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Precision Vision’s ETDRS® Illuminator Cabinet – *The international gold standard for clinical trials and vision research since the landmark NEI-funded, Early Treatment Diabetic Retinopathy Study (ETDRS), which ran from 1979 to 1985.*

Precision Vision ETDRS® Illuminator Cabinet History and Future Outlook: A Guide for Clinical Trials and Vision Research

This article provides a comprehensive overview of the evolution of the Precision Vision ETDRS® Illuminator Cabinet, highlighting key updates and improvements over time. As the most trusted workhorse in clinical trials and vision research, our equipment has undergone significant advancements over the last 40 years, evolving to meet or exceed industry standards.

Additionally, we offer our manufacturer recommendations for which versions are considered acceptable for use today and in future trials. Our goal is to ensure researchers and practitioners can make informed decisions moving forward.

History of Cabinet Components

The physical shape and size of Precision Vision’s ETDRS® Illuminator Cabinets have remained essentially unchanged for 40 years. Over the years, all components that make up the cabinets have changed. This includes materials and methods such as paint, diffuser panels, bulb diffusers (fenestrated sleeves), and ballasts. Precision Vision has always managed these changes to ensure the light output characteristics are maintained across different cabinet versions (materials and components) and line voltages (100v, 120v, and 230v) in the countries in which they are used.

All versions of the ETDRS® Illuminator Cabinet prior to Version 4 (v4) (released October 2024) were illuminated with fluorescent bulbs powered by ballasts. A ballast is an electrical device placed in series to limit the amount of electrical current in a circuit. Fluorescent bulbs require ballasts to regulate the electrical current being delivered to them in order to function correctly. Fluorescent bulbs would be destroyed without the ballast regulating the current being delivered.

Ballasts used in light box circuitry can be magnetic or electronic. They can also be either voltage specific or universal voltage. In the early days, magnetic, voltage-specific ballasts were used. This evolved to voltage-specific electronic ballasts which then evolved further into universal-voltage ballasts. These universal-voltage ballasts can accommodate electrical current ranging from line voltages of 99-277 volts.

Each ballast iteration yielded a different luminance output. Every time there was a ballast change, Precision Vision reconfigured the bulb diffusers to maintain consistency across years of cabinet versions and various line voltages. Hence, multiple version designations over time.

Ballasts don't last forever.

Both magnetic and electronic ballasts fail, and they don't always fail all at once. The performance of a failing ballast usually diminishes gradually, and even a failing ballast will still light up a fluorescent bulb. Signs of failing ballasts include flickering lights, buzzing noises, dimming lamps, or burn marks on the ballast housing, these signs may be obvious or very subtle. Deteriorating ballasts do not perform the same as new ones. It is generally believed that ballasts can last up to 15 years, but that simply indicates it may light a bulb for up to 15 years, not that it is acceptable for use in clinical trials or vision research. As ballasts age and fail, reduced performance is to be expected.

Previous Precision Vision Cabinet Models

ETDRS® Illuminator Cabinet Cat. No. 2425, L220, LH-DV-14, and L9130.

The earliest versions of the Precision Vision illuminator cabinets used magnetic ballasts and were labeled as the Precision Vision Cat. No. 2425 ETDRS® Illuminator Cabinet (this version did not specify a model/version number and ranges in age from 15 to 40 years old). These cabinets are often referred to as our Version 1 (v1) cabinets. This cabinet was also private-labeled for the Lighthouse for the Blind in the U.S. under different names, the most common models being L220, LH-DV-14, and L9130.

THE ILLUMINATOR CABINET MODELS LISTED ABOVE SHOULD NOT BE USED IN NEW TRIALS OR STUDIES.

If currently in use in an active study you should consult with the Sponsor and CRO for direction. The calibration status of version 1 cabinets is certainly not acceptable by new cabinet standards.

Version 2 (v2) 2425-v2, 2425E-v2 and Version 3 (v3) 2425Ev3 Cabinets

When magnetic ballasts became obsolete the move to electronic ballasts resulted in these cabinet models:

CATALOG NUMBER	MODEL NUMBER	VOLTAGE
2425-v2	120-E-P	120v Specific
2425E-v2	230-E-P	230v Specific
2425Ev3 (Introduced in 2019)	2425Ev3	99-277v (Universal Voltage)

The v2 and v3 cabinets are still endorsed for clinical trial use by Precision Vision.

