WINWERTH®

THE 3D MEASUREMENT SOFTWARE FOR ALL TASKS
ON THE SHOPFLOOR AND IN THE LABORATORY
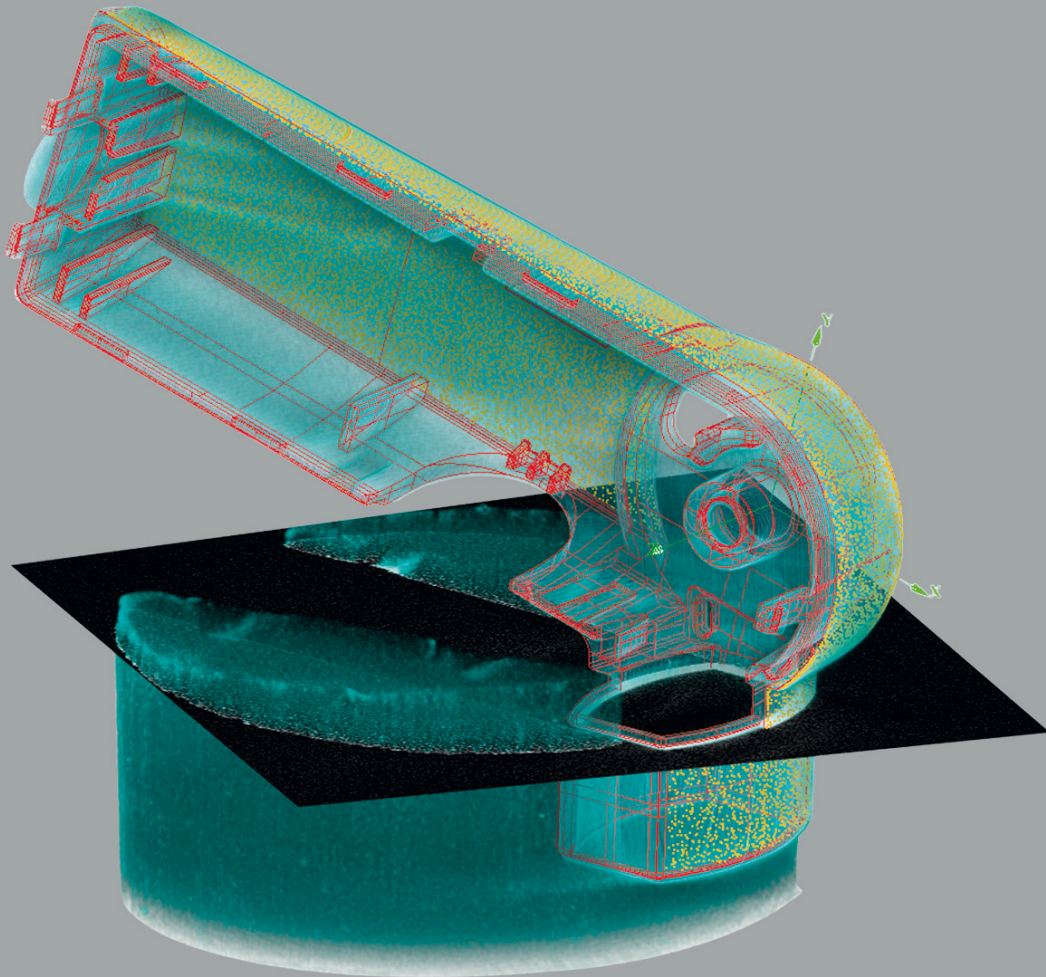
WinWerth® Version 8.42

Dear customers,

WinWerth® 8.42 measurement software has many new functions for multisensor systems and X-ray tomography.

For coordinate measuring machines with multisensor systems, 2D CAD Online® and 2D CAD Offline® functions have been integrated in the 3D Graphic alongside simple measurements with PMI support.

In the field of X-ray tomography, the new FormCorrect method can speed up the product development process. In addition to the CAD model and measurement point cloud, the voxel volume can now be shown in the same coordinate system in the 3D module. Volume Patch Selection, for example, enables measurement of multi-material workpieces at high lateral resolution, out to the edge of the workpiece.

