

VGMetrology 3.0

Maximum Precision, Minimal CT Data Set Sizes



**VOLUME
GRAPHICS**



Full-featured but nonetheless easy-to-use – *VG Metrology* is made for metrologists.

Measure on voxel data, point clouds, meshes, and CAD data with *VG Metrology 3.0*, Volume Graphics' universal metrology solution. Our easy-to-use stand-alone application turns your computed tomography (CT) scanner into a comprehensive and precise metrology device.

VG Metrology 3.0 is:

- Full-featured. *VG Metrology 3.0* offers you the full metrology-related functionality of *VG Studio MAX 3.0* including GD & T functionality.
- Uncompromisingly accurate. *VG Metrology 3.0* gives you the complete picture of all object surfaces – and saves it in the very compact .mvgf format.
- Universal. *VG Metrology 3.0* works natively on voxel, point cloud, mesh, and CAD data.
- Easy-to-use. The focussed range of functionality makes *VG Metrology 3.0* easily accessible for new users.
- Seamless. You can exchange files between *VG Metrology 3.0* and other Volume Graphics 3.0 products.
- Certified. *VG Metrology 3.0* is verified by the Physikalisch Technische-Bundesanstalt (PTB), Germany's national metrology institute.*
- Affordable. *VG Metrology 3.0* costs significantly less than a comparably equipped *VG Studio MAX*.

*PTB tested the algorithms based on minimum-zone method ("Chebyshev") and on least-squares method ("Gaussian"). These algorithms are used for coordinate measurement in *VG Metrology 3.0*.

Holistic Measurement Technology

CT Gives You the Full Picture – Conventional Methods Can't

In contrast to tactile and optical methods, industrial CT holistically scans all surfaces of an object, even if they might be inside your part or difficult to capture. This makes CT the modern non-destructive testing technology of choice and the ideal basis for metrology applications. *VGMetrology 3.0* is designed from the ground up for metrology on CT data.

CT also has tangible benefits if you want to measure flexible, reflective, or translucent materials. While tactile coordinate measurement methods are also non-destructive, CT moreover is non-intrusive. This means measuring on CT doesn't deform the part. And unlike optical methods, CT still works accurately even if the part reflects or is translucent.

Innovative File Format

It's Time to Retire those Meshes

VGMetrology 3.0 uses a file format that opens up all advantages of CT to metrologists. Developed for CT data, a *.mvgl* file contains the best possible object surface without any loss in quality. At the same time, a *.mvgl* file is smaller than a *.stl* file with comparable precision. But unlike the *.stl* format, a *.mvgl* file is small because it contains only the surface of the object. A *.stl* file, on the other hand, sacrifices information.

The disadvantage of *.stl* files already lies in the nature of the format. In a *.stl* file, a polygon mesh approximately describes the surface of the object. However, a small file size of a mesh limits its accuracy; the more accurate the surface is being represented by polygons, the larger the file.

