Software Guide *MMD Box*

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January 2026

MMD Measurement Software User Guide

1. Introduction

The “MMD Measurement Software” is a program that acquires measurement data on-site, performs calculations, and presents the results. The “MMD Measurement Software” program is used when carrying out Kiln Alignments to measure:

- Supporting Roller Shaft Deflection
- Tyre Throw
- Girth Gear Throw

The above measurements are referred to later in this manual as **Inspections.**

2. System requirements

The software requires Windows 10 or newer. The minimum system requirements are:

- Windows 10 or later (64-bit or 32-bit)
- Quad-core 2.0 GHz or faster processor
- 4 GB or higher RAM
- 1 GB free disk space or more
- Full HD resolution (1920x1080) or higher
- DirectX 10-compatible GPU for better performance
- .NET Framework 4.7.2 or later (installed by default on Windows 10)

Notes for Installation

1. Ensure your system is up-to-date with the latest Windows updates.
2. Install the latest graphics drivers for optimal performance.
3. Administrative privileges may be required to install the application.

3. Installation of the software

The software can be installed on the user's PC by running the MMD Measurement Software setup file and following the instructions.

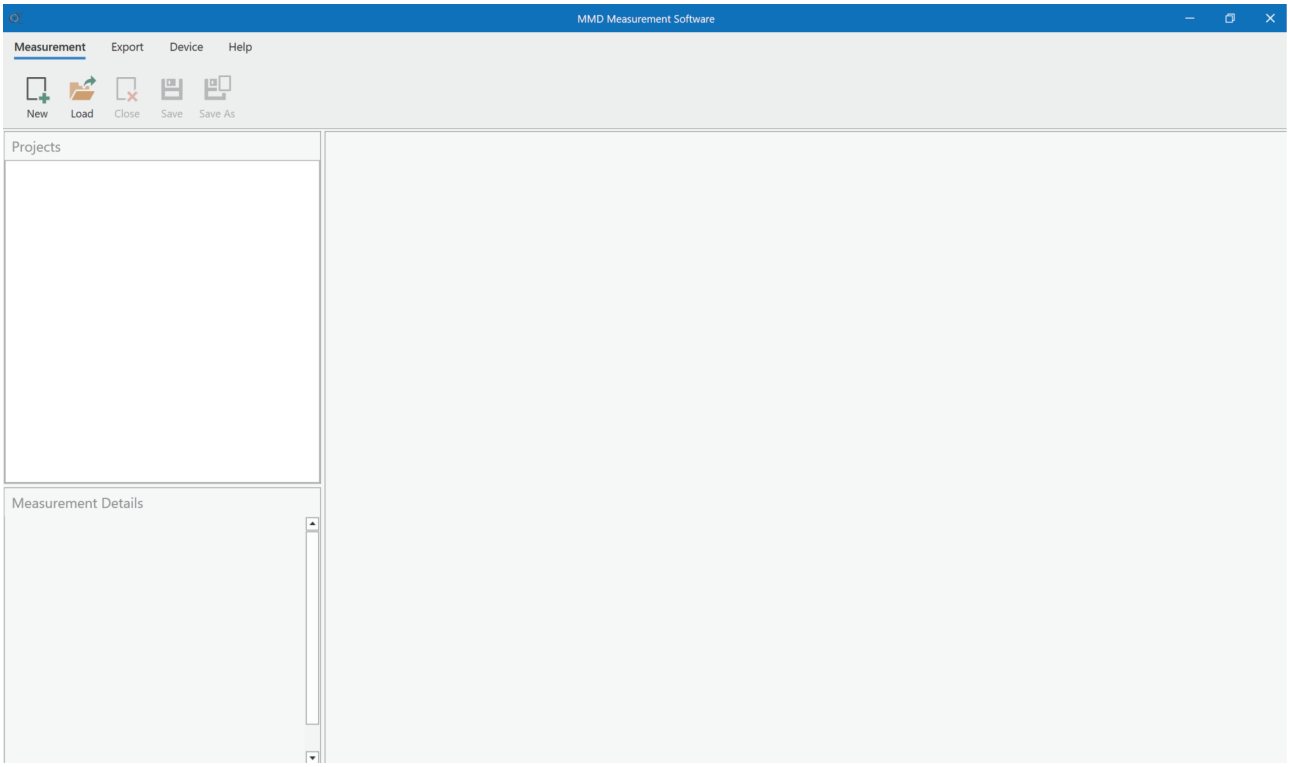
4. User interface

The MMD Measurement Software user interface is designed to be intuitive and easy to use. After opening the software, you can see interface as shown in the below picture.

