

Release Notes

Dear Customer,

Thank you for purchasing iC PVM 7.0, the simply powerful software package for ParticleView™ V19 and PVM® V819 instruments. Everything you need to install and run iC PVM 7.0 is stored on the installation media (CD-ROM or downloaded zip file).

Contents of the Installation Media

- iC PVM 7.0 Software (Setup.exe)
- iC PVM 7.0 Release Notes (this file)
- iC PVM 7.0 Installation Guide

Installation Guide and System Requirements

Please install iC PVM 7.0 according to the Installation Guide. This also describes the minimum PC requirements to run iC PVM 7.0.

User Guide and Help File

The iC PVM 7.0 Help file is available within the software and includes a link to the Help Portal for iC PVM User Assistance, video tutorials and other useful links.

Customer Support

If you encounter any issues with iC PVM 7.0, please do not hesitate to contact your sales representative or service engineer, or contact us at:

support.msg@mt.com for General Support on your PVM Instrument

iC@mt.com for Software Support

Feature Comparison Table

Key features of iC PVM 7.0 compared with PVM 8.3:

Feature	PVM 8.3	iC PVM 7.0	iC PVM 7.0SP
Easy Data Collection and Instrument Control			
Support for the latest ParticleView V19 with Onboard PVMIO SmartChip Technology	X	✓	✓
Support for existing PVM V819 systems	✓	✓+	✓+
Easy to start image acquisition	✓	✓	✓
Templates and cloning allow reuse of settings from previous similar experiments	X	✓	✓+
Image saving at various intervals and durations	✓	✓+	✓+
Automated lighting control	✓	✓+	✓+
Easily switch between front and back lighting schemes during experiment	X	✓	✓
Live experiment toolbar consolidates key status and control functions	X	✓	✓
Focus adjustable through software for V19	X	✓	✓
Easily setup experiment phases to vary the save interval in an experiment	X	✓	✓
Intuitive Data Analysis and Visualization			
iC Next Generation interface including ribbon style controls and separate windows for each document	X	✓	✓
Replay a recorded experiment	✓	✓+	✓+
Pin important images and add notes for significant events	X	✓	✓
Pinned image view as an overview of all key images in the whole experiment	✓	✓+	✓+
Image based trending to indicate changes in particle size and concentration	X	✓	✓
Real time image export and link to iC FBRM	X	X	✓
Meta data included in the exported image file	X	X	✓
Size distributions from image analysis	✓	X	X
PVM Image Enhancements and Viewer	✓	✓+	✓+

Feature	PVM 8.3	iC PVM 7.0	iC PVM 7.0SP
Filtering based on information content to determined which images to accept or to reject	✓	✓+	✓+
Thinning images by interval	✓	✓+	✓+
Deleting images for a specified time region	✗	✓	✓
Merge experiments	✗	✓	✓
Quick Reporting and Data Exchange			
Easily export all images or images from a time-range to a video file	✗	✓	✓
Easy and flexible WYSIWYG Report Designer including export to Microsoft® Word®	✗	✓	✓
Create a Microsoft® PowerPoint® slide show of pinned images	✗	✓	✓
Export to image files for use with 3 rd party applications	✓	✓+	✓+
Support for iC Data Center to automatically capture, prepare and share experiments	✗	✓	✓
Support for iC OPC UA	✗	✓	✓+
Compatibility			
Microsoft® Windows® XP compatibility	✓	✗	✗
Microsoft® Windows® 7 32-bit compatibility	✓	✓	✓
Microsoft® Windows® 7 64-bit compatibility	✗	✓	✓
Microsoft® Windows® 8.1 compatibility	✗	✓	✓
Support for touch-enabled monitors	✗	✓	✓
Easily share trends with other iC and iControl applications	✗	✓	✓
Open and export legacy .SEQ files	✓	✓	✓
Support for GAMP and 21 CFR Part 11 compliant environments	✗	✓	✓

✓ = Supported feature ✓+ = Supported feature with enhancements ✗ = Not supported

These release notes summarize incremental changes in iC PVM™.

