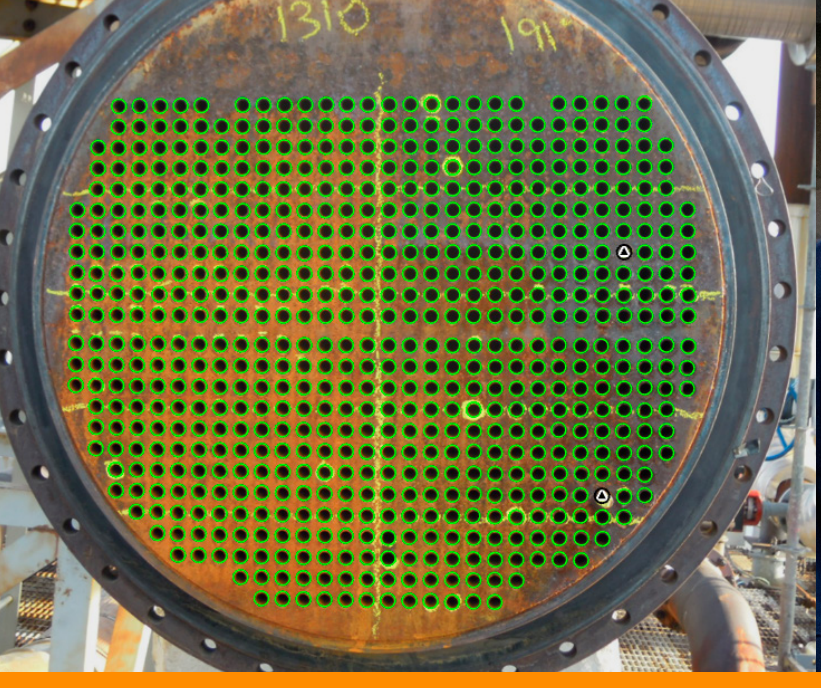


Technical
Specifications

TUBEPRO 6

Efficient. Consistent. Insightful.

Advanced pre-inspection and reporting software designed to provide accurate and reliable tubing reports for today's fast-paced heat exchanger (HX) inspections.

COMPLETE SOFTWARE TAKING YOUR REPORTS BEYOND THE TUBESHEET MAP

Whether a shell and tube HX is inspected in the oil & gas, petrochemical, power generation balance-of-plant, or climate control industry, thorough equipment assessment requires much more than just a tubesheet map with the tubing inspection results. TubePro features the most advanced reporting tools on the market for easily understood presentation of inspection results. In addition to full tubesheet map tools for bundles as large as 15,000+ tubes, TubePro includes 3D representation of the heat exchanger, extensive drawing tools, different legends for various reporting, multiple tube inspection results for comparison in a single report, and so much more.

EFFICIENCY AND CONSISTENCY ARE PARAMOUNT FOR ANY INSPECTION

In the dynamic contemporary environment, we rely on efficient processes and consistent data. TubePro software offers customizable templates, allowing inspection companies to tailor them to meet the most stringent customer specifications. Once built, these templates expedite the entire process by incorporating all necessary formatting, structure, and common variables. With templates in place, teams can quickly complete inspections, focusing only on the tubesheet map and data import. This uniformity in template usage not only accelerates the process but also ensures consistent reports across inspection teams, even those with multiple analysts.

Recognizing that the effectiveness of an inspection hinges on its report, TubePro™ empowers service companies to generate the industry's most perceptive reports. With an extensive set of tools for creating tubesheet maps and fully customizable 3D models, TubePro stands out as the preferred pre-inspection and reporting software, ensuring the production of consistent tubing reports for rapid heat exchanger evaluations.

ADVANCED FEATURES FOR COMPLETE REPORTING

The most insightful tubing reports on the market.

AUTOMATIC PHOTO DETECTION

Utilizing a field-captured photo of the heat exchanger, TubePro can automatically identify and detect the tubes within the tubesheet, expediting the tubesheet creation, as shown in Figure 1. Following this, a range of tools is at your disposal to accurately number the tubes according to the inspection requirements.

