IDEXX Digital Cytology

Instrument

Operator's Guide

Contents

Getting started

Introduction

The IDEXX Digital Cytology* Instrument provides you with an in-house method for submitting cytology slides as high-resolution scanned images to IDEXX Reference Laboratories and receiving results in 2 hours or less.

The high-resolution scans capture the entire slide, enabling the pathologist to review the entire case as they would when reviewing glass sides.

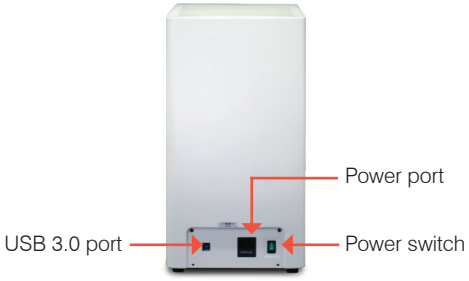
Like other IDEXX Pathology services, the IDEXX Digital Cytology Instrument includes 24/7/365 access to a global network of pathologists to interpret and consult on routine, critical, and complex pathology cases, and provides the ability to receive comprehensive results via the practice information management system or VetConnect* PLUS.

Workflow

You'll create the cytology slides as you normally would but then also stain the slides before scanning them. Once you've prepared and stained a slide, you load it into the instrument for scanning. Once loaded, you can preview the slide, edit the scanned area, and then submit 1–2 scanned slides for the patient to IDEXX Reference Laboratories. For more information, see *Submitting slides to IDEXX Reference Laboratories* on pages 14–15.

Instrument components

Front and right side of the instrument



Back of the instrument

Monitor and barcode scanner

Analyzer status

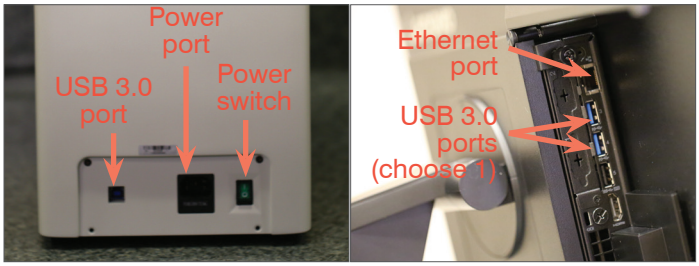
The status light on the front of the instrument will change color and/or flash depending on the status of the analyzer.

When the status light appears...	And is...	The instrument...
Green	Solid	Is on and ready for use
Green	Flashing	Is operating or requires user attention

Installing the instrument

1. Remove the zip tie and protective foam inside the scanner:
    a. Unscrew the two hand screws under the front panel.
    b. Pull the panel up to remove it from the instrument.
    c. Cut the zip tie and remove the foam from inside the instrument.
    d. Replace the panel removed in step b.

2. Connect the cables:
    a. Connect the instrument to the computer using the USB 3.0 cable. (The USB 3.0 ports on the computer are blue.)
    b. Connect the Ethernet cable to the computer and to an Ethernet port.



    c. Connect the computer to a power source using the cord that came with the PC for the monitor.
    d. Connect the instrument to a power source.
3. Power on the instrument.

    IMPORTANT: Ensure the scanner is powered on for 20 seconds before you turn on the computer.
4. Power on the computer.

    When prompted, enter the IDEXX-provided PC password.
5. Import the calibration file:
    a. Insert the silver USB drive into the computer.
    b. Launch the IDEXXScanner program on the computer desktop.
    c. Tap **Settings**.

   d. Enter the IDEXX-provided system password.
   e. From the **Tools** menu, tap **System Calibration** and then tap **Import**.
   f. Browse to **E:\Software** and then double-click to import the **.cfg** calibration file.
   g. Tap **OK** when you receive confirmation that the import was successful.
   h. Tap **Save**.
6. Set up web image viewing and submission:
   a. Performing this step ensures that once an image is finalized, Google* Chrome* will launch automatically and you will be directed to the digital cytology web account.
   b. Using Google Chrome, navigate to digitalcytology.idexx.com.
   c. When prompted, enter the **email** and **password** provided by IDEXX, select the **Remember Me** check box, and then tap **Login**.
7. Set up the image path:
   a. Browse to **C:\Program Files (x86)\IDEXX\IDEXXScanner**.
   b. Sort the files by name and open the **IDEXXApi.cfg** configuration file.
   c. In Notepad, at the end of the line before the closing brace, enter the NodeID provided **between the quotation marks**.
8. Close and then reopen the IDEXXScanner program.

