



Precision Reference Materials for
Precision Fiber Optic Measurements

PDL Calibration Artifact

PDL calibration artifact

The series PPLS PDL Calibration Artifact is a compact in-line device that possesses a fixed amount of polarization dependent loss (PDL). The nominal amount of PDL can be specified from 0.05 to 2.0 dB during ordering. Once the device is assembled, its PDL is measured using the Mueller Matrix method, according to the IEC-61300-3-12 specification and/or the All States method according to the TIA/EIA-455-157 standard.



The PPLS features a sealed package and a low PDL temperature dependence. The primary application of the PPLS is its use as a calibration artifact when making PDL measurements. The flat wavelength PDL response, low temperature dependence, and the certification make this device the ideal choice for verifying the accuracy of PDL measurements. Additional applications include simulation of PDL in optical networks, and testing PMD compensators in the presence of PDL. The PPLS is available with FC/UPC and SC/UPC 1 meter long terminated pigtails. Other cable lengths and connector types are available with longer lead times. The PPLS is shipped with a calibration certificate (1 year expiration).

THE SERIES
PPLS PDL CALIBRATION
ARTIFACT IS USED AS
A VERIFICATION TOOL
WHEN MAKING PDL
MEASUREMENTS.

features

user selectable fixed PDL (0.05 - 2.0 dB)
calibration certificate provided for "s" and "h" versions
"h" version is calibrated at FTTx wavelengths
low PDL temperature dependence
flat wavelength response

applications

calibration of PDL measurement instruments
verification of PDL measurements
simulation of PDL

Operating Principle

The PPLS uses a tilted glass plate to generate Polarization Dependent Loss. When light impinges on a glass plate which positioned at an angle, the horizontal and vertical polarized elements of the light are transmitted at different relative efficiencies. This is how PDL is generated. The amount of PDL produced can be varied by changing the tilt angle of the glass plate.

Design and Assembly

The PPLS was designed to provide wavelength flatness, maximum thermal and temporal stability, and maximum ease of use. To this end low thermal expansion materials are used in the packaging and the device is thermally cycled after assembly. The PPLS is shipped in a rugged, compact and stylish case that can be stored on a bookshelf.

Traceability

The measurement system that the PPLS is calibrated with has been certified under the NIST Measurement Assurance Program. Additional traceability certification is available through a program from the National Physical Laboratory in the United Kingdom.

Measurement Procedure

For artifacts with a 0.20 dB PDL nominal values or less, the Mueller Matrix method is used for calibration according to the International Electrotechnical Consortium standard IEC-61300-3-12. For artifacts with a 0.25 dB PDL nominal value or more, the All States method is used for calibration according to the Telecommunications Industry Association procedure TIA/EIA-455-157.

Calibration Certificate

Each artifact is shipped with a calibration certificate that is valid for 1 year. The calibration certificate details the PDL measurement values given and describes the measurement procedure that is used. In addition, an uncertainty analysis is provided.

Support

Top-level technical and application support is provided before and after a device is purchased by phone and/or email.



There are several different ways in which the PPLS can be used to improve PDL measurement accuracy and repeatability as part of a quality control process. For a single PDL measurement instrument or system, the PPLS is used periodically to verify that the systems measurements are consistent. For example, an operator might make verification measurements each morning. Also, when a new system is delivered and brought on-line, a series of tests with one or more PPLS devices can be performed.

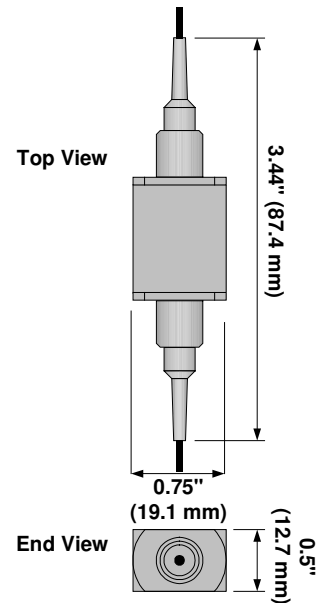
In facilities where there are more than one measurement systems, tests can be performed with the same PPLS on multiple systems. This way, system to system variations in PDL measurements can be quantified. This procedure would especially be useful for measurement systems from different manufacturers.

Another way that the PDL calibration artifact can be used is to help resolve measurement discrepancies between a vendor and a client and/or between the measurement system manufacturer and the end user. If PDL measurement results don't agree among the parties, one or multiple PDL artifacts can be measured by all parties involved to help discover where the discrepancy is.

specifications



Insertion Loss Typical Maximum	0.8 dB 1.2 dB	
Back Reflection	60 dB	
Wavelength Range	1310 - 1700 nm	
PDL Wavelength Flatness 1520 - 1570 nm 1450 - 1700 nm	0.05 - 0.25 dB nominal PDL ± 0.005 dB ± 0.01 dB	0.30 - 2.0 dB nominal PDL ± 0.007 dB ± 0.02
Max. PDL Deviation from Nominal 1520 - 1570 nm 1450 - 1700 nm	0.05 - 0.45 dB nominal PDL ± 0.02 dB ± 0.03 dB	1.0 - 2.0 dB nominal PDL ± 0.03 dB ± 0.05 dB
PDL Temperature Dependence	0.0003 dB/°C	
Measured PDL Accuracy 1520 - 1570 nm ("S" version only)	0.05 - 0.45 dB nominal PDL ± 0.005 dB	1.0 - 2.0 dB nominal PDL ± 0.01 dB
Polarization Mode Dispersion	0 ps	



ordering information

PPLS — □ — □ □ — □ □

Certification —

N - Nominal PDL value provided
S - PDL spectrum measured with a narrowband source (1520 - 1570) nm

Nominal PDL Value —

05 - 0.05 dB	30 - 0.30 dB	100 - 1.0 dB
10 - 0.10 dB	35 - 0.35 dB	200 - 2.0 dB
15 - 0.15 dB	40 - 0.40 dB	
20 - 0.20 dB	45 - 0.45 dB	
25 - 0.25 dB		

Pigtail Connector Type —

FC - FC Type SC - SC Type

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