



OPTICAL FIBER MEASUREMENT SPECIALISTS



Precision for
Next-
Generation
Hollow Core
Fiber

FGC-GH

Fiber Glass Geometry Measurement System

To meet the extreme characterisation requirements of intricate, small-diameter specialty fibers, the FGC-GH Fiber Geometry Measurement System is engineered to resolve the fine internal structures of complex fibers, such as Hollow Core Fiber (HCF).

At the heart of the FGC-GH is a state-of-the-art, ultra-high numerical aperture optical system paired with Arden's proprietary measurement algorithms. It delivers 50x magnification and a calibration factor of $0.07 \mu\text{m}$ per pixel, approximately three times the resolution, sharpness, precision, and repeatability of the FGC-GS when measuring smaller fibers. This makes it the definitive instrument for characterising the delicate structures of NANF and DNANF geometries, optimised for fibers ranging from $240 \mu\text{m}$ down to ultra-fine $40 \mu\text{m}$ diameters.

The FGC-GH inherits the flagship DNA of the FGC-GS, featuring NPL-Traceable Accuracy through in-house calibration via a golden-fiber artefact for absolute confidence. The system employs the latest software with plug-in architecture for standardised production alongside powerful manual tools for R&D.

This makes the FGC-GH the definitive instrument for characterising the delicate structures of small specialty fibers.



Designed to measure the intricate structures of hollow-core fibers



Plug-in architecture to rapidly standardise testing of tomorrow's fibers



Enhanced manual analysis tools for quick assessment of new fiber designs



User calibration with NPL-traceable artefact

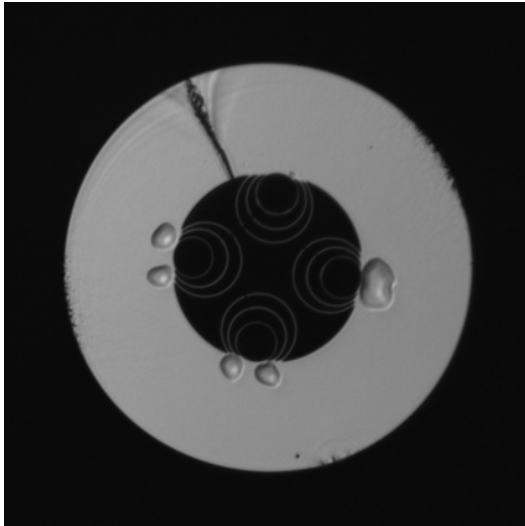
Arden Photonics Ltd
Royston House, 267 Cranmore Boulevard,
Shirley, Solihull, B90 4QT, UK
+44 (0) 121 733 7721

Arden Photonics, LLC
Central Florida Research Park, 3251
Progress Drive Suite 105, Orlando, FL 32826
+1 727 504 8748

www.ardenphotonics.com
enquiries@ardenphotonics.com

Extreme Precision, Resolution and Repeatability

Featuring a state-of-the-art, ultra-high numerical aperture (NA) and high-magnification objective lens, paired with Arden’s proprietary measurement algorithms, the FGC-GH delivers peak optical performance at 50x magnification and improved precision and repeatability when measuring smaller fibers.