Preparing, staining, and selecting slides

Preparing slides

When preparing slides, remember to:

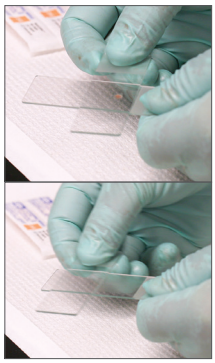
- Label each with the name, date, source, and slide preparation type.
- Save the sample and any stained slides submitted digitally for 2 weeks.
- Save 1–2 additional unstained slides in case additional testing is recommended.
- Only use standard slides as provided by IDEXX Reference Laboratories.

For detailed information about collecting samples, see the *Getting the Most Out of Your Cytology Pathology Submissions* tutorial at idexxlearningcenter.com.

Fine needle aspiration (FNA)

Recommended slide preparation workflow: Prepare 2 direct slides.

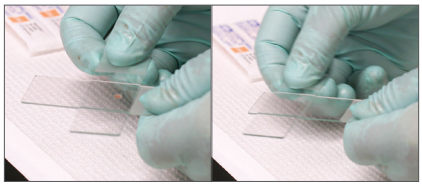
1. Immobilize the lesion with one hand while introducing a needle with a syringe attached.
2. Draw the sample into the syringe by withdrawing the plunger with negative pressure.
3. Release negative pressure and then withdraw the needle.
4. Remove the needle from the syringe, aspirate air into the syringe, and then reattach the needle.
5. Expel the cellular material onto 2 slides.
6. After sample is applied on one slide, place another slide on top so that they are perpendicular to each other. Without adding pressure, pull the top slide down the length of the bottom slide with even pressure to make a smear.
7. Let the line smear slide air-dry or use a fan (not heat) to avoid air-drying artifacts.
8. Stain the slides and allow to air dry or use the cool setting on a fan. For more information, refer to the *Staining slides* section.



Fine needle nonaspiration

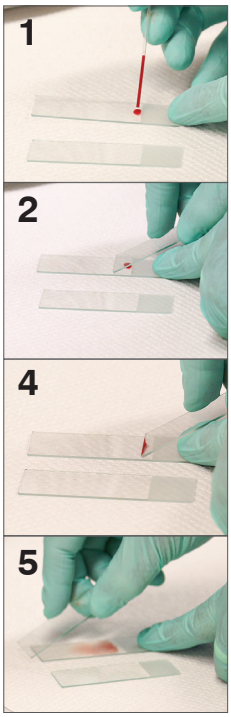
Recommended slide preparation workflow: Prepare 2 direct slides.

1. Immobilize the lesion with one hand while introducing a needle.
2. Once in the lesion, move the needle up and down several times at an angle and in the same needle track to collect material from the lesion.
3. Aspirate air into the syringe, and then attach the needle to the syringe.
4. Expel material onto 2 slides using the air in a syringe.
5. After the sample is applied on one slide, place another slide on top so that they are perpendicular to each other. With light, even pressure, pull the top slide down the length of the bottom slide to make a smear.
6. Let the line smear slide air-dry or use a fan (not heat) to avoid air-drying artifacts.
7. Stain the slides and allow to air dry using the cool setting on a fan. For more information, refer to the *Staining slides* section.



Blood film

Recommended slide preparation workflow: Run the sample on an IDEXX in-house hematology analyzer; prepare 2 blood films.

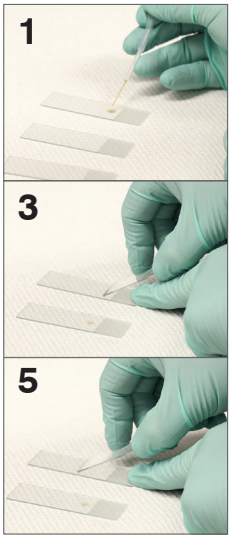


1. Place a small drop of fresh, well-mixed anticoagulated blood on a clean glass slide approximately 2 cm from one end of the slide.
2. Place a clean glass spreader slide in front of the drop of blood at approximately a 30° angle to the film slide.
3. Back the spreader slide into the drop of blood.
4. Let the blood spread along the contact line between the two slides until it covers ¾ of the width of the slide (this should take place quickly).
5. With a steady and seamless movement, move the spreader slide down the entire blood film slide, maintaining the angle without lifting the spreader slide. Blood from the drop will follow the spreader slide, placing a thin film on the other slide. The blood film should be 3–4 cm in length and the shape of a thumb print.
6. Let the blood film slide air-dry or use a fan (not heat) to avoid air-drying artifacts.
7. Stain the slides and allow to air dry or use the cool setting on a fan. For more information, refer to the *Staining slides* section.

