JURA

Ultra High Quality Plate and Print Inspection System (QPPIS)

Quality *and* Trust

Ultra High Quality Plate and Print Inspection System (QPPIS)

'3D quality control
system for security printing'

Contents

INTRODUCTION

Corresponding with today's newest technologies, Jura developed a quality control system called Ultra High Quality Plate and Print Inspection System (QPPIS).

QPPIS is a combination of a unique software application and an ultra-high accuracy measuring device, providing the possibility of 3D checking and analyzing the intaglio and dry offset plates, with ultra-high resolution 3D scanning and enhanced 2D scanning.

QPPIS

QPPIS is a specialized tool developed by Jura for controlling the quality of security intaglio plates, dry offset and wet offset printing plates, any printed sheets including offset and intaglio printed sheets. This tool gives the perfect solution to supervise the first quality results created by the state-of-the-art digital intaglio platemaking technology such as Direct Laser Engraving (DLE®).

QPPIS is a combination of a unique software application and an ultra-high accuracy measuring device. Its main purpose is to check the quality of 3D plates, to help the R&D department and the printing house to develop new security features and to have a full control over the platemaking process.

It has several features specially developed to complete today's high security design and printing requirements:

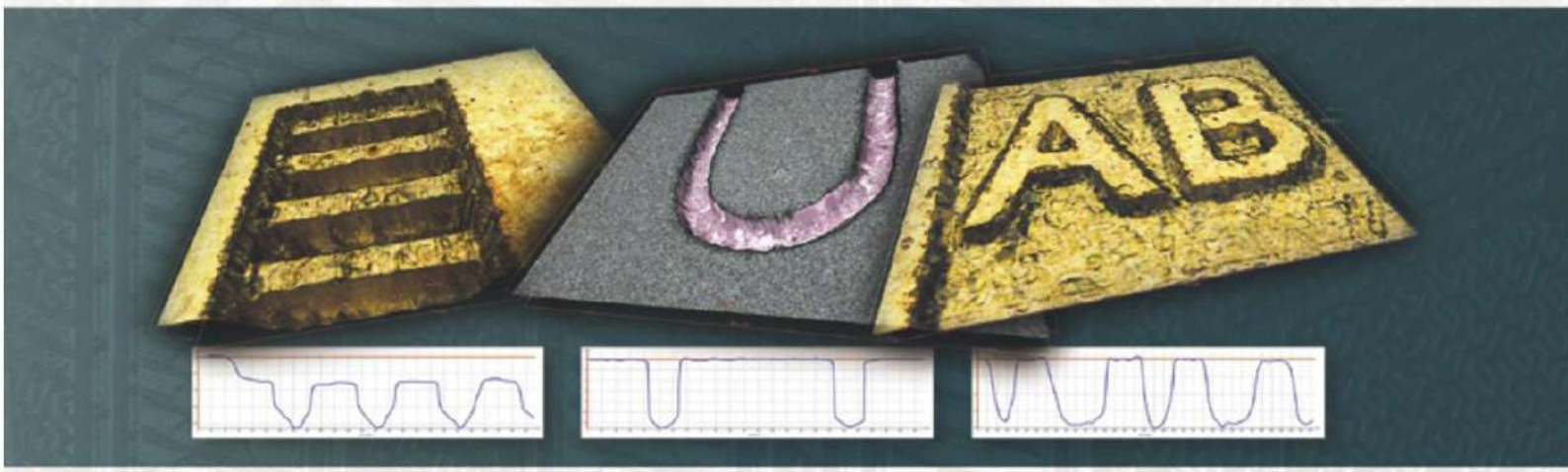
- Single original 3D plate quality checking
- Step-and-repeated 3D plate quality checking