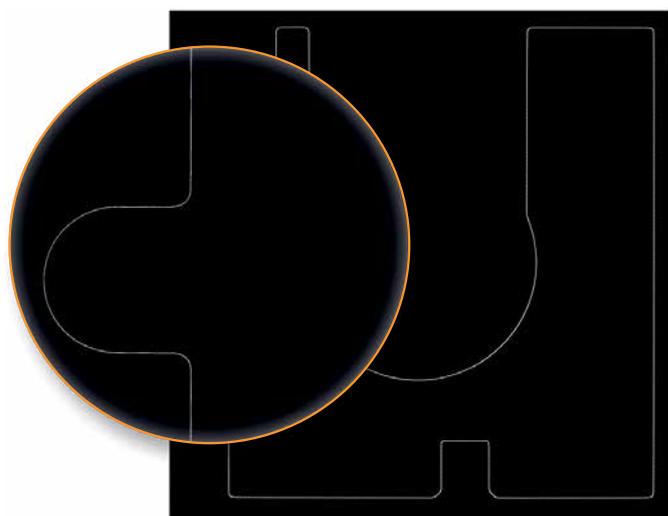
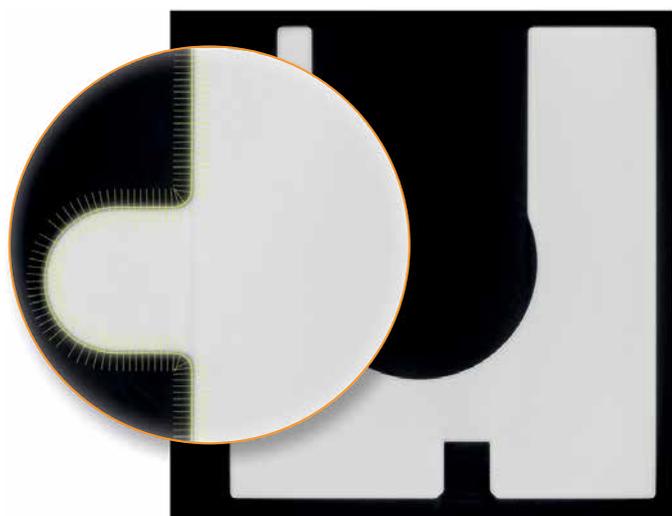
You can trust in CT-based metrology with *VGMetrology 3.0*.



The Volume Graphics Metrology Kernel in *VGMetrology 3.0* is verified by the Physikalisch-Technische Bundesanstalt (PTB), Germany's national metrology institute.

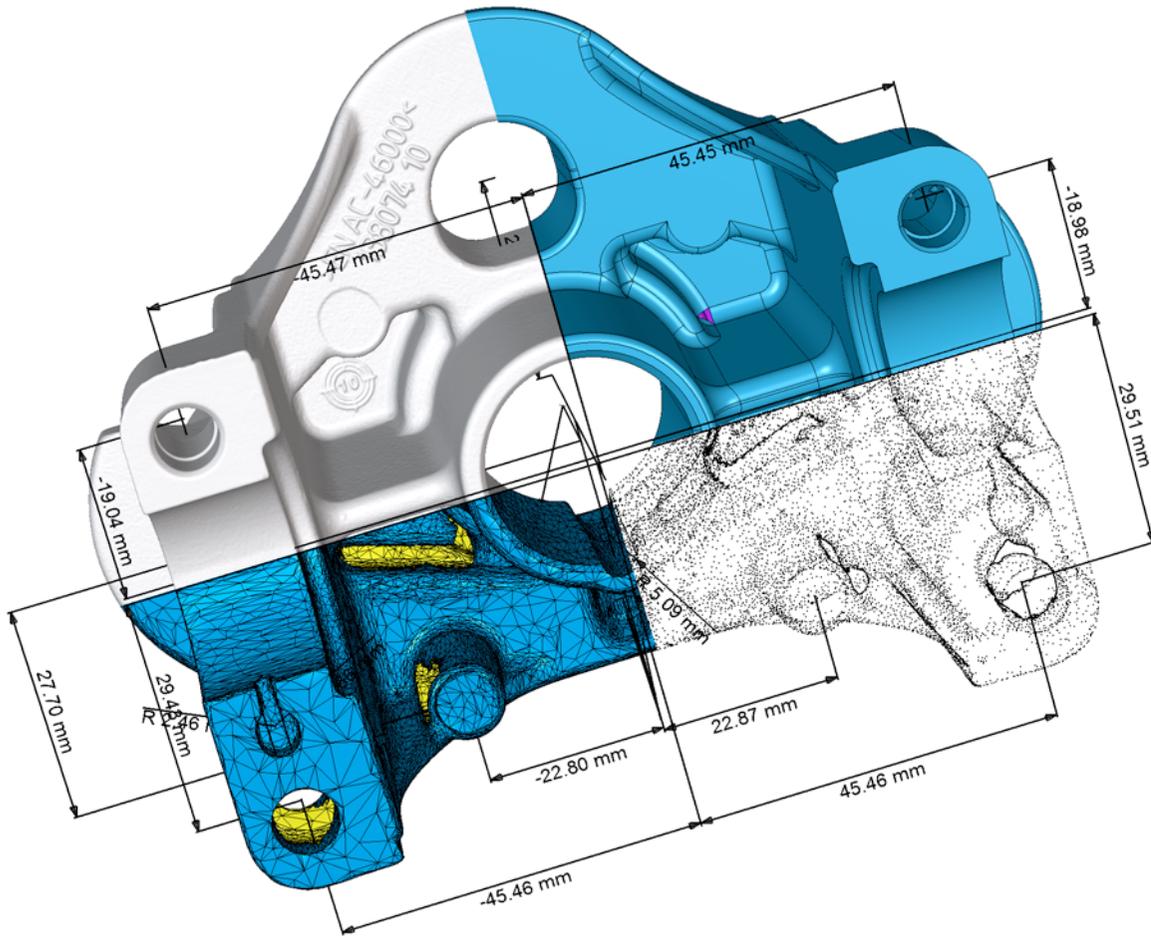
A *.mvgl* file contains subvoxel accurately determined surfaces. To achieve subvoxel accuracy, *VGMetrology 3.0* processes the gray values of individual voxels in a way which makes even those details visible that are smaller than a voxel.*

