

Intego Vision Systems

Intego develops and produces **customised automatic inspection systems** for the manufacturing in the solar industry. We have experience with all steps in the production process.

Our inspection systems allow you to recognise defects reliable and as soon as possible. So **immediate feedback** and hence quick reaction on production drifts lowers the rejection rate.

The **statistical analysis** of the inspection results correlated with the production parameters (additional storing in the statistics is possible) helps you to optimise effectively your production.

In order to keep your special technological lead we will customize our systems to your needs.

Your advantages in using Intego Vision Systems are

- Fast and objective control
- Reduced inspection costs
- Immediate feedback of production quality
- Inspection statistics and protocols
- More effective process optimization
- Adaptations to your needs



Don't hesitate to contact us with your technical questions!

Together with you, we will develop a specification draft and estimate total costs.

Step 1: Discussion of concept

Just give us a call or send several sample parts, if possible with characteristic faults. We help friendly to answer the questions: Is it technically possible? How much will it cost?

Your time spent: Just 15 minutes to send the samples

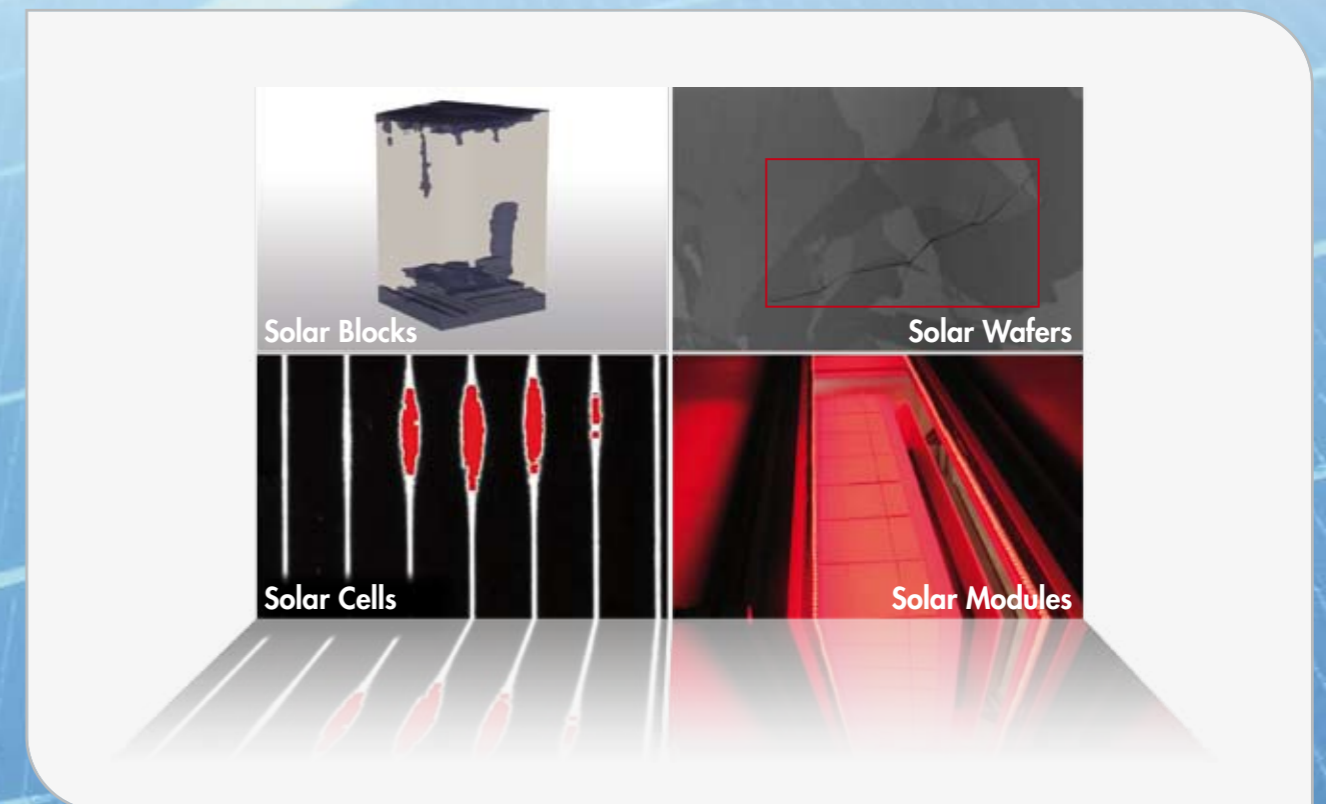
Step 2: Drafting specifications

Based on the above concept we will create with you the specifications of the inspection system. You will receive a free written summary without obligation.

