

# Ultra-compact PEBBLE NIR spectrometer with high stability



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p h o t o n i c s

# Ibsen is a manufacturer of OEM spectrometers for integration into spectroscopic instruments

## 3 main reasons to choose Ibsen



Transmission grating

## How it impact consistency

High **efficiency**  
High **stability**  
Enable **compact** design

## Annual output

**+40k** a year



Spectrometer design

**+200 years** combined tenure in design team  
**Environmentally robust** design  
**Thermally stable** optomechanics  
Designed for **volume production**

**+6** designs annually



Spectrometer production

Low **unit-to-unit** variation by design enables good transferability  
**100% inspection** of all units

**+8.5k** a year



## New product: PEBBLE NIR key features

- 950 – 1700 nm
- Numerical aperture 0.22
- 12 nm resolution
- Uncooled InGaAs detector array with 128 pixels
- Footprint of 23 x 21 x 8 mm
- 3 kHz frame rate



# New product: PEBBLE NIR

- ▣ Benefits
  - ▣ Compact size
  - ▣ High sensitivity
  - ▣ High frame rate
  - ▣ Environmental stability
  - ▣ Low unit-to-unit variation



# The key challenges in process and handheld NIR are stability and transferability

## ■ Stability:

- Performance should be maintained when the unit is exposed to temperature changes, vibrations and shock
- For the spectrometer environmental variation often lead to mechanical displacements of optical components

## ■ Transferability

- The instrument software (chemometrics) model should provide the same result for the same sample measured with different instruments
- For the spectrometer this often translates to low unit-to-unit variation for resolution and peak shape

# Why PEBBLE NIR is the best compact spectral sensor on the market

- ▣ Stability:
  - ▣ PEBBLE NIR uses no moving parts
  - ▣ PEBBLE NIR uses transmission optics which guarantees better stability than reflective optics
  - ▣ PEBBLE NIR is based on a proven, rugged opto-mechanical design
- ▣ Transferability
  - ▣ PEBBLE NIR provides low unit-to-unit variation by design
    - Low variation on resolution due to tolerance tolerant design
    - 100% inspection against PASS/FAIL criteria for key parameters
    - Symmetrical and consistent peak shapes due to lens-based design