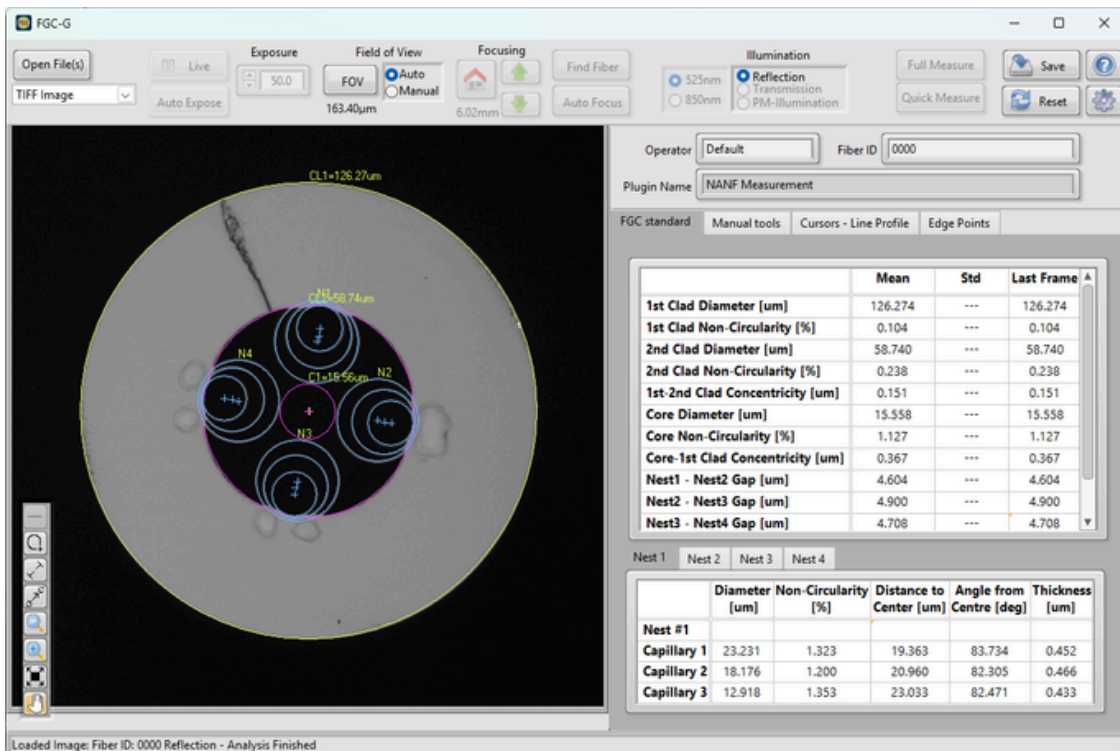


FGC-GS
125 µm NANF fiber



FGC-GH
125 µm NANF fiber

Optimised for Measuring Small and Complex Fibers - from 240 µm down to ultra-fine 40 µm.



The screenshot shows the FGC-G software interface with a fiber cross-section image on the left and a data table on the right. The data table includes the following information:

	Mean	Std	Last Frame
1st Clad Diameter [µm]	126.274	---	126.274
1st Clad Non-Circularity [%]	0.104	---	0.104
2nd Clad Diameter [µm]	58.740	---	58.740
2nd Clad Non-Circularity [%]	0.238	---	0.238
1st-2nd Clad Concentricity [µm]	0.151	---	0.151
Core Diameter [µm]	15.558	---	15.558
Core Non-Circularity [%]	1.127	---	1.127
Core-1st Clad Concentricity [µm]	0.367	---	0.367
Nest1 - Nest2 Gap [µm]	4.604	---	4.604
Nest2 - Nest3 Gap [µm]	4.900	---	4.900
Nest3 - Nest4 Gap [µm]	4.708	---	4.708

	Diameter [µm]	Non-Circularity [%]	Distance to Center [µm]	Angle from Centre [deg]	Thickness [µm]
Nest #1					
Capillary 1	23.231	1.323	19.363	83.734	0.452
Capillary 2	18.176	1.200	20.960	82.305	0.466
Capillary 3	12.918	1.353	23.033	82.471	0.433

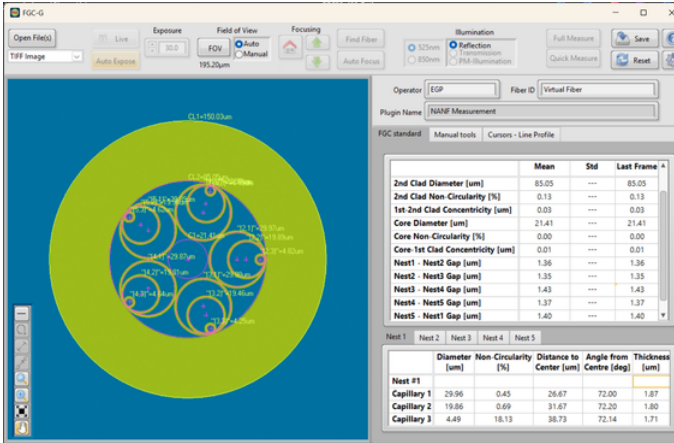


FGC-GH

Fiber Geometry System

Key Features and Technologies

Whilst optimised for measuring tiny fibers, the FGC-GH inherits the DNA of the FGC-GS:

