a short time to avoid inter-coat adhesion problems. This leads to difficulties in planning construction programmes where part of the paint system is applied at works and completed some time later at site. However, long-term overcoating properties can be obtained by pigmenting with MIO at about 40-45 per cent PVC. These coatings can be applied over epoxy primers pigmented with zinc or zinc phosphate and are very effective for sealing zinc silicate coatings. They can be overcoated with further epoxy coatings or paints based on other binders.

Typical Properties

Volume solids 45-60%
Drying time .....8-16 hours (extended at low temperatures)
DFT..... 75-150 microns

Moisture-Curing Polyurethanes

In recent years, techniques have been developed to overcome stability problems and these resins are increasingly being used for application to steelwork under non-ideal conditions. They are single-pack coatings using moisture from the air as the curing component. They can be applied under cold, moist conditions and have good adhesion to damp surfaces. Special techniques have to be taken in manufacturing these paints because traces of moisture in the raw materials or surrounding air can cause gellation. Moisture scavengers are introduced during production and all procedures from initial mixing to filling into containers should be carried out under a blanket of dry nitrogen. Incorporation of MIO improves inter-coat adhesion and film integrity within a multi-coat system and reduces "bubbling" tendencies during curing. PVC levels in the order of 35-40 per cent are recommended but lower values are better in finish coats intended for withstanding permanently wet conditions.

Typical Properties

Volume solids 45-54%
Drying time .....2-6 hours (depending on conditions)
DFT..... 80-150 microns

Latest developments in horizontal grinding mills

A. J. Boulton
Mastermix Limited, Vigo Place, Aldridge, Walsall, West Midlands, WS9 8UG.

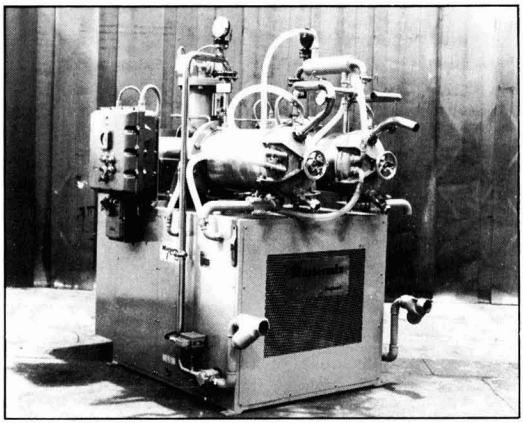
The concept of horizontal milling employing grinding media of approximately 1 mm diameter is now well established, particularly in the surface coatings industry. For many years grinding media were essentially in glass, but more recently zirconia and steel are extensively used.

The horizontal grinding mill provides many benefits over traditional batch milling, either by ball mill, attritor or similar, and once set up, operates on a continuous basis free of operator control.

Over the last two years particular design improvements have been included in the *Mastermix* range of horizontal grinding mills—termed the CH range and worthy of particular mention are:-

1. A directional flow of ground material from "back to front" so allowing easy discharge of ground product via a suitably apertured wedge wire screen which is easily accessible.

2. The introduction of a pressurised double mechanical



Mastermix horizontal twin-chamber grinding mill

seal which is contained within an all stainless steel cartridge and which offers much greater reliability than standard assembled seals.

The newly developed range of twin chamber mills offers the facility either to operate each unit independently or to combine the two for continuous flow, so that those formulations which require "extra grinding" can be automatically passed through the second chamber.

As the range of *Mastermills* has developed over the years and further applications have been established, so further processing features have been added to the design of the machine:-

(i) An "overnight running feature" such that after pre-mix and start up of the grinding mill under controlled conditions, then the machine can be left and allowed to run over off peak periods to complete the grind sequence and at the point of detecting zero flow into the grinding chamber, a "shut-down" sequence will come into operation.

(ii) When particularly concerned with systems which are "temperature sensitive" such as some organic pigments in the surface coatings industry, then a temperature control shut-down facility can be included.

(iii) A process control system has now been developed which can be added to the range of Mastermills and which now offers an intelligent control function which will monitor such critical operating parameters as flow rate, temperature, water cooling and run hours.

Flocculation Monitor

Michael Gamon
Pearson Panke Equipment Ltd, 1-3 Halegrove Gardens, London NW7 3LR

The *Flocculation Monitor* (Figure 1) is an instrument for measuring the flocculation of pigment dispersions, particularly titanium dioxide dispersions in wet and dry films.

Possible savings of up to 10 per cent titanium dioxide usage have been demonstrated using the *Flocculation Monitor* to monitor the quality of dispersion. It is an essential tool for quantifying the dispersion and hence the performance of pigments.

The method involves measuring the amount of radiation at 2.5 micron which is reflected (back scattered) by dry paint films of different thicknesses. A plot of reflectance against film thickness gives the flocculation gradient. A large value indicates flocculation. Low values indicate a good dispersion.

Measurements on wet samples are carried out with the sample contained in a special cell. A single value is obtained. A high value indicates flocculation whilst a low value indicates a good dispersion.

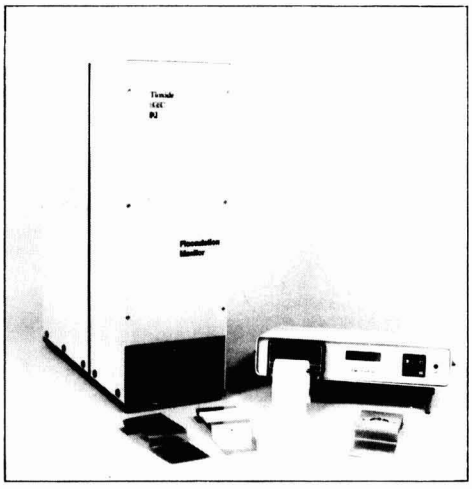


Figure 1. Flocculation Monitor

Principle

The optimum particle size for opacity is half the wavelength of the light with which the dispersion is illuminated. Since the maximum sensitivity of the eye to light is around 0.55 μm, it follows that the optimum particle size for visual perception is 0.27 μm (usually taken as 0.25 μm).

If particles are very much closer than half a wavelength apart, they optically become one particle. Therefore pigment particles of the correct particle size, which are flocculated, are optically larger and their optimum wavelength for opacity is considerably higher than 0.55 μm. Thus the visual opacity is reduced.

The basic principle of the *Flocculation Monitor* is to measure the reflectance of dispersions irradiated at a wavelength of 2.5 μm. At this wavelength, flocculated dispersions exhibit high reflectance and conversely dispersed (i.e. deflocculated) system exhibit low reflectance. The method is more sensitive than normal contrast ratio or scattering coefficient measurements at 0.55 μm.

Method

Dry Films

The optical performance is expressed as the flocculation gradient.

Paint films are applied onto 125 micron thick polyester sheet using *Erichsen Spiral Rod Applicators* to give wet film thicknesses of approximately 20, 30, 50 and 60 μm.

The reflectance (i.e. back scatter) of light at 2.5 μm wavelength of each film relative to a ceramic tile is then measured on the Flocculation Monitor.

A plot of reflectance against film thickness gives a

SURFEX 86

14-15 MAY 1986

HARROGATE CONFERENCE AND EXHIBITION CENTRE

OFFICIAL GUIDE

including plans of the exhibition, editorial descriptions of the stands, details of hospitality suites, maps of the locality and other general information.

THE HARROGATE INTERNATIONAL HOTEL

Issued with the April 1986 issue of JOURNAL OF THE OIL & COLOUR CHEMISTS' ASSOCIATION,
Priory House, 967 Harrow Road, Wembley, Middlesex, HA0 2SF, England.
(Telephone (01) 908 1086. Telex 922670 OCCA G).

CELEBRATE WITH
SANDOZ PRODUCTS LTD
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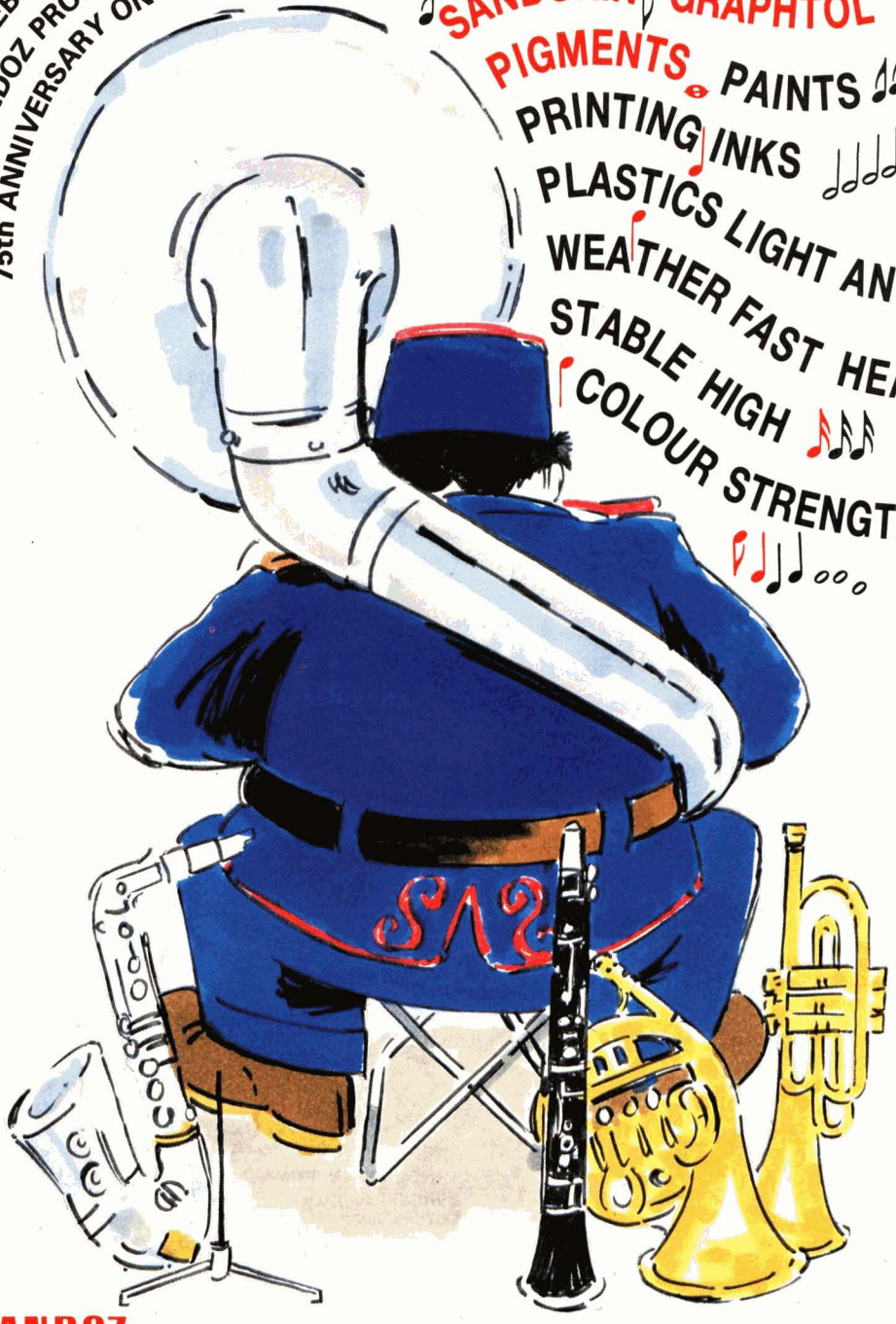
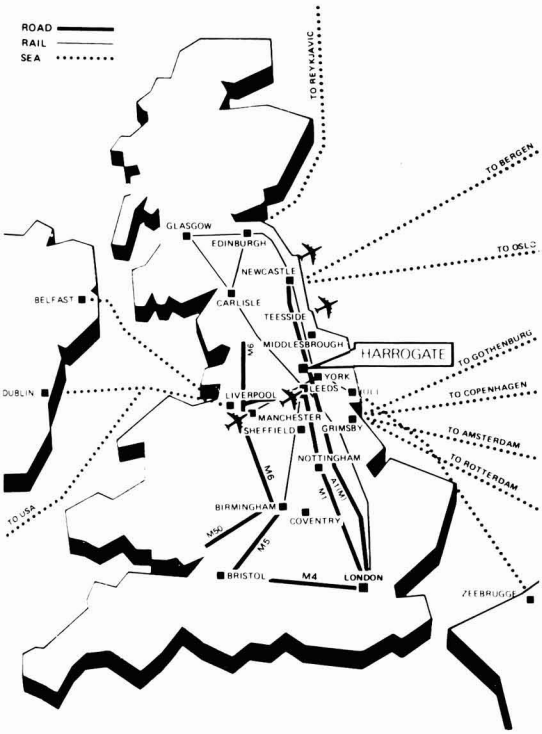
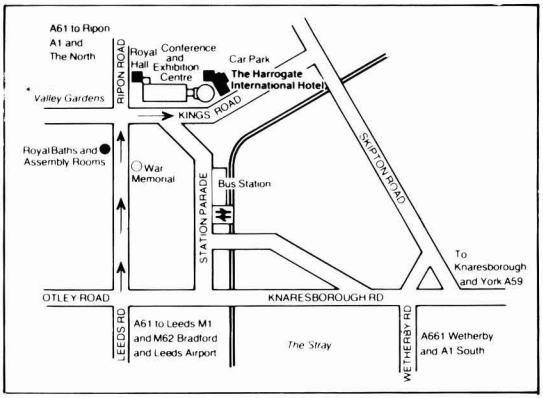


SANDOZ Sandoz Products Ltd., Calverley Lane, Horsforth, Leeds LS18 4RP. Telephone 0532 584646



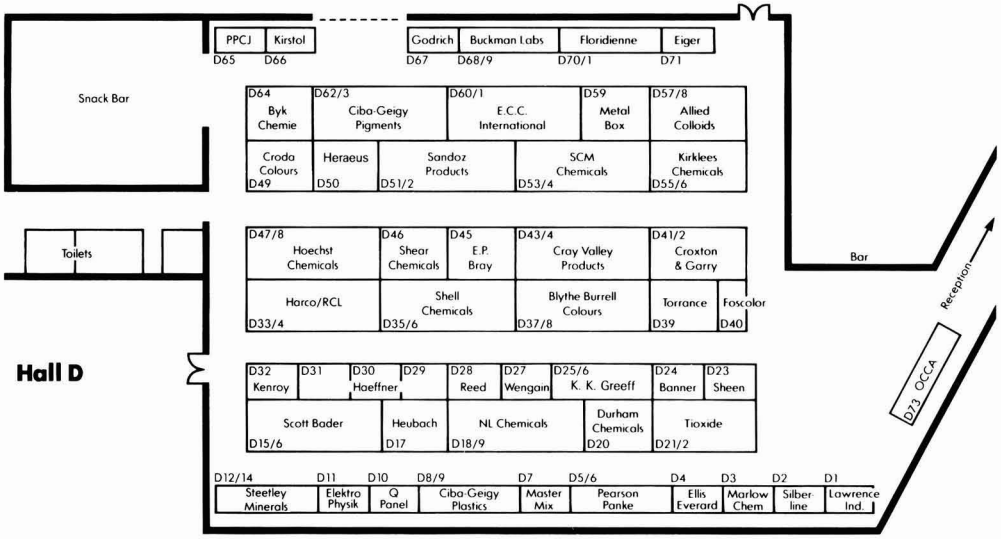
ROUTES TO HARROGATE.



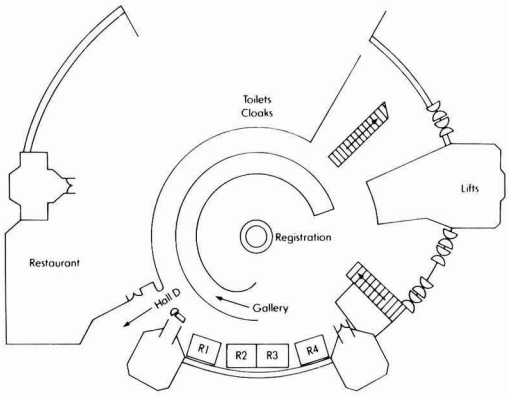
Approaches to the Conference and Exhibition Centre and the Harrogate International Hotel.
NOTE: The entrance to the large underground car park is situated to the rear of the Hotel and is connected with lift and escalator access direct to the registration point.

The Exhibition takes place in Hall D, reception and gallery areas of the Conference Centre and the hospitality suites are located in the International Hotel which is connected by a covered walkway to the Centre.

Plan of the Exhibition

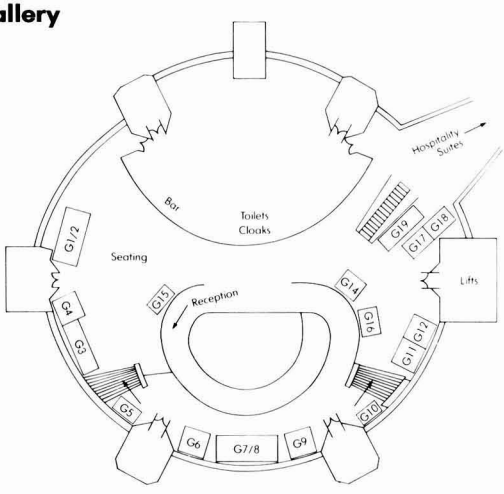


Reception



R1 Tego Chemie
R2 Diamond Shamrock
R3 Union Camp
R4 Ernstroem Minerals

Gallery



G1/2 Red Devil Inc
G3 Boud MKTG
G4 Baxenden Chemicals
G5 3M UK
G6 Perchem
G7/8 Seaton Group (Microfine)
G9 Cornelius
G10 C & W
G11 PRA PMA
G12 Norwegian Talc
G14 ICI
G15 KK Greeff
G16 Bromhead & Denison
G17 BP Chemicals
G18 Vuorikemia
G19 Miox
G20 Colourgen Ltd (next to G15)

NOTE: DETAILS OF HOSPITALITY SUITES ARE GIVEN IN THE GENERAL INFORMATION SECTION ON THE FOLLOWING PAGES

Exhibitors at *SURFEX 86*

Stand	*Exhibitor*
D57/8	Allied Colloids Ltd
D24	Samuel Banner & Co Ltd
G4	Baxenden Speciality Chemicals
D37/8	Blythe Burrell Colours Ltd
G3	Boud Marketing Ltd
D45	E. P. Bray & Co Ltd
G17	BP Chemicals
G16	Bromhead & Denison
D68/9	Buckman Laboratories Ltd
D64	Byk Chemie GmbH
G10	C & W Specialist Equipment
D62/3	Ciba-Geigy Pigments
D8/9	Ciba-Geigy Plastics
G9	Cornelius Chemical Group Ltd
D43/4	Cray Valley Products Ltd
D49	Croda Colours Ltd
D41/2	Croxton + Garry Ltd
R2	Diamond Shamrock Ltd
D20	Durham Chemicals Ltd
D60/1	ECC International Ltd
D72	Eiger Engineering Ltd
D11	Elektro Physik
D4	Ellis & Everard Chemicals
R4	Ernstroem Minerals AB
D70/1	Floridienne (UK) Ltd Trading as Micro Products Ltd
D40	Foscolor Ltd
D65	Fuel & Metallurgical Journals
D67	John Godrich Consulting Eng
D30/1	H. Haeffner & Co Ltd
D29	Haeffner Machinery Co Ltd
D33/4	Harlow Chemical Co Ltd
D50	Heraeus Equipment Ltd
D17	Heubach UK
D47/8	Hoechst UK Chemicals
D47/8	Hoechst UK Pigments
G14	ICI Organics Division
D32	Kenroy Dispersions Ltd
D25/G15	K & K—Greeff Ltd
D55/6	Kirklees Chemicals
D66	Kirstol Ltd
D1	Lawrence Industries
G5	3M United Kingdom PLC
D3	Marlow Chemical Co Ltd
D7	Mastermix Ltd
D59	Metal Box PLC
G7/8	Microfine Minerals & Chemicals
G19	Miox Ltd
D18/9	NL Chemicals Ltd
G12	Norwegian Talc (UK) Ltd
D73	Oil & Colour Chemists' Association
G11	Paintmakers Association
G11	Paint Research Association
D5/6	Pearson Panke Equipment Ltd
G6	Perchem Ltd
D10	The Q-Panel Co Ltd
G1/2	Red Devil Inc
D28	Reed Plastic Containers
D33/4	Resinous Chemicals Ltd
D51/2	Sandoz Products Ltd
D15/16	Scott Bader Co Ltd
D53/4	SCM Chemicals Ltd
G7/8	The Seaton Group
D46	Shear Chemicals Ltd
D23	Sheen Instruments Ltd
D35/6	Shell Chemicals UK Ltd
D2	Silberline Ltd
D12/14	Steetley Minerals Ltd
R1	Tego Chemie Service
D21/2	Tioxide UK Ltd
D39	Torrance & Sons Ltd
R3	Union Camp Chemicals
G18	Vuorikemia OY
D27	Wengain Ltd

In addition to the exhibitors listed above, details of products and/or services from the companies listed alphabetically below will be available on the stands shown.

