VG InLine 3.0

Easily Automate CT Inspections and Analyses

View the content of your inspection tasks at a glance

With *VG InLine 3.0*, Volume Graphics brings non-destructive testing (NDT) with industrial computed tomography (CT) to the production line. It's simple to set up. It works with almost every CT system on the market – right out of the box.

VG InLine 3.0 offers:

Fully Automated or Semi-Automated CT Inspection

VG InLine 3.0 automatically or semi-automatically inspects your parts with a recurring analysis pattern. It doesn't matter if your CT scanner is within the production line (in-line) or close to the production line (at-line), e. g., in a quality lab.

Maximum Flexibility

Unlike currently available custom-built solutions, *VG InLine 3.0* is highly flexible. Other in-line CT inspection systems are often geared to just one task, so that changes are usually difficult and very expensive to implement. *VG InLine 3.0* on the other hand, you can easily reconfigure yourself; whether you have to adjust for small changes to the product design or whether you want to use your CT system for testing a totally different product.

Broad Feature Set

VG InLine 3.0 Complete offers full scope of features of *VGStudio MAX 3.0*, e. g., wall thickness measurement, nominal/actual comparison, fiber orientation analysis, and defect detection (pores, voids, inclusions).* It transforms your CT system into a universal automated metrology and NDT tool. As *VGStudio MAX 3.0*, *VG InLine 3.0* works natively with voxel, point cloud, mesh, and CAD data.

Extensive Compatibility

VG InLine 3.0 understands almost all formats of reconstructed CT volumes. Even if you have a CT system that writes files in a proprietary format, *VG InLine 3.0* can normally handle these files with its preprocessors.** And because *VG InLine 3.0* also works natively with point clouds and meshes, you can use it with or integrate tactile and optical scanners when required.