Enhancements and Updates for Version 7.0 SP2

Latest Version of V19 Camera Driver Included

iC PVM 7.0 SP2 now deploys the latest driver version for the V19 camera. All new cameras shipping from our vendor in 2017 require a driver update in iC PVM for compatibility.

For existing V19 users the service pack upgrade is optional as there are no additional benefits for already deployed cameras.

Enhancements and Updates for Version 7.0 SP1

Live Image Import to iC FBRM 4.4

iC PVM 7.0 SP1 can export images during a live experiment. The exported images are saved to a user defined folder and are available for direct import in to iC FBRM 4.4. The export of live images from iC PVM can be for the current experiment or it can be set globally to apply to all experiments. To export images from ALL live iC PVM experiments, enable the feature from the user preferences. To export images from the CURRENT live iC PVM experiment, select the export saved images checkbox from the LIVE ribbon.

Remote Control and Live Data Export Supported via OPC UA

Used in combination with the iC OPC UA Server, iC PVM data acquisition (start, pause, stop, edit sample interval and duration, etc.) can be controlled and trend data sent to an OPC UA Client application, like a DCS. The iC OPC UA Server is available at no charge to iC users and can be found on your iC PVM 7.0 SP installation CD or downloaded from the AutoChem Customer Community website <https://community.autochem.mt.com>.

Note that use of the iC OPC UA Server is only recommended for users who are already familiar with the sophisticated OPC UA standard. For simpler real-time data sharing, the iC Data Share Microsoft® Excel® Add-in can be used, also available on the iC PVM 7.0 SP CD and the AutoChem Customer Community website.

New Relative Transmission Index (RTI) Image-Based Trend

The Relative Backscatter Index (RBI) is an image-based trend, sensitive to changes in particle size and concentration that helps scientists identify and then investigate important process events and upsets when FRONT lasers are in use.

Now, in addition to the RBI, the Relative Transmission Index (RTI) is an image-based trend sensitive to changes in particle size and concentration that enables scientists/engineers to study process dynamics when BACK lasers are in use. Combined with critical process parameters such as temperature or agitation, particle mechanisms can be linked directly to process conditions.

A template, 'Quick start with default RTI and backlighting', has been deployed with iC PVM 7.0 SP1 where the hardware will start up with the back lasers enabled and the RTI trend will display by default in the trend chart.

The RBI and RTI image-based trends reduce the time and effort needed to fully understand complex particle systems and processes.

Metadata in Exported Images

Images can be exported from iC PVM in both .jpg and .png file formats and each exported image will have metadata saved with it. For the .jpg file format, the metadata is saved using the industry-standard EXIF format and it can easily be viewed by Microsoft® Windows® Explorer or any EXIF reader tool. The meta-data in a .png file is in a proprietary format that can be read by iC applications.

Easier to Thin an Entire Experiment

Users can now easily thin/reduce the file size of the entire experiment. Previously users needed to define a time region spanning the entire experiment before the thinning/reducing action could be performed. Users now have the option to thin images over the entire experiment.

Ability to Export All Pinned Images as a Video or Individual Files

When exporting to individual image files or to a video, users now have the option of simply exporting those images of interest that have been pinned.

Display Grid Lines on the Trend Viewer Option

User may display grid lines for the Trends viewer display. If desired, users may toggle grid lines on/off for the Trends viewer from the 'View' ribbon.

Copy Chart and Paste into Microsoft® PowerPoint® and Excel®

Some users encountered issues when trying to copy charts to Microsoft® PowerPoint® or Microsoft® Excel®. Previously this was only supported for Microsoft® Word®. This issue has been resolved in the service pack.

Main Features in iC PVM 7.0

Support for New ParticleView Instruments with Onboard PVMIO SmartChip Technology

iC PVM 7.0 is the first software version to support the new ParticleView V19 instruments. ParticleView instruments include onboard PVMIO SmartChip technology for storage of critical system configuration information – providing better security and traceability in experimental data. This simplifies the workflow for setting up an instrument and makes it plug and play.