Stand	
D4	Albright & Wilson
D70/71	Allco Chemical Corporation
D70/71	American Carbonyl Inc
D66	Applied Color Systems
D4	Asturquimica
G10	A.T.S. Spa
D4	Bayer
D4	Bevaloid
D27	Caffaro Spa
G3	Charternorth Ltd
D3	Chemsafe Developments Ltd
D41/42	Chemviron SA
D41/42	Coatex SA
D41/42	Comiel SpA
D37/38	Cowan Colours
D5/6	CO FO ME GRA
D67	Credit Machines Ltd
D49	Croda Resins Ltd
G9	Daniel Products
D5/6	Datapaq
D4	Degussa
D12/14	Dicalite Europe Nord SA
D18/19	Dominion Colour Co Ltd
D41/42	Doratura Mirella, La, SpA
D25/26	Dow Chemicals
G15	Dow Corning
D66	DSET
G7/8	Dupre Vermiculite Ltd
D1	Engelhard Minerals and Chemicals
D5/6	Erichsen
D41/42	Faci Industriale srl
D29/30/31	Flint Dispersion Ltd
D27	Frenkel, Leon, Ltd
R1	Goldschmidt, Th, AG
D12/14	Grefco Inc
G9	Hagedorn
D41/42	Hall, C. P., Co
D27	Hampstead Colours
D50	Hanau
D70/71	Hitox Corp
D66	Hunterlab
D67	Jorgen Jorgenson
G19	Kaernter Montanindustrie GmbH
G15	King Industries
G15	Kusumoto Chemicals
D41/42	Lambertii, Fratelli, SpA
D27	Lead Chrome Colours
G9	Leneta
D67	Liebisch
D27	Magruder Color Co
D41/42	Maier, W., GmbH & Co
D41/42	Makhteshim Chemical Works Ltd
D41/42	Martinswerk GmbH
G9	Mearl
G10	Mebon Paints plc
D41/42	Meyer, Lucas, GmbH & Co
D70/71	Micro Powders Inc
D29/30/31	Mineral and Technical Services (Belper) Ltd

continued on p.6

Analysis of Exhibits

The Information Centre of the Oil & Colour Chemists' Association is located on stand D73

Stand	Exhibitor	Resins	Extenders, fillers and matting agents	Pigments	Additives, driers, surfactants, etc.	Chemical intermediates	Manufacturing equipment, drums etc.	Laboratory apparatus and testing equipment	Miscellaneous
D57/58	Allied Colloids Ltd	●			●	●			
D24	Samuel Banner Ltd	●			●	●			Solvents, chemicals, vegetable oils
G4	Baxenden Chemical Co.	●				●			
D37/38	Blythe Burrell Colours Ltd.			●					
G3	Boud Marketing		●	●					
G17	BP Chemicals Ltd.								Solvents for industry
D45	E. P. Bray & Co. Ltd.			●					
G16	Bromhead & Denison/ Teikoku Kako Co. Ltd.			●					
D68/69	Buckman Laboratories Ltd.			●	●				
D64	Byk Chemie GmbH				●			●	
G10	C & W Specialist Equipment							●	
D62/63	CIBA GEIGY Pigments			●					
D8/9	CIBA GEIGY Plastics	●							
G9	Cornelius Chemical Group Ltd.	●	●	●	●	●		●	Methacrylate monomers
D43/44	Cray Valley Products	●							
D49	Croda Colours Ltd	●		●	●	●			
D41/42	Croxton + Garry Ltd	●	●	●	●	●	●		
R2	Diamond Shamrock UK Ltd				●				
D20	Durham Chemicals Ltd				●				
D60/61	ECC International Ltd		●		●				Organo-clays
D72	Eiger Engineering Co.						●		
D11	Elektro-Physik							●	
D4	Ellis & Everard	●	●	●	●				Solvents
R4	Ernstroem Minerals AB		●						
D70/71	Floridienne UK Ltd trading as Micro Products	●	●	●	●	●			
D40	Foscolor Ltd			●					Pigment dispersions
D65	Fuel & Metallurgical Journals Ltd								Periodicals for the paint, printing ink, adhesive and chemical industries
D67	John Godrich Consulting Engineers						●	●	
D29/30/31	The Haeffner Group of Companies		●	●	●		●	●	
D33	Harlow Chemical Co. Ltd	●							
D50	Heraeus Equipment Ltd							●	
D17	Heubach UK Ltd.			●					Zinc dust, zinc oxide
D47/48	Hoechst Chemicals				●				
D47/48	Hoechst Pigments			●					

Stand	Exhibitor	Resins	Extenders, fillers and matting agents	Pigments	Additives, driers, surfactants, etc.	Chemical intermediates	Manufacturing equipment, drums etc.	Laboratory apparatus and testing equipment	Miscellaneous
G14	ICI Organics Div				●				
D32	Kenroy Dispersions			●					
D55/56	Kirklees Chemicals Ltd	●							
D66	Kirstol Ltd							●	
G15, D25/26	K & K Greeff Ltd	●			●	●			
D1	Lawrence Industries Ltd		●						
D3	Marlow Chemicals Ltd		●		●				
D7	Mastermix Ltd						●		
D59	Metal Box Ltd								Packaging, packaging machinery
G19	Miox Ltd			●					
G5	3M UK Plc				●	●			
D18/19	NL Chemicals UK Ltd	●		●	●				
G12	Norwegian Talc		●						
G11	Paintmakers' Association								Training, industry information
G11	Paint Research Association								Training, information
D5/6	Pearson Panke							●	
G6	Perchem Ltd				●				Thixotropic agents
D10	The Q-Panel Co. Ltd							●	
G1/2	Red Devil Inc								Tinting machinery
D28	Reed Plastic Containers Ltd								Packaging–plastic containers
D34	Resinous Chemicals Ltd	●							
D51/52	Sandoz Products Ltd			●	●				
D53/54	SCM Chemicals Ltd			●					
D15/16	Scott Bader & Co. Ltd	●							
G7/8	Seaton Group (Microfine)		●						
D46	Shear Chemicals Ltd			●	●				
D23	Sheen Instruments Ltd							●	
D35/36	Shell Chemicals UK Ltd	●				●			Solvents
D2	Silberline Ltd			●					
D12/14	Steetley Minerals Ltd		●		●				Filtration equipment
R1	Tego Chemie Service	●			●				
D21/22	Tioxide UK Ltd			●					
D39	Torrance & Sons Ltd						●	●	
R3	Union Camp Chemicals Ltd	●			●	●			
G18	Vuorikemia Oy			●					
D27	Wengain Ltd	●		●	●				

Additional companies mentioned in editorials (continued from p.3)

Stand	
D12/14	Mineraria Marittina
D4	Montedison
D18/19	NL Victor Wolf Ltd
G12	Nortalc Milling Ltd
D41/42	Nyacol Products Inc
G9	Oulu Oy
G9	Oy Partex AB
D70/71	Paterson, A.S.
G9	PGS Minerals
D29/30/31	Phillips Petroleum
D41/42	Pluess-Staufer AG
G15	PMC Specialties
D41/42	Potters-Ballotini Ltd
D29/30/31	Procter Johnson
D41/42	Promindsa SA
D66	Quintell
D12/14	Raybo Chemical Corp
G9	Rohm GmbH

Stand	
D46	Shear Colour Ltd
D41/42	Scholz, Harold, & Co
D41/42	Shiraishi Calcium Kaisha Ltd
D12/14	Spencer & Halstead
G3	Strabruken AB
D29/30/31	Swada
D1	Tamusco
G16	Teikoku Kako Co Ltd
D41/42	Thorson Chemical GmbH
D12/14	Tolsa SA
D5/6	Toyo Seiki
G15	Vanderbilt Corp
D41/42	Union Carbide (UK) Ltd
G7/8	Vanderbilt, R.T., Corp
D27	Waardals
D64	Westlairds
G9	Zeofinn Oy

HOSPITALITY SUITES

The following exhibitors have been allocated hospitality suites in the Harrogate International Hotel, which is approached from the Exhibition in the Conference Centre by a covered walkway on the first floor:

Ground floor
Pointer Suite:
(1) Hoechst Group
(2) Croxton + Garry Ltd

First floor
Charter Suite:
Tioxide UK Ltd

Third floor
Room 308 Allied Colloids Ltd
Room 301 Ciba Geigy Pigments
Room 305 Cray Valley Products Ltd
Room 302 Croda Colours Ltd
Room 306 Kirklees Chemicals
Room 304 Scott Bader Co Ltd
Room 303 Shear Chemicals Ltd

SURFEX 86 OFFICIAL GUIDE

14-15 May 1986

Harrogate International Conference and Exhibition Centre

Aim of the Exhibition

The aim of the Exhibition is the presentation of commercial and technical information relating to raw materials, plant and equipment used in the paint, polymer, printing ink, colour, adhesive and allied industries, in their manufacture, processing and application.

Dates and times

The 1986 Exhibition of the Oil and Colour Chemists' Association (known as *SURFEX 86*) will take place at the Harrogate International Conference and Exhibition Centre, Harrogate, Yorkshire, England, on the following dates and times:

Wednesday 14 May 09.00-18.00
Thursday 15 May 09.00-17.00

This will be the first occasion on which an OCCA Exhibition has been held outside the London area and the exhibition is designed to combine the best features of both hotel and theatre style shows.

It is the most important UK exhibition of suppliers to paint, printing ink and allied surface coating industries, bringing together the most famous names in the industry.

Travel arrangements

Harrogate is situated close to the A1, midway between London and Edinburgh. It is easily reached by road, and Intercity trains from London terminate within a few minutes' walk of the Conference Centre. Leeds/Bradford airport is about 14 miles south.

Some UK Sections of the Association are arranging daily coach visits to *SURFEX 86* and members wishing to avail themselves of this facility should contact their local Section Honorary Secretary.

There may be some places available for non-members, who should write to the Director & Secretary at Priory House and their requests will be forwarded to the relevant Sections.

For those staying overnight it will be possible to take advantage of British Rail discount fares for the return journey and leaflets are available on application to Priory House.

SURFEX Dinner

A dinner has been arranged by the West Riding Section for exhibitors, OCCA members, guests and wives at the Majestic Hotel, Harrogate, on Wednesday, 14 May 1986 at 8 p.m. Dress informal (jacket and tie).

An excellent four-course menu has been selected and the after-dinner speaker will be Canon the Rev J. R. Smith.

Limited overnight accommodation plus free car parking has been secured at the four-star Majestic Hotel for this function. Special concessionary terms are: Single £36 and Double £40 per couple. These terms include full English breakfast, VAT and service charge and reservations should be addressed to Majestic Hotel, Ripon Road, Harrogate HG1 2HU (Tel: 0423 68972), referring to the block booking made by the Association for this dinner. The latest booking date will be **30 April 1986.**

Tickets are priced at £16 each, incl VAT and service charge.

All tickets will be numbered for a prize draw, main prize being a free weekend for two at the Majestic Hotel, Harrogate.

Dinner Reservations—Tickets (**pre-payment only**) from Mr G. C. Alderson, c/o Sandoz Products Ltd, Calverley Lane, Horsforth, Leeds LS18 4PR (Tel: 0532 584646).

Editorial Entries

Each exhibitor has been asked to supply an editorial entry, giving details of the exhibits on the stand and, if possible, the names of personnel who will be in attendance. The telephone number shown directly beneath the stand numbers are temporary installations on the stands. Since some stands will be showing the products and/or services of additional companies, these companies have also been listed, and the stand(s) concerned, in the *"Official Guide"*.

As a further aid to visitors a grid is provided showing the main categories of exhibits on each stand.

Where no entries appear, either in editorial descriptions or the grid (analysis of exhibits), returns had not been received from exhibitors at the time of printing. Details may be available at the Association's Information Centre (Stand D73).

Admission to the Exhibition

Admission to the Exhibition will be free, but all visitors will be required to register upon arrival. Pre-registration cards are included in copies of this issue sent to the UK, Ireland and the Continent of Europe to facilitate ease of entry, but further cards will be available at the reception desk. Copies of the April issue of the *Journal*, which contains the *Official Guide*, will also be available without charge at the Exhibition Hall.

Layout of the Exhibition and Hospitality Suites

Some of the diagrams shown earlier in this text are reproduced on that portion of the registration card which will be retained by visitors so as to afford easy reference to the location of stands and badges will be provided for identification purposes to both stand holders and visitors (yellow for visitors, pink for exhibitors and blue for OCCA officials).

The registration area is in the foyer, which is approached by steps from King's Road or direct from the car park. The entrance to Hall D is located in the foyer and this Hall contains bars as shown; the position of the restaurant is also shown in the diagrams. From the foyer visitors can proceed upwards to the gallery in which further stands are located and from this area the hospitality suites in the Harrogate International Hotel can be approached across the covered walkway to the Hotel. Signs will direct visitors to the various areas occupied by exhibitors.

Accommodation

The following hotels have offered accommodation at special rates to both visitors and exhibitors. Bookings should be made direct with the hotels and should confirm that the person(s) concerned are exhibiting or visiting *SURFEX 86*.

Old Swan Hotel, Swan Road, Harrogate, North Yorkshire HG1 2SR (Tel: 0423 500055. Telex: 57922).

Granby Hotel, Granby Road, Harrogate HG1 4SR (Tel: 0423 56151. Telex: 57423).

The Cairn Hotel, Ripon Road, Harrogate HG1 2JD (Tel: 0423 504005. Telex: 57992 Cairn-G).

The Gables Hotel, 2 West Grove Road, Harrogate HG1 2AD (Tel: 0423 55625).

Adelphi Hotel, Cold Bath Road, Harrogate HG2 0NT (Tel: 0423 66540/63334).

Askern Guest House, 3 Dragon Parade, Harrogate HG1 5BZ (Tel: 0423 523057).

The Fern Hotel, Swan Road, Harrogate, North Yorkshire HG1 2SS (Tel: Harrogate 523866. Telex: 57583).

Prospect Hotel, Prospect Place, Harrogate, North Yorkshire (Tel: 0423 65071).

First aid

First aid personnel will be in attendance and request for their assistance should be made to the OCCA Information Centre (Stand D73). The OCCA Information Centre will show details of membership, the professional grade and will have available for purchase many publications as described in the editorial entry in the *Official Guide*.

Symposium

On the two days prior to the Exhibition, the

Paint Research Association will be organising a symposium on "Coatings for Plastics" at the Cairn Hotel, Harrogate. Details were given in a leaflet enclosed with the March issue of *JOCCA* and further copies can be obtained from the Association's office or direct from the PRA (address as given in their editorial entry in the *Official Guide*.

Exhibition Committee

Chairman: F. Morpeth, CChem, FRSC, FTSC
President: F. B. Redman, FTSC
Immediate Past President: C. N. Finlay, ATSC
Hon. Secretary: L. J. Brooke, ATSC
Hon. Treasurer: B. F. Gilliam, ATSC
Hon. Editor: D. S. Newton, AMCT, CGIA, FICorrST, FTSC
Hon. Research & Development Officer: J. R. Taylor, BSc, CChem, FRSC, FICorrST, FTSC
Hon. Technical Education Officer: H. J. Clarke, FTSC
A. B. Lock
D. W. Komrower
G. W. Fowkes
L. Morpeth
Director & Secretary: R. H. Hamblin, MA, FCIS

The Exhibition Committee are pleased to announce that Lord Kaberry of Adel has accepted an invitation to visit the Exhibition and will be touring the stands accompanied by the President (Mr F. B. Redman), the Exhibition Committee Chairman (Mr F. Morpeth) and the Director & Secretary (Mr R. H. Hamblin).

The editorial descriptions of stands given below follow as nearly as possible the list of the Analysis of Exhibits which appears above. Where no editorial entries had been received from exhibitors at press date, the stand numbers and addresses of the exhibitors are given for reference.

Exhibitors and exhibits

Stand D57/8

Allied Colloids Ltd

PO Box 38, Bradford, England
Tel: 0274 671267 Telex: 51646

Allied Colloids is one of the world's leading producers of additives for water-based paints and resins and additives for printing inks and adhesives. Of particular interest to emulsion paint manufacturers will be RHEOVIS CR and CRX, two new types of associative thickener, which together with the well-known DISPEX DISPERSING agents and VISCALEX thickening agents make up the Allied Colloids range of paint additives. For printing inks several new additions to the GLASCOL range of binders for water-based flexographic inks will be featured. New at *SURFEX 86* will be high gloss heat resistant resins for pre-print liner inks, also new systems for water-based flexographic newsinks.

For adhesive producers the latest additions to the COLLAFIX 'PP' range of pre-pasting adhesives for wallcoverings will be on display together with the COLTAC series of acrylic pressure sensitive emulsions. New developments here include types suitable for labels which are to be applied to greasy polythene surfaces such as may be encountered on cheese packs, bacon packs, etc.

Stand personnel include: E. Alston, Sales Manager; D.

Marshall, Marketing Manager; J. B. Clarke, Technical Manager; A. L. Pyett, Area Manager, North West England; J. B. Pearson, Area Manager, Southern England; R. Sloan, Area Manager, North East England; Janet Mackintosh, Sales Secretary.

Stand D24

Samuel Banner & Co Ltd

59/61 Sandhills Lane, Liverpool L5 9XL
Tel: 051 922 7871 Telex 627025 Banner G.

Samuel Banner & Co Ltd solvent range is the widest and most varied in Britain today. It owes its success to a sound technical back-up and nation-wide storage facilities guaranteeing continuity of supply. The company has four divisions, hydrocarbons, chemicals, vegetable oils and fuel and can meet a wide range of product requirements. Every customer receives a personal service which extends to providing blends to individual specifications whether for full road tanker deliveries or the odd barrel. Our specialists will outline the wide range available—look them up on Stand D24.

Stand executive: Mr S. J. Lloyd.

Stand G4

Baxenden Speciality Chemicals Division

Paragon Works, Accrington, Lancs BB5 2SL

The Speciality Chemicals Division of Baxenden produces acrylic and urethane intermediates for a wide range of applications including surface coatings, adhesives and chemical building products. A standard range of products is manufactured together with toll manufactured materials and specials for single customers.

The Baxenden stand will place emphasis on its expanding range of moisture curing prepolymers for membrane coatings and anti-corrosive type coatings; recent developments in blocked isocyanate cross-linkers which unblock at low temperature and custom manufacturing facilities.

Stand personnel will include: Boyd Cooray, Technical Manager; John Simpson, Section Leader; Cath Emmett, Technical Assistant; Phil Boden, Technical Sales Representative; and Rob Jackson, Product Manager. They will be available to discuss all aspects of the Division's activities and products and how these can be tailored to customer's specific requirements.

Stand D37/38
Stand telephone: 0423 505470

Blythe Burrell Colours Ltd

Newbridge Road, Stockport, Cheshire SK1 2NB
Telex: 665624

Blythe Burrell Colours Ltd will be exhibiting a selection of their new and modified products for the surface coating industry. These will include a modified pigment yellow 74 and pigment yellow 111 and a new version of pigment red 48:2. Also on exhibition for the first time will be illustrations and data on their recently-developed range of transparent iron oxides.

For many years Blythe Burrell Colours Ltd, through their *Cowan Colours Department,* have been suppliers of anti-corrosive pigments and these will be shown in detail.

In addition, composite pigments from the Cowan range will be on display, together with examples of their many applications.

Several technical staff will be available on the stand to discuss the new developments and any other requirements that visitors may have.

Stand G3 Stand telephone: 0423 505435

Boud Marketing Ltd

High Street, Yalding, Kent ME18 6HS
Tel: 0622 814042 Telex: 966272

Boud Marketing Ltd are exhibiting with two of their principals:

Straåbruken AB— Sweden, who will feature:

Stra-Dolomite — High whiteness dolomite powders and granules for use in emulsion paints and textured coatings.

Siokal — Micronised feldspar, an acid insoluble filler/extender for use in exterior decorative coatings and protective coatings.

Enlett — Lightweight filler for use in emulsion paints and textured coatings.

Charternorth Ltd—Redcar, who will present:

Caratex — An epoxy coated pigmented quartz which is used as both the filler and pigment in exterior and interior decorative coatings, anti-graffiti coatings and resin flooring systems.

Personnel: David Boud, Managing Director, Boud Marketing Ltd; Margareta Boud, Director, Boud Marketing Ltd. Technical and commercial personnel from *Straåbruken AB* and *Charternorth Ltd.*

Stand G17

BP Chemicals Ltd

Belgrave House, 76 Buckingham Palace Road, London SW1W 0SU

BP Chemicals will be presenting the latest innovations in their comprehensive product range for the surface coatings industry.

In addition, they will be demonstrating their computer reformulation technique to produce cost effective blends to match and improve on existing formulations.

OCCA PUBLICATIONS

Copies of OCCA publications are available at the **Information Centre (Stand D73)**

Stand D45

E. P. Bray & Co Ltd

Coombes Lane Works, Charlesworth, Broadbottom, Via Hyde, Cheshire SK14 6DQ

As long-established manufacturers of Lead Chromate pigments, E. P. Bray & Co Ltd will be exhibiting a selection of pigments from the standard range currently being sold to the surface coatings and allied industries in the UK as well as overseas.

The up-to-date production facilities and operating policies at E. P. Bray & Co Ltd enables quick response to large or small orders and tailor-made pigments can be produced without the high costs usually associated with them.

The Kenkrom range of pigments on show will include Lemon, Middle, Orange, Scarlet, Post Office Red, Signal Red and a variety of Greens, all of which are well known within the surface coatings industry.

Also on show will be a selection from the Kenfast range of Organic pigments, some of which are available in dust-free granular form.

Specifically for the plastics industry there will be a range of coated, free-flowing, dust-free pigments which are designed to give maximum colour strength with the minimum of effort.

Information will be available on the stand of all of these products as well as a number of recent further additions to the range. Staff will be available to answer questions and if necessary enquiries can be referred back to headquarters for more detailed investigation.

The company's policy is one of continuous research and development which has enabled it to produce better pigments at no extra cost to the end user, some examples of the work will be available for inspection by visitors to the stand.

Personnel on stand: Mr I. G. Copeland, Sales Manager; Mr K. R. Lomas, Production Manager.

Stand G16

Teikoku Kako Co Ltd

3-47 Funamachi, 1-Chome Taisho-Ku, Osaka, Japan

Bromhead & Denison Ltd

7 Stonebank, Welwyn Garden City, Herts AL8 6NQ, England

Teikoku Kako is a leading Japanese chemical manufacturer better known for its production of titanium dioxide, but in addition it produces sulphuric acid, a range of surfactants and speciality products.

Teikoku Kako is the first company to have succeeded in commercial production of aluminium-dihydrogen-tripolyhosphate and this year's *SURFEX 86* OCCA Exhibition is devoted to their products K-White and K-Bond.

K-White has been used by Japanese paint manufacturers for almost a decade but it has only recently been launched in the European market. K-White represents a new type of non-toxic corrosion-inhibiting pigment, white in colour, which does not contain harmful metal elements such as chromium or lead.

K-White is used in air-drying alkyd primers, baking water-soluble alkyds and thermosetting acrylic resins, two component epoxy systems, rubber chlorinated paints, inorganic zinc coatings, wash primers and anti-corrosive coatings for galvanised steel. Because of its excellent performance, K-White has recently been enjoying a good reputation both in the domestic market and abroad and thanks to its performance this pigment is now widely employed.

The purpose of the display panels amongst others is to promote combinations of K-White and Zinc Phosphate, where the results clearly demonstrate the advantages in salt spray tests, when these two materials are used together in various proportions.

K-Bond represents a new type of water glass hardener enabling the production of effective and inexpensive inorganic paints with controlled potlife, resistance to water and flexibility coupled with hardness.

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, non-flammable 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 D68/69

Buckman Laboratories Ltd

Enterprise House, Manchester Science Park, Lloyd St North, Manchester M15 4EN Tel: 061 226 1227 Telex: 665509

Buckman Laboratories have recently developed four new products not exhibited in the UK before which overcome the need to label paints based on them with the St. Andreas Cross.

These products are:

BUTROL 23 is the latest development in low toxicity anti-corrosive pigments based on modified Barium Metaborate. The exhibition display panels will demonstrate the anti-corrosive equivalence of primers based on Butrol 23 with those based on zinc chromate and the better cost effectiveness of primers based on Butrol 23 to similar zinc phosphate-based primers.

BUSAN 11-M3 and BUSAN 1030 have been recently developed as paint film algicides and fungicides for both solvent and water-based systems.

BUSAN 1024 is a new Buckman patented organic biocide for in-can preservation.

Also to be exhibited will be BUSAN 1009, BUSAN 1030 and BUSAN 1025 for blue stain control on wood. They can be used alone or incorporated into stains and varnishes. Busan 1030 has been registered for this use with the PSPS.

OCCA INFORMATION
Membership of OCCA.
OCCA Biennial Conference 1987, Eastbourne.
Advertising in JOCCA.
For details of these and other Association activities, ask at the **Information Centre, Stand D73.**

Stand D64 **Stand telephone: 0423 505244**

BYK-Chemie GmbH

Postbach 245, Abelstrasse 14, D-4230, West Germany
Tel: 0281 670-1 Telex: 812 772

The Instruments division of BYK Chemie, Wesel, West Germany, will present its wide range of testing equipment for suface coatings.

These include Density Cups, Levelling Sagging Testers, Grind Gauges, Film Applicators, Wet and Dry Film Thickness Gauges, Cross Cut Adhesion Testers, Mechanical and Electronic Hardness Testers, Impact and Bend Testers and an Electro Hydraulic Driven Cupping Tester. High precision engineering in manufacture together with the back-up of Application Laboratories and a World Wide Field Service Organisation make them the useful and well-known laboratory tools they are today.

For gloss measurement the BYK family of instruments now includes the portable POCKET GLOSS available with angles of 20°, 60° and 85°. The portable TRI-GLOSS which combines all three angles in one unit.

The SINGLE GLOSS M and MULTI-GLOSS M are laboratory models available with individual measuring heads of 20°, 60° and 85° or the triple angle head. On request systems can be supplied for the measurement of extremely high gloss (mirror gloss) or for continuous on line gloss measurement. All BYK gloss meters comply with DIN 67530, ISO 2813 and ASTM D523.

