

What's New in VGSTUDIO MAX

Discover the Exciting New Capabilities of Version 3.4
(as of July 2020, Version 3.4.1)

VGSTUDIO MAX and myVGL for macOS (New in 3.4.1)

With version 3.4.1, we offer VGSTUDIO MAX and myVGL for macOS again (macOS 10.15 Catalina or macOS 10.14 Mojave). A graphical user interface optimized for the high pixel density of the Mac's Retina display makes working with VGSTUDIO MAX and myVGL on the Mac all the more enjoyable. Also, VGSTUDIO MAX 3.4.1 is the most comprehensive version for macOS yet, offering the array of possibilities introduced with VGSTUDIO MAX 3.4.0 to our Mac users.*

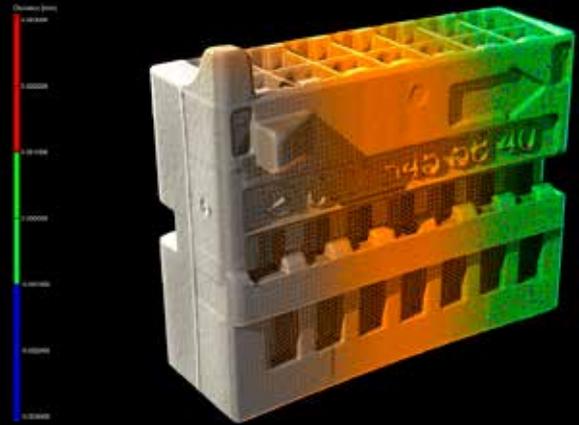


Reverse Engineering

With its auto surface function, the new Reverse Engineering Module makes it easy to convert CT scans into CAD models that you can use in your CAD systems.

You can use these CAD models for products that don't have existing 3D representation—cost-effectively and directly from CT or mesh data—to make manually generated design models available digitally, generate CAD models for old parts where no CAD information (or only 2D drawings) is available, update models in which the actual part or tool looks different than its master CAD model, and enable CAM systems to mill on CAD instead of meshes. All in one software, and without the need for a CAD designer or reverse engineering specialist.

The Reverse Engineering Module creates a pattern of 4-sided patches that follows the edges and main features of the model. By including these character lines, the result is a useful patch layout of untrimmed NURBS surfaces—commonly known as an auto surface model—which can be exported as a STEP file to any CAD system.

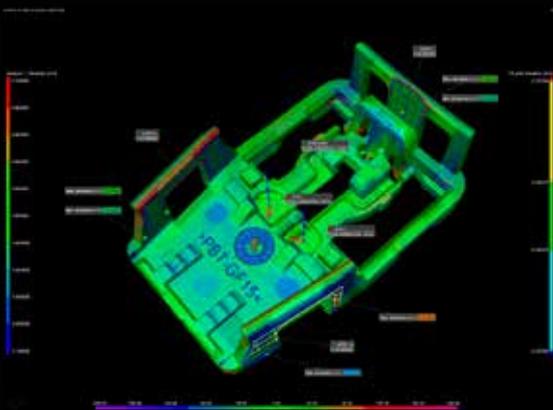


New Visualization Option for Deviations of Geometric Tolerances

A new visualization option gives answers to questions such as: Where exactly are the highest deviations located? How are the deviations distributed on a surface? Which areas of the surface were actually evaluated? Where do the pattern deviations come from? This option is helpful when a pure OK/NOK decision is not sufficient and additional information is required for various reasons (e.g., to adjust manufacturing processes or to decide if a deviation is critical).

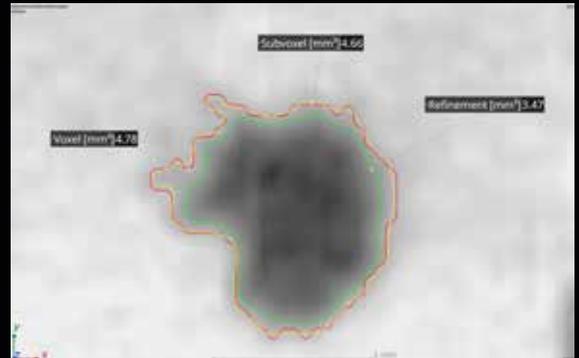
Depending on the toleranced element, certain methods for visualizing the actual deviations can be activated, e.g., a colored and scaled deviation vector for position tolerances, while simultaneously visualizing entire patterns of position tolerances.

