



## The Lumicyano technology and its advantages

### How does Lumicyano work?

Lumicyano provides a « fluorescent cyanoacrylate fume » allowing highly detailed fingerprint development under Forensic lightning. It can replace classical cyanoacrylate in fuming chamber. The Lumicyano fuming process can be repeated on the same evidence without losing the quality of the ridge details. After the fuming cycle, fluorescent fingerprints are instantly visible and ready for examination. For a video of demonstration, visit our website.

### How to use the Lumicyano technology?

Lumicyano is a bi-component technology: the Lumicyano Solution and the Lumicyano Powder, which the operator has to mix before starting the fuming process. After the fuming cycle, the latent marks are directly fluorescent under forensic lightning. Lumicyano is compatible on non-porous or semi-porous surfaces in a 30 minutes period of time. In accordance with the volume of your fuming chamber, you have to dissolve the proper amount of Lumicyano Powder with Lumicyano Solution to reach a 5 % concentration (upto 8% for stronger fluorescence) and start a classical fuming cycle. You will find the adequate proportions of Lumicyano Solution and Lumicyano Powder in the user guide provided with your sample or by consulting the table thereafter. In the case of more important volumes, please contact us.

Volume of the fuming chamber		Lumicyano Powder		Lumicyano Solution	
Volume in liters (L)	Volume in cubic feet (ft <sup>3</sup> )	Mass (mg)	Number of scoops	Mass (g)	Number of drops
170	6	5 % : 40	1	0.8	26
		8 % : 64	1.5		
300	10.6	5 % : 80	2	1.6	53
		8 % : 130	2.5		
500	17.6	5 % : 120	3	2.3	75
		8 % : 180	4.5		
650	23	5 % : 135	3.5	2.7	90
		8 % : 216	5.5		
1000	35.3	5 % : 160	4	3.2	105
		8 % : 256	6.5		
1500	53	5 % : 180	4.5	3.7	123
		8 % : 300	7		
2000	70.6	5 % : 200	5	4.1	135
		8 % : 328	8		

Adjust concentration of the Powder according to your cabinet and light source. 5% concentration is standard. You can go up to 8% concentration. The fluorescence will be even stronger.

### On which surfaces does the Lumicyano work?

Lumicyano allows the development of latent fingerprints on semi-porous and non-porous surfaces. Revelations on all types of plastics (plastic bags, food packaging, credit cards), on glass, on smooth metallic surfaces, on both sides of adhesives and on semi-porous papers (glossy papers ...) are therefore possible.



## Frequently Asked Questions

### Is it still possible to perform DNA analysis on Lumicyano-developed fingerprints?

The Lumicyano technology is fully compatible with DNA analysis. Since genetic material is not altered over a fuming cycle with Lumicyano, it is possible to sample all the information needed for DNA identification. It is therefore possible to perform a double identification (papillary then DNA identifications) on a single print. Such additional analysis is not possible with dactyloscopic powder or Basic Yellow 40 post-treatment.

### Should I modify my fuming chamber to use Lumicyano?

No modification of your fuming chamber is required to use Lumicyano. A classical fuming chamber (with a hot plate reaching 120°C / 250°F and a hygrometry ratio of 80 %) is sufficient. You just need to replace the classical cyanoacrylate previously used in your fuming process by the mixture Lumicyano Solution + Lumicyano Powder and start the cycle.

### What are the optimal storage conditions? What is the shelf life of Lumicyano?

Lumicyano should be stored in a cold, dark and dry environment to obtain an optimal shelf life. Under these conditions, Lumicyano Solution and Lumicyano Powder have a shelf life of 18 months.

## Fingerprint development with Lumicyano

### Can I use a classical cyanoacrylate, instead of the Lumicyano Solution, together with the Lumicyano Powder?

Lumicyano Solution is a specifically designed cyanoacrylate, calibrated to be used with Lumicyano Powder. Mixing with inappropriate components, Lumicyano Powder may lead to uncontrolled side reactions (exothermic reactions or polymerization) and unguaranteed fingerprint development. For safety reasons, it is therefore highly recommended to use exclusively the Lumicyano Solution with Lumicyano Powder.

### After the fuming cycle, the fingerprints are not visible. What can I do?

It is necessary to check the heating temperature of the fuming chamber. In the case of a lower temperature –  $T < 110^{\circ}\text{C}$  (230°F) – the vaporization temperature of Lumicyano Solution/Powder is not reached. Therefore, no revelation would be obtained. At such temperature, you may obtain pink solid pieces of polymerized cyanoacrylate. In this case, the development should be repeated with new mixture of Solution + Powder and the appropriate temperature settings as mentioned in the Lumicyano user guide. In the case of a higher temperature –  $T > 130^{\circ}\text{C}$  (266°F) – the vaporization temperature of Lumicyano Solution/Powder is overstepped. In this case, the risk is to “cook” the dye, thus leading to non-fluorescent fingerprints. One solution could be to increase the amount of Lumicyano Powder in the initial preparation. However, optimal results are not guaranteed.

In any case, we strongly advise to use the appropriate settings for the fuming with a gradual increase of temperature to reach 120 °C (250 °F) in approximately 10 minutes and 80 % of humidity. If you encounter any technical problem, feel free to contact us.

