



Waters™

Empower 3.8.1

Release Notes

General information

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About these release notes

This document contains information about the features and functions introduced, changed, or removed in this version of the product. It contains a list of major feature changes as well as descriptions of known defects, resolved defects, and observed product behaviors (concessions) that Waters deems of importance to customers. This document does not include:

- An exhaustive list of all changes to this version of the product
- Descriptions of defects that were not known to Waters at the time of the product's release
- Descriptions of defects that cannot be reproduced by Waters
- Information about customer requests for enhancements to the product
- Specific details of changes to proprietary aspects of product components, features, computational algorithms, and software code

The changes listed in this document are relative to the previous version of the product. If you are updating an older version of the product, review the release notes for all the intervening versions to ensure that you understand the cumulative impact of the product changes.

Carefully review the information in this document before the product is installed. If you have questions about how installing this product might affect your environment or if you need more information about this product, contact your Waters representative.

Contacting Waters

Contact Waters with technical questions regarding the use, transportation, removal, or disposal of any Waters product. You can reach us through the Internet, telephone, fax, or conventional mail.

Contact method	Information
www.waters.com	The Waters website includes contact information for Waters locations worldwide.
iRequest	iRequest is a secure Web service form that allows you to request support and service for Waters instruments and software or to schedule a planned service activity. These types of support and services may be included as part of your maintenance plan or support plan. You may be charged for the requested

Contact method	Information
	service if you do not have appropriate plan coverage for your product. Note: In areas managed by authorized distributors, iRequest may not be available. Contact your local distributor for more information.
Local office contact information	For worldwide locations, telephone, fax, and conventional mail information is available at the Local Offices website.
Corporate contact information	Waters Corporation 34 Maple Street Milford, MA 01757 USA From the USA or Canada, phone 800-252-4752.

Updated information

Refer to the Waters website (www.waters.com) and click **Support > Support Documents and Downloads** for updates to this document.

Obtaining Waters software and software updates

To digitally obtain the software application and licenses that you purchased, use the Waters Digital Software Delivery and License Entitlement platform. For products that require an active Waters Software Maintenance Plan, the platform provides email notifications of and immediate access to newly released software. The platform also provides free access to additional downloads, such as instrument drivers and example projects, and issues email notifications when new versions of these items become available. You can also use the platform to securely search and share software entitlements and instrument drivers and to access all relevant documents for the specific software product and version through a secure search document link to www.waters.com.

To access the Digital Software Delivery and License Entitlement platform, contact the designated Software Manager for your organization. The Software Manager is typically a system administrator or someone responsible for implementing software and activating licenses, and they are the person responsible for the Waters digital entitlements (software and licenses) within your organization. From within the platform, the Software Manager can securely manage and distribute software entitlements to others within your organization, providing organizational control of your software assets.

If you have not yet arranged for access to this platform, work with your Waters sales representative to begin the secure onboarding process.

Access the software delivery and license entitlement platform through your www.waters.com user profile at **waters.com > My Account [Hello, *username*] > Profile > Download Software Entitlements**.

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Empower 3.8.1

Compliance recommendations

Any time you install, change, or uninstall software or system modules in a regulated environment, Waters recommends that you follow your organization's approved change control procedure.

You should assess the impact of the changes described in the release notes on the qualification status and validation for the intended use of your system, including any impact on personnel, methods, laboratory workflows, or connected equipment, and scale your activities accordingly.

Antivirus considerations

Some real-time virus scanners mistake normal data acquisition and instrument control for virus activity, and thus interfere with proper operations. Full-system scans and live updates can be network-intensive, disk-intensive, and CPU-intensive, and they can also interfere with normal data acquisition. Schedule scans and updates for idle times when data acquisition does not occur.

Certain antivirus program features such as "intrusion prevention", "tamper protection", and "heuristic analysis" can also interfere with normal operation. If you observe issues with the software, review and verify the antivirus logs. It may be necessary to white-list any affected components.

Empower software installations

For Empower software installations, exclude the Empower software installation folder (usually `C:\Empower`) and its sub-folders.

For full antivirus exclusion recommendations per installation type, consult the "Virus scanning" section in the *Empower System Administrator's Guide* corresponding to your Empower software version.

Naming convention

Starting with Empower 3.6.0, the naming convention for Empower releases is `Empower XX.YY.ZZ.QQ`, where:

- `XX` = Major Release version
- `YY` = Minor Release number

- ZZ = Maintenance Release number
- QQ = Hotfix Release

For example, Empower 3.6.0.1 is Major Release 3, Minor Release 6, Maintenance Release 0, Hotfix 1.

Note: QQ digits occur only with actual hotfixes. All other release types omit QQ digits.

Supported platforms and operating systems

Empower 3.8.1 software supports Windows 10 Professional and Enterprise (Personal, Acquisition Client, and LAC/E devices), Windows Server 2019 Standard or Windows Server 2022 Standard, and Red Hat Enterprise Linux Server 8.0.

For non-acquisition Empower Client platforms only, Empower 3.8.1 software also supports Windows 11 Professional or Enterprise version 22H2.

Notes:

- Support includes English, Japanese, Simplified Chinese, and Korean distributions of Empower 3.8.1 software.
- Waters performs Oracle and Windows patch testing on the latest two released Empower versions and periodically releases Oracle patch installers and test results.

Specifically, Empower 3.8.1 supports these platforms and operating systems:

Table 1: Supported platforms and operating systems

Platform	Operating systems and components
Personal	• Windows 10 Professional or Enterprise, 64-bit versions 21H1 and 21H2 • Windows 10 Enterprise Long Term Servicing Channel (LTSC) 2021 (including IoT) • Windows 10 Enterprise Long Term Servicing Branch (LTSC) Build 1607 • Oracle 19c^a
Empower client	• Windows 10 Professional or Enterprise, 64-bit versions 21H1 and 21H2 • Windows 10 Enterprise Long Term Servicing Channel (LTSC) 2021 (including IoT) • Windows 10 Enterprise Long Term Servicing Branch (LTSC) Build 1607

Table 1: Supported platforms and operating systems (continued)

Platform	Operating systems and components
	- Windows 11 Professional or Enterprise version 22H2 (only for non-acquisition platforms) - Oracle 19c^a
Citrix environment	- Windows Server 2019 Standard - Citrix Virtual Apps and Desktops 7 1912 Long Term Service Release (LTSR) CU6 - Citrix receiver: Windows 10 Professional or Enterprise - Windows Server 2022 Standard - Citrix Virtual Apps and Desktops 2203 Long Term Service Release (LTSR) CU1 - Citrix receiver: Windows 10 Professional or Enterprise
Database server	- Windows Server 2019 Standard or Windows Server 2022 Standard - Red Hat Enterprise Linux Server 8.0 - Oracle 19c^a
File server	- Windows Server 2019 Standard - Windows Server 2022 Standard
Waters LAC/E device	- Windows 10 Professional or Enterprise, 64-bit version 21H1 - Windows 10 Enterprise Long Term Servicing Channel (LTSC) 2021 (including IoT) - Windows 10 Enterprise Long Term Servicing Branch (LTSB) Build 1607 - Oracle 19c^a Notes: - Waters LAC/E devices Configuration 15 and Configuration 16 are both supported with Windows 10 Enterprise Long Term Servicing Branch (LTSB) Build 1607. - Waters LAC/E devices Configuration 16 and LAC/E 17 are supported with Windows 10 Enterprise Long Term Servicing Channel (LTSC) 2021. - Waters LAC/E device Configuration 16 comprises both eLAC/E and cLAC/E and the corresponding BC LAC/E option. - The Waters LAC/E 17 device comprises the BC LAC/E option.

Table 1: Supported platforms and operating systems (continued)

Platform	Operating systems and components
Virtualization technology ^b	• VMware vSphere ESXi 7.0.3 build number 21313628 • Microsoft Azure Virtual Desktop (English only) • Amazon WorkSpaces (English only)

- a. Embedded Oracle versions are 19.20.0.0.0 64-bit for the Oracle database and 19.20.0.0.0 32-bit for the Oracle client. Red Hat servers require Oracle version 19.20.0.0.0. The Oracle database is installed on Empower server and Empower Personal installations. Oracle clients are installed on Empower server, Personal, Empower client, and LAC/E installations.
- b. Waters is aware of customer requirements for deploying Empower software using a virtual desktop solution. While Waters structurally validates Empower software in a Citrix environment and trains its Empower Informatics personnel in deploying in Citrix and Microsoft Azure Virtual Desktop (English only) environments, it recognizes alternatives. Waters Informatics Professional Services teams successfully deployed Empower software using the virtual technologies listed in the topic "Virtualization support" of the *Empower 3.8.1 Installation, Configuration, and Upgrade Guide* (715008818).

