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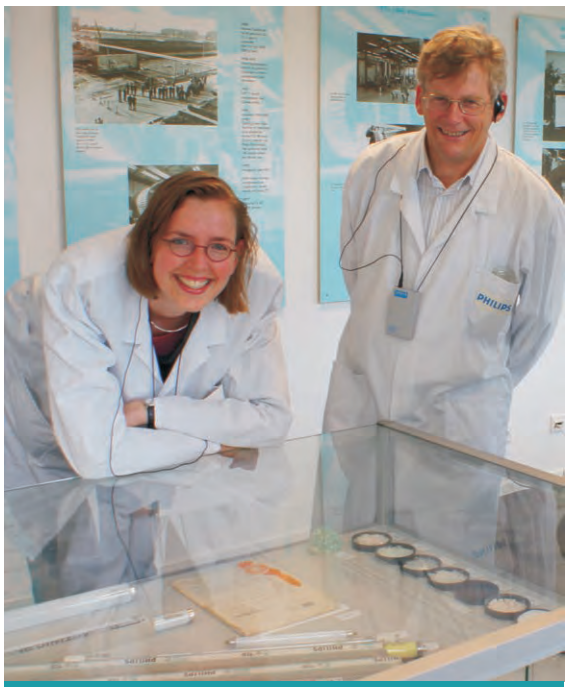
Not all lamps are the same

To the uninitiated one UV lamp for an electronic fly killer looks very much like any other. But scratch a little deeper and there is a whole world of cutting-edge technology behind the development and manufacturer of these products – as *Pest* editor, Frances McKim, discovered when she accepted an invitation to visit Philips Lighting at Roosendaal in the Netherlands.



From Philips Special Lighting, Dr Xaviera Reynhout (left) and Ad van den Brandt

Hosts for the visit were Ad van den Brandt, who has global responsibility for marketing in of the Health & Industry sector of Philips Special Lighting, along with his colleague Dr Xaviera Reynhout, who is in charge of European sales for this sector. Both are relatively new to this part of the Philips portfolio, so they are able to approach the pest control industry with two pairs of fresh eyes. So both were asked to expand on their views on challenges to the industry and what the future may hold.

"Cost always seems to be a factor which comes up time and time again when discussing the selection of lamps for use within an electronic fly killer," exclaims Ad van den Brandt. "But really it's quality and performance that should be considered and the benefits these bring. We need to encourage our distributors to sell these benefits to their customers."

Commenting on this, Dr Xaviera Reynhout said: "With high performance lamps there are savings in energy costs – the cost of making the lamp in the first place, of installing it in a customer's premises and then of running it. Each step offers a saving. If a customer, say in a food factory, can effectively use three lamps instead of four, in a large facility with maybe hundreds of lamps, the savings are substantial."

"Traditionally all those who service EFKs have it firmly in their mind that a UV tube needs changing each year due to the fall-off in UV-A output. Yet, with the advances incorporated within the Actinic Master range, this is no longer the case. Effective output can be offered for a two year period," explains Ad. "I'm delighted that, increasingly, there is a swing towards the measurement of light intensity levels. Some of the international food standards bodies, for example AIB, are working towards modifying their standards away from a compulsory annual change."

Philips has certainly embraced the environmental benefits this new technology can offer as is evident from the features now built into their lamps. And throughout the offices and within the factory, this 'green' message is very evident.

But, like all industries, the only thing that is certain is change. New regulations, such as the Restriction of Hazardous Substances (RoHS) have to be navigated. One of the most recent challenges has been the rocketing prices of the rare earth elements required as ingredients within the fluorescent phosphor coating. China controls 95% of their production and the price of elements such as terbium and europium have increased 1,000 fold over the last year. Manufacturers, but certainly not Philips, may well try to cut corners on their use, leading to poor performance warns Ad.

And for the future, Ad comments: "The use of UV light to control insects is both efficient and environmentally sound – so I predict this use is going to grow." Xaviera points out that compact lamps are becoming increasingly popular as they offer greater design possibilities, especially for use where they can be seen by the client's customers.

For the longer term LED lights seem a strong possibility, but at the moment they are expensive and do offer some technical challenges. "Maybe in ten years time they'll be here," quips Ad.

Who knows? But one thing is for certain – with the expertise, commitment and resources behind this company, Philips is bound to be at the forefront.

A Master Actinic BL lamp with its distinctive green end

PHILIPS

Fact file

Philips, or to give the organisation its full name, Royal Philips Electronics of the Netherlands is a diversified health and well-being company, focused on improving people's lives through timely innovations. It was founded in Eindhoven in 1891 by Gerard Philips and his father Frederik.

Headquartered in the Netherlands, Philips is a massive company, employing approximately 122,000 people in more than 60 countries worldwide with sales of EUR 23 billion in 2011.