Fluids

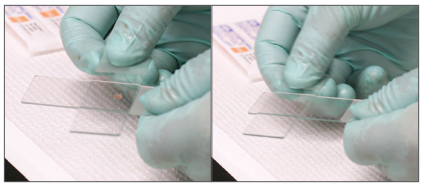
IMPORTANT: Record protein with refractometer and run on hematology analyzer using the appropriate setting per the sample type. Prepare 1 direct slide and 1 line preparation slide (unconcentrated). When creating a requisition for fluid samples, specify color, clarity, and total protein when submitting the test.

- If the sample has low cellularity or when infectious agents are suspected, an additional line smear may be prepared to enhance cytologic evaluation:



1. Place a drop of well-mixed, nonconcentrated fluid on a clean glass slide.
2. Place a clean glass spreader slide in front of the drop of fluid/urine at approximately a 30°–40° angle to the smear slide.
3. Back the spreader slide into the drop, allowing the material to spread along the edge of the spreader slide.
4. Move the spreader slide toward the end of the specimen slide, keeping the two in contact with each other.
5. In the middle of the slide, abruptly stop spreading the sample and lift the spreader slide straight up to form a line of material.
6. Let the line smear slide air-dry or use a fan (not heat) to avoid air-drying artifacts.
7. Stain the slides and allow to air dry or use the cool setting on a fan. For more information, refer to the *Staining slides* section.

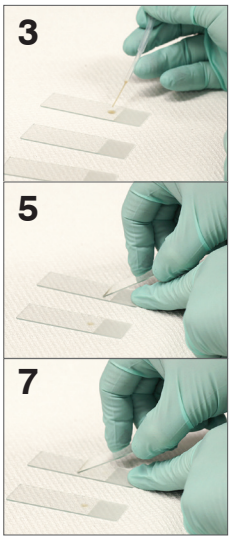
- Additional preparations: If flocculent material is present, collect some of the material and prepare an additional slide using the smear technique described for cytology samples.
- For samples with large blood content, a buffy coat may be prepared for submitting along with a direct film.



Urine sediment

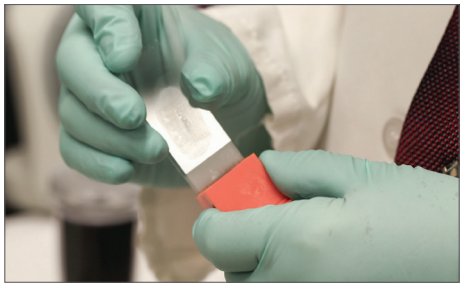
Recommended slide preparation workflow: Prepare 1 direct slide and 1 line preparation (concentrated).

1. Fill a centrifuge tube with 5 mL fresh, well-mixed urine and then centrifuge it on the urine setting (or 400 × g). If your centrifuge does not have a urine setting, refer to your operator's guide for centrifugation settings and times.
2. Gently aspirate the supernatant down to the pellet, leaving an extremely small amount of urine in which to resuspend the pellet. Then lightly flick the bottom of the tube multiple times with your finger to gently resuspend the formed elements.
3. Place a drop of well-mixed, nonconcentrated fluid or resuspended urine sediment (obtained via centrifugation) on a clean glass slide.
4. Place a clean glass spreader slide in front of the drop of fluid/urine at approximately a 30°–40° angle to the smear slide.
5. Back the spreader slide into the drop, allowing the material to spread along the edge of the spreader slide.
6. Move the spreader slide toward the end of the specimen slide, keeping the two in contact with each other.
7. In the middle of the slide, abruptly stop spreading the sample and lift the spreader slide straight up to form a line of material.
8. Let the line smear slide air-dry or use a fan (not heat) to avoid air-drying artifacts.
9. Stain the slides and allow to air dry or use the cool setting on a fan. For more information, refer to the *Staining slides* section.



Staining slides

IMPORTANT: Be sure to label the slide(s) with the source and the patient name and place into a slide storage container. When submitting slides from both needle aspirates and impression smears from the same lesion, mark the collection method on the label of each slide.



