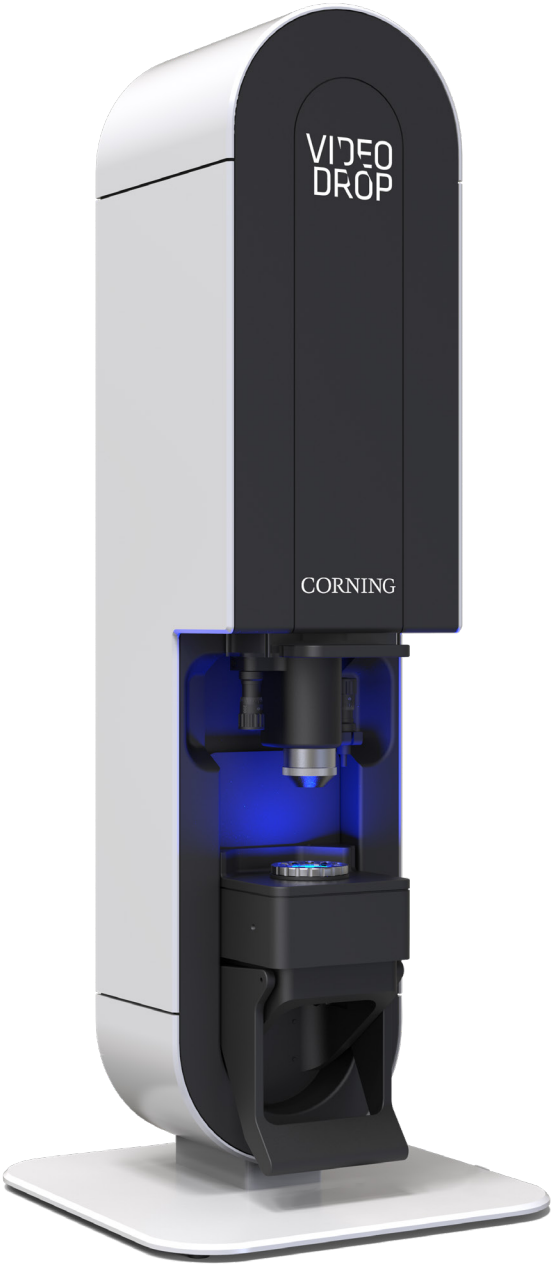
Corning® Videodrop

A device for measuring the size and concentration of nanoparticles in real time and in one drop

CORNING

Instruction Manual

Catalog Number:
VD-1000



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1.0 Introduction

This Instruction Manual has no contractual value and under no circumstances may Corning be held liable on the basis of the information contained in this Instruction Manual.

This Instruction Manual details all the knowledge required to implement, use and maintain the system, and the collection of the information displayed.

Thus, after carefully reading it, the operator will be able to:

- Connect the auxiliary devices (power cable, USB devices, sensors) and power on the device
- Navigate the device interface
- Perform basic maintenance

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This Instruction Manual is updated regularly. The most recent version of this Instruction Manual is available on request from Corning. However, should significant changes be made to the Instruction Manual, Corning undertakes to send the user the new Instruction Manual in paper or electronic format as soon as possible. Please note that this does not imply an update to the hardware and/or software in your possession.

The owner of the product is obliged to keep this Instruction Manual for the duration of use of the product.

This Instruction Manual contains a chapter featuring quick solutions to the most frequently encountered problems.

Any request for information or modification relating to this Instruction Manual must be sent to Videodrop@corning.com.

1.1 Symbols and conventions

This symbol means WARNING. Instructions preceded by this symbol may cause personal injury or damage the device and facilities if not properly followed or implemented.

This symbol means INFORMATION. Additional information not affecting the use of the device.

1.2 Ownership and copyright

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1.3 Service life

The lifetime of the device, during which Corning commits to the availability of spare parts, is 5 years from delivery date.

1.4 Maintenance

Corning recommends performing an annual preventive maintenance performed by Corning authorized staff.

1.5 Reverse engineering

The device may not be distributed, reproduced, disassembled, analyzed, adapted, modified, incorporated into or combined with any other device, except as permitted by law.

Software may not be distributed, reproduced, translated, disassembled, decompiled, analyzed, adapted, modified, incorporated or combined with any other software, except as permitted by law.

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Resale of the device and/or its software is prohibited.

2.0 Safety Precautions / *Mesures de sécurité*

2.1 Symbols on the device / *Symboles sur l'instrument*

	Instruction symbol. An Instruction Manual is provided with the device and must be read carefully before use. *Symbole d'instruction. Un manuel d'instructions est fourni avec l'appareil et doit être lu attentivement avant utilisation.*
	Optical safety symbol. There is an optical risk associated with the use of the device. Read the Instruction Manual for complete recommendation and information. *Symbole de sécurité optique. Il existe un risque optique lié à l'utilisation de l'appareil. Lisez le manuel d'instructions pour obtenir des recommandations et des informations complètes.*
 AAAA	Year of manufacture of the device. *Année de fabrication de l'instrument.*

2.2 Electrical markings and safety / *Marquage électrique et de sécurité*

	Direct current. *Courant continu.*
O I	Off (0) and On (I) positions of a switch. *Positions Arrêt (0) et Marche (I) d'un interrupteur.*

2.3 Electrical safety / *Sécurité électrique*

- It must be possible to access the power supply switch at any time.
- The socket outlet used to segregate the network must be accessible at all times.
- To avoid any risk of electric shock, this device must only be connected to a power supply network equipped with an earth ground.
- Power strips or extension cables must not be connected to the device.
- The correct operation of the system can only be ensured if it is connected to a socket that meets the IEC-60950 or IEC-61010 safety standards.
- Do not connect parts not specified in the Instruction Manual to the system.
- Correct operation of the earthing system can only be ensured if the system is connected to a socket that meets the safety standards.
- Take care not to obstruct the vents, otherwise the electronic equipment will overheat, and irreparable damage will result.
- *L'interrupteur d'alimentation doit pouvoir être accessible à tout moment.*
- *La prise de courant utilisée pour isoler le réseau doit être accessible à tout moment.*
- *Pour éviter tout risque d'électrocution, cet appareil ne doit être connecté qu'à un réseau d'alimentation équipé d'une prise de terre.*
- *Des prise multiples ou des rallonges ne doivent pas être connectées à l'appareil.*
- *Le bon fonctionnement du système ne peut être assuré que s'il est connecté à une prise conforme aux normes de sécurité IEC-60950 ou IEC-61010.*
- *Ne connectez pas de pièces non spécifiées dans le manuel d'instructions au système.*
- *Le bon fonctionnement du système de mise à la terre ne peut être assuré que si le système est raccordé à une prise conforme aux normes de sécurité.*
- *Veillez à ne pas obstruer les évents, sinon l'équipement électronique surchauffera et des dommages irréparables en résulteront.*

2.4 LED optical safety / *Sécurité optique*

- Possibly hazardous optical radiation emitted from this product. Do not look at operating lamp. Eye injury may result. Risk Group 3.
- When using the device, use the protective goggles provided.
- DO NOT lower the sample platform and the handle while a measurement is being recorded.
- *Rayonnement optique potentiellement dangereux émis par ce produit. Ne regardez pas la lampe en fonctionnement. Des blessures aux yeux peuvent en résulter. Groupe de risque 3.*
- *Lors de l'utilisation de l'appareil, utilisez les lunettes de protection fournies.*
- *N'abaissez PAS la plate-forme d'échantillonnage et la poignée pendant que l'instrument effectue une mesure.*

2.5 Electromagnetic safety / *Sécurité électromagnétique*

- The use of accessories not specified in the Instruction Manual may cause an electromagnetic compatibility nonconformity (EMC).
- Avoid stacking the device on or using it close to any device that generates electromagnetic interference.
- *L'utilisation d'accessoires non spécifiés dans le manuel d'instructions peut entraîner une non-conformité de compatibilité électromagnétique (CEM).*
- *Évitez de positionner l'appareil sur ou de l'utiliser à proximité de tout appareil générant des interférences électromagnétiques.*

2.6 Use of the device / *Utilisation de l'instrument*

- Do not move the device.
- Manipulate the handle with caution not to pinch your hand.
- Take care to keep the USB connection cable away from trafficked areas so as not to risk sudden disconnection, which may cause software malfunctions.
- Never switch Off the device while a measurement is being taken. Never switch Off the mains power supply when the device is switched On. Failure to do this may result in device malfunction and/or data loss.
- *Ne déplacez pas l'appareil.*
- *Manipulez la poignée avec précaution pour ne pas vous pincer la main.*
- *Veillez à éloigner le câble de connexion USB des zones de passage afin de ne pas risquer une déconnexion brutale pouvant entraîner des dysfonctionnements logiciels.*
- *N'éteignez jamais l'appareil pendant qu'une mesure est en cours. Ne coupez jamais l'alimentation secteur lorsque l'appareil est allumé. Le non-respect de cette consigne peut entraîner un dysfonctionnement de l'appareil et/ou une perte de données.*

2.7 Service and maintenance / *Service et maintenance*

- It is strictly forbidden to have maintenance operations carried out by any third party other than a technician authorized by Corning.
- It is strictly forbidden for any third party other than a technician authorized by Corning to open or modify the device.
- *Il est strictement interdit de faire réaliser des opérations de maintenance par un tiers autre qu'un technicien agréé par Corning.*
- *Il est strictement interdit à tout tiers autre qu'un technicien agréé par Corning d'ouvrir ou de modifier l'appareil.*

2.8 Cleaning / *Nettoyage*

- When cleaning, switch Off and disconnect the device to prevent electric shock.
- Do not spray cleaning or disinfectant directly on the device. Leaks could damage the system.
- Do not use liquid on electronic parts (LED, connectors). Do not let liquid enter inside the device.
- *Lors du nettoyage, éteignez et débranchez l'appareil pour éviter tout choc électrique.*
- *Ne vaporisez pas de nettoyant ou de désinfectant directement sur l'appareil. Les fuites pourraient endommager le système.*
- *Ne pas utiliser de liquide sur les composants électroniques (LED, connecteurs). Ne laissez pas de liquide pénétrer à l'intérieur de l'appareil.*

2.9 Data interpretation / *Interprétation des données*

The data should only be interpreted by staff trained by Corning.

Les données doivent être interprétées seulement par du personnel formé par Corning.

3.0 Indications and Precautions for Use / *Indications et précautions d'utilisation*

3.1 Terms of use / *Conditions d'utilisation*

- This device is designed for use in a laboratory to acquire physical data on biological and non-biological nanoparticles.
- The device is based on Interferometric Light Microscopy (ILM).
- The device consists of an LED light source, an optical system, and a camera to acquire the images.
- The data is transmitted to a computer connected to the device and equipped with the dedicated control interface.
- *Cet appareil est conçu pour être utilisé en laboratoire afin d'acquérir des données physiques sur des nanoparticules biologiques et non biologiques.*
- *L'appareil est basé sur la microscopie optique interférométrique (ILM).*
- *L'appareil se compose d'une source de lumière LED, d'un système optique et d'une caméra pour acquérir les images.*
- *Les données sont transmises à un ordinateur connecté à l'appareil et assurant son contrôle.*

3.2 Precautions for use / *Précautions d'utilisation*

The instructions below must be followed for user safety:

- Place the device on a stable surface capable of supporting 45 lbs. (20 kg).
- Use the protective goggles provided to avoid direct contact with the light from the LED.

It is essential that personnel follow the standard safety procedures in their laboratory.

Les instructions ci-dessous doivent être suivies pour assurer la sécurité de l'utilisateur :

- *Placez l'appareil sur une surface stable capable de supporter 45 lb. (20 kg).*
- *Utilisez les lunettes de protection fournies pour éviter tout contact direct avec la lumière de la LED.*

Il est essentiel que le personnel suive les procédures de sécurité standard dans son laboratoire.

3.3 User training / *Formation des utilisateurs*

Only persons who have been trained in the use of the device are authorized to perform a measurement using the device. Training is essential for the proper use of the equipment and to obtain usable data.