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* Especially for the foundry sector we offer *VG InLine 3.0 Cast & Mold Enhanced* including the Add-on Modules Coordinate Measurement, Nominal/Actual Comparison, Wall Thickness Analysis, Enhanced Porosity/Inclusion Analysis (includes P 202/VW50093 and P 201/VW50097)
** Volume Graphics programs preprocessors for you. Just contact us for details.
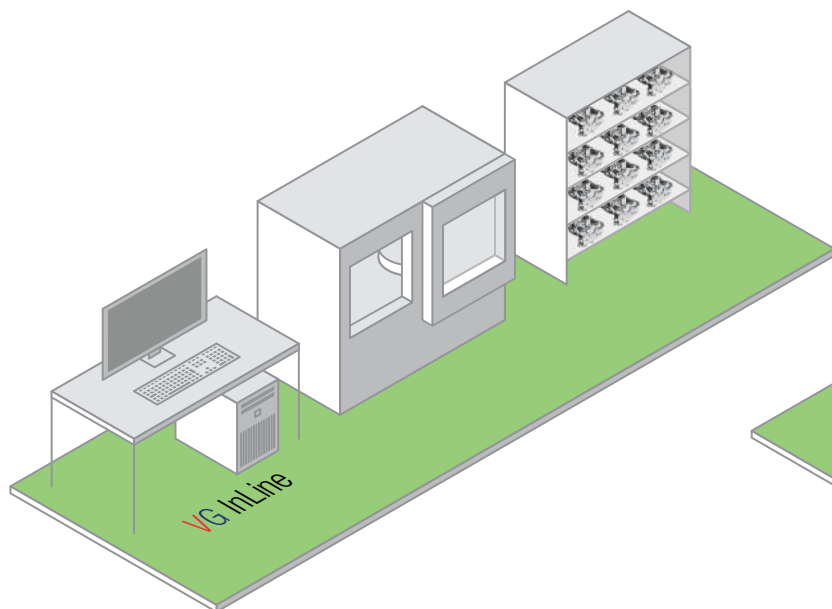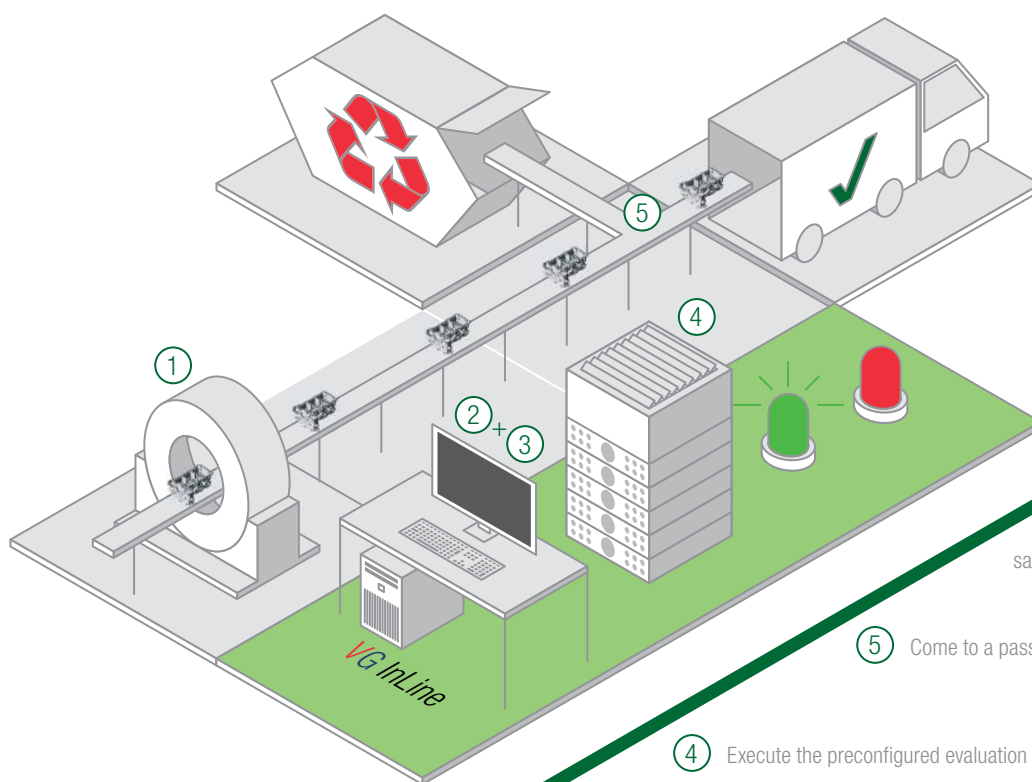
In quality labs/for service providers
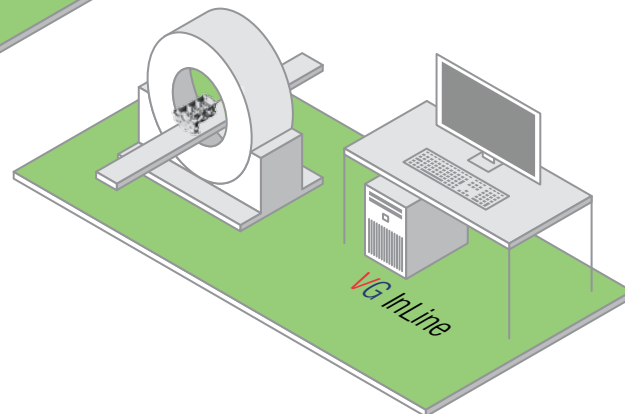
In industrial production

Optional: Review results using either *myVGL* or *VGStudio MAX* and save data for documentation.

5 Come to a pass/fail decision.

4 Execute the preconfigured evaluation schemes.

3 Supervise project data folders with *VG InLine*.

2 Save project data in dedicated folders.

1 Scan several items in-line (at-line, in the lab).

A Simple Idea

VG InLine 3.0 is based on a simple idea: It monitors directories for incoming CT data sets. When the program detects incoming data, it automatically triggers one or several predefined actions. All it requires is that you configure your CT scanner to save the data set into specific directories that *VG InLine 3.0* monitors.

