

Bringing new products to market through precision measurement

May 24 2016



Measurement expertise from the National Physical Laboratory (NPL)

has provided UK developer Arden Photonics with the confidence to launch a significant new product for the optical communications industry.

Optical fibres are the heart of modern communications, allowing information to be transmitted quickly and with high fidelity through pulses of light. Arden Photonics has recently developed a new high-magnification system for optical fibre manufacturers and users to measure the diameter of the fibre cladding - the layer of material surrounding the central core of a fibre.

The lower refractive index of the cladding material traps light within a fibre core through total internal reflection. Precise knowledge of the diameter of this cladding is of crucial importance to manufacturers, as it helps to ensure good performance when joining [optical fibres](#) together. However, cladding typically has a diameter of around 125 micrometres (μm) and the manufacturing tolerance required by industry has recently been reduced to $\pm 1 \mu\text{m}$, which demands calibration of the measurement equipment down to an accuracy of about $0.1 \mu\text{m}$ - this makes its precise measurement extremely challenging.

Having worked with NPL previously, Arden Photonics sought the expertise of the Optical Fibre team within the Electromagnetics Group, to verify its new measurement system could meet these exacting requirements. NPL provided Arden with measurements using [calibrated reference fibres](#), allowing the company to compare the new system's performance against those produced by NPL's well-established, high-precision microscope system.

The results confirmed that Arden's new measurement system was capable of meeting the strict tolerances required by the optical communications industry. David Robinson, Managing Director at Arden Photonics, said: "This work has allowed us to launch a significant new

product with great confidence that we can match or exceed the current [commercial] state-of-the-art in terms of optical fibre geometry.

"We also have a clear way forward mapped out so we can provide our future customers with [NPL-manufactured] calibration artefacts of their own. Our previous experience has shown us that it is a very attractive feature for companies all around the world to have artefacts with the NPL seal of approval."

NPL and Arden Photonics have worked together previously on a [laser measuring device](#), and are continuing to collaborate as part of a project to develop improved metrology for the photonics industry, funded by the European Metrology Programme for Innovation and Research (EMPIR).

Provided by National Physical Laboratory

Citation: Bringing new products to market through precision measurement (2016, May 24) retrieved 10 September 2024 from <https://phys.org/news/2016-05-products-precision.html>

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