Seules les personnes formées à l'utilisation de l'appareil sont autorisées à effectuer une mesure à l'aide de l'appareil. La formation est indispensable à la bonne utilisation du matériel et à l'obtention de données exploitables.

3.4 Electrical safety / *Sécurité électrique*

The device is manufactured and tested in accordance with IEC standards relating to Electromagnetic Compatibility (EMC) and electrical safety. It is manufactured in full compliance with safety and performance requirements. In order to maintain this compliance and ensure safe use of the device, the user must comply with the indications and symbols contained in this Instruction Manual.

Before installation, check that the operating voltage and that of the power supply match.

The electrical cable supplied must be connected to the device's power supply connector and plugged into a socket.

L'appareil est fabriqué et testé conformément aux normes CEI relatives à la compatibilité électromagnétique (CEM) et à la sécurité électrique. Il est fabriqué dans le respect total des exigences de sécurité et de performance. Afin de maintenir cette conformité et d'assurer une utilisation sûre de l'appareil, l'utilisateur doit se conformer aux indications et symboles contenus dans ce manuel d'instructions.

Avant l'installation, vérifiez que la tension de fonctionnement et celle de l'alimentation correspondent.

Le câble électrique fourni doit être raccordé au connecteur d'alimentation de l'appareil et branché sur une prise.

Refer to the warnings in Section 2 on electrical safety.

Reportez-vous aux avertissements de la section 2 sur la sécurité électrique.

Safe use is no longer guaranteed in the following cases (non-exhaustive list):

- The device is visibly damaged.
- The device is no longer working.
- After prolonged storage under unfavorable conditions (see Section 10.0).
- After serious damage suffered during transport.

La sécurité d'utilisation n'est plus garantie dans les cas suivants (liste non exhaustive) :

- *L'appareil est visiblement endommagé.*
- *L'appareil ne fonctionne plus.*
- *Après un stockage prolongé dans des conditions défavorables (voir section 10.0).*
- *Après de graves dommages subis pendant le transport.*

Lorsqu'une utilisation en toute sécurité de l'appareil n'est plus possible, il doit être mis hors service. Il faut alors s'assurer qu'il ne sera pas utilisé par inadvertance. L'appareil sera confié à des techniciens agréés pour inspection. Pour plus d'informations, contactez Videodrop@corning.com.

3.5 Safety related to maintenance / *Sécurité associée à la maintenance*

For all maintenance operations, users will contact Corning by submitting a detailed email message to Videodrop@corning.com, which will then dispatch an authorized technician.

For correct and safe use for all maintenance work, it is essential that personnel follow standard safety procedures.

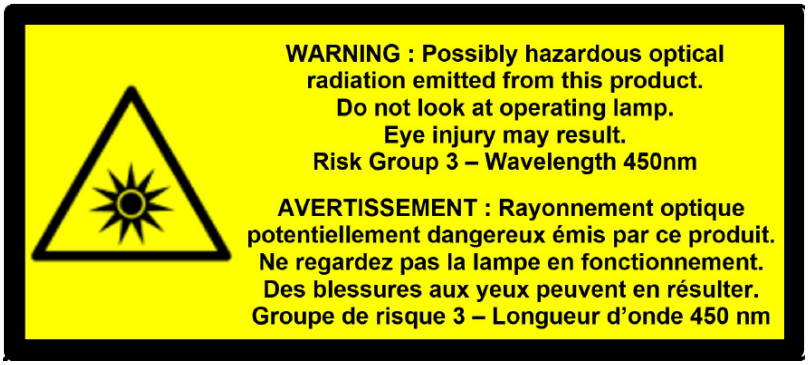
Pour toutes les opérations de maintenance, les utilisateurs contacteront Corning en soumettant un message électronique détaillé à Videodrop@corning.com, qui enverra ensuite un technicien agréé.

Pour une utilisation correcte et sûre pour tous les travaux de maintenance, il est essentiel que le personnel suive les procédures de sécurité standard.

3.6 LED optical safety / *Sécurité optique*

Safety glasses must be worn to prevent eye damage. Do not look directly into the LED and do not look through the optical system while in operation as this can be harmful to the eyes, even over brief periods of exposure due to the intensity of the light. This LED emits an intense light during operation at 450 nm. Care should be taken to avoid staring directly into the light.

Des lunettes de sécurité doivent être portées pour éviter les lésions oculaires. Ne regardez pas directement dans la LED et ne regardez pas à travers le système optique pendant le fonctionnement car cela peut être dangereux pour les yeux, même pendant de brèves périodes d'exposition en raison de l'intensité de la lumière. Cette LED émet une lumière intense à 450 nm. Des précautions doivent être prises pour éviter de regarder directement dans le rayonnement.

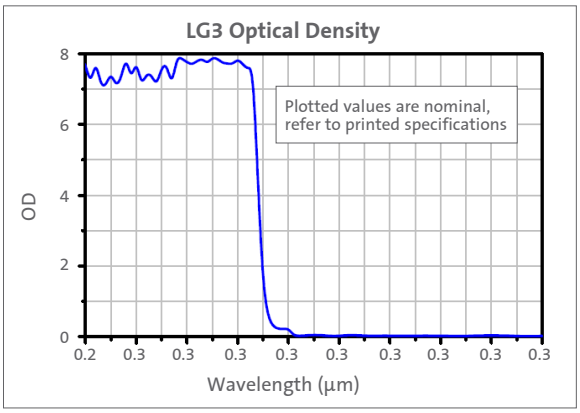


When using the device, use the protective goggles provided.

Lors de l'utilisation de l'appareil, utilisez les lunettes de protection fournies.

The characteristics of the optical safety goggle provided (from Thorlabs, Ref: LG3) is illustrated (OD of at least 7 at 450 nm).

Les caractéristiques des lunettes de protection optique fournie (Thorlabs, Réf : LG3) sont illustrées (DO d'au moins 7 à 450 nm).



Recommendations:

- Before switching on the LED (Clicking on Record, Preview, or Adjust saturation), always make sure that:
  - The sample holder is placed on the Videodrop.
  - The handle is in the upper position.
  - The protective shield is in the lower position.
- Make sure that the measurement is finished by clicking STOP before lowering the handle or raising the protective shield.
- DO NOT lower the handle during a measurement (LED ON).
- The default position of the handle is up, between operation make sure the handle is in the upper position.
- After operation, always remove the sample holder, and place the LED protection cap, and lift the handle into the upper position.

The table and figures below present the exposure hazard map according to IEC 62471:2006. The limit time of direct exposure corresponds to the exposure duration at which the exposure is equal to the hazard threshold at a given distance.

The hazard maps are plotted for 2 configurations:

- Handle down, without sample holder and protective shield in the upper position.
- Handle up, with sample holder and protective shield in the upper position.

NOTE: The LED must not be illuminated in these configurations.

Recommandations :

- *Avant d'allumer la LED (en cliquant sur Enregistrer, Prévisualiser ou Ajuster la saturation), assurez-vous toujours que :*
  - *Le porte-échantillon est placé sur le Videodrop.*
  - *La poignée est en position haute.*
  - *La vitre de protection est en position basse.*
- *Assurez-vous que la mesure est terminée en cliquant sur STOP avant d'abaisser la poignée ou de relever le capot de protection.*
- *NE PAS abaisser la poignée pendant une mesure (LED allumée).*
- *La position par défaut de la poignée est vers le haut, entre les opérations, assurez-vous que la poignée est en position haute.*
- *Après utilisation, retirez toujours le porte-échantillon, placez le capuchon de protection LED et soulevez la poignée en position supérieure.*

Le tableau et les figures ci-dessous présentent la carte des risques d'exposition selon la norme CEI 62471:2006. Le temps limite d'exposition directe correspond à la durée d'exposition à laquelle l'exposition est égale au seuil de danger à une distance donnée.

Les cartes des risques sont tracées pour 2 configurations :

- *Poignée vers le bas, sans porte-échantillon et écran de protection en position haute.*
- *Poignée vers le haut, avec porte-échantillon et écran de protection en position haute.*

***REMARQUE :** La LED ne doit pas être allumée dans ces configurations.*

The LED must be switched On ONLY when:

- The sample holder is positioned
- The sample platform is raised
- The protective shield is down.
- Protective googles must be used during operation.

La LED doit être allumée UNIQUEMENT lorsque :

- *Le porte-échantillon est positionné*
- *La plate-forme d'échantillon est relevée*
- *La vitre de protection est baissée.*
- *Des lunettes de protection doivent être utilisées pendant le fonctionnement.*

Blue light risk and thermal retinal risk are 2 types of risks associated with this 450 nm LED.

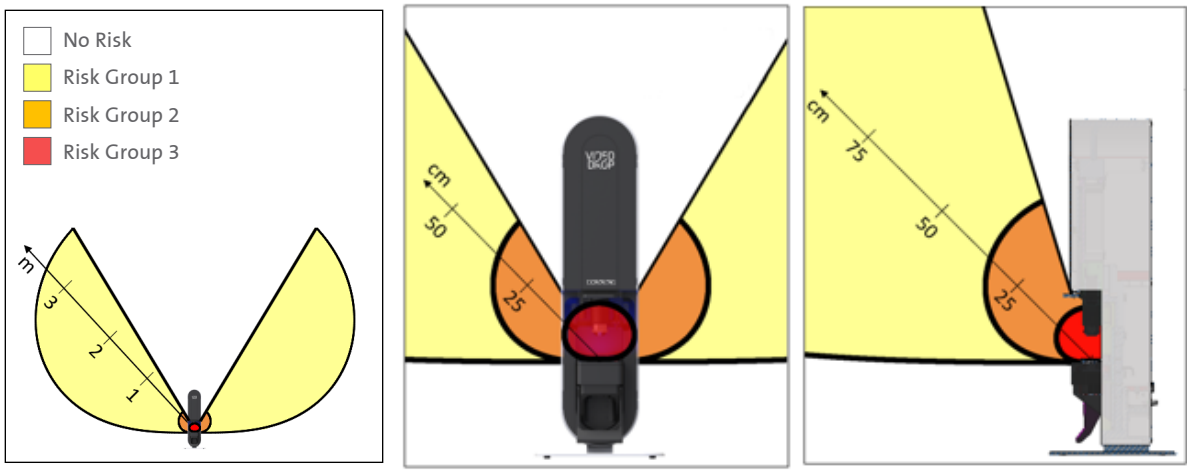
Le risque lumière bleue et le risque rétinien thermique sont les 2 types de risques associés à cette LED 450 nm.

	No Risk / *Aucun risque*	Risk Group 1: Low Risk / *Groupe de risque 1: risque faible*	Risk Group 2: Moderate Risk / *Groupe de risque 2: risque modéré*	Risk Group 3: High Risk / *Groupe de risque 3: risque élevé*
Limit time of direct exposure for **blue light risk** *Temps limite d'exposition directe pour le **risque de lumière bleue***	T>10,000 s	T>100 s	T>0.25 s	T<0.25s
Limit time of direct exposure for **thermal retinal risk** *Temps limite d'exposition d'exposition directe pour le **risque rétinien thermique***	T>10 s	T>10 s	T>0.25 s	T<0.25s

The hazard maps are plotted for 2 configurations: / *Les cartes des risques sont tracées pour 2 configurations :*

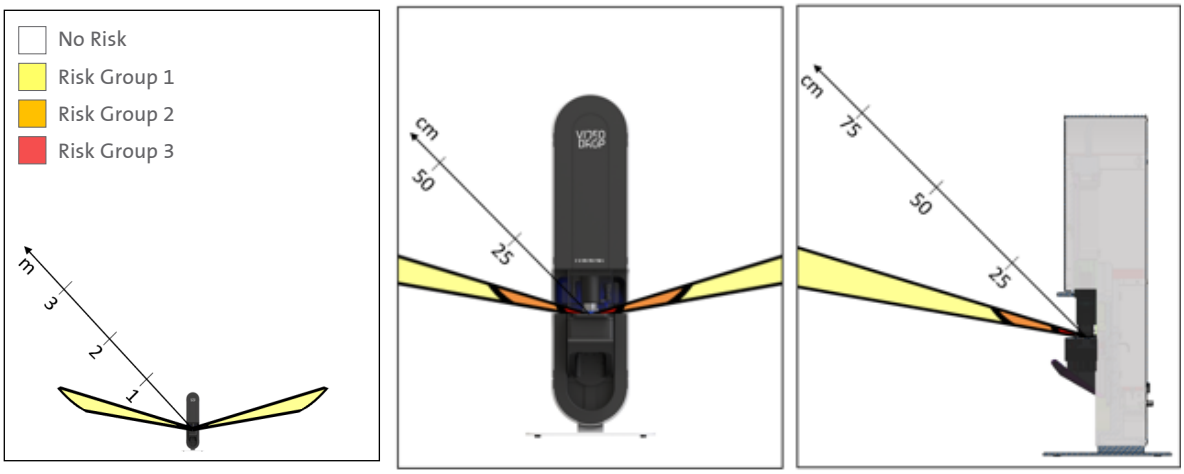
Handle down, without sample holder and protective shield in the upper position.