The company is organised into three main divisions: Philips Consumer Lifestyle, Philips Healthcare and Philips Lighting. It holds 53,000 registered patents illustrating the innovative nature of the company and around 39,000 registered trademarks.

From glass tube to top quality lamp

In this series of pictures, the objective is to capture the essence of how a fluorescent lamp is manufactured. The process is very high tech, hot, noisy and yet spotlessly clean. This production line, one of six at Philips in Roosendaal, can manufacture 14 million tubes a year. Although tubes longer than those a pest controller would use are featured, the production process is exactly the same.

1

Manufactured in Poland, the pre-cut glass tubes are transported by lorry to Roosendaal

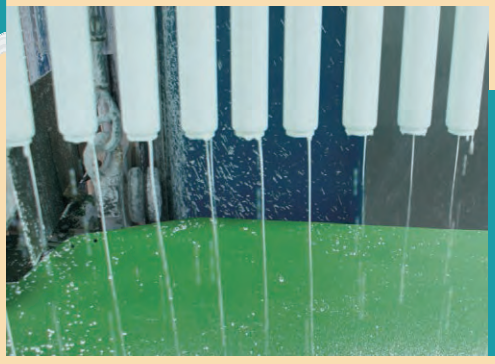
2

Unpacked, the tubes await the first step in their transformation. The 'shoulder' is visible on each tube

3

Once loaded, the tubes are first washed with de-mineralised water and then coated with the fluorescent phosphor powder applied as a water suspension

4



Exiting the coating machine, excess fluorescent phosphor coating is caught for recycling

5

The lamps move onwards towards the sintering machine

Quality is paramount

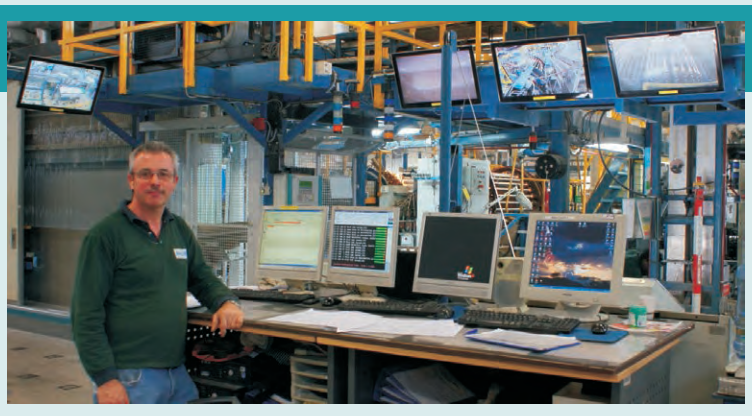
Throughout the manufacturing process, quality control is rigorous.

As the sequence of pictures on the right show:

1 The entire production line is computerised and every stage is monitored by CCTV.

2 Samples are taken from each batch manufactured for testing

3 A very expensive piece of kit. This spectro-photometer checks the tube for the correct wavelength of light



6

Next, the glass parts of the stem are melted together with the lead-in wires

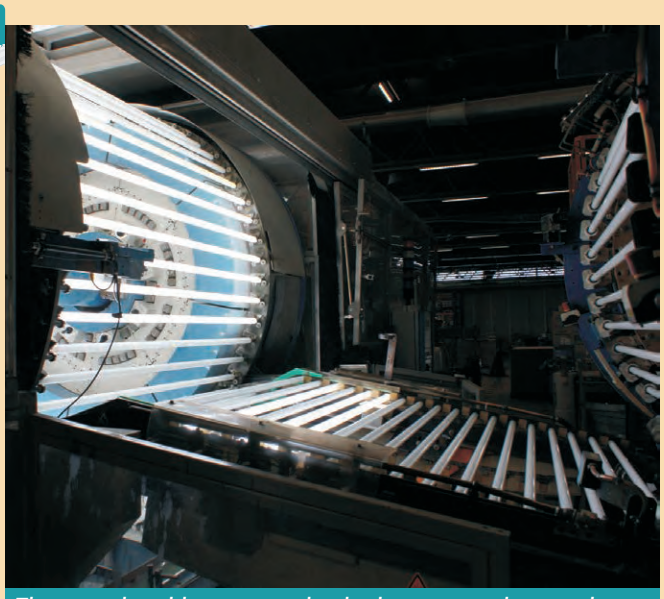
7

The sealing machine then melts the stems to the tubes in which the filaments are mounted