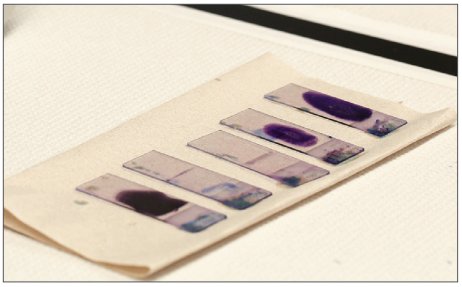
1. Place prepared slides in a slide holder, ensuring the labelled section of the slides is at the top.

2. Dip the slide holder 3 times in fixative to coat the slides. Then immerse the slide holder in fixative for 30 seconds. Tap the slide holder gently on absorbent material to absorb any extra fixative.

3. Dip the slide holder in red stain 3 times to coat the slides. Then immerse the slide holder in red stain for 5 seconds. Tap the slide holder gently on absorbent material to absorb any extra red stain.

4. Dip the slide holder in blue stain 3 times to coat the slides. Then immerse the slide holder in blue stain for 5 seconds. Tap the slide holder gently on absorbent material to absorb any extra blue stain.

5. Dip the slide holder in water 5–10 times, and then repeat this step with clean water.



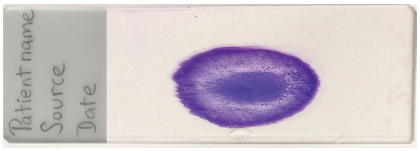
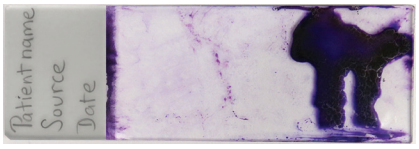
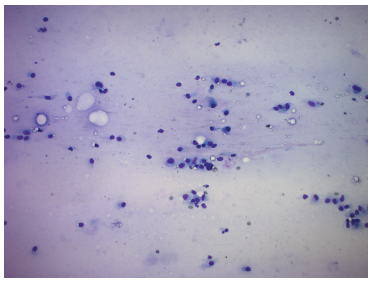
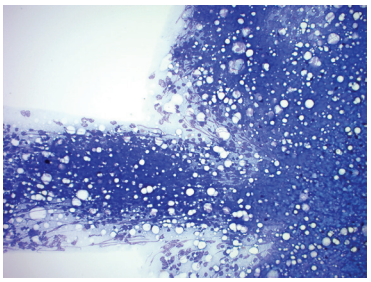
6. Remove slides from the slide holder and allow to air-dry or use a fan.

Selecting slides

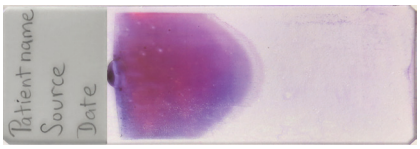
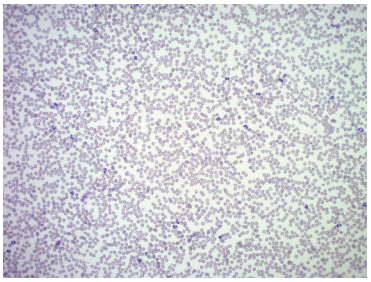
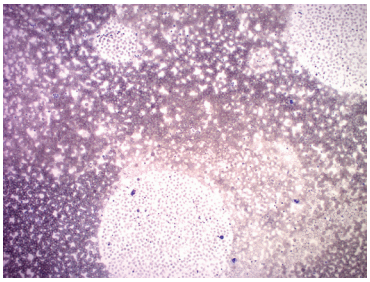
When selecting slides to scan, be sure to:

- Visually inspect the slides in good light, without the microscope.
- Evaluate the stained slides on the microscope. The best slides contain visible cellular material on low power (4× and 10×) and a majority of intact cells when observed at higher magnification (10×–20×).
- Use the following images as a guide for what to look for and what to avoid when selecting the best slides to submit to your pathologist for interpretation.

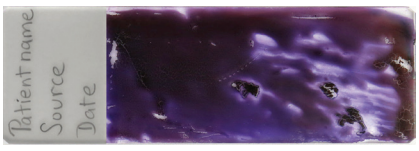
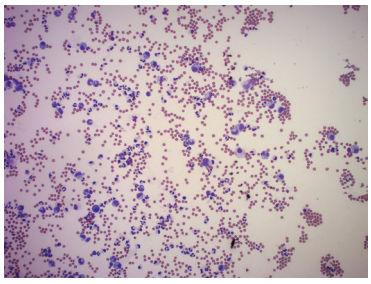
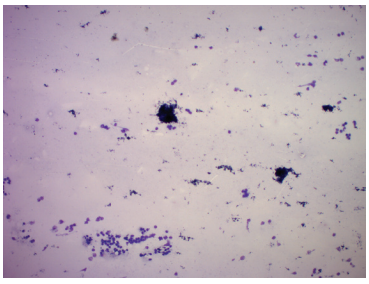
FNA