See also: *Empower 3.8.1 Installation, Configuration, and Upgrade Guide* (715008818)

Oracle software licenses

For Empower software installations on a Windows operating system, Waters embeds the required Oracle software components within the Empower software product.

For Empower software installations on other operating systems, contact your local Waters support representative or raise a support ticket for further information and to discuss your proposed installation.

Important: Empower software does not support Oracle's Transparent Application Failover (TAF). This option is known to cause undesired behavior. If you are configuring a High Availability deployment, do not enable the TAF option. As a customer, engage with Waters Professional Services for consultation on how to deploy supported High Availability options.

Instrument support

Changes in instrument support

Starting with version 3.7.0, Empower software uses an instrument catalog to identify which third-party instruments in your configured systems require instrument control licenses. For details about the introduction of the instrument catalog, see the *Empower 3.7.0 Release Notes* (715007561), and for information about upload and usage of the instrument catalog, see the *Empower 3.8.0 Installation, Configuration, and Upgrade Guide* (715008196).

Ethernet and serial instruments

To further align its products, after the release of Empower 3 Feature Release 5 Service Release 4, Waters no longer offers Empower software defect corrections or enhancements related to IEEE control in any release of Empower software. Use of IEEE instrument control beyond

Empower 3 Feature Release 5 Service Release 4 was not tested, will not be tested, and is not supported.

In addition to IEEE control support, Waters discontinued the following instruments.

Table 2: Instruments that Empower software no longer supports

Instrument	As of this release:
410 RI detector	Empower 3
486 TUV detector	Empower 3
996 PDA detector	Empower 3
474 fluorescence detector	Empower 3
Agilent 5890 gas chromatograph	Empower 3 FR3
Agilent 7673 automatic liquid sampler ^a	Empower 3 FR3
Waters ZQ 2000 mass detector	Empower 3 FR3
Waters ZQ 4000 mass detector	Empower 3 FR3
Waters EMD1000 mass detector	Empower 3 FR3
Waters SQ mass detector	Empower 3 FR5
Waters TQ mass detector	Empower 3 FR5
Waters 3100 mass detector	Empower 3 FR5
BusSAT/IN Module	Empower 3.8.1
BusSAT/IN 2 Module	Empower 3.8.1
484 Tunable UV Detector	Empower 3.8.1
600 Pump Controller	Empower 3.8.1
717 Autosampler	Empower 3.8.1
TMD Analog Detector Module	Empower 3.8.1
Alliance modules 2690, 2695, 2690D, and 2695D when controlled via IEEE (control via Ethernet is supported)	Empower 3.8.1
2487 Dual Wavelength Absorbance Detector	Empower 3.8.1
2790 Separations Module	Empower 3.8.1
2996 Photodiode Array Detector	Empower 3.8.1
ACQUITY 2996 Photodiode Array Detector	Empower 3.8.1

a. Agilent 7673B and 7673C automatic liquid samplers are supported via ICF Support Layer drivers.

Support for Agilent 6850, 6890, and 7890 GC modules and Agilent 7697A and G1888 Headspace modules

Prior to Windows 10, the Agilent 6850, 6890, and 7890 GC modules and the Agilent 7697A and G1888 Headspace modules were controlled either by an instrument driver built directly into Empower software or by a legacy Instrument Control Software (ICS) driver. Additionally, the 6850 and 6890 used either RS-232 serial control or RS-232 serial/edgeport USB driver control. To control these modules in an Empower Windows 10 environment, Waters recommends installing the Agilent drivers available with its Instrument Control Framework (ICF) Support Layer version 3.0 (minimum), which uses Ethernet communication. To enable Ethernet communication with the 6850 or 6890 modules, install the Ethernet conversion kits available from Agilent. For more information on ICF Support Layer drivers, see www.waters.com > **Support** > **Support Documents and Downloads**, search for "ICF", and filter the search results by Content Type = Downloads.

Driver compatibility

Waters expects no driver compatibility issues with either Waters or third-party instrument drivers with this Empower software release because the driver interfaces within Empower underwent no significant changes.

Empower 3.8.1 supports:

- Waters Driver Pack 2023 Release 1
- Instrument Control Framework Support Layer v3.7.01
- Alliance iS HPLC Instrument Control Software 1.1

Note: Obtain the Alliance iS HPLC Instrument Control Software and the Waters driver pack from the Waters Digital Software Delivery and License Entitlement platform. The ICF Support Layer is available for download from www.waters.com > **Support** > **Support Documents and Downloads**.

For information on the Waters drivers, refer to the following documents available on the Waters website (www.waters.com > **Support** > **Support Documents and Downloads**):

- *Waters Driver Pack 2023 R1 Release Notes (analytical)* (715008470)
- *Waters Driver Pack 2023 R1 Installation and Configuration Guide* (715006278)
- *Instrument Control Framework Support Layer v3.7 Release Notes* (715008078)
- *Instrument Control Framework Support Layer 3.7.01 Release Notes* (715008916)
- *Instrument Control Framework Support Layer v3.7 Installation Guide* (715008074)
- *Alliance iS HPLC System ICS Installation and Configuration Guide* (715008749)

For information on compatibility with chromatography instruments and drivers from other vendors, refer to the release notes for those instruments and drivers.

NuGenesis SDMS LMS compatibility

Empower 3.8.1 is compatible with NuGenesis LMS 9.3.0 Hotfix 3 (NG LMS 9.3.0 HF3) components as follows:

- The NuGenesis LMS Base Kit (SDMS) requires NuGenesis SDMS 9.3.1 for printing functionality.
- The NuGenesis LMS Option Kit (ELN and Connectors) for NG SDMS 9.3.1 requires NG LMS 9.3.0 HF3, NG LMS 9.3.0 Empower Interface 2.3.0, or NG 9.3.0 LMS Connectors 2.3.0 HF1.
- The NuGenesis SDMS 9.3.1 Data Adapters Release 6 (NG SDMS 9.3.1 DAR6).

Requirement: For Empower 3.8.1 support, you must apply NuGenesis SDMS 9.3.1 Data Adapters Release 6 (NG SDMS 9.3.1 DAR6).

See also: The *NuGenesis LMS 9.3.0 Release Notes* (715007872), the *NuGenesis LMS 9.3.0 SDMS Data Adapters Release 6 Reference Guide* (715007870), and the *NuGenesis LMS 9.3.0 Installation and Configuration Guide* (715007873) for complete information.

Empower 3.8.1 is compatible with NuGenesis LMS 9.1.0 HF4 components as follows:

- The NuGenesis LMS Base Kit (SDMS) requires NuGenesis SDMS 9.1.0 HF2 for printing functionality.
- The NuGenesis LMS Option Kit (ELN and Connectors) for NG SDMS 9.1.0 HF2 requires NG LMS 9.1.0 HF4, NG LMS 9.1.0 HF4 Empower Interface 2.1.0, or NG 9.1.0 HF4 LMS Connectors 2.1.0 HF3.
- The NuGenesis LMS 9.1.0 SDMS Data Adapters Release 4 HF1 (NG SDMS 9.1.0 DAR4 HF1).

Requirement: For Empower 3.8.1 support, you must apply NuGenesis LMS 9.1.0 SDMS Data Adapters Release 4 HF1 (NG SDMS 9.1.0 DAR4 HF1).

See also: The *NuGenesis LMS 9.1 Release Notes* (715006815) and the *NuGenesis LMS 9.1 Installation and Configuration Guide* (715006816) for complete information.

Legend:

Tested	Both software entries were tested and structurally validated as part of a software release. The test was performed by either the Empower or the NuGenesis program, depending on the software release.
Incompatible	The two software entries will not work together.
Supported under risk assessment	This is based on our knowledge of the software changes made at each release. If you encounter compatibility issues, Waters provides support in accordance with the terms of the Licenses, Warranties, and Support Services agreement. To resolve compatibility problems, you might need to upgrade to a supported platform or install a newer version of Empower software.