Poignée vers le bas, sans porte-échantillon et écran de protection en position haute.



Handle up, with sample holder and protective shield in the upper position.

Poignée vers le haut, avec porte-échantillon et écran de protection en position haute.

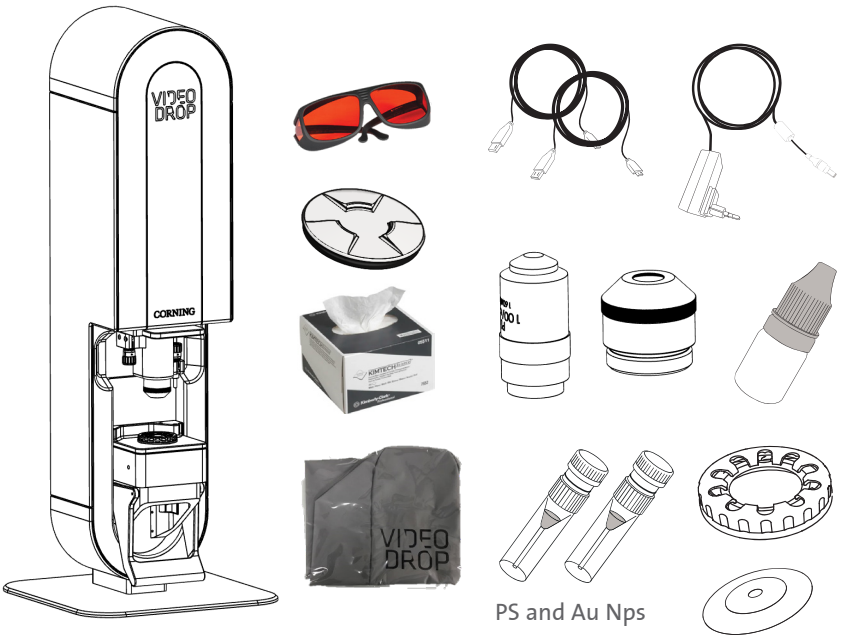


4.0 Overview

4.1 Unpacking

The package includes:

- Corning Videodrop device
- Optical safety googles (from Thorlabs, Ref: LG3)
- Immersion objective
- Objective protective cap
- LED protection cap
- Regional power cord with its transformer
- USB cable 2.0 micro B (1.5 m)
- USB cable 3.0 micro B (2 m)
- Immersion oil
- Sample holder
- Box of 50 sample slides
- Tubes of polystyrene and gold nanoparticles
- Kimtech precision wipes (1 box)
- Corning Videodrop device slipcover
- Instruction Manual



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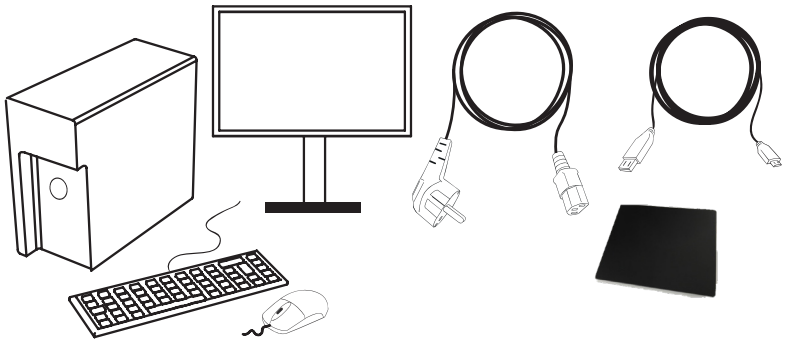
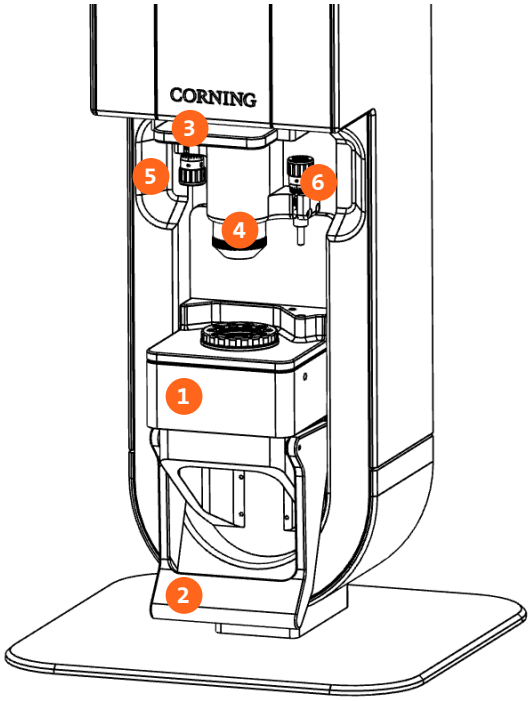
Not included:

- PC computer with qvirCLS software installed*
- PC power cord
- Monitor
- Display port video cable
- Screen power cord
- Keyboard
- Mouse
- Mouse pad (optional)

*qvirCLS software will be installed by a Corning technician after purchase.



4.2 Front view



1. Sample platform

The sample holder is positioned on this platform that can be translated vertically. In its lower position the sample holder can be placed or removed. The upper position responds to the Measurement Position. The platform contains the LED.

2. Handle

The handle allows the sample platform to be move up and down. In the upper position, it locks the sample in its position for measurement.

- Do not use the handle while the device is measuring.
- Manipulate the handle with caution as not to pinch your hand.

3. Protective shield

The protective shield can be lowered or pulled up manually. It allows to isolate the sample from the user during measurement.

Operate the protective shield (up or down) only when the sample platform is in the lower position.

4. Lens

The lens is protected by a mechanical piece with a cover glass slide at the bottom. When the sample platform is in the upper position, this glass slide is in contact with the sample droplet.

5. Lens adjustment micrometer

This micrometer is used to adjust the height of the optical system in relation to the sample.

This adjustment is initially performed during installation by Corning authorized personnel. It must not be modified by the end user.

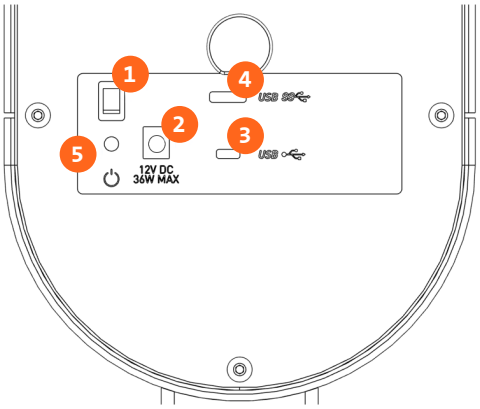
6. Sample platform adjustment micrometer

This micrometer sets the upper height of the sample platform, at which the sample is positioned under the optical system.

This adjustment ensures that the sample drop remains in contact with the upper glass cover.

This adjustment is initially performed during installation by Corning-authorized personnel. It must not be modified by the end user.

4.3 Rear view



1. Primary switch

This switch has two positions:

- **Position 0:** No voltage is present, and the device connected to the transformer is not powered. This is the zero (0) state position when the device is no longer in use.
- **Position I:** The transformer is powering the device. This is the working position of the device.

2. Power input

The power supply transformer connecting the device to the main electrical network must be connected to this input. The device must be plugged in to a 120V or 230V mains socket, single-phase 50/60 Hz AC via the supplied power supply.

3. USB micro B connector (device control)

The USB 2.0 micro B (59.1 in./1.5 m) cable must be connected to this output and be connected (A connector) to any USB port of the desktop PC.

4. USB SuperSpeed (SS) micro B connector (Video output)

The USB 3.0 micro B (78.8 in./2 m) cable must be connected to this output and be connected (A connector) to a SS USB port of the desktop PC (blue USB port).

5. Power indicator light

- Green light indicates the device is powered (On).
- No light indicates the device is not powered (Off).

Cables from the device are fragile elements and must be handled carefully.

5.0 Installation

5.1 Connection

Connections of the system are performed during the installation by Corning-authorized personnel.

5.1.1 Power supply

The Videodrop and the computer must be connected to a main socket using the power cords supplied.

5.1.2 Control interface

Connect the USB 2.0 (59.1 in./1.5 m) cable by connecting:

- The male micro B port to the Videodrop rear female connector: ***USB*** .
- The male A port to any A female port of the desktop PC.

5.1.3 Data interface (Video data)

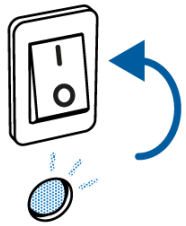
Connect the USB 3.0 (78.8 in./2 m) cable by connecting:

- The male micro B port to the Videodrop rear female connector: ***USB SS*** .
- The male A port to a USB SS A female port of the desktop PC. These types of ports are blue.

If the video data wire is not connected to a USB SuperSpeed port (usually these ports are colored in blue) of the computer: ***USB SS***, the system won't work properly as the data transfer speed won't be sufficient.

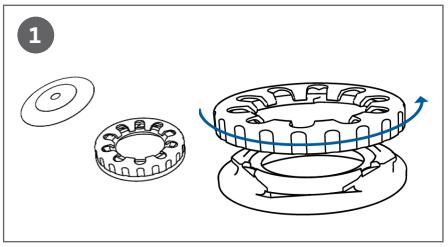
5.2 Power

- Remove the slipcover from the Videodrop.
- Turn the switch to “I” (On) and make sure the green power indicator is lit.



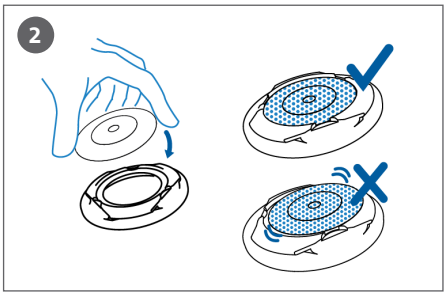
5.3 Preparation of the sample holder

Take a sample slide out of the sample slides box.



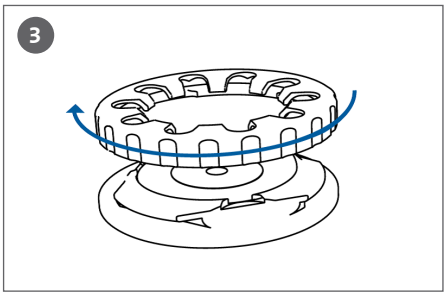
Handle with care. The sample slides box and sample slides are fragile.

1. Unscrew and remove the upper part of the sample holder.
2. Position the sample slide on the sample holder, ensure that it is properly centered.



If the slide is not correctly positioned, it can be damaged.

3. Place the upper part of the sample holder and fasten it into position.



5.4 Maintenance

Corning recommends an annual preventive maintenance be performed by Corning authorized staff.