	What to look for	What to avoid
Visual inspection (naked eye)	 Slide has visible material (typically stains blue)/ sample is spread on the slide	 Mostly blood or thick sample droplets, sample covering frosted edge, or sample material on the opposite side of the frosted edge
Microscopic screening (4×, 10×, or 20× objective)	 Look for intact cells and one-cell-thick layer (monolayer) with good cell color contrast	 Predominance of lysed, overly pink, or pale cells

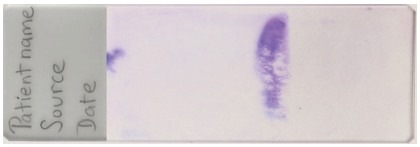
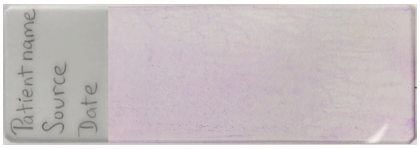
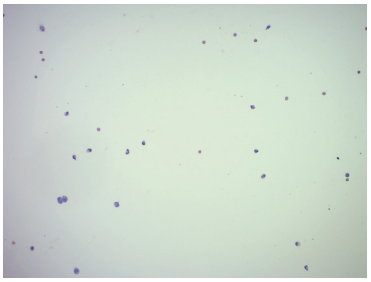
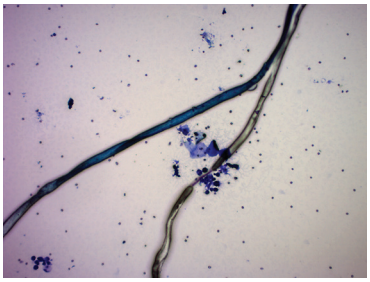
Blood

	What to look for	What to avoid
Visual inspection (naked eye)		
	A thumbprint appearance and presence of a feathered edge	Uneven staining, incomplete and asymmetrical feathered edge
Microscopic screening (4×, 10×, or 20× objective)		
	Presence of monolayer, minimal to no stain precipitate	Sample over 48 hours old, uneven film, lysed cells

Body fluids

	What to look for	What to avoid
Visual inspection (naked eye)		
	Thin film of sample and noticeable, distinct strip of material in line smear	Sample droplets (poor spreading)
Microscopic screening (4×, 10×, or 20× objective)		
	Good cell color contrast, intact cells, even cell distribution (direct smear), and minimal stain precipitate	Stain precipitate, air-drying artifact (fuzzy cells), and lysed cells

Urine

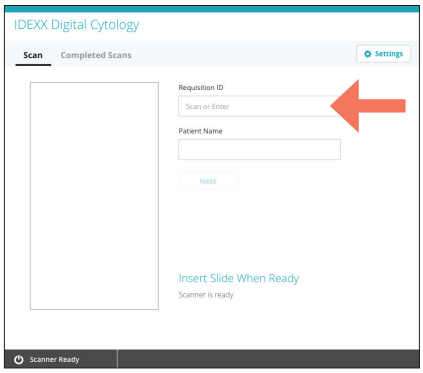
	What to look for	What to avoid
Visual inspection (naked eye)		
	Thin film of sample and noticeable, distinct strip of material in line smear	Insufficient drying can lead to washing off of the sample during staining
Microscopic screening (4×, 10×, or 20× objective)		
	Good cell color contrast, intact cells, even cell distribution (direct smear), and minimal stain precipitate	Presence of foreign material, overstained slides

Using the IDEXX Digital Cytology Instrument

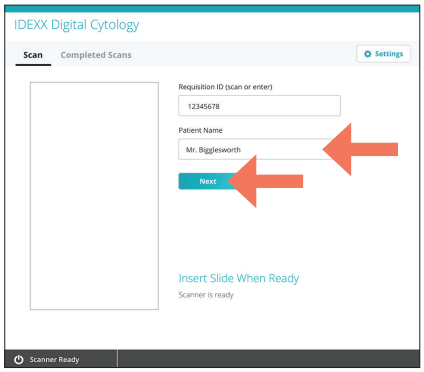
Submitting slides to IDEXX Reference Laboratories

1. Create and print the patient requisition form using VetConnect* PLUS or your compatible practice information management system.

