What makes the Cell Locker System exceptional for working with viruses and viral vectors?

When working with viruses or viral vector constructs, it is critical to prevent the escape of these viruses and to avoid any mixing of different strains or constructs. With its advanced contamination control and containment technology, the Thermo Scientific™ Cell Locker™ System in the Thermo Scientific™ Heracell™ VIOS 160i and Thermo Scientific™ Forma™ Steri-Cycle i160 CO_2 Incubators offers enhanced stability, protection, and flexibility for culturing sensitive cell types.

A Cell Locker System contains six individual chambers, each of which holds up to nine T-75 flasks or up to 28 microwell plates (Figure 1). The dual membrane filters allow gas exchange to the cultures inside but restrict entry or exit of microorganisms [1]. Thus, the Cell Locker chambers help isolate viruses and viral vector constructs and provide confidence that they remain identified and separate. Each Cell Locker chamber is effectively a quarantine chamber.

The Cell Locker System can be used with or without the optional transport door and work tray. Using the transport door ensures containment of viruses when removing a Cell Locker chamber from the incubator and transporting it to the biological safety cabinet (BSC) work area. The Cell Locker System provides stability of culturing conditions in one Cell Locker chamber even when another is opened [2,3]. This means that sensitive cells remain in their ideal conditions longer, contributing to clonal stability and proper gene expression; these are critical factors when evaluating effects on cultured cells. The Cell Locker System is shown to use 50% less carbon dioxide (CO_2) and nitrogen gas than a standard Heracell VIOS 160i or Forma Steri-Cycle i160 CO_2 Incubator, providing great savings when working in conditions that efficiently mimic human physiology [3].

Figure 1. Design of the Cell Locker chamber. An individual Cell Locker chamber holds up to nine T-75 flasks. The removable Transport Door is attached to a sliding tray for ease in removing vessels. Each Cell Locker chamber is constructed of polycarbonate, and each has dual 0.2 µm membrane filters to protect cultures. Independent studies show that when a chamber is properly closed, microorganisms cannot enter or exit it [1].

thermo scientific

How does the filter work?

The Cell Locker chambers with their 0.2 µm membrane filters will capture all particle sizes, not just those larger than 0.2 µm. This is because 1) due to the physical processes involved, pore size is effectively about ten times smaller when filtering air than when filtering liquid [1], and 2) the membrane filters we use are not made of "straight-through" pores; instead, they are a complex mesh that presents a labyrinth for particles.

This structure and other benefits of the polyethersulfone (PES) material mean that the filters will capture the smallest particles, even as small as 0.01 µm. The smallest viruses are parvoviruses, which are about 0.02 µm. Figure 2 compares different membrane filter materials for efficiency of capturing particles of varied sizes, using some example microorganisms. The Cell Locker chamber's membrane filter is composed of PES with a 0.2 µm pore size, but the interlocking mesh material of the PES and the physical processes involved in filtering air [1] result in an effective pore size of about 0.02 µm. More details about the filter, and the independent testing that has demonstrated the containment provided by the Cell Locker chamber, are found in our application note [1]. The Cell Locker System provides better containment of viruses and better protection against cross-contamination than any other available CO_2 incubator.

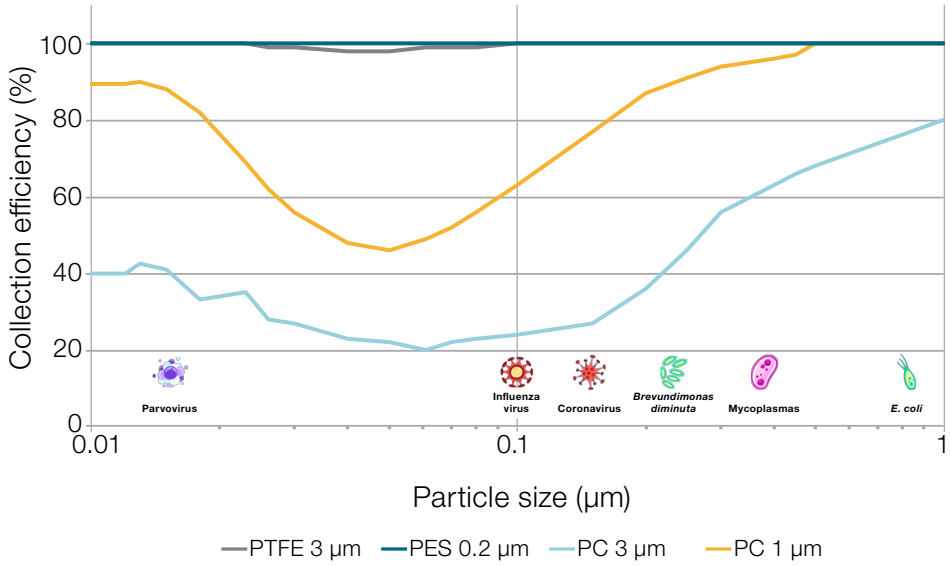

Figure 2. Efficiency of capturing various particle sizes with different filter materials and pore sizes. A PES membrane with a pore size of 0.2 µm captures 100% of particles at all sizes. A polytetrafluoroethylene (PTFE) membrane with a 3 µm pore size can miss some particles in the 0.02–0.1 µm range. In contrast, polycarbonate (PC) filters with smooth, circular "straight-through" pores will miss many particles. Example microorganisms are positioned according to their sizes.

Summary

The Heracell VIOS 160i and Forma Steri-Cycle i160 CO_2 Incubators, used with the Cell Locker System, are ideal for culturing as well as segregating and protecting virus cultures and vector clones. Thermo Scientific™ THRIVE™ active airflow combined with proven contamination control helps to ensure excellent culturing conditions, and the Cell Locker chambers help prevent unwanted entry or exit of contaminants.

References

1. Bates MK, Love Parrucci M (2019) Thermo Scientific Cell Locker System prevents entry of microorganisms for protection of sensitive cell cultures. Thermo Fisher Scientific ANCELLLOCKER 0119.
2. Bates MK, Schneider J, Love M, Low L (2020) Cell Locker System segregates stem cells, protecting from contamination and enhancing environmental stability. Thermo Fisher Scientific AN-CELLLOCKERSC 0120.
3. Thermo Fisher Scientific (2023) Protected chambers for your most sensitive cells. EXT 5771 0923.

Learn more at **thermofisher.com/co2**

thermo scientific