Beyond Air. Helium Takes You Higher.

Western Digital.
Today’s data centers face many storage challenges—from storage density, to power and cooling costs, to reliability and more. As your data center’s capacity needs grow, your challenges grow as well.

Responding to the complex needs of the modern data center, Western Digital has developed HelioSeal® technology, a foundational building block for high-capacity hard disk drives (HDDs). This innovative technology hermetically seals the HDD and replaces the air inside with helium, which is one-seventh the density of air. The less-dense atmosphere resets the boundaries and challenges of conventional high-capacity HDDs, allowing for dramatic increases in efficiency, reliability and value.

HelioSeal technology complements magnetic recording technologies like shingled magnetic recording (SMR), microwave-assisted magnetic recording (MAMR), heat-assisted magnetic recording (HAMR) and bit-patterned media (BPM). When paired with SMR, HelioSeal technology will enable the fast-growing sequential workload storage market.
The benefits of helium are well known. For over a decade, the HDD industry has looked for solutions to leverage helium. However, no one has been able to manage leakage, nor establish a development process that can cost-effectively manufacture millions of these drives. After six years of design and rigorous testing, Western Digital successfully patented the first helium development process; HelioSeal technology. In 2013, we raised the standard for storage efficiency, reliability and value by shipping the first helium HDD, the Ultrastar® He6, using our patented production process.

**The Science of HelioSeal®**

Reliability has always been a Western Digital hallmark. Prior to shipping helium-filled drives, we performed long-term reliability testing, with 5,000 drives each running more than 1,000 hours (over 5 million combined hours), showing no seal degradation on any of the drives.

Western Digital helium drives undergo accelerated stress testing, including high-temperature soaking, thermal cycling, pressure cycling, humidity cycling and shock testing. Every drive is tested for seal integrity during the manufacturing process prior to shipping. Additionally, our helium drives utilize internal environmental telemetry to monitor seal integrity and report any potential issues.

Our Ultrastar DC HC500 Series of HelioSeal drives continues to push capacity and limits in our fifth generation 14TB Ultrastar DC HC530 HDD. Our HelioSeal platform quality proved so successful in the field that we increased the reliability rating by 25% to 2.5M hours MTBF compared to enterprise-class air-filled drives.
The world’s video-streaming leader gains competitive advantage using Western Digital helium-filled drives. In fact, Netflix increased capacity by 50%, while reducing energy usage by 23%.

"We’re saving about 90 watts per appliance with [Western Digital] helium drives. This savings is significant when you’re talking about thousands of streaming appliances."

David Fullagar, Director of Content Delivery Architecture, Netflix

Uncompromising capacity. The less dense atmosphere inside a HelioSeal HDD virtually eliminates turbulence, allowing read/write mechanisms to track more precisely and reliably over storage media, enabling higher recording densities.

Piling on the platters. Less internal turbulence also makes it possible to add more disks and heads to achieve even higher capacity per HDD. This is how Western Digital delivers 14TB capacity and beyond in an eight-disk design.

The power of helium. Disks spin more easily in a helium-filled environment, resulting in less power usage—even with additional platters. Less power consumption means cooler operation and lower cooling requirements, reducing both energy costs and carbon footprint.

Reducing the risk. Many air-filled drives use a breather filter leading to reliability problems when used in environments with high levels of carbon in the air. This problem does not exist with sealed drives.
Driving Down TCO: The **Value** of HelioSeal® Technology

HelioSeal technology delivers today's lowest total cost of ownership (TCO) for hyperscale and data-centric applications.

**Unmatched storage density** with 14TB capacity in an eight-disk design and a 3.5-inch HDD footprint. That's 75% more storage capacity for mainstream applications than 8TB air-based drives, saving you rack space.

**Greater power efficiency** with 27% lower operating power than Ultrastar 8TB air drives. Our 14TB HelioSeal drives consume just 5.6 watts during idle operation, a 56% reduction in watts-per-TB compared to Ultrastar air-based HDDs.

**Quieter operation** and up to 45% lower weight-per-TB than 8TB Ultrastar drives improve environmental conditions in high-density deployments and enable more storage capacity where building codes enforce floor loading limits.

**Lower cooling requirements** with drives that typically run 4°-5°C cooler to lower power and cooling cost. Cooler operation also results in better reliability and enables systems with higher storage densities.

**More affordable than ever** with the introduction of our high-volume, fifth-generation 14TB HelioSeal HDD—higher volume leads to lower cost to the market.
Abundant and Safe. Helium Quick Facts.

It’s colorless, odorless, tasteless and non-toxic. Here are some little-known facts about this inert gas.

Helium is the second lightest and the second most abundant element in the observable universe. HDD vendors have used helium for years in the servo-writer manufacturing process.

One standard helium tank provides enough gas to fill nearly 10,000 Western Digital drives. There is a wealth of commercially available helium today.

Helium is used to create stable breathing mixtures for deep sea divers. Party balloons consume 19% of all helium—hard drive production uses less than 1%.
Why Western Digital

Western Digital creates environments for data to thrive. Everywhere data is captured, preserved, accessed and transformed, we’re leading the charge to unlock its potential. From advanced data centers to mobile sensors to personal devices, our industry-leading solutions create environments where the flow of information leads to smarter decisions, breakthrough discoveries and deeper connections.

Learn more about us at www.westerndigital.com