Additional features

Features

Single original 3D quality checking

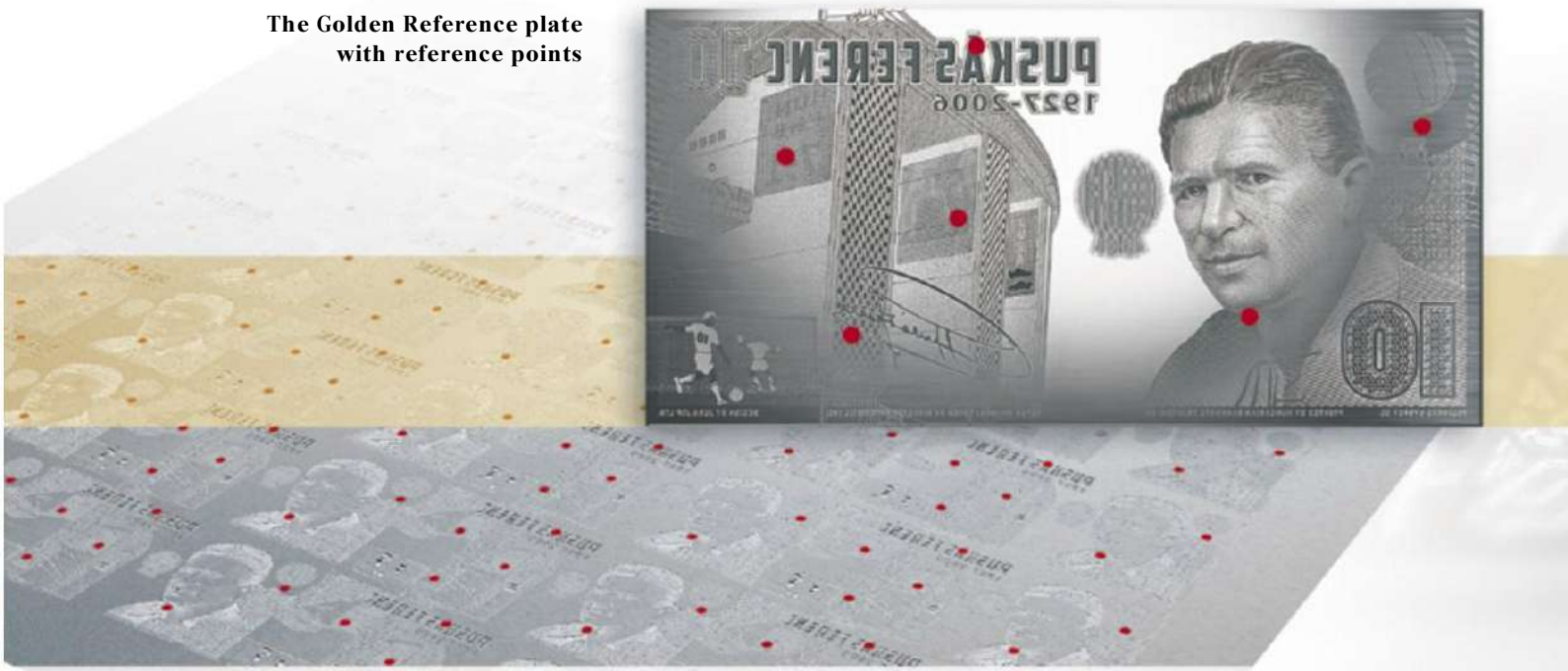
- Ultra-high resolution 3D images – Creates the most realistic pictures of the printing plate in details.
- Profile analysis – Provides very detailed analysis of the cross-sections of the selected profiles.
- Comparing plan to reality – Automatically positions and generates, then compare graphs based on the original digital 3D design data against the measured 3D values.
- Defining Golden Reference – When engraved single original plate is accepted, it will be considered as the Golden Reference.



Step-and-repeated 3D quality checking

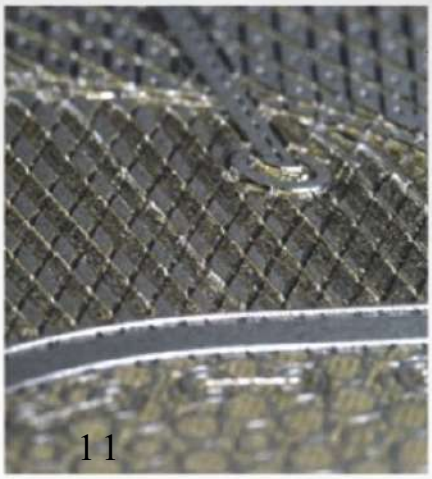
- Reference mapping – Quality checking is based on user defined maps containing the most important checkpoints related to sensitive areas.
- Automatized workflow – All processes, such as positioning, multisampling, angle profile measurement, data storing and comparing, are fully automatic.
- High accuracy profile angle measuring – Line widths and depths are measured with very high precision at any point on the plate.
- Detailed reporting – Generates report comparing all measured data: planned values, measured values, differences, average values, etc. The result helps evaluate the quality of the subject and to decide if it's ready for printing and/or acceptable.