Table 3: NuGenesis SDMS and Empower compatibility matrix

NuGenesis SDMS version	Empower 3.8.1
NG 9.0.0 SDMS	Incompatible
NG 9.0.0 DAR1	Incompatible
NG 9.0.0 DAR2	Incompatible
NG 9.0.0 DAR3	Incompatible
NG 9.0.0 DAR4	Incompatible
NG 9.1.0 SDMS	Supported under risk assessment
NG 9.1.0 SDMS HF1	Supported under risk assessment
NG 9.1.0 SDMS HF2	Supported under risk assessment
NG 9.0.0–9.1.0 DAR4	Incompatible ^a
NG 9.0.0–9.1.0 DAR4 HF1	Supported under risk assessment
NG 9.1.0 SDMS HF2 DAR4 HF1	Tested
NG 9.2.0 DAR5	Supported under risk assessment
NG 9.2.0 SDMS HF1 DAR5	Supported under risk assessment
NG 9.3.0 SDMS DAR6	Supported under risk assessment
NG 9.3.1 SDMS DAR6	Tested

a. The incompatibility is related to the DAR4 application's archiving functionality. The NG SDMS 9.0.2 and 9.1 are compatible with Empower 3.8.0, and the manual and automatic printing functionality works as expected.

Table 4: NuGenesis LMS and Empower compatibility matrix

NuGenesis LMS version	Empower 3.8.1
NG LMS 9.0.0	Supported under risk assessment
NG LMS 9.1.0 HF1	Supported under risk assessment
NG LMS 9.1.0 HF3	Supported under risk assessment
NG LMS Empower Interface 2.0.0	Supported under risk assessment
NG LMS Connectors 2.0.0	Supported under risk assessment
NG LMS 9.0.2	Supported under risk assessment
NG LMS Connectors 2.0.2	Supported under risk assessment
NG LMS Connectors 2.1.0	Supported under risk assessment
NG LMS Connectors 2.1.0 HF1	Supported under risk assessment
NG LMS Connectors 2.1.0 HF2	Supported under risk assessment
NG LMS Connectors 2.1.0 HF3	Tested
NG LMS Empower Interface 2.0.2	Supported under risk assessment

Table 4: NuGenesis LMS and Empower compatibility matrix (continued)

NuGenesis LMS version	Empower 3.8.1
NG LMS Empower Interface 2.1.0	Tested
NG LMS 9.1.0 HF2	Supported under risk assessment
NG LMS 9.1.0 HF3	Supported under risk assessment
NG LMS 9.1.0 HF4	Tested
NG LMS 9.2.0	Supported under risk assessment
NG LMS 9.2.0 HF1	Supported under risk assessment
NG LMS Connectors 2.2.0	Supported under risk assessment
NG LMS Empower Interface 2.2.0	Supported under risk assessment
NG LMS 9.3.0	Supported under risk assessment
NG LMS Connectors 2.3.0	Supported under risk assessment
NG LMS Empower Interface 2.3.0	Tested
NG LMS 9.3.0 HF3	Tested
NG LMS Connectors 2.3.0 HF1	Tested

Note: NuGenesis SDMS 8 and NuGenesis LMS 8 versions are not compatible with Empower 3.8.1.

Waters Data Converter compatibility

Empower software is compatible with Waters Data Converter 2.1 HF2 (WDC 2.1 HF2) and Waters Data Converter 3.2 (WDC 3.2) as follows:

Table 5: Waters Data Converter and Empower compatibility matrix

WDC version	Empower 3.8.1
WDC 2.1 HF2	Supported under risk assessment
WDC 3.2	Tested

Requirement: When you install WDC 2.1 HF2 on Windows 10, you must run both the installer and the installation qualification *Check.bat* file using an account with the System Administrator role.

Legend:

Tested	Both software entries were tested and structurally validated as part of a software release. Empower, NuGenesis, or WDC Programs performed the test, depending on the software release.
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Supported under risk assessment	This is based on our knowledge of the software changes made at each release. If you encounter compatibility issues, Waters provides support in accordance with the terms of the Licenses, Warranties, and Support Services agreement. To resolve compatibility problems, you might need to upgrade to a supported platform or install a newer version of Empower software.
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Deployment notes

Before you install the application

You can install Empower 3.8.1 as a new installation on a system where no Chromatography Data System (CDS) is currently installed, or you can perform an upgrade from Empower 3.8.0 (minimum).

Prerequisite: To perform an upgrade to Empower 3.8.1, you must have Oracle database version 19.20.0.0.0 (minimum) installed. For the latest available Waters Oracle CPU releases, see the Waters Digital Delivery Platform.

Upon Empower node upgrade, the Empower Deployment Manager automatically applies Oracle client 19.20, without you having to apply an Oracle CPU Patch on those Empower nodes.

Starting with version 3.7.0, the Empower Instrument Catalog defines chromatographic instruments that you can use for data acquisition in Empower software, and verifies which third-party instruments in your chromatographic systems require instrument control licenses. For more details, see the *Empower 3.7.0 Release Notes* (715007561) and the *Empower 3.8.1 Installation, Configuration, and Upgrade Guide* (715008818).

When you migrate from an earlier version of Empower software, Waters recommends using the system object export and import utilities to move objects such as systems, users, nodes, and so on from your old installation to your new installation. Otherwise, you must manually recreate any objects you want to use with your new installation. See "System object export" in the *Empower 3.8.1 Installation, Configuration, and Upgrade Guide* (715008818).

Restrictions:

- In-place upgrade is available only for existing Empower 3.8.0 (minimum) installations.
- You can perform a system object export only on a Windows-based Empower database server.
- Empower Mobile is no longer supported.
- Empower servers support only Empower installations that include the deployment of Oracle software. If Oracle is already installed on the server, the Empower server installer stops.

For information on restoring projects from previous versions of Empower software, see "Restoring projects" in the Empower Online Information System.

For complete installation instructions, review the *Empower 3.8.1 Installation, Configuration, and Upgrade Guide* (715008818) and the *Waters Ethernet Instrument Getting Started Guide* (71500074403).

Additional software components

Empower 3.8.1 deployment includes these additional software components:

Table 6: Software components deployed with Empower software

Component	Version
Oracle Product	Server platforms, Personal workstations: Oracle database version 19.20.0.0.0
	Personal workstations, Empower clients, and LAC/E devices: Oracle client version 19.20.0.0.0
Waters Database Manager (WDM)	4.2
Java software	1.8.0_381
Java SE Runtime Environment	build 1.8.0_381-b09
Java HotSpot 64-Bit Server VM	build 25.381-b09, mixed mode
MSXML	3.0
	6.0
Microsoft Visual C++	2015-2022 Redistributable

Empower software bundle

Starting with Empower 3.8.0, the Empower software download area of the Digital Delivery Platform includes the Waters Edge Device Software installer.

To leverage waters_connect Cloud System Monitoring for your Empower software-controlled instruments, including Alliance iS HPLC, you can deploy the Waters Edge Device Software onto your Empower LAC/E device.

Your onboarded LAC/E devices securely share instrument status and configuration information gathered from Empower software to the waters_connect Cloud, which stores and makes that information available for display through the [System Monitoring cloud application](#) (sold separately).

For Waters Edge Device Software deployment instructions and requirements, see these documents:

- *Edge Device Software Installation Guide* (715007383)
- *Edge Device Software Release Notes* (715007381)

Version information

You can view specific version information for Empower 3.8.1 in the following locations:

Table 7: Empower component version information

Component	Version	Location
Empower software	3.8.1	• Help > About • Information icon on the Empower login screen
Empower Product	7.0.3471.921	• Installation Log • Control Panel > Add/Remove Programs > Empower • Settings > Apps & Features > Empower
Database	7.81.00.00	• Help > About • Verify Files • Information icon on the Empower login screen

Default projects

A default project containing example data for training and troubleshooting purposes is included when you purchase Empower software.

What's new?

New features in this release include the items described in the following sections.

Support for term licenses

Waters adds Empower software term licenses starting with the Empower 3.8.1 software release. Term licenses allow you to continuously use Empower software and enabled options for the duration of your contract term and renew your license when your contract term expires. For example, when a license validity period expires, the software restricts access to the respective instrument systems, users, or software functionality.

Note: Empower software supports a mixed-licensing environment and continues to support perpetual licenses.

Restriction: Versions of Empower software prior to Empower 3.8.1 do not support term licenses.