There are many details that improve user-friendliness, such as expanded dimension display in the 3D graphic, automatic detection of the geometric element when the CAD model is clicked, and color-coded deviation plots with adjustable spike width to improve readability.

For an update or upgrade, please contact our sales team by phone at +49-641-7938-519, send an email to export@werth.de or contact your local dealer.

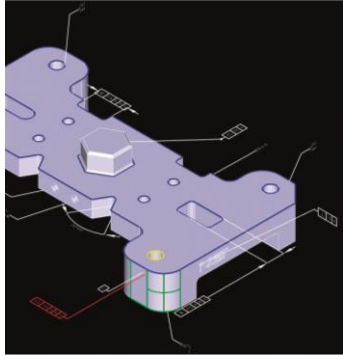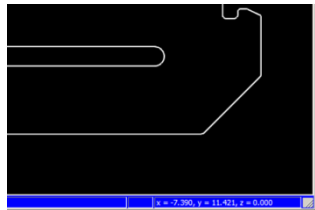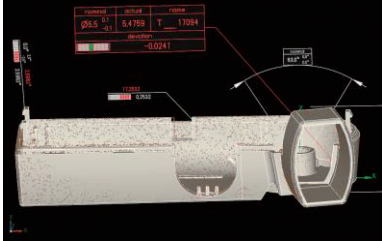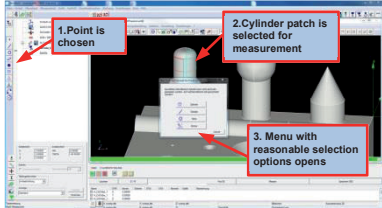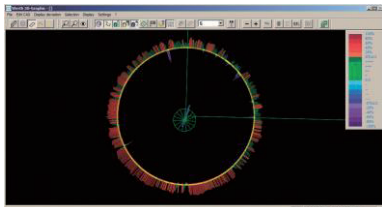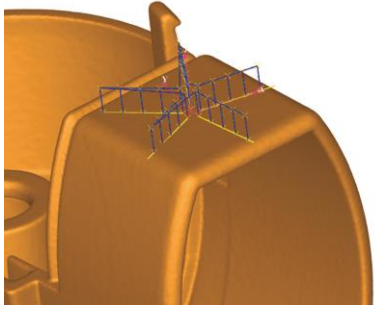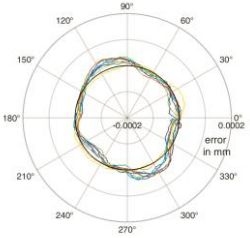We wish you continued success in your work with WinWerth®.
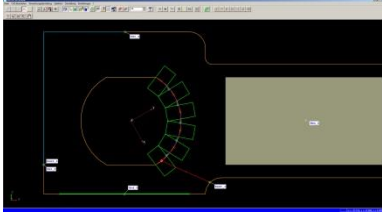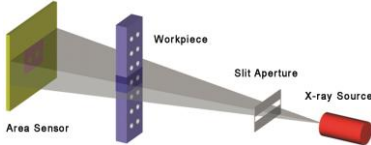