### Why is there still some fluorescent material in the aluminum foil dish, after a complete fuming cycle?

Having few fluorescent residue leftovers in the aluminum foil dish after a fuming cycle is completely normal. Given that, such residue should be in a negligible amount as compared to the initial load. If it is not the case, you may have to check that the aluminum foil dish is properly fixed onto the hot plate. It is necessary to maximize the contact surface between the foil dish and the hot plate. If this is not the case, try to ballast the foil dish. Indeed, it is possible to get an uncompleted vaporization by the end of the fuming cycle. This means the temperature settings are not optimal: there is always a difference between the temperature setting and the effective temperature of the hot plate. If the fingerprint development is acceptable, you can just keep going with the same settings. In the other case, a 5 °C increase of the

temperature setting may be necessary. If you cannot change the temperature settings, you may try to increase the proportions of Lumicyano Powder in the initial mixture, from 5 % to 8 % for example. Another attempt would be to slightly decrease the amount of Lumicyano Solution to increase the heating efficiency with a smaller total volume. Finally, using a larger aluminum foil dish might help to heat properly the thinner volume. Thereafter are pictures showing the aluminum foil dish with Lumicyano before (a) and after (b) a fuming cycle in optimal conditions as well as an example of direct polymerization of Lumicyano in the aluminum foil dish (c) leading to poor fingerprint development.



**There are big chunks of Lumicyano Powder in the vial. How can I properly collect the amount needed?**

It is possible to get chunks of Lumicyano Powder in the vial. This arises from traces of moisture entering the vial while using it or even during the bottling. You may just break these chunks with a metallic spatula by scratching the powder. This phenomenon does not affect the efficiency of the product but it is recommended to tightly close the vial after use.

**Does the heating step to 120°C (250°F) alter the DNA material?**

The heating setting adjusts the actual temperature of the fuming chamber hot plate. It allows the vaporization of the Lumicyano mixture at 120 °C (250 °F) to reveal fluorescent prints. Even if the Lumicyano mixture is heated up, the prints stay at room temperature.

## Visualization of Lumicyano-developed fingerprints

**How can I visualize the developed traces using Lumicyano?**

Several Forensic lightning sources are compatible with Lumicyano technology. They are gathered in the table thereafter:

Optimal viewing sequence	Lighting source	Wavelength (color)	Brand	Remarks
1	UVa	325 nm	LabinoSuperXenonLumi (50 W) Lumatec SuperLight 400 Rofin Polilight PL400 / PL500	Avoid fluorescent background noise
2	Visible Light	480/495 nm (blue-green)	SPEX Crimescope F&Freeman 82/DCS4 Lumatec SuperLight 400 Rofin Polilight PL400 / PL 500 Rofin Polilight Flare+2 Blue Projectina Pagelab / SL450	Recommended for white/multicolor and/or highly reflective surfaces
3	Visible Light	515 nm (green)	SPEX Crimescope	
4	Visible Light	532 nm (green)	Coherent TracER Laser	

It is strongly recommended to wear proper safety glasses. For an optimal detection, orange (550 nm) or yellow (520 nm) glasses are recommended, especially for white or colored surfaces. Red/orange glasses (590 nm) are not suitable here since they cut off the majority of the fluorescence signal.



## Frequently Asked Questions

### How can I photography the prints developed with Lumicyano?

It is mandatory to equip your camera with a proper optical filter. The following filters are recommended for an optimal shoot :

- Orange filter (recommended for intense lighting and/or for reflective surfaces):
  - 1) TIFFEN 21 (especially for 515nm irradiation)
  - 2) PRO MASTER YA 2 (especially for à 515nm irradiation)
  - 3) B+W SCHOTT 040
  - 3) TIFFEN 16 (especially for UVa 300-400nm irradiation)
  - 4) HOYA G Orange (especially for UVa 300-400nm irradiation)
- Yellow filters (recommended for low lighting and/or for low reflective surfaces):
  - 1) TIFFEN 15 (especially for UVa 300-400nm irradiation)
  - 2) B+W SCHOTT 099
  - 3) HOYA K2 Yellow

### What are the optimal conditions to preserve the fingerprint development quality?

After the fuming cycle, it is recommended to store the revealed marks in a dry, dark and fresh cabinet. However, an opaque plastic bag or kraft envelope would work just fine.

### How long does a Lumicyano-developed print stay luminescent?

Even with the optimal storage conditions, the fluorescence intensity may fade over time. It is recommended to photograph the developed fingerprints right after the fuming cycle ending. In general, the fluorescence persists during several days. However, it is still possible to perform an additional fuming cycle using Lumicyano to recover the fluorescence without damaging the ridges details.

## Complementary information

### Is it possible to use Lumicyano directly on a crime scene?

It is possible to used directly Lumicyano at the crime scene with portable devices allowing to fume an entire vehicle or rooms. Many Forensic forces are currently using this kind of devices on the ground in France, UK or Germany.

### Did any Forensic forces perform technical validations of Lumicyano?

The Lumicyano technology is currently used by 100 % of the French Forensic Forces (police and gendarmerie). Technical validations were performed and approved by the French Accreditation Committee (COFRAC / ISO 17025), the classical cyanoacrylate being replaced by Lumicyano. In addition, the Institute of Genetics from Nantes Atlantique, the institute of reference for fingerprint and genetic identification in France, has validated Lumicyano for double identification using both fingerprinting and DNA analysis.

### How can I clean my fuming chamber?

Just like with classical cyanoacrylate, over several fuming cycles, some white or pinkish residues may cover the walls and windows of the fuming chamber. These residues arise from polymerized cyanoacrylate covering the inside of the chamber. To properly clean the inside of the cabinet we recommend to use, in order of preference :

- 1- acetone on paper towel followed by water (preferably warm)



## Frequently Asked Questions

2- ethanol (or any other non irritant dissolvent) on paper towel followed by water (preferably warm)

3- window cleaning soap or white vinegar

It is better to clean the cabinet regularly.

### Is it possible to use Lumicyano in vacuum fuming chamber?

All fuming protocols suitable for classical cyanoacrylate may be used with Lumicyano. Vacuum fuming chambers do not move away from the general rule. This method was well described in a scientific study, showing the compatibility of Lumicyano with vacuum fuming process.

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For further information or personalized support, contact us:

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