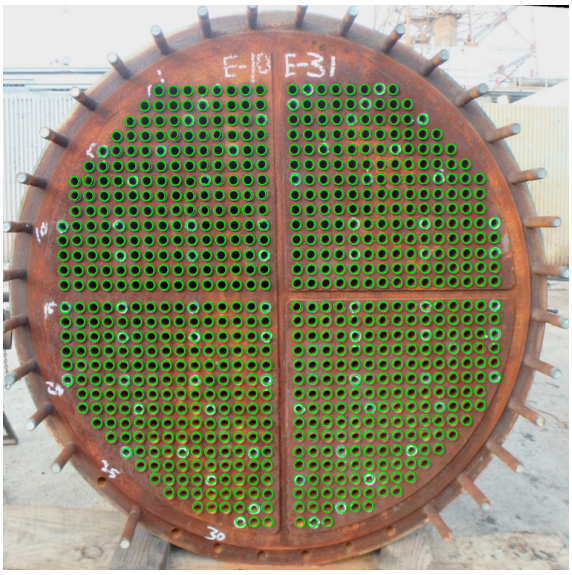


Figure 1: Result of the automatic photo detection feature using a photo taken onsite of a shell and tube heat exchanger.

ACTIVE LINK WITH MAGNIFI®

After creating the map, the tube list can effortlessly be transmitted to Magnifi, ensuring the operator is poised to proceed once the setup is finalized. While the option exists to send the entire tube list, users can also make partial selections based on patterns or free-form choices, as displayed in Figure 2. Then, during analysis, indications entered by the analyst in Magnifi will be promptly displayed on the 2D view in TubePro.

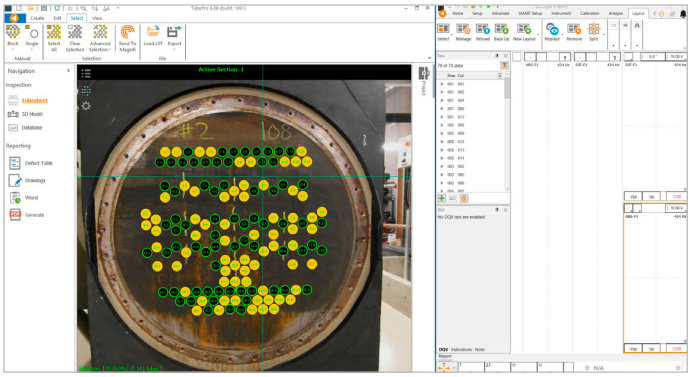


Figure 2: On the left, TubePro 6 user interface with partial selection of tubes. On the right, Magnifi interface with the tube list automatically populated with the selected tubes from TubePro with Active link activated.

3D MODEL TO CONTEXTUALIZE DEFECT PATTERNS

For a clear view of tube status, TubePro efficiently generates a 3D model using the tubesheet representation and inspection results. Defects are accurately positioned and scaled along the length of the tubes, utilizing information from the defect table.

Beyond the tubes, TubePro offers versatile tools for representing u-bends, support plates, tubesheets with partition plates, as well as inlets and outlets. Users can orient, cut, and make representations transparent to enhance context, facilitating a better visualization of defect patterns occurring throughout the length of the heat exchanger.

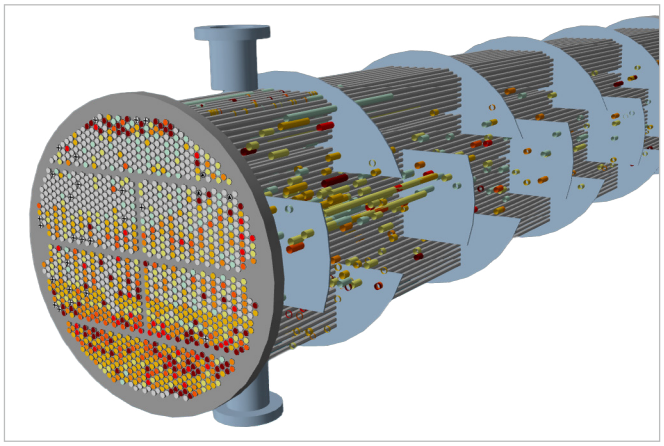


Figure 3: 3D model with indications properly located and with a representative length. The model includes 2 nozzles and horizontal double-segmental support plates. Some tubes are hidden to offer a better visualization of the defects.

FOR ANY SIZE AND ANY INDUSTRY

TubePro is designed to represent tubing inspections in shell and tube exchangers across various industries. Regardless of the sector, whether it's oil & gas, nuclear BoP, maritime, or HVACR, TubePro accommodates multiple shapes and sizes. Figure 4 illustrates an air cooler, a chiller, and a boiler.