The main window is divided into several key areas:

A. **Menu Bar:** Located at the top, providing access to various functions through drop-down menus.
B. **Projects Panel:** Located on the left side, displaying a list of available measurements.
C. **Measurement Details Panel:** Located below the projects panel, displaying information about current project and inspection.

Main Workspace: The large central area where project data is displayed and manipulated.



5. Measurement Setup Screen

The Measurement Setup screen is used to define the measurement parameters before connecting to the device and starting the measurement.

Users can enter general measurement information and select the appropriate measurement configuration based on the application.

6. Taking Measurement

6.1 Connecting the MMD to the PC

Connect the MMD Box to the PC using a USB cable.After connection, wait a few moments while the operating system automatically installs the required device drivers.Once the installation is complete, the MMD device will appear in the Windows device list.

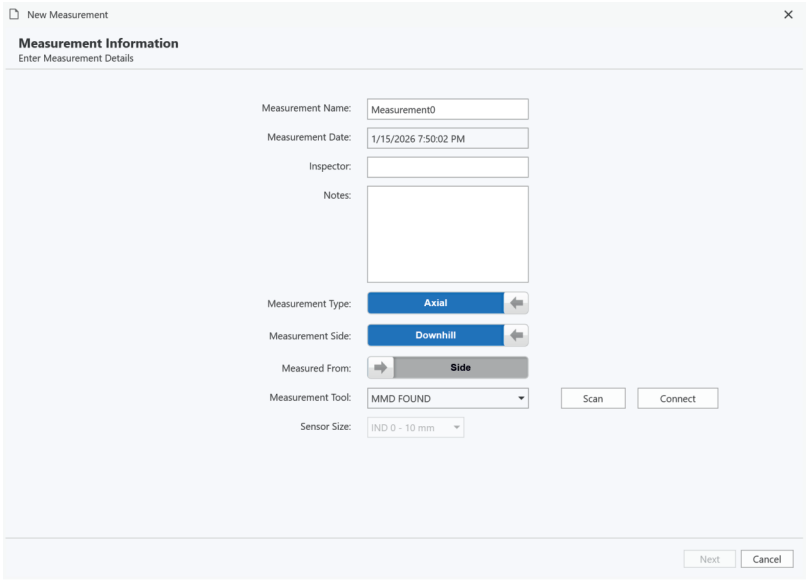


Figure 6-1 Axial Measurement Setup

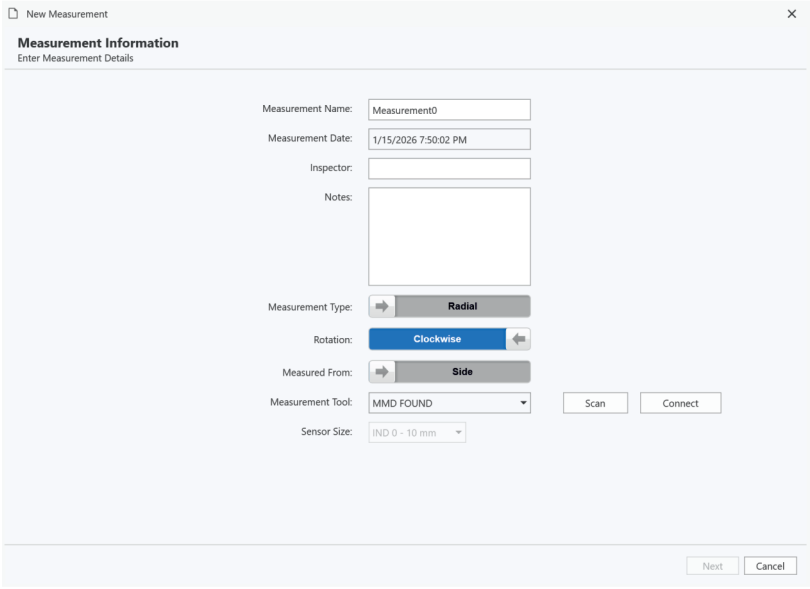


Figure 6-2 Radial Measurement Setup

6.2 Device Connection and Sensor Selection

If the device is not detected automatically, click “Scan” to search for the MMD device.
When the MMD device is found, click “Connect” and select the correct sensor size and sensor channel according to the connected sensor.