8

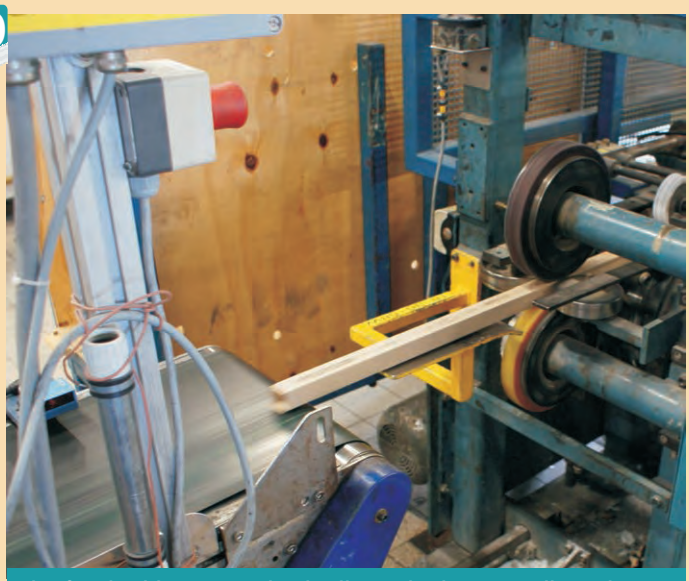
Having melted the stems to the tubes (right-hand machine) the left-hand machine vacuum pumps the tubes, activates the emitter on the filaments and fills the tube with the inert gas

9



The completed lamps are checked to ensure they work

10



The finished lamp is individually packed in a cardboard sleeve....

11

.... and loaded ready for despatch to the customer

How does a lamp work?

You can take things for granted. We quite happily live with fluorescent lights – or 'strip lights' as they are frequently called – but have you ever wondered how they are made and how they actually work? Then, bringing the subject back to pest control, is a lamp used in an electronic fly killer similar to the one in your kitchen?

In short, a fluorescent light is a minor miracle – or as one person described it – a mini nuclear explosion! And the answer to the second question is – a tube in an EFK works on exactly the same principle as one in your house – the only difference is the 'type' of light it produces.

The nuts and bolts

The largest and most obvious part of a tube light is the actual tube itself. Made of glass, they are manufactured and shaped into a long continuous strand and then cut to size – rather like a butcher making a string of sausages, each then cut into an individual sausage. The thickness and composition of the glass along with the diameter of the tube is a whole subject in itself – which we will not, at this stage, go into here.

So, having now got your tube of glass, the next stage is to coat the inside with a layer of fluorescent powder applied as a suspension – and, as you might expect with Philips, the liquid used is environmentally-friendly – water, rather than butyl, which is the norm for many of the other manufacturers.

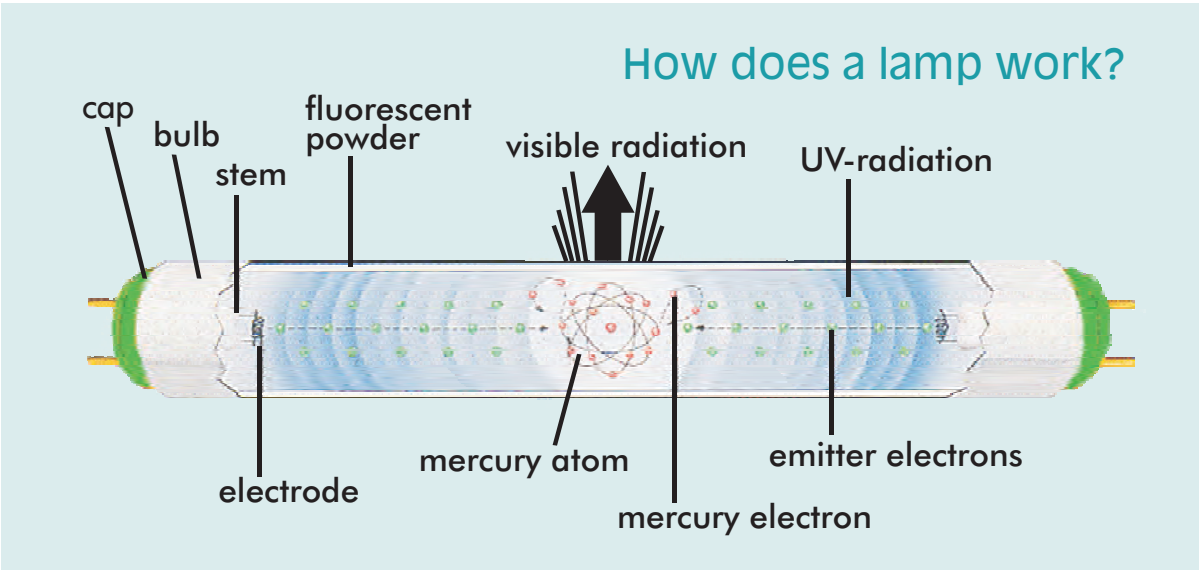
Surprisingly, the fluorescent phosphor coating is actually about the most expensive part of the entire lamp. It contains a selection of rare earth elements and it is these elements that convert the UV light produced into the visible light we can see. Then the colouring mixed with the coating gives the light the desired colour.