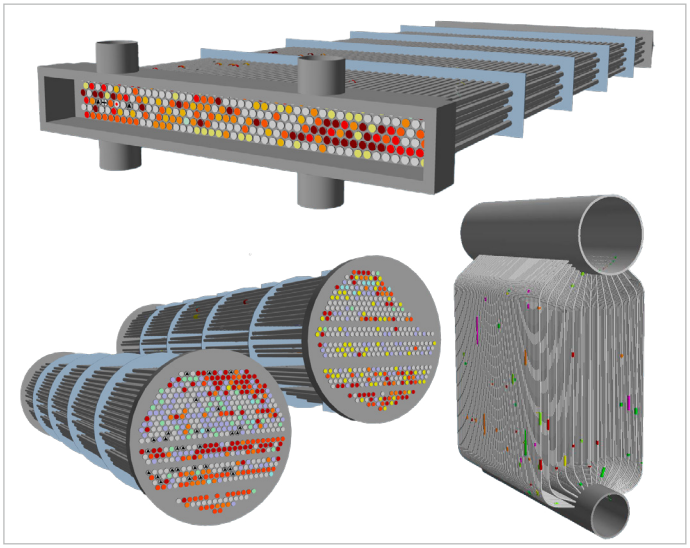


Figure 4: 3D model representations of three different equipment. At the top, an air cooler. On the left, a chiller or heat pump. On the right, a boiler.

3D MODELING AVAILABLE IN PDF REPORT

To allow the end customer to fully contextualize the inspection results, the actual 3D model from the report can be added as a dedicated page in the final PDF report. Simple to use, it increases the asset owner's confidence in the results. With this new feature, the reader of the final report can rotate and zoom the model to visualize defect patterns throughout the HX without leaving blind spots as displayed in Figure 5.

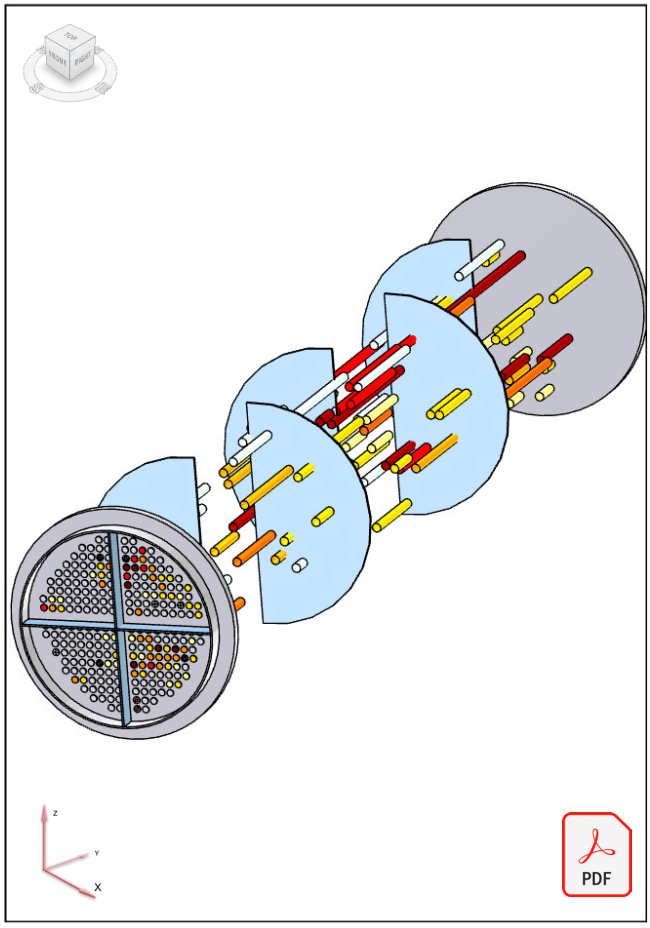


Figure 5: Representation of the page available in the PDF document allowing the user to rotate and zoom the model.

SUPPORT MULTIPLE DATA SETS AND REPORTS

Two data sets can be added and analyzed in the same report, increasing the added value of your report. This feature enables the user to instantly visualize the current condition of the bundle and compare it to previously recorded data. Therefore, asset owners are best positioned to identify trends and take actions to protect their assets. As shown in Figure 6, data from two different years can be compared tube-to-tube.

