JTR / JEWELLERY TECHNOLOGY RESEARCH

REVEAL

DIAMOND DETECTOR

USER MANUAL BOOKLET

USER MANUAL V1.1

JTR REVEAL
DIAMOND DETECTOR

CONTENTS

I. DISCLAMERS, EXCLUSIONS AND LIMITATIONS OF LIABILITY

Please take note of the warranty terms and conditions for the Reveal Diamond Detector, which are outlined in the accompanying warranty card. The warranty for the Reveal Diamond Detector is contingent on proper use by the user, in accordance with all terms and conditions specified in the relevant user manual, but any attempt to open the detector or interfere with the screws will void the warranty and the company will refuse to repair it. The warranty does not cover damage caused by user abuse, water damage, drops, or any other type of inappropriate handling. If repairs are needed, the buyer will be responsible for the cost of shipping, insurance, and handling. Warranty repairs will be sent back fob destination. Only manufacturing defects are covered by the warranty.

As part of our ongoing product development, Reveal reserves the right to update all documentation, including the user manual, without prior notice. We advise users to check our website http://www.jtr.org for any updates.

Reveal shall not be held liable for any damage or loss resulting from the use of the product or user manual. Under no circumstances will Reveal, its manufacturer, or any of its subsidiaries, licensors, distributors, resellers, servants, and/or agents be responsible for any direct or indirect damages arising from the use of this product.

To the fullest extent allowed by applicable law, Reveal, its manufacturer, or any of its subsidiaries, licensors, distributors, resellers, servants, and/or agents will not be responsible for any special, incidental, consequential, or indirect damages, regardless of the cause.

This user manual refers to the Reveal Diamond Detector, which is provided and/or sold on an "as is" basis. Except where required by law, no warranties, expressed or implied, including but not limited to merchantability and fitness for a particular purpose, are provided.

Detectors come with a complete one-year warranty for regular usage.

II. ABOUT REVEAL DIAMOND DETECTOR

We extend our sincere congratulations to you on the acquisition of our Reveal Diamond Detector - a ground-breaking synthetic diamond screener. This device boasts the remarkable capability of automatic screening for mounted jewellery, as well as loose stones, parcels, and any size melee with the added feature of providing various test results including natural diamond, CVD synthetic diamond, and HPHT synthetic diamond. Loose diamonds can be screened even when they are inside a thin plastic bag. However, the detectors cannot determine diamonds covered by thick plastic or glass. These detectors are specifically engineered to detect only white diamonds within the d-k colour range. It is not recommended to test lower colour diamonds or fancy colour diamonds with the Reveal Diamond Detector. Diamond simulants such as CZ, moissanite, diamond coated CZ, and diamond coated moissanite are more easily detected when tested individually, however, it is recommended not to use Reveal Diamond Detector to detect diamond simulants. If you need further assistance, you can check out our website, http://www.jtr.org, where you will find helpful instructional videos on how to utilize the detectors and our most updated user manual.

NOTE: IT IS CRUCIAL THAT YOU WATCH OUR INSTRUCTIONAL VIDEOS, AS WE BELIEVE THAT WITHOUT DOING SO, THERE IS A RISK OF MISINTERPRETING THE RESULTS.

Reveal Diamond Detector distinguishes itself with its sophisticated functionality, which includes automatically saving and sending results to your cloud account, ensuring longer access to your results in your diamond screening processes.

III. FEATURES AND ADVANTAGES

Our diamond detector boasts the following features:

- It is capable of testing both mounted jewellery and loose stones.
- It is capable of detecting stones as small as 0.002 carats.
- It comes with a built-in high-resolution camera.
- It has low current consumption.
- It provides a 360-degree view for rings and jewellery. (coming)
- Test results are uploaded to your cloud account service.
- It is capable of testing stones inside a transparent plastic bag for bulk testing.

Here are some advantages of our diamond detector:

- The test results are automated, which makes the process more efficient and less time-consuming.
- Double-view test results are provided, which enhances the accuracy and reliability of the test results through comparison.
- There is no need for an external computer or smart phone to operate the diamond detector, which makes it a portable and user-friendly tool.
- The detector is suitable for both loose detection (separated and bulk stones) and jewellery detection.

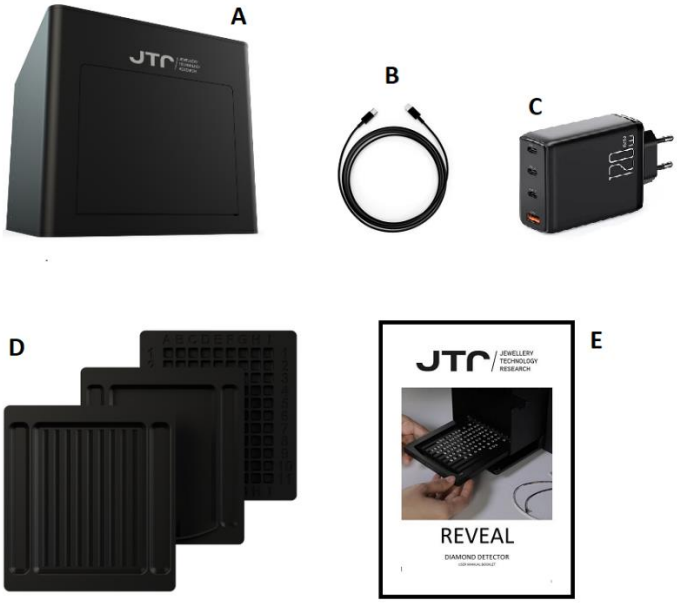
IV. PRODUCT SPECIFICATIONS

Stones Testing Capabilities	Natural Diamond, CVD Synthetic Diamond, HPHT Synthetic Diamond
Stone Colours (capable to detect)	Colourless to Near Colourless (D-K)
Stone size (capable to detect)	0.002 carat and above
Estimated Maximum Count of Stones per test	Approximately 1200 loose 0.02 ct stones
Time Duration per test	15 secs. for Quick Analysis-4 min for Detailed Analysis
Loose Stone Tray Size (camera view)	13.5×15.5 cm
Tester Body Dimension	Height 19 cm
	Width 20 cm
	Depth 24 cm
Weight	5.0 ± 0.2 kg
Body Colour	Black and White
Power Adaptor	100-240 V, 50/60 Hz
Power Cable Type	TYPE-C
Visual Output	1920X1080 full HD
Lamp Life	6000 hours
Operating System	Raspberry Pi
Device Memory	8 GB processor, 32 GB
Ventilation Requirements	Do Not Obstruct the Ventilation Holes

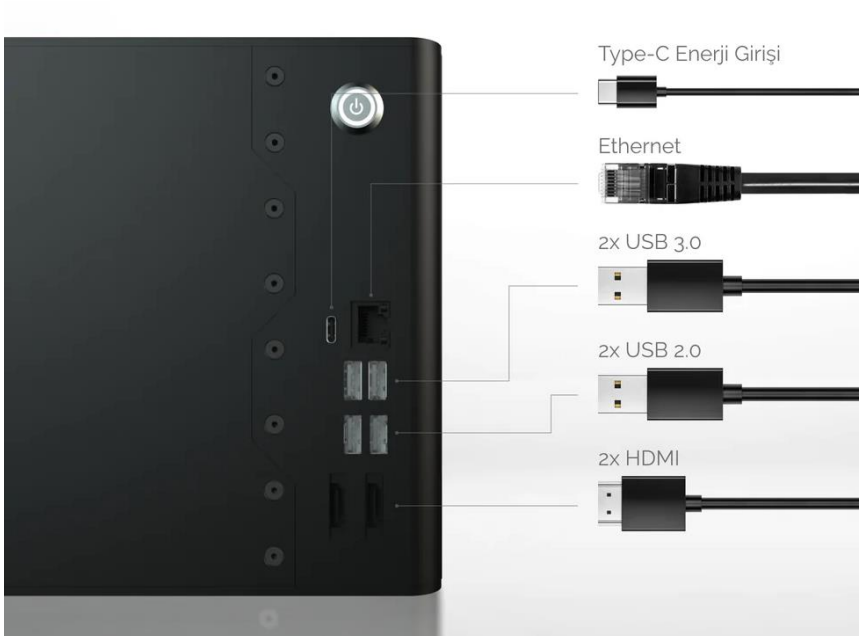
V. DETECTOR OVERVIEW

i. DETECTOR PARTS AND ACCESSORIES

A. Reveal diamond detector
B. AC power cable
C. Power supply
D. Loose stone and jewellery trays
E. Detector's user manual