6.0 Videodrop Measurement Workflow

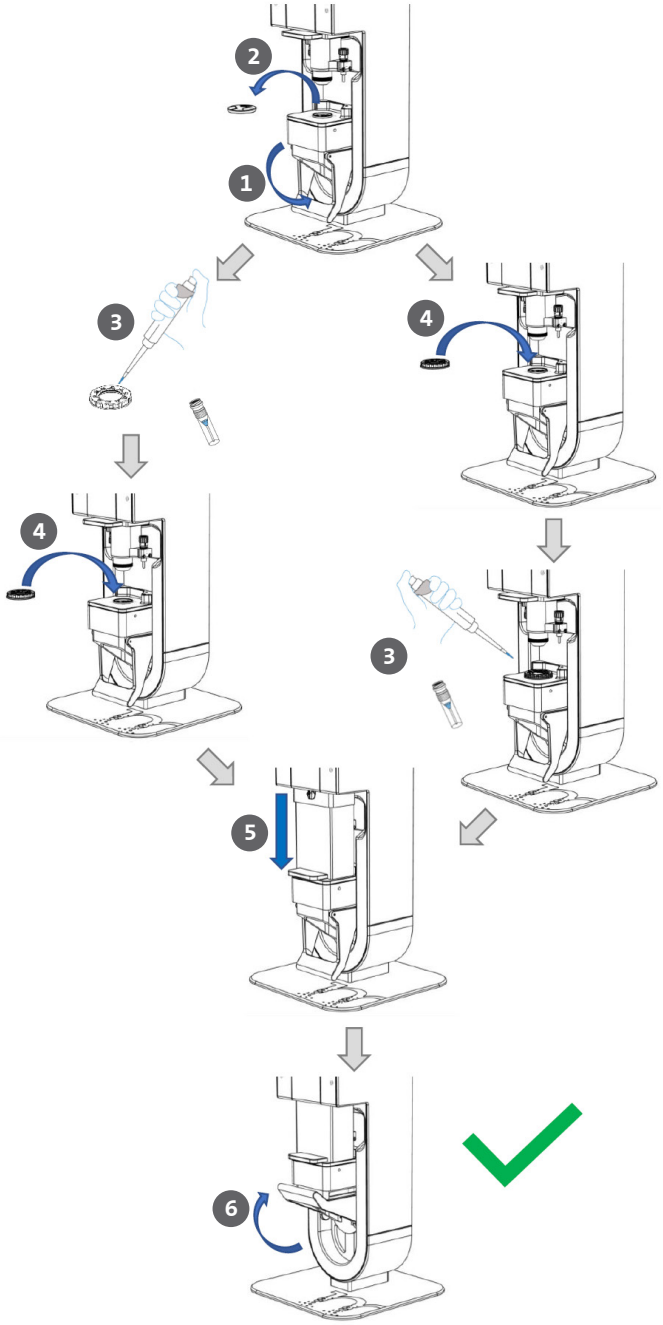
6.1 Sample loading

This schematic details how to load a sample in the Videodrop to perform a measurement.

1. Lower the handle to lower the sample platform.
2. Remove the LED cover.
3. Deposit the sample droplet (5 to 10 µL) to analyze with a pipet in the well centered on the sample slide mounted in the sample holder.
4. Position the sample holder on the sample platform. Magnets allow perfect positioning.

NOTE: Depending on your workflows and/or samples, Steps 3 and 4 are interchangeable.

5. Lower the protective shield.
6. Pull up the handle to lock the sample platform in its Measurement Position.



6.2 Record and Export a Measurement

Refer to Section 8 that details the use of the qvirCLS software.

6.3 Sample removal and cleaning

Depending on the workflow and the sample used it is possible to replace the sample slide after each measurement or reuse the same sample slide in the same experimental session.

We recommend replacing the sample slide at least:

- At the end of each experimental day.
- After each experimenter.
- After each type of sample if needed.

After the measurement is stopped in the Videodrop software interface.

1. Lower the sample platform using the handle.
2. Raise the protective shield.
3. The sample holder is now accessible.

For Steps 4 and 5, the wipe can be soaked with the appropriate cleaning or disinfection product accordingly with the nature of the sample (Section 9.3 and 9.4).

4. Use a lint-free wipe to absorb the drop and clean the sample slide.
5. Use a lint-free wipe to absorb the drop and clean the objective protective cover.

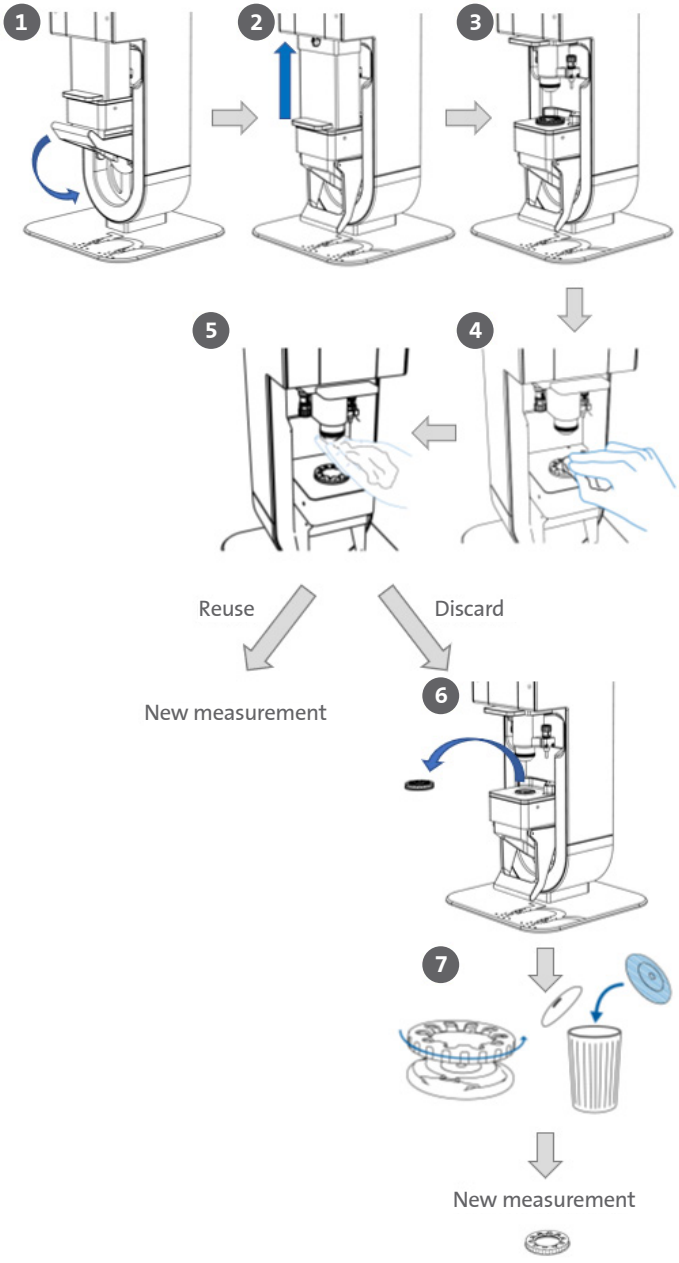
To reuse the sample slide follow Section 6.1 to load a new sample.

To discard and replace the sample slide:

6. Remove the sample holder.

7. Open the sample holder and discard the sample slide.

Use a new sample slide and follow Section 6.1 to load a new sample.



You can discard the sample slide without having to touch it by turning the sample holder over the waste bin after having removed the upper part of the sample holder.

- Do not press on the lens protection window. This can damage it, making the device unusable. If this occurs, contact Corning technical support or your local representative.
- Dispose of the slide in the appropriate waste area in accordance with your waste disposal practices.

7.0 Software

Be cautious that the USB wires does not disconnect during the measurement.

The following instructions correspond to qvirCLS 2.7.2 version.

7.1 Welcome window

Double click on the launch icon. The Welcome window opens.

The window is separated into two parts: the left-hand column to CREATE a new sample measurement environment, and the right-hand column to LOAD a previously saved .qvir or .qvirx file.

Fill in the left-hand column to launch a new measurement.

1. NEW SAMPLE

- **Sample Name** (mandatory field)
  Enter the sample name.

NOTE: You will not be able to change the name of the sample once the sample is created.

2. ENVIRONMENT SETTINGS

- **Temperature (°C)**
  Sample temperature range: 2°C to 40°C. It is recommended to use Room Temperature.
- **Use water viscosity (mPa.s)**
  Check box. If your sample is an aqueous medium, check the Use Water Viscosity box. The viscosity will automatically be adjusted with temperature[1]. This box is checked by default.
- **Viscosity (mPa.s)**
  Viscosity of the sample. If the viscosity of your sample is different from the viscosity of pure water, uncheck the Use Water Viscosity box, and manually enter the viscosity of your sample.
  Range: 0.3 to 10 (mPa.s).

To guarantee the quality of the results delivered, the temperature and the viscosity of the sample must be adjusted according to the experimental conditions **NOTE:** You will not be able to change the sample temperature and viscosity once the sample is created.

[1]Kestin J, Sokolov M, Wakeham WA. Viscosity of liquid water in the range -8 °C to 150 °C. JPCRD 7, 941-948 (1978).

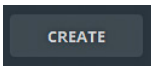
3. ADD A COMMENT

This optional box allows you to add a comment.

For example, you can add your dilution factor. This field is accessible and can be modified during the measurement at any time until export of the results.

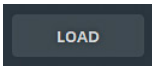
4. CREATE

Click on CREATE to save the pre-configuration of the new sample and access the main measurement interface.



5. LOAD

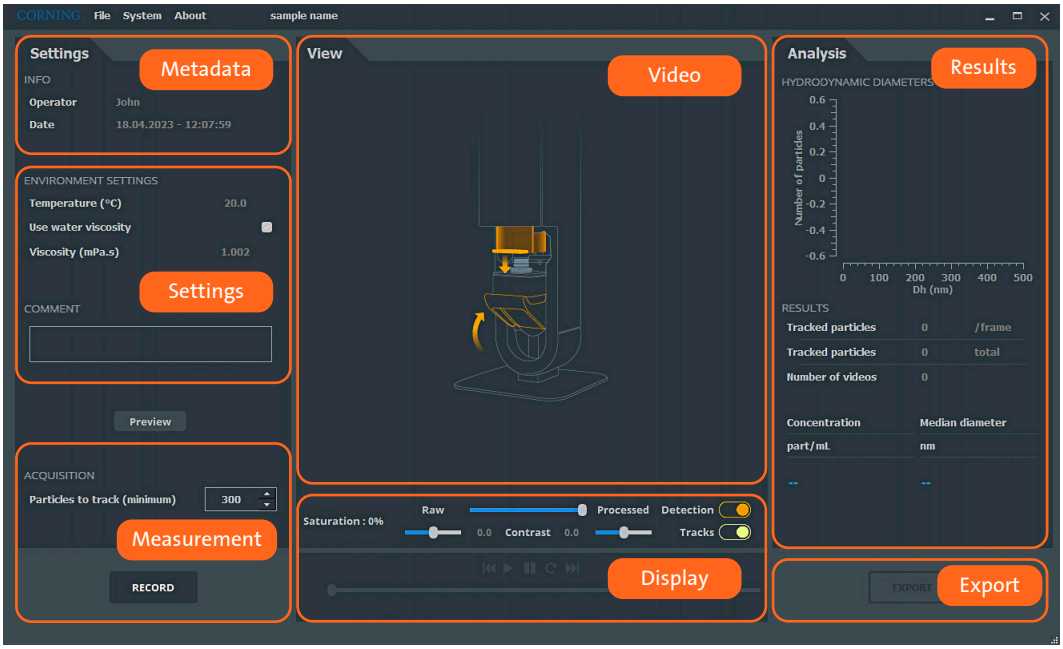
Click on LOAD to load a previously saved .qvir or .qvirx file and access the main interface. Loading a file allows to:



- For .qvir file:
  - Play the last video of a measurement.
  - Export the results (PDF report, Excel file, etc.).
- For .qvirx file:
  - Visualize the last image of the measurement.
  - Export the results (PDF report, Excel file, etc.).

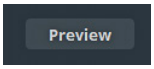
Loading a file does not allow to modify the parameters or the comments.