Moreover, this feature helps compare inspections performed using two different techniques on the same bundle. For example, if a bundle is tested with remote-field testing (RFT) and some tubes are rescanned with internal rotary inspection system (IRIS), both results can be displayed in a comparison view.

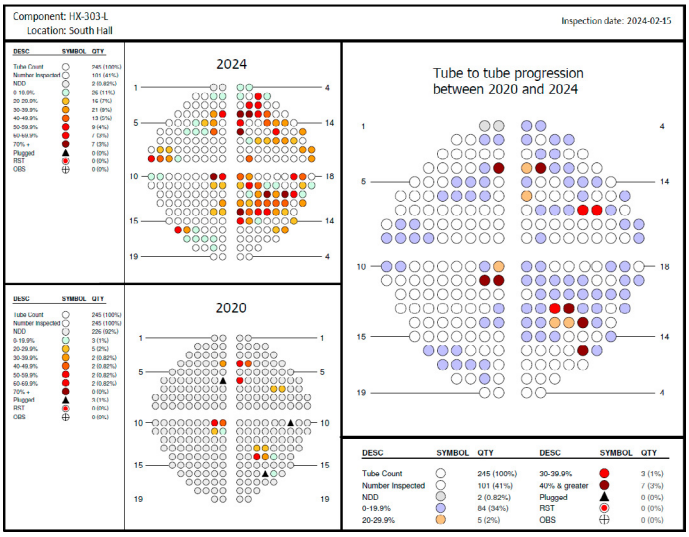


Figure 6: A drawing representing on the left the inspection results of two different years with the respective result table and, on the right, the tube-to-tube comparison between the two years for the deepest defect and its associated result table.

ADVANCED TUBE NUMBERING CAPABILITIES

Because not all HXs are alike, TubePro has all the tools to adapt to multiple numbering and sequencing patterns for any tubesheet size. Once the tube pattern is created on the tubesheet map, the numbering sequence can be changed to reflect how the inspection was performed or to meet the end customer requirements. Basic vertical and horizontal sequences are most used, but less common patterns, grids, and ordering sequences can be set as well. Figure 7 represents a pattern used for large condensers.

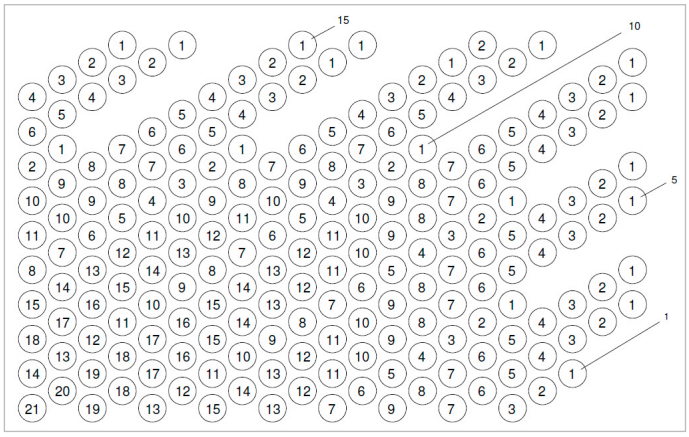


Figure 7: Tube pattern of a condenser showing directional tube row numbering.

PROJECT TEMPLATES FOR FAST AND REPEATABLE REPORTS

To ensure on-time delivery of final reports and consistency across various inspection methods, report templates include the project's structure reducing the number of steps required to generate the final report.

REPORT TEMPLATES EXPLAINED

The project template ensures consistent structure and visuals in final reports. It includes report formats, drawing layouts, stored legends, and all project variables. It does not include tubesheet maps, project-specific inspection results, or 3D model features. This means that once a user has entered information specific to the current inspection, the rest of the report updates automatically.

LEGENDS AND DEFECT TABLES

To effectively communicate the analysis results, one or multiple legends can be created with specific depth ranges, colors and icon shapes, defect codes and other filters as report legends are fully customizable.