ii. DETECTOR OVERVIEW



iii. ACCESSORIES

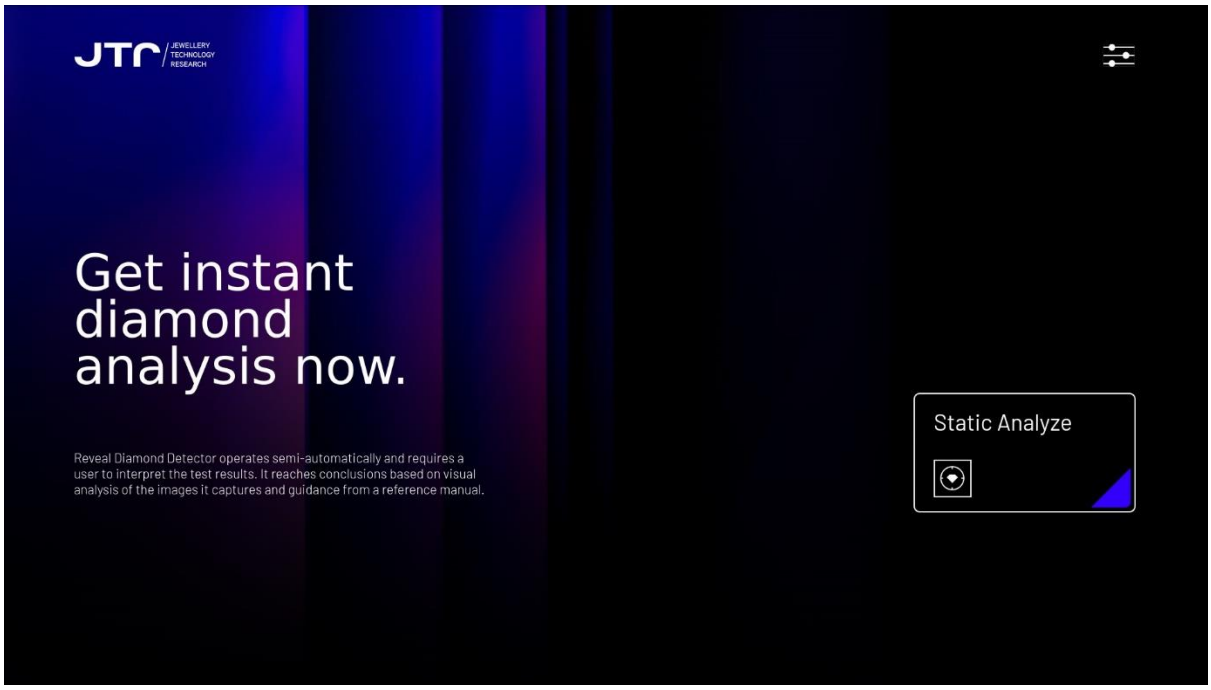
I. Loose Stone Sorting Tray – 135 X 155 mm
   For Bulk Stones / Stones Inside Transparent Plastic
II. Loose Stone Tray with Sections – 135 X 155 mm
   For Big and Separated Stones
III. Loose Stone Tray with Channels – 135 X 155 mm
   For Smaller Stones and Melee
IV. Slotted Ring / Jewellery Holder Accommodates – 135 X 155 mm
   13 Slots for Ring and Earrings
V. Worldwide Power Adaptor 100-240v and Power Cable
VI. User Manual

VI. INSTALLING DEVICE

- Connect the power cable into the USB-C on the side of Reveal Diamond Detector and the other end of cable plug to the power outlet.
- Connect the screen cable (HDMI) to the HDMI socket on the side of Reveal Diamond Detector and the other end of cable to the desired screen.
- Connect mouse and/or keyboard to the USB socket on the side of Reveal Diamond Detector.
- Connect LAN cable to the LAN socket on the side of Reveal Diamond Detector and the other end of cable to the LAN socket of your desired source. (In case of using Wi-Fi connections you do not need to apply the LAN cable)
- Press the power button, it turns blue which means the device is turned on. Make sure that the screen is also plugged in and switched on.
- Homepage is shown on the screen.

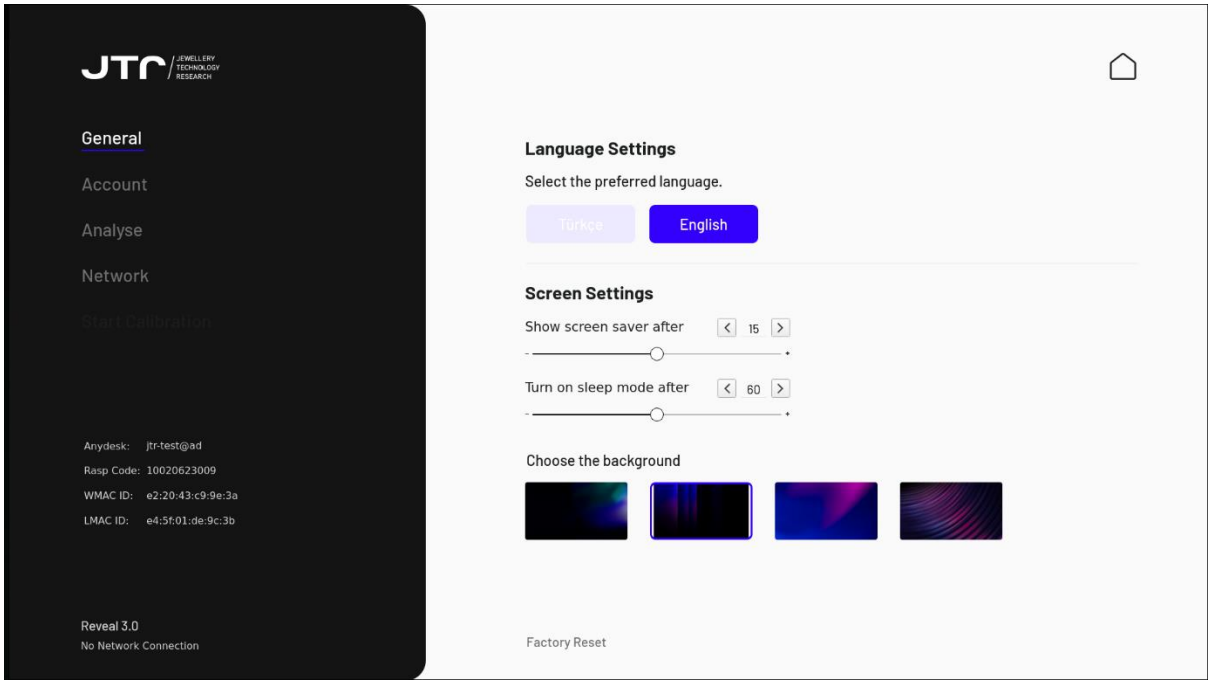
VII. HOMEPAGE SETTINGS

When the detector is turned on, it is directed to the application homepage.



There is a hamburger menu on the top right corner of the homepage. Press the hamburger menu and you are directed to the side menu containing the following tabs.

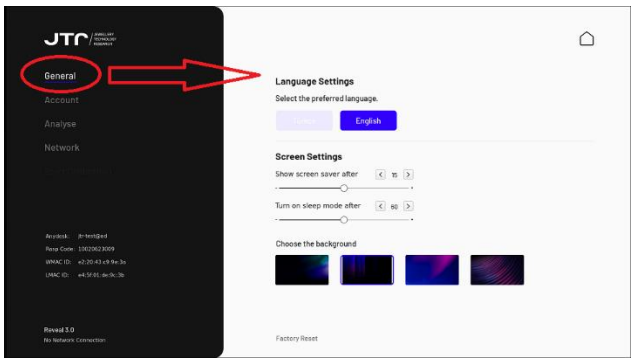
General
Account
Analyse
Network



You can choose any of the tabs by simply clicking on them.

On the bottom left corner of the screen, you can see your Reveal Diamond Detector information.

To return to homepage press the home button on the top right corner of the screen.



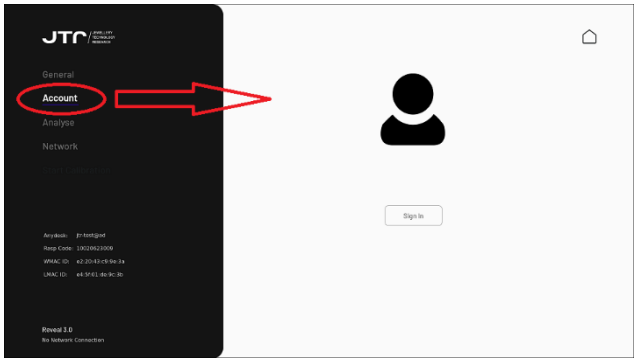
In **General** tab, you can adjust your language and screen settings.
Language setting: Select the preferred language by clicking on either of the options, Turkish or English.
Screen settings: Allows you to adjust the time after which the screen saver is shown. You can change the number of seconds by sliding the button and using the arrows to get to the number you wish.

You can also adjust the number of seconds after which the sleep mode is turned on. You can change the number of seconds by sliding the button and using the arrows to get to the number you wish.

