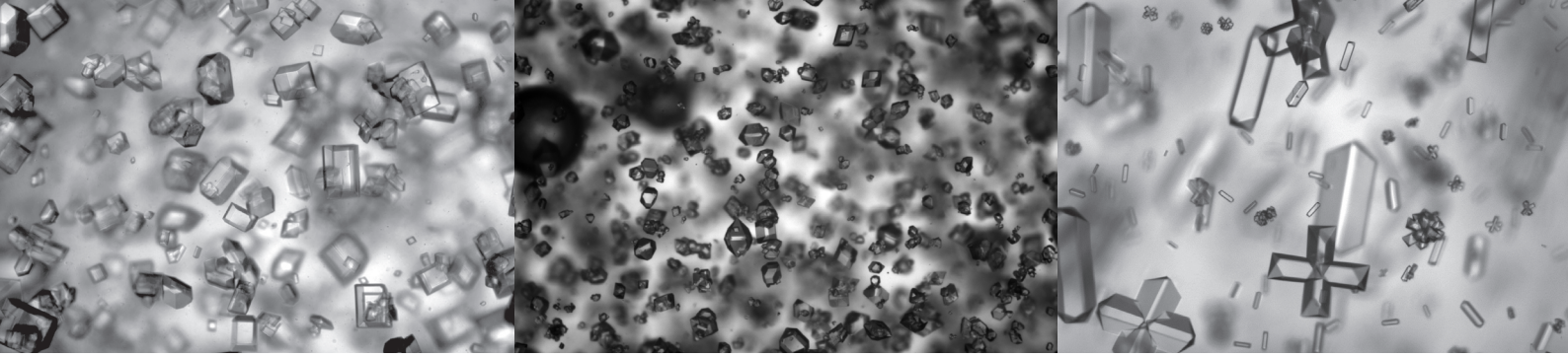


Pixact Crystallization Monitoring

The Pixact Crystallization Monitoring (PCM) technology is designed for the inline analysis and control of batch and continuous crystallization processes. The technology combines inline process microscopy with advanced image analysis techniques.

PCM offers high-quality live view and real-time crystal analysis even in high color and concentration crystal suspensions. Measurement data produced by PCM helps you to optimize, control and troubleshoot your crystallization process.



Experiences of plant managers

“We have been able to decrease batchwise variation and reduce the number of out-of-spec batches from a **few to zero**.”

“PCM enables **more accurate control** of metastable state than any other method in our factory.”

“In the six months we have had the Pixact system installed we have **learned as much as in the past decade.**”



pixact
a brighter picture of your process

Features

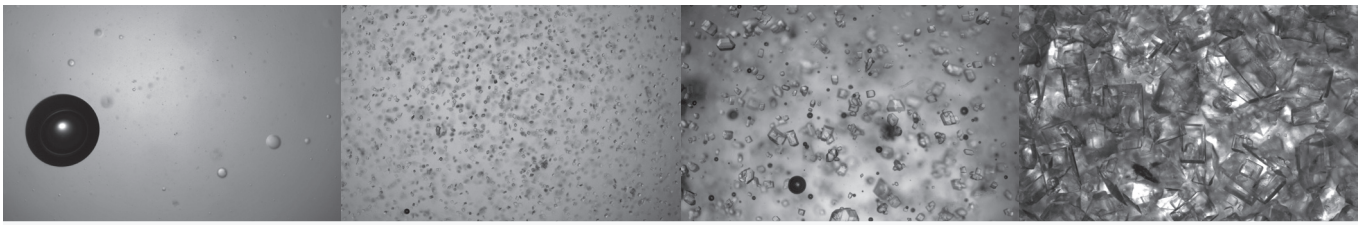
Pixact system provides excellent features to optimize your process:

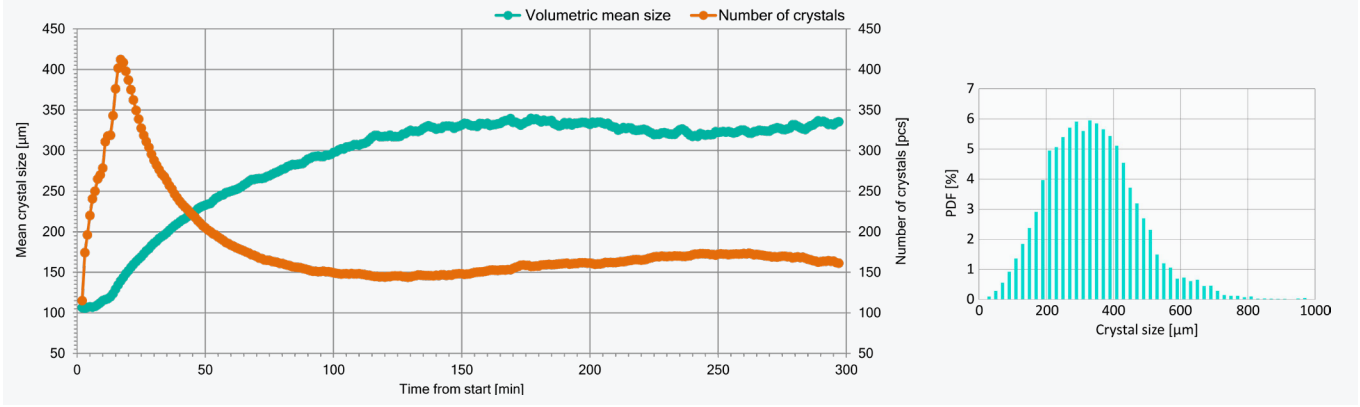
- **Superior image quality** even in high color and dense crystal suspensions
- **Real-time crystal sizing** from the seeding phase until the end of the batch
- Batchwise report of the measurement results in Excel or csv format
- Transmission of the measurement results to the factory DCS (e.g. mA, Modbus-TCP or OPC-UA)
- **Fully configurable** user interface and data reporting
- Robust imaging unit **without any moving parts**, equipped with automatically operating washing nozzle

