

DIVERSE NEWS

Chancellor's Budget or balance of power?

In the optics industry the *budget* means something rather different than for the Chancellor of the Exchequer. For us, it is the balance of power in an optical system.

In any optical system, there are light sources, processes, losses, filters and detection. Using a variety of convolution techniques, Diverse is able to analyse almost any optical system to determine its power budget.

Why? Well before any design of instrumentation can be realised, the signal to noise ratio at the detector needs to be known. Using our techniques, specific components can be selected and their effect on the overall performance determined.

Typical applications are in instrumentation and the biotech and security industries. If you are designing a new system that uses optics this will be relevant to you.

DIVERSE PRODUCTS for diverse INDUSTRIES

NDT

Magnetic Field Meter
Magnetic Flux Meter
Ferrite Meter

Welding

Zeromag See Page 2
Squeeze analyser See Page 3

Full information available on the DIVERSE web site

A380 Takes Off!

Diverse contribute to Advanced Avionics



The Airbus A380 takes off! The world's most sophisticated and engineered aircraft takes to the skies. The world watched and marvelled. This aircraft will be the market leader for years to come taking over 500 passengers and dwarfing the 'Jumbo jet'.

The pilot's controls and data are provided through the most advanced aircraft avionics system. And behind these high technology displays are light systems designed at Diverse.

Our illumination guide system uses a combination of advanced optical design, light re-circulation to improve light efficiency and smart elemental control to eliminate dark patches or stria. High brightness was required to allow the

avionics to be seen even in bright sunlight.

The System designed by Diverse uses our lightguide technology. We used a variety of unique CAD tools to design and simulate the illumination performance. Special software was written to place the hundreds of light control elements on the guide to provide the correct light profile.

The final design used standard printed circuit technology for the light emitting diode illumination (as well as the display controller), and a unique optical system comprising a base light guide, a light controlling reflector and hundreds of small light controlling elements.

All the small optical elements were implemented in the same single planar process, making the product simple to manufacture. Variants of the design were provided for different avionic displays.

If your product needs a light guide or takes to the skies please call Diverse.

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DIVERSE SOLUTIONS for diverse INDUSTRIES



Zeromag - the solution for the big project!



DIVERSE has been supplying the Zeromag welding demagnetiser for many years to leading welding companies all over the world.

Early in 2005, Diverse was invited to help with Zeromag to degauss pipes that had become magnetised in a Dutch shipyard. The reality of this exotic visit was measurement of magnetism in the shipyard in driving snow! Why do these problems not happen in Jamaica!

The project was for a huge lay barge that was scheduled to lay a 20km pipeline. Weld verification tests had shown that there was arc blow due to magnetism on a proportion of the pipe stock. The stock was a complex clad variety used in undersea applications.

The customer, realising the cost that encountering this problem at sea would cause, decided to invest in Zeromag and some of Diverse's complementary instruments.

Trials carried out at the yard showed that Zeromag was the ideal tool to control magnetism, and allow production of the pipe to continue with minimal delay.

A new version of Zeromag was evaluated on

site. This product is able to prepare pipes magnetically for welding before the weld process rather than during it. Using a novel technique, the pipe magnetism can be reduced to acceptably low levels before welding, without having to use standard degauss techniques which are slow and power hungry. The advantage to the welder is that welding can be

done at full speed and double headed.

Generally, wherever there is a major pipeline construction you find a Zeromag in use. It saves so much money to have one on site - and down time is too expensive.

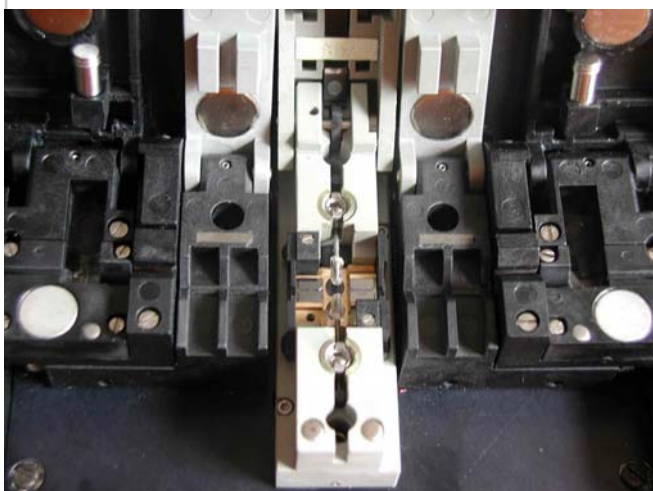
Information on Magnetic Arc Blow can be found on the DIVERSE web site.