You can choose your preferred background by simply clicking on the one you desire.

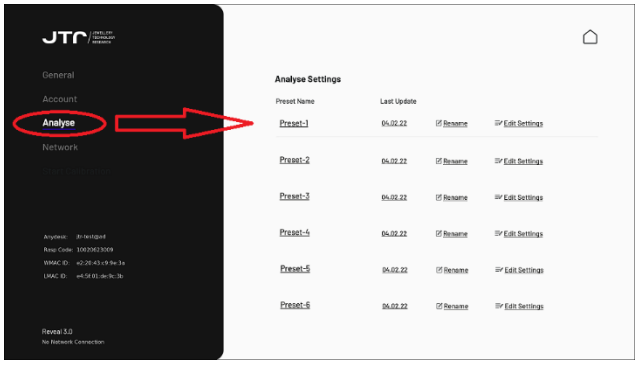
You can reset your detector to the factory adjustment by clicking on the factory reset button.

Note: If you reset your device to the factory settings your pre-saved settings will be lost.

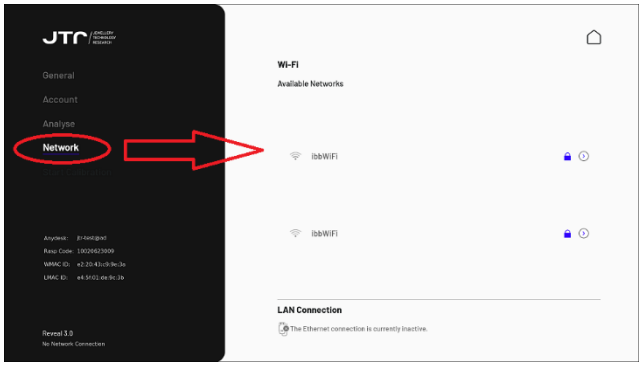


In **account** tab, you can sign into your user account. You can also see the information of the user logged in to the device, it contains their name, surname, and their email address.

You can sign out by simply clicking on the sign out in the account tab.

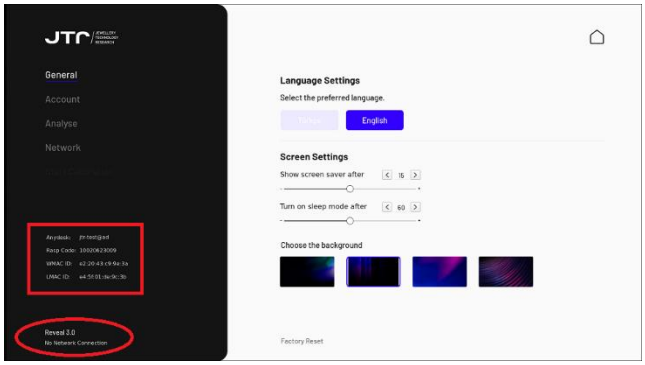


In **Analyse** tab you can see the list of Presets and their last update date. You can rename or edit each Preset by simply clicking on the desired action.



In **Network** tab, you can see the list of available Wi-Fi networks. Choose your favoured Wi-Fi source, click on it, type in the password and press connect.

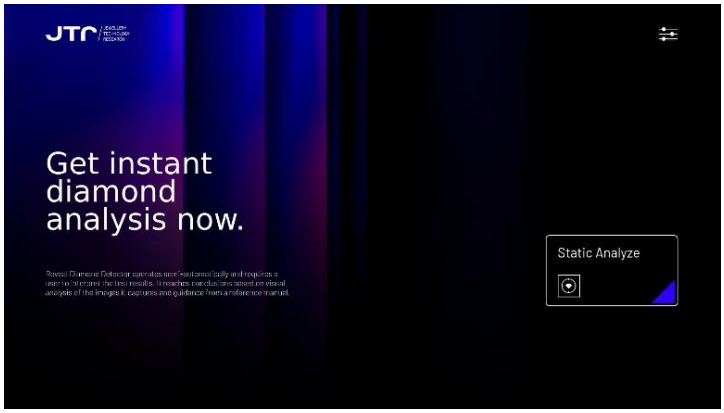
In case of using a LAN connection it is mentioned on the bottom of the network tab. In case of using a Wi-Fi connection the term “the ethernet connection is currently inactive.” Is written under the LAN connection setting.



On the bottom left corner of the screen, you can see your device particular information. Which contains your detectors Anydesk, Rasp code, WMAC ID and LMAC ID. (red square)

You can also see your device's software version (here 3.0) and check either your device is connected to any network. (red circle)

To return to homepage press the home button on the top right corner of the screen.



In the homepage you choose Static Analyse. The live camera view of the analysis area appears on the screen.

- *Static Analyse* mode is applied when loose stones or jewellery are placed in the analysis area. (Directly or using a sample tray)

VIII. TESTING, ANALYSIS, DETECTION

i. RUN A TEST

Open the detector door and place the sample in the analysis area. (Explained in detail in section VIII-II)

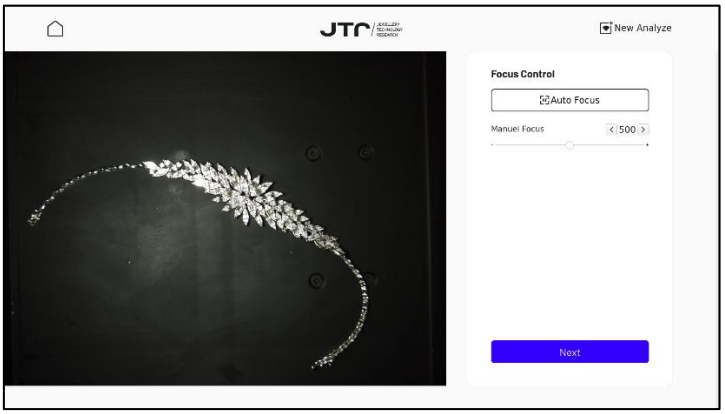
Close the door.

Note: The door must be closed during the analysis due to safety measures and the effect of light on the analysis results.

The live camera view of the analysis area under the daylight lamps appears on the left side of the screen.

Focus control settings is on the right side of the screen. A focused and clear image is obtained by clicking the auto focus button on the top right side of the screen. However, you can manually change the focus number by sliding the button and using the arrows to get to the number you wish. So, you are able to adjust automatically or manually to get the best quality image.

To return to homepage press the home button on the top left corner of the screen.



Press next. You are directed to the next page. A live camera view of the analysis area under the UV light is appeared on the left side of the screen.

Capture setting menu is on the right side of the screen. By default, automatic mode is selected for the capture setting, however, you can either choose different presets based on the characteristics of your sample.

Two analysis modes are designed and can be used for each sample:

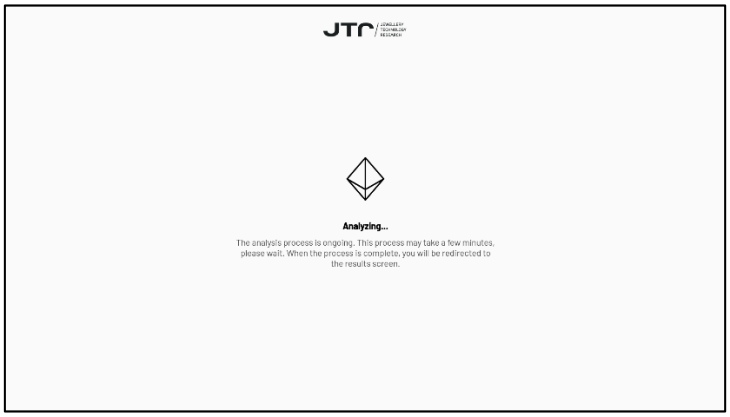
Quick Analysis: This mode takes only up to 15 seconds to offer you the result of your sample.

Detailed analysis: This mode takes can take up to 4 minutes to complete the analysis.

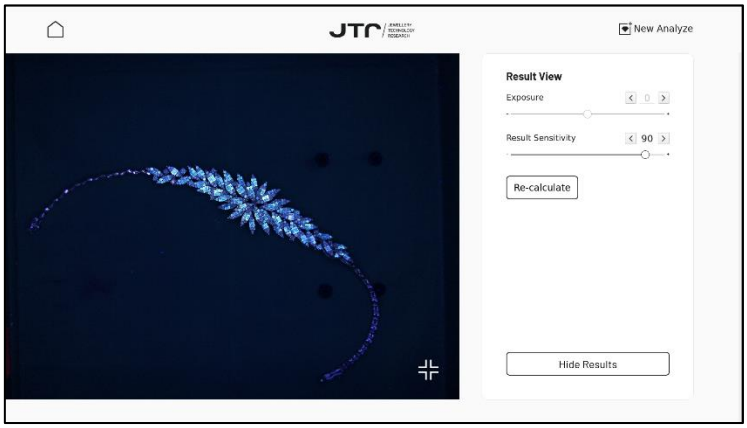
Remember that the results obtained by both modes are the same, the difference is that when using the detailed mode, you will be able to observe more details as you have a chance to change the amount of light exposure in the result and fluorescence images of the sample. (explained in details in section VIII-iii-3)

To return to homepage press the home button on the top left corner of the screen.
Click on new analysis to return to the live camera view of the analysis area under the daylight lamps.