Let's say your CT scanner saves the scan data of a part 1 in one directory and the data sets of a part 2 in another directory. If configured accordingly, *VG InLine 3.0* knows to run a defect analysis on part 1, but to apply a measurement template and run a nominal/actual comparison on part 2.

Complex Inspections

The concepts of macros and templates, well known from *VGStudio MAX*, form the basis of all automation with *VG InLine*. Together they constitute jobs which define what *VG InLine 3.0* does with CT data sets.

New if-then statements in jobs allow even more complex inspections with *VG InLine 3.0*: For example, you can determine if it's part A or B and – as a consequence – run different analyses. Or maybe further analyses are unnecessary if the first analysis, e. g., finds an insufficient wall thickness.

How it works:

- With jobs you define what *VG InLine 3.0* does with CT data sets.
- Build a new job from scratch by combining macros and templates. Or duplicate and modify an existing job.
- Use *VGStudio MAX 3.0* to create macros and templates and draw from the full scope of available analyses.*
- For the first time, you can include if-then statements in your jobs in *VG InLine 3.0*.

* Depends on license (*VG InLine 3.0 Complete* or *VG InLine 3.0 Cast & Mold Enhanced*).

- To save time, you can tell the software to execute recurring steps within the inspection process only once.
- More important jobs will be calculated first. For example, you can use several CT scanners to scan various parts and assign a different priority to each inspection process.
- If an inspection could not be finished (e. g., because of a computer or network problem), *VG InLine 3.0* ensures that it will be processed again.
- A dashboard keeps you informed about the status of your inspections and the results for every part at all times. If desired, *VG InLine 3.0* shows you detailed results in real-time – read-only and therefore absolutely secure.

Easy Setup

You create macros and templates as usual with *VGStudio MAX 3.0* – you don't need special knowledge in *VG InLine 3.0*.

And when it comes to setting up jobs, our software assists you: A job wizard guides you through the process and an advanced editor allows if-then job creation via drag and drop. Both tools also help you find inconsistencies in your jobs and macros before they occur during operation.

The general setup procedure of *VG InLine 3.0* is straightforward:

- Install *VG InLine 3.0*
- Create macros and templates in *VGStudio MAX 3.0*
- Create jobs in *VG InLine 3.0*
- Specify input directories for each job
- Specify what to do with processed input data
- Specify what to do with result data
- Start *VG InLine*
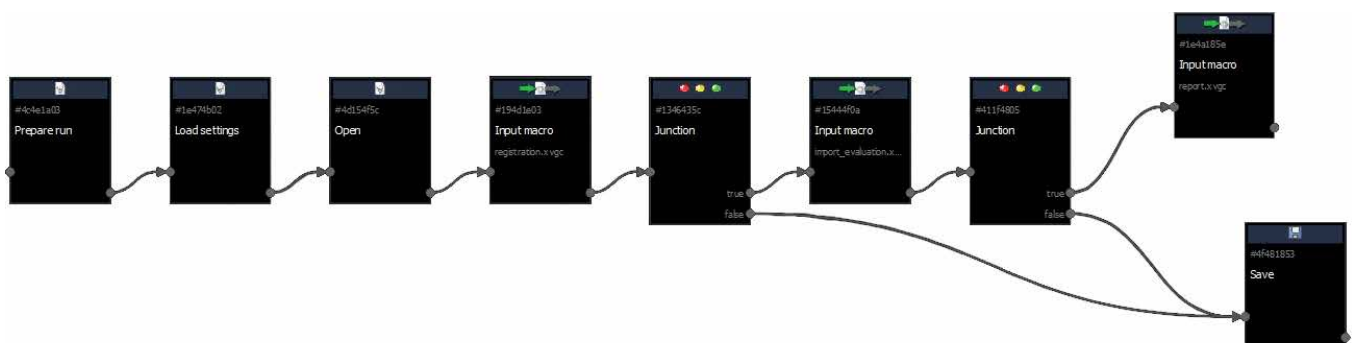
You create if-then jobs with the new advanced editor – simply via drag and drop.