Take it apart and put it together - cheaper

Diverse undertake a wide range of different engineering projects ranging from product

definition brainstorm through to manufacture. One aspect of our work is to benchmark the opposition.



In a recent project Diverse were given two complex fibre optic systems from two world leading companies. Our task: to pull the products apart, cost every aspect of their manufacture and put them back together again!

The technique used was simple enough, but as with all good engineering the devil was in the detail. Special parts had to be tracked down from suppliers around the world, alternatives had to be found for application specific ICs, and alternative designs and methods of construction identified to reduce cost.

Increase profitability

If you want to design a new product and there is competition in the market then why not ask Diverse to evaluate and benchmark them. By doing so you have the chance to reduce your manufacturing costs, introduce the latest technology and ultimately increase profits.

To take advantage of the improvements and financial benefits that benchmarking can bring, just contact us.

Look! when you cross the road

The Pelican road crossing is something we all take for granted. However in the last few years a quiet revolution has slowly been taking place! Gone are the white crossing symbols and the pictograms are now high contrast red and green. This bright image is obtained using high brightness LEDs.

Diverse has undertaken a variety of designs for this market, including the Pelican, Toucan and Equestrian signals. The optical design task is to provide a reasonable breakup of the light from the individual LED sources and

thus provide even illumination.

The technique to achieve the control of the lighting polar diagram and make the LED sources individually invisible, used some of the most advanced optical products available anywhere in the world. Strange that such high technology should be used in what seems a mundane product on the high street!

Further developments using other specialist optical components have included directing the pictogram light away from the view of motorists and

towards the pedestrians - a feature that is not currently in the DoT specification - but in the light of this development may soon be.

Custom Design

If you require the solution to a specific optical or magnet problem, please call us. If one of our standard products cannot be used, then we can provide custom designs to meet your needs.



DIVERSE PRODUCT DEVELOPMENTS

A new squeeze on auto production

The concentration of car production to lower labour cost areas of the world has resulted in a demographic change for car workers in the UK. However it is not all bad news; the Diverse Squeeze Analyser, used to calibrate resistance weld guns, has been the instrument of choice for overseas customers.

There are many different tools that can be used for setting up resistance welders, but what they all have in common is the need to measure, take note of numbers, subtract, adjust and repeat the process. The Diverse Squeeze Analyser does not require any of this!

On a simple bar graph display, the phasing of the squeeze and the weld current can be seen at a



glance. The operator simply tests, checks the phase on the Squeeze Analyser and adjusts.

The advantages are: simplicity of use, no numbers to calculate, and a

system that, given only a few moments training, can be used by workers from Brazil to China. And the Squeeze analyser is tough! It has to be as it is used in an environment where it is placed in a 10 Tonne press,

works at elevated temperature and humidity and face the general rigours of the factory floor.

Recent advances in the design of the latest generation of Squeeze Analyser have resulted in an international power charger, more robust construction and better battery life. So whether its GM, Ford or Nissan the squeeze analyser delivers.

Better Products = repeat customers

At DIVERSE we always try to work in the way that best suits our clients. Listening to customer feedback we upgrade our products to meet changing needs.

Micro-fluidic Systems

A variety of micro fluidic systems designed at Diverse

Diverse has been working with micro fluidic systems for a number of years. This technology has particular application in biotechnology, providing a route for analysis of large numbers of combinations of biology and chemistry to be performed on a single substrate.