Term license enrollment and renewal

The process to set up or renew term licenses is similar to the Empower software license activation process. Use the Empower License Management Wizard to add, renew, or reactivate using the new or existing installed license, serial number, and expiry date. When your license validity period expires contact your local account manager for a quote on the next term. For details on how to use term licenses, see “Managing Empower term licenses” in the latest version of the *Empower 3.8.1 System Administrator's Guide* (715008878).

See also: For a full discussion of Empower software licensing, see the *Read Me: Waters SW License Management and Empower documentation* (715002703).

License expiration monitoring and notifications

Waters provides tools for administrators and users with the Manage Licenses privilege to monitor the status of term licenses. These tools include email notifications, plus additional alerts in Empower software. See the “Tools to monitor term license status” table in the *Empower 3.8.1 System Administrator's Guide* (715008878).

Oracle's Optimizer Statistics Advisor (CRI-6027)

Previously, Oracle's Optimizer Statistics Advisor caused the temporary tablespace of the database to fill up while the scheduled task ran. Consequently, the Oracle `Alert.log` file reported various errors related to Oracle's Advisor utility, and the Empower database server encountered performance issues.

Now, for clean installations in Microsoft Windows environments, the Empower 3.8.1 software installer disables Oracle's Advisor scheduled task, because Empower software does not use any of the Advisor statistics.

Users that upgrade to Empower 3.8.1 in Microsoft Windows environments and users with Red Hat Linux database servers must follow these steps to disable the Oracle Optimizer Statistics Advisor scheduled task:

1. Download and install the Oracle patch 26749785 specific to the Oracle CPU installation on your Empower database server.
2. Using SQLPlus, log in to the database with the `sys` account and set the container to `EMPPDB1`.
3. Run the command `exec`
`dbms_stats.set_global_prefs('AUTO_STATS_ADVISOR_TASK','FALSE');`

For detailed information, consult Oracle's document *How To Disable Optimizer Statistics Advisor From 12.2 Onwards* (Doc ID 2686022.1).

Other enhancements and security updates

Empower 3.8.1 also includes these enhancements and security updates.

Table 8: Empower 3.8.1 enhancements and security updates

Software area	Enhancement or update
Instrument Catalog	The Waters Licensing Wizard's "Update instrument catalog" section now displays the installed Empower Instrument Catalog version.
Security	• <i>Checksum.txt</i> output files now reside in <i>Empower\Logs</i>. • <i>Checksum.txt</i> files no longer record information from database calls, such as Oracle Version, Database Version, installed Empower Licenses, or Instrument Catalog details. The Installation Qualification report that the Software Qualification option (SQT IQ) creates continues to capture this information. • An improved algorithm now encrypts Oracle schema passwords.
Project Audit Trail (CRI-6370)	Empower 3.8.1 Project Audit Trail differentiates a manual locking action from an electronic signature locking action. Each action creates a distinct audit trail entry: • <code>Locked Channel At Sign-Off</code> for an automatic lock after Sign Off 2 • <code>Locked Channel</code> for a manual lock
Result Audit Viewer (CRI-929)	• For improved performance, now the Result Audit Viewer (RAV) initially loads only one result. Then, RAV appends any subsequent results that the user selects next. Also reported as PCS 55224 and PCS 55649. • File > Save Preferences retains RAV's View menu item configuration. • For the method tabs and the Result Differences tab: • When you select one single line in the Superseded Methods table (or no line in the Superseded Results table), you cannot compare method or result differences. Empower disables the associated options in the View menu. • When you select two or more lines in the Superseded Methods table (or one or more lines in the Superseded Results table), Empower enables the associated options in the View menu and you can show method differences.
User privileges (CRI-5720)	Previously, Empower software hid only the following fields in the Review window Peaks table for users without the View Quantitation Peak Fields in Review (VQPFR) privilege:

Table 8: Empower 3.8.1 enhancements and security updates (continued)

Software area	Enhancement or update
	• Area • % Area • Height • % Height • Amount • % Amount • Response • Concentration Empower 3.8.1 software hides these additional fields from users without the VQPFR privilege: • Time Corr. Area (when the CE/CIA option is enabled) • % Time Corr. Area (when the CE/CIA option is enabled) • Relative Response • Impurity Response • % Adjusted Area • Corrected Area~ • Adjusted Total Area • Maximum Impurity Response • Dissolved Amount (when the Dissolution option is enabled) • Dissolved Percent (when the Dissolution option is enabled) • All Peak type custom fields • All Result type custom fields Note: Users not assigned the VQPFR privilege cannot view these fields, and the fields are not visible in the Peaks and Results tables' Properties tab. Additionally, users not assigned this privilege cannot add these fields as labels or legends in the plots in Review.

Issues resolved in this release

This section lists the problems resolved in this release. The numbers identify issues that Waters personnel monitor within a system change request tracking tool.

INFEMP-7215 (CRI-1479)

When a user attempted to access projects with Read Only and Process Only locks using the Walk-Up interface, they could modify objects despite the locked status. Now, this is corrected. The user cannot add or modify data, and the following error appears: `Cannot access project. It is locked.`

Also reported as CRI-4667.

INFEMP-7257 (CRI-1510)

Previously, when using the lightweight directory access protocol (LDAP), users received a login error if they launched a Toolkit app from the Project or Validation Manager window in Empower software. Now, this issue is corrected.

INFEMP-7269 (CRI-1523)

Previously, users were allowed to name custom fields with the names CConst1 through CConst7. As a result, custom field processing failed in Review and background processing caused the applications to stop responding.

Now, a warning appears if you attempt to name a custom field with the field names CConst1 through CConst7.

Important: CConst1 through CConst7 are reserved names. Ensure that you do not use them to name your custom fields.

INFEMP-7307 (CRI-1154)

Previously, when verifying incomplete data files, the Audit Trail did not record verification for some data files if a lapse in database connectivity occurred during this activity.

This issue is resolved.

INFEMP-7309 (CRI-1158)

The Chinese text in User Type Privilege Properties now shows the correct translation for the following error: `You do not have permission to delete sample set methods.`

Note: This error also appears for users who do not have the Delete Sample Set Methods privilege.

INFEMP-10862 (CRI-691)

Previously, in the Spectrum Index pane in Review, you could not adjust the Lambda Max labels for PDA data or the Intensity Maximum labels for mass spectrometer (MS) data. Now the issue is resolved.

Additionally, the Spectrum Index pane in Review now includes Lambda Max Level and Intensity Level fields in Plot properties.

INFEMP-13450 (CRI-2781)

Previously, in Empower FR4 SR3 or later if you selected or deselected the Don't Show License Expiration Warning Messages (User Preference Setting) check box in User Properties the change did not save. Now, when you click **Apply** the setting saves properly.

INFEMP-14689 (CRI-2897)

When setting LDAP authentication in the System Policies General tab, the check box label in the Authentication window was incorrect, `Use TLS/SSL`. Now, the check box shows the correct label, `Use StartTLS`.

INFEMP-15114

Previously, during the Empower software installation, Verify Files produced an initial *Checksum.txt* report. After system restart, if the user executed Verify Files, the initial report was incorrectly overwritten with a new time-stamped report, causing both the *Checksum.txt* and *Checksum_timestamp.txt* to contain the same information.

This issue is resolved.

INFEMP-18589 (CRI-3668)

Previously, when signing off multiple results in a full audit trail (FAT) project, if you pressed **Cancel** in the Saving Sample Changes comments dialog box, the operation canceled for only one result, and any remaining results were signed off.

Now, when you press **Cancel** the sign-off process is cancelled for the entire set of results.

INFEMP-20417 (CRI-4040)

When using Result Audit Viewer, if you performed a difference on an instrument method with only one version, the PDA Range and Data Mode for 257 nm were incorrectly flagged as a difference. These were also flagged when viewing the differences for an instrument method that is locked. The issue is resolved.

INFEMP-21278 (CRI-4156)

Previously, if you changed settings in Project Properties for the parent project with the Copy to Sub-Projects function selected, the new settings did not update in unlocked sub-projects if one or more sub-projects were locked (with read only, process only, or full locks). The issue is resolved.

INFEMP-26623 (CRI-4889)

Previously, when processing a sample set where the sample set method contained a processing function whose label reference field contained multiple references (in this customer case, "S0*S*" matched the sample label "S01"), duplicate results were generated. If the result set was then reprocessed using the existing integration, each of the duplicated results were duplicated again in the new result set.

For example, instead of one result in each of the result sets, two results appeared in the first result set and four results appeared in the second result set.

Now, this issue is resolved and duplicate results do not occur.