Combined with the possibilities of bookmarks, this allows for a visual, comprehensible, and easily understandable communication of a part's geometrical deviations.



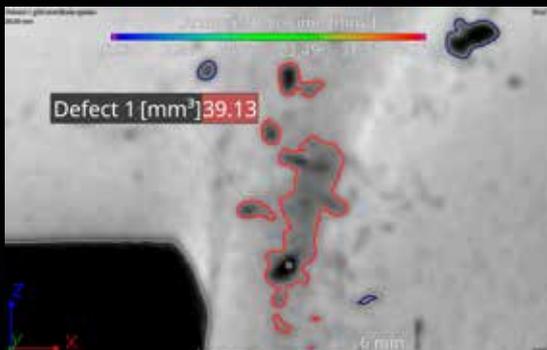
Subvoxel-Accurate Defect Detection with VGEasyPore

You can now capture the shape of defects with sub-voxel accuracy using the new subvoxel-accurate mode of VGEasyPore. This makes it possible to differentiate between gas pores and shrinkage cavities based on the sphericity and compactness of defects. The ability to acquire a more exact shape of given defects also allows you to make better predictions about potential component malfunctions caused by these defects.



Contour Rendering of Defects

With the new "Render outline only" function, a detected defect is not flooded with a color that indicates the chosen property of this defect; instead, only the surface of the defect is displayed in the same color. This allows you to quickly decide if the real size of the defect was segmented by the defect detection using the chosen settings. In data sets with a high number of artifacts (e.g., scatter, beam hardening, noise, and sampling artifacts), defects can sometimes be labeled as too large and thus lead to an unnecessarily high rejection rate, as the defect size is outside the defined tolerance. If you want to correctly segment all defects in this type of data set, contour rendering, which is available for all defect detection algorithms, will help tremendously.

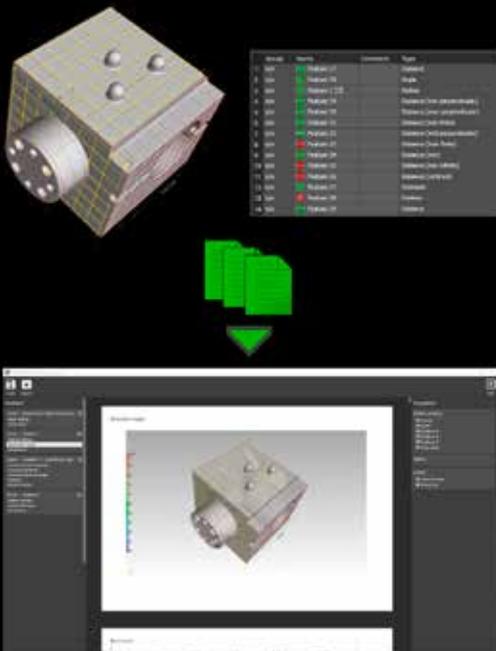
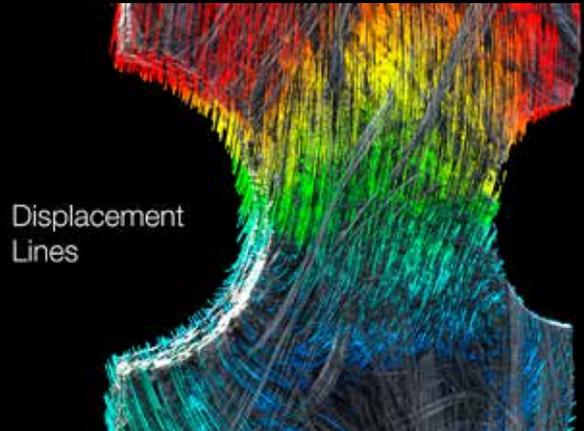


Digital Volume Correlation Module

The new Digital Volume Correlation Module allows you to quantify displacements between an initial and deformed volume in a simple and intuitive way. In material science, this is an excellent tool for quantifying strain and displacements of the visible inner structure of composite materials, foams, or porous components produced by additive manufacturing.

The Digital Volume Correlation Module offers superior support for finding damage in materials using a voxel-based before-after comparison, making it possible to easily export strain tensors with respect to your FEM mesh to validate your FEM simulations. It allows for the convenient alignment of the initial and the deformed volume through the use of VGSTUDIO MAX built-in registration tools and the subvoxel-accurate determination of displacements and strain fields.