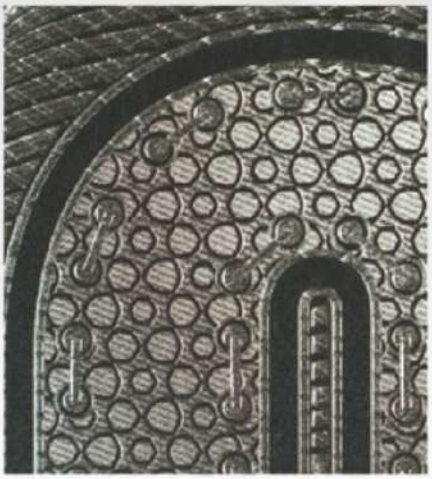
The Golden Reference plate with reference points



Main advantages

- Ultra-high resolution 3D images – QPPIS creates three- and two-dimensional pictures of the plate surface with perfect precision.
- Ultra-high accuracy – up to 1 micron.
- Inspectable area (Length x Width) – maximum of 1,000 x 1,000 mm.
- User-definable profile analysis – A cross-section can be made of any parts of a line or area to measure the line width and depth as well as calculating the ink volume.
- High accuracy profile angle measurements – Line widths and depths are measured with very high precision at any point on the plate.
- Multisampling measurement – QPPIS can analyse cross-sections along a line or a wider track that makes it possible to calculate the average values and shapes and display them with their deviations.
- Automatic processes – QPPIS eliminates human errors with fully automatized workflow steps: positioning, multisampling, angle profile measurement, data storing and comparing, etc. Fully automated system without the need to move the subject material under inspection.
- Complete quality control – QPPIS provides all essential functions for quality control of banknote printing plate production that helps reduce waste and costs.





- Error definition – QPPIS checking method allows to identify and define mistakes (plate defects, insufficient polishing, improper post-processing etc.) and helps to avoid or fix them.
- System independency – QPPIS is a standalone solution with features that can be used independently from each other and can be integrated into any security printing plate production system.
- Compatibility – QPPIS results can be converted to other databases or storage systems. All reports and photos are archivable for subsequent review.
- Full-size comparison – QPPIS compares all measured values with reference values. The QPPIS compares measured values of the Golden Reference and a full-size laser engraved plate containing the step-and-repeated single originals. Each single original will be measured on its individual reference areas based on user definable mapping.
- Helping developments – Collecting and analyzing data from different cases and plates helps to study and improve the existing platemaking workflow.
- Full reports – Based on detailed checking QPPIS generates reports containing all data following the design from the first moment until the final summary and the accepted print-ready plate.
- Display shape of engraving
- Measurements at any point on the plate of length – width – depth (x,y,z)
- Reference values, measured values and matching quality percentage for 3D scanning.
- Objective measurements and reports without human interference.
- The voltage is 100 – 240V, frequency is 50-60Hz.

Workflow

Single original plate manufacturing process

2D original design

3D digital data

Digital plate

SINGLE ORIGINAL 3D PLATE QUALITY CHECKING

Improving

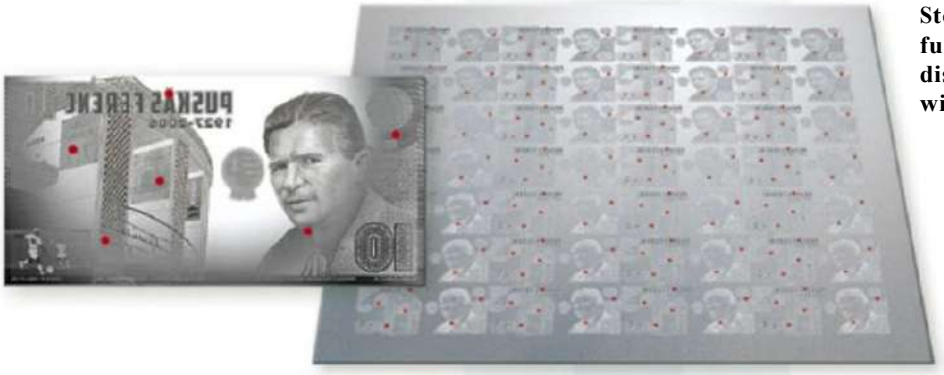
Printed proof

Improving

Visual checking

The Golden Reference plate: automatically and visually checked and approved single original

Step-and-repeated 3D quality checking



Step-and-repeated full-size plate including distortions and marks, with reference point mapping

The Golden Reference plate with reference points

Automatically generated step-and-repeated 3D plate quality checking report

Automatic comparison

Plate unusable

Accepted full-size print-ready plate

Plate to double-check: with differences within a tolerance

Additional features

3D scanning – digitizing existing intaglio plates

3D Scanning is an ultra-high resolution procedure aiming to get a three-dimensional picture of an original plate – as close to reality as possible – that helps to reproduce it faithfully with the newest technology. This process sweeps the target then converts the data to optimized format for the digital intaglio platemaking method such as direct Laser Engraving, DLE®.