To run the test, click on your selected mode of analysis. The fan is turned off while the test is running. If quick analysis mode is selected after 15 seconds the fan is turned on and the result image appears on the screen. If detailed analysis mode is selected a screen saver with a rotating diamond crystal appears on the screen and tends to continuo while the test is running. This takes up to 4 minutes. Then the fan is turned on again and the result image appears on the screen.



Congratulations! You have just completed your test!



To **save** your test results click on new analysis, your data will be automatically saved and sent to your cloud account, and you will return to the live camera view of the analysis area under the daylight lamps. Here you can run another test.

to return to homepage press the home button on the top left corner of the screen.

Note: If after running a test you press the home button instead of the new analysis your test results will **NOT** be saved, and you return to the homepage.

ii. SAMPLE PLACEMENT

- Jewelleries on Tray / Jewellery Holder

  Do not place jewellery over the detection area.

  Arrange the jewelleries on the same height as possible to get a better camera focus for the best detection process.

- Separated Stones

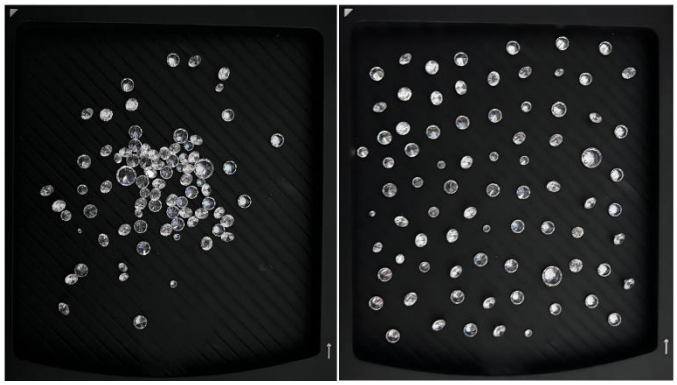
  Do not place stones over the detection area.

  For accurate testing, user should separate stones from the other (not overlapping) to reduce the flashlight effect which is described in section IX-V.

  Too bright fluoresce stones are recommended to test separately from other stones so there will be no unwanted light reflections.

  Use loose stone tray with sections in testing big stones.

  Note: To ensure a thorough testing of loose diamonds, it is advised to examine them on both the table and the pavilion sides. The testing process is incomplete unless the diamond is inspected on both sides.



If the result images are blur, kindly repeat the test. Make sure that you get a clear, focused image in the live view and then press next.

iii. DETECTION GUIDELINES AND ANALYSIS OF A TEST RESULT

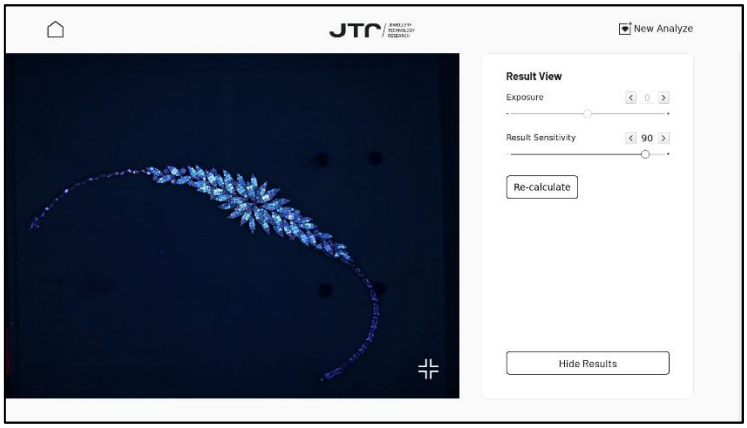
The Reveal detection process utilizes a specialized lighting system, software, and AI to determine the identity of diamonds under test. This process involves subjecting the diamonds to a proprietary light source, which causes them to emit light (fluoresce). Subsequently, the light source is turned off, and the diamonds are observed for phosphorescence, a phenomenon in which some diamonds continue to emit light even after the cessation of excitation. By analysing the fluorescence and phosphorescence characteristics of the diamonds, the Reveal system can accurately identify their unique properties.

1. Result Image

The image that appears automatically on the left side of the screen, after the analysis (either Quick Analysis or Detailed Analysis) is the default outcome.

- A diamond that reflects **only blue** light is a **Natural** diamond.
- A diamond that reflects **non-blue** light or is marked in **red** is a **Lab-grown** diamond.

For example, in this case all stones on this bracelet reflect only blue light which shows that all are **Natural** diamonds. Different stones are showing rather light or dark blue due to their different characteristics but all the same blue hue.



Result view menu is located on the right side of the result image.

- *Exposure (See section VIII-iii-3)*

You can increase or decrease the result image exposure to your desired amount by sliding the button and using the arrows. For some stones the amount of the fluorescence is so high that the stone seems rather white, or on the other hand for some stones the amount of the fluorescence is quite low which the stone seems rather dark. In cases as such, you can balance the amount of observed fluorescence by decreasing or increasing the exposure of the result image, respectively. ***Remember, this option is only available when running a detailed analysis.***

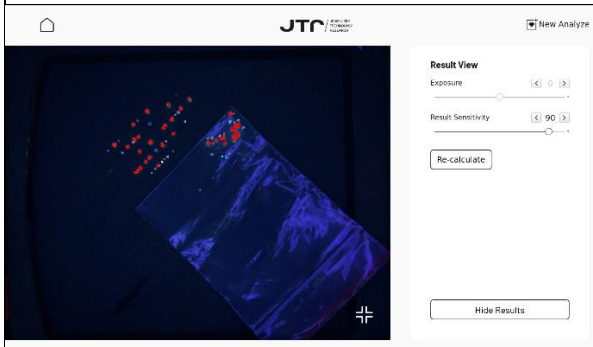
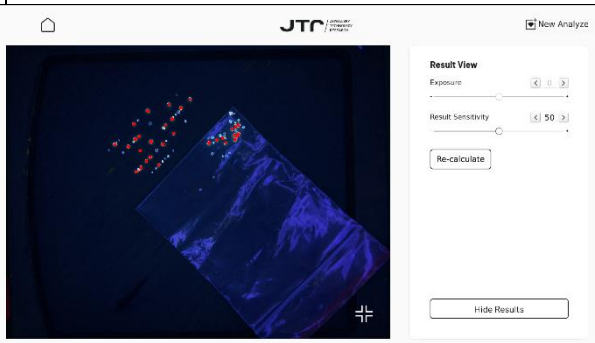
- *Result sensitivity (See section VIII-iii-4)*

This shows red filter sensitivity. Sometimes in the result image you can see that the diamonds are marked red to the extent that you cannot really see or distinguish them, this means the red filter is too sensitive. You can change the amount of red filter sensitivity by sliding the button and using the arrows. The higher the number of the red filter the more sensitive it is. If you cannot distinguish

between the diamonds, you can decrease the amount of red filter sensitivity and see that it improves and you start seeing the shape of the diamonds, maybe there is a natural stone among the others.

Your Reveal Diamond Detector comes with pre-set sensitivity levels however you can change the level anytime as needed. After changing the amount of red filter sensitivity click Recalculate.

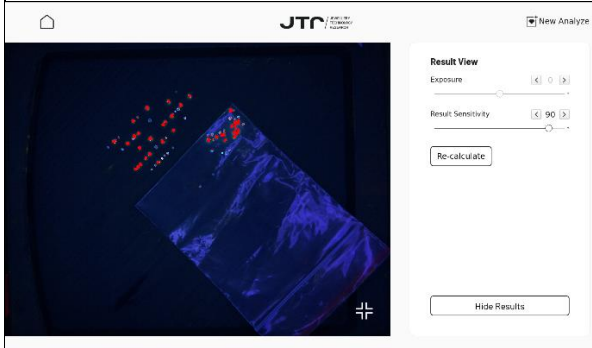
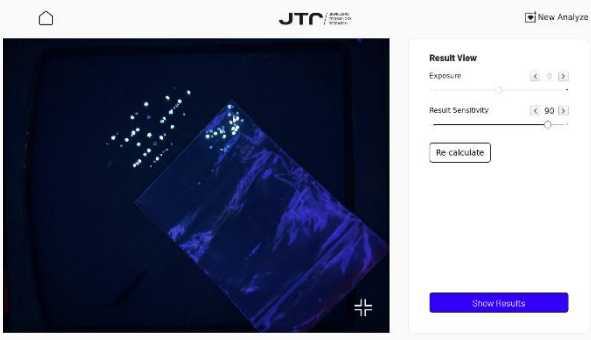
You can play with the red sensitivity and get your optimum testing results for different types of goods.