7.2 Main interface



7.2.1 Start/Stop a measurement

Preview



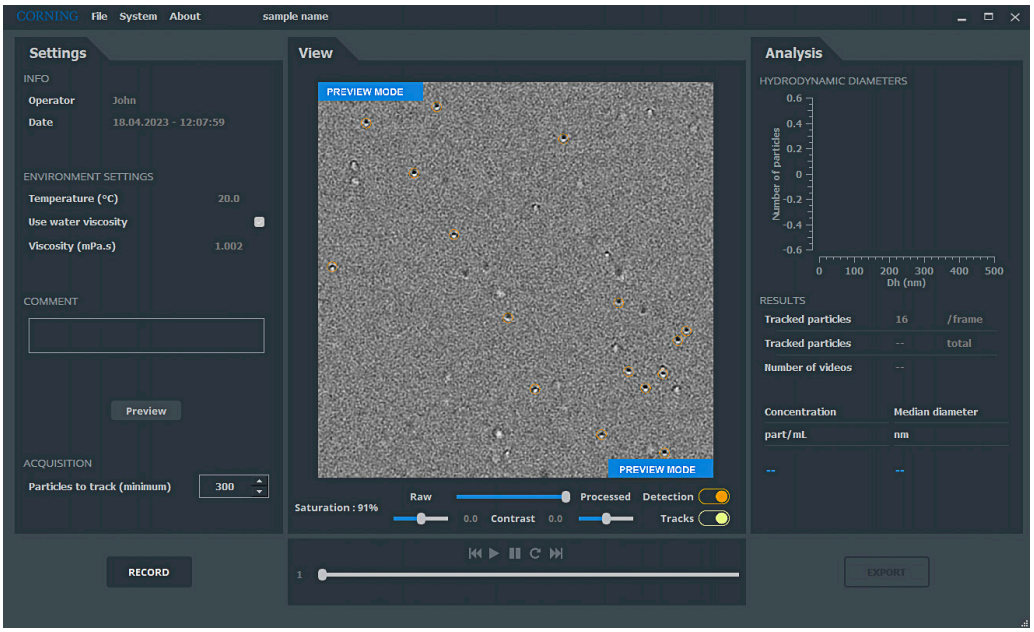
Click Preview to launch the preview step.

The preview mode allows to quickly estimate visually if:

- The sample is ready for measurement (proper contact and positioning of the droplet).
- The sample concentration is in the recommended range and to adjust the dilution if necessary.
- The saturation is in the recommended range (90% to 95%).

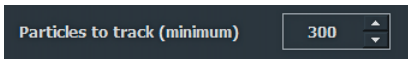
It records 50 images and displays no result. A preview video cannot be exported.

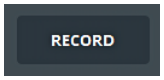
PREVIEW MODE is displayed in the interface to identify preview video.



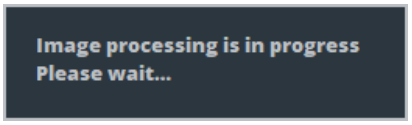
Measurement

Before starting a measurement, the targeted minimum number of particles to track must be set.



	
Start the measurement by clicking once on Record. Videos will be recorded and processed one after the other. The recording stops automatically when: ◗ The targeted number of particles to track is reached. ◗ The maximum number of videos is reached.	If you want to stop the measurements before the end, click on “Stop”. The measurement stops at the end of the running video. This video and measurement data are buffered.

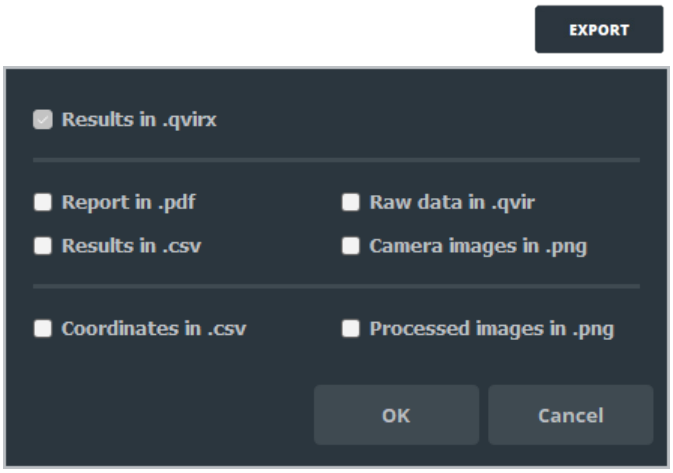
When Stop is clicked on, the following pop-up appears until the processing of the last video is done.



7.2.2 Export measurement results

Export options

- Click EXPORT to save your data.



QvirCLS offers several export options detailed in the table below.

Format	Description/Content	Size*	Open with
.qvirx	Contains all measurement results. Contains only the last image of the last video. Can be loaded to export all formats except images.png and .qvir files. **Saved by default when an export is done.**	12 Mb	qvirCLS 2.7.2 and further versions only
.qvir	Contains all measurement results. Contains all the images of the last video of the measurement. Can be loaded to export all formats.	190 Mb	qvirCLS only
.pdf	Creates a .pdf report containing all the final results of the measurement (mean size, concentration, histogram statistics, settings, and metadata).	<1 Mb	Any PDF reader
Results.csv	Creates a spreadsheet file with individual data for each tracked particles (track length, size, intensity, etc.). Histogram can be plotted using this file.	<10 Kb	Any spreadsheet reader
Coordinates.csv	Creates a spreadsheet file containing all the coordinates of each particle tracked.	<500 Kb	Any spreadsheet reader
Camera images.png	Creates a folder with the raw images recorded by the camera during the last video of the measurement (in .png format).	230 Mb	Any image viewer
Processed images.png	Creates a folder with the processed image computed by the software during the last video of the measurement (in .png format).	360 Mb	Any image viewer

*With factory settings.

The image displayed in the PDF report is the imaged displayed on the software interface when Export is clicked (Raw, processed, or mixed).

An example of the PDF report.

VIDEO DROP

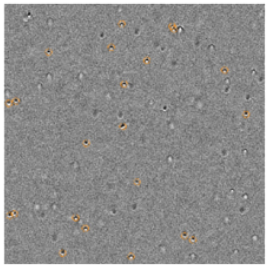
Print: dd.mm.yyyy - hh:mm:ss

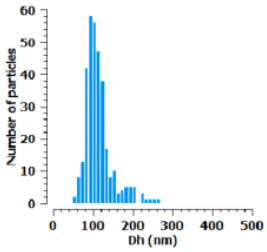
Sample 1

Concentration	Median diameter	
3.28e+9	108	Mean diameter 114 nm Modal diameter 95 nm D90 155 nm D50 108 nm D10 83 nm Standard deviation 34 nm
part/mL	nm	

Number of videos: 4
Saturation: 92%

Average tracked particles: 28 /frame
Total tracked particles: 328





Comments:

Settings:

ACQUISITION
Particles to track (minimum): 300
Max number of videos: 20
Number of frames: 100
Averaging frames: 100
Exposure time (ms): 0.73

LED SETTINGS
Intensity (%): 86

PHYSICAL CONSTANTS
Temperature (°C): 20.0
Use water viscosity: yes
Viscosity (mPa.s): 1.002

Institution: (institution name)
Serial number: (serial number)
Camera type: (camera type)
Software version: (software version)
Operator: (operator)
Begin date: dd.mm.yyyy - hh:mm:ss - time zone
End date: dd.mm.yyyy - hh:mm:ss

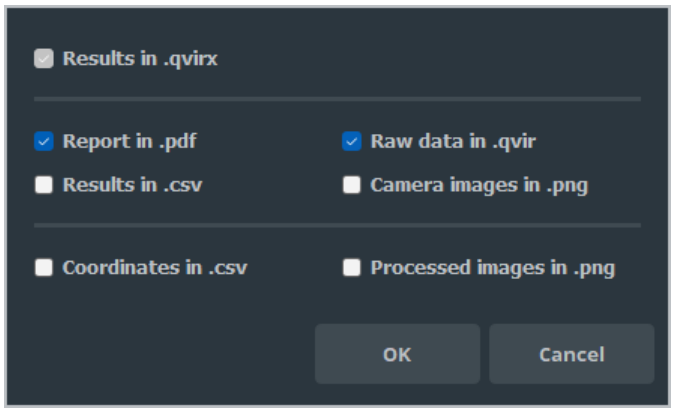
CORNING

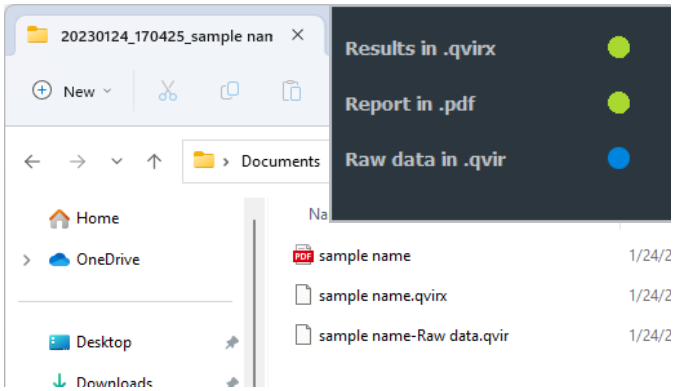
Export file

- Select the formats you want to save by checking the corresponding boxes and click OK.
- Choose the folder location where the selected elements will be saved.
- The folder name is by default:

  DATE(YYYYMMDD)_HOUR(HHMMSS)_SAMPLE NAME

  It can be modified when confirming the folder name before Saving.
- The export progress indicates when the export is completed.



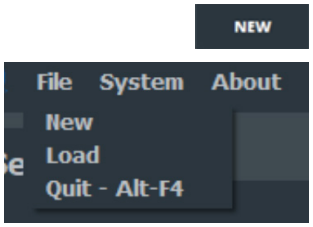


7.2.3 Create a new file

After exporting the results, the user can create a new sample by:

- Clicking on the New button that has replaced the Record button when the export is completed.
- By clicking on File, New.

It will load the Welcome window (see Section 7.1).



7.2.4 Load sample

There are several ways to load a previously saved .qvir or .qvirx file.

- From the Welcome window (see Section 7.1)
- By clicking on File, Load.
- By dragging and dropping the file from the load window into qvirCLS
  - On the Welcome window.
  - On the main window.

Loading a file allows:

- For .qvir file:
  - To play the last video of a measurement.
  - To export the results (PDF report, Excel file, etc.).
- For .qvirx file:
  - To visualize the last image of the measurement.
  - To export the results (PDF report, Excel file, etc.).

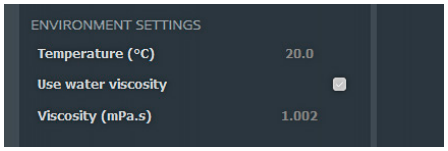
Loading a file does not allow to modify the parameters or the comments.

7.2.5 Main interface Parameters

INFO (Non-modifiable Information)

- **Sample name**
  The sample name has been entered by the operator in the Welcome window. It cannot be modified.
- **Operator name**
  The operator's name is automatically specified by the software using the Windows session ID been used. It cannot be modified.
- **Date**
  The date is automatically entered into the software. It cannot be modified.

ENVIRONMENT SETTINGS



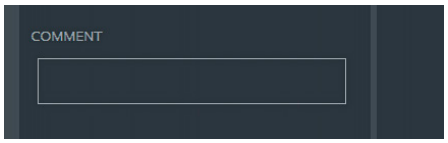
- **Temperature (°C)**
  Sample temperature range: 2°C to 40°C. It is recommended to use Room Temperature.
- **Use water viscosity (mPa.s)**
  Check box. If the sample is an aqueous medium, check the Use Water Viscosity box. The viscosity will automatically be adjusted with temperature[1]. This box is checked by default.
- **Viscosity (mPa.s)**
  Viscosity of the sample. If the viscosity of your sample is different from the viscosity of pure water, uncheck the Use Water Viscosity box, and enter manually the viscosity of your sample.
  Range: 0.3 to 10 (mPa.s).

To guarantee the quality of the results delivered, the temperature and the viscosity of the sample must be adjusted according to the experimental conditions.

NOTE: You will not be able to change the sample temperature and viscosity once the sample is created.

[1]Kestin J, Sokolov M, Wakeham WA. Viscosity of liquid water in the range -8 °C to 150 °C. JPCRD 7, 941-948 (1978).