INFEMP-28169 (CRI-5183)

Previously, if you clicked the Integrity tab from Project Properties after you restored projects with a large number of backups (for example, 4 GB with more than 2,000 integrity records), an `Out of memory` error appeared. Now, when you click on the **Details** tab, the records are retrieved individually and no error appears.

INFEMP-28676 (CRI-5193)

Previously, the Database Migration Assistant for Unicode (DMU) folder from the Oracle client caused potential problems from the reported vulnerability CVE-2017-12626 (Apache POI in versions prior to release 3.17 are vulnerable to Denial of Service Attacks).

Now, the DMU folder is removed to prevent any issues from the vulnerability.

INFEMP-30747 (CRI-5730)

Previously, the Verify Files *Checksum.txt* file did not indicate if a directory in the Empower software installation folder was missing.

Now, a message appears in the *Checksum.txt* file that identifies each missing *dir.cks* folder.

INFEMP-31637 (CRI-5849)

Due to security concerns, the Empower 3.8.1 software installer does not install the Microsoft Visual C++ 2008 Redistributable package in the following installation/upgrade scenarios:

- Clean installation of Empower 3.8.1 software
- When you delete the Microsoft Visual C++ 2008 Redistributable package and then upgrade from 3.8.0 to 3.8.1

Note: If the package is already installed on the system, upgrading from 3.8.0 to 3.8.1 will not remove it.

If you prefer, you can install the package after the Empower software 3.8.1 installation completes.

INFEMP-31886

You can successfully connect to SDMS 9.3.1 in web mode using a dedicated port.

INFEMP-32932

Previously, if the first project in Configuration Manager's Projects table was locked, and then you logged in using the Walk-Up interface attempting to open a different project that is not locked, the following error appeared: `Cannot access project. It is locked.`

Now, this issue is resolved. The first selected project that is not locked opens successfully.

INFEMP-33040 (CRI-6192)

Previously, in the Japanese version, when using an instrument with embedded Empower software drivers (for example, Alliance 2690), if you attempted to change the flow of the instrument in Run Samples, all the systems connected to the same LAC/E device stopped responding. Now, the Change Flow operation works as expected.

INFEMP-33551 (CRI-6364)

Previously, the number of characters allowed when creating a username for LDAP authentication was between four and thirty characters. Now, the number of characters allowed for the username is between two and thirty characters.

INFEMP-33227 (CRI-6279)

Previously, the Empower 3.8.0 software installer terminated with configurations running Windows versions in the following Microsoft Azure environments because the software incorrectly detected that these are not supported:

- Windows 10 Enterprise for Virtual Desktop
- Windows 10 Enterprise multi-session
- Windows 11 Enterprise multi-session

Now, the appropriate warning appears giving you the option to cancel the installation or continue the installation using your preferred operating system.

INFEMP-33596 (CRI-6331)

Previously, with the following system configurations, Empower 3.8.0 and Empower 3.8.0.1 software versions reported an instrument failure that prevented acquisition:

- Waters 2414 Refractive Index (RI) detector connected to an Alliance 2695 system running in W410 emulate mode

Notes:

- This issue did not impact systems when the 2414 detector ran in native 2414 mode.
- The Alliance 2414 SQT (System Qualification Tool) projects were configured to use the 2414 detector in emulate W410 mode and, as a result, the SQT version could not be used with Empower 3.8.0 and Empower 3.8.0.1.
- An Agilent 6890 GC system running without an Instrument Control Framework (ICF) Support Layer
- Waters systems with an Alliance 2695 installed (and no other instruments installed in the system)

Note: Systems that contain a module that uses an external instrument control software (ICS) driver were not impacted, except for an Alliance HPLC Instrument, which uses a combination of ICS and embedded drivers.

Upgrading to Empower 3.8.1 software corrects the issue.

INFEMP-33665

Previously, renaming a custom field using the same name as one that you recently created for a project was allowed.

Now, you cannot use the same name. You must adhere to these new restrictions:

- Creating a new custom field with the same name and formula as an existing one is not permitted, regardless of capitalization.
- Renaming an existing custom field with the name of an existing custom field or formula is not permitted, regardless of capitalization.

INFEMP-34938

Previously, when you acquired data in Run Samples using Interactive System Suitability, the number of reinjections that you set in Reinject on Fault mode were not applied in systems configured with more than one module.

Now, reinjections are performed based on the reinjection setting that is set in Reinject on Fault mode, regardless of the number of modules configured in the acquisition system.

Known issues in this release

This section lists the known issues and solutions for this release. The numbers identify issues that Waters personnel monitor within a system change request tracking tool.

INFEMP-7288 (CRI-703)

Bad *Checksum.txt* file errors can occur due to intermittent network issues that cause data files to close improperly. This can happen at the end of acquisition when the data file is closed or when 2D data files are extracted and saved from 3D data.

In this scenario, the Channel Status is "Being Acquired" and the Injection Status is "Incomplete".

Typically, this data can be brought into Review and a privileged user can verify it as complete. When data is "Verified as Complete", the checksum is re-calculated.

INFEMP-8221

In the Japanese version, in Run Samples, when using the In-Needle Auto Additions editor, if a user specifies incomplete information in the Vial or InjVol column, the system correctly displays the Entry in row %d is incomplete. Enter a valid location and a volume message. However, the error message incorrectly refers to the %d rather than indicating the row number that is incomplete. Due to an error in translating the message, the %d value is not converted into the row number.

INFEMP-11774

In the Chinese, Japanese, and Korean versions, when you launch the Waters Email Service installer, some text does not display correctly because the following translation is missing:

"The installer starts the Waters Email Service on this computer. You must double-click the **Manage Waters Email Center** shortcut, which is created by this installer in order to configure the Waters Email Service on your Empower computer. If you want to continue, press Install, otherwise press Cancel."

INFEMP-13017

In the Korean version of Empower software, when you type the Group Name in the New User Group dialog field, the first letter of the second character overwrites the first character and the following error appears:

Enter a value for this field or press ESC to refresh.

Workaround: Type the user group name in a text file, copy, and then paste the user group name into the Empower Group Name field.

INFEMP-15301 (CRI-3154)

During recovery after buffering, intermittent network issues caused the timestamp to display strange numbers (for example, 03/51/6034). This occurred because the time zone table in the database was not available due to the network disruption.

INFEMP-15722

When you edit an instrument method for an Alliance system and modify an existing gradient table by changing values in random or backward order of columns, Empower software removes values in any unedited columns and replaces recently edited values, auto-populating them with values that autosum to 100%.

Tip: When populating the gradient table, methodically edit the gradient table in a left-to-right, top-to-bottom fashion.

INFEMP-29853 (CRI-2013)

In Configuration Manager, during project creation, if this process is interrupted or stopped, the Create Project audit trail is not written and the created project may not be properly created.

Workaround: Delete the project that you attempted to create, and then replace it by creating a new project.

INFEMP-29854 (CRI-5559)

When using Method Validation Manager (MVM), the **Study Finish Date** field is not populated. This field appears blank in the user interface and on reports.

This issue also affects the Valid_OQMVM project used for MVM qualification using the Waters SystemsQT for Software tool.

INFEMP-30110 (CRI-5629)

In Report Publisher, when you have two different projects, with two reports and two result sets with the same name, if you perform a sign-off in quick succession in less than 20 seconds, the PDFs may be incorrectly stored in the wrong project.

INFEMP-30989 (CRI-5822)

The Project Backup process fails or stalls during the project integrity part of the backup if a *.dat file that cannot be read is encountered.

INFEMP-32057 (CRI-5740)

The Processed Channel Description is incorrect when background processing a 3D channel (PDA or MS) using baseline subtraction. The defect occurs only if the 3D channel was acquired as part of a sample set.

Note: The channel that was processed is correct. Only the description is incorrect.

Workaround: Process the 3D channel's injection or sample set instead of just processing the 3D channel.

INFEMP-32378 (CRI-5474)

For peak type custom fields, when you use the Acceptance Criteria Limits option on the Limits tab in a processing method, and then modify the column properties to change the name of the column of a peak type custom field, the criteria for the custom field do not appear in the report.

Note: Modifying the name of a default peak field in column properties in the peak table of a report does not affect the reporting criteria for the field.

INFEMP-32379 (CRI-5331)

When there are a very large number of projects in your database, the project properties can take a long time to display the properties of a single project.