Best regards from Giessen,

Your team at Werth Messtechnik GmbH

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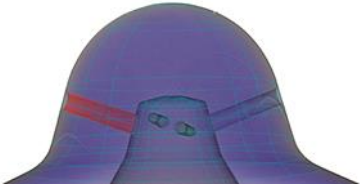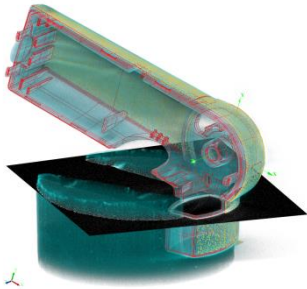|		
WinWerth® General Functions (Option) **3D-PMI**	**Easy measurements with PMI support** Many CAD systems now have the ability to integrate PMI data (Product and Manufacturing Information). In addition to the geometric description of 3D surfaces, this data also contains the dimensions, tolerances, and reference elements defined by the designer. • A measurement sequence based on the PMI data can now be created in record time from the WinWerth® interface. • When the desired geometric property is selected, all geometric elements to be linked for the solution are highlighted in color. • The geometric elements can be clicked in sequence, the probing strategy can be modified, and immediate measurements can be taken in CAD Online® mode for automated scanning path and point distribution measurements. • Specified values and tolerances can be extracted from the PMI data at the push of a button and modified manually as needed once the measurement is complete. • With PMI, task interpretation is simplified and transmission errors are minimized.	 *By clicking on the geometrical characteristic, the elements that must be measured are color coded, for example with a blue border*
WinWerth® General Functions (Standard)	**Status line in the 3D graphic** The current cursor position in the current coordinate system is shown in the bottom right corner of the graphics windows (status line). To improve readability of the coordinates and the number of points, the status line contents are now displayed in color.	 *Status line*
WinWerth General Functions *(Standard)*	**Encrypting measurement sequences** WinWerth® measurement sequences can now be protected against undesired changes. With encryption, the text in the DMIS file is no longer legible.	

WinWerth®
 	
General Functions
(Standard)
	Intelligent illumination concept
	
	When switched on, light sources on the CMM cause local warming of the workpiece.
	
	• The lights switch off automatically when the axes are not moving.
	
	• The lights are switched on
	  o To capture a picture
	  o When positioning with the joystick
	
	• The most recently recorded scene is always displayed on the video image.	

WinWerth® General Functions (Standard)	**Maximum inscribed/minimum circumscribed and MZ elements** A new algorithm has been integrated to improve calculations for inscribed/circumscribed and MZ elements (PTB-certified) on critical point distributions.	
WinWerth® General Functions (Standard)	**Expanded dimension representation in the WinWerth® 3D graphic** The options for displaying dimensions in the WinWerth® graphic have been improved. • Representation of geometric properties has been optimized. • Geometric properties are displayed in accordance with the ISO 16792 standard. • Deviations from the specified value are shown with color coding (green highlight: measured values within tolerance; red highlight: measured values outside of tolerance). • The dimension reference lines shown make it easy to associate the measured values with the corresponding features. • Source elements of the measured geometric feature are displayed in the graphic.	 *The displays of the dimensions can be edited, and each dimension can be hidden or unhidden*
WinWerth® General Functions (Standard)	**Change elements automatically** The automatic scan path and point distribution based on the CAD model is available with strategies such as helix, circles, surface lines and others for various elements. • If the form element selected in the element selection list matches that of the selected patch element, then the associated point distribution is now started automatically. • If the form element selected in the element selection bar does not match with the selected patch element, then the element in the selection bar is now modified automatically. If the selected CAD element cannot be clearly associated with a measurement, then a menu (right) appears and the operator can select the element to be measured. The point distribution is then started automatically.	 *3D-CAD-Online® with scan path distribution*
WinWerth® General Functions (Standard)	**Color-coded deviation plot now more flexible** • To improve operation and visibility, the superelevation of the deviation is now adjustable. • The new feature also applies to graphic plots of axial and radial runout. • If desired, only the deviations that fall outside the tolerance range can be shown.	 *Color-coded plot of runout error*