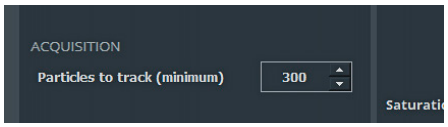
COMMENT



Free comment space.

- For a new sample: This insert could have been pre-filled in the Welcome window. It can be modified until the measurement is recorded.
- For a loaded sample: Commentary written when the measurement has been made. **This comment cannot be changed.**

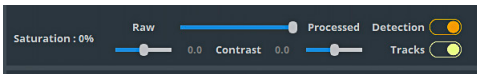
ACQUISITION



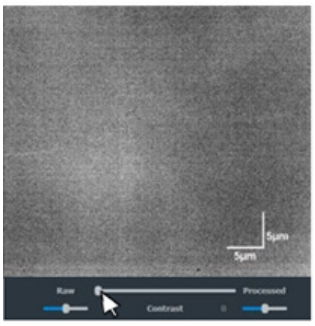
- Particles to track (minimum): Targeted number of particles to track in a measurement. The software will do videos one after the other and accumulate tracked particles until it reaches this number. When this number (or the maximum number of videos in a measurement) is reached, the measurement stops.
  Range: 0 to 10,000 (tracked particles).

DISPLAY

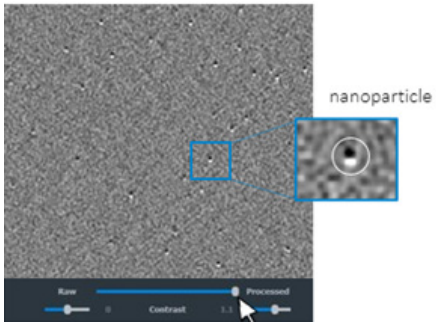
Display settings do not modify the results of the measurement, they only modify the visualization.



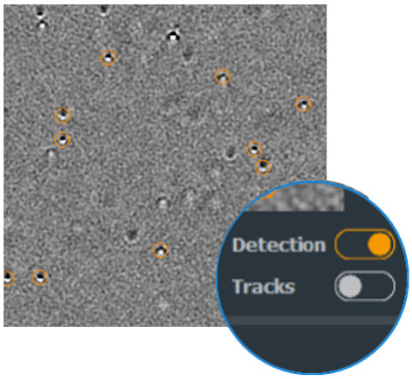
- **Raw/Processed**
  The slider allows to continuously switch from the Raw image to the Processed image.



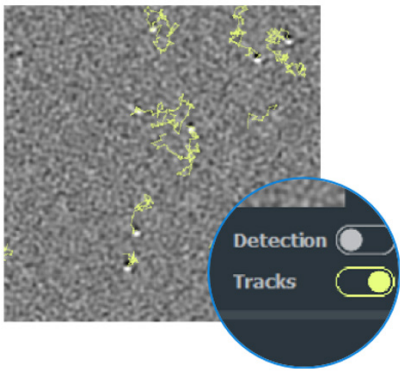
Raw image. Image captured by the camera without any image processing. It corresponds to the micrometric image.



Processed image. Image after image processing where nanoparticles are visible. It corresponds to the nanometric image.

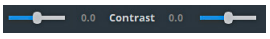


Select Detection to show the nanoparticle detection circles.

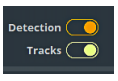


Select Tracks to show the particle trajectories.

- **Contrast**
  Two sliders allow to modify the contrast of the Raw image (left slider) and the Processed image (right slider) separately.
  Range: -2 to 2.

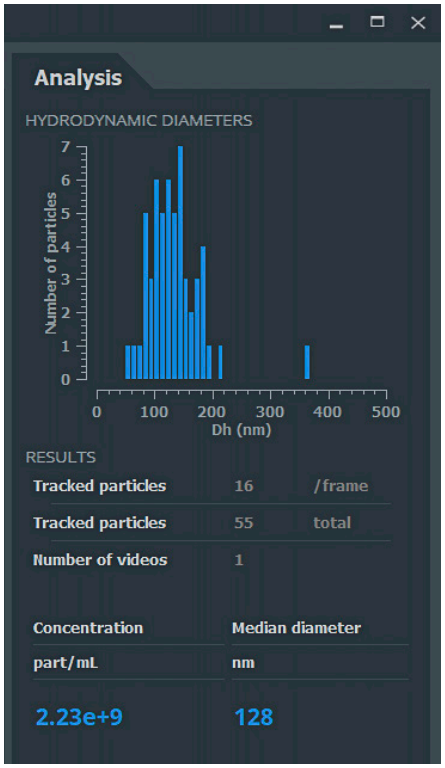


- **Detection/Tracks**
  These two buttons allow to choose what is displayed in the image after image processing.



7.2.6 Results/Analysis

All the following metric values are updated at the end of each video processing until the measurement stops.



HYDRODYNAMIC DIAMETERS HISTOGRAM

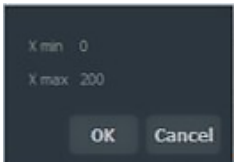
Histogram built with all the tracked particles in the videos recorded in a measurement.

RESULTS

- **Tracked particles (per frame)**
  Number of particles tracked in the displayed image.
- **Tracked particles (total)**
  Total number of particles tracked in the measurement. This number is accumulated video after video during a measurement.
- **Number of videos**
  Number of videos recorded in the current measurement.
- **Concentration**
  Concentration in particle per mL measured in the sample.
- **Median diameter**
  Median hydrodynamic diameter (nm) of the above histogram.

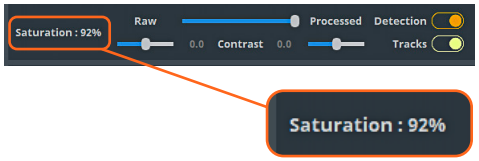
DISPLAY OPTION OF THE HISTOGRAM

- **Histogram scale**
  Histogram axis scales can be modified by double-clicking on the axes.
  A window appears where the user can set the minimum size (x min) and the maximum size (x max).

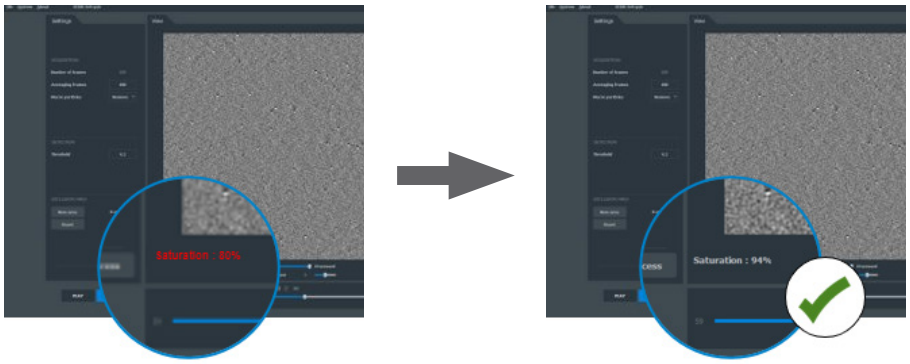


7.2.7 Adjust saturation

Camera saturation is displayed in the main window. **Its value must be between 90% and 95%.**



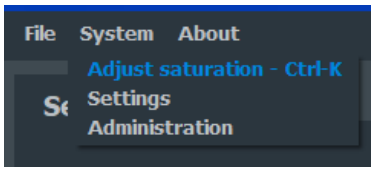
The LED intensity is automatically adjusted between each video to ensure optimal camera saturation.

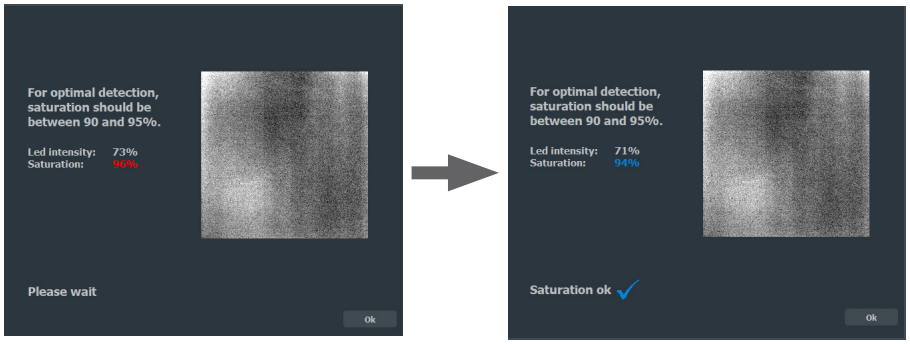


To quickly adjust the LED intensity, there is a dedicated tool called Adjust Saturation.

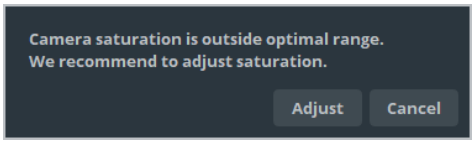
Click System and Adjust Saturation.

It will automatically adjust the LED intensity value to reach optimal camera saturation. Once the saturation reaches the recommended range, click OK to close the Adjust Saturation window and go back to the measurement window.





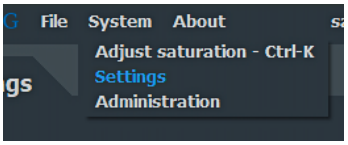
The software automatically detects during a Preview if the saturation is out of optimal range and proposes to perform Adjust Saturation. You can choose to Adjust or pass the recommendation by clicking Cancel.



7.3 Advanced settings (system)

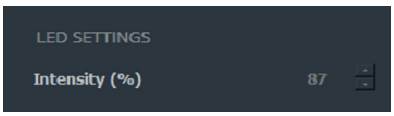
Click on System, Settings to display the advanced parameters.

The factory settings have been chosen to optimize performances (except temperature and viscosity which must be set for each measurement); nevertheless, they can be modified in the advanced settings panel.

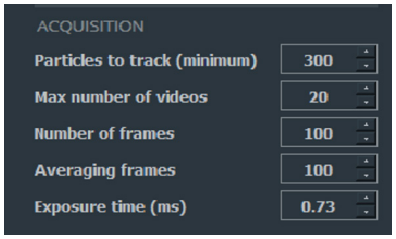


LED SETTINGS

- **Intensity (%)**
  LED intensity command. The LED intensity is automatically adjusted between each video or by using the adjust saturation function. It cannot be modified manually.
  Range: 0 to 100 (%).



MEASUREMENT



- **Particles to track (minimum)**

  Targeted number of particles to track in a measurement. The software will do videos one after the other and accumulate tracked particles until it reaches this number. When this number (or the maximum number of videos in a measurement) is reached, the measurement stops.
  Range: 0 to 10,000 (tracked particles).

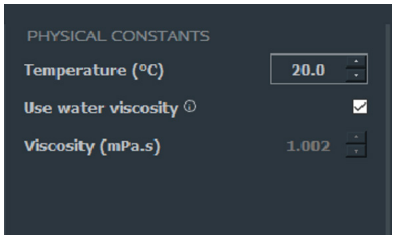
- **Max number of videos**
  Maximum number of videos taken during a measurement. Once this value is reached, the measurement stops (even if the targeted number of particles to tracked is not reached).
  Range: 1 to 100 (videos).

- **Number of frames**
  Defines the number of images per video.
  Range: 50 to 800 (frames).

- **Averaging frames**
  Defines the number of images used to subtract the camera static background.
  Range: 50 to 500 (images).

- **Exposure time (ms)**
  Defines the exposure time of the camera.
  Range: 0.9 to 2 (ms) camera type #1 and #2/0.73-2 (ms) camera type #3

PHYSICAL CONSTANTS



- **Temperature (°C)**
  Sample temperature range: 2°C to 40°C. It is recommended to use Room Temperature.

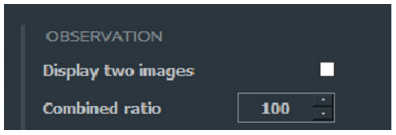
- **Use water viscosity (mPa.s)**
  Check box. If your sample is an aqueous medium, check the Use Water Viscosity box. The viscosity will automatically be adjusted with temperature.
  This box is checked by default.