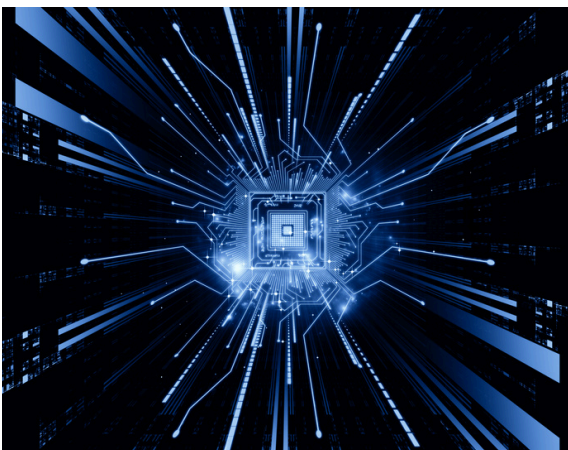


Software Plug-in Architecture

The FGC's innovative software plug-in architecture enables dedicated measurement for specific fiber types, optimising quality control and production routine. Currently, available plug-ins include: PM fibers, Single mode/Multi mode fibers, Active fibers, Multi-core fibers, and NANF fibers. We can customise plug-ins to rapidly standardise testing of tomorrow's fibers.

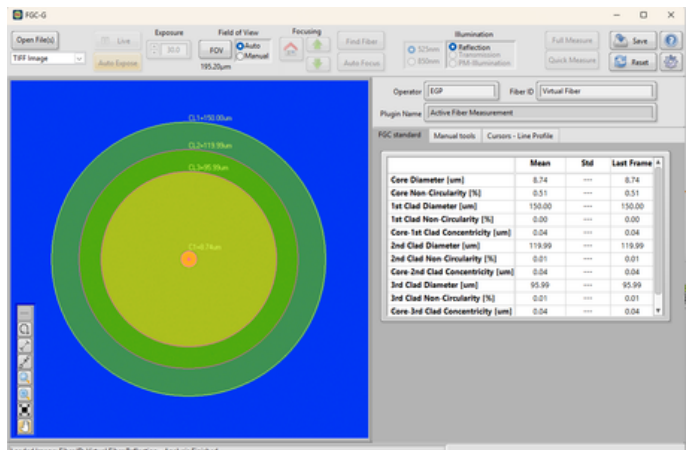
User calibration with NPL-traceable artefact

To maintain absolute calibration, users can perform in-house calibration using the FGC-FCD125 golden-fiber artefact, which is traceable to the National Physical Laboratory (NPL) in the United Kingdom, significantly reducing downtime and the need for on-site servicing.



Enhanced Optical System & Algorithm

The FGC's software and hardware have been redesigned for better measurement performance in a smaller footprint.

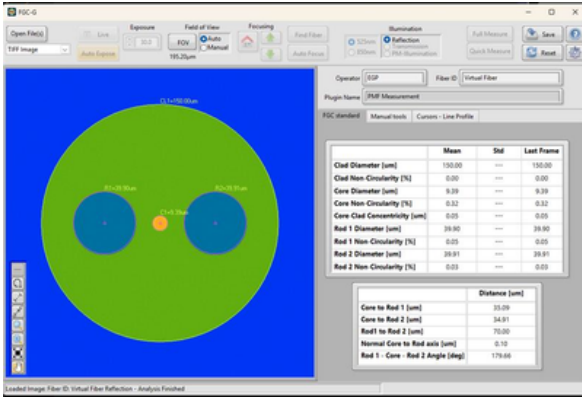


Improved Manual Analysis Tool & Reporting

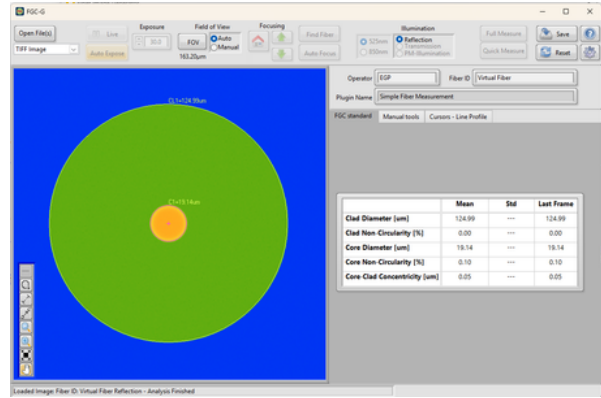
Improved manual analysis tools enable quick assessment of new fiber designs without setting up automated routines. All measurement data is easily stored for production feedback and quality assurance.