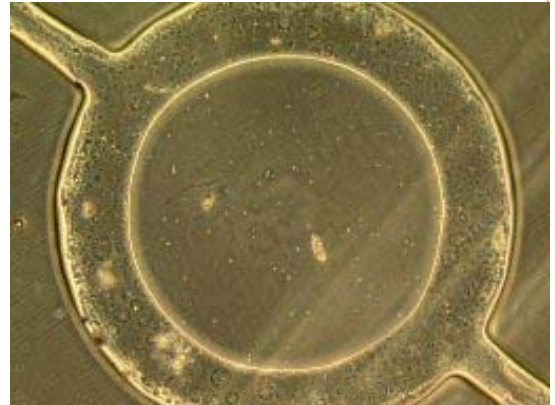
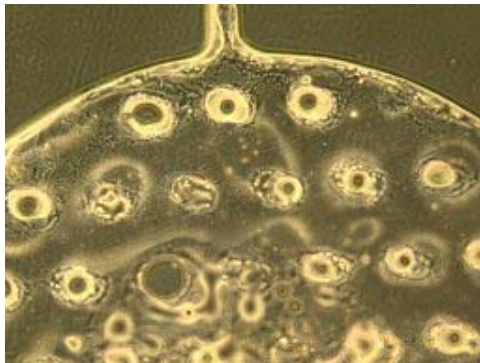
Working with a leading UK University, Diverse has been in the forefront of the development of disc based microfluidics together with novel detection methods for specific biology or chemical species.

A wide variety of fluid control possibilities have been investigated including source, sink, multi-source

mixing and weirs, with base characteristics such as integrated measurement chambers, and vents to air.

Our work extends beyond the substrate and the instrumentation to the techniques for injecting very small quantities of fluid into the disc.

There are a number of techniques for achieving this. All require a combination of accurate measurement of the tiny volumes to be dispensed, together with accurate



control of the dispensing mechanism. The measurement of small volumes can be complicated by containment and surface tension effects.

applicable to the inkjet industry as well as related systems such as inkjet manufactured semiconductors.

Diverse has a long track record working for inkjet printer companies. Some of these microfluidic techniques are

DIVERSE
- solutions -

- Optics
- Magnetics
- Electronics
- Software
- Instrument Design

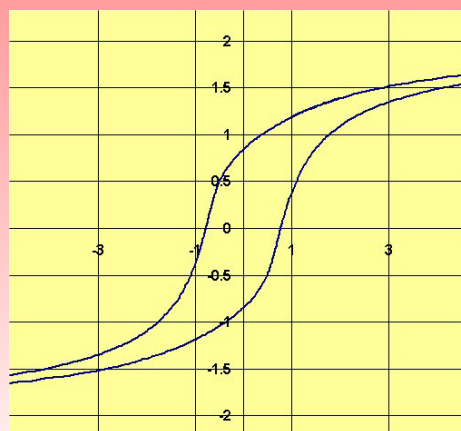
DIVERSE KEY TOPIC - Practical Degauss

During World War II many of the mines laid at sea had magnetic triggers. To overcome this for minesweepers, the whole hull of the vessel would be degaussed. This was achieved by winding coils of wire around the vessel and taking an ac current from a maximum value, which caused magnetic saturation in the material, slowly down to a minimum level leaving the hull demagnetised.

This same idea can be used in today's industrial environment to demagnetise steel parts or even complete machines and assemblies. Unfortunately there can be complications. First, the

nature of the materials used needs to be properly understood. A complex machine is built with a variety of different materials some of which will be magnetic. If the magnetic materials are in the same magnetic circuit, then the field strength will hit the saturation plateau of the first to saturate, which will in turn require a much higher field strength to make the other materials saturate.

The complexity of the geometry also needs to be



considered. With a variety of potential magnetic paths, parts of the magnetic circuit can be

bypassed and consequently become very difficult to demagnetise.

In some instances it is necessary to fully characterise the materials for their magnetic properties. This information can then be used to set the saturation field, and set the key points in the demagnetisation sequence.

Zeromag is one key tool that can be used for this process. Its fast reaction time and high current capability mean that demagnetisation can be accomplished quickly and efficiently. Please call to discuss your practical degauss issues.