- **Viscosity (mPa.s)**
  Viscosity of the sample. If the viscosity of your sample is different from the viscosity of pure water, uncheck the Use Water Viscosity box, and enter manually the viscosity of your sample.
  Range: 0.3 to 10 (mPa.s).

NOTES:

- The temperature and the viscosity of the sample must be adjusted according to the experimental conditions to guarantee the quality of the computed results.
- The temperature and the viscosity of the sample can't be set in the setting interface, they must be set before on the Welcome page, when creating a new sample.

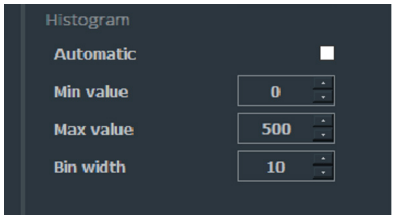
OBSERVATION



- **Display two images**
  Check box. When checked, simultaneous display of the raw image and the processed image side by side.

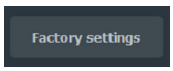
- **Combined ratio**
  Degree of fade between the raw image and the processed image, corresponds to the position of the cursor in the main interface.
  Range: 1 to 100.

HISTOGRAM

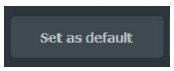


- **Automatic**
  Check box. If activated, the software adjusts the width of the bars as well as the range of hydrodynamics diameters axis.
  Not activated by default.
- **Min value/Max value**
  Minimum and maximum diameters (nm) that will be use on the histogram scale.
  Range: 0 to 1,000.
- **Bin width**
  Defines the width of the bars in nm.
  Range: 1 to 100.

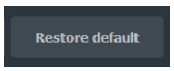
OTHER BUTTONS



Factory Settings reinitializes the factory settings.



Set as Default saves the current settings as default.



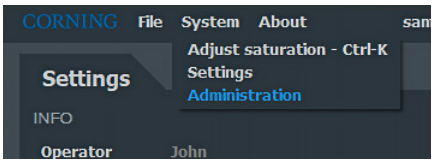
Restore Default loads the default settings.

When launched, Videodrop uses the Default Settings.

Initially the Default Settings have the Factory Settings values.

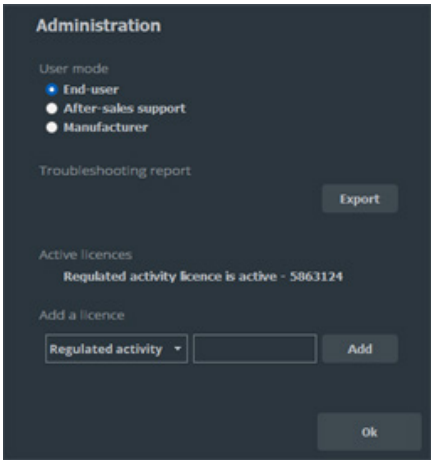
7.4 Administration

Clicking on System, Administration gives access to the administration interface.



This interface allows:

- To select the user mode:
  - End-user: No password needed and default user mode.
  - After sales Support (protected by password): For installation and after sales support only.
  - Manufacturer (protected by password): For Corning only.
- To export a troubleshooting report for after sales purposes.
- To enter license key and activate specific additional features.



NOTES:

- The troubleshooting report generates a folder named: YYYMMMDD_HHMMSS_ Videodrop-troubleshooting-report containing a .txt file per user session.
- This .txt file is encrypted.
- No results are saved in this file.
- Usernames, sample names are anonymized.

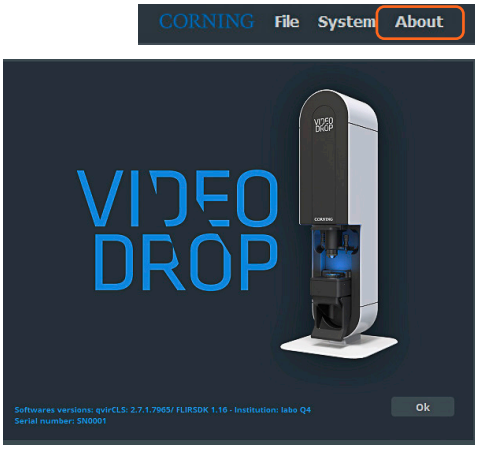
Troubleshooting report will be asked by Corning or Corning representative in case of after sale service issues.

The Regulated Environment license features and activation procedure are detailed in detailed in the VD-1000-AT instruction manual. Please reach Videodrop@corning.com for more information.

7.5 Additional information

For more information on the Videodrop, click on About.

The software version and Videodrop serial number are displayed in this window.



7.6 Warning and Error messages

7.6.1 Warning messages

The following table summarizes the warning messages that can be displayed in qvirCLS.

Warning/Information Message	Meaning/Recommendations
Camera initialization. Please wait.	Normal message when qvirCLS opens and initiates communication protocol with the camera.
Connection error. Videodrop not powered or/and usb cable not connected. Read only mode activated.	Normal message if qvirCLS is used in read only mode (Videodrop is not powered to only visualize previously saved measurements). Otherwise, make sure the Videodrop power supply is connected to a functioning power outlet; the power switch is ON; the USB wires are correctly connected.
Connection error. Camera cable not connected. Read only mode activated.	Make sure the Videodrop power supply is connected to a functioning power outlet; the power switch is ON; the USB video cable is correctly connected.
Videodrop is already running. Impossible to run two Videodrop sessions.	Two qvirCLS windows cannot be launched simultaneously in the same Windows account.
Connection error. Videodrop is already running in another windows session. Impossible to run two Videodrop sessions or Videodrop not powered or/and usb cable not connected.	Two qvirCLS windows cannot be launched simultaneously in two different Windows accounts. Check that the Videodrop is correctly powered and connected. Close the previously open Videodrop session to open a new one.
No camera installed on this computer. Please install Matrox or ActiveSilicon. Read only mode activated.	Please contact Corning support team (Videodrop@corning.com) or your local representative.
Matrox and Active Silicon frame grabbers are detected. Matrox frame grabber will be ignored.	Please contact Corning support team (Videodrop@corning.com) or your local representative .
Camera saturation is outside optimal range. We recommend to adjust saturation.	When Record is clicked and the saturation is outside the recommended saturation range, using the adjust saturation tool (quick access in the popup message) allows to quickly reach the proper range.
A Preview cannot be exported.	Record data before exporting result.
XX videos were not recorded within recommended saturation range. Do you confirm export?	Saturation was not in the recommended range for some of the videos recorded in this measurement. Make sure it is OK before exporting results.

Warning/Information Message	Meaning/Recommendations
This folder name is already used. Please select another folder name.	Results cannot be exported in a folder with an already existing name.
No data to export.	Record data before exporting result.
Impossible to load a .qvir file during measurement.	Load feature is disabled during measurement recording.
Measurement aborted because of saturation decrease. ◗ Check the upper slide/drop contact. ◗ Make sure sample platform is in upper position.	The Videodrop detected a saturation decrease during a measurement. It can be due to the opening of the Videodrop. For optical safety reason, the measurement has been aborted. Follow the instruction, and click on Record again.
Measurement aborted. Sample platform must be in upper position for measurement.	The Videodrop detected a very low saturation value at the beginning of the measurement. The sample platform is in the lower position which is hazardous for optical safety and must be stopped. The measurement has been aborted. Close the Videodrop, and click on Record again with the handle in the proper upper position after following the Sample Loading Protocol in Section 6.1 of this manual.
End of recording. Maximum number of videos reached.	Measurement ended because the number of video criteria has been reached.
Recording has been stopped manually.	Measurement ended because Stop was clicked.
Please create a new sample to access Adjust saturation.	It is not possible to use this feature after exports.
Image processing is in progress. Please wait...	Waiting message: the software is computing measurement results.
Images will be deleted. Do you confirm?	Confirmation requested.
Videodrop closing. Do you confirm?	Confirmation requested.
Default settings will be restored. Do you confirm?	Confirmation requested.
These settings will be set as default. Do you confirm?	Confirmation requested.
Factory settings will be restored. Do you confirm?	Confirmation requested.
Temperature and viscosity have been modified.	When Restore Default or Factory Setting is clicked in the advanced setting windows, the preselected temperature and viscosity for the current sample will be modified if they are different from the defaults or factory values.
The following characters \ / : * ? \" < > | are prohibited.	Windows file name rule.
A sample name is required.	You must enter a sample name in the Welcome window to create a new sample.
The sample name exceeds 110 characters.	Sample name must use less than 110 characters.

7.6.2 Error messages

The following table summarizes the error messages that can be displayed in Videodrop.

Warning/Information Message	Meaning/Recommendations
error 4 - Export failed	Contact Corning support team (Videodrop@corning.com) or your local representative.
error 5 - Export failed	
error 6 - Camera initialization error	
error 7 - Camera initialization error	
error 8 - Camera initialization error	
error 9 - Camera initialization error	
error 10 - Camera initialization error	
error 11 - Camera initialization error	
error 12 - Video card driver error	
error 13 - Video card driver error	
error 14 - Video card driver error	
error 15 - Video card driver error	
error 16 - Video card driver error	
error 17 - Video card driver error	
error 18 - Communication error	Try to restart qvirCLS. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.
error 19 - Communication error	
error 20 - Communication error	
error 21 - Communication error	
error 22 - Videodrop is not responding	
error 23 - Videodrop is not responding. Videodrop not powered or usb cable not connected.	Make sure the Videodrop power supply is connected to a functioning power outlet; the power switch is ON; the USB cable is correctly connected. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.
error 24 - Videodrop is not responding	Try to restart qvirCLS. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.
error 25 - Videodrop is not responding	
error 26 - Camera is not responding	
error 27 - Camera is not responding	
error 28 - Camera is not responding. Camera not connected or Videodrop not powered.	Make sure the Videodrop power supply is connected to a functioning power outlet; the power switch is ON; the video cable is correctly connected. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.
error 29 - Camera is not responding	Try to restart qvirCLS. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.
error 30 - Camera is not detected	
error 31 - File cannot be saved	Contact Corning support team (Videodrop@corning.com) or your local representative.
error 32 - File is corrupted	
error 33 - File cannot be read	
error 34 - File cannot be opened	
error 35 - Measurement cannot be saved	
error 36 - Measurement cannot be saved	
error 39 - Camera is not responding: Camera not connected or Videodrop not powered.	Make sure the Videodrop power supply is connected to a functioning power outlet; the power switch is ON; the video cable is correctly connected. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.

Warning/Information Message	Meaning/Recommendations
error 40 - Camera power supply control failure.	Try to restart the Videodrop and qvirCLS. If the error appears again, contact Corning support team (Videodrop@corning.com) or your local representative.
error 41 - Communication failure with camera. Please click on Record to restart measurement.	Several images have been lost during the data transfers from the camera. Click on Record to restart measurement. If this error occurs often, verify USB camera connection cable and/or contact Corning support team (Videodrop@corning.com) or your local representative.

Should you have a question about the operation of the Corning® Videodrop, qvirCLS, or if service is required, please email Videodrop@corning.com.

8.0 Switch Off the Device

Always switch Off the device in the following sequence:

- Remove the sample holder from the Videodrop, and discard it accordingly with adapted waste disposal procedure.
- Position the LED protection cap on the LED before positioning the handle in upper position.
- Exit qvirCLS software.
- Switch Off the Videodrop.
- Turn Off the computer.
- Position the slipcover on the Videodrop.

Refer to the warning in Section 2 regarding turning Off the device.

9.0 Cleaning

Periodic cleaning and disinfection of the Videodrop is recommended depending on its usage and environment.

9.1 General recommendations

- Always use eye protection and gloves to avoid injury. Respect the use-by date of cleaning products and disinfection solutions.
- Ensure that the contact time and concentration of cleaning product and disinfection solution are appropriate for the equipment and the samples being used. Carefully observe the instructions provided on the label of the cleaning product and the disinfection solution.
- Read the Association for Professionals in Infection Control and Epidemiology (APIC) and Food and Drugs Administration (FDA) recommendations carefully if applicable in your country.