Results—such as deformations—can be impressively visualized by using vector fields and strain lines. The equivalent strain or single components of the strain tensor can be shown as a color overlay and mapped directly on a volume mesh to validate the results of your FEM simulations. These meshes can either be imported from other programs, e.g., Patran (.pat) or Abaqus (.inp), or generated using the Volume Meshing Module. The Digital Volume Correlation Module also assists you in detecting arising singularities, like cracks and pores that can hardly be seen with the naked eye, by comparing the initial and the deformed image.



Coming Soon: New Integrated Reporting*

The new integrated reporting function is a fast way to create presentable .pdf reports without having to switch to external software like Microsoft Excel. Reports can contain all or a subset of the reportable content in a scene and are stored in the .vgl file itself, available for later viewing (also in myVGL), exporting, or editing. You can customize the displayable content, such as the table columns or page layouts, making it easy to create a more digestible view of your project data.

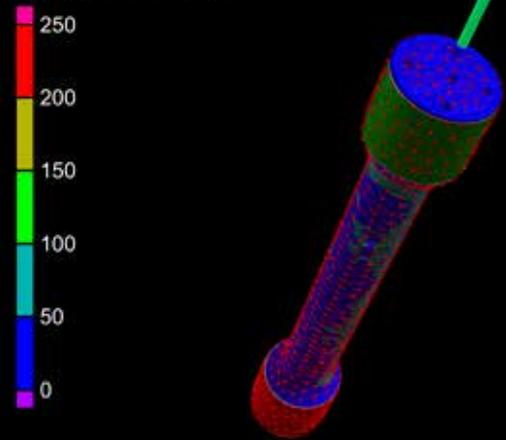
*This feature will be available with a later version of 3.4.

Stress Tensor Export

You can now use a stress field calculated using the VG-STUDIO MAX Structural Mechanics Simulation Module as input in third-party simulation software, e.g., for fatigue analysis, by mapping the stress tensor components onto a volume mesh and exporting them in a .csv format. For each integration mesh cell, the stress tensor components related to the maximum scalar value chosen by the user (maximum von Mises stress, maximum shear stress, or maximum principle stress within the integration mesh cell) will be exported.

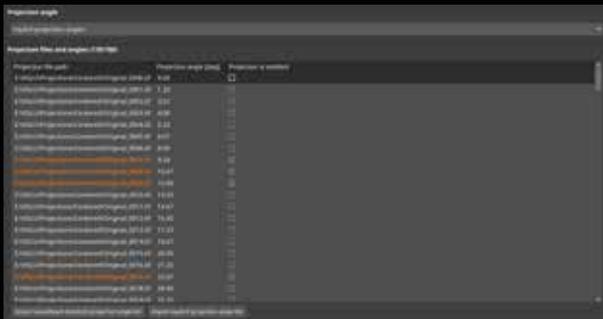
This new export function in the Structural Mechanics Simulation Module allows you to take advantage of a detailed micromechanical simulation on real components for a more realistic and precise assessment of a component's structural performance within your existing simulation workflow.

Von Mises stress [MPa]



Exact Angle Reconstruction for Circular Trajectories

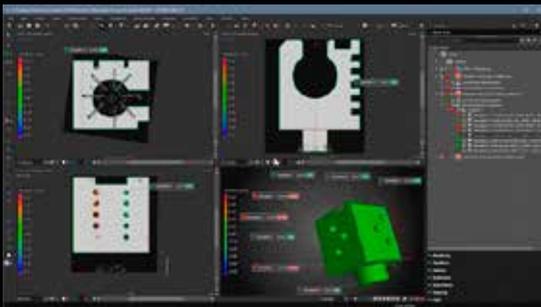
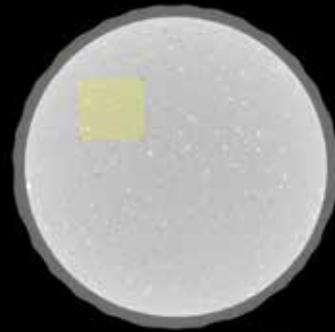
You can now factor in the real angular position of each projection for a high-quality reconstruction. If your CT system is equipped with an angular encoder that provides the actual angular position of each projection, you can now use this information to increase the spatial resolution of your scan—or if some projections went missing during your CT scan, you can now skip these projections and still get a high-quality reconstruction without artifacts from missing or incomplete projections and without having to perform re-scans.



Auto-Adjusting Opacity Curve

You can now save time by using the new, automatically adjusting opacity curve. Based on a rectangle drawn in a 2D view of one object, the contrast for the selected region will automatically be optimized. With one click, the contrast can be converted to an opacity curve that provides the optimal contrast for the selected region. You can also apply this to several objects in the scene to compare the selected region between two or more scans.