Click “Next” to proceed to the measurement screen.
Click “Start Measurement” to begin the measurement.

For measurements requiring multiple rotations, click “Next Rotation” after each completed rotation.

Note: Selecting an incorrect sensor size or channel may result in inaccurate measurement results.

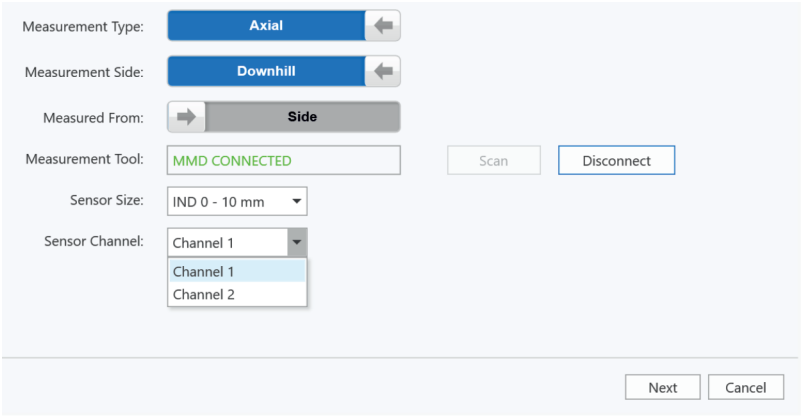


Figure 6-3. Sensor channel selection screen (Channel 1 / Channel 2).

Figure 6-4. Sensor size selection screen for inductive and laser sensors.

6.3 Measurement Screen and Rotation Control

During the measurement, live data from the device is displayed graphically on the measurement screen.

Click “Start Measurement” to begin data acquisition.
The measured values are displayed in real time on the graph.
For measurements requiring multiple rotations, click “Next Rotation” after each completed rotation.
Click “Stop Measurement” to end the measurement.

After stopping the measurement, the software processes the collected data and prepares the results for review.