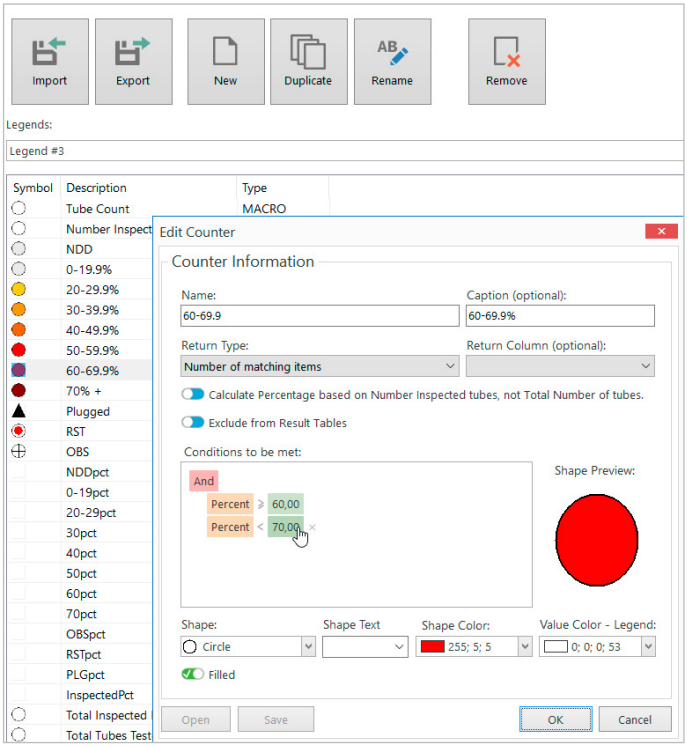


Figure 8: Customizable legends allowing to customize the range and type of condition as well as the appearance of the icon such as the shape, the color, and the inclusion of text.

STANDARDIZE KNOWLEDGE AND BEST PRACTICES WITH REPORT VARIABLES

The best inspection crews know how to adapt to ever-changing conditions, but when it comes to reporting, the customer expects consistency. With the report variables, generic information that is frequently required in the report is centralized in the management menu backstage. For example, contact information regarding recuring customers, instrument specifications or specific nomenclature can all be added to the report variable database. Once entered behind the scenes, these fields can be selected from a drop-down menu and will be automatically updated wherever they are placed in the report. This way, all team members use the same terms and don't waste time finding information and filling in multiple fields. These report variables are included in the templates and can be easily exported/imported separately.

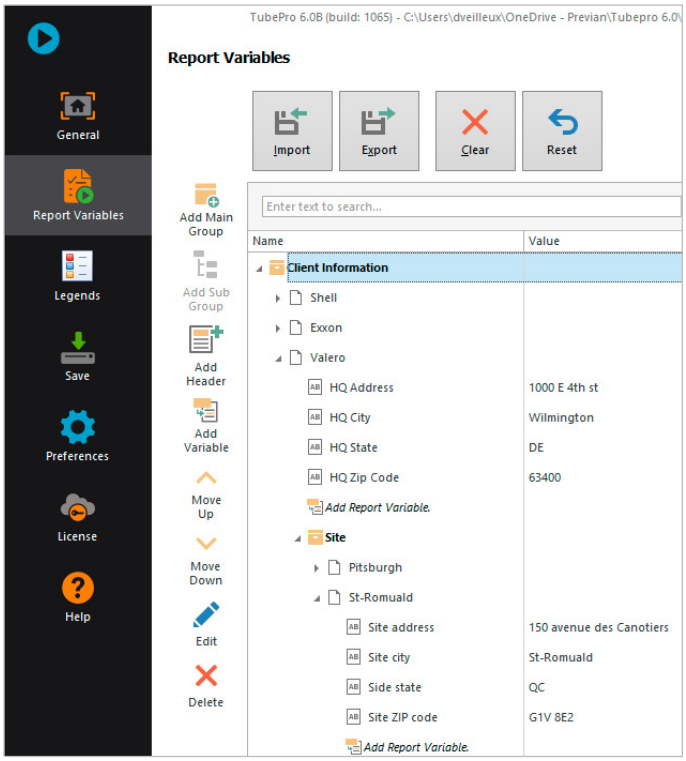
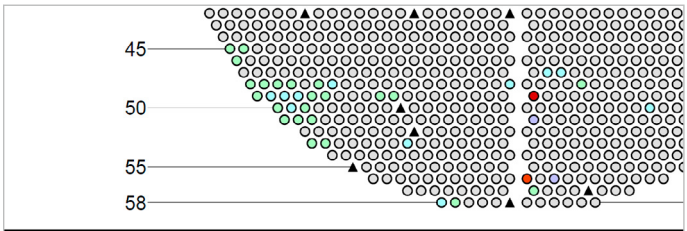


Figure 9: Report Variables editor to simplify the input entry and management for any personnel generating a report.