Your time spent: Just 2 hours including preparations

100% Quality Control Ensured

We provide you with automatic inspection solutions for ...



■ ■ ■ Silicon Blocks

Optimise your crystal growth process
Reduce your saw damages and unnecessary polishing



NIR inspection system with manual and automatic operation (top)
Detailed NIR image of inclusions in a silicon block (right)

Requirements:

- Detection of SiN- and SiC-inclusions in Si-blocks
- 3D-measurement of the Si-blocks (including detection of chipping)

Technology:

- NIR cameras with resolutions up to 100 μm
- 3D-reconstruction of the inclusions of a single block and of the whole ingot
- Cutting/sawing and polishing proposals are generated
- Laser measurement with accuracy better than 10 μm

System:

- Manual or automatic operation is possible
- Cycle time typical 2-3 minutes per block
- Build-in barcode scanner
- Optional weighing possible

■ ■ ■ Silicon Wafers

Reduce your breakage rate through the production
Reduce your saw damages and unnecessary polishing

Requirements:

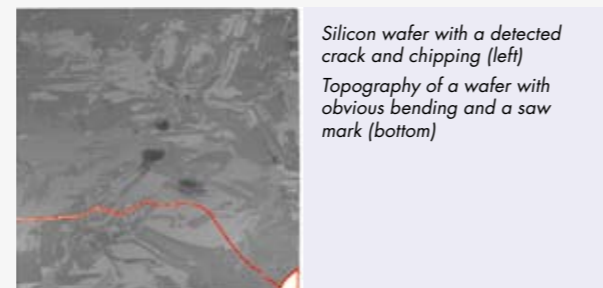
- Outgoing or incoming quality control of wafers, including geometry
- Detection of micro cracks which are normally not visible on the surface

Technology:

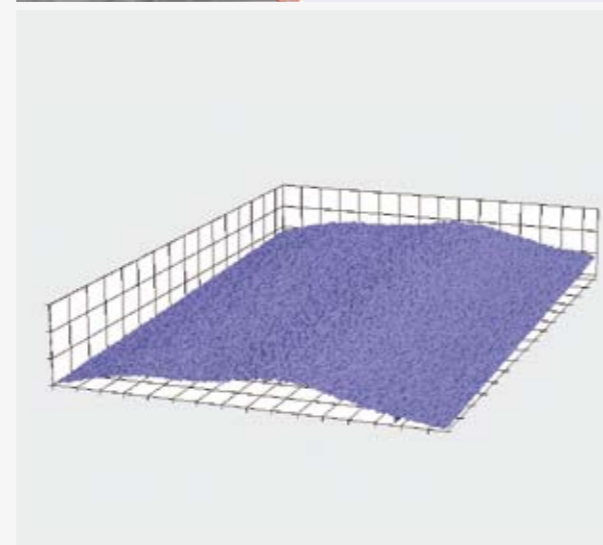
- 2D-measurement including dimensions, cracks and breakage
- 3D-measurement including detection of chipping, saw marks, local thickness and bending
- Multi-crystalline wafers and EFG wafers possible
- NIR cameras with resolutions up to 20 μm

System:

- Wafer move continuously on conveyor belts
- Cycle time typical 1-2 seconds per wafer