The BYK COLOR-GLOSS is a laboratory colour and gloss meter which can be equipped with both a colour measuring head and a gloss measuring head for one or three angles. The standard colour values X, Y, Z are measured simultaneously. The colour values X, Y, Z, CIE-LAB, Hunter co-ordinates, Colour Difference, White Index and Yellow Index can be calculated by the built-in microprocessor along with averages and standard deviation. All information can be documented on the built-in printer. BYK Chemie offer an excellent back-up by specialists in colour and gloss measurement.

The BYKO-STOR is an oven temperature recorder with electronic data storage. Up to six probes can provide accurate information on both air and metal temperature as objects are passed through an industrial oven. After measurement the results are displayed as a continuous record using a t/y recorder.

The GRADIENT OVEN is a programmable electronic oven which can stove panels over a temperature gradient of up to 100°C between 50°C and 250°C. New in 1986 is the possibility to feed directly into the Gradient Oven information from the BYKO-STOR memory, therefore reproducing in the laboratory the conditions in your customers' ovens.

The new special low voltage DC-CONDUCTIVITY METER for liquid paint in the range of 50 K Ohm to 20 M Ohm will avoid agglomeration as caused by higher voltages and gives highly reproducible results. In addition a new probe is available for the measurement of surface resistance of dry films, especially for Aviation applications.

The BYK Chemie instrument range is available from *Westlairds Ltd*, North Green, Datchet, Slough.

(Extra item on additional leaflet obtainable from Information Centre.)

Stand G10

C & W Specialist Equipment

Unit 3, Paytoe Lane, Leintwardine, Craven Arms, Shropshire SY7 0NB
Tel: 05473 654/237

C & W SPECIALIST EQUIPMENT will be displaying machines from its range of corrosion test equipment which consists of the following:

(i) HOT SALT SPRAY CABINETS. These cabinets are available in two sizes—450 litres and 1,000 litres. Our latest model is a fully automatic unit which has automatic filling of the humidification tower and a pumped salt solution inlet. These cabinets will operate to all the major salt spray standards including ASTM B117, BS 3900 F12, CASS and DIN Standards.

(ii) MEBON PROHESION® CABINET. This unit is now being used by many of the major national and international companies as a realistic accelerated weathering test which compares favourably with natural weathering tests.

(iii) HUMIDITY CABINETS. These cabinets are available to test to BS 3900 F2, ASTM D2247 and will operate to constant temperatures to meet your own requirements. We now have two models available—the standard 450-litre unit which will accommodate 230 panels maximum and our new unit, Model AV5, which will accommodate a maximum of 100 panels.

(iv) ADDITIONAL CABINETS available include:
Cold Salt Spray Cabinets to operate to BS 3900 F4.
Condensation Cabinets to operate to BS 3900 F9.
"Coldair" Forced Convection Cabinets—up to −80°C.
High Performance Forced Convection Ovens—up to +300°C.
Material Testing Cabinet (Colt Heat) −80°C +80°C.
Flammability Test Equipment.
Ozone Test Chambers.

Details of all these cabinets will be available. Our company also undertakes to manufacture prototype equipment for Research and Development and Quality Control work. Please discuss your requirements with our staff on the stand.

PROHESION®—Registered Trade Mark *Mebon Paints plc.*

Stand D62/63
Stand telephone: 0423 505427

Ciba-Geigy Pigments

Clayton, Manchester M11 4AR
Tel: 061 223 1341

Ciba-Geigy Pigments will be exhibiting a wide range of organic and inorganic pigment powders and preparations for use in the paint, printing inks and plastics industries.

For the first time in the United Kingdom the new Irgacolor range of mixed metal oxide pigments will be on show. These highly heat-stable and light-fast colourants are especially recommended in most plastics applications and for coil coating and other paint uses. For the moment the range comprises:

Irgacolor Yellow 10401	CI Pigment Yellow 53
Irgacolor Yellow 10406	CI Pigment Brown 24

continued

Irgacolor Yellow 10408	CI Pigment Brown 24
Irgacolor Brown 10364	CI Pigment Yellow 164

Ciba-Geigy Pigments will also be prominently featuring their newly-extended portfolio of pigments for the automotive paint industry, notably the Cinquasia range which provides a combination of outstanding tinctorial properties and excellent fastness to light, heat, chemicals and solvents.

Also of value in automotive and other high performance paints are certain members of the high-grade organic Cromophtal and Irgazin ranges, selected representatives of which are, in addition, particularly suitable for the top quality colouration of plastics, fibres and speciality printing inks.

The extent of the Ciba-Geigy offer to user industries is such that not every range can be featured at *SURFEX 86*. Nevertheless, also featured on the stand will be illustrations and information on, amongst others, Unisperse pastes for aqueous gloss paints and aqueous wood stains, Irgalite pigments for paste and liquid inks, and the new MC range of pigment concentrates for the colouration of polyethylene and selected elastomeric systems.

Ciba-Geigy Pigments sales representatives and technical specialists will be on Stand D62/63 to discuss specific requirements with visiting current and potential customers.

Note: Cinquasia, Cromophtal, Irgacolor, Irgalite, Irgazin and Unisperse are Ciba-Geigy registered trade marks.

Stand D8/9 Stand telephone: 0423 505364

Ciba-Geigy Plastics

Duxford, Cambridge

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.

Of particular interest on the Ciby-Geigy stand will be a display showing the recently-developed multi-functional epoxidised novalac resins for:

(a) Powder Coatings:
Two new modified bisphenol-A epoxy resins are introduced, which will give coatings with an improved surface hardness and good chemical and abrasion resistance. These can be used in conjunction with a new Ciba-Geigy phenolic hardener or with conventional curing agents. Uses of this system include pipe coating and concrete reinforcement ('rebar') coating, as well as for upgrading conventional systems.

(b) Maintenance Paints:
A range of liquid and semi-solid epoxy-novolac resins and the appropriate hardener systems is available to meet requirements for higher performance and improved chemical resistance. Applications are mainly heavy industrial, including the coating or repainting of steelwork and for floor coatings.

Also on display is a new matting agent for use in the production of semi-gloss and low-gloss finishes, based on epoxy/polyester and TGIC/polyester powder coating systems.

Ciba-Geigy are offering a range of bisphenol-F-based resins, ranging from a bisphenol-A/F blend to a very low viscosity pure bisphenol-F resin. These resins can be used by formulators to reduce the viscosity of conventional systems and to impart non-crystallising properties. In cases where reactive diluent has to be added, less diluent is required, resulting in better physical properties.

Other products from the well-established Araldite range will be featured on the Ciba-Geigy stand, including weather-resistant powder coatings derived from TGIC.

Stand G9

The Cornelius Chemical Group Ltd

St James House, Eastern Road, Romford, Essex RM1 3NN
Tel: 0708 22300 Telex: 885589

The Cornelius Chemical Group will be featuring resins, pigments, fillers and basic raw materials from their extensive, well-established range as follows:

DANIEL speciality dispersions for paint and ink industry including SLIP AYD dispersed slip agents, FLAT AYD dispersed flatting agents, DISPERSE AYD dispersing agents and new additions to the interfacial tension modifier range.

FINNTITAN Titanium dioxide Pigments manufactured by *Kemira Oy, Vuorikemia Division.*

HAGEDORN Nitro Cellulose and Nitro Cellulose Chips from Western Germany.

LENETA range of hiding powder 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 the 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.

RÖHM ACRYLIC RESINS including the well-known Plexigum range of solid grades for the ink and surface coating industry, Plextol acrylic emulsions, Plexisol acrylic solutions and Rohagit thickeners.

RÖHM METHACRYLATE MONOMERS; the range comprising both standard 'commodity' monomers and speciality grades.

WOLLASTONITE Calcium Metasilicate low iron, high purity mineral filler with reinforcing properties.

ZEOLEX range of synthetic sodium aluminium silicate pigment/extenders for pigment spacing/pigment saving.

ZEOTHIX rheology control agents.

We will be introducing the Cardolite range of extenders/modifers for epoxy casting and coating systems.

Technical and Commercial personnel will be in attendance during the Exhibition.

Stand D43/44

Stand telephone: 0423 505220

Cray Valley Products Ltd

Head Office: Farnborough, Kent BR6 7EA, England
Tel: 0689 53311 Telex: 25898

Long life coatings

CRAY VALLEY PRODUCTS LTD will feature SYNOLAC 6005W—a new long oil alkyd designed for long life exterior coatings . . . the retained elasticity of this resin enables it to tolerate the natural movement of wood without cracking or loss of adhesion.

Additionally, CRAY VALLEY will show a number of other resins for use in long life coatings; lazure and pigmented gloss finishes for wood based on the revolutionary SUPER GELKYDS; durable finishes produced from the SYNOLAC range of oil free polyesters; and the versatility of the UNITHANE range of urethane alkyds.

A selection of the SYNOCURE range of hydroxy acrylics for curing with isocyanates will be exhibited demonstrating their outstanding performance. The exceptional durability characteristics of the reactive polyamides will be illustrated by a display of prestigious applications, as well as thermoplastic polyamide ink resins in their new pastillated form.

The SYNOCURE range of oligomers and reactive diluents for use in UV and Electron Beam cure applications will also be featured.

The CRAY VALLEY stand will be manned by a team of technically and commercially qualified staff representing both the UK and Europe who will be pleased to discuss areas of interest.

Stand D49 **Stand telephone: 0423 505480**

Croda Colours Ltd/Croda Resins Ltd

Brookfoot, Brighouse, West Yorkshire HD6 2QZ

Croda Colours Ltd is a leading supplier of pigments and dyestuffs to a variety of industries, including cement, inks, paints, paper, plastics and rubber. At *SURFEX 86* Croda Colours will be promoting its FORTHFAST range of organic pigments, FORTHBRITE PTMAs, FORTHFLUSH flushed pigments and FORTHSPERSE aqueous dispersions. It will also highlight dyes used extensively in the leather, textile and paper industries.

Croda Colours is a major supplier of sulphanilic acid and its salts and will promote these intermediates for the production of dyes and fluorescent brightening agents.

Recent developments, including pigment chips which find application in inks, paints and cosmetics, will also be featured.

Croda Resins Ltd has established an international reputation in the surface coatings industry and at Surfex will concentrate its promotional efforts on its most recent and on-going developments. These include:

three new powder coating resins (0-45, a 7% TGIC curing type, 0-46, a 4% curing TGIC type and 0-47 for epoxy cure)

oil free polyesters— a comprehensive range to meet a variety of applications

silicone copolymers. Croda Resins manufacturers a full range with many varied applications

resins for metal decoration, including oil free polyesters, acrylic modified alkyds such as AC-4AS and AC-26AS—a new product offering a low temperature cure

the AC-200 series—a commercially successful range offering an alternative to vinyl toluene modification

ink resins—including the recently-launched HYTEX WR-20 and WR-30 slightly structured isophthalic alkyds offering controlled rheology and water uptake characteristics

surfactants—a new package of surfactants for the formulator—the INCROSPERSES.

Stand D41/42

Croxton + Garry Ltd

Curtis Road, Dorking, Surrey RH4 1XA
Tel: 0306 886688 Telex: 859567/8

Croxton + Garry Ltd are a wholly owned subsidiary of *Pluess-Staufer AG* of Switzerland, who are one of the world's largest producers of natural calcium carbonate with plants located throughout the world. In addition to our own manufactured Whitings and Calcites, Croxton + Garry acts as distributors for a wide range of products for both the paint and ink industries. The major product groups that will be exhibited include our Britomya Chalk Whitings which are widely used in all types of paints, textured ceiling compounds, some letterpress inks and various other applications. The Omya calcite extenders cover a full range of particle sizes with top cuts varying from 3μ to 3 mm. Of particular interest at present are grades such as Setacarb OG for use in gloss and silk emulsions, Durcals and Granicalciums for use in textured coatings to prevent the carbonation of concrete. Our unique range of Hakuenka precipitated calcium carbonates from *Shiraishi* are well known in the ink industry.

A wide range of thickeners are available including Cellosize HECs, *Coatex* associative thickeners, Forbest gellants for ink oils and Ircogel metal polysulphonates for vinyl and solvent acrylic-based systems.

A limited number of pigments are also available, in particular *Promindsa* Red Iron Oxides and Micaceous Iron Oxides from *H. Scholz*. *La Doratura Mirella* make a wide range of aluminium pastes and bronze powders and phosphorescent pigments from West Germany have recently been launched in the UK by *W. Maier*.

A comprehensive range of dispersants covering both solvent- and water-based systems are represented by the *Colorol* and *Coatex* range of products.

In addition, there are also available a wide range of other products including photoinitiators from *Fratelli Lamberti*, flame retardant additives, water-thinnable alkyds from *Pluess-Staufer*, Forbest micronised waxes, polymeric plasticisers from *C. P. Hall*, surface treated glass spheres from *Potters-Ballotini* and novel hollow, high crush strength glass bubbles from *3M's*.

Stand R2

Diamond Shamrock Process Chemicals Ltd

147 Kirkstall Road, Leeds LS3 1JN
Tel: 0532 457471 Telex: 557448

continued

The Process Chemicals Division of Diamond Shamrock is committed to solving problems for manufacturers and processors in industry world-wide. The technical expertise gained from many years' experience within the paint, polymer and adhesive industries have enabled us to develop a broad range of speciality additives, many tailor-made to meet individual customer's requirements.

Particularly featured on our stand will be our ranges of 'Foamaster' defoamer/antifoam agents, 'Nopcocide' bacteriacide/fungicidal compounds and the 'Capcure Series' novel epoxy curing agents highlighting recent developments especially for aqueous based gloss and wood finishes, epoxy adhesives and coatings.

On visiting our stand experienced personnel including Richard Fletcher (Sales Director), David Aspinall (Technical Services Manager), John Stanley (Sales Manager) and Richard Harrison (Marketing Manager) will be more than willing to discuss visitors' particular interests.

Stand D20 Stand telephone: 0423 505617

Durham Chemicals Ltd

Birtley, Chester-le-Street, County Durham DH3 1QX

Durham will concentrate their exhibit on two of their major paint industry product lines.

Driers are a small but essential component of many coatings and it is intended to concentrate the display on the changes brought about by the recent restrictions on the use of lead as a drier.

Biocides are another major field of activity for Durham and the exhibit will provide the latest information on the application of the Durham biocide range.

Technical staff will be available at all times to discuss the above product ranges and other Durham products used by the paint industry.

Stand 60/61 Stand telephone: 0423 505228

ECC International Ltd

John Keay House, St. Austell, Cornwall

The display will feature ECC International's activities in the United Kingdom, with special emphasis on our presence in the North of England. ECC International is ideally situated to supply raw materials to the paint manufacturers in this area; with a storage and distribution complex at Stoke-on-Trent and a calcium carbonate production plant at Beverley, North Humberside. A daily train service from Cornwall brings minerals to Stoke-on-Trent for further road distribution. Our main UK calcium carbonate production plant is at Salisbury; and, of course, we have extensive deposits of china clay in Cornwall and South Devon. ECC International offers a comprehensive range of extender pigments and other minerals, including PoleStar calcined clays, speciality and graded clays, ground minerals, whitings, Polcarb fine calcium carbonates and the Claytone range of organo-clays.

Stand D72

Eiger Engineering Co

19 Tatton Court, Kingsland Grange, Warrington, Cheshire WA1 4RR
Tel: 0925 818692 Telex: 629838

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

Stand D11

Elektro-Physik

117 King Street, Knutsford, Cheshire WA16 6EH
Tel: 0565 51221 Telex: 665947

ELEKTRO-PHYSIK are showing their complete range of instruments for the non-destructive measurement of surface coatings of all types. Of particular interest to the paint industry will be those gauges which are designed to measure the thickness of organic coatings on both ferrous and non-ferrous metals. The MIKROTEST range of magnetic gauges now has scales up to a maximum of 20 mm while the digital display electronic gauges measure from zero to over 1 mm in one scale—the MINITEST FD. Porosity in paint coatings can be detected with the NEW POROTEST instrument which is a small, lightweight unit utilising high voltage to detect flaws in surface coatings.

In the ELEKTRO-PHYSIK range there is virtually a gauge for every application and they are all on display on Stand D11.

Stand D4

Ellis & Everard (Chemicals) Ltd

Caspian House, East Parade, Bradford BD1 5EP
Tel: 0274 392411 Telex: 517464.

Ellis & Everard serves the paint, printing ink and surface coatings industries throughout the UK from 18 strategically located branches. The company is a main distributor for *Shell* UK's range of solvents; *ICI* Alloprene Cereclor and Drikold; Winnofil from *ICI; Degussa* Aerosils; Phosphoric Acid and Phosphates from *Albright & Wilson; Bayer's* Titanium Dioxide, Sodium Benzoate and thickeners; Ammonia, Sodium Hydroxide, acids and alkalis again from ICI; *Bevaloid* de-foamers; Potassium Permanganate from *Asturquimica* and Vinavil from *Montedison.*

Fast and efficient turnround of orders both large and small and a deserved reputation for high safety standards and reliable delivery have earned for Ellis & Everard a rapid and continued growth in business with the surface coatings industry.

Existing customers and visitors who would like more information about the Ellis & Everard service are welcome to call in at Stand D4.

Stand R4

Ernstroem Mineral AB,

Box 1142, S-701 11 Oerebro, Sweden

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

Stand D70/71

Floridienne (UK) Ltd
Trading as Micro Products Co

Unit 10, Moor Park Industrial Centre, Tolpits Lane, Watford, Herts WD1 8SP
Tel: 0923 23368 Telex: 933219

FLORIDIENNE UK LTD, T/A MICRO PRODUCTS, will show the following products:

A complete range of micronised waxes from *Micro Powders Inc.*

Polyfluo 200, a new ultra high slip additive for inks and coatings.

The Florcryl range of copolymer emulsions for water-based printing inks and paper coatings.

Florplast 100 and 200, saturated hydroxylated polyester resins for solvent-based and radiation curing inks, coatings and adhesives to improve tack, intercoat adhesion and flexibility.

Hitox, a yellow rutile pigment—for low-gloss interior and exterior emulsion paints, for undercoats as an inert opacifier, for plastics pigmentation.

BTDA and PMDA: intermediates for flame resistant fibres and high HDT laminates. These products of *Allco Chemical Corp* are being exhibited for the first time in Europe. Further anhydrides will be added during the year.

Florstab UV, a range of stabilisers for radiation curing inks and coatings to improve can stability without slowing down the cure speed.

UV Antimist, a special additive for UV offset inks.

Can top securing clips to Nacanco design manufactured by *A. S. Paterson* will be featured as a new activity.

Technical support personnel will be available during the Exhibition: Mr Paul Keymolen, Managing Director, Floridienne Polymeres; Mr J. G. M. Sallis, Marketing Manager, Floridienne (UK) Ltd; Mr E. Kensbock, Managing Director, Floridienne (UK) Ltd.

Stand D40

Foscolor Ltd

Bickershaw Lane, Abram, Wigan, Lancs WN2 5TB
Tel: 0942 861215 Telex 67233

As well as an extensive range of standard products, FOSCOLOR produce tailor-made dispersions designed to meet the requirements of individual customers in the paint, printing ink and allied surface coating industries.

Chip, paste and liquid dispersions of pigments and additives will be shown for Industrial and Automotive finishes, Coil Coatings, Silkscreen, Flexographic, Gravure, Offset and Letterpress inks, Timber Treatment, Wallpaper and Calendered Sheet, Leathercloth, Shoes, etc.

Of specific interest at *SURFEX 86* will be chip dispersions for Offset inks. These are so soluble that they can be cold-soaked into distillate. Indeed the chip is provided ready mixed in the solvent blend of the customer's choice so that by the time he is ready to use it the action of blending with other ingredients is sufficient to complete the dissolution process.

Also featured will be new advanced colourants for fence panels and other timber treatments. Marketed under the trade mark FOSTAIN they have been specially formulated to prevent colour patching, even on wet wood, and will set at temperatures down to freezing without the addition of binder.

The following personnel will be in attendance: Fred J. Morpeth, Managing Director; Stan Jones, Marketing Manager; Roy Charnock, Technical Representative; Frank Brooks, Technical Consultant.

Stand D65

Fuel & Metallurgical Journals Ltd

Queensway House, 2 Queensway, Redhill, Surrey RH19 1TN
Tel: 0737 68611 Telex: 948669

POLYMERS PAINT COLOUR JOURNAL, the official journal of the British Paintmakers' Association, is Britain's leading technical journal for the surface coatings industry, a role it has played since the first issue in 1879. Published alternate weeks, it circulates amongst Paint, Printing Ink, Adhesive, Mastic, Polymer, Resin, Pigment and Solvent Manufacturers and is read by Technical Directors, General Works Managers, Chemists, Technologists and Purchasing Officers.

As the most frequently published journal in Europe, it is able to keep abreast of all the latest technical and commercial developments, new information, news and comments.

Complementary to this journal is the POLYMERS PAINT COLOUR YEAR BOOK which is the standard reference directory of materials and suppliers for the Paint, Printing Ink and Adhesive industries in Britain.

POLYMERS PAINT COLOUR JOURNAL also organises the annual RESINS & PIGMENTS EXHIBITION—Europe's largest annual event for the coatings industry. This is an informal exhibition for manufacturers of Resins, Pigments, Solvents and Speciality Chemicals used in the production of Paints, Printing Inks and related industries.

The 1986 Resins & Pigments Exhibition will be held at the BRUSSELS SHERATON HOTEL & TOWERS, Place Rogier 3, Brussels, on 5 and 6 November in conjunction with the 6th International Conference of the Paint Research Association taking place on 3, 4 and 5 November.

In addition to copies of Polymers Paint Colour Journal and Polymers Paint Colour Year Book, on view will be SPECIALITY CHEMICALS, a quarterly publication highlighting developments

continued

and trends in the production, marketing and applications of Speciality Chemicals, Performance Chemicals, Effect Chemicals as well as EUROPEAN ADHESIVES & SEALANTS, the quarterly journal for Europe's manufacturers and users of adhesives and sealants.

Stand D67

John Godrich Consulting Engineers

Ludford Mill, Ludlow, Shropshire

The latest Liebisch STR-400 Salt Spray Cabinet is to be shown, having the unique salt evacuation system which is used prior to opening the lid of the cabinet and all the safety features normally found on a Liebisch cabinet to prevent salt from entering the laboratory. Also fitted to this unit will be the flow meter and regulator for regulating the amount of salt to the nozzle, this entails actually adjusting the amount of salt and means a cabinet can be set up in seconds as opposed to adjusting the air flow which takes some considerable time in comparison.

The Liebisch Salt Spray cabinets can now be supplied in 400- and 1,000-litre capacity chest-type or 400-, 1,000- and 2,000-litre capacity in the cabinet-type with a front opening door. The HS2000 is a specially built cabinet, which will allow larger items such as car doors and complete window frames to be tested, and because of its unique construction (two 1,000-litre cabinets 'piggy-backed') it is not difficult to load and is easy to operate.

These cabinets conform to the requirements of ASTM B117, BS 3900 F4, F12, IEC and ISO specifications for either continuous or discontinuous/cyclic salt spray testing, combining salt and drying facilities. Recently, a cabinet has been delivered which has been programmed with a small programmer to carry out salt spray, humidity and drying up to a temperature of 60°C all in the same unit.

Liebisch also supply Sulphur Dioxide Test Cabinets in either individual form or combined with the standard Salt Spray cabinets range. The Sulphur Dioxide testing conforms to the DIN and Kesternich tests as well as BS 3900 F8. Salt Spray cabinets of the front opening type, 1,000-litre capacity have been supplied which not only carry out salt spray and sulphur dioxide testing but can automatically change without operator assistance from common salt, acetic acid and sulphur dioxide testing through a micro-processor programmer.