Optional Software Plug-ins

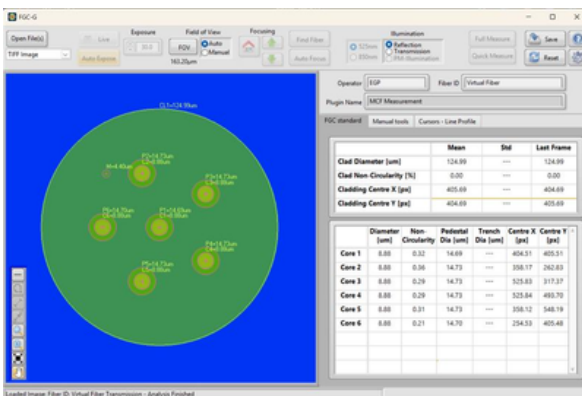
The optional plug-ins extend the functionalities of FGC-GH. Five optional plug-ins are currently available for measuring the geometry of key features of specialty fibers with cladding diameter 40 - 250 μm .



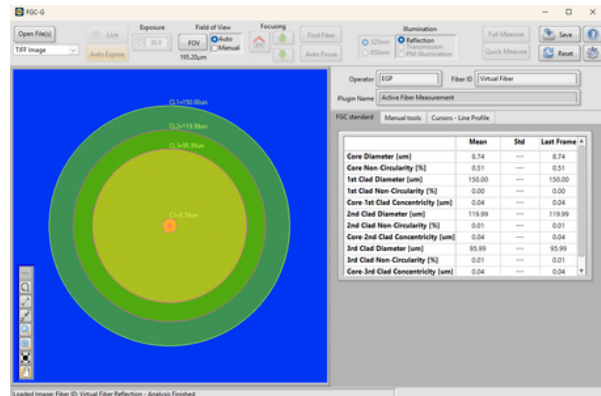
FGC-SPI01: Software plug-in for Panda-style PM Fibers (measuring stress rods, the diameters and non-circularity of cladding and core, core to rod distance)



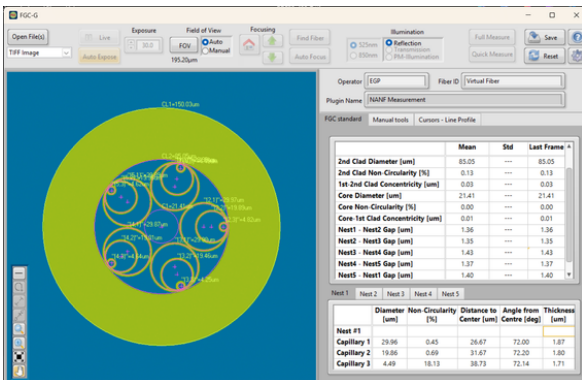
FGC-SPI02: Software plug-in for Single Mode Fibers and Multimode Fibers (measuring cladding and core diameters and their non-circularity)



FGC-SPI03: Software plug-in for Multi Core Fibers (measuring the diameter and non-circularity of cladding, core, pedestal and trench)



FGC-SPI04: Software plug-in for Active Fibers (measuring cladding diameters, non-circularity, core to cladding concentricity)



FGC-SPI05: Software plug-in for Nested Antiresonant Nodeless Fiber (NANF) (measuring the inner and outer claddings' diameter and non-circularity, tube's diameter and non-circularity, distance between lobes, and central core diameters)



FGC-GH

Fiber Geometry System

Technical Specification

Optical	FGC-GH
Field of View	Approx 330 μm
Fiber Illumination - Reflection	Darkfield illumination, 525 nm LED
Fiber Illumination - Transmission	High NA LED source, 525 nm

Repeatability*	Singlemode*	Multimode*	NANF Plug-in**
Core Diameter / Hollow Core Diameter	< 0.02 μm	< 0.08 μm	< 0.02 μm
Cladding Diameter	< 0.02 μm	< 0.02 μm	< 0.02 μm
Core Non-Circularity	< 0.5%	< 0.5%	< 0.5%
Cladding Non-Circularity	< 0.02%	< 0.02%	< 0.02%

Measurement Capability	
Measurement Time (standard)	< 20 seconds (excluding fiber preparation)
Measurement time (image optimisation)	< 90 seconds (excluding fiber preparation)
Fiber Diameter	Single fibers up to 250 μm
Specialty Fibers	Dual clad, Non-circular, Octagonal, PM, Capillary, Multicore, NANF / DANF etc.