INFEMP-33224

In the Korean version, there is untranslated text in the Instrument Method Report and the Post Run Report.

INFEMP-33559 (CRI-6260)

When using non-Waters software that connects to Empower software using a Toolkit application, Empower project read-only and process-only locks may not be enforced. For example, sometimes users are able to perform actions (such as modifying methods and processing data) that are normally prohibited by the project lock.

INFEMP-33768

When you pre-install the Oracle Client on a client or LAC/E device, the Oracle Install Type registry shows the `Customer` value. If the client or LAC/E device is uninstalled, the Oracle Client is uninstalled with Empower software.

The Oracle Client installed by the customer is uninstalled after the Empower software upgrade and the Oracle home folder and registry key are deleted.

Workaround: To prevent the removal of the Oracle Client, change the Oracle Install Type registry value from `Empower` to `Customer`.

INFEMP-34384

For Empower Personal installations on a customer's computer with less than 8 GB of RAM, a message about the minimum system requirements similar to the following does not appear: The system does not have enough memory (RAM) to run Empower properly. A total of 8.0 gigabytes (GB) of memory (RAM) is required.

See the *Empower 3.8.1 Installation, Configuration, and Upgrade Guide* (715008818) for complete details on Empower software system requirements.

INFEMP-34442 (CRI-6212)

If the value of a Sample Set Type custom field is modified and the sample set is subsequently processed, the value of the Sample Set Type custom field shown in the middle table in the Result window of Review will show the original value instead of the updated value.

Workaround: You can locate the correct value for this custom field in Preview Publisher.

INFEMP-34445 (CRI-6421)

The View Numerical and Textual Results in Review (VNTRR) privilege incorrectly grants users without the privilege the ability to use the Set Processing Method Peak Area or Set Processing Method Peak Height functionality to view the area or height of a peak.

INFEMP-34870 (CRI-6483)

When using an application that connects to Empower software using a Toolkit app, it is not possible to use that application to change the default `RawDataPath` parameter.

Workaround: If you want to create a project using an alternate path for the raw data, you must set that as the default path in Configuration Manager each time you run the Toolkit app.

INFEMP-34933

When an error is logged in the Message Center in a Japanese Linux environment, the following behavior occurs:

- The Message Center icon (a small megaphone) remains green although it should change to red.
- The immediate attention notifications do not appear.

INFEMP-34975

When you open a Result Set in Review and then open Result Audit Viewer (RAV), the RAV table correctly displays only the selected result.

To load subsequent results in the RAV table, open RAV from Review and then click **Next Injection**.

Test configurations

This application update was tested on the following system configurations.

Empower File Server

Windows Server 2019 Standard

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5008873,KB4486153,KB4535680,KB4549947,KB4589208,KB4598480,KB4601393,KB5005112,KB5010351,KB5009642,KB5005114,KB5004335,KB4577586,KB5003711,KB5005102,KB5029925,KB4486167,KB5000859,KB5001404,KB5003243,KB5012170,KB5030214,KB5006754,KB5008287,KB5011574,KB5015896,KB5020374,KB5030505,KB5005701,KB4486168,KB4562562

Windows Server 2022 Standard

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5028956,KB5012170,KB5014831,KB5029250,KB5029395,KB5031993,KB5014856,KB5032198,KB5032310,KB5014858,KB5031590

Windows 10 Professional

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19045	KB5032005,KB5016592,KB5000736,KB5003791,KB5011048,KB5012170,KB5015684,KB5032189,KB5007273,KB5011352,

Microsoft OS version	Microsoft hotfixes
	KB5011651,KB5014032,KB5014035,KB5014671,KB5015895,KB5016705,KB5020372,KB5022924,KB5023794,KB5026879,KB5028318,KB5028380,KB5029709,KB5031539,KB5032392,KB5005699

Empower Server

Windows database server

Windows Server 2019 Standard

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5004335,KB4535680,KB4549947,KB4577586,KB4589208,KB4598480,KB5003711,KB5005112,KB5005102,KB5005114,KB5027131,KB4486153,KB4558997,KB4566424,KB4570332,KB4587735,KB4601393,KB5003243,KB5012170,KB5028168,KB5015896,KB5020374,KB5028316,KB5005701,KB5028960,KB5029247,KB5029925,KB5000859,KB5030214,KB5006754,KB5008287,KB5030505,KB5009472,KB5009616,KB5009642,KB5027222,KB5023789,KB5029931,KB4562562,KB5011503,KB4494174,KB4580325,KB5031361,KB5031589,KB5008873,KB5010351,KB5031990,KB5032196,KB5032306,KB5016713,KB5012675,KB5014031,KB5033904,KB5034127

Windows Server 2019 Datacenter (Amazon WorkSpaces and Elastic Computer Cloud)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5031990,KB4470502,KB4470788,KB4480056,KB4486153,KB4493510,KB4499728,KB4504369,KB4512577,KB4512937,KB4521862,KB4523204,KB4535680,KB4539571,KB4549947,KB4558997,KB4562562,KB4566424,KB4570332,KB4577667,KB4587735,KB4589208,KB4598480,KB4601393,KB5000859,KB5001404,KB5003243,KB5003711,KB5005112,KB5032196,KB5006754,KB5008287,KB5009642,KB5011574,KB5012675,KB5014031,KB5014797,KB5015896,KB5017400,KB5020374,KB5023789,KB5028316,KB5030505,KB5031589,KB5032306,KB5005701,KB5031010,KB5031361

Windows Server 2022 Standard

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5028858,KB5012170,KB5028171,KB5017399,KB5028317,KB5013630,KB5016627,KB5015897,KB5027127,KB5017028,KB5017381,KB5017265,KB5028956,KB5029250,KB5029395,KB5022507,KB5026370,KB5026493,KB5029928,KB5014831,KB5030216,KB5030369,KB5014856,KB5014858,KB5030999,KB5014856,KB5031590,KB5031993,KB5031364,KB5032198,KB5032310,KB5033118

Windows Server 2022 Datacenter

Microsoft Windows versions and hotfixes tested on Azure Virtual Desktop and Virtual Machines

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5030999,KB5031364,KB5031590,KB5031993,KB5032198,KB5032310

Microsoft Windows versions and hotfixes tested on Amazon WorkSpaces and Elastic Computer Cloud

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5029928,KB5012170,KB5030216,KB5030369

Red Hat Linux database server

Red Hat Enterprise Linux release 8.0 packages

powershell-7.4.0-1.rh.x86_64,unixODBC-devel-2.3.11-1.rh.x86_64,unixODBC-2.3.11-1.rh.x86_64,jdk-11.0.10-11.0.10-ga.x86_64,gpg-pubkey-be1229cf-5631588c,openldap-clients-2.4.46-15.el8.x86_64,openldap-2.4.46-15.el8.x86_64,samba-client-4.12.3-14.el8_3.x86_64,openssl-1.1.1g-12.el8_3.x86_64,krb5-libs-1.18.2-5.el8.i686,sssd-kcm-2.3.0-9.el8.x86_64,sssd-2.3.0-9.el8.x86_64,samba-4.12.3-14.el8_3.x86_64,oddjob-mkhomedir-0.34.5-3.el8.x86_64,sssd-ipa-2.3.0-9.el8.x86_64,python3-sssdconfig-2.3.0-9.el8.noarch,openssl-libs-1.1.1g-12.el8_3.i686,oddjob-0.34.5-3.el8.x86_64,libipa_hbac-2.3.0-9.el8.x86_64,sssd-proxy-2.3.0-9.el8.x86_64,sssd-ldap-2.3.0-9.el8.x86_64,sssd-krb5-common-2.3.0-9.el8.x86_64,sssd-krb5-2.3.0-9.el8.x86_64,sssd-common-pac-2.3.0-9.el8.x86_64,sssd-ad-2.3.0-9.el8.x86_64,sssd-common-2.3.0-9.el8.x86_64,sssd-client-2.3.0-9.el8.x86_64,libsss_nss_idmap-2.3.0-9.el8.x86_64,samba-libs-4.12.3-14.el8_3.x86_64,samba-common-tools-4.12.3-14.el8_3.x86_64,libsmbclient-4.12.3-14.el8_3.x86_64,adcli-0.8.2-7.el8.x86_64,samb