Replacement fluorescent bulbs

Precision Vision has secured a supply of fluorescent bulbs that, based on historical demand, will last until mid-2027. Our fluorescent bulbs will continue to be calibrated for our v2 and v3 cabinets and will still be available with the option of pre-burned for 96 hours and not pre-burned.

International regulations banning the import and use of many fluorescent bulbs for general and other special use, including F20/T12, will take effect in 2026. We anticipate that most countries will, at some point no longer allow the import/export of fluorescent bulbs or, at the very least, make it extremely difficult to do so. For this

reason, **WE RECOMMEND REPLACING v2 ILLUMINATOR CABINETS WITH v4 CABINETS FOR ANY NEW TRIALS THAT ARE TWO (2) YEARS IN LENGTH OR LONGER.**

Replacement bulbs for the old v1 cabinets are available, but they are not calibrated. Version 1 bulbs still have a diffuser installed, but that diffuser is only intended to minimize luminance hot spots. There are no new or like new v1 cabinets available to use for calibration of the bulbs. Some bulbs are sold without diffusers at the customer's request because they are still using their old fenestrated sleeve. Those cabinets range from nearly 20 years old to as much as 40 years old.

2425Ev4, the ETDRS® Illuminator Cabinet with LED Bulbs

The version 4 cabinet was introduced in October 2024. The rollout of this version was previously planned for 2025, but that plan was abruptly and unexpectedly accelerated due to availability issues with the required ballasts for the v3 cabinets.

The new v4 cabinets look exactly like all the previous versions. They are built using the exact same illuminator cabinet shell as previous versions, but this model requires Precision Vision custom-manufactured LED bulbs. These LED bulbs are installed with diffusers facing the back of the cabinet. This is the opposite of how the fluorescent bulbs are installed. Bulb installation information is provided with all new v4 cabinets and replacement LED bulbs. The new bulbs were designed with internal power management circuitry, no longer requiring the installation of a ballast in the cabinet. The bulbs are designed and calibrated by Precision Vision, with custom manufactured diffusers adhered to the bulbs, similar to those on the fluorescent bulbs. All v4 bulbs from Precision Vision ensure proper luminance levels are consistently achieved and are no longer impacted by aging cabinet ballasts.

The new v4 bulbs can be used for up to two years before replacement is necessary for use in clinical trials and vision research. Biennial bulb replacement guarantees the luminance levels will always be consistent. With the ballast now being a part of the bulb instead of part of the cabinet, the cabinet age is not the determining factor of reliable use in critical applications. As long as the cabinet is kept in good working order and properly calibrated bulbs from Precision Vision are installed, the v4 ETDRS® Illuminator Cabinet will remain in service for many years.

Summary of Cabinet Models and Recommendations

Cat. No.	Status	Recommendation
2425 L220 LH-DV-14 L9130	Obsolete	DO NOT ENROLL "v1" CABINETS INTO ANY NEW CLINICAL TRIALS OR STUDIES. If a v1 cabinet is currently enrolled in a study, please consult the Sponsor/CRO for direction.
2425v2 (120V) 2425Ev2 (230V)	Phase-Out	Acceptable for use in existing and new studies/trials. Recommend replacement for new long-term studies due to cabinet age and risk of future bulb availability.
2425Ev3	Current	Acceptable for use in existing and new studies and trials. Replacement Recommended due to future bulb availability.
2425Ev4	Current	Acceptable for use in existing and new studies and trials.
2425LED-100 2425LED-200 2425LED-300	Current	Acceptable for use in existing and new studies and trials.

A Word of Caution

Unfortunately, some companies in the U.S. and abroad have attempted to imitate our products—creating light boxes, bulbs, and eye charts that look identical to ours, that is intentional. Those products are not like our products. Those people are not like us.

Precision Vision takes immense pride in making the most reliable and precise vision testing equipment available. No one is more dedicated to ensuring uniformity across generations of products, so you can trust your results from our equipment today, tomorrow, and for many years to come. If you have questions about the authenticity of your equipment, please reach out to Precision Vision right away.

It has been our honor and privilege to contribute to thousands of research studies that have led to discoveries, breakthroughs, and life-changing findings in vision research. We are driven by a mission to serve this industry with integrity, guaranteeing the most reliable and precise products and services so you can do the important work you do.



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