Default Result Sensitivity 90	Applied Result Sensitivity 50
	

- *show/hide result*

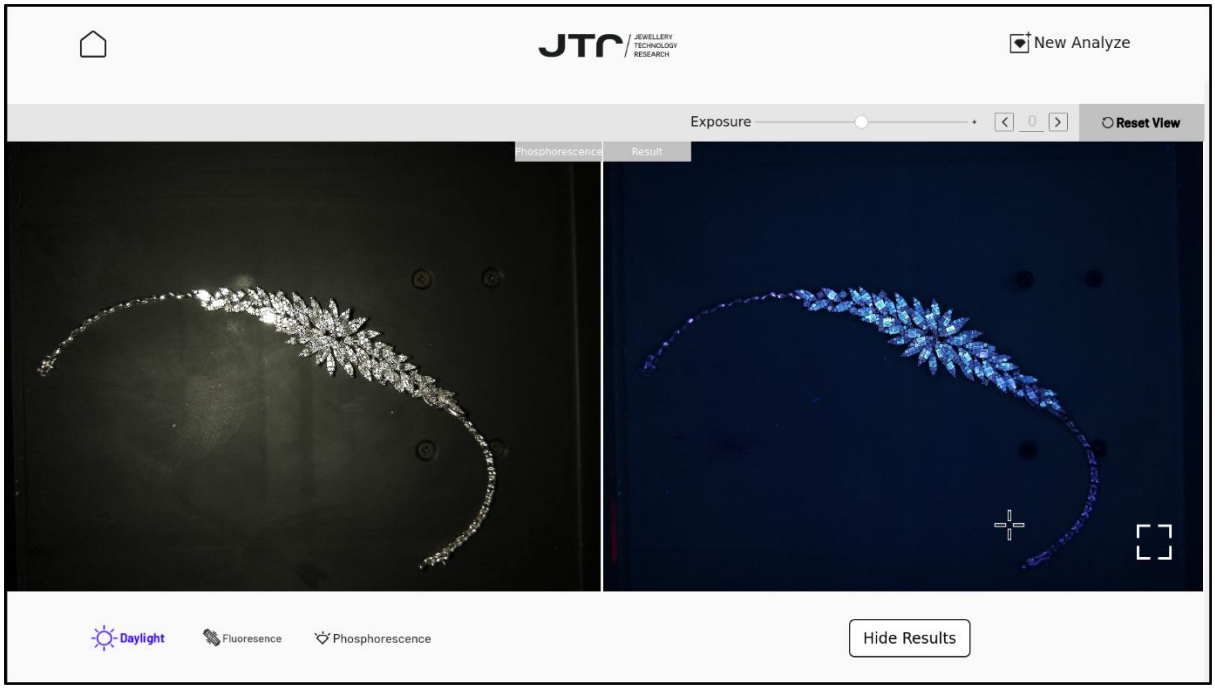
When your sample contains a **lab-grown** diamond which is marked red by the detector, you can hide the detector marking by clicking on the show/hide result button on the bottom right corner of the screen. This option can be used when you want to check the original fluorescence colour of the marked stone. Click again and you will be able to see the red marking again.

You can zoom in and out the result image by scrolling the mouse.

Shown Result	Hidden Result
	

2. Double Image Screen

By clicking the cross mark on the bottom right corner of the result image you are directed to a screen with double images right next to each other which can be used to investigate more details on the test results.



Herein, the image on the right is the result image and will not change. The result image combines both the fluorescence and phosphorescence images. However you are able to add or remove the detector red marking to the result image (in case of existence of a **lab-grown** or false positive diamond) by clicking on the show/hide result button on the bottom right corner of the screen.

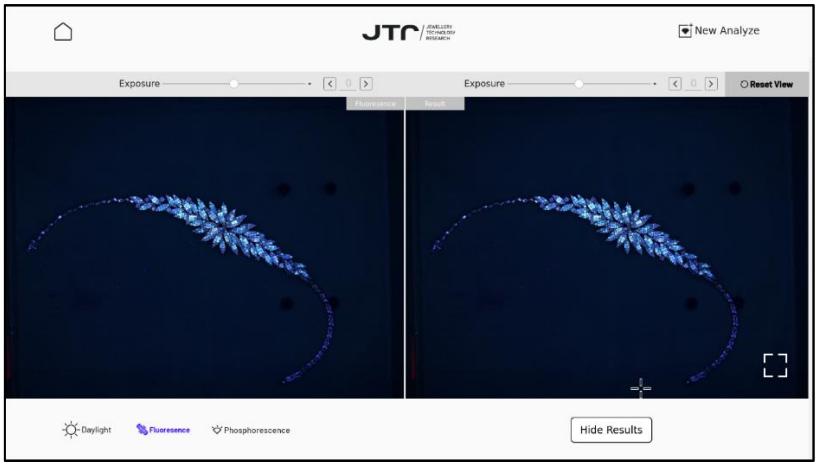
The image on the left side of the screen can show the sample image under daylight, sample fluorescence or its phosphorescence. You can choose either of these 3 options by clicking on the buttons under this image.

- *Daylight image*, is the untouched image of the diamonds and jewellery that you are testing.
- *Fluorescence image*, is taken when our proprietary lamp emits light on the diamonds, so they fluoresce in different colours.
- *Phosphorescence image,* is saved when a diamond exhibits phosphorescence, emitting a glowing light even after the light source is turned off, which can help distinguishing a lab-grown from a natural diamond.

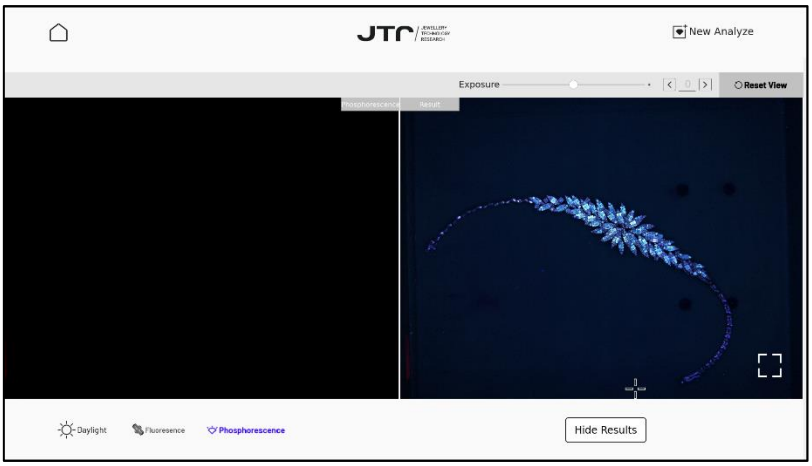
You can zoom in and out the images by scrolling the mouse.

Click reset view and the images will be resized and recentred.

You can increase or decrease the exposure of the result image and the fluorescence image to your desired amount by sliding the button or using the arrows. For some stones the amount of the fluorescence is so high that the stone seems rather white, or on the other hand for some stones the amount of the fluorescence is quite low which the stone seems rather dark. In cases as such, you can balance the amount of observed fluorescence by decreasing or increasing the exposure of the result image, respectively. ***Remember, this option is only available when running a detailed analysis.***



In the case of this sample bracelet since no lab-grown diamonds are present and the natural diamonds usually do not show phosphorescence no phosphorescence is shown in that image.



Click the square button on the bottom right corner of the result image and you will be directed to the previous screen, where you can change the amount of result sensitivity. Do not forget to click on recalculate after changing the amount of result sensitivity.

To **save** your test results click on new analysis, your data will be automatically saved and sent to your cloud account, and you will return to the live camera view of the analysis area under the daylight lamps. So, you can run another test.

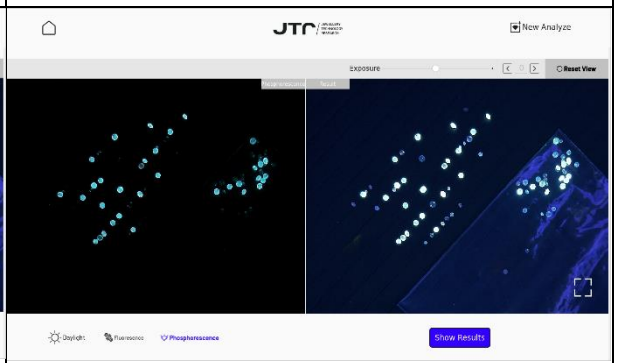
To return to homepage press the home button on the top left corner of the screen.

Note: If after running a test you press the home button instead of the new analysis your test results will **NOT** be saved, and you return to the homepage.