Physical	
Weight	9kg (with carry case 33kg)
Size of FGC unit	0.3 x 0.45 x 0.15 m
Total Footprint (incl. fiber handling bench)	0.3 x 0.7 x 0.15 m
Operating Temp	10 - 30°C
Computer Requirements	All FGC systems are supplied with a computer running up-to-date Windows OS
Data Interface	1 x USB 3.0 (USB B to USB A: 1m cable supplied)

* Repeatability is measured on the FGC-GH using a single 125 μm fiber without removing it from the unit at 22°C, the repeatability specifications are only applicable to OM1, OM2 and singlemode fibers.

** Repeatability is measured on the FGC-GH using a single 240 μm fiber without removing it from the unit.



FGC-GS

Fiber Geometry System

Ordering Information

Part number	Description
FGC-GH	FGC-GH Fiber Glass Geometry System for measurement of optical fibers with diameters up to 250 μm . Including single wavelength optical unit and the following accessories, FGC-FHB - Fiber handling bench, FG-H-250 - Pair of Arden holders with 250 μm V-groove, FG-FTK-250 - Fiber samples, FGC-CK - cable kit, FGC-SFT - software package, APL-PC - desktop computer, FGC-CC - shipping case, FGC-ILL-525 - 525 nm illumination system

Holders	Description
FGC-FCD125	Fiber cladding diameter measurement artefact placed in a retractable holder, and supplied with carry case. Allows the use of a single measured and maintained fiber cleave for calibration and verification of FGC performance. Fiber diameter and circularity is measured by NPL and supplied with a measurement certificate
FG-FTK-250	FGC fiber samples, 250 μm diameter, for checking FGC alignment and calibration
FG-H-080	Pair of Arden FGC fiber holders with 80 μm V-groove, suitable for 80 μm diameter coated fiber
FG-H-125	Pair of Arden FGC fiber holders with 125 μm V-groove, suitable for 125 μm diameter coated fiber
FG-H-200	Pair of Arden FGC fiber holders with 200 μm V-groove, suitable for 200 μm diameter coated fiber
FG-H-250	Pair of Arden FGC fiber holders with 250 μm V-groove, suitable for 250 μm diameter coated fiber
FG-H-400	Pair of Arden FGC fiber holders with 400 μm V-groove, suitable for 400 μm diameter coated fiber
FG-H-500	Pair of Arden FGC fiber holders with 500 μm V-groove, suitable for 500 μm diameter coated fiber
FG-H-600	Pair of Arden FGC fiber holders with 600 μm V-groove, suitable for 600 μm diameter coated fiber
FG-H-800	Pair of Arden FGC fiber holders with 800 μm V-groove, suitable for 800 μm diameter coated fiber
FG-HL-125	Pair of long Arden FGC fiber holders with 125 μm V-groove
FG-HL-080	Pair of long Arden FGC fiber holders with 80 μm V-groove

Software Plug-ins	Description
FGC-SPI01	FGC Software Plugin for measurement of geometry of Panda-style PM Fibers
FGC-SPI02	FGC Software Plugin for measurement of geometry of Single Mode Fibers and Multimode Fibers
FGC-SPI03	FGC Software Plugin for measurement of geometry of Multi Core Fibers
FGC-SPI04	FGC Software Plugin for measurement of geometry of Active Fibers
FGC-SPI05	FGC Software Plugin for measurement of geometry of Nested Antiresonant Nodeless Fiber (NANF)

Other Accessories	Description
FGC-GUEW3	FGC-Glass geometry system, extended warranty covering parts and labour for 3 years from purchase, return to base.
FGC-GUEW5	FGC-Glass geometry system, extended warranty covering parts and labour for 5 years from purchase, return to base.
FGC-PMI-525	PM illuminator, 525 nm, for measuring dimensions of 125 and 80 μm diameter PANDA fibers.
FGC-UCS1	FGC on-site service visit. Includes calibration of FGC and issue of calibration certificate. Travel and subsistence will be charged separately

For North American sales enquiries, call +1 727 504 8748 or email us on sales@ardenphotonics.com

For Rest of World sales enquiries, call +44 (0)121 733 7721 or email us on sales@ardenphotonics.com

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Manufactured by
Arden Photonics Ltd
Royston House, 267 Cranmore Boulevard,
Shirley, Solihull, B90 4QT, UK
+44 (0) 121 733 7721

Arden Photonics, LLC
Central Florida Research Park, 3251
Progress Drive Suite 105, Orlando, FL 32826
+1 727 504 8748

www.ardenphotonics.com
enquiries@ardenphotonics.com