As the legends are the building block to the final inspection drawings, they can then be combined with specific inspection results and tubesheets map to display the results table. Figure 10 represents the results table displayed on a drawing which is the combination of legend items as well as a set of inspection results included in the report.



DESC	SYMBOL	QTY	DESC	SYMBOL	QTY
Tube Count		2328 (100%)	50-59.9%		30 (1%)
Number Inspected		2328 (100%)	60-69.9%		27 (1%)
NDD		1235 (53%)	70% +		25 (1%)
0-19.9%		360 (15%)	Plugged		17 (0.73%)
20-29.9%		486 (21%)	RST		1 (0.04%)
30-39.9%		108 (5%)	OBS		3 (0.13%)
40-49.9%		36 (2%)			

Figure 10: Drawing representing a result table and the associated tubesheet map with the results.

RAPID ONBOARDING

Streamlined and user-friendly interface for quickly onboarding your entire team.

MOVING THROUGH THE REPORT IN SEQUENCE

The interface of TubePro 6 is designed to help users move around the software seamlessly. Starting with a template, the user can go from creating and editing a tubesheet to building the 3D model and importing the defect inspection table, before finalizing the report in Word or Excel format.

ELEARNING

To support users in harnessing the full potential of TubePro 6, a complete eLearning course for TubePro 6 is available at the Eddyfi Academy. This online course covers various workflows within the software, empowering users to leverage the software's capabilities while ensuring continuous learning.

USER PARAMETERS CENTRALIZED BACKSTAGE

As with Magnifi software, TubePro regroups common parameters backstage. This allows the user to easily manage the project location and establish the link with Magnifi, set preferences, as well as manage imports/exports as shown in Figure 11. Additionally, the Report Variables are also managed with a dedicated menu and all legend items can be customized backstage.

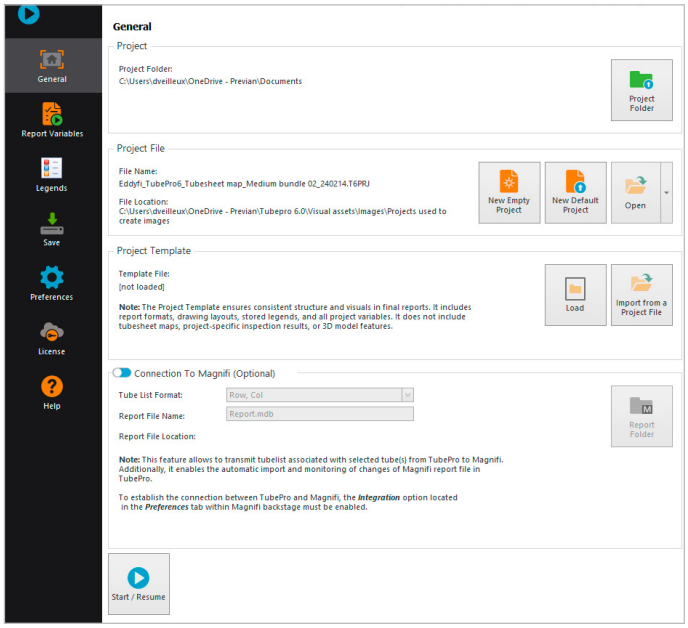


Figure 11: A view of the backstage with the different menus on the left and the parameters associated with a menu on the left. The view represents the *General* menu where the tools to choose the project folder, the project file, the template and to enable the link with Magnifi are located.

SPECIFICATIONS

INSTRUMENT	
Visual representation	2D and 3D
Single tubesheet size supported	15,000+
Automatic tube detection source	Image and PDF
Data list export	Active link with Magnifi, LST
Heat exchangers supported	Straight, U-bend, boiler, air cooler, hairpin
Tubesheet patterns	Rectangular, directional, and circular
Active link with Magnifi	Yes
Support multiple datasets per report	Yes
Report types	Word or Excel
PDF report generation	Yes
Legacy report import	TubePro 4, TubePro 5
Keyboard shortcuts	Yes, customizable
License type	Cloud-based

VERSION	WINDOWS® COMPATIBILITY	*NOTE
TubePro 5.x	Windows 8.1 and Windows 10 (32 and 64-bit editions)	Not tested on Windows 11
TubePro 6.x	Windows 10 and Windows 11 (64-bit editions)	Unsupported on Windows 8.1 (64-bit).

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Eddyfi Technologies
Beyond current