9.2 Cleaning the device

- When cleaning, switch Off, and disconnect the device to prevent electric shock.
- Do not spray cleaning or disinfectant directly on the device. Leaks could damage the system.
- Do not use liquid on electronic parts (LED, connectors). Do not let liquid enter inside the device.

Surfaces must be cleaned in strict compliance with the following steps:

- Clean using a soft cloth soaked in the recommended cleaning product.
- If necessary, rinse using a soft cloth soaked in water.
- Wipe the surface with a soft cloth soaked in the recommended disinfection solution.
- If necessary, dry thoroughly with a soft, clean and absorbent cloth.

If damage is found, stop using the device, and contact Corning.

9.3 Recommended cleaning products

Corning recommends the following products:

- Pure water, soapy water, 70% Ethanol.
- Neutral pH detergent (pH 5-8).
- Recommended disinfection solution (see below) following the specific supplier recommendations.

The **prohibited** cleaning products are:

- Abrasives (“Cif” type and scouring powders)
- Alkaline detergents (pH >9), bleach, etc.
- Sulfuric, acetic, nitric, hydrochloric, and oxalic acids, etc. Soda, potash, ammonia, etc.
- Hydrocarbons and solvents: unleaded petrol, acetone, MEK, MIBK, toluene, xylene, benzene, trichloroethylene, paint thinner, nail varnish remover, etc.

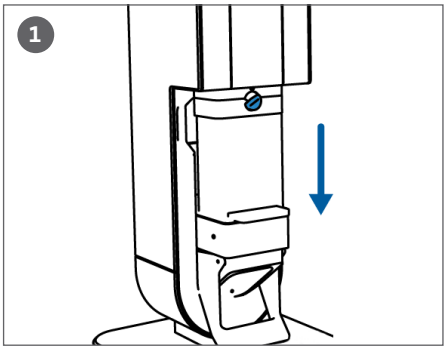
9.4 Recommended disinfection solutions

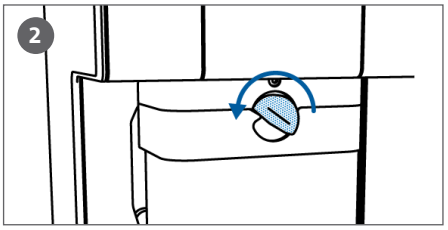
Cleaning and Disinfection Solution	Type	Active Substance
Aniospray Quick	Spray	Quaternary ammonium

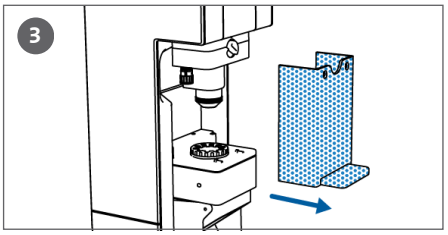
9.5 Protective shield cleaning

The protective shield can be removed for periodic cleaning. To perform this operation:

1. Lower the handle and lower the glass as far as possible to access the unlocking button.
2. Turn the unlocking button 1/4 turn to the left.
3. Slide the glass forward for release and cleaning.
4. Follow the previous steps backward to install again the protective shield.







9.6 Sample holder cleaning

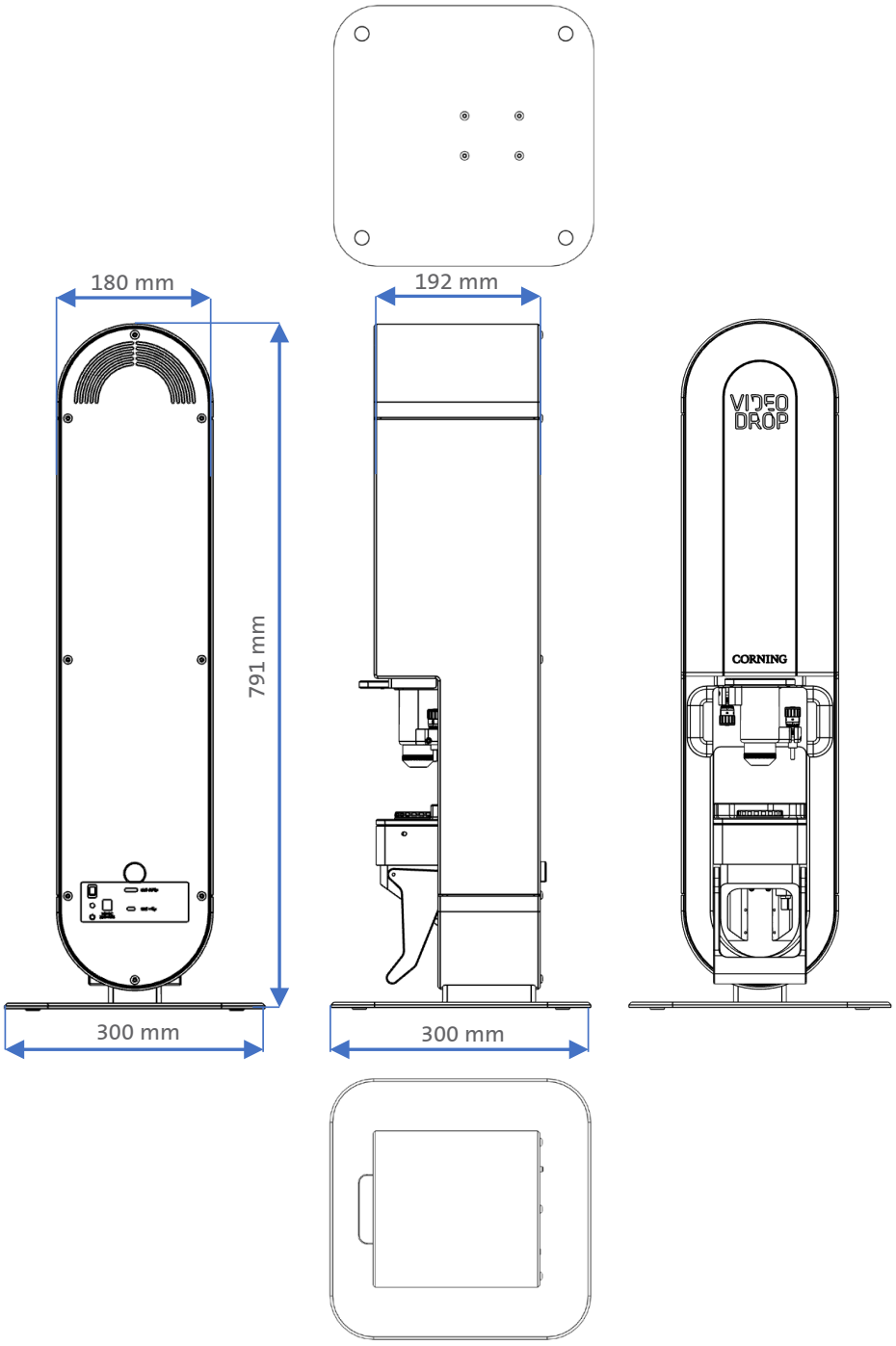
The sample holder can be cleaned with adapted cleaning and disinfection liquid.

Disassemble the sample holder before cleaning.

We recommend to carefully dry the sample holder after cleaning and before reassembling it to prevent corrosion.

10.0 Technical Specifications

Device	
Model	Videodrop
Country of origin	France
IP code	IPX0: the device is not protected against liquids
Mode of operation	Continuous service
Minimal system requirements	◗ Windows® 10 or 11 PC ◗ 16 GB of RAM ◗ Hard drive with at least 4 TB (terabyte) storage capacity ◗ Processor with at least 8 cores (min. of 3.6 - 5 GHz of frequency per core) ◗ USB SS port available
Measurement ranges	
Size of Biological Nanoparticles (Hydrodynamic diameter)	80 to 500 nm
Concentration	1.10^{8} to 1.10^{10} part./mL
Electrical	
Power supply	◗ 120V, 60 Hz ◗ 230V, 50 Hz
Usable power	30 VA
External power supply	
Tension	12V
Power	36 W
Tolerance	±10%
Mechanical	
Weight	39.69 lbs. (18 kg)
Material	Painted aluminum
Dimensions (L x W x H)	11.82 x 11.82 x 31.15 in. (30 x 30 x 79.1 cm)
Optical	
Maximum output power	4.5 W
Wavelength	450 nm
Risk group	3 (according to EN 62471)
Environmental	
Operating temperature	2 to 40°C
Operating humidity	30% to 75% relative humidity (non-condensing)
Storage and transport temperature	-20 to 60°C
Storage and transport humidity	30% to 85% relative humidity (non-condensing)
Additional information	
Cables Supplied	◗ 1 power cable with a 12V transformer ◗ 1 USB cable 2.0 micro B (1.5 m) ◗ 1 USB cable 3.0 micro B (2 m)
Consumables	
Boxes of sample slides	1 box of 50 sample slides
Packaging	
Videodrop parcel and protective foam (L x W x H)	34.9 x 16.8 x 15 in. (88.5 x 42.5 x 38 cm)


180 mm
192 mm
791 mm
300 mm
300 mm
VIDEO DROP
CORNING

11.0 Regulations

This device complies with the following safety standards:

- EN61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use
- EN61326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements
- EN 62471 Photobiological safety of lamps and lamp systems

12.0 Limited Warranty

Corning Incorporated (Corning) warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of purchase. CORNING DISCLAIMS ALL OTHER WARRANTIES WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. Corning's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves defective in material or workmanship within the warranty period, provided the purchaser notifies Corning of any such defect. Corning is not liable for any incidental or consequential damages, commercial loss or any other damages from the use of this product.

This warranty is valid only if the product is used for its intended purpose and within the guidelines specified in the supplied Instruction Manual. This warranty does not cover damage caused by accident, neglect, misuse, improper service, natural forces or other causes not arising from defects in original material or workmanship. This warranty does not cover consumables, wearing part (objective protective cover), or damage to paint or finish. Claims for transit damage should be filed with the transportation carrier.

In the event this product fails within the specified period of time because of a defect in material or workmanship, contact Corning Customer Service at: USA/Canada 1.800.492.1110, outside the U.S. +1.978.442.2200, visit **www.corning.com/lifesciences**, or contact your local support office.

Corning's Customer Service team will help arrange local service where available or coordinate a return authorization number and shipping instructions. Products received without proper authorization will be returned. All items returned for service should be sent postage prepaid in the original packaging or other suitable carton, padded to avoid damage. Corning will not be responsible for damage incurred by improper packaging. Corning may elect for onsite service for larger equipment.

Some states do not allow limitation on the length of implied warranties or the exclusion or limitation of incidental or consequential damages. This warranty gives you specific legal rights. You may have other rights which vary from state to state.

No individual may accept for, or on behalf of Corning, any other obligation of liability, or extend the period of this warranty.

For your reference, make a note of the serial and model number, date of purchase, and supplier here.

Serial No. _____ Date Purchased _____

Model No. _____ Supplier _____

13.0 Equipment Disposal

According to Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), this product is marked with the crossed-out wheeled bin and must not be disposed of with domestic waste.

Consequently, the buyer shall follow the instructions for reuse and recycling of waste electronic and electrical equipment (WEEE) provided with the products and available at **www.corning.com/weee**.

Warranty/Disclaimer: Unless otherwise specified, all products are for research use or general laboratory use only.* Not intended for use in diagnostic or therapeutic procedures. Not for use in humans. These products are not intended to mitigate the presence of microorganisms on surfaces or in the environment, where such organisms can be deleterious to humans or the environment. Corning Life Sciences makes no claims regarding the performance of these products for clinical or diagnostic applications. *For a listing of US medical devices, regulatory classifications or specific information on claims, visit www.corning.com/resources.

Corning's products are not specifically designed and tested for diagnostic testing. Many Corning products, though not specific for diagnostic testing, can be used in the workflow and preparation of the test at the customers discretion. Customers may use these products to support their claims. We cannot make any claims or statements that our products are approved for diagnostic testing either directly or indirectly. The customer is responsible for any testing, validation, and/or regulatory submissions that may be required to support the safety and efficacy of their intended application.

CORNING

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