Support for Legacy PVM V819 Instruments

iC PVM can be used to control existing PVM V819 instruments. When upgrading from PVM 8.3, the PVM.ini file is needed to get the calibration settings into iC PVM. If iC PVM is installed on the same computer that ran PVM 8.3, then this file will be automatically imported. If iC PVM is on a new computer, then the PVM.ini file should be moved from the previous computer.

Easily Start Experiment Using One of Three Options

There are three separate paths for starting a new experiment: Quick Start, Clone Experiment, and Create from Template. The Quick Start button uses the recommended settings for the installed instrument type and gets an experiment started as quickly as possible. If you would like to run a new experiment using the settings from a previous one, use the "Clone experiment" option.

There is now a separate file type for templates similar to the philosophy used by Microsoft Office. So you can also choose to base your new experiment on one of a small number of templates. Some of these may come with the iC software or they can be created and saved by the user. When applying an experiment template to a new experiment, the template's trend definitions, instrument settings, reference trends, and phase definitions are copied to the new experiment before it starts.

Auto Lighting – New lighting Algorithm and Dual Lighting Scheme

The software automatically adjusts lighting based on individual images. Adjustment involves increasing the overall brightness as needed. When 'Auto adjust' is in effect, you can switch between a front-lighting and back-lighting scheme by a single click. By default, this option is enabled to help ensure the highest quality images are collected and it is strongly recommended that it remains selected. Users have the option to turn off the 'Auto-adjust' feature and manually set which lasers are on and the overall brightness used by the instrument.

Live Experiment Tool Bar

iC PVM includes a Live Experiment Toolbar when running experiments. This toolbar includes Pause/Resume and Quick annotation features and has timers to track the experiment Elapsed Time,

as well as the Time Remaining in the experiment. Also, the save interval and phases can be edited from the Home ribbon or phase editor without pausing the experiment.

Software Controlled Focus for ParticleView V19 Hardware

The user can adjust the focus of the instrument in small or large increments using buttons on the 'Live' ribbon during an experiment. The user can change the increment size and can set a new home position using the software. Any new experiments will default to the latest home focus position defined.

Easy to Setup Experiment Phases

iC PVM supports varying save interval throughout the course of the experiment. With this feature, images can be saved more frequently during the "fast" parts of the reactions, and more slowly during the "slow" parts of the reaction. The 'Live' ribbon includes a Phase editor to create and edit the phases.

Next Generation iC Features: Ribbon and Multiple Window Support

The new generation of iC products use a more modern interface based on the Windows 8 platform. The new start page, updated file menu structure and overall layout all follow those used by the latest Microsoft Office products. One change to note from previous iC versions is that each experiment now opens as its own window instead of as a new tab in the existing window. This allows the user to compare and navigate between open experiments more easily.

The previous iC platform employed many right-click menus to access various features. To make these options easier to find, they are now available on the easily viewable ribbons or as quick local controls. The 'Home' ribbon contains all of the most commonly used controls for that software. The options available may differ between running and completed experiments. The 'Live' ribbon contains controls that are generally only applicable during running experiments. Changing these settings will change the way that the data is collected whereas changing the settings on most of the other ribbons will only affect how the data is displayed.

Replay Experiment

iC PVM allows users to easily replay parts of a previous executed experiment from the 'Home' ribbon. The display rate can be set by the user and the playback can be easily paused and restarted using the icons. The replay option can be used to loop the playback so it restarts automatically.

Pin and Annotate

During an experiment, the user can enter notes to describe what is happening in the process. Entering a note automatically pins the image and makes it available for quick reference. Any

selected image can also be pinned without a note using the push-pin icon in the upper left corner of the main image viewer or by clicking on the Pin button on the 'Home' ribbon.

Overview of Pinned Images

iC PVM provides an overview of all of the pinned images with any associated notes. This view can be opened from the 'View' ribbon or by expanding the pinned images bar on the right side of image viewer. Three size options are available for the view with each including different amounts of details about the pinned images.