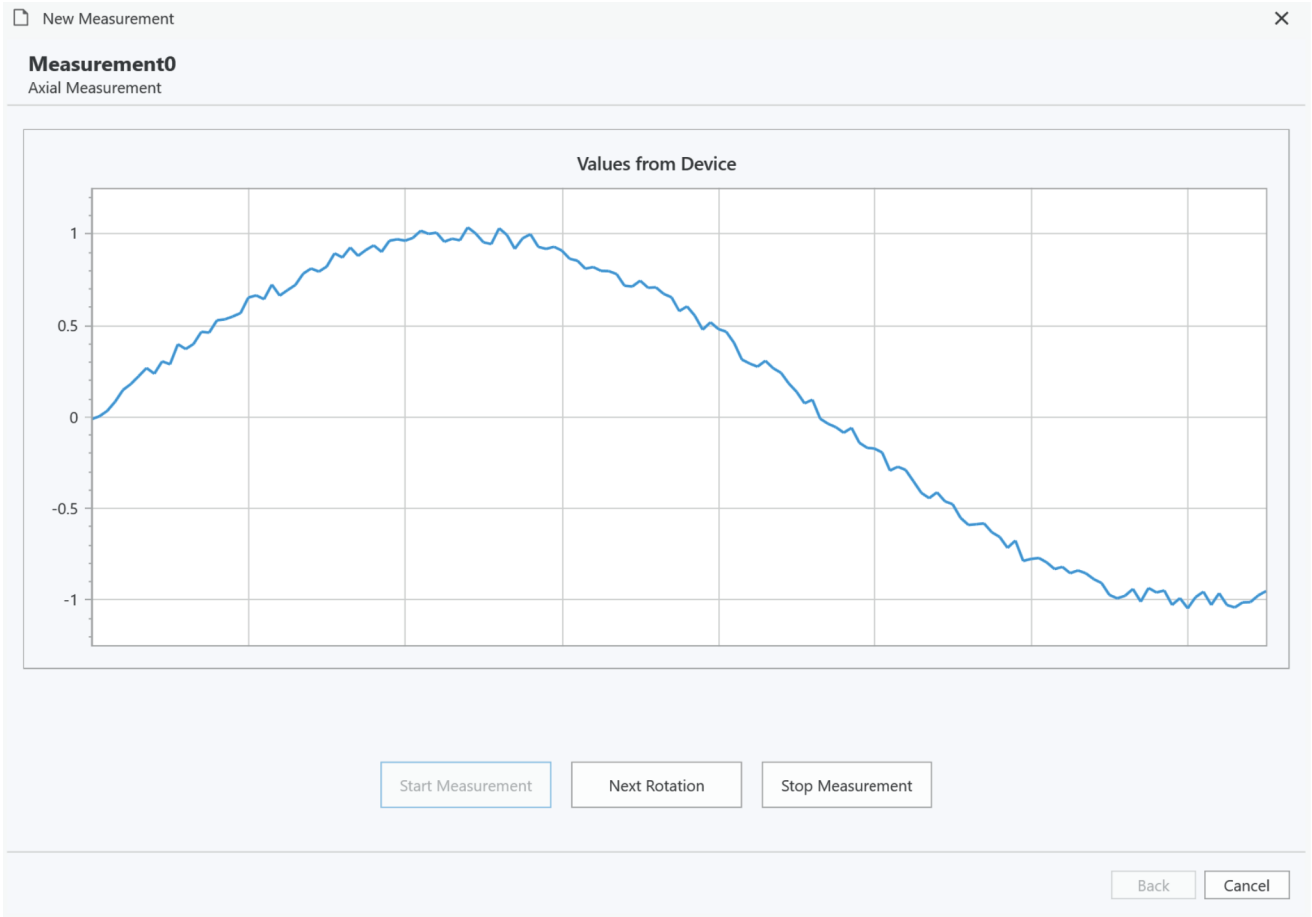


Figure 6-5. Measurement screen showing live data from the device during an axial measurement.

When all required rotations are completed, click “Stop Measurement”. The software automatically calculates the measurement results.

The result graph and detailed measurement information are displayed on the next screen.

6.4. Measurement Results and Acceptance

After the measurement is completed, the software displays the calculated results and graphical representations of the measurement data.
Click “Accept” to add the measurement to the current project.

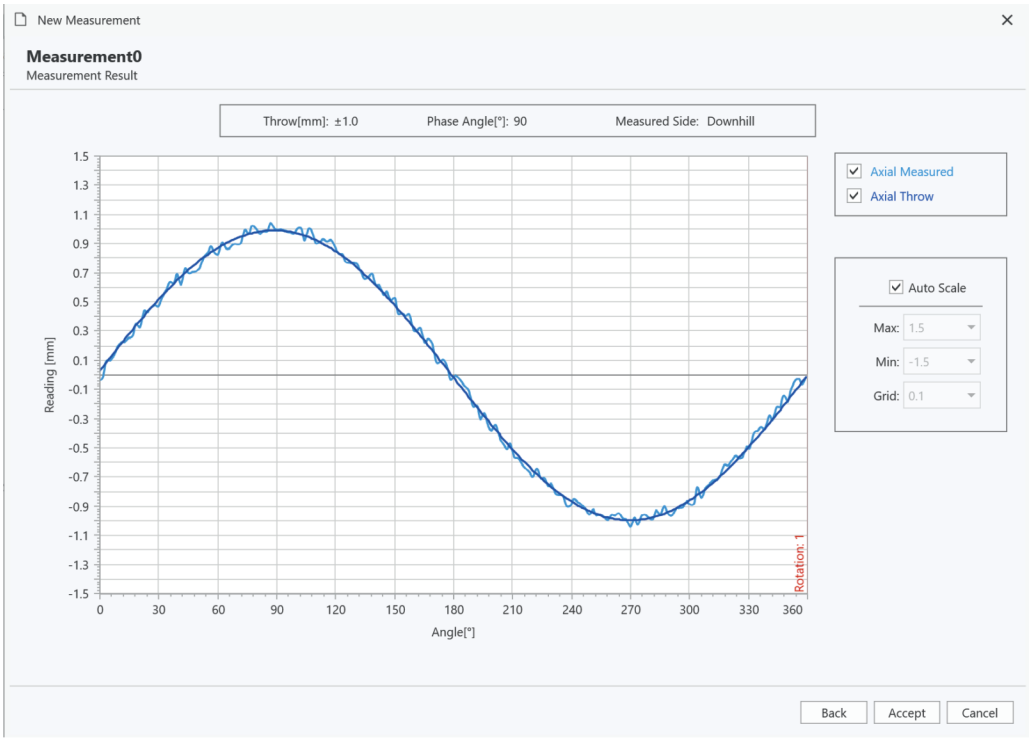


Figure 6-6. Axial measurement result screen.