- If a diamond exhibits 100% blue fluorescence, it is always a **Natural** diamond."
- If a diamond fluoresces in any other colour besides blue or is marked red, it is a **Lab-grown** diamond.
- Even if a diamond fluoresces in blue, if it has a red marking, there is a chance of being a **lab-grown** diamond or treated. In such cases you are advised to have the stone controlled with other devices or by a gemmological laboratory, to make sure of the diamond origin.

To put it in simpler terms, our software can detect diamonds that exhibit phosphorescence or glow in the dark and highlights them with a bright red colour in the result image.

Although our software marks these diamonds with a red colour in the result image, the intensity of the marking may vary and based on the diamonds characteristics they could be either completely or slightly marked. We recommend referring to the phosphorescence image to accurately identify which diamonds exhibit phosphorescence or glow in the dark.

Shown Result	Hidden Result
	

3. Exposure

You have the flexibility to adjust the exposure of the resulting image to your preferred level by sliding the button or using the arrows. In some instances, certain stones may appear overly bright due to a high level of fluorescence, while others may seem relatively dark due to minimal fluorescence. In such cases, you can fine-tune the observed fluorescence by either reducing or increasing the exposure of the resulting image accordingly. **It's important to note that this option is exclusively accessible when conducting a detailed analysis.**

To take advantage of this option run a detailed analysis and wait for it to end. Usually, Detailed analysis takes about 4 minutes to complete. When the test is completed on the Result Image the first item in the Result View menu is the Exposure. Simply by sliding the button or using the arrows change the Exposure to your desired level.

In the case of diamonds with a very strong fluorescence which show a very bright white colour decrease the amount of exposure so that the fluorescence colour underneath is shown. If after decreasing the Exposure level the diamond still shines in blue colour it is a natural diamond. If any colour except for blue is observed the stone is most probably a la-grown diamond and it is advised to control its origin with other techniques or consult a gemmology laboratory.

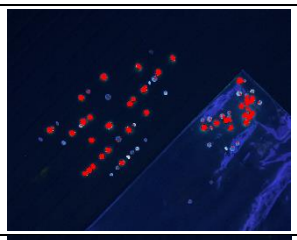
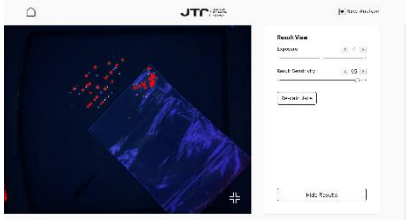
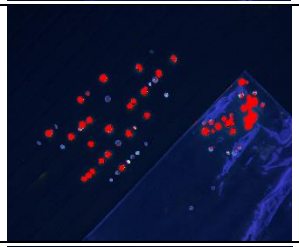
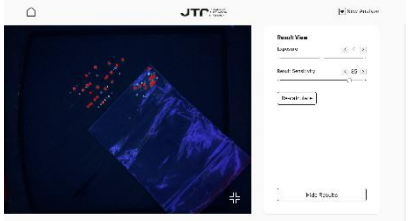
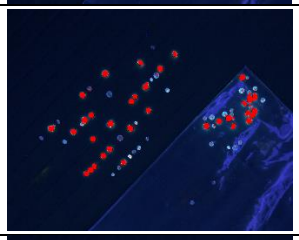
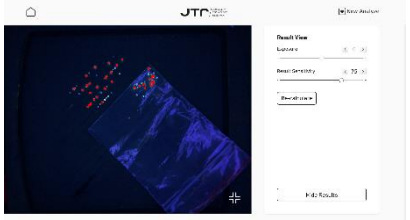
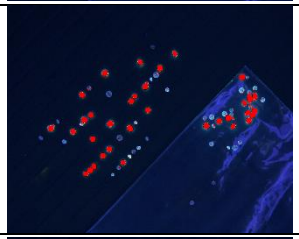
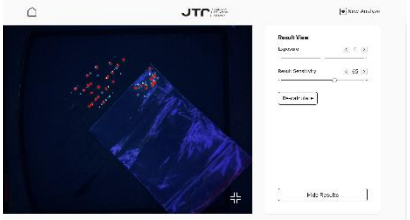
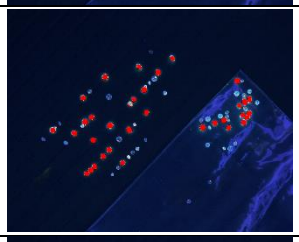
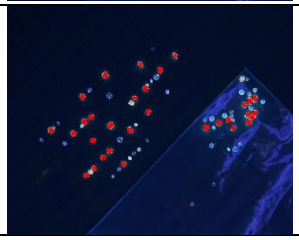
If diamonds have a low amount of fluorescence and seem rather dark increase the amount of Exposure to see the colour more intense. If after increasing the Exposure level the diamond shows blue it means it is a natural diamond. If any colour except for blue is observed or you can only see the reflection of the UV source, it is advised to control its origin with other techniques or consult a gemmology laboratory.

Images

4. Result Sensitivity

To make things easier for you, we have included result sensitivity button at the result view menu, which allow you to adjust the amount of red filter sensitivity. Click the square button on the bottom

right corner of the result image and you will be directed to the previous screen, where you can change the amount of result sensitivity. As mentioned before, you can manually change the result sensitivity number by sliding the button and using the arrows to get to the number you wish. **Remember to click on recalculate after changing the amount of result sensitivity**. The higher the number of result sensitivity, the higher the intensity of the red filter and marking.

Default Result Sensitivity 90		
Applied Result Sensitivity 95		
Applied Result Sensitivity 85		
Applied Result Sensitivity 75		
Applied Result Sensitivity 65		
Applied Result Sensitivity 55		

X. CVD AND HPHT METHODS

HPHT (High Pressure High Temperature) and CVD (Chemical Vapor Deposition) are two methods of creating lab-grown diamonds. HPHT diamonds are created by subjecting a small diamond seed to high pressure and high temperature conditions, which mimic the natural conditions in which diamonds form in the earth's mantle. In contrast, CVD diamonds are grown from a gas mixture in a vacuum chamber, with the diamond seed acting as a substrate for carbon to deposit onto and form a diamond. Both methods can produce high-quality diamonds with similar physical and chemical properties to natural diamonds, but they differ in their manufacturing processes and cost.

In Reveal Diamond Detector, HPHT laboratory-grown diamonds often display a very strong turquoise colour fluorescence and a highly visible phosphorescence. In the result image, such diamonds typically appear entirely painted in bright red, making it difficult to distinguish their actual colour.

However, the diamond's true fluorescence colour can be seen in the result image by clicking on the show/hide result button on the bottom right corner of the screen. In the phosphorescence image, identifying HPHT lab-grown diamonds is simple as they emit a strong glow. If the amount of the fluorescence is so high that the stone seems rather white (or on the other hand quite low which the stone seems rather dark-NOT in the case of HPHT diamonds) you can balance the amount of observed fluorescence by decreasing (or increasing) the exposure of the result image or the fluorescence image, respectively. In this case by reducing (or increasing) the amount of image exposure the true colour can be seem. ***Remember, this option is only available when running a detailed analysis.***

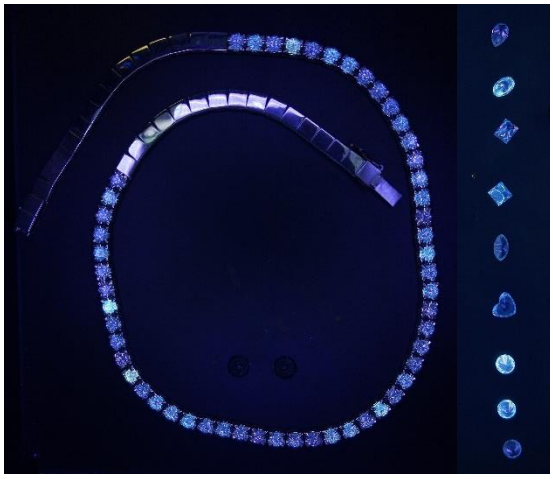
Lab-grown diamonds produced through CVD process often display fluorescence in colours other than blue, and they may exhibit faint phosphorescence, which can be seen in the resulting image as a non-blue and/or slightly marked red. Although CVD lab-grown diamonds may glow in the phosphorescence image, the intensity of the glow is much weaker than that of HPHT lab-grown diamonds.

Diamonds do not talk but their images let go of their secrets.

So please look at them carefully.