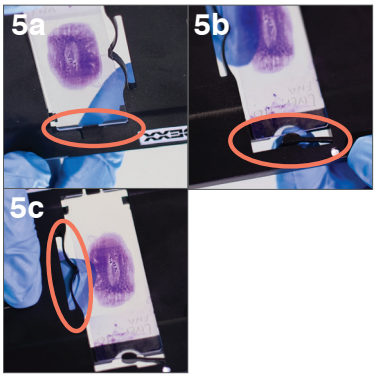
2. Launch the IDEXX Digital Cytology Instrument software from the computer desktop.



3. From the Home screen, tap the **Requisition ID** field and use the handheld scanner to scan the bar code on the printed requisition form.

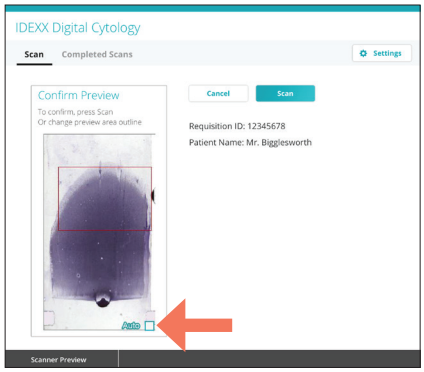


4. Enter the patient's name in the **Patient Name** field and then tap **Next**.

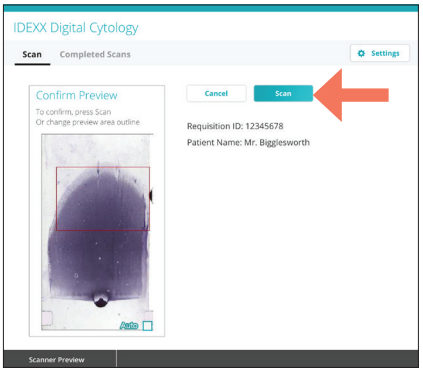


5. Insert the stained slide into the slide tray:
   a. Holding the slide face up by the labeled/frosted end, slide the opposite end of the slide under the black tab in the tray.
   b. Pull back the arm on the labeled/frosted end of the slide and align the arm with the end of the slide.
   c. Pull back the bow near the top of the slide to lock the slide into place.

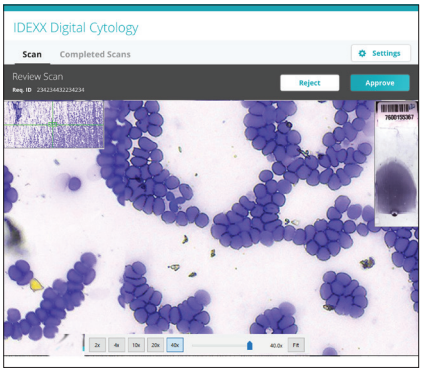
6. Gently insert the slide tray into the instrument until it stops (do not force it in as scan errors may result). The instrument will automatically pull in the slide tray.



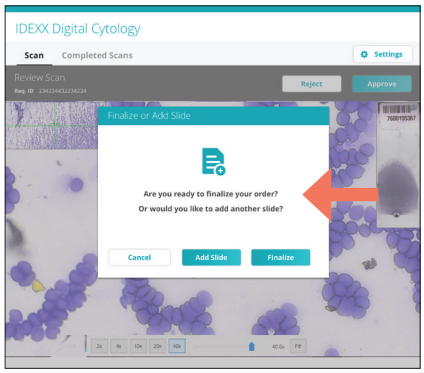
7. A preview appears, allowing you to view the scan area before you submit the slide. If you would like to edit the scan area, clear the **Auto** check box on the lower-right corner of the preview image and then redraw the scan area.



8. Tap **Scan**. Total scan time and time remaining are displayed. After completion of the scan, the Review Scan screen appears.



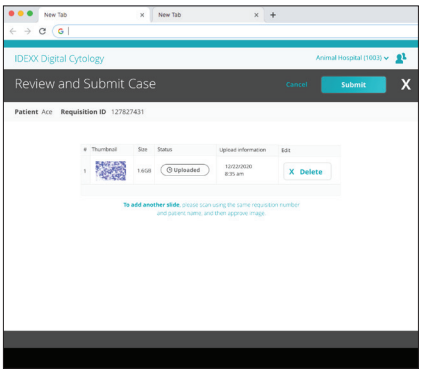
9. Tap **Approve**.
   Note: If you are not happy with the slide image, tap **Reject** and scan a new slide.