Explanation of the measurement results

After completing the measurement, the graph displaying the results can be seen in the Main Workspace. The measured side and values for Throw, Phase Angle, and the measured distance are shown in the table on the left.

The graph is automatically scaled to adapt to the measurement results. If you want to change the scale, deselect the "Auto Scale" checkbox on the right side of the graph and select values from the dropdown menus.

Here is the description of the terminology used in the axial measurement.

Measured Side – indicates whether the measurement was taken from the uphill or downhill side of the tyre. The measurement side affects the calculation of the phase angle, as the point furthest from the outlet is always used as the reference point for the phase angle.

Throw – Calculated axial movement of the tyre. It is +/- value in millimeters.

Phase Angle – the angle, in degrees, between the starting point of the measurement (usually a manhole) and the point of maximum throw (the point furthest from the outlet).

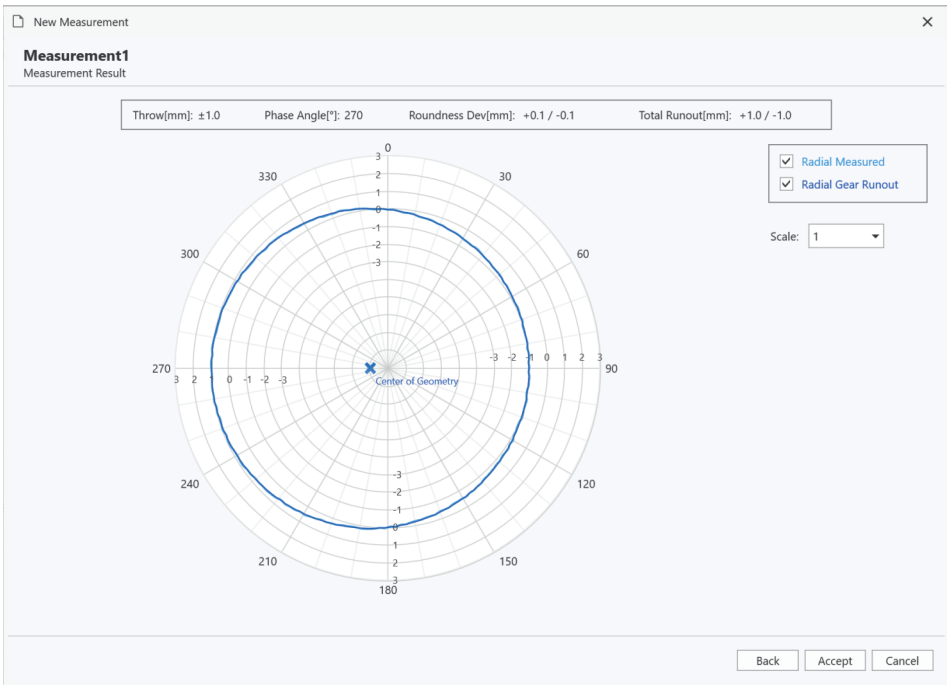


Figure 6-7. Radial measurement result (polar view).

After completing the measurement, the graph displaying the results can be seen in the Main Workspace. The values for Throw, Phase Angle, Measured Distance, Roundness Deviation and Runout are shown in the table on the left.

The graph is automatically scaled to adapt to the measurement results. If you want to change the scale, choose the value from the dropdown menu on the right side of the graph.

Here is the description of the terminology used in the Radial Measurement.

Runout– the actual measured values. Mathematically, it is equal to shell throw + shell deformations, and therefore equivalent to the **total runout**. It is represented on the graph with a light blue line. The minimum and maximum values are shown in the panel on the right.

Ideal Gear – a circle assuming no deformations of the girth gear but displaced from the axis of rotation (graph center) by the value of the throw. It is represented on the graph with a dark blue line.

Center of geometry – mass center of the figure created by the Radial Measured line.