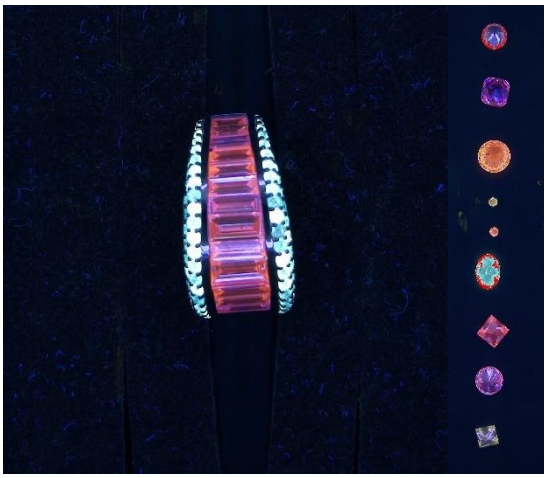
i. NATURAL DIAMONDS

Natural diamonds show only blue fluorescence with no red marking. **Natural diamonds will shine only in blue colour**. Any kind of blue. As shown in the following images different natural diamonds may show different blue colours (from dark to light blue) depending on their characteristic and the amount of their fluorescence. Although the amount of exposure is different in these stones, they all have the same hue. Natural diamonds mainly do not show phosphorescence.



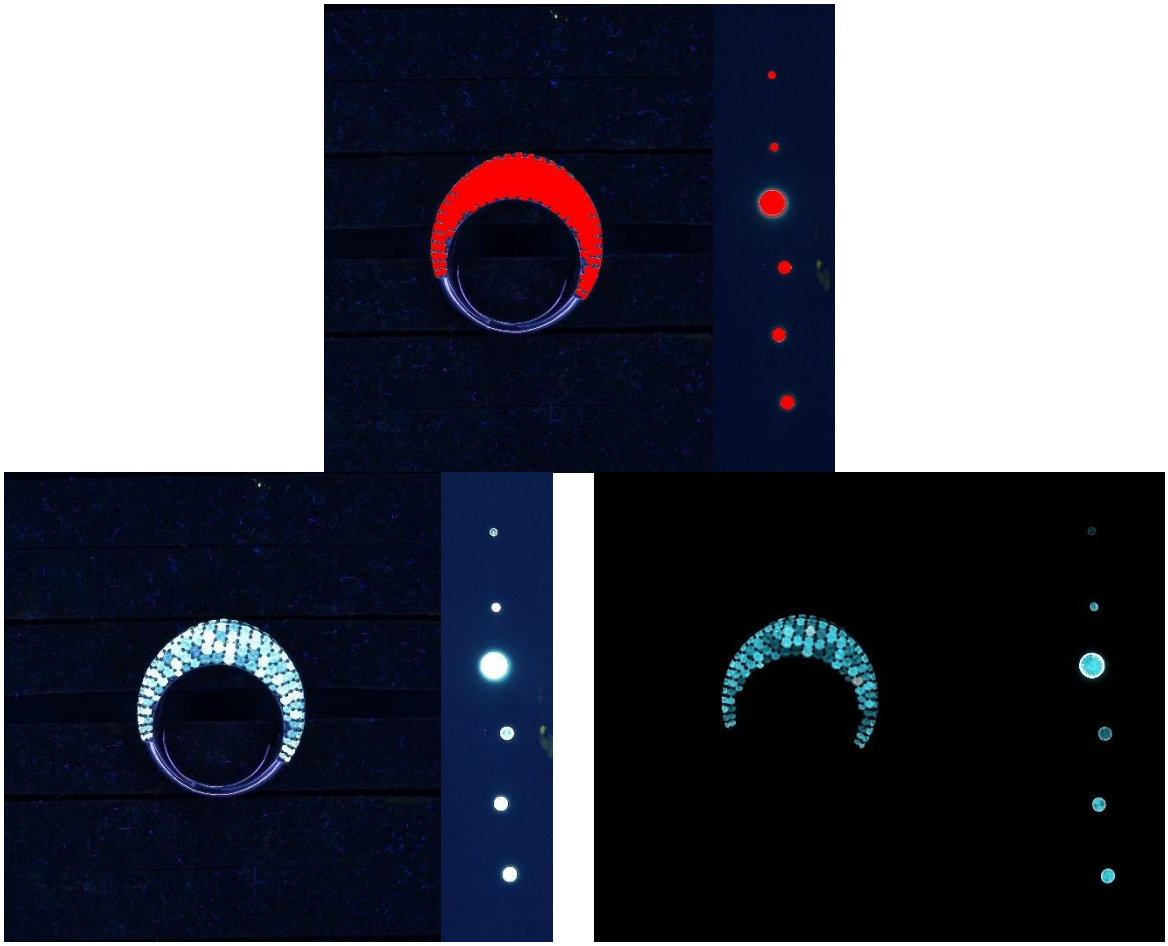
ii. CVD LAB-GROWN DIAMONDS

CVD lab-grown diamonds show a **different non-blue colour** and/or are fully or partially marked red depending on the amount of their phosphorescence. A CVD lab-grown diamond may or may not have phosphorescence. If it has phosphorescence, it will be marked in red in the result image. If the CVD lab-grown diamond do not show phosphorescence it will not be marked red, however the difference in the fluorescence colour expresses its laboratory origin. In the case of this ring all the baguette diamonds are CVD diamonds.



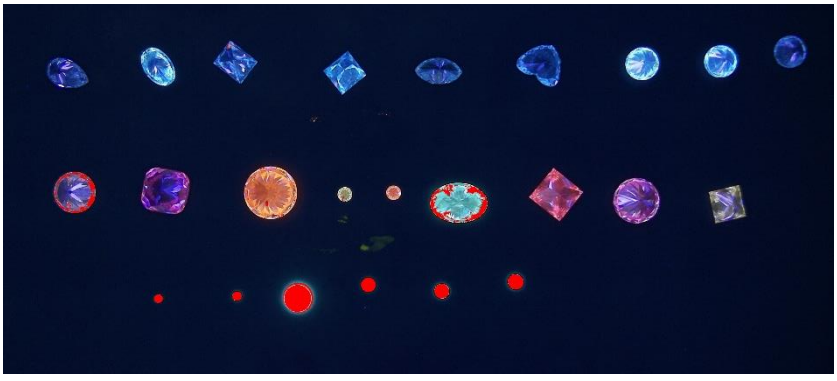
iii. HPHT LAB-GROWN DIAMOND

The HPHT lab-grown diamonds in the image below are fully marked red in the result image. Their fluorescence and phosphorescence images are also shown. HPHT lab-grown diamonds show high turquoise fluorescence and also strong phosphorescence, which helps finding them more easily. Actually, the phosphorescence of these diamonds is the reason that the software marks them red in the result image.

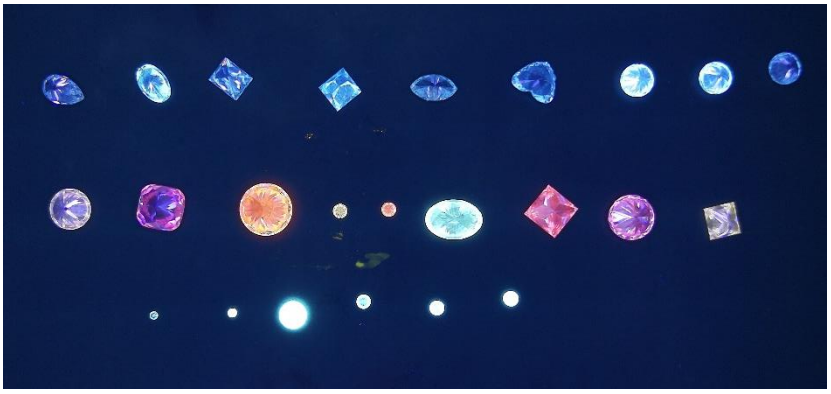


iv. NATURAL, HPHT & CVD LAB-GROWN DIAMONDS TOGETHER

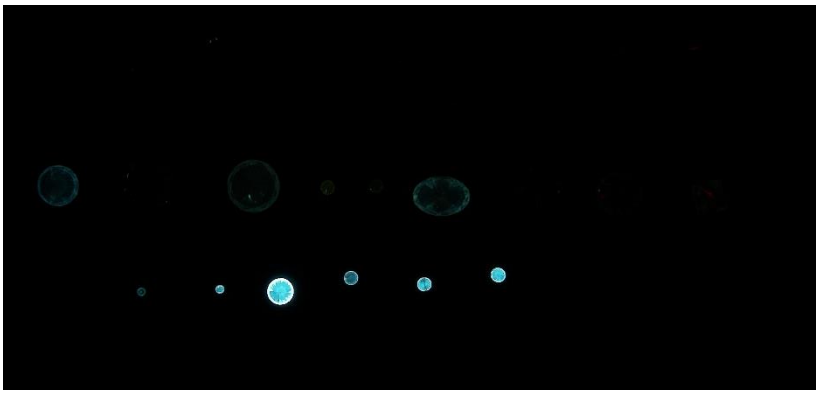
Natural diamonds show blue colour and are not marked red in the **result image**. HPHT lab-grown diamonds are fully marked in red. The CVD lab-grown diamonds show a non-blue colour and some are partially marked red.