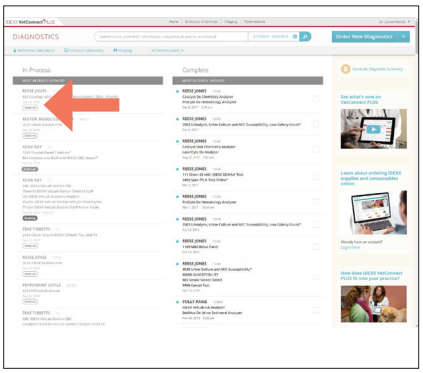
10. If you are finished scanning slides for this patient, tap **Finalize**. A new web browser tab appears where you can view all uploaded slides at digitalcytology.idexx.com.

    OR

    If you would like to submit an additional slide for this case, tap **Add Slide** and repeat steps 6–10.
    Note: Only two slides per case may be submitted for IDEXX Pathology review.



11. Review the case slides, keeping the best 1–2 slides, and then tap **Submit** to send your slides to an IDEXX pathologist.
    Note: Slides can still be submitted even if they have an "uploading" status.



Slide images have successfully reached the IDEXX Pathology laboratory when the VetConnect PLUS status has changed from "Ordered" to "At the Lab."

Accessing results

Your pathology results can be accessed via VetConnect* PLUS or your compatible practice information management system. Please refer to your system's documentation for more information.

Maintenance and troubleshooting

Cleaning the case

Clean the case with a soft cloth moistened with water and/or mild detergent. Do not use full-strength or diluted organic solvents (such as alcohol, ether, etc.) for cleaning.

Rebooting the instrument and computer

IDEXX recommends shutting down and restarting the IDEXX Digital Cytology Instrument and its computer at least once per week.

- To shut down and restart the IDEXX Digital Cytology Instrument, use the power switch on the back of the instrument to power it off and then on.
- To shut down and restart the IDEXX Digital Cytology Instrument computer, select **Shut down** from the Windows* Start menu (located on the lower-left corner of the screen).

Upgrading the software

As new features and functionality are added to the instrument, you will receive software upgrades from IDEXX. These updates will be sent automatically to your IDEXX Digital Cytology computer via your SmartService* Solutions connection.

Troubleshooting

Scanned image quality has worsened

If the scanned image quality has worsened or scanned images look checkered, this may indicate that the instrument requires recalibration.

If images appear to have debris in the field of view, the objective may require cleaning.

To discuss recalibration or cleaning, contact IDEXX Customer and Technical Support.

Appendix

Technical specifications

Dimensions

Width: 7.6 inches

Depth: 15.1 inches

Height: 14.75 inches

Weight: approximately 12 pounds

General specifications

Slide tray capacity: 1 slide

Slide tray dimension: 120 mm × 100 mm × 5.8 mm

Slide dimension: 76 mm × 25 mm × 1 mm

Objective plan: APROCHROMAT 20×/0.50

S APO: 10×/0.3

Resolution: Under 20X magnification, scanner resolution is 0.52 μm/pixel tolerance.

Light illumination: 10 W LED, auto-control intensity (99 grade)

Main camera: 5 megapixels

Communication port: USB 3.0

Digital camera system specifications

Resolution: 2048 × 1536

Pixel dimension: 3.45 × 3.45 μm

Port: USB 3.0

Working temperature: 5°C–40°C (41°F–104°F)

Storage temperature: 0°C–40°C (32°F–104°F)

Electrical specification

Input voltage: 100–240 V ~ 50–60 Hz

Input power: 100 VA

Fuse: 250 V T2.5 AL (If damaged, replace with a fuse with the same specifications.)

Operating conditions

Indoor use only

Altitude: 2,000 meters (Higher altitudes should be revised based on the international coefficient.)

Voltage: Power supply voltage fluctuation should not be more than ±10% of nominal voltage.

Air pressure: 75k Pa–106k Pa

	Operating	**Storage**
Temperature	5°C–40°C (41°F–104°F)	0°C–40°C (32°F–104°F)
Relative humidity	30%–75%	10%–90%

Safety precautions

Note: If the equipment is used in a manner other than specified, the protection provided by the equipment may be impaired.

The instrument does not contain any user-serviceable components. DO NOT disassemble.

Line voltage for the IDEXX Digital Cytology Instrument AC power adapter is 100–240 V AC, 50–60 Hz. Be sure to plug all equipment into properly grounded electrical outlets.

Use only the AC power adapter and AC power cable supplied.

