



Beyond air.
Helium takes
you higher.





In its first year of production, about a million HelioSeal® drives shipped without a single seal-related field failure reported.

The **foundational** building block for high-capacity HDDs

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, HGST 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), heat-assisted magnetic recording (HAMR) and bit-patterned media (BPM). When paired with SMR, HelioSeal technology will enable the fast-growing cold storage market.

The **science** of HelioSeal®

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. Now, after six years of design and rigorous testing, HGST has 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.

Proven reliability

Reliability has always been our hallmark at HGST. 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.

HGST 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.

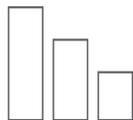
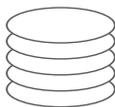
At HGST, we continue to push capacity and reliability limits in our second-generation 8TB helium HDD. Our HelioSeal platform has proven so successful that we announced our final air-filled product in 2014, placing a target on helium ubiquity by 2017.

Netflix runs on HelioSeal technology

The world's video-streaming leader gains competitive advantage using HGST 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 HGST 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 HGST delivers industry-leading 8TB capacity and beyond in a seven-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 industry-leading 8TB capacity in a seven-disk design and a 3.5-inch HDD footprint. That's 33% more storage capacity for mainstream applications than our closest competitor, saving you rack space.

Greater power efficiency with 23% lower operating power than 6TB air drives. Our 8TB helium drives consume just 5.1 watts during idle operation, a 44% reduction in watts-per-TB compared to conventional air-based HDDs.

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.

Quieter operation and up to 38% lower weight-per-TB improve environmental conditions in high-density deployments and enable more storage capacity where building codes enforce floor loading limits.

More affordable than ever with the introduction of our high-volume, second-generation 8TB 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.

He
FACTS

Helium is the second lightest and the second most abundant element in the observable universe.

One standard helium tank provides enough gas to fill nearly 10,000 HGST drives.

Helium is used to create stable breathing mixtures for deep sea divers.

HDD vendors have used helium for years in the servo-writer manufacturing process.

There is a wealth of commercially available helium today.

Party balloons consume 19% of all helium—hard drive production uses less than 1%.



Why **HGST**

With roots tracing back to the first hard drive, HGST is helping tens-of-thousands of people harness the power of data through smarter storage solutions. We're creating more efficient, TCO-driven storage with larger capacities per unit volume, fabrics for breakthrough performance, and solutions that are tightly integrated with software. We're at the heart of the data center helping unlock the value of data.

Trusted by some of the world's largest companies, our high-quality hard-disk and solid-state drives are everywhere data is from the cloud, to some of the most sophisticated systems in healthcare, finance, government, oil & gas, entertainment and media.

Learn more about us at www.hgst.com.



www.hgst.com

Long Live Data™

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