Natural diamonds show blue **fluorescence** of different shades. HPHT lab-grown diamonds show high fluorescence, which is mainly a turquoise (blue-green) colour. CVD lab-grown diamonds fluoresce in non-blue colours.

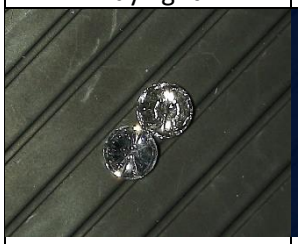
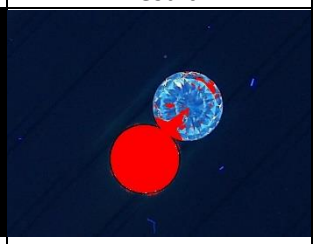


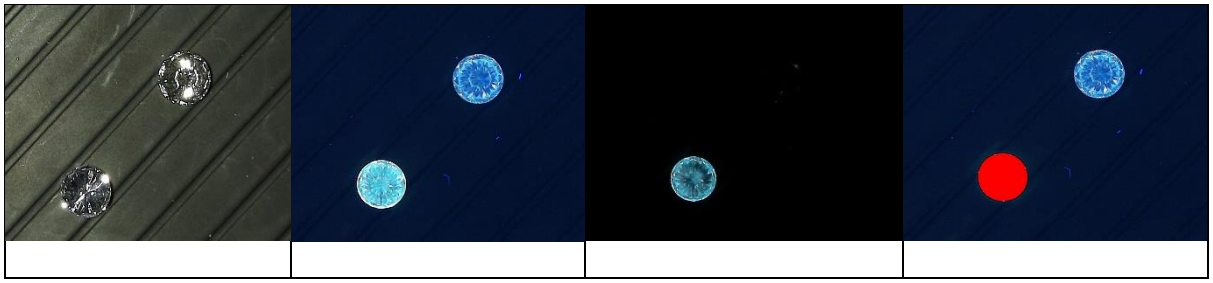
Natural diamonds usually do no show **phosphorescence**, in rare cases they might show some phosphorescence (False Positive – section IX-vii). HPHT lab-grown diamonds show very strong phosphorescence in a blue colour. CVD lab-grown diamonds show a very weak phosphorescence or none at all.



v. FLASHLIGHT EFFECT

As mentioned before, natural diamonds typically do not exhibit phosphorescence and will not emit light after being exposed to the light source, except in rare cases (False Positives). Occasionally, we may come across a diamond or diamonds that appear blue with some red markings. In such cases, it is important to ensure that there are no nearby stones that exhibit strong phosphorescence. These glowing stones may act as a source of light and make the natural diamond appear as though it is glowing on its own. If such a situation arises, we should remove the diamonds that are completely painted in red and retake the test. An illustration of this can be found in the images below.

Day light	Fluorescence	Phosphorescence	Result
			



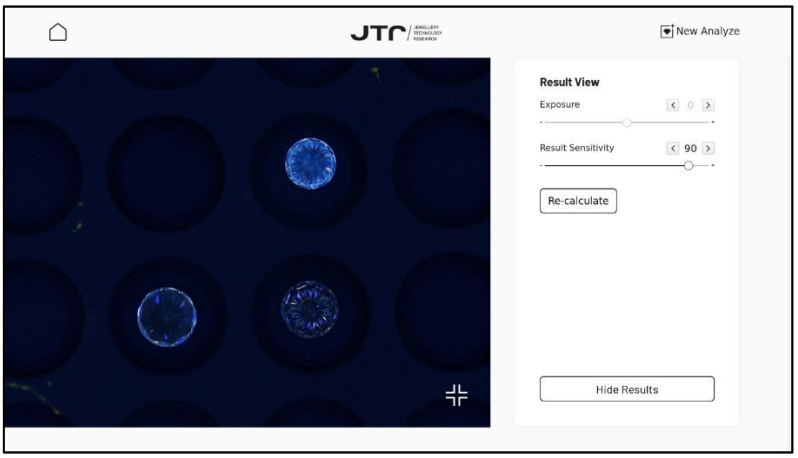
Here you can see a natural and a lab-grown diamond in the pictures. The HPHT lab-grown diamonds and natural diamonds both show fluoresce. However, the hue and the intensity of their fluorescence is different because of their nature. Due to the fact that HPHT lab-grown diamonds show phosphorescence, they will be marked in red in the result image where natural diamonds are not marked at all. The HPHT lab-grown diamond above is showing very strong phosphorescence and acts like a flashlight illuminating the natural diamonds near it. Thus, some red marking will be applied on natural diamond at the result image. As seen above, after taking away the stone that acts like a flashlight, natural diamonds do not show phosphorescence and as a result is not marked red in the result image.

vi. SIMULANT

Non-diamonds do not exhibit any fluorescence or phosphorescence, which implies that they do not produce light when exposed to our exclusive light or prolonged UV illumination. Objects that seem black and do not emit any colour under our unique lighting system are classified as simulants. These might be any other natural or synthetic minerals except for diamonds, minerals such as moissanite or cubic zirconia.

In the event that they exhibit any hue, it is essential to note that it is only a reflection. You can readily distinguish whether the stone is shining or simply reflecting some light. In the case of these sample stones, the blue, fluorescent stone on the top row is a natural diamond. The stones on the lower row are Simulant (left Cubic Zircon, right Moissanite). As shown in this figure the simulant stones do not fluorescent in blue and just reflect some UV light coming from the lamps, however they might be mistaken with low fluorescent, inert natural diamonds.

In order to prevent any confusion as such it is advised **NOT to use** Reveal Diamond Detector to separate diamonds and simulants. **Remember Reveal Diamond Detector is a screening device to separate natural and lab-grown diamonds.**



vii. FALSE POSITIVE

False positive means that a natural diamond gets a result of a lab-grown diamond. It happens in about 2.5% of natural diamond.

- Reveal Diamond Detector detects 100% of all lab-grown diamonds.
- It also has a false positive rate of 2.5%.

If the result is that a diamond glows a blue colour - it is 100% a natural diamond.

You can always be 100% certain that the diamond is natural if this occurs.

If the result is a lab-grown diamond, there is small (2.5%) chance that it is a natural diamond. In other words, only 2.5 diamonds out of every 100 natural diamonds will give a result of a lab-grown diamond. This is called **false positive**.

What this means from a practical perspective:

If the result is that a diamond glows in a non-blue colour or is painted in red, it is most likely a lab-grown diamond, since only 2.5% of all natural diamonds will give a false positive result showing a lab-grown diamond.

The bottom line is:

- **When you get a natural result - it is 100% natural.**
- **When you get a lab-grown result - there is a very small chance that it is a natural diamond**.

XI. DETECTOR VERIFICATION

In order to verify that your Reveal Diamond Detector operates properly a verification stone has been offered to you in the Detector package. To test the machine, follow the instructions.

- ✓ Turn on your Detector.
- ✓ Sign on to your Account.
- ✓ On the homepage click Static Analysis.
- ✓ Open the detector door, put the stone in the analysis area. Remember to remove the glass cover of the stone packaging. You can put the stone in the detector using its black holder or the sample trays.
- ✓ Click the auto focus button on the top right side of the screen to get a clear Image of the stone.
- ✓ Click next.
- ✓ By default, automatic mode is selected for the capture setting, click either Quick or Detailed Analysis.
- ✓ When the test is done the stone must be marked red. If it is marked red your Reveal Diamond Detector is working properly.

The verification stone is an HPHT lab-grown diamond with strong phosphorescence and Reveal Diamond Detector marks it red. If the stone is not marked or is partially marked, make sure the show result button is on and the Result Sensitivity is at least set to be 90. If the verification stone in not marked yet contact JTR support and service centre.

XII. SAFE HANDLING / MAINTENANCE

- To maintain the peak performance of your diamond detector, it's crucial to shield it from dusty or damp environments. Additionally, refrain from attempting to open any sealed components of the device, as it houses delicate electrical circuits.
- If you anticipate not using your diamond detector for an extended period, ensure it is stored correctly.
- The diamond detector operates most effectively within a specific temperature range. It should be used in temperatures ranging from 32° to 95° F (0° to 35° C) and stored within the range of -4° to 113° F (-20° to 45° C). Exposing the detector to extreme temperature or humidity fluctuations can cause damage and reduce its lifespan.
- To guarantee optimal functionality of your diamond detector's software, it is advisable to keep it up to date by regularly checking for updates.

XIII. TROUBLE SHOOTING

For assistance with any issues, kindly visit our website at www.JTR.org and view the video that corresponds to your specific concern. We've curated a range of concise instructional videos, and we are confident that you'll discover one that effectively addresses the problem you're currently facing.

Customer Support: If you prefer direct customer support, you can submit your inquiry through our website. Navigate to the 'Contact Us' section, describe the issue, and send it to us. We will promptly respond via email with a solution or reach out to you by phone as soon as possible.

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