WinWerth® General Functions (Standard)	**Measuring Spot Sensor – tactile measurement strategies for point clouds** The new measuring spot sensor allows simulation of a tactile scan path and point distribution for point clouds. • As with tactile sensors, the software automatically distributes the measurement points or scan lines across the selected geometric elements. • The target element can be defined via patch selection or by entering the parameters. • Depending on the geometric element, many different distribution strategies are available, based on helical, circular, and cylindrical surface lines; raster; stars, spirals, boundary curves and polylines. • The scan path or point distribution can be edited and tested either online during interactive measurement on the CMM, or offline at a remote workstation. • Existing measurement programs with automatically generated scan paths and point distributions can now be used for evaluating point clouds, and vice versa. • With the new function, for example, point clouds of gear teeth can be analyzed using the WinWerth® GearMeasure software.	 *Simulation of a tactile point distribution on a point cloud*
WinWerth® General Functions (Option)	**Werth Interferometer Probe (WIP)** The extensive range of sensors available from Werth Messtechnik GmbH allows the right machine configuration to be found for any application. • The WIP is a highly accurate optical distance sensor. • The measurement probe is an optical fiber with a diameter of, e.g. 125 µm, with geometry that can be adapted to the individual requirements of the measurement task. • The probes can be changed out automatically by the WMS (Werth Multisensor System) and a parking station. • The version with a WIP/RS probe rotation device can be used for highly accurate roundness measurements. • The WIP is suitable for capturing very small, deep geometric properties at high precision, such as for fuel injectors. • The WIP is also suitable for measuring roughness and flatness, for example on deeply embedded, sensitive bearing surfaces in large transmission housings. As with all sensors for use on Werth coordinate measuring machines, the WIP is calibrated using SCALIB.	 *Werth Interferometer Probe (WIP) – the measuring probe is a long, light-conducting glass fiber with a standard diameter of 125 µm* *Roundness measurements with minimal measurement errors of about 100 nm*

WinWerth® General Functions (Option) **2D-CAD Online® / 2D-CAD Offline®**	**Aligning and teaching with a click of the mouse using 2D-CAD Online®/Offline®** Measurement programs are easy to create using 2D-CAD Online® or 2D-CAD Offline®. • The controls are integrated in the 3D graphic of the WinWerth® software program. • The Raster Scanning HD (patented) and AutoAlign options are now available for CAD-based measurements. This makes it much easier to align the coordinate systems of the CAD model and the workpiece. • WinWerth® automatically detects the target element and generates a point distribution when the CAD element is clicked. • In addition to lines, circles, points, and planes, contours can also be scanned and now camfers and edge radii can be measured fully automatically in conformance with standards.	 *With 2D-CAD-Online®, various geometric elements can be measured directly by clicking the Werth 3D graphic.*
WinWerth® General Functions (Option) **Part of: Raster scanning HD N and Rasterscanning HD P**	**WinWerth® profile comparison** The patented raster scanning HD method can be used to capture an entire workpiece automatically at high resolution. • The raster image thus produced can now be superimposed in workpiece coordinates in the Werth 3D graphic with the 2D-CAD model in DXF format. • The actual condition in the raster image can now be visually compared with the specified condition in the 2D CAD model. The software takes on the function of a profile projector. • The result is a fast, visual inspection of various geometries. • Problem areas can be zoomed quickly, as the image has very high digital resolution. • A BestFit analysis with color-coded deviation plot is available as an option. The deviations can also be displayed in flags, and the least and greatest deviation are detected automatically.	 *Raster image superimposed on a DXF file, with color-coded deviation plot from contour comparison*
Computed Tomography (Standard)	**Accelerated STL calculation** Calculating the point cloud for high-resolution measurements after the CT is complete was significantly accelerated. • By optimizing the software, the time for the STL calculation has been reduced significantly (by a factor of 5).	

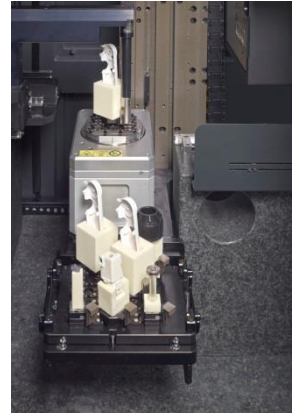|		

Computed Tomography
(Option)
 	
Prerequisites: Raster Tomography resp. slit aperture
	Reducing cone beam and scattered radiation artifacts
	
	When measuring workpieces with long radiographic length or high material density, scattered radiation and cone beam artifacts often occur. Both effects make inspection tasks more difficult and degrade measurement uncertainty when determining geometrical characteristics.
	
	• Using Scattered Radiation Artifact Reduction (SAR), a special aperture in the X-ray beam path, and the Raster Tomography mode, these interfering effects can now be greatly reduced.
	
