



The DIAS™ is an innovative instrument designed to measure the DOI (Distinctness of Image) of media and prints. As digital printing becomes more mainstream in the photography market, DOI is recognized as an important attribute that often influences the customer's perception of "photo-quality." The DIAS™ measures DOI using an innovative edge-projection technology, wherein reflection sharpness data indicating image clarity is collected, analyzed, and reported within seconds. This information is critical to quantifying ink and media quality for quality control and R&D applications.

**Overview**

DOI is the sharpness and clarity of an image reflected from a print or media surface as illustrated in the example shown in Figure 1. In this example, the reflection of a window blind and a potted plant is observed on two inkjet-printed media placed by a windowsill. As shown, the reflection in Print A is sharp and clear, indicative of a high DOI surface; whereas the reflection in Print B is blurry and fuzzy, indicative of a low DOI surface. Such clarity of reflection is an attribute associated with the "finish" of a photograph, which in combination with other attributes such as color and gloss, determine a customer's overall perception of "photo-quality."

Many digital prints have poor DOI, resulting in customers not accepting them as "real" photographs. Being able to quantify DOI is therefore one of the key factors in improving DOI and customer acceptance of digital photographs.

The DIAS™ is a hand-held instrument designed to quantify DOI conveniently, objectively, and reproducibly. It is typically used as a standalone instrument; but data and images can also be transferred to a PC via a USB interface. The DIAS™ simulates our visual experience of DOI by projecting a sharp edge onto the sample-under-test and captures the reflection by means of a high-resolution CCD camera built into the instrument. Examples of the reflections captured from a high and a low DOI sample respectively are illustrated in Figure 2. The DIAS™ computes DOI in terms of sharpness and blurriness of the edge in these reflections using the built-in image analysis software.

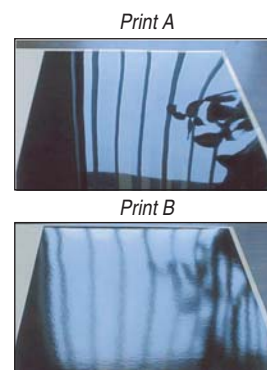


Figure 1. Illustration of high (A) and low (B) DOI

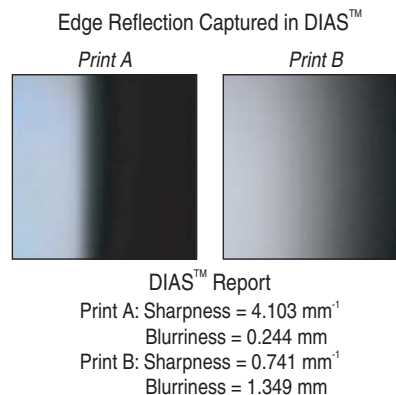


Figure 2. Reflection of a sharp edge projection on a high (A) and low (B) DOI sample

**DOI Measurements**

- Blurriness (mm)
- Sharpness (mm<sup>-1</sup>)
- Peak (% per mm)
- Maximum reflectance (%)

**QEA IAS® Product Family for Print Quality Evaluation**

<b>Personal IAS</b>	Portable image analysis system
<b>Spectro<sub>photometer</sub> Kit</b>	Portable Pocket PC-based spectrophotometer
<b>DIAS</b>	Portable DOI analysis system
<b>Scanner IAS</b>	Scanner-based image analysis system
<b>IAS-1000</b>	Automated camera-based image analysis



**Quality Engineering Associates, Inc.**

755 Middlesex Turnpike, Unit 3, Billerica, Massachusetts 01821 USA

Tel: (978) 528-2034 Fax: (978) 528-2033 Email: info@qea.com URL: www.qea.com

# System Specifications\*

## Functional Data

<b>Description</b>	Portable distinctness of image (DOI) measurement device. DOI determined from an edge spread function and reported as blurriness and sharpness
<b>DOI Measurement</b>	Blurriness (mm) Sharpness ( $\text{mm}^{-1}$ ) Peak (% per mm) Maximum reflectance (%)
<b>Software Features</b>	Numerical data display Running statistics and data logging Live video DOI display Graphical display of edge spread function Image and profile saving
<b>Data Storage &amp; Handling</b>	PC-compatible files of raw data and analyzed results (as text files from data logging or individual data saving) ActiveSync file transfer with laptop or PC

## Technical Specifications

<b>Sensor</b>	Color CCD
<b>Resolution</b>	5 $\mu\text{m}$ per pixel
<b>Aperture Size</b>	2.4mm $\times$ 2.4mm
<b>Blurriness Repeatability</b>	$\pm 3\%$ <sup>†</sup>
<b>Blurriness Reproducibility</b>	$\pm 5\%$ <sup>†</sup>
<b>Blurriness Range</b>	0.06 ~ 2.5mm
<b>Calibration</b>	Factory calibrated
<b>Measuring Time</b>	2 seconds (user selectable)

## Physical Specifications

<b>Display</b>	Hyper amorphous silicon TFT color LCD (320 $\times$ 240)
<b>Accessories</b>	Hard-sided carrying case AC power adapter Measurement platform Reference sample USB cable User's manual Backup software
<b>Power Requirements</b>	Rechargeable battery AC power adapter included
<b>Instrument Size</b>	263.5mm (L) $\times$ 95.3mm (W) $\times$ 57.2mm (H) [10.4" (L) $\times$ 3.75" (W) $\times$ 2.25" (H)]
<b>Instrument Weight</b>	870gm [1 lb 15 oz]
<b>Shipping Size and Weight</b>	460cm (L) $\times$ 38cm (W) $\times$ 23cm (H) [18" (L) $\times$ 15" (W) $\times$ 9" (H)] 3.6kg [8 lbs]

\*Specifications subject to change without notice Rev. 2.3 12/05  
<sup>†</sup>Performance data was taken by DIAS<sup>TM</sup> using 4th setting of the measurement time.