Our *.mvgl* format packs everything metrologists need into one compact, easy-to-handle file. This comes handy when you exchange metrology data sets over the internet.



Left: Conventional CT data, right: *VGMetrology* data

* *VGMetrology ES 3.0* and *VGMetrology VIEWER 3.0* can work with subvoxel-precise surfaces, but don't offer surface determination.



No matter what's the format, *VGMetrology* can handle it. From top left to bottom right: voxel, CAD, mesh, and point cloud data.

Truly Universal

All Formats

Metrologists can use *VGMetrology 3.0* as the one universal application for all their measurements because *VGMetrology 3.0* is not only equipped for CT but for all common measurement methods. You can even use *VGMetrology 3.0* with your existing tactile and optical scanners, because it works natively with point clouds and meshes in addition to voxel data. And *VGMetrology 3.0* also loads CAD data in various formats.

VGMetrology 3.0:

- loads CAD models in formats such as CATIA V5, Creo, Pro/ENGINEER – in addition to the import of STEP and IGES formats;*
- automatically translates and intelligently evaluates additional part information that is stored in Product and Manufacturing Information (PMI), e.g., dimensioning, GD&T, layers, annotations, or captions;**
- imports point clouds in ASCII files, .csv files, and plain text files;
- supports mesh files in the .stl format, both ASCII coded as well as binary coded; and
- reduces measurement uncertainty because geometry object fitting is optimized for each supported data type (voxel, CAD, mesh, and point cloud data).

One Metrology Software

VGMetrology 3.0 offers you the full metrology-related functionality of *VGStudio MAX 3.0*, including:

- GD&T functionality (according to DIN EN ISO 1101);
- object registration by Best-Fit, 3-2-1, RPS, or feature-based method;
- fitting of ruled geometries;
- nominal/actual comparisons on CAD data, mesh data (.stl), and voxel data;
- application of tolerances to the nominal/actual comparison with various parameters, e.g., deviation (minimum, maximum, cumulated);
- support of Regions of Interest (short ROIs), e.g., for nominal/actual comparisons;
- macros, templates, and batch processing for automation;
- extensive reporting functions, e.g., for test reports; and
- the familiar Volume Graphics user interface.

* Optional add-on module for a fee. Supported CAD formats are: CATIA V5 (R4 to V5-6R2015), Creo (Elements/Pro 5.0, Parametric 3.0). In beta status: CATIA V4 (up to 4.2.5), JT (up to 10.0), Pro/ENGINEER (up to Wildfire 5), Siemens PLM Software NX (Unigraphics V11.0 to NX 10.0), SolidEdge (V19–20, ST–ST8), SolidWorks (up to 2015). CAD Translation Technology supplied by Tech Soft 3D.

** Optional add-on module for a fee. PMI import is supported for CATIA V5 and Creo. In beta status also for Pro/ENGINEER and Siemens PLM Software NX. CAD Translation Technology supplied by Tech Soft 3D.

