Beyond Air.

Helium Takes You Higher.
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.

Since 2013, Western Digital has used HelioSeal® technology as the foundational building block for high-capacity Ultrastar® hard disk drives (HDDs). Industry leading capacities depend on a number of innovative technologies such as Energy-Assisted Magnetic Recording (EAMR) technology, Triple Stage Actuator and Shingled Magnetic Recording (SMR). However, these technologies need to work in a helium environment to achieve the highest capacity.
The **Science** of HelioSeal

Capacity gains can be realized by adding ever more disks into a standard 3.5" form factor, requiring thinner disks. Helium is necessary to realize more disks per HDD. Helium is important because it reduces the vibration in the drive, which allows the areal density on the disk to improve. It allows the drive to run cooler and it takes less power. HelioSeal technology hermetically seals the HDD and replaces the air inside with helium, which is one-seventh the density of air. The less-dense atmosphere inside the drive allows for dramatic increases in efficiency, reliability and capacity compared to conventional air-filled HDDs.

**Proven Reliability**

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.

The Ultrastar DC HC550 & DC HC650 are our sixth generation of HelioSeal drives and pushes capacity to an industry leading 18TB for a CMR HDD and 20TB for an SMR 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.
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 18TB CMR and 20TB SMR capacities and beyond in a nine-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.

Over \( \frac{2}{3} \) rds of Helium exabytes shipped in 2019 were based on Western Digital's HelioSeal technology*

* Source: WDC Internal Market Intelligence, CQ3/2019
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 18TB (CMR) and 20TB (SMR) capacity in a nine-disk design and a 3.5-inch HDD footprint. The Ultrastar DC HC550 18TB HDD has 80% more storage capacity for mainstream applications than 10TB air-based drives, saving you rack space.

**Quieter operation** and up to 49% lower weight-per-TB for 18TB HelioSeal drives, compared to 10TB air-filled drives, improve environmental conditions in high-density deployments and enable more storage capacity where building codes enforce floor loading limits.

**Greater power efficiency** with 30% lower operating power than Ultrastar 10TB air drives. Our 18TB HelioSeal drives consume just 5.6 watts during idle operation, a 61% reduction in watts-per-TB compared to Ultrastar 10TB air-based HDDs.

**Enabling lower TCO** with the sixth generation of Ultrastar data center HDDs with HelioSeal technology. High capacity 18TB (CMR) and 20TB (SMR) HDDs lead to lower system-level TCO for the data center.

**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.
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.
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