The "Credit" range of machines include the new "Credit" Humidity cabinet, which has a small micro-processor programmer on it and can now be supplied with independent cooling via small enclosed refrigeration unit, this enables a machine to be free-standing and have accurate temperature control to within plus or minus ½°C conforming to BS 3900 F2, ASTM 2247 and similar specifications. The "Credit" Environmental cabinet can have temperature ranges from minus 70° to plus 150° with the option of controlled humidity and full micro-processor programming, most environmental cabinets are built to suit customer's specification, therefore a suitable cabinet is built to suit a particular need. The "Credit" Refrigeration cabinets can be supplied in one cubic foot sizes upwards.

The Rotostat range of mixers shown will include the now well-known and well-proven energy-saving type 'X' and 'XP' models, with their unique Rotor/Stator mixing/stirring action with a free-running stator helping to mix larger and heavier mixes and in certain cases reduce energy costs to a tenth of those previously known with dissolver disc type machines.

The Rotojet axial mixer is designed for mixing liquid/liquid and liquid/powder applications, particularly where no aeration is required.

Also available are the Rapidex PR range of stirrers and the Rapidex range of Anchor stirrers. These can be supplied for customers' own vessels or supplied with vessels to suit a customer's requirement.

The "Credit" HSD Laboratory Mixer will be shown for the first time, this new lab/semi-production unit is designed to mix from ½ to 25 litres of material and is supplied as standard with an 80 mm dissolver disc but can take other sized dissolver discs and also the Rotostat type 'T', type 'X' mixing head should this be required. A variable speed unit in Ex-d flameproof form complete with Ex-d switch and hydraulic stand it is compact and extremely versatile.

Staff will be available to help with enquiries for special test cabinets and special mixing machines covering a wide range of paint and chemical testing.

Stand D29/30/31

Stand telephone: 0423 55630

The Haeffner Group of Companies

Nursery Industrial Estate, Station Road, Chepstow, Gwent NP6 5PB
Tel: 02912 5236/7/8, 2389 5281/2
Telex: 497241

The Haeffner Group of Companies will be exhibiting as follows:

H. Haeffner & Co
Haeffner Machinery Ltd
Mineral and Technical Services (Belper) Ltd
Procter Johnson & Co Ltd
Flint Dispersions Ltd

These companies, both collectively and individually, represent the major manufacturing distribution and supply service to the Paint, Plastic, Printing Ink and Rubber Industries and can offer a full range of mixing machinery with which customers can use the raw materials initially supplied by Group Companies.

Products on display will include Bayferrox Iron Oxides, The Tioxide UK Ltd range of Titanium Dioxide pigments, Carbon Black from *Phillips Petroleum*, Fluorescent Pigments from *Swada (London) Ltd.* In addition we have some new raw materials such as the EFKA range of additivies for the Paint, Plastics and Printing Inks and Rubber Industries, and through our group companies Haeffner Machinery Ltd, we will be showing a complete range of manufacturing equipment and *Mineral and Technical Services (Belper) Ltd* offer specialised range of fillers and extenders.

Personnel attending the Exhibition will include Edward Haeffner, Managing Director; Geoff Stayt, Sales Manager for Haeffner Machinery Ltd; Mike Ramsden, Commercial Manager; and J. C. Shaw, Sales Manager for H. Haeffner & Co Ltd.

Stand D47

Harlow Chemical Co Ltd

Templefields, Harlow, Essex

In the continuing development of vinyl acetate/VeoVa 10 copolymers, Emultex VV547 is offered as a product with a unique balance of properties. The high level and sheen produced in vinyl silk paints often permits formulation at a higher PVC. Throughout the PVC range it provides good opacity whilst the very high

binding power provides a good latitude for formulating high PVC paints. Thixotropic gel paints are readily obtained by incorporation of organic titanates.

The latest gloss paint system will be shown which comprises two coats of gloss based on a pure acrylic Mowilith LDM7770 and an associative thickener, Mowilith LDM7000 over a primer undercoat based on the wet adhesion promoted Revacryl 483. Gloss and flow are excellent in both white and deepshade paints, as also is exterior durability. The primer/undercoat has been designed not only to conform to BS 5082 but to provide very good flow and holdout. Permeability to moisture provides a high order of performance in exterior situations and this is combined with easy application, rapid recoat and minimum preparation.

The latest range of woodstains will be shown from the low-cost, creosote-replacement type, to formulations giving unparallelled exterior performance. These are based on a pure acrylic, Revacryl 480, which has given exceptional exterior durability.

DP3266 is the latest development designed for elastomeric products, such as caulks and sealants. The elastomeric properties are extremely good and this is combined with good adhesion to wood, glass and metal.

Stand D50

Heraeus Equipment Ltd

Unit 9, Wates Way, Brentwood, Essex CM15 9TB
Tel: 0277 231511 Telex: 995310

Heraeus Equipment design and manufacture a wide range of lightfastness testing equipment and the company will be displaying their Xenotest 150S light and weatherfastness tester, a Suntest accelerated exposure machine table unit, a Novasoltest accelerated exposure machine and an example of their range of lacquer drying cabinets.

The 150S is a development of Heraeus' well-proven 150 model and it offers significant advances on the original machine which has been operative for over 25 years. Heraeus also offer a larger and more versatile Xenotest—the 1200—which will not be on display but details will be available on the stand.

The Suntest is a compact bench unit which stimulates sunlight and with reproducible exposure results.

Heraeus' Novasoltest has high intensity ultra-violet radiation in an inexpensive chamber for testing a wide variety of materials.

It provides good simulation of natural sunlight or global radiation with low energy consumption.

Full details of the entire Heraeus range will be available and the stand manning team will be able to discuss the equipment and processes available from Heraeus. The company places great emphasis on after-sales service and there is a country-wide team of factory-trained field engineers to maintain that service.

Stand D17 Stand telephone: 0423 505338

Dr Hans Heubach GmbH & Co KG

PO Box 1160, D-3394 Langelsheim, West Germany
Tel: 05326 520 Telex: 957726

Heubach UK

74 Dickenson Road, Manchester M14 5HF
Tel: 061 225 4292 Telex: 669003

The company will display its full production range: zinc oxides (French process), zinc dust (pigment grade, chemical grade) chromium yellows, molybdates reds, zinc phosphate, modified zinc phosphates (Heucophos), high grade tailor-made pigments (Heucodur and Heucotan), Heucoflow pastes.

Special products

Heucotron yellow and Heucotron red with very good fastness properties and low acid soluble lead content of less than 1% for yellow and less than 2% for red.

Krolor colours, heat stabilised, glass encapsulated lead chromates and molybdates for coil coatings, powder coatings and all plastics.

Heucophos pigments

ZMP, ZPO, ZPA and—new—ZPZ especially designed for etch primers. The Heucophos pigments are non-toxic, lead and chromate-free anti-corrosive pigments.

Heucotan pigments

Nickel and chrome titanates, cobalt blue, cobalt green, spinel black. For paints, special coil coatings and plastics with the well-known excellent fastness properties of this product range.

The additional advantages of the Heucotan pigments are very good dispersibility and high gloss.

Heucosin special

Pigments for concrete and floor coating systems.

Heucoflow pastes

Zinc chromate, zinc tetroxychromate and strontium chromate pastres. Heucoflow pastes are pigment dispersions which are completely dust free and compatible with almost all solvent based paints.

Heucoplast pigments

These are non-dusting pigments for the plastics industry, in particular there are special products for PVC pipes.

Heucomin 5

Red lead—non-dusting.

The main personnel in attendance on the stand will be Mr Hans Noack, Sales Manager for Dr Hans Heubach GmbH World Wide; Mr Klaus Weigel World Wide Sales and Product Manager for Zinc Dust and Zinc Oxide; Mrs Annegret Bittner, Technical Manager responsible for the Heucophos and Other Speciality Anti-Corrosive Pigments; Mr David Gregory, Operations Manager Heubach UK.

Stand D33
Stand telephone: See Hoechst Pigments

Hoechst Chemicals

Hoechst House, Salisbury Road, Hounslow, Middlesex TW4 6JH
Tel: 01 570 7712 Telex: 23284

The Chemicals Department of Hoechst UK will be emphasising their complete range of products for the surface coating industry.

continued

These may be classified under the three headings of commodities, specialities and performance chemicals.

In the commodity area the chemicals department are a major supplier of oxygenated solvents, esters and glycol ethers. In addition general purpose plasticisers such as DOP, DINP, DIDP and DBP are also offered.

The products Neopentyl Glycol and PTBBA for resin production are also demonstrated, as are monomers such as vinyl acetate for PVA homo and copolymers which are well known.

In the area of vinyl derivatives, the ®Mowital B range of polyvinyl butyral resins are being shown and in particular ®Movital B30HH for use in chromate-free primers. Also the ®Mowilith and ®Hostaflex ranges of PVA's and PVC/PVA copolymers will be exhibited.

The Hoechst range of waxes are also of special interest in the ink industry and ®Ceridust 3715 is recommended in particular for water- and alcohol-based inks. Also being shown is ®Ceridust 9630f which is a PE/PTFE micronised wax specially developed for use in inks for high-speed printing processes.

Fire retardant products also feature strongly and the Exolit range of fire retardants, along with other products such as chlorinated paraffins and melamine salts, are shown in this context.

Stand D48 **Stand telephone: 0423 505330 0423 505586**

Hoechst Pigments

Hoechst House, Salisbury Road, Hounslow, Middlesex TW4 6JH
Tel: 01 570 7712 Telex: 23284

Hoechst Pigments will be exhibiting a range of dyes and pigment preparations for woodcare products, particularly for wood stains and preservatives.

In addition they will be illustrating the Type 70 pigments for the paint industry which offer good opacity for toys, general industrial and automotive applications. For lower cost, high quality paints, the Special Azo pigments based on benzimidazolone will be exhibited.

For printing inks the exclusive '80' series will be shown which give all the advantages of flush pastes without the extra cost.

Transparent iron oxide dispersions for use in water-based systems will also be featured.

Stand G14

ICI Organics Division

Floor 5, Hexagon House, Blackley, Manchester

ICI will be featuring their range of SOLSPERSE hyperdispersants. ICI have developed this range of dispersing agents specifically for use with pigments in non-aqueous systems. The SOLSPERSE range of products may be used with organic and inorganic pigments and fillers and find outlet in the paint and printing ink industries and also for producing plasticiser dispersions in the plastics industries.

Use of SOLSPERSE agents, which are exceptionally powerful wetting agents, can lead to significant improvements in the efficiency of dispersion. These agents differ from classical surfactants in having a tailor-made molecular structure which enables them to 'anchor' firmly to specific pigment surfaces. They also have solvent soluble chains which may have wide compatibility with hydrocarbons, esters or alcohols according to the grade. As no single hyperdispersant can be developed which is effective with all types of pigments in the wide variety of solvents in paints and inks, a limited range has been developed.

For the paint industry a new SOLSPERSE 24000 hyperdispersant will be introduced. This agent is compatible with aromatic hydrocarbons, esters and ketones, and is eminently suitable for chemically-cured or stoved industrial paints. It is such as effective wetting agent that it permits very high pigment loadings in millbases (eg 80% titanium dioxide or 35% phthalocyanine blue) with no adverse effects on the viscosity or physical properties of the paint.

For decorative paints there is new information on the use of SOLSPERSE 3000, 9000 and 17000 prime hyperdispersants. These agents may be used to produce significant cost savings. Typical productivity improvements are two to threefold, which is of significance in a competitive market situation.

In the printing ink industry the use of hyperdispersants is now well established. For the offset and gravure inks based on hydrocarbons, SOLSPERSE 17000 alone or in mixture with synergists (SOLSPERSE 5000, 22000 and 25000) has proved to be very effective; higher tinctorial strength is obtained for pigments and the prints are much glossier, sharper and more intense.

In flexographic inks, SOLSPERSE 20000 will be featured together with the blue synergist SOLSPERSE 12000.

For the plastics industry the use of SOLSPERSE hyperdispersants for the production of pigmented plasticisers dispersions will be introduced. The SOLSPERSE agents allow the possibility of obtaining very high pigment loadings into various plasticisers or mineral oils. Fluid dispersions with 80-85% inorganic pigment content have been produced. SOLSPERSE treated dispersions of organic pigments are often brighter and tinctorially stronger than conventional dispersions, due to the increased quality of dispersion. Further developments are being made into novel methods of producing masterbatches using SOLSPERSE hyperdispersants in polyethylene and polypropylene.

Stand personnel will include Roger Slater, Tom Stuart and Ian Wasson, together with members of the UK Sales staff.

Stand D32 **Stand telephone: 0423 505426**

Kenroy Dispersions

Holt Mill Road, Waterfoot, Rossendale, Lancs

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

Stand D55/6

Kirkless Chemicals Ltd

2 George Street, Batley, West Yorkshire WF17 5AU

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

Stand D66 Stand telephone: 0423 505450

Kirstol Ltd

Cheethams Park Estate, Park Street, Stalybridge, Cheshire SK15 2BT
Tel: 061 338 7512 Telex: 665004

The Kirstol stand will exhibit products from *Applied Color Systems (ACS)*, *Hunterlab*, *Quintell* and *DSET*. The following is a brief resume of the particular products on exhibition from each of these companies.

Applied Color Systems (ACS)

On show will be the new ACS 1800 ATE colour matching and batch correction system comprising the powerful IBM AT enhanced personal computer with 1.2 MB floppy disc and 10 MB Winchester disc drive together with the high accuracy ACS Spectro Sensor II scanning spectrophotometer. Software includes combinatorial matching and correction, colour difference, strength comparison, pass/fail, shade sorting, statistical analysis and many other features.

Hunterlab

New, Hunterlab D25-PC2 Colorimeter, designed in response to user requirements for cost-effective, reliable, flexible and fast measurement.

New COLORQUEST spectrophotometer which is an affordable colour measurement system consisting of the COLORQUEST optical sensor and an IBM PC. The standard software package enables users to tailor the system to exact requirements, whether for evaluating raw materials, in-process goods or final inspection.

Quintell

On show will be COMPUTRAC, a microprocessor based moisture analysis system offering consistently quick, accurate results which enables operators to more precisely control production operations.

DSET

Accelerated weathering and measurement services.

Stand D25/26
Stand telephone: 0423 505243

Stand G15 Stand telephone: 0423 505479

K & K Greeff Ltd

Suffolk House, George Street, Croydon CR9 3QL

Various companies, including *Dow Chemical*, *Dow Corning*, *PMC Specialities*, *Vanderbilt Corporation* and *Kusumoto Chemicals*, with a long history of service to the Paint, Printing Ink and Allied Industries, are represented. Products featured include antimicrobials, cellulose ethers, resins, propylene glycol ethers, silicones and a variety of speciality additives designed to meet the demand within surface coatings for improved properties.

Stand D25/26

The new Methocel 310 series offers solubility in water together with solubility in solvents such as Methanol, Ethanol, Methylene Chloride, Chloroform and blends thereof. Information on these products together with the well-known 'J' Series and the speciality construction and adhesive grades will be available.

The range of Dow Epoxy resins for Maintenance Paints, Powder Coatings, Esters, Can and Coil Coatings, Marine Paints and Civil Engineering will be illustrated. Also available will be information on the newly-extended comprehensive range of curing agents.

The unique Dowfax range of surfactants can solve your problems in high performance emulsion polymerisation. Dowfax offers greater stability, finer particle size, improved ion tolerance and exceptional pH tolerance. In cleaning areas they offer coupling ability, stability, strong aqueous solutions of acids, alkalis and salts.

The search by customers for safer glycol ether solvents has lead to a wide acceptance of propylene glycol ethers. In many cases they can offer advantages in evaporation rate without sacrificing solubility when compared with ethylene glycol ethers. In addition to the standard range we would be pleased to discuss your individual requirements.

Stand G15

Through *Vanderbilt Corporation*, K & K Greeff Ltd offer the excellent technical Nacure, Nacorr and K Flex ranges manufactured by *King Industries*.

The unique range of Nacure catalysts are based on PTSA, DNNDSA and DDBSA. They allow the dual demands of higher solids and lower energy use to be satisfied.

Nacorrs are especially developed anti-corrosive additives to be used as replacements for toxic alternatives such as Zinc Chromate.

The K Flex grades are resin modifiers offering the optimum balance of flexibility, hardness and resistance.

From *Kusumoto Chemicals* the Disparlon range of additives for non-aqueous systems will be highlighted. They include a wide range of non-seeding thixotropes, pigment dispersants and non-silicone surface control additives.

New biocides, XZ 875Y0 and 7287 (DBNPA), find utility within a wide range of applications, viz water-based paints, adhesives, polishes, starches, construction and foundry products, pulp and paper, metal cutting fluids, etc, complementing the familiar Dowicil 75 and chlorinated phenols which Dow also produce.

Ethocel (Dow Ethyl Cellulose) is a long-established product, familiar to industry in a wide variety of applications. However, it is not so well known that, following a technological breakthrough, material is now offered in a new densified form with better solubility and film properties. Recent additions offer prospective customers a wider range of types.

Dow Corning is synonymous with silicones. On display are a number of modified silicone paint additives which are increasingly being used in coatings to improve the performance of organic products. Similarly, the ink industry is finding that silicone additives can help solve modern-day problems.

PMC Specialities, who recently purchased Sherwin Williams' Chemical Division, are actively developing new generation alkali blue pigments for printing inks whilst also marketing the newer grades of Molywhite anti-corrosion pigments. Prominent are the new easy disperse powdura blues and the more cost-effective, low toxicity, Molywhite grades which provide acceptable alternatives to toxic lead and chromium-based pigments.

Stand D1 Stand telephone: 0423 505229

Lawrence Industries

Mitcham Industrial Estate, Streatham Road, Mitcham, Surrey CR4 2AP, England
Tel: 01 648 2272 Telex: 946846

As a supplier of industrial minerals to the Surface Coatings Industry for over 30 years, we welcome the *SURFEX 86* Exhibition as an opportunity to meet our customers and we will be

continued

launching new clay pigments from *Engelhard Minerals and Chemicals Corp., USA,* who, since the takeover of Freeport Kaolin, have several completely new delaminated and calcined grades of Kaolin which will be of interest to UK formulators. There will also be details of Attagels from Engelhard and the use of ASP 170 to extend Titanium Dioxide in both industrial and decorative gloss paints.

We also represent Tammsco Silica and full details of the Goldbond range of fine naturally occurring soft silicas will be available.

Stand personnel: J. Morris, Sales Manager/Lawrence Industries; B. Quiroga, Sales Co-Ordinator/Lawrence Industries; M. Pavol, Engelhard Minerals & Chemicals Corp.

Stand D3

Marlow Chemical Co Ltd

Marlow House, 17 College Avenue, Maidenhead, Berkshire SL6 6BX
Tel: 0628 35922 Telex: 847063

Marlow Chemical Co personnel will be available to discuss the complete range of products currently offered for the surface coatings and allied industries.

In particular they will be highlighting the granular and powdered rubber systems from Rumal BV together with their established products including titanium dioxide, solvents, microfined waxes, blowing agents, metal stearates, PVC resins.

Chemsafe Developments Ltd, part of the Marlow Group, will also be on hand to discuss their full range of services including blending, mixing, packing, formulating and pre-weighing.

Stand D7 Stand telephone: 0423 505440

Mastermix Ltd

Vigo Place, Aldridge, Walsall, West Midlands WS9 8UG
Tel: 0922 58104 Telex: 335298

Over a period of time the surface coatings industry has come to demand more than the simple supply of a unit machine. Nowadays it is very important to offer a "systems concept" which takes account of not only basic mixing and dispersion requirements but also health and safety considerations, and the integration of plant and other essential elements, such as solids handling and process control.

To this end Mastermix, having successfully developed and proven a unit machine capability now places emphasis on the supply of process systems.

Staff present for *SURFEX 86* will be A. J. Boulton (Sales Director) and W. Hancock (Sales Manager), and data will be available to describe:

(a) The PMD mixing concept, combining high-speed dispersion with slow-speed agitation.
(b) The Mastermill range of horizonal grinding mills.
(c) The HVS range of "change can" dispersers.
(d) Ancillary Mastermix products, including Let Down Mixers and Filling Machines.

In addition, there will be illustrations, flow diagrams and literature to describe successful Mastermix systems installations, where all these elements have been combined into one composite plant and supported by computer-based process control.

Stand D59 Stand telephone: 0423 505477

Metal Box plc

Queens House, Forbury Road, Reading RG1 3JH

Metal Box, the UK's largest supplier of paint cans, will have the latest developments in paint packaging on display at its stand at *SURFEX 86.*

These developments, aimed at providing customers in the paint industry with the widest choice of packaging materials and technology, remain at the forefront of the latest trends while continuing to satisfy the more traditional requirements of paint manufacturers.

The new generation of metal lever lid paint cans with many improved features such as plastic handle rivets to minimise leakage and corrosion; plastic handles and post applied plastic sidestripe for improved corrosion resistance, will ensure a continuing future for the traditional metal paint can.

But, Polycan, a single-piece injection moulded can, is Metal Box's response to the paints market demand for all plastics packaging. Available in 1-, 2.5- and 5-litre sizes, its major asset is the elimination of corrosion. An important feature is an anti-slop ring to minimise spillage. Dent proof, it runs on existing filling lines and is cost competitive with metal cans. It has a secure snap-on lid which gives easy opening and reclosing without the need for a tool.

Also on display will be Polypak, a new family of all-plastics pots launched recently, which has proved a great hit in the DIY filler market. All three sizes—510 ml, 850 ml and 1,100 ml—of this competitively priced tapered pot allow nesting for economic storage.

Appearing at the Exhibition will be Nestacan, the UK's first nestable metal containers designed for either vacuum or ambient packaging. Although a multi-role container, it has been designed to meet the needs of manufacturers of viscous or semi-viscous products.

Also on view will be the company's wide range of tinplate ablongs; tinplate cone top cans, the traditional liquids packaging with many modern benefits; and stock and custom-built plastic bottles, including an oblong shape recently launched.

Thanks to a continuing programme, Metal Box's oblongs, cone top cans and paint cans now have certificates to meet the new carriage of dangerous goods legislation and someone will be available on the stand to discuss this aspect of legislation. A wide choice of closures including tamper-evident and child resistant versions are available for these containers. The latest addition is the Cansafe closure which incorporates tamper-evidence and child resistance. Plastic overcaps offer a measuring vessel, a dacanter and attractive shelf appeal.

Metal Box will be delighted to welcome all visitors to the stand, where representatives will be available to discuss any aspects of the range.

Stand G7/8 Stand telephone: 0423 505368

Microfine Minerals & Chemicals Ltd

Mica Works, Raynesway, Derby DE2 7BE

The Seaton Group—*Microfine Minerals & Chemicals Ltd, Seaton Chemical Developments Ltd* and *Dupre Vermiculite Ltd,* are well-established manufacturers of fillers, extenders and functional additives designed to meet the needs of today's polymer and surface coating industries.

In addition Seaton now offer viscosity modifiers and Rheology control materials, and will introduce the latest additions to their product range at the Exhibition.

To supplement its own production Seaton offer a comprehensive range of products from principals having similar policies, to that of the Group, and in this context are pleased to feature the minerals of R T Vanderbilt Export Corporation on the stand at *SURFEX 86.*

The Group's technical policy is to provide products that are quality controlled at each stage of manufacture to meet the very latest international standards. In addition to the existing laboratories at each of its five factories in the UK, a new research and development facility is currently under construction at the Derby Headquarters to further improve the services the Group can offer existing and potential customers.

Stand G19

MIOX Ltd

33A Grosvenor Road, Tunbridge Wells, Kent TN1 2AN

MIOX Micaceous Iron Oxide pigment is mined and processed by *Kärntner Montanindustrie GmbH* in Austria and is supplied to the paint industry world-wide.

MIOX pigment is incorporated in paints to improve long-term durability. The pigment particles have a flaky structure which orientate within a paint film in such a way that they overlap and interleave to form a barrier against UV and corrosive conditions.

