



### **B166 A Cyanoacrylate Chamber for Vehicles: Innovation and Astonishing Results in Brazilian Casuistry**

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**Learning Overview:** The goal of this presentation is to show the possibility of increasing the number and quality of developed latent fingerprints in vehicles with the use of a cyanoacrylate chamber for vehicles, especially when the powder method would exhibit limitations.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by explaining an exclusive project developed by fingerprint experts from Brazil, the cyanoacrylate fuming chamber for vehicles, that is fully automated, which guarantees scalability in the amount of material to be processed and safety for the experts and to the environment. This processing allows revealing latent fingerprints in a high-quality standard and on uncommon surfaces when compared to other conventional methods.

The analysis of latent fingerprints stands at the forefront of criminal investigations, especially in crime scene casework. Their detection on smooth surfaces, like metals, plastics, or glass by Cyanoacrylate Ester (CA) fuming is a commonly used technique worldwide.<sup>1</sup> In fuming chambers, the CA is vaporized and polymerizes as a white solid residue on the surfaces of the potentially manipulated objects. In Brasília, Brazil, vehicles commonly used to be analyzed by visual inspection and treated with the black fingerprint powder/lift technique. Considering that the CA method is capable of enhancing the quantity of ridge detail as well as better quality fingerprints being developed when compared to the powder methods, fingerprint experts from Brasília projected, installed, and validated a CA Chamber for Vehicles (CCV), which is considered the largest in the world (6.2×4.0×3.1m). This was the result of an exclusive project developed by fingerprint experts that work in the Laboratory of Fingerprint Enhancement Methods of the Civil Police of the Federal District. Usually, the CVV is used to process vehicles related to homicides, large thefts, and robberies and allows processing a vehicle as large as a pickup truck. There is an internal division isolating one-third of its volume for daily use to process small- and medium-sized objects recovered from crime scenes and two-thirds of its volume is designated to the vehicle. The operating cycle was tested and automated in three steps: (1) pre-humidification to about 80% by water evaporation using a boiler; (2) CA fuming using 16 electric heaters (180–200°C) distributed inside and outside the vehicle for 40min; and (3) CA fume exhaustion for 40min. The equipment also includes an air circulation device to homogenize humidity and a CA fume inside the chamber.

Vehicle processing in CCV enables visualization of fingerprints on surfaces that would rarely be appropriate for the application of other techniques. Positive results were obtained on the turn signal, windshield wiper handle, central panel, glove compartment, driver's seat regulation handle, emergency brake button, ignition, steering wheel, motor compartment, gear shift, headrest stand, inside door handle, and seatbelt buckle. Since the inauguration of CVV (approximately ten months), 26 vehicles have been processed and 17 suspects were identified based on the fingerprints developed on vehicle structures. Six of these suspects have previously been criminally identified and one of them was identified in two different vehicles. For vehicles treated by the black powder method and subsequently processed in the CVV, an increase in the number of developed fingerprints was observed. In addition to an increase in the number, the new equipment allowed an increase in the quality of fingerprint evidence, especially when the powder method would show limitations. The acquisition of CVV represented a significant improvement in the expert routine of the Identification Institute of the Civil Police of the Federal District and should be encouraged for other forensic laboratories around the world. The results have helped to solve several criminal cases in the Federal District.

#### **Reference(s):**

- <sup>1</sup> F.G. Kendal. Super glue fuming for the development of latent fingerprints. *Identification News* 27 (5) (1982) 3-5.

#### **Cyanoacrylate Chamber, Vehicles, Brazil**