This is helpful for the visual inspection of an area of interest or the same area of interest for two or more objects.



New Tool Dock

The new, more intuitive Tool Dock reduces the mouse travel needed to navigate to the next tool. It now has fewer—but more intuitive—icons. Tools can be expanded and collapsed or pinned; by only expanding the currently used tool and automatically collapsing the others, you will eliminate the need for vertical scrolling. Tools that you want to have permanently visible (e.g., the Scene Tree) can be pinned. For the best visibility, expanded tools will always use all the available vertical screen space.

Support of 4K Displays

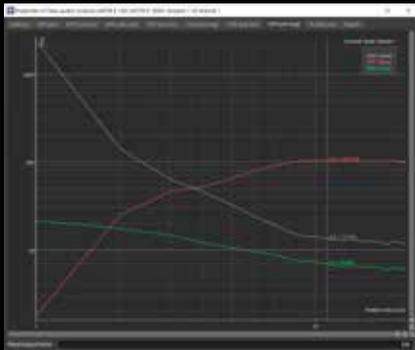
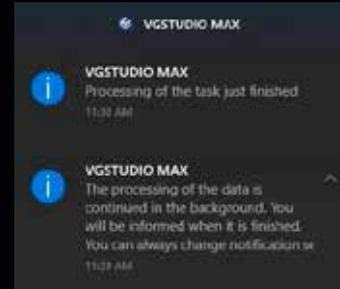
Enjoy a crisper, sharper, and scalable graphical user interface of all applications on 4K displays.



Operating System Notifications

When running other applications parallel to Volume Graphics software, you will now receive a notification when calculations or other processes in the Volume Graphics applications are finished.

This allows you to work simultaneously on other tasks without missing important developments in Volume Graphics applications.



Contrast Detail Diagram According to ASTM E 1441

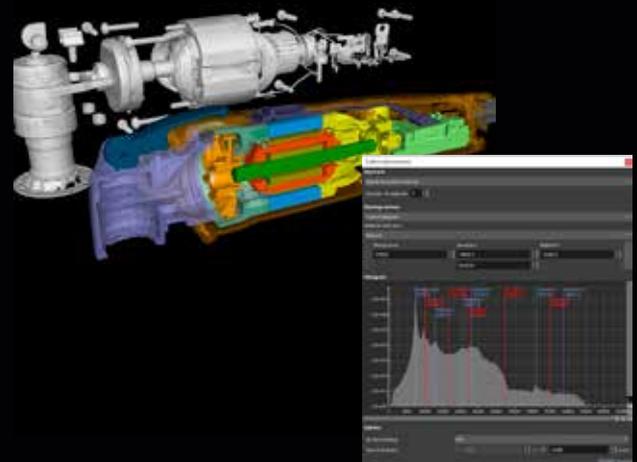
You can now monitor the state of your CT system over time by calculating the Contrast Detail Diagram (CDD), which combines structural and contrast resolution in one measurement according to ASTM E 1441. This parameter estimates the minimum contrast that a feature of a given size must have in order to be detectable.

The new measure is supported in addition to the MTF (Modulation Transfer Function) and CDF (Contrast Discrimination Function).

Faster Multi-Material Surface Determination

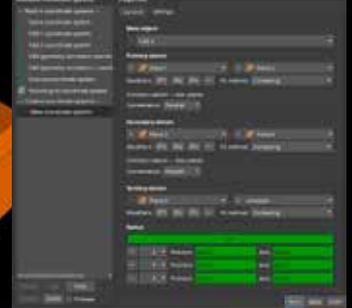
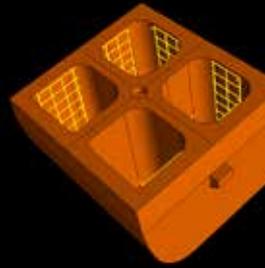
The calculation time of multi-material surface determinations is now almost twice as fast (depending on your system configuration), as it utilizes the graphics processing unit (GPU) of your computer.

With the option of using the GPU for time-consuming advanced surface determinations in multi-material data sets, you will experience fewer disruptions in your manual workflows and a smoother inline operation.