Measurement results

PCM provides a live camera view of the process and **detailed measurement data** on crystal characteristics:

- Crystal size distribution and related statistics (mean and standard deviation; number and volume fraction of fines and crystals in user specified bins)
- Crystal growth rate
- Number of crystals and nucleation rate
- Crystal morphology, aspect ratio and surface texture
- Detection of impurities, agglomerates, droplets and bubbles
- Suspension flowability and light transmittance





Benefits

In batch crystallization

Immediate evaluation of seeding phase:

- Optimization of seed crystal quality and dosage
- Improved repeatability

Enabling accurate control of the crystal population in growth phase:

- Real-time monitoring of fines formation enables washing optimization
- Narrow crystal size distribution enhances screening
- Improves crystal quality and purity
- Leads to smaller recirculation rates
- Increases capacity due to shorter boiling time
- Decreases energy consumption

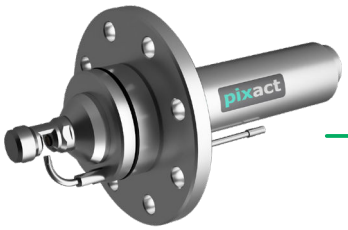
In continuous crystallization

- Real-time detection of variations in the feed quality and other disturbances
- Enables fast and accurate control of the metastable state by monitoring nucleation
- Better control of the crystal size distribution results in better runnability of the centrifuges

pixact
a brighter picture of your process

Pixact Solution for industrial processes

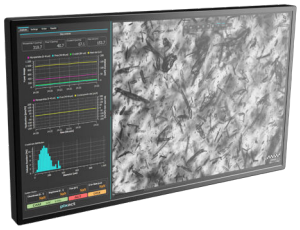
The Pixact measurement systems consist of a Pixscope imaging unit and a Pixstation main unit running the Pixact measurement software.



Pixscope imaging unit produces microscope quality image data directly from the process



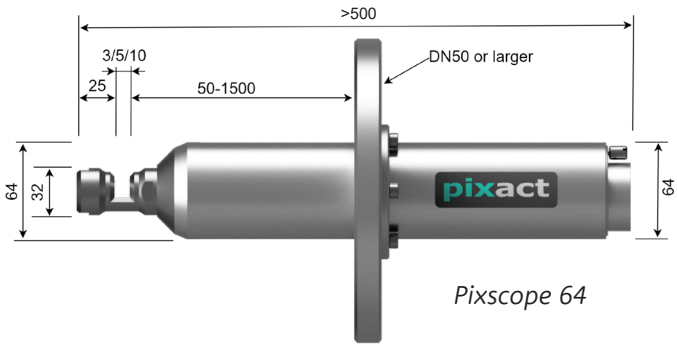
Pixstation ONLINE main unit houses the main components



Live image from the process & Pixact analysis results displayed in the oprator station located in the control room etc.

Pixscope Imaging Unit

The imaging unit flange type and probe wet length are **customizable**, allowing installation for a variety of industrial process equipment. Below are presented some typical installation options, but the designs are fully customizable. The imaging unit can also be equipped with a **washing nozzle** to flush the measurement gap when needed.



Pixscope 64

Preferred **installation location** for the *Pixscope* imaging unit is a flange on the reactor or tank side wall. Longer version of *Pixscope* can be built to install on a flange on top of the reactor.