At the Exhibition MIOX Ltd (UK distributors) will feature Micaceous Iron Oxide and its use in protective coatings for steelwork. Eric Carter, Technical Director and Jean Harding, Director, both of MIOX Ltd, will be in attendance to discuss latest developments in the technology of MIO coatings. They will be pleased to provide information about basic principles of formulation in a variety of binders including oleoresinous, alkyd, chlorinated rubber, styrene-acrylic, copolymer, vinyl chloride-vinyl isobutylether copolymer, epoxy and polyurethane types. Details of water-thinned paint formulations and the use of MIOX in high-build primers for steelwork will also be available.

Typical examples of the practical use of MIOX-based coating systems will be illustrated ranging from corrosion protection of long-span bridges to offshore platforms in the North Sea.

Many other structures are protected with MIO paints: electricity transmission towers; radio masts; railway gantries; cranes; building frameworks; gas holders; chemical plant; oil storage tanks and pipework. Railway bridges all over Britain are being aesthetically improved with "pastel shade" MIO finishes developed by British Rail laboratories and these coatings are ideal for other applications. Advice will be available regarding the suitability of various types of MIOX-pigmented coatings for different environments and service conditions.

Stand G5 Stand telephone: 0423 505434

3M United Kingdom PLC Commercial Chemicals Group

continued

3M House, PO Box 1, Bracknell, Berkshire RG12 1JU
Tel: 0344 58534

The Commercial Chemicals Group of 3M United Kingdom will be exhibiting their range of Fluorad fluorochemical surfactants. Fluorochemical surfactants offer a number of unique properties being effective in both aqueous and non-aqueous, high solid or powder coating systems. They are stable at high temperatures and in strongly acid or alkaline environments. Their unique surface activity can reduce surface tensions to as low as 16 dynes per cm with addition levels as low as 50 ppm

Fluorad surfactants improve the wetting of many difficult to wet materials like plastics and even silicone contaminated substrates. They improve flow and levelling, can eliminate fish-eyes and craters and are extremely effective in preventing crawling, edge build up and pinholding. Added at the milling stage, Fluorad surfactants can improve productivity by reducing pigment dispersion times.

The wide range of Fluorad fluorochemical surfactants is available from 3M United Kingdom and will suit most coating systems. 3M offer a comprehensive technical service which is available to all users and potential users of these products.

Stand D18/19
Stand telephone: 0423 505170

NL Chemicals (UK) Ltd

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

NL Victor Wolf Ltd has been part of the NL Chemicals/NL Industries Group since May 1985. The range of speciality polymers which it manufactures will be featured on the NL Chemicals stand will include the full range of WOLFAMID non-reactive polyamide resins for use in inks and thixotropic alkyds together with reactive polyamide resins for use as curing agents for epoxy systems.

NL Victor Wolf places emphasis on customer service and technical staff will be at the Exhibition to advise on specific areas of interest.

The commitment of NL Chemicals to the titanium dioxide industry is well illustrated by its substantial investment in new manufacturing facilities in West Germany and Canada whilst at the same time, through other major investment programmes, ensuring that its existing plants in Canada, Norway, West Germany and Belgium fully comply with environmental considerations.

The theme "Born in a Burner" will focus attention on newer titanium pigments derived from its chloride processes. Data will be displayed on the full range of organic rheological additives, anti-corrosive pigments and Bentone Gels.

Information will also be available on the latest chrome and molybdate pigments from *Dominion Colour Company*, Toronto.

Stand G12 **Stand telephone: 0423 505616**

Norwegian Talc (UK) Ltd

205 Cotton Exchange Building, Old Hall Street, Liverpool L3 9LA
Tel: 051 236 6435 Telex: 627012

NORWEGIAN TALC will be promoting their range of products on three main fronts. Microdol H grades are a new group of products, manufactured at the UK grinding facility of their sister company, *Nortalc Milling Ltd.* The H-grades extend and complement the existing Microdol range produced in Bergen and are being developed to meet the needs of you, the customer, in areas such as emulsion paints, texture paints, adhesives and fillers.

Also on show will be:

Micro Minerals against corrosion, the advantages of both Micro Talc and Microdol as fillers in anti-corrosive paints will be shown in comparison with paints incorporating alternative extenders.

Sil-cell® lightweight fillers and their use in the surface coatings and allied industries.

Now that Norwegian Talc is really filling a need, visitors are invited to come and talk about their requirements at our stand.

Stand D73 (Information Centre)
Stand telephone: 0423 505420

Oil & Colour Chemists' Association
(with which is incorporated the Paint & Varnish Society)

Priory House, 967 Harrow Road, Wembley, Middlesex HA0 2SF
Tel: 01 908 1086 Telex: 922670

The Association was formed in 1918 to further the scientific development of the industries concerned with the manufacture of paint, printing inks, pigments, varnishes, drying oils, resins, lacquers, soaps, linoleum and treated fabrics, and the plant, apparatus and raw materials used in their manufacture.

The Association has a large membership engaged in various aspects of the above industries in all parts of the world. Sections of OCCA are maintained in Bristol, Hull, Ireland, London, Manchester, the Midlands, Newcastle upon Tyne, Scotland, Thames Valley and the West Riding of Yorkshire; there is also a General Overseas Section and an Ontario Section in Canada. In addition, Divisions of the Association have been established in New Zealand (Auckland and Wellington sections) and in South Africa (Cape, Natal and Transvaal sections), and there are branches of sections as follows: Eastern Branch of the Scottish Section; Trent Valley Branch of the Midlands Section. There are a Nigerian Branch and a Zimbabwe Branch of the General Overseas Section; the Cape Section is operating an Eastern Cape Branch.

Details of the Association's activities, including proceedings of technical meetings and conferences, appear in the *Journal of the Oil & Colour Chemists' Association,* which is published monthly. The *Journal* holds a leading position in the technical literature of the surface coatings industry and has an unrivalled world-wide circulation. Subscription forms for non-members, technical libraries and companies can be obtained from the Information Centre, Stand D73. The annual subscription rate is £65 (US $120) and includes a title page and yearly index. Copies of the *Journal* will be available on the Association's stand together with the following Association publications:

The Monograph Series

Monograph No. 1 on *"Marine Finishes"* by Dr T. A. Banfield will be available at the Stand, and is also available from the Association's office, price £2.

Monograph No. 2 on *"Water Borne Coatings"* by Dr J. W. Nicholson, price £7.50 **(new this year).**

Monograph No. 3 on *"Painting on zinc surfaces and zinc containing anti-corrosive primers"* by E. V. Schmid, (to be published in May).

Also new this year:

"The Surface Coating and Raw Material Directory" **scheduled for publication in spring 1986,** price £30 plus postage according to destination.

"Surface Coatings" Volumes 1 and 2 published by the *Oil & Colour Chemists' Association Australia.* Orders for these volumes are taken by this Association but the volumes are **temporarily out of stock.** Further supplies are expected in the summer of 1986.

"Introduction to Paint Technology". Over 30,000 copies of this book have been sold. The fourth edition of the book has been published (1976) and includes a glossary of terms. Copies will be offered for sale on the Stand. Price £10.

"Ultraviolet Polymerisation", pp 252, 12 papers. Published 1976. Price £5.

"UV Polymerisation 2". Newcastle Section Symposium 1977. Bound copies of the 11 papers presented covering recent advances in this dynamic field. Price £7.50. *Special offer.* The two volumes of the papers presented on Ultraviolet Polymerisation are offered at a **special price of £10 purchased together.**

Conference Preprints: Full preprints are prepared for delegates at the Association's biennial Conference (see below) and there are a limited number of bound copies of the preprints for the 1983 and 1985 Conferences which are offered for sale. Price £15 per volume.
1983 *"The Efficient Use of Surface Coatings"* 17 papers.
1985 *"New Substrates, New Materials, New Problems?"* 22 papers.

Paint Technology Manuals Part VII: *Works Practice and Manufacturing Techniques* has been published as a series of Student Reviews in the Association's *Journal* from January to December 1972 and is now available in book form with limp covers, £4.

Conferences

Association Conferences are held regularly to discuss important scientific topics affecting the industry. The papers and discussions of these Conferences are published in the Association's *Journal.*

The next Association Conference will be held from 17-20 June 1987 at Eastbourne, England, under the general title "Advances and Application of Science and Technology in Surface Coatings". Anyone interested in presenting a paper should contact the Director & Secretary of the Association at the Association's offices or at the Information Centre.

The New Zealand and South African divisions also hold conventions.

Membership of the Association
Ordinary Membership is open to scientifically trained persons whose qualifications comply with the standard of competence laid down by the Council.

The Council has instituted an optional Professional Grade which is open to application by Ordinary Members of the Association. Successful applicants into the Grade will be able to use the appropriate designatory letters which will identify them with the surface coatings industry and these are as follows:

Fellow (of the Oil & Colour Chemists' Association) in the Technology of Surface Coatings, designated FTSC.

continued

Associate (of the Oil & Colour Chemists' Association) in the Technology of Surface Coatings, designated ATSC.

Licentiate (of the Oil & Colour Chemists' Association) in the Technology of Surface Coatings, designated LTSC.

Rules and regulations for admission to the optional Professional Grade and application forms for entry will be available at the Information Centre.

Besides Ordinary Membership, there are classes of Associate Membership and Student Registration. Associate Membership is available to persons connected with, or otherwise interested in the work of the Association, who are not eligible for Ordinary Membership. The 1986 subscription rate for Ordinary and Associate membership is £32 (plus Value Added Tax at the standard rate).

Student Registration is open to persons up to the age of 21 years and may be extended up to 25 for those following a course of technical study. The 1986 subscription rate is £11 (plus VAT) for those under 21 and £16 (plus VAT) for those between 21 and 25. An entrance fee (plus VAT) is payable in all cases (£5 for Ordinary and Associate members and £1 for Registered Students). A leaflet giving details of the aims and activities of the Association and privileges of membership may be obtained at the Information Centre, together with membership application forms. *Note:* VAT does not apply to membership subscriptions for members resident overseas.

Stand G11

Paintmakers Association of Great Britain

Alembic House, 93 Albert Embankment, London SE1 7TY
Tel: 01 582 1185

The prime function of our exhibit will be to display the 'Open Tech' in surface coatings materials which have been prepared under the funding set up in 1984 by the Manpower Services Commission.

To date five modules (units of study—mainly 60 hours' duration) have been produced and will be on display. Interested parties will be able to read the notes and listen to the commentary, as desired.

The three further modules will be available later in 1986.

Nearly 200 students have so far completed or are studying surface coatings technology through this distant learning mode, and over 200 Certificates of Completion have already been awarded.

Full details, objectives leaflets, application forms, etc, will be available.

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 G11

Paint Research Association

Waldegrave Road, Teddington, Middlesex TW11 8LD
Tel: 01 977 4427 Telex: 928720

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

Stand D5/6 Stand telephone: 0423 505245

Pearson Panke Equipment Ltd

1-3 Halegrove Gardens, London NW7 3LR
Tel: 01 959 3232 Telex: 23273

The Pearson Panke exhibit will include the following:

Flocculation Monitor

Originally developed by Tioxide (UK) the Flocculation Monitor is an essential tool for the optimisation of pigment dispersions, particularly titanium dioxide.

Erichsen Glossmasters

A full range of the widely used portable Mini Glossmaster will be exhibited together with the bench Glossmasters.

Erichsen Paint Borer for determination of film thickness of coatings on any substrate.

Erichsen 526 Colorimeter

This new colourimeter is of particularly compact design and is ideal for quality control use.

Logamat Portable

A new pocket Densitometer.

Stand G6

Perchem Ltd

West Road, Templefields, Harlow, Essex CM20 2BU

Perchem Easigel continues to be the spearhead in the Company's increased sales penetration into the surface coatings and ancillary markets. Developed two years ago Perchem Easigel is now extensively used by a large number of companies throughout the world in a wide range of applications. It is generally regarded as a universal, easy dispersing organoclay and will again be the feature of our display. Key members of Perchem's technical and commercial team will be available to discuss all aspects of this successful product.

The conventional range of Perchem organoclays will also be on display. These include Perchem 44, Perchem 97 and Perchem 108 which are used to structure paints, printing inks, greases and other systems over a wide range of polarities.

Perchem DMB and Perchem FPS will also be featured. These are manufactured uniquely and are extremely cost-effective when used in selected paint systems, bitumenous sealants and roofing compounds as well as underbody coatings for the automobile industry.

Hydrogenated castor oils and modifications of these can also be offered. These are generally used for higher build systems and

continued on page 27

SPECIAL ANNOUNCEMENT

– A NEW PUBLICATION –

"THE SURFACE COATING & RAW MATERIAL DIRECTORY"

SPONSORED BY

THE OIL & COLOUR CHEMISTS' ASSOCIATION

You will soon be receiving full details concerning "The Surface Coating & Raw Material Directory – 1986" **scheduled for publication in the Spring of 1986.**

This book has been specially commissioned to satisfy demand for a multi-lingual directory which fully covers the industry – not only in the U.K. – but also in Western and Eastern Europe. With many special features, this top quality A4 production will quickly establish itself within the industry it serves worldwide.

ADVANCE ORDERS will be accepted by OCCA by completing this form and return with the appropriate remittance.

✂----------

TO: *THE OIL & COLOUR CHEMISTS' ASSOCIATION, PRIORY HOUSE, 967, HARROW ROAD,* WEMBLEY HA0 2SF U.K.

Please supply ..... copy(ies) of: "The Surface Coating & Raw Material Directory – 1986" **scheduled for publication in the Spring of 1986,** *@ £30.00 each, plus postage (per item)* U.K. £1.25, *Europe* £2.20; Airmail Rates: Canada/U.S.A. £5.50, Middle East/South Africa £6.00; Australasia £8.00; Far East/South America £9.00.

Cheques made payable to OCCA – **Post with remittance to the above address.**

Name .....

Address .....

.....

Telephone .....

* Please note: Details for advertising and all other enquiries should be made to: Wansbeck Inc., Southon House, *Station Approach, Edenbridge, Kent TN8 5LP. Telephone* (0732) 866400).

OIL & COLOUR CHEMISTS' ASSOCIATION

NEW PUBLICATION SPECIAL ANNOUNCEMENT

MONOGRAPH SERIES — NO. 2 NOW AVAILABLE FROM ASSOCIATION'S OFFICE, BY PREPAYMENT ONLY.

Water-borne coatings by J. W. Nicholson, BSc, PhD, CChem, MRSC, Laboratory of the Government Chemist.

Basic principles of water-borne coatings — the nature of water — principles of solubility/dispersability in water — emulsions and dispersions — electrodeposition — principles of electrodeposition — polymers for electrodeposition — the change from anodic to cathodic electrodeposition — pigmentation of paints for electrodeposition — emulsion paints — film formation by emulsion paints — polymers for emulsion paints — formulation of emulsion paints — latex paints for corrosion protection — gloss emulsion paints — recent developments in water-borne coatings — developments in water-soluble resins — developments in cross-linking reactions — flash-rusting inhibitors — aqueous powder coatings.

To Oil & Colour Chemists' Association, Priory House, 967 Harrow Road, Wembley, Middlesex, HA0 2SF.

Please send ..... copies of Monograph 2 ***Water-Borne Coatings*** at £7.50 each (surface mail) (US $18.00)

I enclose remittance for £..... **(prepayment only)**

NAME.....
BLOCK LETTERS

ADDRESS.....

.....

.....

include our Perchem MF, Perchem XS, Perchem JT, Perchem XTR and Perchem XT.

Our Perchem AMU range provides anti-settle properties with minimal increase in viscosity. AMU-60X is widely used and we also offer AMU-X and AMU-PX, the latter being a pumpable version of AMU-60X.

The continuing development of the Perchem range of mastergels can also be discussed. Their applications grow in the paint, cosmetic and agrochemical markets.

Exhibition personnel: Mr C. J. Curtis, Managing Director; Mr C. H. Jenkins, Sales Manager; Mr R. Gough, Technical Manager; Mr B. Cliffe, Technical Sales & Service.

Stand D10

The Q-Panel Co

102 Taylorson Street South, Ordsall, Salford M5 3EL
Tel: 061 872 1152

The world-renown QUV Accelerated Weathering Tester will once again form the centre of Q-Panel's exhibit.

The QUV is a laboratory simulation of the damaging forces of the weather for the purpose of predicting the relative durability of materials exposed to the outdoor environment.

The QUV is a radical departure from traditional methods of laboratory weathering and has the advantage of low purchase price, low operating cost and minimal maintenance.

The effects of sunlight are simulated by an array of eight special fluorescent lamps, from which the light emission is concentrated in the critical UV wavelengths. Rain and dew are simulated by a revolutionary condensation system which gives a new dimension of realism and control in a design of extraordinary simplicity.

In a few days or weeks, the QUV can produce damage that might occur over months or years of natural outdoor exposure. Deterioration observed includes fading, chalking, cracking, crazing, hazing, blistering, gloss loss, strength loss and embrittlement.

Also on display will be a selection of Q-Panels—reproducible steel and aluminium test surfaces for evaluating the performance of applied coatings. Q-Panels minimise the effect on coating performance due to substrate metal and surface variation.

Q-Panels are supplied degreased and completely oil free, the panels have rounded corners, deburred edges and are punched with a 6 mm hole at one end. Q-Panels are available in a wide range of surface finishes and sizes from stock.

On display for the first time in the UK will be the QCT Model MB—a low cost bench top Condensation Tester conforming to BS 3900 Part F10. This is the little brother of the well-tried and proved Model ADO—Cleveland Condensation Tester which is supplied with automatic dry-off.

The Stand personnel: David Birchenough, European Manager, William Bethell, Inspection & Shipping, will be pleased to answer any questions on any of the Q-Panel range of products.

Stand G1/2

Red Devil Inc

Bishop House, Britannia Road, Worcester WR1 3BQ

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

Stand D28

Reed Plastic Containers
A Division of Reed Packaging Ltd

Kilburn Road, Oakham, Rutland LE15 6QL
Tel: 0572 3771

An eye-catching exhibit by Reed Plastic Containers, UK market leader in supply of packaging for paints, surface coatings, sealants, adhesives and many other associated products, will be a feature of *SURFEX 86*. The display by Reed will highlight a selection of superbly-printed plastics containers produced for both large and small companies in the surface coatings industries.

The exhibit by Reed will strongly feature the company's "S" range of open-top plastics containers—the most popular of their type in the UK for marketing surface coatings and emulsion paints. This high-quality range of containers, available with capacities from 2.5 litres to 25 litres, is designed with fold-down handles, an attractive, tapered shape and lids which provide a secure closure while being easy to open and reclose.

The 10-litre, 15-litre and 20-litre containers have proved particularly successful as trade and industrial packs for coatings and related products, while smaller sizes are also used widely for consumer markets. Applications for these convenient and practical containers are now being extended through the introduction of a membrane sealing unit now available from Reed. This membrane sealer forms part of the "Packline" modular automated packaging system developed to handle "S" type containers. Other Packline equipment includes a container denester, indexing conveyor, weight or volumetric filler, lid dispenser, lid presser and self-adhesive labeller.

In addition to the "S" type containers, Reed's award-winning "Paintainer" all-plastics lever-lid cans will be exhibited at *SURFEX 86*. Available in three sizes—1 litre, 2.5 litres and 5 litres—these revolutionary, consumer-friendly containers are now being used increasingly for marketing major national brands of emulsion paints.

Stand D34

Resinous Chemicals Ltd

Cross Lane, Dunston, Tyne & Wear NE11 9HO

Resinous Chemicals Ltd will be showing a wide range of their outstanding Synthetic Resins for surface coatings products as well as illustrating the facilities available both at their Dunston headquarters and through their links with the world-wide *Hoechst Group*.

Special emphasis will be focused on three particular product lines:

1. Coatings for plastics
2. Chromate-Free Epoxy for wash primers
3. Powder Coatings

continued

RCL's products continue to offer significant advantages in both Technical and Commercial terms and constant developments are being introduced to maintain the company's position at the forefront of the market.

As well as the above products RCL also manufacture and market Alkyd, Acrylic, Melamine, Phenolic, Epoxy, Urea, Polyurethane and hard resins; plus many associated materials.

The stand will be manned by both Technical and Commercial staff so that rapid response is guaranteed for any queries.

Stand D51/D52
Stand telephone: 0423 505428

Sandoz Chemicals

PO Box 4, Calverley Lane, Horsforth, Leeds LS18 4RP

Do you have problems with lead chromate replacement, colour matching, too many tinters, UV protection and speciality inks? We don't! Visit our Stand to discuss Sandorin and Graphtol Pigments, ICS Colour Service, Sandosperse Universal Tinters, Sanduvor UV Absorbers and Speciality Pigments and Dyestuffs for vinyl, screen, tissue and security inks.

New from Sandoz will be Sandorin Red Violet 3RL, a heterocyclic nickel complex pigment. The shade of this product is between Quinacridone Magenta and Violet and is used to match red to maroon solid colours. The opacity, weather fastness and rheological properties of the pigment are an asset to paint formulation and production. Colour panels and graphs will emphasise these properties on the Stand.

In the UV Absorber area, as well as the current Sanduvor range for solvent-based finishes a new Sanduvor water-based range has now been developed.

So don't forget to celebrate with Sandoz Products Ltd in this their 75th anniversary year on Stand D51 and D52.

Stand D15/16
Stand telephone: 0423 505173

Scott Bader Co Ltd

Wollaston, Wellingborough, Northants NN9 7RL

Scott Bader Co Ltd are exhibiting the widest range of resins and polymers for surface coatings available in the UK market. This follows the successful integration of the product lines from *Synthetic Resins Ltd* and Scott Bader.

Existing and recently completed plants enable Scott Bader to offer the following extensive coverage:

Alkyds—drying and non drying oil modified
Alkyds—vinyl, rosin and phenolic modified
Polyurethane alkyds and oils
Epoxy esters
Acrylic thermosetting resins
Moisture cure urethanes
Oil free polyesters
Amino Resins
Polyester Powder Coating Resins
Vinyl acetate copolymer emulsions
Acrylic emulsion copolymers
Polyvinylidene chloride emulsions
Polystyrene emulsions
Thickeners
Dispersants

The theme of the Scott Bader display is "Don't leave choice of resin to chance . . . Scott Bader load the dice in your favour". No matter what the application, Scott Bader have the capability to meet the need.

The stand will be manned by the following technical and commercial personnel: Brian Elgood, General Manager, Industrial Marketing Division; Lester Bowman, International Market Manager, Surface Coatings; Keith Lett, International Market Manager, Construction Chemicals; David Mead, Product Manager, Urethanes and epoxies; Michael Palmer, Aqueous Coatings technical service; Roy Wilkinson, Solvent & Powder technical service; Peter Knight, Northern area representative; Keith Jacques, Southern area representative.

Stand D53/54
Stand telephone: 0423 505339

SCM Chemicals Ltd

PO Box 26, Grimsby, South Humberside DN37 8DP

SCM Chemicals Ltd have long been a major force in the European Paint Industry, supplying the Tiona range of quality titanium dioxide pigments.

Recently an extensive appraisal of the industry needs for the future has resulted in the investment of $30 million to expand the Chloride process titanium dioxide facility in Stallingborough, England.

The exhibition stand will underline the growth and commitment of SCM Chemicals Ltd to the European and World Markets prior to, during and after the volume availability of its product range increases in 1986.

To achieve this, SCM will show the growth of the company, world-wide, to the present day, the achievement of becoming the second largest producer of Chloride process titanium dioxide in the world, and the expected future of titanium dioxide production in a changing market.

As the theme of the stand will be expansion and commitment, SCM will strongly feature the growths aspects of the product range, and the reasons for the success of specific products with multipurpose applications.