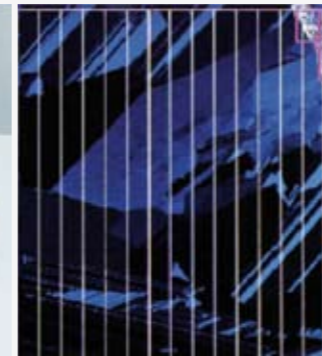
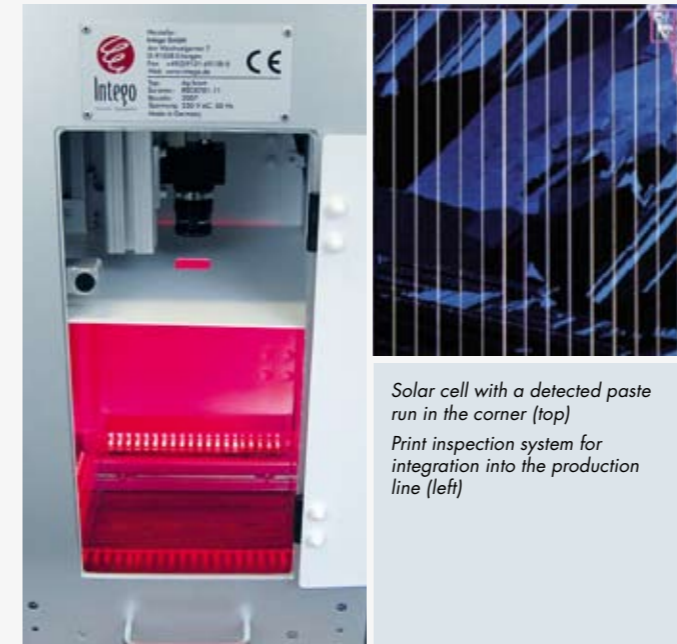


Silicon wafer with a detected crack and chipping (left)
Topography of a wafer with obvious bending and a saw mark (bottom)



■ ■ ■ Silicon Cells

Direct feedback to optimise the coating and printing process
Classify your cells to get uniform (colour, efficiency) modules



Solar cell with a detected paste run in the corner (top)
Print inspection system for integration into the production line (left)

Requirements:

- Control of the printed electric contacts and fingers on both sides
- Planar thickness measurement of the ARC coating and colour classification of the cell

Technology:

- Inspection of Ag front grid, Al-Ag back busbars and Al back surface field
- High accuracy measurement of 3D-finger profiles along chosen lines for detailed classification of paste quality
- Spectral measurement techniques based on a physical coating layer model gives a high accuracy

System:

- Wafer move continuously on conveyor belts
- Cycle time typical 2-3 seconds per cell
- OPC interface

■ ■ ■ Silicon Modules

Reliable final control to ensure 100% quality for your customer
Avoid processing non-perfect modules at this stage

Requirements:

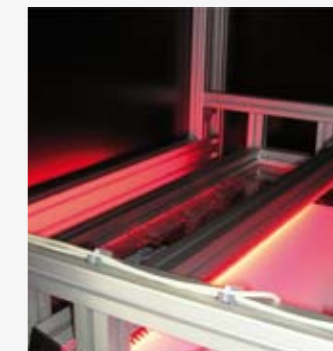
- Control that cells and strings are undamaged and well positioned
- Final inspection of laminates/modules for typical functional and aesthetic faults, e.g. breakage, inclusions, surface defects

Technology:

- Inspection and alignment of incoming cells
- Inspection in the layout and laminate process from both sides
- Camera arrays with resolutions of 100 μm over the complete laminate/module
- The inspection is adaptable to customer specific needs, e.g. additional control of junction boxes or frames

System:

- The systems are preferably integrated in the process automation, e.g. conveyor belts, but are also available as stand-alone versions
- Cycle time typical 1-3 minutes per laminate/module



Silicon wafer with a detected crack and chipping (left)
Topography of a wafer with obvious bending and a saw mark (bottom)