- Scanning resolution – X and Y directions from 28,870 up to 144,350 dpi, Z (depth): 1 micron step increment
- Normalizing – for DLE® processing to 12,700 dpi, 8-bit grayscale format

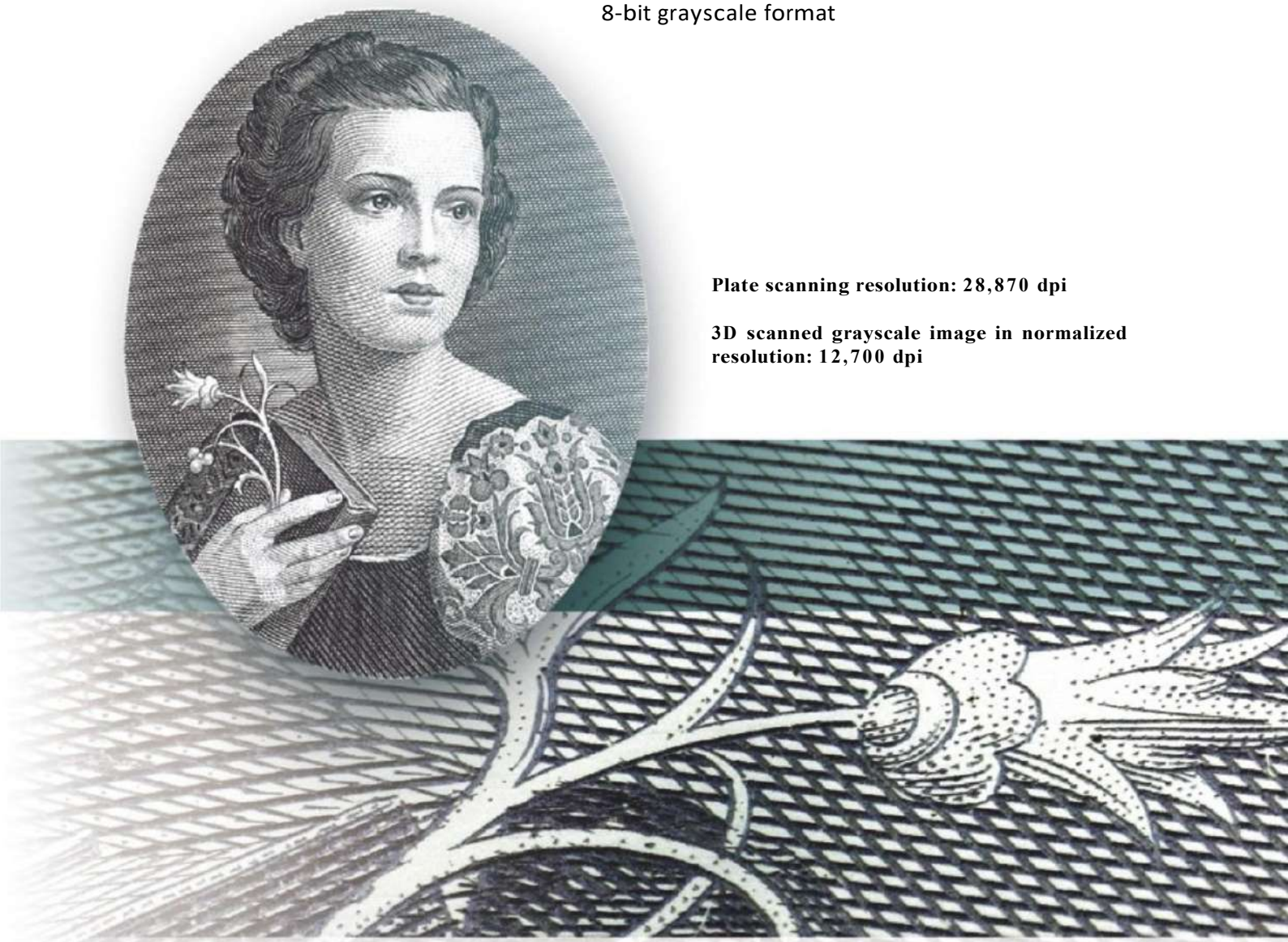


Plate scanning resolution: 28,870 dpi

3D scanned grayscale image in normalized resolution: 12,700 dpi

Enhanced 2D scanning

2d scanning is an enhanced version of the usual process for digitizing printed graphic security documents. At 14,552 dpi scanning resolution, far beyond the usual accuracy, providing the finest possible details, this method serves as a perfect and reliable data source for high security graphic design software. Enhanced high resolution scanning allows to check even the details of the carrier material (paper fibres etc.). If downsampling is needed later, the result is still equalized and smoother than usual scanning.

Comparing printing plates and printouts

As an additional possibility, QPPIS can be used to compare the Golden Reference plate to its replica: the printed full-size step-and-repeated result.

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