a-client-libs-4.12.3-14.el8_3.x86_64,samba-common-libs-4.12.3-14.el8_3.x86_64,samba-
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rb5-libs-1.18.2-5.el8.x86_64,openssl-
libs-1.1.1g-12.el8_3.x86_64,libevent-0.10.2-2.el8.x86_64,libtdb-1.4.3-1.el8.x86_64,libtalloc-2.3.1
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 devel-4.18.0-80.el8.x86_64,gdisk-1.0.3-6.el8.x86_64,e2fsprogs-libs-1.44.3-2.el8.x86_64,daxctl-
 libs-62-2.el8.x86_64,perl-XML-Parser-2.44-11.el8.x86_64,perl-Time-
 Local-1.280-1.el8.noarch,perl-TimeDate-2.30-13.el8.noarch,perl-Storable-3.11-3.el8.x86_64,perl-
 MIME-Base64-3.15-396.el8.x86_64,perl-IO-Socket-IP-0.39-5.el8.noarch,perl-
 interpreter-5.26.3-416.el8.x86_64,perl-HTTP-Date-6.02-18.el8.noarch,perl-File-
 Temp-0.230.600-1.el8.noarch,perl-Digest-MD5-2.55-396.el8.x86_64,perl-
 Digest-1.17-395.el8.noarch,perl-Data-Dumper-2.167-399.el8.x86_64,perl-Compress-Raw-
 Zlib-2.081-1.el8.x86_64,perl-Unicode-Normalize-1.25-396.el8.x86_64,perl-threads-
 shared-1.58-2.el8.x86_64,perl-threads-2.21-2.el8.x86_64,perl-Text-
 Tabs+Wrap-2013.0523-395.el8.noarch,perl-Socket-2.027-2.el8.x86_64,perl-
 PathTools-3.74-1.el8.x86_64,perl-IO-1.38-416.el8.x86_64,perl-File-Path-2.15-2.el8.noarch,perl-
 constant-1.33-396.el8.noarch,perl-Term-ANSIColor-4.06-396.el8.noarch,perl-
 macros-5.26.3-416.el8.x86_64,perl-Errno-1.28-416.el8.x86_64,libnl3-
 cli-3.4.0-4.el8.x86_64,libmetalink-0.1.3-7.el8.x86_64,exempi-2.4.5-2.el8.x86_64,boost-
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 el8.x86_64,xcb-util-0.4.0-10.el8.x86_64,startup-
 notification-0.12-15.el8.x86_64,speexdsp-1.2-0.13.rc3.el8.x86_64,slang-2.3.2-3.el8.x86_64,newt-
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 eyutils-1.5.10-6.el8.x86_64,groff-base-1.22.3-18.el8.x86_64,glx-
 utils-8.3.0-9.el8.x86_64,dmidecode-3.2-1.el8.x86_64,device-mapper-persistent-
 data-0.7.6-1.el8.x86_64,boost-random-1.66.0-6.el8.x86_64,boost-date-
 time-1.66.0-6.el8.x86_64,attr-2.4.48-3.el8.x86_64,acl-2.2.53-1.el8.x86_64,m4-1.4.18-7.el8.x86_6
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 2.el8.x86_64,exiv2-libs-0.26-10.el8.x86_64,exiv2-0.26-10.el8.x86_64,boost-
 regex-1.66.0-6.el8.x86_64,boost-atomic-1.66.0-6.el8.x86_64,zip-3.0-23.el8.x86_64,xorg-x11-xkb-
 utils-7.7-27.el8.x86_64,pciutils-
 libs-3.5.6-4.el8.x86_64,lzo-2.08-14.el8.x86_64,libXxf86vm-1.1.4-9.el8.x86_64,libXpm-3.5.12-7.el
 8.x86_64,libxkbfile-1.0.9-9.el8.x86_64,libXdmc-1.1.2-11.el8.x86_64,libwebp-1.0.0-1.el8.x86_64,
 libuv-1.23.1-1.el8.x86_64,libsmartcols-2.32.1-8.el8.x86_64,libglvnd-
 glx-1.0.1-0.9.git5baa1e5.el8.x86_64,libglvnd-gles-1.0.1-0.9.git5baa1e5.el8.x86_64,libglvnd-
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 dbm-libs-1.18-1.el8.x86_64,flac-

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 thread-1.66.0-6.el8.x86_64,boost-chrono-1.66.0-6.el8.x86_64,bluez-
 libs-5.50-1.el8.x86_64,adwaita-icon-theme-3.28.0-2.el8.noarch,iso-
 codes-3.79-2.el8.noarch,diffutils-3.6-5.el8.x86_64,xml-
 common-0.6.3-50.el8.noarch,unzip-6.0-41.el8.x86_64,perl-Text-
 ParseWords-3.30-395.el8.noarch,opus-1.3-0.4.beta.el8.x86_64,libxshmfence-1.3-2.el8.x86_64,li
 bXmu-1.1.2-12.el8.x86_64,libtheora-1.1.1-21.el8.x86_64,libtasn1-4.13-3.el8.x86_64,libplist-2.0.0-
 10.el8.x86_64,libpciaccess-0.14-1.el8.x86_64,libmpc-1.0.2-9.el8.x86_64,libglvnd-1.0.1-0.9.git5ba
 a1e5.el8.x86_64,libexif-0.6.21-16.el8.x86_64,libdrm-2.4.96-2.el8.x86_64,bubblewrap-0.3.0-1.el8.
 x86_64,tar-1.30-4.el8.x86_64,nettle-3.4.1-1.el8.x86_64,lz4-
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 .8-14.el8.x86_64,libaio-0.3.110-12.el8.x86_64,hunspell-en-
 US-0.20140811.1-12.el8.noarch,hunspell-en-GB-0.20140811.1-12.el8.noarch,hunspell-
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 system-1.66.0-6.el8.x86_64,xz-5.2.4-3.el8.x86_64,sed-4.5-1.el8.x86_64,perl-
 parent-0.237-1.el8.noarch,orc-0.4.28-2.el8.x86_64,mpfr-3.1.6-1.el8.x86_64,libXtst-1.2.3-7.el8.x8
 6_64,libXt-1.1.5-8.el8.x86_64,libXrender-0.9.10-7.el8.x86_64,libXrandr-1.5.1-7.el8.x86_64,libXin
 erama-1.1.4-1.el8.x86_64,libXi-1.7.9-7.el8.x86_64,libXfixes-5.0.3-7.el8.x86_64,libXext-1.3.3-9.el
 8.x86_64,libXdamage-1.1.4-14.el8.x86_64,libXcursor-1.1.15-3.el8.x86_64,libXcomposite-0.4.4-1
 4.el8.x86_64,libxcb-1.13-5.el8.x86_64,libXau-1.0.8-13.el8.x86_64,libX11-1.6.7-1.el8.x86_64,libw
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 86_64,libxslt-1.1.32-3.el8.x86_64,libxkbcommon-0.8.2-1.el8.x86_64,libwayland-
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 _64,perl-Scalar-List-Utils-1.49-2.el8.x86_64,numactl-libs-2.0.12-2.el8.x86_64,lua-
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 Carp-1.42-396.el8.noarch,libxcrypt-4.1.1-4.el8.x86_64,libpng-1.6.34-5.el8.x86_64,libnl3-3.4.0-4.e
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common-20170801-10.el8.noarch,subscription-manager-rhsm-
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qemu-20181214-1.git133f4c47.el8.noarch,hplip-common-3.18.4-7.el8.x86_64,go-srpm-
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fonts-2.35-6.el8.noarch,adobe-mappings-cmap-deprecated-20171205-3.el8.noarch,geolite2-
city-20180605-1.el8.noarch,adobe-mappings-cmap-20171205-3.el8.noarch,yelp-
xsl-3.28.0-2.el8.noarch,mozilla-filesystem-1.9-18.el8.x86_64,langtable-
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fonts-0.0.25-4.el8.noarch,libgcc-8.2.1-3.5.el8.x86_64,hwdata-0.314-8.0.el8.noarch,google-noto-
fonts-common-20161022-7.el8.noarch,fontpackages-filesystem-1.44-22.el8.noarch,emacs-
filesystem-26.1-5.el8.noarch

Empower client

Windows Server 2019 Datacenter (Amazon WorkSpaces and Elastic Computer Cloud)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5031010,KB4470502,KB4470788,KB4480056,KB4486153,KB4493510,KB4499728,KB4504369,KB4512577,KB4512937,KB4521862,KB4523204,KB4535680,KB4539571,KB4549947,KB4558997,KB4562562,KB4566424,KB4570332,KB4577667,KB4587735,KB4589208,KB4598480,KB4601393,KB5000859,KB5001404,KB5003243,KB5003711,KB5005112,KB5031361,KB5006754,KB5008287,KB5009642,KB5011574,KB5012675,KB5014031,KB5014797,KB5015896,KB5017400,KB5020374,KB5023789,KB5031589,KB5005701,KB5026362