Disconnect the power cable:

- If the cable becomes frayed or otherwise damaged.
- If anything is spilled onto the equipment.
- If your equipment is exposed to excessive moisture.
- If your equipment is dropped or the case has been damaged.
- If you suspect that your analyzer needs service or repair.
- Whenever you clean the case.

When moving the devices, disconnect the power and USB cables.

Lift equipment base plate from both sides when lifting and handling to maintain balance of the instrument and prevent rollover.

Automatic voltage selection device is applicable to worldwide voltage configuration, but it is recommended to use the power cable that matches with the rated voltage of your area. Incorrect use of power cable may cause fire or damage to the device.

To prevent electric shock, make sure the power switch is turned off before connecting the power cable.

Connect the power cable to a grounded electrical outlet.

If an emergency occurs, remove the power cord.

Care of the instrument

IDEXX recommends shutting down and restarting the system at least once every week.

It is recommended that you do not stack other equipment or containers on top of the instrument.

Keep instrument away from sources of heat or flames.

PROTECT your equipment from damp conditions, wet weather, or liquid spills.

Take care not to spill water or other liquids on the unit.

DO NOT use solvents, ink markers, sprays containing volatile liquids, or polish on the instrument as it may damage the outer case. Clean only with a mild soap and slightly moist cloth and only when the analyzer is not in use.

Clean only with a mild soap and slightly moist cloth and only when the instrument is not in use.

Keep the slide tray clean (especially the back side of the slide tray) to ensure it can slide smoothly in and out of the instrument.

Dragging the instrument along a surface (i.e., when cleaning) can affect its accuracy.

The instrument should not be placed near direct sunlight, dust, mechanical vibrations, high temperature, or high humidity.

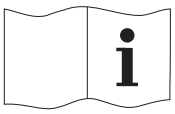
Please keep this device in an environment with good ventilation.

Install the device in a place where you can easily disconnect the power cable.

International symbol descriptions

International symbols are often used on packaging to provide a pictorial representation of particular information related to the product (such as expiration date, temperature limitations, batch code, etc.). IDEXX Laboratories has adopted the use of international symbols on our analyzers, product boxes, labels, inserts, and manuals in an effort to provide our users with easy-to-read information.

Symbol	Description
EC REP	**Authorized Representative in the European Community** Représentant agréé pour la C.E.E. Autorisierte EG-Vertretung Rappresentante autorizzato nella Comunitá Europea Representante autorizado en la Comunidad Europea EC内の正規販売代理店
	**Manufacturer** Fabricant Hersteller Ditta produttrice Fabricante 製造元
	**Caution, consult accompanying documents** Attention, consulter les documents joints Achtung, Begleitdokumente beachten Attenzione, consultare la documentazione allegata Precaución, consultar la documentación adjunta 注意、添付文書をご参照ください。

Symbol	Description
	**Consult instructions for use** Consulter la notice d'utilisation Gebrauchsanweisung beachten Consultare le istruzioni per l'uso Consultar las instrucciones de uso 取扱説明書をご参照ください。
	**WEEE Directive 2002/96/EC** Directive 2002/96/CE (DEEE) WEEE-Richtlinie 2002/96/EG Directiva 2002/96/CE RAEE Direttiva RAEE 2002/96/CE 廃電気電子機器指令 (WEEE Directive 2002/96/EC)
	**Temperature limitation** Température limite Zulässiger Temperaturbereich Temperatura limite Limitación de temperatura 保存温度 (下限)

IDEXX Customer and Technical Support contact information

IDEXX sales representative: _____

Phone: _____

United States: 1-800-248-2483

Australia: 1300 44 33 99

Austria: 43 (0)1 206 092 729

Belgium: 32 (0)27 00 64 38

Brazil: 0800-777-7027

Canada: 1-800-248-2483

China (PRC): 400-678-6682

Czech Republic: 420-239018034

Denmark: 45 (0) 43 31 04 39

Finland: 358 (0)9 7252 2253

France: 33 (0) 810 433 999

Germany: 49 (0)69 153 253 290

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New Zealand: 0800 83 85 22

Norway: 47 24 05 51 10

Poland: 48 22 853 40 01

Russia: 7-4999-511-255

Singapore: 65 6807-6277

Slovakia: 421-268622417

South Korea: 080 7979 133

Spain: 34 932 672 660 or 34 916 376 317

Sweden: 46 (0)8 5198 9566

Switzerland: 41 (0)44 511 22 37

Taiwan: 0800 291 018

United Kingdom: 44 (0)20 3788 7508