Throw – Calculated radial movement of the tyre. The distance in millimeters between the center of geometry and axis of rotation (center of the polar diagram). Value is +/- as during rotation of the kiln the center of geometry rotates around the axis of rotation. Value in millimeters.

Phase Angle – the angle, in degrees, between the starting point of the measurement (usually a manhole) and Center of Geometry.

Roundness Deviation – the distance in millimeters between the Ideal Tyre and the Radial Measured. The table presents the maximum convex (+) and maximum concave (-) values.

6.5. Measurement Results and Acceptance

Click “Accept” to add the measurement to the project.
Click “Save” to store the measurement in the selected location.

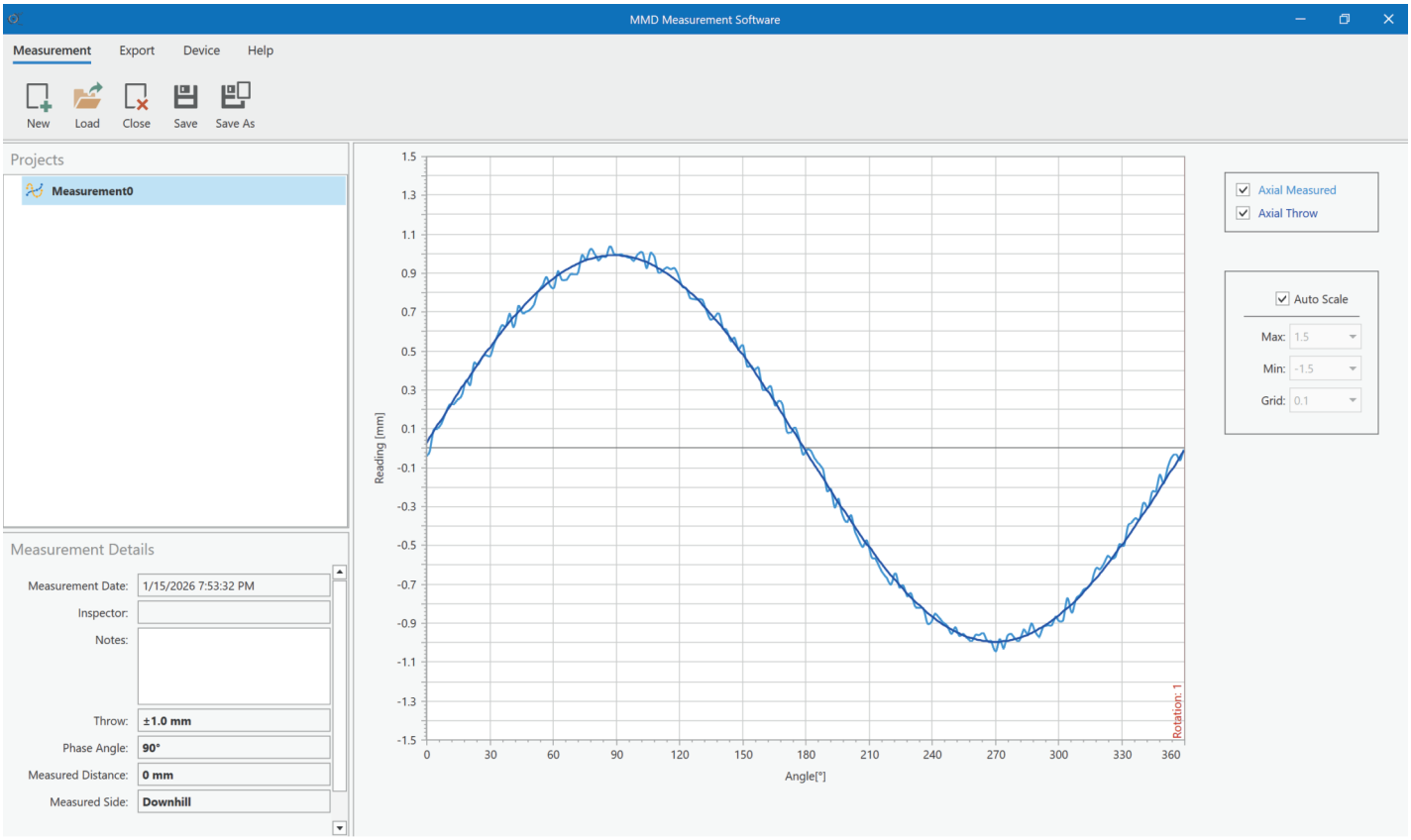


Figure 6-8. Measurement saved in project view.