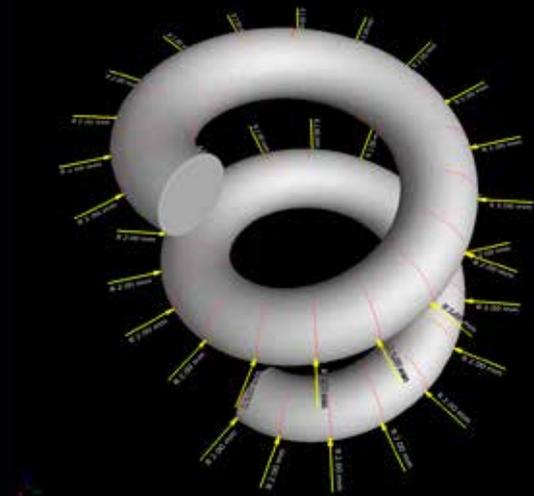
Preview in Coordinate System Editor

A new preview option in the coordinate system editor allows you to interactively see changes in the views while you create or modify a system. For example, with the preview option, it is no longer difficult to select the correct axis labels and orientations when creating a new coordinate system (e.g., 3-2-1 or datum system).



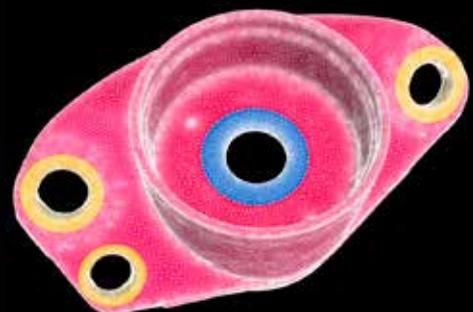
Helix Pattern in Coordinate Measurement Templates

Coordinate Measurement Templates now support helix patterns, which allow you to more quickly measure parts with re-occurring geometries along a helical path (e.g., threads and gears).



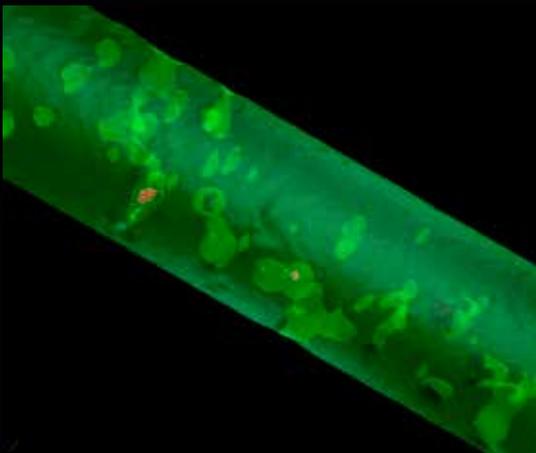
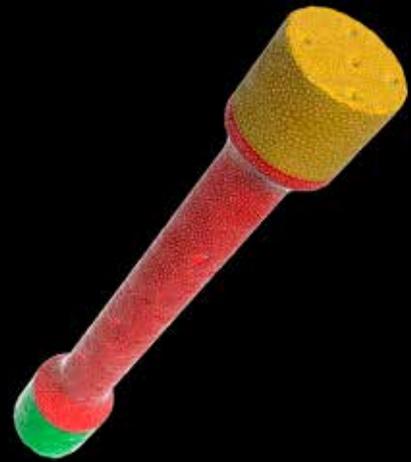
Finite Element Entity Sets Follow ROI Outline

You can now create finite element (FE) entity sets for facets and nodes based on ROIs with element nodes that are aligned to the borders of the defined ROI. Since the intended FE entity set contour will be created following the underlying ROI outline, you can create very accurate, geometrically well-defined FE entity sets to create boundary conditions in third-party FEM software. The contour of the created FE entity set is independent of the chosen element size and other meshing parameters. It enables mesh quality optimization and purging, making FE entity set definition efficient, reliable, and robust.



Color Overlay for Finite Element Entity Sets

FE entity sets can now be visualized with a color overlay. The new visualization function adds comfort and control when defining FE entity sets to create boundary conditions in third-party FEM software. It enables the visual inspection of the created FE entity set before export and thus minimizes the need to switch between VGSTUDIO MAX and FEM preprocessors, allowing you to perform the complete workflow (creation, visual inspection, correction, and export) in VGSTUDIO MAX.



Visualization of Unconnected Element Sets

It is now easier to remove scanned and meshed non-structural content, e.g., dust or loose particles, from a created volume mesh. A new visualization feature enables you to review the identified, unconnected element sets of an FE mesh in a different color before purging them, which enhances your control over the final mesh.