The full product range will be presented in various practical paint systems, with a computer database to provide additional information which SCM's personnel will be pleased to discuss in detail.

Exhibition personnel: G. M. Deighton, T. D. Edwards, A. King, B. J. R. Mayes, B. R. Milner, C. A. Morrell, K. J. Phipps, G. R. Siddle, W. G. Young.

Seaton Group see Microfine

Stand D46

Shear Group

The Old Foundry, Hall Street, Long Melford, Sudbury, Suffolk CO10 9JG
Tel: Sudbury 77418 Telex: 987018

The Shear Group of companies are manufacturers of high quality dispersions for the Paint, Printing Ink and Plastics industries. *Shear Colour* specialize in Pigment dispersions, particularly for Paint and Plastics, and Shear Chemicals in non-coloured, non-pigmented additives for Printing Inks. Both companies are small, efficient, family-run organizations based in rural Suffolk offering an extensive range of standard products, but are also flexible enough to custom-make to meet customers' individual technical requirements with total confidentiality.

At *SURFEX 86, Shear Colour* will be showing its largest range of high quality, high performance, pigment dispersions for OEM and Refinish automobile paints. Also being shown will be the current, extremely successful, range of Transparent Iron Oxide concentrates, both solvent and water-based, for tinting a wide variety of wood varnishes and finishes. These concentrates are well-dispersed and exhibit good stability coupled with ease of use in the final production of the wood stain. The dispersion of Transparent Iron Oxide pigment is one of the major specialist activities carried out by Shear Colour.

Shear Chemicals will be demonstrating its current range of wax pastes for use as rub and slip aids in the production of sheet-fed and heat-set paste inks. These pastes are superior quality dispersions of high melting point polyethylene wax in conventional ink vehicle systems. They have an extremely small particle size but yet still exhibit very good non-rub properties in the ink film. They can be post-added to the ink if required. They can also be used in the mix-and-filter method of ink production without the normal problems of blocked filters etc. Shear Chemicals will also be showing details of its other specialist additives for the ink industry including paste driers, water reactive driers and anti-oxidant dispersions.

Details of the new, specialist built, group production facilities which have been coming on stream on a green field site in Sudbury during the last year will also be shown. These will further enable us to meet our customers' requirements over the coming years.

Stand personnel will include B. K. Hood, Mrs V. J. Hood, C. M. Hood and Mrs J. Elsden.

Stand D23

Sheen Instruments Ltd

Rear of Paint Research Association, 8 Waldegrave Road, Teddington, Middlesex TW11 8LD
Tel: 01 977 0051

Editorial entry not yet received. Please apply to Information Centre (Stand D73) for additional leaflet.

OCCA TIES

Members may purchase OCCA ties (£4.25 including VAT) at the **Information Centre** (Stand **D73**)

Stand D35/36

Shell Chemicals UK Ltd

1 Northumberland Avenue, Trafalgar Square, London WC2N 5LA
Tel: 01 257 4000 Telex: 21795

Shell Chemicals UK Ltd is a member of the Royal Dutch/Shell Group of Companies.

Shell was a pioneer in the development of epoxy resins and has plants in many countries around the world to service its leading market position. "Epikote" resins have been produced since 1955 at Stanlow in Cheshire, and there has been continuing investment in scale and technology.

Among the first products marketed by Shell Chemicals in the UK were solvents for paint, imported from Shell plants in the USA. Solvents production began in the UK in 1949 and Shell Chemicals UK Ltd is now one of Britain's major producers of a wide range of petroleum derived chemical and hydrocarbon solvents.

Commitment to the UK market was emphasised in 1985 when work started on a new liquid resin plant to add new and improved quality options to the already comprehensive range. A new experimental laboratory was established to continue the work of tailoring resins to individual UK customer needs.

Commitment to the epoxy resin market is worldwide. The Polymer Centre in Amsterdam provides a centralised source of technical knowledge and experience to support customer activities, and in 1985 plans were announced for a new laboratory in Belgium to concentrate on applicational development and international after-sales service.

Stand D2

Silberline Ltd

Banbeath Industrial Estate, Leven, Fife KY8 5HD
Tel: 0333 24734

Recent years have seen Aluminium Pigments commanding greater importance in the industrial production of printing inks, automotive coatings, industrial finishes and plastic applications. This increased importance can be attributed to the manufacturers of aluminium pigments developing brighter and higher performance pigments, allowing designers and stylists to create products and effects which capture the public imagination.

In 1970, Silberline introduced an innovative non-leafing pigment range called SPARKLE SILVER which set new standards of brilliance and flash for aluminium pigments, and led to Silberline being recognised as innovative leaders by competitors.

Subsequently, many more products have been added to the range, each product reflecting a specific characteristic requested by industry. Silberline will be exhibiting some of the recent additions to the range. A typical example is SPARKLE SILVER 7005AR, one of the acid resistant, non-leafing pigments with a very fine particle size, yet having a startling white face normally expected from a pigment with a much coarser distribution.

Traditionally, aluminium pigments have been supplied either as dry powders or as pastes. The introduction of the Silvet granular range offers for the first time a pigment having none of the

continued

disadvantages of powder or paste. The Silvet range includes selected non-leafing SPARKLE SILVER pigments and Eterna-Brite leafing pigments, and represents the state of the art in metallic pigment manufacture. Cleanliness, ease of dispersion, low odour and their wide compatibility have led to their being used in plastics, powder coatings, and printing inks as well as paints.

Why not come anJ see them for yourself on Stand D2?

Stand D12/14

Steetley Minerals Ltd

PO Box 2, Retford Road, Worksop, Notts S80 2PY
Tel: 0909 475511 Telex: 547901

At *SURFEX 86* Steetley Minerals Ltd will introduce a number of new products to extend their existing wide range of products for the surface coatings and related industries.

The stand will feature Bentone Rheological Additives including the now well-established Bentone SD-1 and Bentone SD-2. Also featured will be Bentone Gel Additives, manufactured to a high standard of efficiency and applicable in paints, inks and sealants.

Detailed performance data on the whole range of Organoclay Rheological Additives from NL Chemicals/NL Industries will be available.

Complementing the company's existing range of fillers and extenders are the newly-introduced high-brightness dolomite fillers. These are produced in the UK by Steetley Minerals using imported feed stocks, and extend the existing wide range of limestone fillers, chalk whitings, china clays, imported calcites and high purity talcs.

Recently introduced is the Dicaperl range of low density fillers. These are available in uncoated or silane-coated form and are extremely cost-effective for use in textured coatings, building products, automotive putties and lightweight composites. Also shown will be the Dicalite range of diatomite fillers for use as flatting agents.

Other speciality products offered on the Steetley Minerals stand are the Pansil and Pangel range of clay-based additives and reinforcing fillers, produced in Spain. A range of metal driers will also be on offer, in addition to the Stecat cationics and Raybo speciality additives.

On the equipment side, Steetley Minerals offers a range of filter, cartridges, bags and pressure vessels for filtration of solvents, resin solutions and other liquids.

Finally, but of most importance, is safety in the work place and thus Steetley Minerals offers a range of industrial absorbents for safe handling of spillages. Absorbit and Multizorb clay granules have a high capacity to absorb oils, solvents and aqueous liquids and Unisorb, a specially-treated cellulose absorbent, can also be used to extinguish fires.

Using experience gained in the large-scale extraction and processing of industrial minerals, Steetley Minerals has specialised for many years in merchanting a comprehensive range of mineral-related products obtained from leading world manufacturers.

Steetley Minerals Ltd is a wholly-owned subsidiary of Steetley plc, a British-based public company with origins dating back to 1885.

Stand R1 Stand telephone: 0423 505429

Tego Chemie Service Th Goldschmidt Ltd

Tego House, Victoria Road, Ruislip, Middlesex HA4 0YL

Additives for water-based coating systems which are harmless to the environment form one of the highlights of Tego Chemie Service's stand at *SURFEX 86* in Harrogate. With the aid of demonstration panels, visitors will be able to see how coatings can be effectively de-foamed and de-aerated and how non-slip and anti-blocking properties can be incorporated into the formulation. The range of surface active products has been formulated to meet the specific requirements of manufacturers of wood finishes, emulsion paint, automotive line and vehicle refinishing paint as well as anti-corrosion coatings.

In addition, this subsidiary of *Th Goldschmidt AG* of Essen, West Germany, will be emphasising the quality of coating systems based on their special combination silicone resins. These resins have been developed for the production of high temperature anti-corrosion paint, decorative coatings for domestic appliances, release coatings for industrial and domestic baking trays and coil coating applied systems.

Technical service personnel from our central laboratory in Essen will be available to advise customers on individual areas of interest.

Tego Chemie Service GmbH is represented in the UK by Th Goldschmidt Ltd, of Eastcote, Middlesex, who can supply the full range of additives and resins from their warehouses in Luton and Manchester.

Stand personnel: Angus Smith, UK Marketing Manager; Barrie Ratcliffe, Area Technical Sales Manager; Wernfried Heilen, Technical Service Manager; Kurt Thomczik, Product Manager.

Stand D21/22
Stand telephone: 0423 505478

Tioxide UK Ltd

Billingham, Cleveland TS23 1PS, England

The single most important property given by titanium dioxide pigment is opacity and Tioxide UK Ltd, Europe's leading manufacturer, is showing its commitment to this property by making the theme of its display "Opacity '86".

The theme is introduced by a display which describes the concept of opacity in terms of pigment loading, dispersion and crowding. This is followed by the Flocculation Gradient Monitor technique for quantifying pigment flocculation, and the influence of fine particle size extenders on the opacity of paints. The final display will be a presentation of an important survey of UK manufactured decorative paints showing pigments utilisation, flocculation and opacity.

An "Opacity '86" portfolio will be available, containing several Tioxide publications relating to opacity including the new technology booklet "Measuring Opacity".

Stand personnel: Mr J. M. Rackham, European Technical Service Manager; Dr L. A. Simpson, Assistant Technical Service Manager; Mr J. Clark, Section Manager, Decorative Paints; Mr L. Cutrone, Section Manager, Development; Mr J. J. Marron, Technical Officer, Decorative Paints; Mr D. V. Moulton, Technical Officer, Durability; Mr I. Melville, Technical Officer Development.

Stand D39

Torrance & Sons Ltd

PO Box 14, Bitton, Bristol, BS15 6HW
Tel: 0272 322118

SURFEX 86 provides Torrance & Sons Ltd with the opportunity to show examples from their extensive range of production and laboratory process equipment.

To complement the Torrance range of production sized horizontal bead mills, a 1.1 litre Rotomill Horizontal Bead Mill, specifically designed for the laboratory, has been introduced. This mill is intended for the laboratory assessment of liquid/solid dispersions formulae of a wide range of chemical products—as diverse as agro chemicals, paints, printing inks, paper coatings and cosmetics. The water cooled mill process chamber and agitator is manufactured in stainless steel. The mill is fitted as standard with an air operated stainless steel gear pump unit. Drive is from a 3 kw electric motor which can be supplied to a flameproof specification if necessary.

The 60 litre production Torrance Rotomill Horizontal Bead Mill is also exhibited. Emphasis in design has been placed on ease of access to the process chamber and use of special wear resistant alloy seals for the manufacture of the agitator discs and renewable chamber liner, which results in longer operational life and in down-time for machine maintenance. Another feature incorporated is a very reliable cooled balanced mechanical seal which can be used with any compatible solvents.

The latest edition to the Torrance range of HSF Batch Bead Mills is represented by the recently introduced Laboratory machine, which fills a long felt need in this particular field.

Test Bay facilities are available at Torrance & Sons Ltd, Bitton factory, which can be placed at clients disposal for evaluation of the exhibited machines and other Torrance process plant.

To assist visitors to *SURFEX 86* in their search for product and production improvement, Torrance technical staff will be in attendance to discuss the full range of equipment and production problems.

Stand R4

Union Camp Chemicals (UK) Ltd

Vigo Lane, Chester-le-Street, Co Durham, DH3 2RB

Union Camp Chemicals (UK) Ltd is the European operation of the Chemical Products Division of Union Camp Corporation (USA).

The division is the crude tall oil based part of the Chemical Group, which is the largest wood-derived chemical manufacturer in the world.

The company operates a 50,000 tpa tall oil fractionation plant in the UK and a similar 100,000 tpa facility in the USA at Savannah, Georgia. These two facilities serve the world markets for distilled tall oil, fatty acids and rosin, which are used in surface coatings, adhesives, paper chemicals, inks and oilfield chemicals.

The Savannah operation, facilities at Valdosta, Georgia, and Dover, Ohio, manufacture a range of speciality chemicals from the tall oil commodities; these include dimer acids, polyamides, hard resins and fatty esters as well as sebacic acid and capryl alcohol from castor oil.

Early in 1986 the first steps in producing speciality chemicals from tall oil commodities was taken in the UK with the commissioning of a derivatives plant at Chester-le-Street in County Durham. Utilising fatty acids and rosin from the nearby tall oil plant, the new facility will produce the new range of UNITAC modified rosin and rosin esters for adhesives and coatings and the UNIMID and UNIMUL range of emulsifiers for coatings and oilfield chemicals.

In addition to these new products the company will be exhibiting the existing range of American and Scandinavian tall oil fatty acids, distilled tall oil and rosin as well as the full range of speciality chemicals manufactured in USA.

The European Sales Group operating from offices at Chester-le-Street in the UK, Paris in France, and Duren in Germany, will be represented by the following personnel: Dr R. Lofthouse, European Sales Manager; Mr J. R. Roberts, UK Sales Manager; Mr Y. Van Havere, Sales Manager, France; Mr P. Tatzel, Sales Manager, Germany.

Stand G18

Vuorikemia, Kemira OY

SF-28840, Pori, Finland
Tel: +358 39 443 555 Telex: 66248

FLONAC Pearl Lustre Pigments

Flonac lustre colours give a beautiful nacreous effect which occurs also in Nature in pearls and mussels. Flonac colours are made up of titanium dioxide coated mica platelets and have many advantages over Nature's pearl essence.

Not only do Flonac pigments give a white pearl effect but they are also capable of showing colours from iridescence, in other words, different shades from the whole spectrum of colours.

Although non-metallic in nature, Flonac colours are capable of producing metallic effects, too. Flonac colour based on phlogopite mica reflect golden lustre ranging from a soft satin sheen to sparkling brilliance.

Flonac pigments are produced with excellent weather resistance and they have proven capable of withstanding chemical and heat stresses usually encountered in extremely demanding conditions.

KEMIRA Mica

Mica is a platey mineral which is easy to delaminate, ie, to shatter into thin flakes, due to the nature of its crystal lattice. Chemically it is a K-Mg-Al silicate. Kemira mica is produced at Kemira's Siilinjärvi mine as a by-product of the apatite process. Kemira's mica is of phlogopite variety.

The crystal lattice of phlogopite contains iron-atoms which give the mica its characteristic golden-brown colour.

Applications of Kemira Mica; different grades for the plastic, car and construction industries and as sound insulation and vibration dampening masses.

Exhibition personnel: Ms Tuula Laiho, Customer Service Engineer; Mrs Riitta Onniselkä, Departmental Secretary; Mr Tommy Böök, Product Manager; Mr Pekka Vapaaoksa, Product Manager.

Stand D27 **Stand telephone: 0423 505449**

Wengain Ltd

The Birtles, Wythenshawe Centre, Manchester M22 5RF. Tel: 061 436 3966 Telex: 666318

Wengain will be exhibiting a wide range of pigments, resins and speciality products for the surface coatings and plastics industries. They market products from major manufacturing sources in Norway, USA and Italy.

The following materials will be particularly featured:

ZINC BORATE for non-toxic anticorrosive applications with fungicidal, flame retardant and smoke suppressant properties.

LCC X GRADES High performance lead chrome pigments for paints and plastics.

CLORTEX chlorinated rubber resins with less than 1% carbon tetrachloride content.

MAGRUDER flushed process pigments for a new generation of newspaper inks.

HAMPSTEAD ZX aqueous pastes for water-based paints and inks.

John Stooke and Andrew Foster, directors of Wengain, will be in attendance throughout the exhibition. They will be supported by executives from *Lead Chrome Colours Ltd,* the Derby-based pigment manufacturer whose products are marketed by Wengain worldwide. It is expected that representatives from *Leon Frenkel, Waardals* and *Magruder* will be available to discuss their product ranges.

Wengain invite export enquiries from visiting users or agents in respect of *LCC* lead chromes: *Magruder* pigments for printing inks: ZX aqueous pastes from *Hampstead Colours.*

Advertisements in the Official Guide

Note: Some exhibitors have reserved advertising space in the April issue of **JOCCA,** of which this *Official Guide* is a supplement. Reference to these should be made in the Index of Advertisers at the end of the April issue.

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Printed by The Herald Press, Stratford-upon-Avon and Suite 108, Temple Chambers, Temple Avenue, London EC4. Tel: 01-583 3190.

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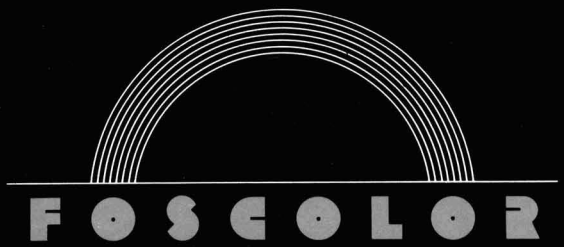

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TIMBER	Aqueous Stains Solvent Stains Fencing Panels

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straight line, the gradient of which is referred to as the flocculation gradient. Figure 2 shows typical plots of flocculated and dispersed paints.

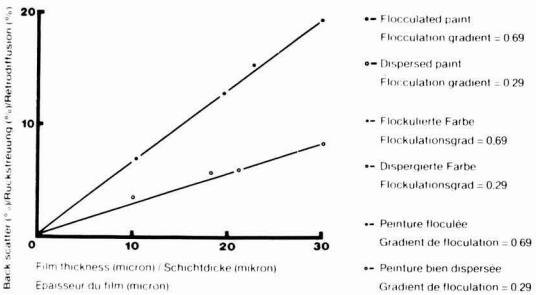


Figure 2. Flocculation gradients

Wet Films

This technique is more applicable to quality control. Hence only single measurements are taken.

A special cell supplied with the *Flocculation Monitor* (see figure 3) is filled with the dispersion. Its reflectance is determined on the Flocculation Monitor and expressed as a percentage (R_W^{40}) of the ceramic tile reflectance.

Figure 4 shows the variation of R_W^{40} for a number of batches of thioxotropic alkyd paint produced by a well-known paint manufacturer.

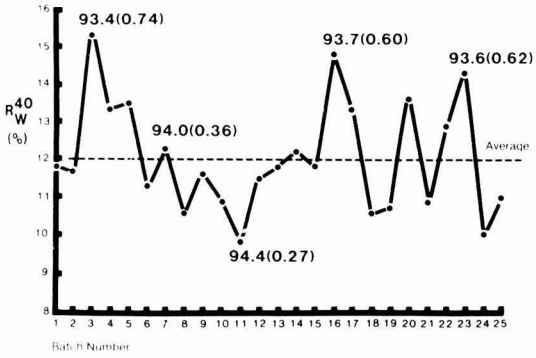
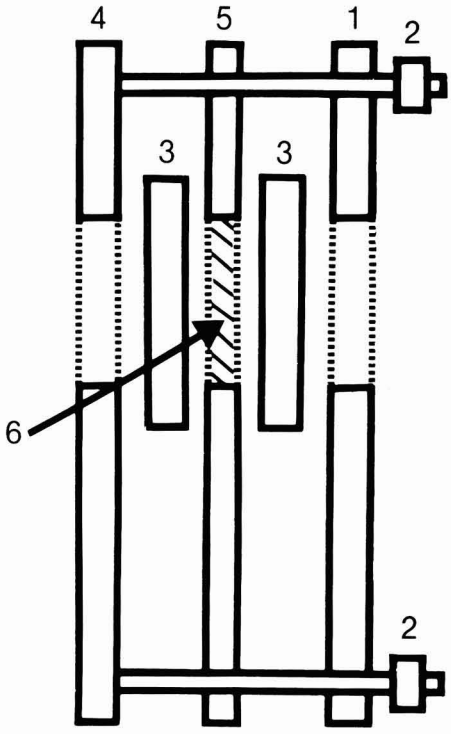


Figure 4. Reflectance variation of thixotropic paint



1 - Top plate/Obere Stahlplatte
Plaque métallique supérieure

2 - End nut/Anzugsschrauben/Vis de serrage

3 - Glass plate/Glasplatten/Plaquette de verre

4 - Bottom plate/Untere Stahlplatte
Plaque métallique inférieure

5 - Polyester spacer/Polyester Abstandsblatt
Cadre d'espacement en polyester

6 - Paint sample/Farbmuster
Echantillon de peinture

Figure 3. Special cell for monitor

letters

Wet Adhesion: The Continuing Debate

Sir,

I have read with great interest Prof. Funke's spirited reply[1] to my recent letter to the Hon Editor[2] and am pleased the question of "wet adhesion" is still open for debate as it concerns a topic that is, or should be, of interest to the coatings chemist and informed paint user alike. I would like to answer the points raised by Prof. Funke on the test methods used, correct some points of fact, indicate areas of agreement and return to the argument that wet adhesion is not necessarily the most important factor in corrosion protection.

Cyanoacrylate adhesives used under normal conditions do require about one hour for complete cure but under water soaked conditons cure is very much faster. Complete cure is not required in wet adhesion testing as the residual adhesion of the coating is low, bond strengths of greater than seven MPa are readily achievable in a matter of seconds rather than minutes. If a relatively large quantity of cyanoacrylate adhesive is applied to a lacquer type coating, or even an alkyd film without bonding taking place then penetration or removal of the coating film can occur. This

does not occur with highly cross-linked films of epoxide and polyurethane. However, when a small quantity of adhesive is applied and the joint closed, the rapid cure of the adhesive, particularly in the presence of water prevents attack even on lacquer type coatings.

The statement that water is consumed in the curing reaction is perhaps a misreading of the actual situation. In discussions with the manufacturers of cyanoacrylate adhesives it was stated that these materials are base catalysed and cure by an ionic mechanism, water provides this catalyst. Under the conditions of use i.e. high humidity, the presence of water on the actual surfaces being bonded and the time scale of the experiment, it is extremely unlikely that water depletion could occur. Prof. Funke correctly draws attention to the time scale of the experiments and points out that desorption could occur, this is a valid point and it may well be that the **minimum** wet adhesion values were not measured in this original work[3]. This work demonstrated the rate of loss of adhesion, and more importantly that coatings of many different types suffered a loss of adhesion under water soaked conditions. However, the criticism that the experimental technique allowed recovery of adhesion cannot be levelled at the later work reported[4, 5]. Here the specimens were tested by the torque spanner test and the bonded and cured in a chamber of 100 per cent relative humidity. Water loss from the coating under these conditions seems improbable. Immersion times varied between 1000 and 1500 hours.

It was not my purpose in the original letter to either criticise the tape test or to compare the relative merits of the direct pull-off, torque spanner test and tape test, but to argue that the two former tests could be used to measure wet adhesion. This is still my opinion, but I would state a preference for the torque spanner test. Readers should perhaps be reminded that the adhesive forces in any bond will be a fixed value at any one time in a constant environment, but the values obtained for the bond strength will depend on the method used to measure it. Thus there is no reason why data obtained in peel, shear, or tension should be the same, the data on shear and tension measurements clearly indicates a difference, and it is well known that peel adhesion methods always give low results. Peel adhesion measurements are notoriously difficult to interpret depending as they do on the physical properties of the adherent polymer.