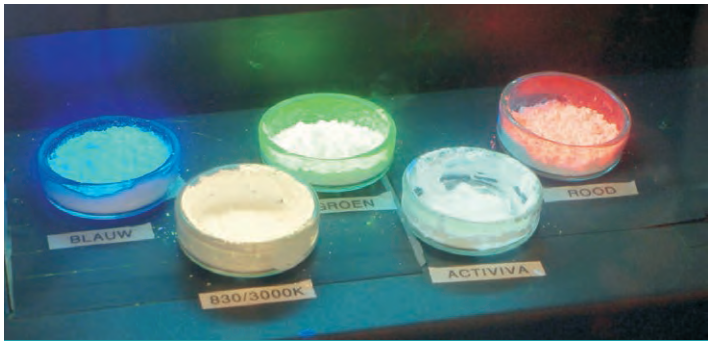
At each end of the tube a stem is added mounted on which is an electrode. This electrode holds the emitter – which helps liberate the electrons from the filament.

The lamp tube is then filled with inert noble gas (argon and neon) and mercury, which at room temperate is a liquid, but, once heated, evaporates to make a gas. It is this process that causes the start-up delay when you initially switch on a tube.

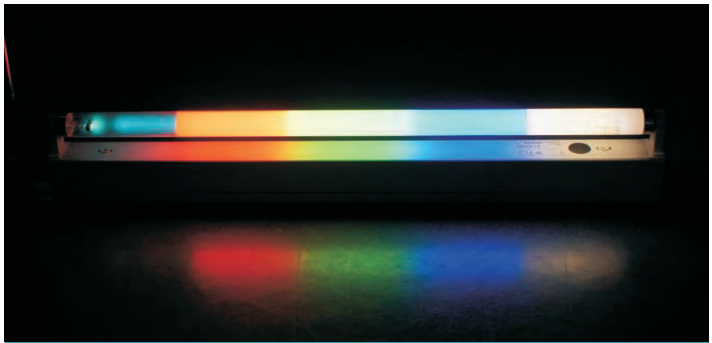
An electric current (provided by the external starter motor) is passed through the electrodes, these glow and give-off heat. Due to the potential difference between the electrodes the emitter begins to emit free electrons to the opposite electrode at the other end of the glass tube. These free electrons collide with the mercury electrons and the result is invisible ultraviolet radiation – your mini nuclear explosion. The layer of fluorescent powder applied to the inside of the tube converts the invisible ultraviolet radiation into visible light – the colour of which is determined by the coating of the tube.

So there you have it. Switching on a florescent tube may never be the same again!





A selection of the different fluorescent powders that can be applied to the phosphor coating



The fluorescent powders on the inside of the tube convert invisible ultraviolet radiation into coloured visible light

Philips lamps and the environment

asimpleswitch.com

Improving their environmental footprint is a core strategic objective for Philips. They estimate that globally, with the application of energy efficient lighting technologies, electricity savings of up to 40% can be achieved.

Key improvements introduced by Philips from an environmental perspective to their Actinic BL range include:

- Conversion from T12 (38mm diameter tube) to T8 (26mm diameter tube) – meaning a 50% reduction in glass used to produce the lamp and a 10% reduction in energy consumed;
- Elimination of lead in the fluorescent phosphor coating which is applied using water as the carrier;
- Reduction to the lowest level in the market in the quantity of mercury used within the lamp – up to 10 times lower than most competitors.

In addition to these, further developments employing all cutting edge new technology available in the florescent tube business are added. This creates the new Master, or Philips Long-life lamp product range. These include:

- A new phosphor coating which improves UV-A output over the tube's lifetime to such an extent- that UV-A tubes can be used for two years in the field;
- More constant UV-A output, making it possible to design units with less lamps but which have the same effectiveness in attracting flies. This saves both lamps and energy – so reducing the environmental footprint of the entire fly killer unit.

In short, these features mean that a Philips Master Actinic BL, also known as Long-life lamp, offers a highly efficient, long lasting and environmentally friendly lamp for your fly killer.

Philips lights the world

Philips is the largest manufacturer of lighting in the world. When you consider the number of applications there are for lighting, it is quite staggering – not just the humble domestic light bulb, but lighting for streets, offices, industry, theatres and medical applications, such as X-rays. A good example that you might not think of is cars. One out of every three cars globally is fitted with Philips bulbs!

Staggeringly, of all the electricity used worldwide, 19% is in lighting and of this 75% is accounted for by buildings and streets. So it is easy to see why work on energy-efficient lighting features so highly.

The pest control involvement, which readers will particularly be interested in, falls within the Philips Health & Industry sector of Special Lighting. In the fluorescent lamp market, Philips estimates its market share is above 35% in Europe and above 20% worldwide.