Windows Server 2022 Datacenter (Amazon WorkSpaces and Elastic Computer Cloud)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5022507,KB5012170,KB5026370,KB5026493,KB5031993,KB5032310,KB5033118

Windows 10 Professional

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.18363	KB4576484,KB4497165,KB4513661,KB4516115,KB4517245,KB4521863,KB4535680,KB4537759,KB4541338,KB4552152,KB4559309,KB4560959,KB4561600,KB4569073,KB4576751,KB4574727
10.0.19043	KB4562830,KB5000736,KB5003173,KB5014032,KB5005260,KB5004331,KB5005565,KB5005699,KB5005033
10.0.19044	KB5027122,KB4562830,KB4577586,KB5003791,KB5027215,KB5007273,KB5009636,KB5026879,KB5005260
10.0.19045	KB5028853,KB4562830,KB4577586,KB5000736,KB5011048,KB5012170,KB5015684,KB5028166,KB5014032,KB5020372,KB5028318,KB5005260,KB4580325,KB5003791,KB5007273,KB5022405,KB5019275,KB5015895,KB5005699,KB5029923,KB5030211,KB5029709,KB5013624,KB5031356,KB5031539,KB5003242,KB5030649,KB5016592,KB5011352,KB5011651,KB5014035,KB5014671,KB5016705,KB5022924,KB5023794,KB5026879,KB5028380,KB5007401,KB5032005,KB5029714,KB5011062,KB5032189,KB5032392,KB5031988,KB5006753,KB5031540,KB5025315,KB5031816,KB5011063,KB5011050,KB5032907,KB5032278,KB5004331,KB5017308

Windows 10 Enterprise LTSC 2021

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19044	KB5029923,KB5003791,KB5012170,KB5030211,KB5011651,KB5020372,KB5029709,KB5005699,KB5029919,KB5027122,KB5011048,KB5011050,KB5014035,KB5014671,KB5016705,KB5015895,KB5018506,KB5022924,KB5023794,KB5028318,KB5025315,KB5026879,KB5028380,KB5031356,KB5031539

Microsoft Windows 10 IoT Enterprise LTSC 2021

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19044	KB5028951,KB5003791,KB5012170,KB5029244,KB5011651,KB5020372,KB5028380,KB5005699

Windows 11 Professional

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.22000	KB5028947,KB5028954,KB5011048,KB5012170,KB5029253,KB5028381
10.0.22621	KB5028851,KB5012170,KB5028185,KB5022610,KB5028320,KB5032007,KB5032190,KB5032393,KB5031455,KB5031893,KB5028756,KB5028948,KB5029351

Windows 11 Enterprise (Azure Virtual Desktop)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.22621	KB5030651,KB5012170,KB5031354,KB5022948,KB5031592,KB5032007,KB5023706

Citrix Server

Citrix App Server

Windows Server 2019 Standard (Citrix Virtual Apps and Desktops 7 1912 LTSR CU6)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5029925,KB4486153,KB4535680,KB4549947,KB4558997,KB4566424,KB4570332,KB4577586,KB4587735,KB4589208,KB5003243,KB5003711,KB5005112,KB5029247,KB5020374,KB5023789,KB5028316,KB5028862,KB4598480,KB5000859,KB5028588,KB5014692,KB5012675,KB5014031

Windows Server 2022 Standard (Citrix Virtual Apps and Desktops 7 2203 LTSR CU1)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5028956,KB5012170,KB5029250,KB5025314,KB5029395,KB5029928,KB5031590,KB5031993,KB5014856

Citrix Presentation Server

Windows Server 2019 Standard (Citrix Virtual Apps and Desktops 7 1912 LTSR CU6)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5029925,KB4486153,KB4530742,KB4535680,KB4549947,KB4558997,KB4566424,KB4570332,KB4577586,KB4584642,KB4587735,KB4589208,KB5000859,KB5001404,KB5001407,KB5003243,KB5003711,KB5005112,KB5030214,KB5006754,KB5008287,KB5009642,KB5011574,KB5012675,KB5014031,KB5014797,KB5015896,KB5017400,KB5020374,KB5023789,KB5030505,KB5005701,KB5023789,KB5030505,KB5005701,KB5031589,KB5031361

Windows Server 2022 Standard (Citrix Virtual Apps and Desktops 7 2203 LTSR CU1)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.20348	KB5022507,KB5012170,KB5023705,KB5023793

Citrix Client

Windows 10 Professional (Interface Citrix Workspace 2309 - Version 23.9.0.99)

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19045	KB5028946,KB5020613,KB5003791,KB5011048,KB5012170,KB5015684,KB5019180,KB5020683,KB5023319,KB5029244,KB5011352,KB5018506,KB5020372,KB5022924,KB5023794,KB5025315,KB5026879,KB5028318,KB5028380,KB5030649,KB5031356,KB5029709,KB5031539,KB5022405,KB5031988,KB4562830,KB4577586,KB4580325,KB5000736,KB5032189,KB5007273,KB5014032,KB5032392,KB5005260

Standalone/Personal Workstation

Testing was performed using the Waters Empower Workstation.

Windows 10 Enterprise LTSC 2021

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.17763	KB5029925,KB4465065,KB4470788,KB4486153,KB4487038,KB4577586,KB4580325,KB5001404,KB4487044
10.0.19044	KB5013887,KB5003791,KB5013942,KB5014032,KB5005699,KB5033918,KB5033909,KB5011048,KB5034122,KB5011651,KB5032907,KB5005699

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Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.14393	KB3186568,KB4033631,KB4049065,KB4049411,KB4054507,KB4486129,KB4520724,KB4535680,KB4589210,KB5005698,KB5017396,KB5022838,KB4093137,KB4485447,KB4577586,KB5023788,KB5030504,KB5031362

Windows 10 Professional

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19042	KB4601050,KB4562830,KB4580325,KB5003173,KB5003242
10.0.19043	KB5020872,KB4562830,KB5000736,KB5021233,KB5014032,KB5020372,KB5005260
10.0.19045	KB5028853,KB4562830,KB4577586,KB5000736,KB5011048,KB5012170,KB5015684,KB5028166,KB5014032,KB5020372,KB5028318,KB5005260,KB4580325,KB5003791,KB5007273,KB5032005,KB5016592,KB5032189,KB5011352,KB5011651,KB5014035,KB5014671,KB5015895,KB5016705,KB5022924,KB5023794,KB5026879,KB5028380,KB5029709,KB5031539,KB5031540,KB5032392,KB5005699,KB5007401,KB5011062,KB5031356,KB5025315,KB5031816,KB5011063,KB5011050,KB5029919,KB5030649,KB5030211,KB5029716,KB5029244

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Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19044	KB5029923,KB5003791,KB5012170,KB5030211,KB5011651,KB5020372,KB5029709,KB5005699

LAC/E device

Testing was performed using the Waters Empower LAC/E device.

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Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.14393	KB3186568,KB4033631,KB4049065,KB4049411,KB4053577,KB4054507,KB4486129,KB5023788,KB4103723,KB4520724,KB4535680,KB4589210,KB5005698,KB5017396,KB5022838,KB5031989,KB4577586,KB5032391,KB5032197,KB5013625,KB4524244,KB5012170,KB5016058,KB5017095,KB5016622,KB2693643,KB5014630,KB4485447,KB4550993,KB5011570,KB5014026,KB5014702

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Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19044	KB5012157,KB5003791,KB5012599,KB5011651,KB5005699,KB5028946,KB5028853,KB5011048,KB5012170,KB5029244,KB5014035,KB5014671,KB5015895,KB5016705,KB5018506,KB5020372,KB5022924,KB5023794,KB5025315,KB5026879,KB5028380,KB5032005,KB5033372,KB5011352,KB5029709,KB5032392,KB5032907,KB5031988

Windows 10 IoT Enterprise LTSC 2021

Microsoft Windows versions and hotfixes

Microsoft OS version	Microsoft hotfixes
10.0.19044	KB5029923,KB5003791,KB5011048,KB5026037,KB5031356,KB5029709,KB5031539,KB5005699,KB5031988,KB5033372,KB5032907