Relative Backscatter Index

Relative Backscatter Index, or RBI for short, is a powerful image-based trend that is sensitive to changes in particle size and concentration. RBI is calculated in real time for every iC PVM experiment and is a powerful technique that can help users identify and investigate key process changes quickly and easily. RBI can be combined with process trends such as temperature in the trend view. This allows you to click at key points in the process where important events occurred at to study the most relevant images. An RBI trend can also be calculated based on the images stored in a sequence file to allow easier data analysis on previously executed experiments.

PVM Image Enhancements and Viewer

iC PVM has a versatile image viewer. The user can zoom or pan an image using the local controls or draw on the image using tools in the 'Image' ribbon. A tool is also available for adding a measuring line to size individual particles. If any drawings are made on an image, then it is automatically pinned.

There are also a number of image enhancement options available on the 'Image' ribbon. The auto-enhance is enabled by default and is optimized for a number of different particle systems. There are also options available such as sharpen and optimize image histogram (brightness and contrast). Using any of these enhancements will affect all of the images in the experiment.

Filtering Images Based on Information Content

iC PVM has a powerful image acceptance tool that allows uninteresting images to be removed easily. From the 'Image' ribbon, images can be ranked according to information content, and images with little or no information (i.e. too dark, too blurry or too light) can be selected for removal using a simple slider. The images selected for removal are updated dynamically as the slider is moved and they are shown along side the images that will be kept. Once the user has decided what can be removed, it is simple to delete the selected images from the file.

Thinning and Deleting Images

iC PVM 7.0 provides several options for removing uninteresting images to manage file sizes and make videos easier to generate. Users may select a time-region for the experiment and then delete all of the images in that region or reduce the number of images saved using a time interval.

Merge Experiments

iC PVM allows two or more completed experiments to be merged into a composite experiment file. Open one of the experiments and then go to File -> Open -> Merge and then browse for the file to merge in. The images and trends will be merged using absolute time. This may generate a file of larger size.

Data Export to Videos or Image Files

Users have a number of ways to export the data collected during an iC PVM experiment. They can export the images in the experiment to separate image files so they can be used in third party applications. They can also export the images from part of or all of the experiment to an mp4 or wmv video file. Exporting to the mp4 format is considerably faster and creates a smaller file than the wmv format option.

Note: It is recommended that exporting to any file type be done to a local folder on the same computer where iC PVM is installed (instead of a network location) for performance reasons.

Customizable Report Generation

iC PVM features an easy to use WYSIWYG (what you see is what you get) Report Designer allowing users to create experiment reports that fit their company's standards. A 'Report' page is included as part of every iC PVM experiment which by default includes all the significant data from the experiment. The user can easily customize this report from within iC PVM by simply dragging & dropping items such as Trend Graphs or the Experiment Event Logs. Users can also add experiment specific text or images from other sources to the report before, during, or after the experiment completes. The resulting report can then be exported to Microsoft® Word® so it can be easily shared with others.

Automatically Generated Slide Show

In addition to sending reports to Microsoft Word, the software also allows a slideshow to be directed to a Microsoft® PowerPoint® document. The new PPTX document will include a slide for each pinned image with any associated notes included as the slides title. A table of the notes is also included on each slide so that it is easy to see where in the process the shown image occurred. A quick select button is included on the 'Home' ribbon to access this feature and it is available from the 'File -> Export' menu as well.

Support for iC Data Center to Automatically Capture, Prepare and Share Experiments

iC Data Center is a key enabling technology that captures data from all connected instruments at the end of an experiment and stores it in a central location. If iC PVM is configured to connect to an iC Data Center server, then upon experiment completion the experiment file is uploaded to the file share. An email is sent to the user who conducted the experiment with links to the shared file so that it can be easily accessed for further analysis or passed on to colleagues. The experiment file is also automatically re-opened on the iC PVM instrument from the shared location so that any changes made will be on the master file. For more information on iC Data Center, please visit www.mt.com/icdatacenter.