	• Advantages:
	  o Reduction in scattered radiation with the use of an aperture for partially penetrating the workpiece in Raster Tomography mode. The detector range is adjusted automatically to match.
	  o Reduction in cone beam artifacts and saving investment in a line sensor, as this function is handled by the area detector by adjusting the active detector range
	  o With flexible adjustment of the line width, an optimal compromise between measurement time and quality of the measurement results can be selected.
	  o SAR Scattered Radiation Artifact Reduction allows highly accurate measurements of the entire workpiece, with reduced artifacts even for workpieces that have always been difficult to measure.
		
		SAR Scattered Radiation Artifact Reduction with slit aperture and Raster Tomography

Computed Tomography (Option) **WinWerth® FormCorrect**	**WinWerth® FormCorrect – a new 3D correction process for workpieces** For production processes such as injection molding and 3D printing, systematic deviations in geometry occur due to the process. The root cause may include deviations in production parameters, poor quality simulation of the shrinkage processes, inhomogeneous filling of the mold, and inhomogeneous cooling of the workpiece. • FormCorrect generates a modified CAD model for plastic injection molding or 3D printing in order to correct systematic manufacturing deviations. • FormCorrect automatically generates corrected CAD surfaces, which are fitted into the workpiece CAD file. • Due to this high precision, often only one correction iteration is needed for FormCorrect, which greatly reduces the cost of the development process. • FormCorrect is based on measurement data. These can be generated completely and precisely with Werth TomoScope® machines.	

Computed Tomography (Standard)	**Volume Patch Selection now more flexible** Precise calculation of the measurement points captured using X-ray tomography was optimized especially for multi-material workpieces. • The new volume patch selection now allows high-precision measurement of multiple-material and high-density workpieces. • From voxel volume data, local measuring points can be calculated CAD-supported in areas of interest. • Measurement results are improved, so that workpieces with even tighter tolerances can be measured. For some workpieces, this is the only way to calculate the desired measurement points. • For example, for multiple-material workpieces such as metal and plastic components, standard 3D geometries can now be analyzed at the material boundaries without having to separately calculate the measurement point cloud for the low-contrast plastic, which typical has artifacts. • For fuel injection components with tight tolerances on geometric properties in the injection orifices, the new method increases lateral resolution.This allows safe measurements even at the outermost edge regions of the workpiece.	 *The measuring points (red), generated through Volume Patch Selection, can be displayed simultaneously with the voxel volume (blue) through volume rendering*

Computed Tomography (Option)
 	
**WinWerth®
VolumeCheck**
	WinWerth® 3D graphic with volume rendering
	
	Voxel volume representation has been integrated in the 3D module of the WinWerth® measurement program.
	
	• Three different views can be used in parallel and individually hidden or shown in the display.
	
	    ○ Displays the entire volume, that is, every voxel and the associated grayscale value.
	    ○ In the "ISO Surface" view, only voxels that have the selected grayscale value are displayed.
	    ○ 2D cross sections can be displayed after selecting the desired plane.
	
	• All variants can be rotated in three dimensions, so they can be analyzed from all sides.
	
	• The CAD model, voxel volumes, and measurement point cloud are shown superimposed in the same coordinate system. With color and transparency settings, they can be easily visualized to evaluate the data.
		
		The WinWerth® 3D graphic depiction options include: CAD model (red lines), voxel volume (green) and measurement point cloud (yellow)

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Computed Tomography (Option)	**New workpiece changing system** The workpiece changing system for series S, L, XL, and XL NC TomoScope® machines enables workpieces to be fed in automatically for optimal machine utilization. The workpiece carriers are located in the machine, so that measurements can be run during "unmanned" shifts without further measures for radiation protection. • Workpiece carriers of various sizes can now be set at any position on the pallet without prior calibration. • With the ability to use several fully loaded pallets, setup times are greatly reduced. • Save time by using the loop function for rapid teaching of series production measurements. • With the change from a pneumatic to a purely mechanical solution, the new workpiece changing system is now more reliable and maintenance-free.	 *Positioning of workpiece carriers is now possible anywhere on the pallet without calibration*