6.6 Exporting the Measurement Result

To export the measurement, click “Export”. The result is saved as a PDF file.

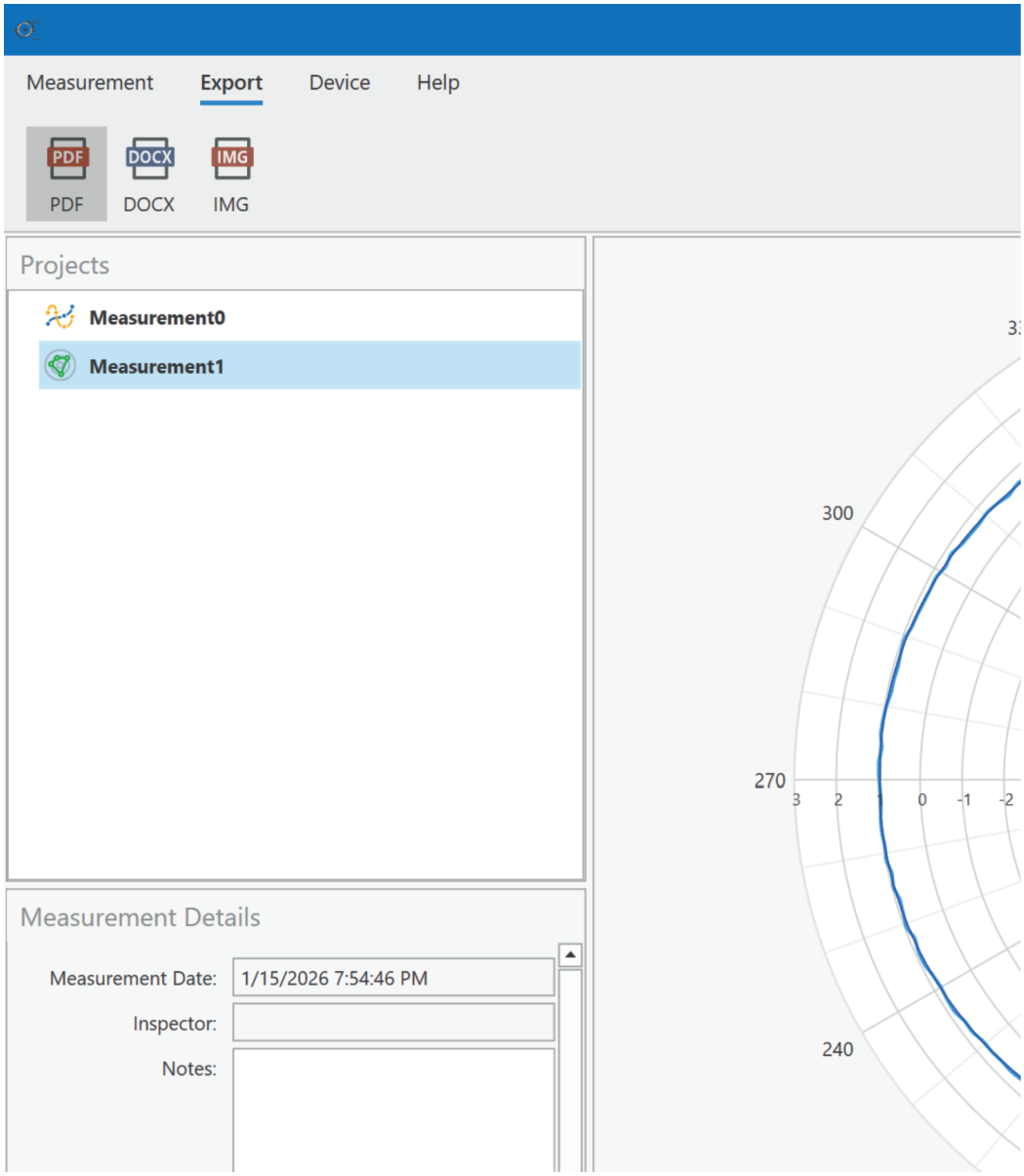


Figure 6-8. Exporting the Measurement