The tape adhesion test as performed by Prof. Funke certainly indicates poor wet adhesion but at an unknown value and is in a sense a "go, no go" test providing only subjective data. Although it has been shown that some coatings pass the test, the margin by which they do so is unknown, on the basis of the evidence available it is highly probable that coatings passing the test will have suffered a considerable loss of bond strength. It is up to the reader to decide between the merits of an objective test, whatever its failings, which produces numerical data and a "go, no go" subjective test.

The work on multicoat systems[6, 7] had the stated objectives "to assess changes in adhesion of modern coatings during natural exposure, and to show to what extent the adhesion varied under actual exposure conditions". There was no intent to measure minimum wet adhesion or to correlate the findings with corrosion protection. Although Aldermaston can be described as a rural site, the presence of a coal-fired power station in the near vicinity means that the environment is considerably more corrosive than that at a typical rural site. The important findings of this work, are that in spite of the minor blemishes in the data, the adhesion of all the systems under test fluctuated widely, showed recovery, and did not lead to corrosion of the substrate in the time-scale of the experiment, in spite of the measured loss of adhesion.

On the question of sites of failure under water soaked conditions, some data has been provided in a previous reference[8] and I have other evidence which shows that failure occurs within the coating i.e. cohesive failure, rather than from the substrate. I will supply this unpublished work to Prof. Funke. At the moment there is no data to show that the site of failure is the same in shear and peel. In spite of the differences in interpretation and emphasis it is apparent that in principle there is complete agreement between Prof. Funke and myself and with pioneer work reported by Bullett and Prosser[9], that conventional surface coatings loose adhesion under water soaked conditions, and that the measured bond strength can be very low. A difficulty is that there is at the present, no way of knowing that the residual adhesion values ranging from two to six MPa measured in shear and tension correlate with the wet adhesion indicated by the peel test. It is my intention to obtain comparative data on this subject at a later date. Further, there can be little doubt that adhesion is reduced to a very low level in a time-scale of 24 to 72 hours exposure.

In this context the recent work by Ruggeri and Beck[10] in which a cutting device was used to measure the adhesion of a wide range of coatings including acrylics, methacrylates, epoxide and polyurethanes is worthy of consideration. The results of their work indicate a loss of adhesion under water soaked conditions occurring within 20 to 40 minutes. The measured wet adhesion values for these paints show a remarkable similarity, all being in the range three to five N (total cutting force). Permanent i.e. non-recoverable adhesion loss only occurred when the test panels were exposed to 1.0 N NaCl solution. The permanent adhesion loss was localised in small regions distributed across the wet area. Are these areas those referred to by Prof. Funke as possible film application defects, or are they defects caused by organic/inorganic contamination embedded in the film acting as "wicks" for salt ingress? Thus it seems reasonable to postulate that loss of adhesion i.e. a stage of low wet adhesion almost invariably precedes the onset of corrosion, on this we are in agreement. This apparent failure would seem to occur in a water-rich layer of the coating, probably of different composition to the bulk which is in contact with the substrate rather than at the coating/substrate interface. Providing this water-rich interfacial layer contains sufficient dissolved material, whether from the coating or from the test environment, then electrical conductivity is possible. It may therefore be unnecessary to postulate a continuous layer of electrolyte between anodic and cathodic area with the total loss of adhesion associated with the presence of such a layer.

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ADVANCES AND APPLICATION OF SCIENCE AND TECHNOLOGY IN SURFACE COATINGS

The objectives of the Conference were stated on the back cover of the February issue.

letters

The problem of accepting a global statement that wet adhesion is the most important property still remains, as there are many cases where low wet adhesion does not lead to corrosion and where good wet adhesion allows corrosion. Unreported work with polyurethane paints has shown that long-term corrosion protection, under laboratory conditions, can be afforded even when the films can be detached manually.

It is this experience and the time interval between the events i.e. loss of adhesion and onset of corrosion which makes it difficult for me to accept the global statement. Perhaps it is a matter of emphasis and the all embracing nature of the statement, but I remain unconvinced and would welcome further discussion on the subject and further experimental data.

Atomic Weapons Research Establishment, Building SB43, Aldermaston, Reading RG7 4PR.

Yours faithfully
P. Walker

20 February 1986

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occa meetings

Manchester Section

TiO_2 industry—evolution, performance and challenge

A meeting of the Manchester Section was held at the Manchester Club, Spring Gardens, Manchester on 18 November 1985. A lecture entitled 'TiO_2 industry—evolution, performance and challenge' was given by Dr R. D. Amberg, *NL Chemicals*.

The speaker outlined the development of the TiO_2 industry from its birth in 1919 simultaneously in Norway and the USA to its unquestionable importance within today's surface coatings, paper and plastics industries. Originally, only anatase via the sulphate process was available but superior pigmentary properties resulted with the first rutile modification in 1939. The coupling of high refractive index with an optimum particle size diameter of 0.2 to 0.3 μm gave the physically stable rutile TiO_2 excellent light scattering power and weather resistance. Further technical developments of recent years include a variety of surface treatments for TiO_2 and the enhanced optical properties derived from the chloride process pigments.

The lecturer's slides illustrated the demand profile of the years following World War II up to the present day. Growth in TiO_2 applications in the surface coatings industries during the 50's and 60's tended to parallel innovative developments of binders. This expansion has now given way to a period of consolidation. TiO_2 producers in the 80's are more likely to grow by acquisition and Dr Amberg quoted examples of some recent mergers in the US and W Europe.

Forecast figures presented gave a world-wide TiO_2 demand growth rate of about 2.3 per cent. Anticipated growth in the surface coatings market was expected to be of the order of 1 per cent whilst demand in the plastics sector would be showing a 4 per cent growth increase. It is predicted that up to 1990 there will be a further tightening of the current supply and demand position.

Dr Amberg stressed the prime importance now being attached to ecological factors in decisions of where to build new plants and in the treatment of waste from existing plants. *Kronos Titan GmbH* have addressed themselves to the latter with their plans to progressively eliminate disposal at sea of spent acid waste from the sulphate process. Ecological constraints together with the high capital investment required will tend to restrict the number of new TiO_2 plants built in the future.

It is estimated that at current foreseen demand levels there is enough discovered raw material to produce TiO_2 for the next 260 years. Apart from present applications, it was suggested that two areas of research might provide new potential outlets for TiO_2. One is connected with the process for removal of nitrogen oxide in flue gases of power stations fired with fossil raw materials and the other concerns the concentration of uranium salts from sea water.

Following question time, Mr S. Lawrenson gave a vote of thanks to Dr Amberg and the Section Chairman, Mr F. B. Windsor, thanked *NL Chemicals* for sponsoring the meal which followed the lecture.

S. Lawrenson

Evolution of colour for automotive styling

The first lecture of the Manchester Section in 1986 was held on 13 January at the Manchester Club. The lecture, preceded by an informal dinner, entitled "Evolution of

Colour for Automotive Styling", was presented by Mr Mike Sear of *Jaguar Cars,* and was attended by 90 members and guests.

The lecture, illustrated by slides and a mini exhibition, was split into three sections. The first section dealt briefly about *Jaguar Cars,* the middle section concerned the state of the art concerning current colours and coating systems, and concluded with a brief summary of probable future trends.

Jaguar have 10,000 employees divided between three plants producing 1,000 cars a week of two basic designs, a saloon car and a sports car. Surface coating to the final decorative finish currently follows a ten-stage process through from surface pre-treatment to finish coat.

Car colours follow fashion with a three- to four-year cycle such that 1985 fashion colours will appear in the 1988/89 range, and all are designed round the basics of blue, red, white, black and silver. The colour range has to look good in the showroom, under various daylight conditions world-wide, and take into account various traditional national tastes, in addition to fashion and car style.

The maximum colour range possible, on a basis of economy, for any one plant, is 16 to 18 colours. Some colours are not possible because of toxicity restrictions with some pigments, and other pigments will not withstand the painting process or the exposure conditions involved.

The criterion for a successful automotive system, are resistance to extremes of climatic conditions world-wide, chip and impact resistance and the colour-coat is required to give full opacity with a 25 micron film.

Using current materials only 18 per cent of the volume of paint used ends up as coating on a car. The new clearcoat system with modern automated plant is now up to 40 per cent efficient. It is anticipated that in the future with water-based systems it will be possible to obtain 50 to 80 per cent efficiency from the coating.

In planning colours for the future, various time factors have to be taken into account. It can take three months to select colours, and up to a further four months for these to be matched by the paint suppliers. Two years exposure evidence is required, and six months to produce trial cars to be studied by sales and marketing. Once selected, there is then a six month lead time to introduce the new range. The result is that it takes a minimum of three years to introduce new colours into a range.

Briefly looking towards the future, colours are anticipated to become brighter and cleaner, and coatings will have to take into account the following factors:

- Total automation
- Minimum organic vapour emissions
- Longer vehicle life

Regarding the last factor, coatings will be required to have enhanced corrosion protection and toleration to a variety of plastic substrates, as well as enhanced colour and gloss retention.

After a question and answer period, a vote of thanks to Mike Sear was proposed by Graham Fielding.

M. G. Langdon

Newcastle Section

Pipeline coatings

Forty people attended the fourth meeting of the 1985/6 session on 9 January 1986 to hear local section member Mr D. H. Tate, Technical Director of *Wailes Dove Bitumastic Ltd,* speak on "Pipeline coatings".

Through the ages pipes have been made from many different materials: the Romans used lead, the French used wood and, more recently, Tanzanians used bamboo. Cast iron was most popular in industrialised countries and Mr Tate recalled seeing such pipes excavated in Norway after 100 years burial yet still in good condition. Nowadays mild steel, ductile iron, concrete and asbestos cement are used, as well as various plastics e.g. uPVC, polyethene etc.

The most extensively used coatings for buried/sub-sea pipes have been pitch/bitumen-based. Significant improvements were made during the 1930's in the USA with the development of coal-digested pitches filled with talc/slate minerals. Liquid tars heated with selected coals at 300°C produced a solid pitch which, when filled, could be applied hot to give sag-resistant and relatively flexible, impact-resistant thick films (AWWA specification). The technology was transferred to the UK in 1947 to allow the British-owned *Iraq Petroleum Company* to be supplied. Other countries followed suit e.g. France developed a lower temperature application product and the Netherlands developed oxidised petroleum bitumen types with less irritating fumes than coal tar enamels. There are still arguments over the relative merits of these.

Thick pitch coatings for pipes are normally reinforced with fibreglass wrapping. In the last 25-30 years the rapid spread of high pressure natural gas pipelines revealed problems which wrapping cannot prevent, namely cracking due to local heating at pumping stations or when bent during very cold winter laying, and cathodic disbondment from high potential CP. Alternative systems, such as rubber/polyethylene tapes and sleeves, have not been the answer and the most popular modern solution is the use of fused epoxy powder at 350-400 microns.

Mr Tate discussed the specialised plant needed for factory application of wrapped pitch and epoxy powder coatings to grit-blasted steel pipes. Pitch coatings require a thin chlor-rubber adhesion primer whilst epoxy powder benefit greatly from specialised pretreatment. Molten pitch coatings are applied by flooding two coats, with wrapping in each, whereas epoxy powders are applied by electrostatic spray to pipe, pre-heated to fuse and cure the powder. Epoxy powder coating plant for pipes requires very large capital expenditure.

Most buried pipelines are now coated with epoxy powder, the main alternative still being wrapped pitch with some use of solvent-free tar urethane and zinc metal spray sealed with tar enamel. Most sub-sea pipelines are wrapped-pitch coated to offer good adhesion to the concrete overlay used for "negative buoyancy" and protection from trawl damage. Concrete and cement asbestos pipes are protected with coal tar enamels generally.

After a brief discussion of the Health & Safety aspects of pipeline coatings Mr Tate showed slides illustrating the application of wrapped pitch and epoxy powders followed by site installation and 'over the ditch' treatment of joints.

During question time, Mr Tate dealt with the probable physico-chemical reaction in digestion of coal dust with hot liquid tar, the selection of the correct coal and the effect of plasticising oils on properties. He gave details of the manufacturing process and interesting experiences with transportation by road tanker as well as early problems met with open top steel drums and paper sacks for export purposes.

The vote of thanks for a thoroughly absorbing talk was given by the Chairman, Mr R. G. Carr.

J. Bravey

Hull Section

Propylene glycol ethers and esters in the coatings industry

The third technical session was held at the Duke of Cumberland Hotel, Cottingham on 3 December 1985. The Vice Chairman, Mr Gamon introduced Dr Dawoodi of *BP Chemicals* (Hull) who gave a lecture entitled "Propylene Glycol Ethers and Esters in the Coatings Industry".

Dr Dawoodi reviewed the manufacture of these materials and indicated that his company manufactured over 20 glycol ether and ester derivatives of ethylene oxide and propylene oxide in France and Belgium. They are used mainly in the surface coatings industry, smaller amounts going into inks and cleaning fluids.

It was interesting to note that propylene oxide yields isomeric ethers and in the case of the ethyl ether the industrial process leads to 10 : 90 mixture (primary/secondary).

The speaker went on to discuss the physical properties of the new solvents, for example water miscibility, evaporation rate, solvent power and flash point. Attention was concentrated on methoxy propanol (MP), ethoxy propanol (EP) and their acetates, MPA and EPA. These were stated to have a much reduced toxicity compared to their ethylene oxide counterparts. Evaporation studies were described for solvent blends incorporating MP, EP and EGE in admixture with other solvents and the work was extended to inks and to a number of paint systems. It was concluded that MP evaporated rather too quickly leading to loss of solvent power and film defects in the final drying stages. Rather large additional amounts of MP were required to compensate for this. EP on the other hand gave excellent results as a direct replacement for EGE. Both EPA and MPA were found to give good results as EGA alternatives, with EPA being superior in formulations where evaporation is a critical property.

During the question period which followed, Dr Dawoodi indicated that iso butoxy propanol and EP can be considered as coalescing solvents in emulsion paints.

The meeting closed with a vote of thanks to the speaker from Mr D. M Spenceley for an excellent lecture.

J. A. Hasnip

Thames Valley Section

Printing paper

The lecture "Is the Chosen Paper Suitable for Printing?" was presented by Mr R. Batts of *Wiggins Teape Research and Development* and was given to an audience of 25 members and guests at the Crown Hotel, Amersham, on 16 January 1986.

The first part of the lecture outlined the major printing processes currently in operation in the UK, illustrated with the aid of appropriate slides.

Mr R. Batts then discussed in detail, each individual process, outlining the advantages and possible disadvantages when faced with an ever-increasing range of paper and board currently available in the UK.

Other topics of interest were discussed such as the effects of printing ink rheology in relationship to the printing process involved and the need to accurately match the printing ink to the paper substrate to eliminate well-known printing defects.

Finally, the speaker outlined possible future trends for the printing industry giving as an example, the recently introduced, computerised jet printing process. Following a lively question and answer session, a vote of thanks was proposed by Mr Alan Fell, Chairman of the Section.

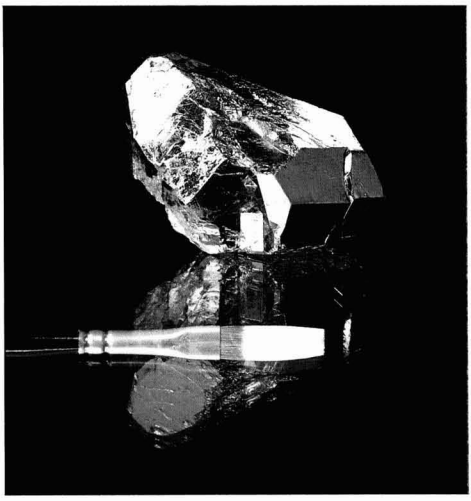
J. A. Gant

Commercial paint analysis

A lecture entitled "Commercial Paint Analysis" was given by Mr Bill Young from *SCM Chemicals* at the Crown Hotel, Amersham, on 28 November 1985. Mr Young detailed the paint analysis carried out in the *SCM Laboratories* for their own use in predicting trends in the industry, advising customers, budgeting and forecasting for maximum production efficiency. The paints are analysed from a commercial point of view, with close liasion between the analyst and the paint technologist.

Mr Young then discussed in detail, the analysis of a standard alkyd gloss, thixotropic gloss, vinyl silk emulsion and vinyl matt emulsions. The methods used included ashing, IJ, XFR and XRD, as well as functional tests such as brushability, scrub resistance and stain resistance.

TiONA PIGMENTS



Above, a rare, outsized specimen of natural rutile. SCM's high technology processes rutile ore to high purity pigments for paints and other industries requiring exceptional opacity and whiteness.

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Im Jahre 1984 investierte SCM in Großbritannien und Australien £90.000.000 in neueste Chlorid- und Sulfat-Technologien. Diese zusätzlichen Investitionen unterstreichen das verstärkte Engagement von SCM als bedeutender internationaler Produzent von Titandioxid-Pigmenten.

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The lecture concluded by Mr Young explaining how the analysis can be useful to paint manufacturers, informing them of their paints' performance in relation to major competitors.

An interesting discussion period followed the paper, and Mr Brian Gregory proposed a vote of thanks and *SCM* were thanked for their hospitality and sponsorship of the evening.

J. A. Gant

Ontario Section

Industrial hygiene

The Ontario Section met on 15 January 1986 at the Cambridge Motor Hotel. Ms Susan Ing, of *BASF Inmont Canada*, spoke on "Industrial Hygiene—Air Sampling".

The science and art of industrial hygiene has received much attention of late, but to some, it still remains a mystery. An industrial hygienist studies work operations, looks for potential hazards, and makes recommendations to minimize health hazards. These recommendations are usually made after careful evaluations using many well recognized testing methods, one of which is air sampling.

Of the many air sampling methods available, the most popular remains the constant flow air pumps, where air contaminants are drawn through and trapped in a series of filters or charcoal tubes. After analysis, a quantified concentration of the air contaminant can be presented and thus compared to legislative or recommended acceptable exposure levels. It is from this type of analysis that control techniques may then be offered.

A question and answer period followed, and the speaker was thanked for an informative presentation.

P. Marr

Midlands Section

Application of paints on plastic

The third technical lecture of the Midlands Section was held on 16 January 1986 at the Clarendon Suite, Stirling Road, Edgbaston, Birmingham. 68 members and guests heard Mr P. Vincent of *PPG Industries (UK) Ltd* give a talk on the "Application of Paints on Plastic". Mr Vincent said he would confine his talk to those plastics that are used in the automotive industry. The first recorded use of plastic was the gear knob of a 1910 Rolls Royce and this was made of *Bakelite*. Various plastics were used by the industry in the construction of a motor vehicle and these had to be painted for uniformity. Today, a single plastic is usually used as in the case of the *Metro* so that painting is unnecessary.

The first exterior use of plastic was for grills and wheel trims. It was vacuum metallised or chrome plated, this has now changed to aluminium painted. The introduction of exterior body panels caused further problems as the panels had to match the body colour but the plastic could only withstand temperatures up to 90°C. This can be overcome by using a high temperature plastic or the same paint as the body colour cured with a catalyst to reduce stoving temperature.

The speaker then described, in some detail, the various types of plastic that are used, where they are utilised on the vehicle and the particular problems associated with coating them. As to the future, Mr Vincent said that the use of plastics would increase. Plastic body panels would actually form part of the rigidity of the vehicle. They would be painted on line and cured at 100°C. The system would be a single surfacer, a single base coat then separate finishing coat dependent on plastic part. These materials are not presently available. At present, this paint is only requested after decision on plastic type has been taken. Closer co-operation between the paint and automotive industry is needed at an early stage.

A short question time followed the talk and the meeting finally closed with a vote of thanks, proposed by Mr R. Devenish, and endorsed by the large audience in the usual manner.

B. E. Myatt

London Section

Water borne coatings

The fifth technical meeting of the 1985/86 session was held at the Laboratory of the Government Chemist, Cornwall House, Waterloo Road, London.

After a brief introduction by the Superintendent, Dr Hussein, to the history of the Laboratory founded in 1842 to aid the Government, firstly in the detection of adulteration of tobacco, and in modern times giving support in many ways to the Department of Trade and Industry, Drs Prosser and Nicholson each gave reviews.

Dr Prosser, head of Materials Group, described a number of projects the Group had undertaken, highlighting work on a novel dental cement in the form of a glass ionomer, essentially an aluminosilicate glass powder in a polyacrylic acid solution.

Diversification of the unique properties of this product led to its use in surgical splint bandages, and as a carrier of trace elements with slow release properties, enabling it to be used in pills to cure cattle suffering from trace element deficiencies.

Dr John Nicolson then gave a review of the principles of water borne coatings.

Starting from the pressures in the United States in 1966 to reduce atmospheric pollution by organic solvents, in the well-known Los Angeles Rule 66, environmental processes have continued to mount in favour of water as a solvent or diluent for coatings.

Dr Nicholson set out to examine:

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1. What is water like?

2. What makes paint resins soluble or dispersible?

3. How do water borne coatings form films?

On the question of what water is like, the advantages and disadvantages were listed.

The advantages are that water is cheap, readily available, non-toxic and non-flammable. The disadvantages are that water borne systems must necessarily be water sensitive, humidity will affect drying, wetting will be poor and the problem of flash rusting frequently occurs. The properties of low molecular weight, high boiling point, high surface tension and high latent heat of evaporation create the major differences from and difficulties as compared with organic liquids as coatings carriers.

He went on to discuss what makes resins soluble, generally speaking very polar materials being water soluble, and so for polymers to be dispersible, polar groups are necessary, examples being polyvinyl alcohol, polyacrylic acids and polyacrylonitriles.

Thermodynamic considerations sometimes led to unexpected behaviour for example, in considering phase diagrams for solutions of polymethacrylic acid in water.

The problem of wetting was one of surface tension, and examination of contact angles led to a list of surface tensions of solids and the critical surface tension above which a liquid cannot wet a solid.

Minimum film forming temperature was discussed, that temperature below which a latex will not form a film, this MFFT not being the same as the glass transition temperature as had been widely felt.

Having described the problems, four examples of new developments in water borne systems were mentioned, the *Ciba-Geigy* water soluble epoxies for can coatings, a new latent acid catalyst in the form of a sulphonate ester which generated a betaine and eventually an amine plus sulphuric acid, a series of zirconyl chloride cross-linked species and amino ethane thio sulphuric acid giving novel cross-linking possibilities via sulphur chains.

For those interested in pursuing the subject further, Dr Nicholson mentioned his forthcoming monograph in the OCCA Series, which would be available in March.

After some interesting questions, Mr R. Gough thanked the speakers for having ably demonstrated the work of the Laboratory.

R. Gough

Discussion is encouraged at OCCA Conferences following the presentation of papers. Those who put the questions were asked to fill in discussion slips with the details of their questions. Edited versions of the discussions that followed the paper published in the **March 1986** issue appears below: questions in ordinary roman type, answers in italic. Only those questions for which discussion slips were received are published.

Parameters controlling colour acceptance in latex paints

H. G. Stephens

G. C. FETTIS: Why did you claim that vinyl chloride based latices are the ones for the future?

H. G. STEPHENS: Apart from obviously superior chemical resistance, vinyl chloride is cheaper than vinyl acetate which in turn is so much cheaper than acrylic monomers.

Paint adhesion to galvanized steel surfaces

W. J. van Ooij and R. C. Groot

G. C. FETTIS: Can you explain the mechanism causing the differences in corrosion from one binder to another and with different pigments, particularly with polyesters?

W. J. VAN OOIJ: With PU as a binder, the adhesion of the polymer to the pigment particle surface is so high that the pigments do not dissolve properly during permeation of water through the coating. As a result, very little difference between the efficiencies of the various pigments is observed. In fact, the pigments are inactive. Yet, some corrosion protection is observed. This is due to the higher adhesion of the PU vehicle to the metal substrate as compared with PE and EP. Experiments which bear this out further are: (1) with unpigmented clear polymer films, PU coatings provide a better corrosion resistance to zinc than PE or EP (as mentioned in the conference paper) and (2) unpublised extraction experiments with cured pigmented films showed that the amount of pigment that can be extracted with water is markedly lower for PU than for PE or EP.