Notes
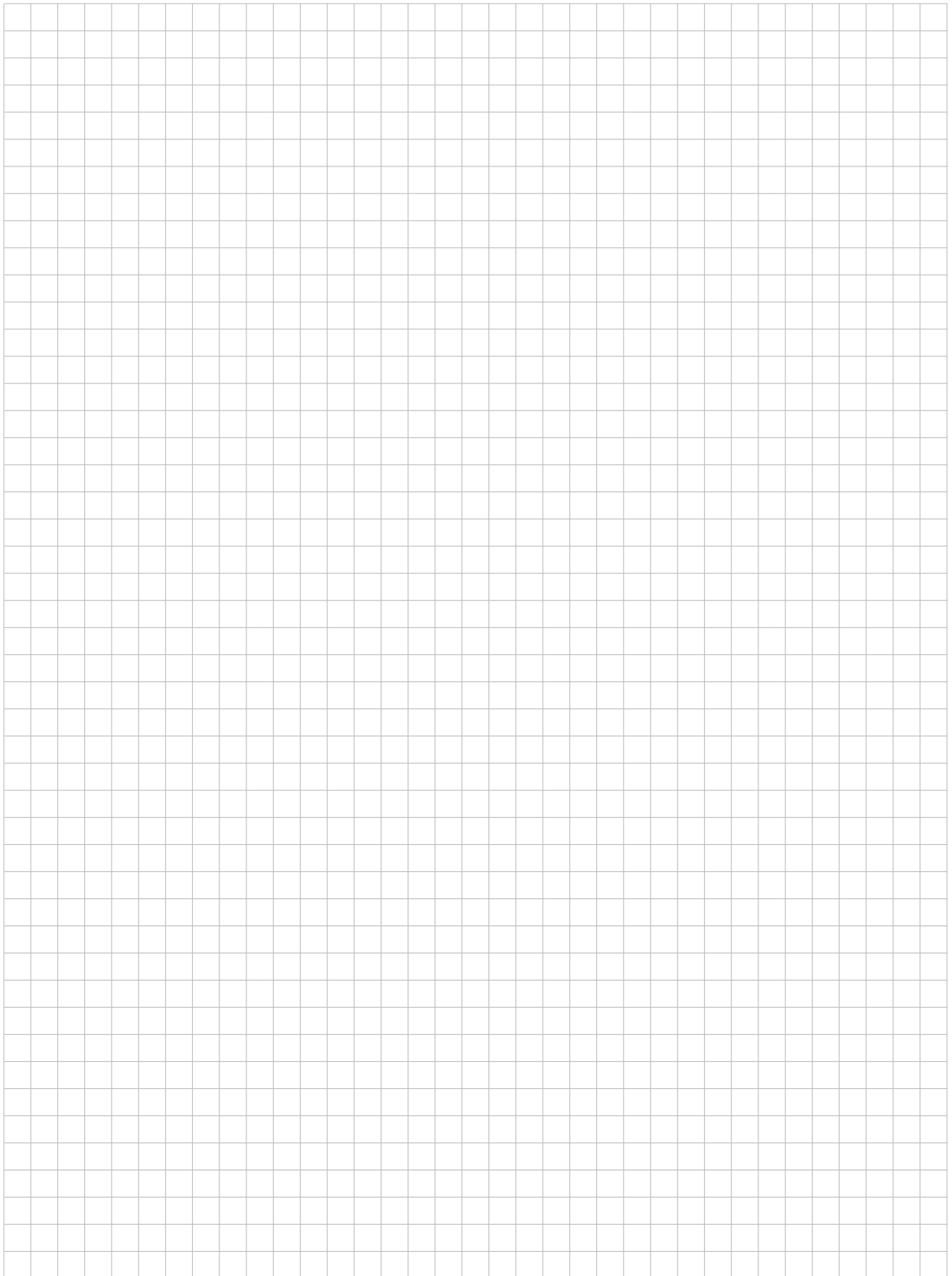
Version Information WinWerth® 8.42
New Features