In-line or At-line

Because of the simple idea to automatically analyze incoming data with a recurring analysis pattern, the software can be used flexibly.

Supported scenarios:

- Fully automated, in-line: 100 % inspection in industrial production
- Fully or semi-automated, at-line: small batch series inspection in industrial production or in quality labs
- Semi-automated: sample tests in quality labs or at service providers

Teachable

Especially for automated inspection tasks it is often not feasible to compare a part to the ideal design. Instead it makes sense to teach the software how an average 'good' part should look like and what deviations are 'normal'. For this, a reference volume needs to be calculated out of actually manufactured parts that have been classified as 'good'.* Based on the reference volume, *VG InLine 3.0* performs a nominal/actual comparison. Or it compares gray values, but also more complex features such as fiber orientations. Using a reference volume is not only much faster than conventional analyses. It's also way more sensitive and less error-prone, and therefore the best choice for automated testing.

Connectable

VG InLine 3.0 integrates seamlessly in your larger process. It reconstructs incoming CT data sets efficiently on the fly. They need not to be saved on a hard drive nor reloaded.

Outgoing data such as statistics or analyses are passed along to other software via built-in interfaces. An SDK opens up *VG InLine 3.0* to external software such as a shop floor control system.

As Safe as You Want It to Be

With Volume Graphics software, you always have total control of your system and your data. No file will be deleted unless you explicitly tell *VG InLine 3.0* to do so.

To improve accountability and security, our software supports the built-in event log of Windows to log every file action. Read and write permission for the directories used by *VG InLine 3.0* for incoming and outgoing data can be set by your system administrator.

* Currently this function is a service that has to be performed by Volume Graphics at additional costs.

VG InLine 3.0 exports data for archiving purposes. The software ensures that this data is complete: For example, *VG InLine* stores a CAD file that it used for inspection together with the result when exporting.

Revisions enable you to modify jobs while maintaining an overview: New content in the input directory is processed with the currently selected revision. For the sake of transparency, the applied revision is mentioned in the result. Within a job, you can always jump back and forth between revisions.

Capabilities Grow with Your Needs – the Costs Don't

VG InLine 3.0 has you covered – even when your needs change or grow. Just prepare new analyses in *VGStudio MAX 3.0* or reuse parts of existing jobs. Custom-built in-line inspection solutions can't match this degree of flexibility.

Scalable and Fail-Safe

There is yet another aspect that makes *VG InLine 3.0* not only flexible and scalable but also fail-safe: you can easily distribute the necessary inspection tasks onto several workstations in order to balance the calculation load or to ensure the necessary redundancy in your process. If more workstations are necessary, just add them.

Moreover, our pricing helps you to scale: Additional workstation licenses are offered at a steep discount. Just contact us for a quote!

We Assist You

You're unsure if your production process is ready for in-line or at-line inspection with industrial CT or how to use *VG InLine 3.0* in your scenario? We assist you, from the decision-making process right through to implementation. And once implemented, we help you to further optimize your inspection process. Just contact our experts for advice!

Volume Graphics

Volume Graphics GmbH, founded in 1997, develops software for the analysis and visualization of industrial computed tomography data. Today, thousands of companies across diverse industries use our software. They analyze, inspect, and measure objects in research, production, and quality assurance. Our customers value our software's ability to display and analyze voxel, point cloud, mesh, and CAD data within one application.

VGStudio MAX is our extendable high-end software; *VGStudio* offers a budget entry into the world of CT data analysis and visualization; *VG InLine* brings industrial CT in or close to the production process; *VGMetrology* turns a computed tomography scanner into a comprehensive and precise metrology device; and *myVGL* is the free, universal CT data viewer.

Our customers get more than support: We offer training courses and partner certification in our VG Academy, consulting services in all aspects of industrial computed tomography, and custom development projects in the fields of analysis, visualization, and processing of volumetric data.

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