With EP films, the pigment extractability is all right so chromates are good inhibiting pigments. The pigments, borosilicate and zinc phosphate, do not perform well here since they are only active above a certain pH value, due to a buffering action. There is evidence that corrosion at EP-zinc interfaces proceeds at low pH, i.e., below 7. PE coatings are better because on the one hand, their adhesion to the

substrate and the pigment particles is about right; on the other hand, interfacial corrosion does not involve low interfacial pH, so all anti-corrosive pigments perform well in this polymer. Hence, PE binders can be more universally applied than EP or PU polymers.

D. S. NEWTON: Since the galvanizing bath is normally saturated with lead, does this have any effect on the paint performance?

W. J. VAN OOIJ: Lead is not soluble in zinc to a great extent and segregates to the surface in the form of small spherical particles. Surface analysis shows that these particles are coated with Al_2O_3 and Zn0. Hence, it is unlikely that they affect paint performance through an acceleration of zinc corrosion by a galvanic mechanism. Problems may arise, however, if there are many local particles in the zinc surface which are not completely embedded and which tend to drop out. This results in local spots of reduced paint adhesion which might initiate delamination of the coating.

D. SCANTLEBURY: Leidheiser has shown that the crystal orientation of zinc in the galvanized layer is important in the subsequent adhesion of an organic coating. How does this theory fit your data?

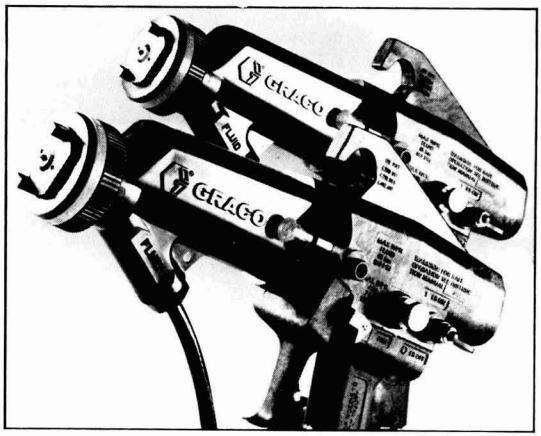
W. J. VAN OOIJ: Leidheiser et al. reported on the retention of initial, unaged adhesion to continuously galvanized steel used in the coil coating industry. Upon deformation of the painted panels, adhesion was lost on crystals with a certain crystallographic orientation only. This effect was related to the brittleness of certain zinc crystals which caused intragranular and intergranualar cracking of these crystals. In our work, only hot dip batch-galvanized steel was considered which is not usually subjected to deformation following painting. Hence, this mechanism of paint adhesion deterioration is not relevant in our studies.

company visits

Graco UK Ltd

Graco UK Ltd, a subsidiary of *Graco Inc.* of Minneapolis, USA, have been well-known in the UK for many years for their fluid handling technology, their motto "You name it—we can pump it" applying to all kinds of fluids and fluid-like materials, including putty. In the paint application field they supply paint circulation systems, air operated or hydraulic pumps for airless spraying, together with all the standard types of spray equipment.

At a recent press conference they introduced to the UK market their latest development—an air-assisted airless electrostatic spray gun, the *Pro AA4000.* A feature of the gun is that the electrostatic voltage (75kV) is generated in the hand gun by an air driven turbine generator. Previously electrostatic spray guns involved the encumbrances of a separate power supply, high voltage generator, and high voltage cable to the gun; this involves electrical hazards in the spray booth whilst the gun is less easy to handle. The new gun, with airless spraying to provide rapid paint application, air atomisation to provide good control over the spray fan pattern and electrostatic charging to ensure maximum transfer of paint to the object being sprayed, gives a good finish and permits up to 85 per cent of the paint to be deposited on the object. This compares with about 40 per cent with a conventional air assisted gun or 60 per cent with an airless spray gun, and obviously makes for a considerable reduction in the amount of paint consumed. The consequent financial savings are such that the cost of the *Pro AA4000* gun is recouped in a comparatively short time, depending on the amount of paint used and the type of spray gun replaced.



The Graco Pro-AA4000 Spray Gun.

T. A. B.

news

Pyrene and Tri-Kem merge

From 19 March, 1986, *Tri-Kem Ltd* of Wellingborough will merge with *Pyrene Chemical Services Ltd* of Iver. Both companies are members of the Metal Finishing Division of *Brent Chemicals International.*

Trimite incorporation

With effect from 1 March, 1986, *Trimite Powders Ltd* of Uxbridge will be incorporated into *Trimite Ltd* as the Powder Division. All purchasing and accounting functions will continue to be carried out at Uxbridge.

ICI award

ICI Paints Division, Slough, was one of five recipients of the 1985 Pollution Abatement Technology Award financed by the Environment Foundation and promoted by the Department of the Environment. The award goes to *ICI*

Paints for their water-based low solvent-emission paint and protective systems for vehicles. For further information contact: Mr Robert Ward, Secretary's Department, ICI Paints Division, Wrexham, Slough SL2 5DS.

Swedish companies joint venture

The Becker Group, the Swedish multi-national paint company who took over *Goodlass Wall & Co Ltd* of Liverpool in 1984, have agreed to enter a joint venture in the field of consumer and trade paint operations with *AB Alfort & Cronholm,* another leading Swedish paint manufacturer. A joint venture company will be established under the name *Alcro-Becker AB.* In the UK a new company called *Valspar Paints Ltd* has been established out of the Trade Paint Division of *Goodlass Wall & Co Ltd,* and will, together with *Alexander, Fergusson Ltd* form an integral part of the joint venture operation.

Sachtleben Plant Investment

Sachtleben Chemie GmbH of Duisberg, West Germany, internationally known as a producer of white pigments and speciality chemicals, is to invest in the near future DM 125 million in a spent-acid recycling plant. At present spent-acid, a by-product of TiO_2 pigment production is discharged into the North Sea. The licence to discharge the acid runs out in 1989 when the recycling plant will be in operation. Therefore this new plant will ensure for the future the company's production of TiO_2 by the sulphate route.

Rohm and Haas New Biocides Plant

Rohm and Haas has announced plans to start construction of a new biocides plant at its Tyneside Works in Jarrow, Tyne and Wear, UK. The facility will produce a number of biocides based on the company's patented isothiazolone chemistry, including the existing commercial grades *Skane M8* and *Kathon 893,* which are currently imported from the company's US plants for sale in Europe. *Rohm and Haas* has indicated that it will be a world scale plant.

Mebon awarded coatings certificate

The British Board of Agrement has assigned Certificate No. 85/1495 to *Mebon Steelguard Zinc Coatings. Mebon* introduced *Steelguard* over 20 years ago and the gaining of the certificate is the culmination of extensive research. *Mebon Steelguard* has been designed to offer an economic and simplified approach to structural steelwork protection. Reliance on high quality metallic zinc and advanced anti-corrosion technology has resulted in a comprehensive system. Different structures require differing degrees of corrosion protection and the scheme offers a 5-star option plan to cost effective protection.

Open Tech

Lists have recently been received of candidates who have successfully completed modules 1 and 2 of the Open Tech Course organised by the Paintmakers' Association and the names are given below. The Council congratulates these candidates and is pleased to note that the lists contain names of members of this Association. It asks colleagues of those who have not yet applied for membership to encourage them to do so and to remind them that Sections organise technical meetings, seminars, visits and other activities which will be of interest to them. Details of membership and application can be obtained upon request from Priory House.

Module 1

R. Ashford, S. Bowen, P Carson, J Caulwell, C Dixon, J Daniels, C Evans, P. Farren, C. Fisher, S. Ford, P. Gee, A. Gladwell, J. Gorick, A. Gosling, S. Heminsley, C. Hogan, S Huxham, M. John, I. Joseph, M. Kirk, A. Knell, C. Krajic, M. Linaker, R. Lodemore, D. McCarthy, R. Minchington, T. Norman, M. O'Shea, S. Overthrow, P. Philpot, S. Preston, M. Pulham, R. Purnell, J. Raisbeck, W. Reid, D. Rutherford, J. Ryan, P. Skett, R. Strong, P. Sturch, P. Szabo, D. Thomas, J. Tynan, D. Venus, A. Wilson.

Module 2

D. Allan, N. Bridgewater, R. Brown, R Brown, J. Carlyle, J. Coleman, S. Cook, R. Corrall, B. Donnelly, D. Grieb, A. Knight, J. Madge, M McManus, G. Paciello, S. Palmer, M. Parrish, C. Robertson, J Siddall, W. Simpkin, G. Smith, M. Tuckwell, G. Zielinski.

products

New epoxide

Degussa AG of Frankfurt am Main, W. Germany has added a bifunctional cyclo-aliphatic epoxide to its range of epoxides. The new product sold as *Diepoxid 126* acts as a low viscosity binder component to cationic UV-Curable paints. Thermosetting casting resins can be produced by reacting *Diepoxid 126* and carboxylic acid anhydrase. The product is also a stabiliser for acid scavenging systems.

Reader Enquiry Service No. 40

Permoglaze new products and product range

Permoglaze Paints Ltd of Hull is adding three new products to its range of *Micatex Masonry Paints.* These are a dirt repellent treatment, a pliolite masonry paint and a heavy texture coating.

The *Micatex Dirt Repellent Treatment* possesses a unique dirt shedding property which ensures that masonry coatings remain clean throughout their lives, even in industrial areas.

The *Pliolite Based Masonry Paint* aims to provide decorators with the answer to painting problems that arise in poor weather conditions. This paint dries quickly, even in sub-zero temperatures, and is unaffected by rain after about 20 minutes from application.

The *Micatex Heavy Texture Coating* is a water-borne coating requiring only one coat to hide surface defects and is used on internal or external walls, ceilings and soffits. The coating has high resistance to water penetration providing both protection to the wall fabric and improved thermal insulation.

Permoglaze Paints is also launching a complete range of high performance coatings for use in the preservation of industrial steelwork and non-ferrous metals. With the exception of the *Permoglaze Metal* and *Etch Primers,* the remaining 19 products in the *High Performance Coatings* range have been formulated on a 'high flash' basis so no special storage requirements are necessary, thus satisfying the strict EEC regulations, which came into effect on 1 January under the EEC's new Health and Safety Act.

Reader Enquiry Service No. 41

Colour control

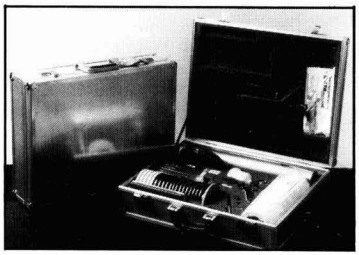
Johne + Reilhofer of Harpenden have introduced a colour measuring system which offers extremely high spectral resolution of 1 nanometre. Known as the *ER10,* it can be used for the colour control of plastics, fabrics and paints. The system incorporates a xenon flash lamp and a spectrophotometer. When used on-line, the continuous colour measurement allows comparison with stored standards, trend analysis and closed loop control.

Reader Enquiry Service No. 42

Design case

Glasurit of West Drayton has launched a new design case for use in custom painting vehicles. Available in a lightweight, aluminium case, this kit contains all the design and application tools necessary for custom refinishing. Included in the kit are: a satagraph air brush, a gravity fed sata mini-jet gun, cutting knives, a length of air hose, drawing instruments, adhesive paper and a range of strip lining tapes.

Reader Enquiry Service No. 43



Glasurit design case

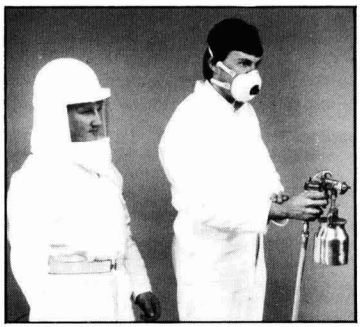
Paint Spray Protectors

Four paint spray protectors are now available from the *3M Occupational Health & Safety Products Group* of Bracknell. These respiratory products are designed for the protection of workers using either conventional paints, or the more complex two-part paints.

The first is the *3M '8709' Easi-Air Spray Paint Respirator* for use with conventional paint formulations. This is a lightweight disposable half-mask and gives a wide field of vision. Its exhalation valve, provides user comfort in prolonged paint spraying jobs. The second lightweight disposable alternative is the non-valved *3M '8711' Spray Paint Respirator.*

For paints containing hardeners such as isocyanates, the Health & Safety Executive requires the use of an air-fed breathing system for fully effective respiratory protection. *3M* now offers two respiratory systems for use with these hardeners. The first is the *3M Hardcap System* which provides respiratory protection and gives protection to the face and eyes, as well as hard-hat protection for the head (BS5240). The second respirator system is the lightweight *3M Air-Fed Half Mask*. Operating from breathable quality compressed air, the product is comfortable to wear in situations which require adequate respiratory protection, but do not need protection for the head, face and eyes.

Reader Enquiry Service No. 44



Paint spray protections: 3M Hardcap System (left) and 3M '8709' Easi-Air Spray Paint Respirator (right).

Spray booth

Kremlin Spray Painting Equipment Ltd of Slough have introduced a *Polywash* spray booth washing system which is said to be easy to clean and the system is stated to be more than 99 per cent effective. *Polywash* is a split level extraction with suction within each working chamber which removes paint particles from the air.

Reader Enquiry Service No. 45

Coloured Floor Coatings

A range of coloured floor coatings formulated to give tough and chemically-resistant finishes is available from *Stuarts Granolithic* of Birmingham.

Florcol is suitable for a wide range of industrial applications to provide safe anti-slip surfaces while enhancing the appearance and wearing characteristics of floors. This is a polyurethane system which hardens not by drying but by chemical reaction with moisture.

Reader Enquiry Service No. 46

literature

Resin modifier bulletin

Monsanto plc of Basingstoke has just published a new technical bulletin on its full range of *Modaflow* flow modifiers and surface problem solvers for non-aqueous paint coatings. The 28-page brochure covers the *Modaflow* resin modifier, the *Modaflow Powder III* resin modifier and *Multiflow* ready-to-use flow additive. A wide range of product characteristics are outlined, including chemical/physical properties. For copies contact: Mr M. J. Harrison, Monsanto plc, Monsanto House, Chineham Court, Chineham, Basingstoke, Hants RG24 0UL. Tel: (0256) 572.88.

Analytical Services

Analysis and testing capabilities for the polymer and coatings industries are highlighted in a new brochure from *Vance Laboratories* of Indiana, USA. This brochure describes the use of instrumental techniques of analysis as they apply to problem solving in manufacturing, formulation, and quality control. For copies contact: Vance Laboratories, Inc. 5728 W. 71st Street, Indianapolis, Indiana 46278, USA.

meetings

Computerised ink handling systems

The Institute of Printing will be presenting a talk on "Computerised ink handling systems" on Tuesday, 15 April, 1986, 6.00 pm, at the Prudential Assurance Building High Holborn. The speaker will be Mr Bruce Wheatley, General Manager of Colour Management for Printers. This meeting is open to both members and visitors. For further information contact: Harry B. Smith, 20 Georgewood Road, Hemel Hempstead, Herts. HP3 8AL. Tel: 0442 64510, Telex: 826715 AERO G.

Research Conference

The Gordon Research Conference on the "Physics and Chemistry of Coatings and Films" will be held at Plymouth State College, Plymouth, New Hampshire, USA, from 11-15 August, 1986. For further information contact: Dr Alexander M. Cruickshank, Director, Gordon Research Conferences, Gordon Research Center, University of Rhode Island, Kingston, Rhode Island 02881-0801, USA. Tel: 401/783-4011.

Adhesion and dispersion courses

Two short courses, "Adhesion principles and practice for coatings and polymer scientists" and "Dispersion of pigments and resins in fluid media" will be presented at Kent State University, Ohio, USA, from 12-16 May and 2-6 June, 1986, respectively. For further information contact: Carl J. Knauss, Chemistry Department, Kent State University, Kent, Ohio 44242, USA. Tel: 216/672-2327.

people

Dennis Wilby has been appointed to the main board of *Brent Chemicals International PLC* with effect from 12 February, 1986.

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Annual subscription (1986)	**US$635.00**
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news

K. W. D. O'Halloran has been appointed sales manager of *Hythe Chemicals*, a wholly-owned subsidiary of *BP Chemicals Ltd.* He will be responsible for the Hythe sales office and co-ordination of sales activities for *Hythe* products through International sales affiliates.

Dr W. J. Petzny has been appointed General Manager of Research and Development at *BP Chemicals Ltd* to succeed Dr J. K. Hambling who is retiring from the company after 27 years' service.

Paul Lever has been appointed Managing Director of *Crown Paints* with effect from 1 March, 1986. Mr Lever is Chairman and Managing Director of *Darius Industrial Investments* which specialises in venture and development fund management, prior to which he was, for six years, Managing Director of the Tower Housewares Division of *Tube Investments PLC.*

Otto Blomberg, Marketing Director of Norzink AS, Oslo, has been elected Chairman of *Zinc Development Association.* He succeeds Mr Tony Wallbank who was joint Chairman of the *Zinc and Lead Development Associations,* a post which has disappeared as a result of changes in organisation within the *ZDA/LDA* group. Under the Chief Executive, Mr F. David Ward, staffs of the two associations will continue to work closely together. *ZDA* and *LDA* Information Services, including the world-wide Zinc, Lead and Cadmium Abstracts, will continue to be produced jointly.

bsi news

BSI publications are obtainable from: BSI Sales Department, Linford Wood, Milton Keynes MK14 6LE (orders by post only).

All sales enquiries by telephone/telex should be directed to 0908 320066/Telex 825777 (BSIMK G).

British Standards

The following publications are now available:

Methods of test for paints: BS3900
Part A3. Standard panels for paint testing: 1986 ISO 1514-1984.
Part A6. Determination of flow time by use of flow cups.
Part B4. Determination of total lead in paints and similar materials: 1986 ISO 6503-1984.
Part B5. Preparation of acid extracts from liquid paints or coating powders: 1986 ISO 6713—1984.
Part B6. Determination of 'soluble' lead content.
Part B7. Determination of 'soluble' antimony content: 1986 ISO 3856/2—1984.
Part B8. Determination of 'soluble' barium content: 1986 ISO 3856/3—1984.
Part B9. Determination of 'soluble' cadmium content: 1986 ISO 3856/4—1984.
Part B10. Determination of hexavalent chromium content of solid matter: 1986 ISO 3856/5—1984.
Part B11. Determination of total chromium content of liquid matter.
Part B12. Determination of 'soluble' mercury content: 1986 ISO 3856/7—1984.
Part F13. Filiform corrosion test on steel: 1986 ISO 4623—1984.

Paints media and related products: BS4726. Methods for sampling raw materials for paints and varnishes: 1986 ISO 842—1984.

occa news

West Riding Section

Annual Dinner Dance

The West Riding Section's Annual Dinner and Dance was again held at the Crown Hotel, Harrogate, on the 29 November, 1985, with 233 members and guests attending.

Section Chairman, Terry Wright and his wife, Margaret, were joined at the top table by Association President, Frank Redman and his wife, Peggy, Director & Secretary, Bob Hamblin, together with Section Chairmen and their Ladies from London, Ken and Shirley Arbuckle, from Manchester, Barry and Marie Windsor and from Newcastle Gordon and Maureen Carr.

Terry Wright (Chairman) welcoming guests to West Riding's Dinner Dance

Following an excellent meal the West Riding Chairman (see photo) warmly welcomed the ladies and guests and thanked the many companies present for their continued support and patronage. He alluded to the medicinal benefits of the local Spa water and invited the assembly to taste later in the evening a fresh sample drawn from the nearby Sulphur Well. The somewhat pungent odour, however, proving too daunting for many willing tasters.

The President responded with a short humorous speech that left many tables hurriedly trying to downgrade their speech time estimates.

Following the traditional number ticket draw, the main prize of a free THF Bargain Break Weekend for two being won by Mrs Audrey Topp from Kirklees Chemical, the evening concluded with dancing until 1 am to the lively Lincoln Four.

All those present again agreed it was another splendid evening.

T. M. Wright

London Section

Kekwick Prize Award for 1985

At the January meeting of the London Section an award of £25 (nominally to be spent on text books) and one year's membership of OCCA as an Ordinary Member was made to Mr Paul Francis Casey, aged 22 years, employed as a Technologist by Berger Industrial Coatings Ltd, Freshwater Road, Dagenham, Essex.

Paul has been studying at the East Ham College of Technology, Department of Science and Computing for several years and this year attained his HNC B Tech qualification.

He was chosen by his tutors because of his diligence and seriousness in his studies, which were hampered by the closing of

classes due to the inability to obtain a viable number of students for the Higher Grade work.

It was felt that Paul truly met the merits and aims for which the Leslie Kekwick Prize was instituted.

J. Tooth

News of Members

Technical representative

Keith Jacques a member of the Midlands Section of OCCA has joined Scott Bader as technical representative for the South and Midlands. In this role he will be spearheading the sales and technical support effort for emulsion solvent and powder coatings products. After graduating in Applied Chemistry he joined Synthetic Resins Ltd and then moved onto TI Drynamels. His last six years were spent as technical manager of Postans Paints.

Phil Gabriel who is a member of the Manchester Section of OCCA has joined *OBS Machines Ltd* of Milton Keynes as technical representative for Scotland, Ireland, the Midlands and North. In this post he will be responsible in his area for the entire *OBS* product portfolio which include mixers, dispersers and conveying systems. Formerly Phil was for the last twelve years with the Organics Division of *ICI* researching into pigment formulations.

G. Bird, ATSC, attached to the Midlands Sections of OCCA has been appointed Laboratory Manager at *Newtown Paints Ltd.*

professional grade

At a meeting of the Professional Grade Committee held on 19 February, 1986, the following admissions were made:

Admitted to Associateship

Attwood, Stephen Charles Jackson *(Transvaal)*
Bourne, Jonathan Paul *(Midlands—Trent Valley Branch)*
Carr, Robin Gordon *(Newcastle)*
Dalzell, Kerry Wayne *(Wellington)*
Dent, Graham John *(Manchester)*
Hopkins, Francis Glenn *(Wellington)*
Wagenvoort, Marinus *(Wellington)*
Waller, Andrew George *(West Riding)*

new members

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

Ordinary members

Aburn, C. E., B.Sc. *(Wellington)*
Adamson, K. A., B.Sc. *(Newcastle)*
Ball, D. *(Scottish—Eastern Branch)*
Barnard, C. S. *(Midlands—Trent Valley Branch)*
Beverley, G. N. *(West Riding)*
Budhoo, S. *(Natal)*
Butterworth, N. C., B.Sc. *(Manchester)*
Clementson, B., B.Sc. *(Newcastle)*
Daniels, G. P., B.Sc. *(Auckland)*
Darbar, R. *(Thames Valley)*
Deadman, P. *(London)*
Egan, M. *(Irish)*
Hudson, S. A. *(Auckland)*
Purohit, S. C., B.Sc. *(London)*
Senior, R. H. *(Manchester)*
Sheppard, D. G. *(London)*
Smith, M. *(West Riding)*
Sole, S. A. *(Cape)*
Tyson, A. *(West Riding)*
Warne, P. A. *(Manchester)*
Yaseen, M., M.Sc., Ph.D. *(General Overseas—India).*

Associate members

Clarke, B. J. *(Irish)*
Cowan, G. *(Natal)*
Flynn, P. *(Irish)*
Jeffers, E. M. *(Natal)*
Searle, R. N. *(Wellington)*

Registered Student

Hemmingway, R. *(West Riding)*

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