DMOptics

How to choose an Optical Detector

Written by Bruce Roberson and Brian Crook 97-03.Revised June 2007 © Kingfisher International

Introduction

The correct detector for a loss and power measurements on fiber systems will generally be as follows:

Choose an **InGaAs** (Indium Gallium Arsenide) detector for:

- General & Precision measurements over 850 - 1650 nm (Kingfisher "new technology" B series InGaAs detectors) up to +5 dBm.
- General & Precision measurements over 1000 - 1650 nm (other InGaAs detectors) up to +5 dBm.
- CWDM or DWDM bands up to +5 dBm.

Choose a **Ge** (Germanium) detector for:

- Modest accuracy over 850 -1550 nm up to +10 dBm.

Don't choose a **Ge** (Germanium) detector for:

- Work on WDM systems above 1550 nm, despite attempts by some competitors to say otherwise. If in any doubt, just look at the graph below. Calibration constants vary by about 2 dB between 1550 and 1625 nm, and are also very temperature sensitive.
- 1550 nm systems if cold temperatures are expected.
- Precision or laboratory grade accuracy. Ge is inherently non-linear by about 0.04 dB and has some temperature sensitivity.

DMOptics

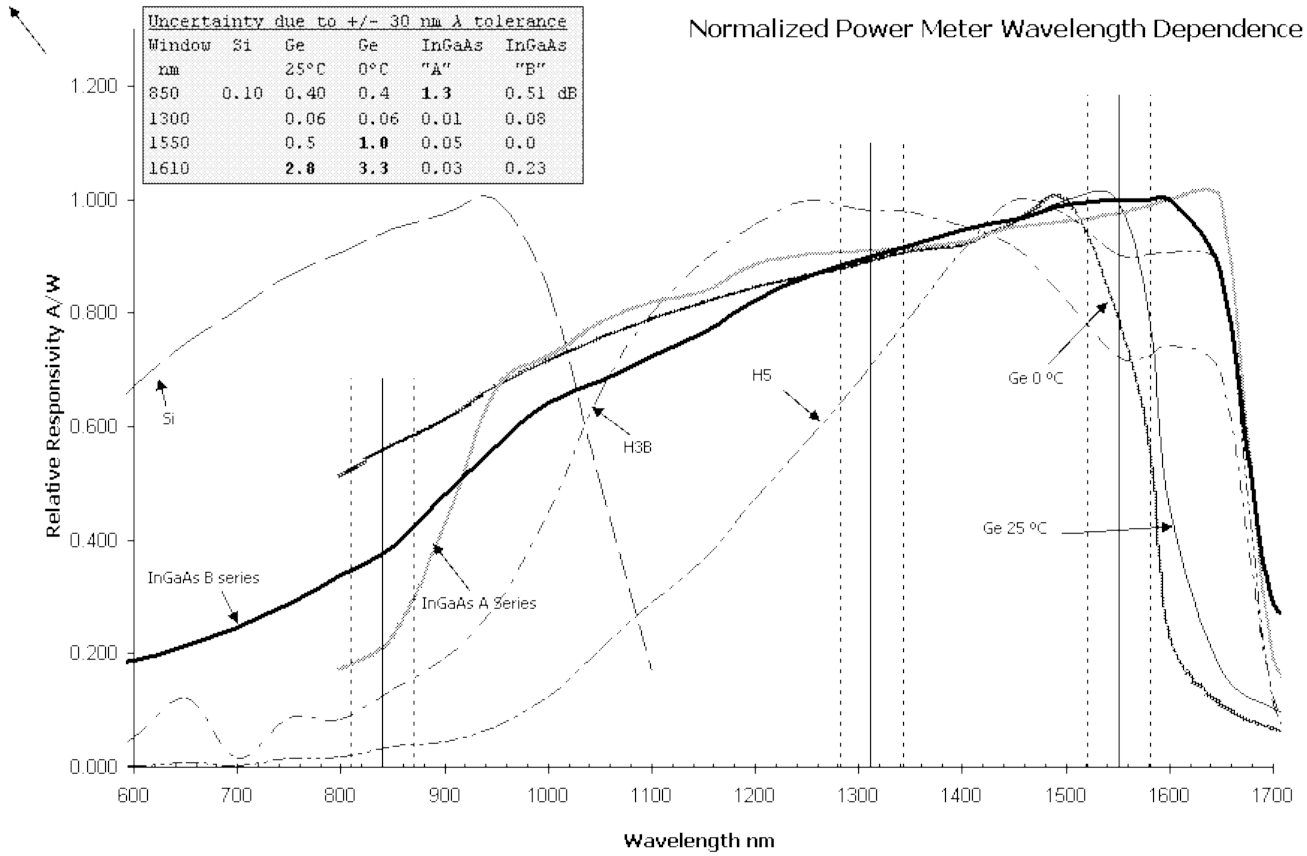
Choose an **H Series** (Attenuated Indium Gallium Arsenide) detector for:

- High power Measurements. These detectors are more expensive and have slightly lower accuracy than normal InGaAs detectors, so only specify them if actually required. **H3B** detectors are for very high power operation up to +27 dBm, and **H5** detectors are for up to +15 dBm.

Choose an **Si** (Silicon) detector for:

- Precision measurement at 600 - 1000 nm up to 0 dBm

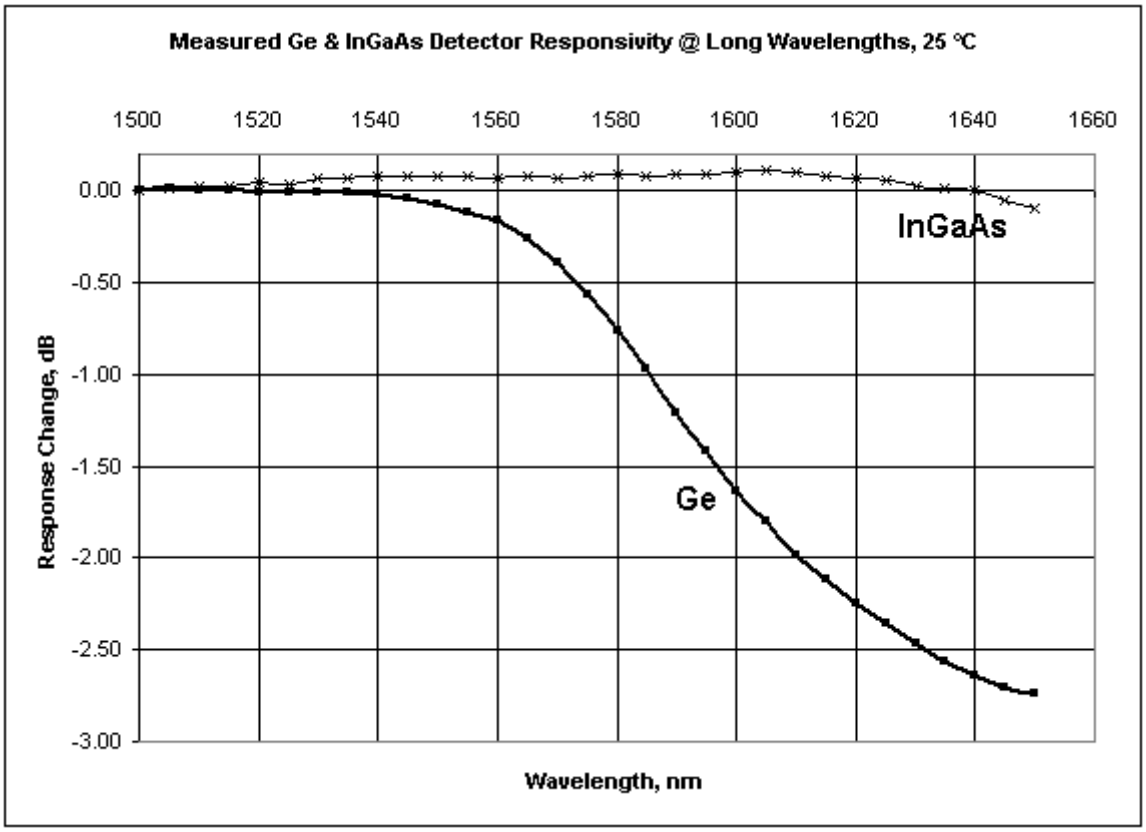
Wavelength Dependence



Slade House Slade Lane, Lympsham, BS24 0DP, United Kingdom
Tel:+44 (0)1934 750655 Fax:+44 (0)1934 750754 sales@dmoptics.co.uk