Great Deal

VGMetrology 3.0 Isn't Only Universal, It's also Affordable

You can get *VGMetrology* as a stand-alone product (*VGMetrology 3.0*), as an 'Essential Version' (*VGMetrology ES 3.0*), or as a free viewer application (*VGMetrology VIEWER 3.0*). So which version should you get?

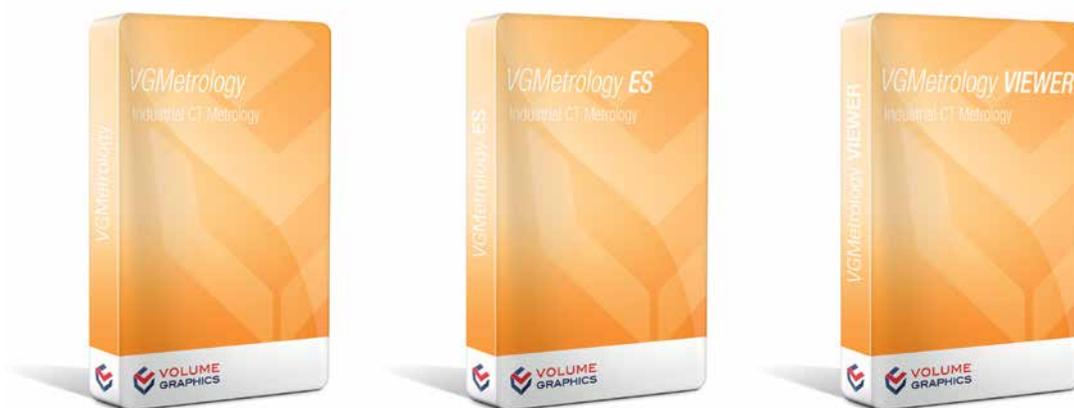
If you're a first-time industrial CT user, our stand-alone version of *VGMetrology 3.0* is most likely the right choice. Its voxel importer understands files that your CT scanner has generated on its own.

If you already work with .vgl files – either because you or your CT scanning service provider have access to *VGStudio MAX 3.0* with an installed Coordinate Measurement Module – *VGMetrology ES 3.0* is the application of choice. The surface will be determined within

VGStudio MAX 3.0 and the project will be saved as a .vgl or .mvgl file. This file you can then open with *VGMetrology ES 3.0*. Except for surface determination, *VGMetrology ES 3.0* and *VGMetrology 3.0* are identical.

If you want to view projects saved in the .mvgl format, you can use the free *VGMetrology VIEWER 3.0*. It even allows to change the alignment of objects and to add basic measurements.

Every version of *VGMetrology 3.0* costs significantly less than a comparably equipped *VGStudio MAX 3.0*. How much? Just contact us for a quote!



Features	<i>VGMetrology 3.0</i>	<i>VGMetrology ES 3.0</i>	<i>VGMetrology VIEWER 3.0</i>
Import voxel data directly from your CT scanner	✓		
Import point cloud, mesh, and CAD data	✓	✓	✓
Measure on voxel, CAD, mesh, and point cloud data	✓	✓	✓*
Automate with macros, templates and batch processing	✓	✓	
Save projects as compact .mvgl files	✓	✓	
Open .mvgl files	✓	✓	✓
Price	Contact us for a quote!	Contact us for a quote!	Free