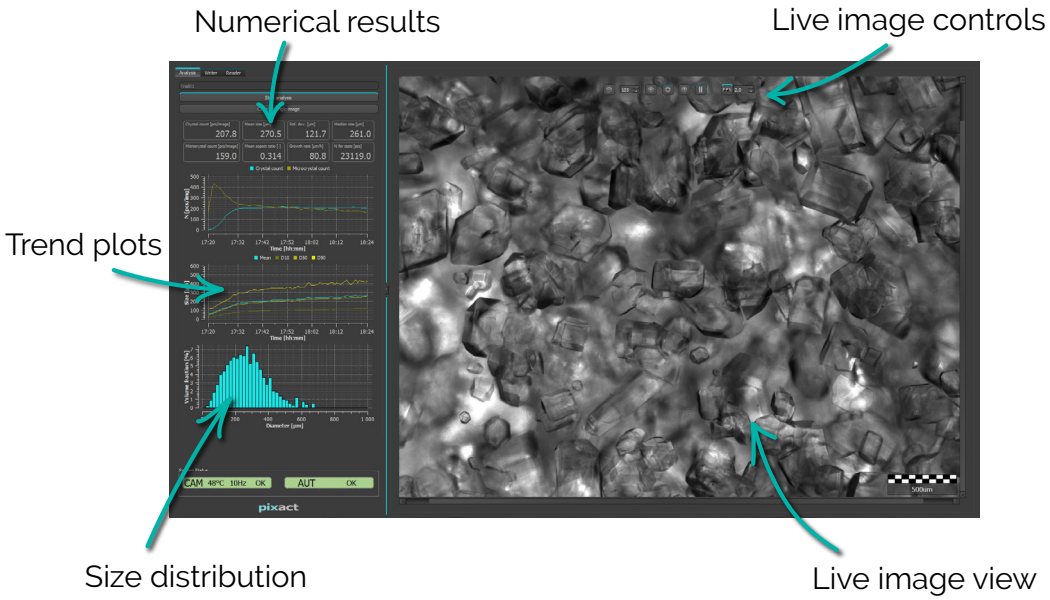
Mechanical specification	
Wet part diameter	63.5 mm
Wet part length to window	Pixscope 64-S: 50-150 mm Pixscope 64-L: 150-1500 mm
Measurement gap	3, 5 or 10 mm
Wet part material	AISI316L/1.4401 AISI904L/1.4539 Super duplex/1.4410 Hastelloy C22
Window material	Sapphire
Sealing material	Standard: EPDM, FFKM, PTFE Ext. temp: PTFE
Probe weight	3-8 kg

Process & Environment specification	
Process temperature [°C]	Std temp: 10-85°C / 120°C short t. Ext temp: -70-120 °C
Process pressure [Bar]	Std: 6 Bar Optional: 30 Bar
Ambient temperature	0-45°C
Housing protection	IP65

Optical specification	
Image resolution	M10: 3.5 µm M20: 1.7 µm
Image area	M10: 8.4 x 7.1 mm M20: 4.2 x 3.5 mm
Mesurement range	M10: 4-4000 µm M20: 2-2000 µm

Pixact Software

Pixact software **controls the entire measurement procedure**, including the hardware, data acquisition, image analysis, and results post processing. Depending on the system specification, the operation varies from a fully automated online measurement to a manually controlled data collection and analysis. Pixact software can be configured from a robust online analysis software to an effective R&D tool, giving access to all required settings.



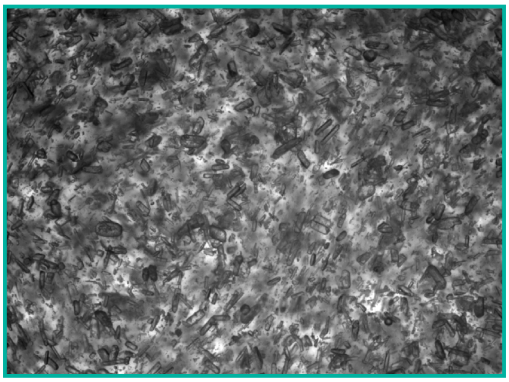
Key features of Pixact Software

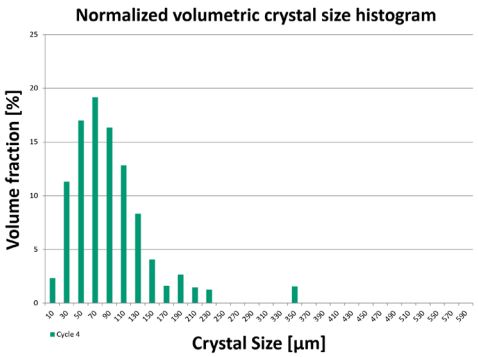
User-friendly adjustment of imaging parameters
- Automatic camera controls to optimize the image quality in varying process conditions
- Adjustable image refresh frequency with zoom and pause features
- Image recording capabilities with time stamps for later inspection or analysis

Powerful analysis algorithms
- High-performance image analysis techniques to produce real-time quantitative measurement information from the image stream
- In-house developed image analysis modules available for several application analyses - customized analysis features on request
- Interface for AI models to detect and classify all kinds of crystals

Flexible reporting tools
- Image data storing to internal or external hard drive
- Internal database for the measurement results
- Export results in the Microsoft Excel ®, CSV, or ASCII format
- From systems equipped with an automation interface, results can be transmitted to external data collection using OPC-UA, Profinet or another standard protocol

Connectivity
- From systems equipped with an automation interface, results can be transmitted to external data collection using OPC-UA, Profinet or another standard protocol
- Integration to mixers, heat baths etc.





CONTACT US pixact.fi info@pixact.fi +358 (0)10 439 2400

pixact
a brighter picture of your process