Quick Play for Macros

You can now save time by quickly triggering freely configurable macros that contain arbitrary functions via predefined shortcuts, including the handling of file outputs. Quick play for macros allows you to easily automate and execute repeating steps in an otherwise manual workflow.



File I/O

- > The quick file integrity check function protects your .vgl projects from loading incorrect reference volume data. It offers an equal level of security compared to the full check while reducing the demand on hardware resources, like CPU usage and network traffic.

Visualization and Navigation

- > Faster creation and replacement of bookmarks, resulting in performance that is nearly 10x faster in complex projects that have, for example, a large number of coordinate measurement objects.
- > Preference options for changing the appearance of the indicator in all views, allowing you to adjust size and shape (e.g., circle) of the indicator and thereby ensuring that the indicator itself is not covering what you actually want to show.

Coordinate Systems

- > User-defined axes in datum systems: You can now specify the axes labels and orientations during the creation of a datum system in the coordinate system editor, allowing you to create a datum alignment where the views mirror those in your drawing or CAD system.

Surface Determination

- > Faster preview and calculation of the (classical) advanced surface determination when using surface healing to remove voids or particles from the initial surface determination.

Geometry Elements

- > Improved refitting and accuracy for profile tolerances: When profile tolerances need to be evaluated on complex shapes, it may be difficult to specify a measurement template that can be applied to several different objects. But now, freeform surfaces created on CAD faces are watertight on common edges and can be refitted more reliably due to the ability to specify a number of iterations for the refitting process, which also improves the accuracy of profile tolerances.
- > You can automatically adjust the size of geometry elements on the actual object: Until now, geometry elements have kept their original size (from the time they were created), even when they are applied to a different object, which requires the user to manually trigger a size adjustment (e.g., to the resulting fit points). Now, the user has the option to automatically refit the size on the actual object for fitted geometry elements. Combined elements (e.g., symmetry) will always adjust their size immediately according to their source elements.
- > Option to change the storage system for several geometry elements at once: In earlier versions, the adjustment of the storage system of a geometry element could only be done by editing each individual element, making it time-consuming to adjust measurement plans. Now, an additional column on the geometry element tab of the CM report shows the storage systems of all geometry elements and allows you to select several geometry elements at once and change their storage system.

Alignment

- > Align objects by local coordinate systems: You can now easily align two different objects (e.g., the nominal CAD model and the actual volume) relative to each other according to a certain alignment method, e.g., 3-2-1 or datum, by simply selecting both local coordinate systems and using the "Apply transformation" function without needing to change the alignment of the nominal object.

Dimensional Metrology

- > Improved handling for the creation of features and geometry elements: You now have more options (e.g., to clear the fit points) in the context menus of the 2D and 3D views when creating geometry elements and features. This makes it more efficient to create measurement templates, since interactions with dialogs can be reduced or completely omitted.

All Analyses

- > Because the active column is now doubled on the colors tab of all defect detection analyses, you no longer have to go back to the "Settings" tab to change the active column (and thus the information presented by the color overlay and the annotations).

Porosity/Inclusion Analysis

- > Rectangular reference faces for 2D porosity analyses according to P 202 and P 201: By allowing the use of rectangular (instead of square) shapes to define reference faces in accordance with P 202 specifications, the analysis area (i.e., the shape of the reference face) can now be better adapted to the area of interest.
- > Increased performance for porosity/inclusion analysis on ROIs: You now benefit from an improved performance when calculating a defect detection analysis on ROIs and extracted ROIs using internal cleaning.

Nominal/Actual Comparison

- > ROI from a nominal/actual comparison: Creating an ROI from nominal/actual comparison components makes them directly available for further use in practically everything that works on ROIs, e.g., alignments, object conversions, analysis, or component geometry corrections. This way, the surface areas with a certain deviation range (components) immediately become available for further processing, e.g., to apply dedicated render settings, exclude or include the areas from further analysis, or surface extractions. These workflows can also be completely automated.

Macros

- > Saving of last-used automation elements: Because the application now remembers a set of macros and automatically makes it available after startup, you no longer need to manually prepare the application after each startup in scenarios where the same workflow is used repeatedly for a longer period of time.

Reporting and Traceability

- > "Save image(s)" stores last-used settings: When manually inspecting a part and creating a series of images, "Save image(s)" now remembers the last settings that were used, such as resolution or picture-in-picture mode. This makes your inspection process faster and smoother, especially in combination with the new shortcut for the quick play of macros.



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