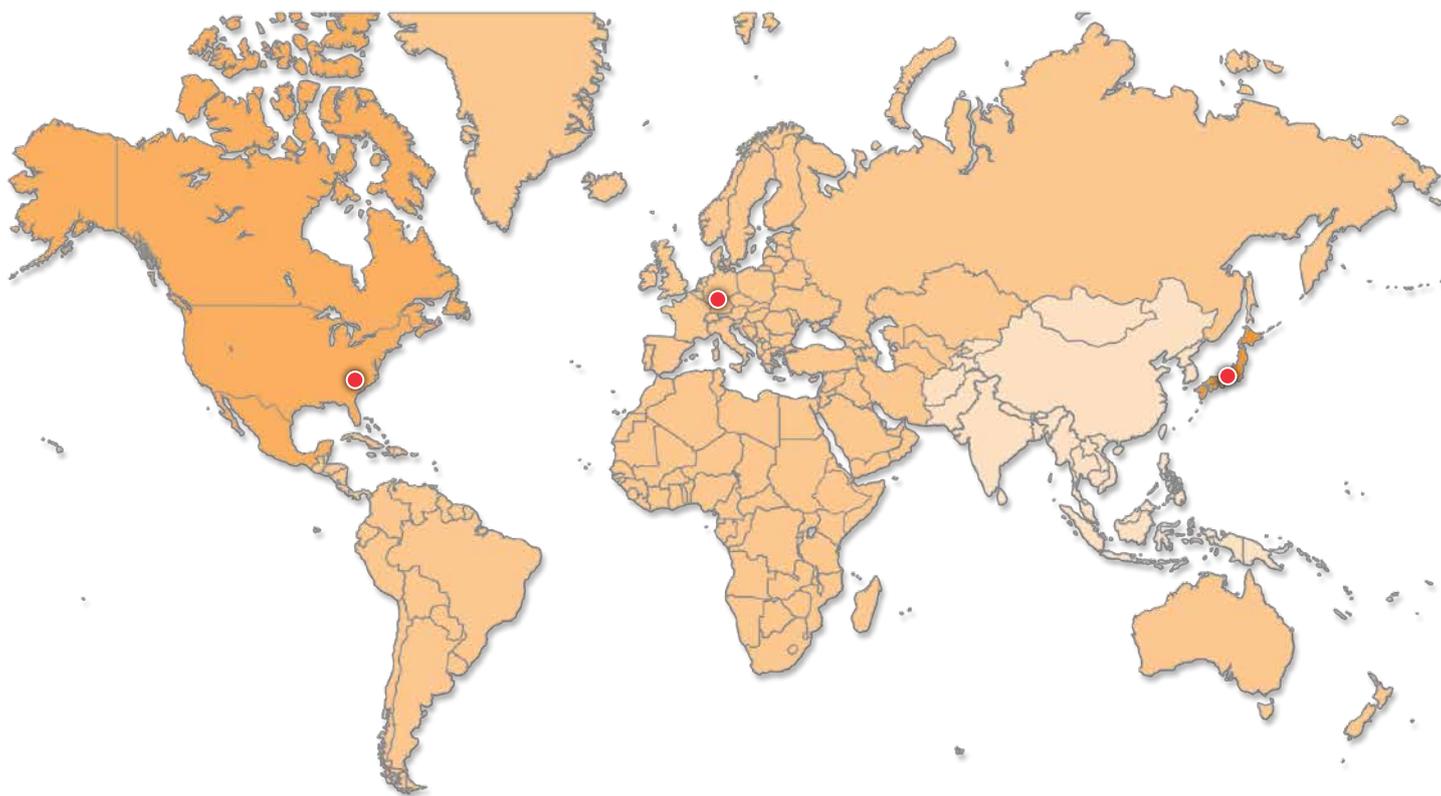
* only alignments and basic measurements

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; *VG Metrology* 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.



Visit our website to learn more about our software, support and training opportunities, custom software development and consulting services.

Headquarters

Volume Graphics GmbH

Speyerer Straße 4–6
69115 Heidelberg, Germany
Phone: +49 6221 73920-60
Fax: +49 6221 73920-88
sales@volumegraphics.com
www.volumegraphics.com

Volume Graphics Co., Ltd.

1-3-19, Osugi, Kita-ku
Nagoya 462-0837, Japan
Phone: +81 52-508-9682
Fax: +81 52-508-9689
sales@volumegraphics.jp
www.volumegraphics.jp

Volume Graphics, Inc.

415 Minuet Lane, Suite C
Charlotte, NC 28217, USA
Phone: +1 704 248 7736
Fax: +1 704 248 0558
sales-us@volumegraphics.com
www.volumegraphics.com



VOLUME
GRAPHICS