IRIS Visual Analyzer
Data sheet

IRIS system is composed of two elements:

▪ The IRIS cabinet housing the lighting camera for picture acquisition under controlled conditions

▪ A computer (provided by Alpha MOS) for system monitoring, data acquisition and processing with AlphaSoft software
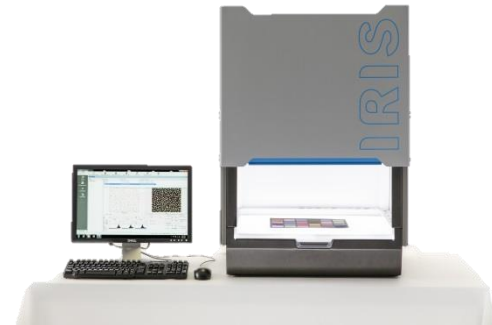
Hardware

Closable light cabinet

▪ Large measurement surface (270 x 390 mm)
▪ Lighting conditions
  ✓ LED (Light Emitting Diodes) : with dual lighting system (top and/or bottom lighting)
  ✓ Lifetime > 40 000h
  ✓ Very fast starting time (5 min)
  ✓ Highly reproducible
  ✓ Back-lighting to avoid shadow effect
▪ Removable tray diffusing a uniform light (white or black - 420x560mm)
▪ Ability to exchange the base plate and choose the lighting

Imaging

▪ Camera
  ✓ Embedded in the cabin for better protection
  ✓ CMOS technology : 5 mega pixels
  ✓ Precise tunable camera 16M colours settings available from soft: software controlled zoom
  ✓ Resolution 2588 x 1942
  ✓ Conformity: CE, FCC, IP30, RoHS, PoE (802.3af), UL, GigE Vision, GeniCam
▪ Lens
  ✓ Fixed focal (high reproducibility & robustness)
  ✓ Low geometrical distortion (lower than 0.5%)
  ✓ Manual focus and diaphragm aperture
  ✓ Several models available with focal length ranging from 4 mm to 25 mm (5mm in standard), depending on the minimum size to be detected and the amount of sample to be analyzed.

Lens	5 mm (standard)	4 mm	6 mm	8 mm	12 mm	16 mm	25 mm
Calibration scale	Standard	Standard	Standard	Standard	Passeport	Passeport	Passeport
Window size (cm)	45 x 34	54 x 40	36 x 27	27 x 20	18 x 13	14 x 10	9 x 7
Pixels/mm	5.8	4.8	7.2	9.6	14.6	18.6	29.8
Pixels/mm^2	38	23	52	92	213	346	886
Pixel size (µm)	174	208	139	104	68	54	34

- Colour calibration : computer-monitored calibration for reproducible measurement conditions
  - ✓ Certified colour checker 24 colours. The calibration is done either on a standard calibration checker (4 mm to 8 mm) or on a passport-size checker (12 mm to 25 mm)
  - ✓ White balance
  - ✓ High calibration reproducibility (standard deviation <5 on averaged 24 colour distances)

AlphaSoft Software

Compatible with Windows® 7. This software controls and monitors the instrument and includes a full chemometrics package for data processing.

- Instrument monitoring
- Method and analytical parameters settings
- Colour calibration
- Picture acquisition
- Set a threshold in order to suppress irrelevant information according to various colour models (RGB, HSV & Lab)
- Display RGB & Lab values for each colour and process data with RGB codes
- Define the minimum value of a colour spectrum for display and for data treatment
- Display objects into coloured circles regardless of the shape of objects in order to assess the quantity or the positioning of one ingredient (primitive function)
- Analyze shape descriptors such as:
  - ✓ Circularity (from 0 to 1; 1 corresponding to a perfect circle)
  - ✓ Area (in pixel)
  - ✓ Length and width (in pixels)
  - ✓ Aspect ratio: ratio of the major/ minor axis of the object (ellipse shape)
  - ✓ Hu moment (7 values) : parameter to measure the similarity of outlines of two objects whatever their size
- Data processing: create a library with visual data
  - ✓ Extract proportion or area of each colour for global picture or each object of the picture
  - ✓ Evaluation of shape descriptors of each object
  - ✓ Automatic removal of background (threshold)
- Multivariate statistical approach with colour, colour primitive or shape parameters: combined use of colour and shape parameters for product assessment
  - ✓ Colour distribution and colour primitive proportion
  - ✓ Conformity analysis with SQC (Statistical Quality Control) for on-line, off-line control
  - ✓ Correlation and selection of variable (shape and /or colour/primitive) linked to visual palatability (consumer preference) using Partial Least Square model
  - ✓ Analysis of product differences using Principal Component Analysis, and statistical models : HCA (Hierarchical Cluster Analysis), Discriminant Factorial Analysis to assess if the differences are linked to shapes , colour distribution of combination of both

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