DMOptics

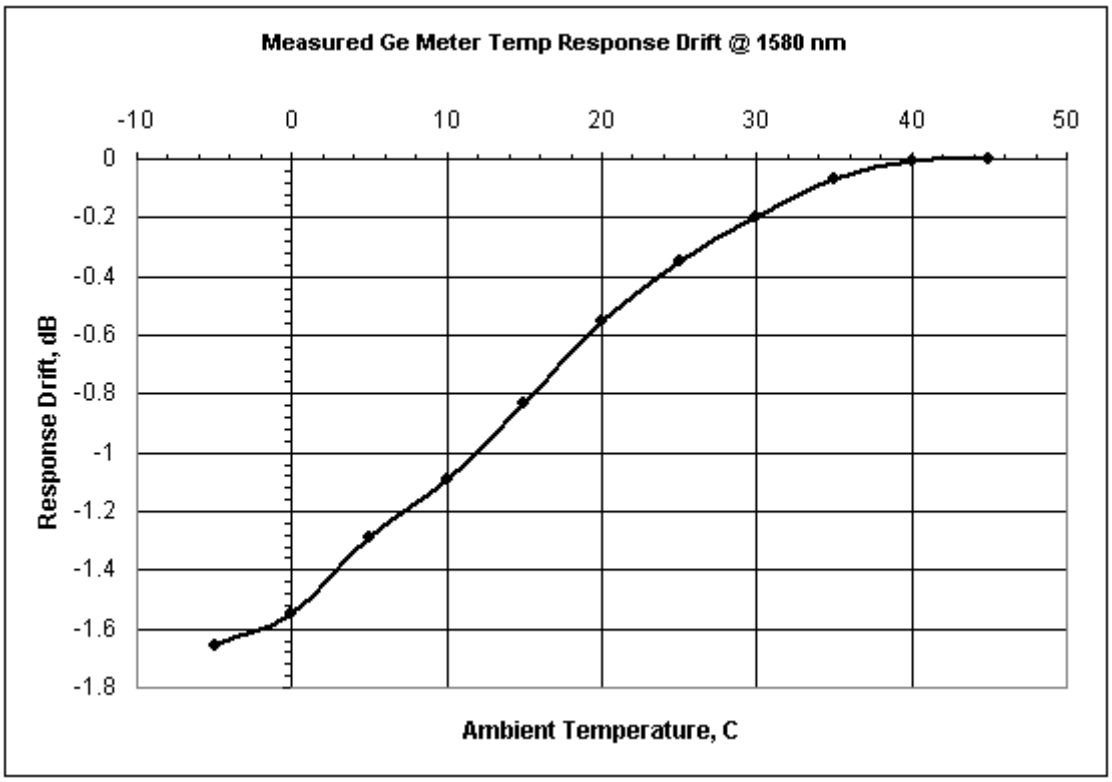
Detector responsivity graphs @ long wavelengths



The above graph shows the room temperature response of power meters with Ge & InGaAs detectors as the wavelength is changed beyond 1500 nm. The Ge meter is unsuitable for work on CWDM and DWDM systems above 1550 nm, the InGaAs meter is obviously a much better choice, since it is very stable. This graph uses real measurement data.

Slade House Slade Lane, Lympsham, BS24 0DP, United Kingdom
Tel:+44 (0)1934 750655 Fax:+44 (0)1934 750754 sales@dmoptics.co.uk

DMOptics



The above graph shows how the 1580 nm thermal response of a power meter with a Ge detector changes with temperature. This instability makes Ge power meters basically unsuitable for field work on CWDM and DWDM systems above 1550 nm. The thermal stability below 1550 nm is much better, around 0.2 dB, however it's never as good as InGaAs. This graph uses real measurement data.

	The new Kingfisher KI 9600A-InGaAs Shirt-Pocket Fiber Meter is a simple and reliable power meter recommended for testing fiber optic systems from 650 - 1650 nm at up to +5 dBm and 200u core diameter. This instrument features a high accuracy extended range InGaAs detector, with good accuracy in the commonly used 850 nm band.

Slade House Slade Lane, Lympsham, BS24 0DP, United Kingdom
Tel:+44 (0)1934 750655 Fax:+44 (0)1934 750754 sales@dmoptics.co.uk