Note: Since the experiment file will need to be transferred over the network, it is important that users manage the file size when collecting data during an iC PVM experiment. It is generally recommended to keep file sizes under 1 GB in this setup to optimize performance.

Share Trends Between iC and iControl

Trend data can be easily shared between iC PVM and other iC and iControl applications. Trends can be copied and pasted or dragged and dropped between most iC applications or they can be added via the 'Add Trends' dialog on the 'Home' ribbon.

Once a link is setup to another application, then any open experiments will automatically appear in the 'Add Trends' dialog in iC PVM. The existing links can be viewed and managed from the File -> Options -> iC Applications page. Note that any iC application installed on the same computer with iC PVM will be automatically linked, only applications on other computers require that an initial link be established. For more information on communicating between iC applications on different computers, please refer to the iC PVM Installation Guide for Administrators.

Ability to Link to iC FBRM Software

iC PVM 7.0 can share trend data with iC FBRM software easily. Since iC PVM was not available when iC FBRM 4.3 was released, images cannot be automatically imported. To bring PVM images into iC FBRM, the iC PVM experiment should be exported to a .SEQ file so it can be imported into an iC FBRM experiment.

Instrument and Office Support

iC PVM supports online acquisition using the iC PVM instrument software. One iC PVM instrument software license supports acquisition from one PVM V19 or V819 instrument. iC PVM office software licenses can be used by multiple users to analyze data from multiple instruments running iC PVM software. To learn more about multiple instrument or office licenses, please contact AutoChemCustomerCare@mt.com or call +1.410.910.8500.

Logging System

Easily collect all log files into a single zip file for mailing to METTLER TOLEDO. This can be accessed from either Start Program menu option under iC PVM, or from within iC PVM Help Page.

Support for 32-bit/64-bit Versions of Windows 7 and Windows 8.1 with Touch Screen

iC PVM 7.0 fully supports Windows 8.1 as well as the 32-bit and 64-bit version of Windows 7. Note that Windows XP system is no longer be supported. There are some limitations when the system is operating on a touch screen. These are documented in the known issue section.

Open and Export Legacy .SEQ Files

iC PVM can import legacy .SEQ files created in PVM 8.3/8.4 and create an iC PVM experiment file. Similarly, iC PVM can export an existing experiment to the .SEQ file format so that it can be read into the legacy PVM software or into iC FBRM 4.3. Please note that there were a number of PVM 8 builds released into the field so there is some variation in the .SEQ file format. iC PVM was tested with a wide range of .SEQ files and experiments, but if any issues are encountered when importing, please contact software support at iC@mt.com.

Supports GAMP and 21CFR11

iC PVM has passed factory acceptance testing (FAT) per the METTLER TOLEDO AutoChem Products software development lifecycle and GAMP guidelines. iC PVM only provides the core technical requirements of a compliant system. Specifically, this includes support for tamper-detection of electronic records and the logging of audit trail messages in experiment documents. Compliance also requires both procedural controls and administrative controls to be put in place by the user. Please contact METTLER TOLEDO to receive information on our software audit or validation package.

Known Issues

No.	Issue	Description and Workaround
1. 17421	<p>Recovery After Power Loss</p> <p>System does not always recover from a loss of power.</p>	<p>iC PVM does not always recover smoothly if the PC that is connected to PVM hardware has suffered a power loss. Sometimes the experiments are corrupted depending on what the operating system was doing when the power loss occurred.</p> <p>Workaround: Using a laptop computer should avoid this issue since it has a battery backup and its operating system handles power drain and eventual loss more elegantly.</p>
2. 34714	<p>Recovery After USB Disconnect</p> <p>System does not resume collecting images if the cable to V19 is disconnected and reconnected.</p>	<p>If the USB cable to the V19 is disconnected (by unplugging the cable itself or a power loss to the USB extender) during a live experiment and then reconnected, iC PVM does not resume collecting images even though the Live Experiment Toolbar might return to the green status.</p> <p>Workaround: Stop the current experiment then restart iC PVM and start a new experiment. The two experiments can be merged at a later time if needed.</p>
3. 16357	<p>Drag and Drop Trends</p> <p>Drag and drop trends doesn't work between iC PVM and certain iC/iControl versions.</p>	<p>An automatic Microsoft Windows update for DotNet can cause the drag and drop feature to not work between different iC applications on the same computer. If you see that dragging a trend, from one iC/iControl application to another does not work as it used to, then this update may be responsible.</p> <p>Workaround: Either use the 'Add Trends' button to import the data or use the copy/paste function.</p>

No.	Issue	Description and Workaround
4. 35101	<p>Experiment Started from iControl</p> <p>No dialog is displayed when iC PVM experiment is started from iControl.</p>	<p>iC PVM does not display any dialog when a new experiment is started from iControl. User may adjust the duration and save interval using the Live Experiment Toolbar before the experiment starts or during the experiment. However there is no way to change the location of the experiment file.</p> <p>Workaround: Move the experiment to a desired location after it completes.</p>
5. 17797	<p>Saving After Deleting Images</p> <p>An error message may be displayed when saving a file after deleting one image more than once.</p>	<p>This may happen if the user deletes one image from a very small time region more than once. It could cause an error message when saving the document.</p> <p>Workaround: Restart iC PVM and ignore the warning message when re-opening the document.</p>
6. 15348	<p>Linking to iC PVM from Other iC Apps</p> <p>iC PVM and an older iC Applications on different PCs might need to link to each other twice before a full link can be established.</p>	<p>Prior iC Applications (e.g. iC FBRM 4.3) are unaware of iC PVM and therefore will identify iC PVM as unknown when the user uses the 'link to other iC application' tool. The link is established and should work but the application isn't identified correctly.</p> <p>Workaround: Add iC PVM to the other iC application again, iC PVM will now be labelled correctly in the other iC application.</p>
7. 16796	<p>Using iC PVM on a Touchscreen</p> <p>Some features are only supported when using a mouse.</p>	<p>Although all major functions are supported on a touchscreen, some specific items require a mouse. These include the drawing tools for images, dragging and dropping an item into the report, and defining a time region on a trend.</p> <p>Workaround: For the report, a double-tap on an item in the palette can be used to add it after the currently selected item. For time regions and drawing tools, a mouse must be used.</p>

No.	Issue	Description and Workaround
8. 18100	<p>Measuring Tool on Images</p> <p>In some cases, the value from the measuring tool can show a slightly inaccurate value (less than 1%).</p>	<p>The measuring tool incorrectly uses the x calibration value for both directions when calculating the length of a drawn line. In the unlikely situation where the x and y calibration values are significantly different, this can result in the measuring tool showing an inaccurate value off by a few microns when measuring large particles vertically or diagonally.</p>
9. 18097	<p>Save Interval Shown in Ribbon</p> <p>In some situations, the current 'Save interval' displayed in the 'Live' ribbon shows an incorrect value even though the images are being saved at the correct rate.</p>	<p>If a custom value is entered for a future phase 'Save interval' (instead of choosing a value from the drop-down list), then when the phase starts the value shown may not match the value specified in the phase editor. This is only an error on the Live ribbon display and the desired save interval is being used. This can be easily verified by looking at the time stamps on the most recently captured images using the trend viewer.</p>
10. 17568	<p>German Operating System Support</p> <p>Some areas of the software require US settings for number and date formats.</p>	<p>Most functions and displays within iC PVM support German regional settings, but there are some areas like copy/paste from the trend viewer to Excel that require English settings for number formats.</p> <p>Workaround: Change the computer's Region settings to use US English settings to avoid any issues.</p>
11. 18063	<p>Loading New Report Layout</p> <p>The outline and content palettes may be temporarily disabled after loading a new report layout.</p>	<p>This generally only occurs if the user specifies that the newly loaded report layout be the new default layout.</p> <p>Workaround: Save the experiment file by clicking File -> Save to update the page and re-enable the palettes.</p>