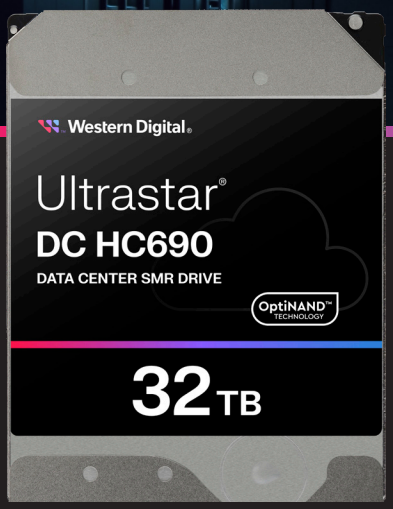
Western Digital.

Data Sheet



Ultrastar® DC HC690

Ultrastar® Data Center HC690 hard drives combine field-proven designs with the latest innovative technologies to meet customer demands for increased storage density in the existing storage footprint.

Highlights

- World's first 11-disk HDD platform
- Delivers unbeaten capacity of up to 32TB[1] (SMR)
- Increases storage density without increasing footprint
- Maintains superior reliability of field-proven hardware designs
- Rated for 550TB/year workloads and up to 2.5M hours MTBF[5]

Target Audience

- Data Center Managers
- IT Administrators
- Data Center Architects
- AI System Administrators

Ideal for

- Hyperscalers and big data applications
- Artificial Intelligence training pools
- Cloud repatriation data pools
- Cloud service providers
- Converged infrastructures

The Future of More. Plus One.

The **world's first 11-disk HDD platform** delivers unbeaten capacity of up to 32TB[1] (SMR) to help quench customer's insatiable demand for increased storage density in the existing storage footprint.

Rapid Qualification and Rock Solid Reliability

Leveraging **field-proven hardware and firmware designs** from generations of highly successful products ensures easy qualification, seamless integration and rapid adoption while maintaining superior dependability and reliability.

Maximum Rack-Space Efficiency

The higher storage density provided by our exclusive **UltraSMR** and **energy-assisted Perpendicular Magnetic Recording (ePMR)** technologies, which increase tracks-per-inch (TPI), allow data centers to maximize their storage efficiency.

Protected Against Vibration and Shock

Our exclusive **Rotational Vibration Safeguard (RVS)** uses dual sensors to anticipate and counteract disturbances, maintaining peak performance in high-vibration environments. Combined with **Dynamic Fly Height technology**, Western Digital offers exceptional drive reliability and protection from unexpected shock events.

Engineered with Industry-Leading Technology

Western Digital's proprietary **OptiNAND™** technology leverages integrated **iNAND® embedded flash** to perform key housekeeping functions, freeing up more capacity and improving the overall drive performance.

Powerful Performance and Resiliency

Choose **ArmorCache™** write cache disabled (WCD) mode for increased random write performance or select write cache enable (WCE) mode to protect cached data in case of Emergency Power Off (EPO) or unexpected power loss scenarios.

Meet Eco Goals with Helium

The stable internal environment created by our **HelioSeal® technology** enables this high-capacity helium drive to deliver one of the lowest power profiles in the industry.

Trusted Reliability, Quality and World-Class Support

As an **industry-leading hard drive manufacturer**, Western Digital stands behind their Ultrastar hard drives with the assurance of a **5-year limited warranty**[5] and world-class support services to help create environments for data to thrive.

Ultrastar® **DC HC690**

	30TB SATA	30TB SAS	32TB SATA	32TB SAS
Model Number	WSH723200ALxxyz	WSH723200ALxxyz	WSH723220ALxxyz	WSH723220ALxxyz
Formatted capacity[1]	30TB	30TB	32TB	32TB
Recording Technology	SMR	SMR	SMR	SMR
Interface	SATA 6 Gb/s	SAS 12 Gb/s	SATA 6 Gb/s	SAS 12 Gb/s
Format: Sector size (bytes)[2]	512e:512 | 4Kn: 4096	512e:512 | 4Kn: 4096	512e:512 | 4Kn: 4096	512e:512 | 4Kn: 4096
Areal density (Gbits/sq. in.)	1385	1385	1480	1480
Performance				
Data buffer[3] (MB)	512	512	512	512
Rotational speed (RPM)	7200	7200	7200	7200
Latency average (ms)	4.16	4.16	4.16	4.16
Interface transfer rate (MB/s, max)	600	1200	600	1200
Sustained transfer rate[4] (MB/s, max) / (MiB/s, max)	260 / 248	260 / 248	269 / 257	269 / 257
Reliability/Data Integrity				
Error rate (non-recoverable, bits read)	1 in 10^{15}	1 in 10^{15}	1 in 10^{15}	1 in 10^{15}
Load/Unload cycles (at 40°C)	600,000	600,000	600,000	600,000
Availability (hrs/day x days/wk)	24x7	24x7	24x7	24x7
MTBF[5] (M hours)	2.5	2.5	2.5	2.5
Annualized Failure Rate[5]	0.35%	0.35%	0.35%	0.35%
Limited warranty	5 years	5 years	5 years	5 years
Power				
Requirement	+5 VDC, +12VDC	+5 VDC, +12VDC	+5 VDC, +12VDC	+5 VDC, +12VDC
Random Read 4KB QD=8 @MAX IOPS (W)	9.4	9.7	9.4	9.7
Idle[6] (W)	5.5	5.8	5.5	5.8
Power efficiency at idle (W/TB)	0.18	0.19	0.17	0.18
Acoustics				
Idle / Operating (Bels, typical)	2.5 / 3.2	2.5 / 3.2	2.5 / 3.2	2.5 / 3.2
Physical Dimensions				
z-height (max)	1.03 in. (26.1 mm)	1.03 in. (26.1 mm)	1.03 in. (26.1 mm)	1.03 in. (26.1 mm)
Length (max)	5.78 in. (146.7 mm)	5.78 in. (146.7 mm)	5.78 in. (146.7 mm)	5.78 in. (146.7 mm)
Width ± .01 in. (max)	4.0 in. (101.6 mm)	4.0 in. (101.6 mm)	4.0 in. (101.6 mm)	4.0 in. (101.6 mm)
Weight (lb/kg , ± 10%)	1.47 lb. (.67 kg) ± 10%	1.47 lb. (.67 kg) ± 10%	1.47 lb. (.67 kg) ± 10%	1.47 lb. (.67 kg) ± 10%

Environmental

(Operating)		(Non-Operating)	
Temperature (°C)[7]	5° to 60°	Temperature (°C)[7]	-40° to 70°
Shock (half-sine wave 2 ms, G)	40	Shock (half-sine wave, G)	200
Vibration (G RMS 5 to 500 Hz)	0.7	Vibration (G RMS 2 to 200 Hz)	1.04

[1] One MB is equal to one million bytes, one GB is equal to one billion bytes and one TB equals 1,000GB (one trillion bytes). Actual user capacity may be less due to operating environment.
[2] Advanced Format drive: 4K (4096-byte) physical sectors.
[3] Portion of buffer capacity used for drive firmware.
[4] Based on internal testing; performance may vary depending on host environment, drive capacity, logical block address (LBA), and other factors. The location of the max rate is at approximately 10% into the capacity of the HDD. 1MiB = 1,048,576 bytes (2^{20}), 1MB = 1,000,000 bytes (10^6).
[5] Projected values. Final MTBF and AFR specifications will be based on a sample population and are estimated by statistical measurements and acceleration algorithms under typical operating conditions, typical workload and 40°C device-reported temperature. Derating of MTBF and AFR will occur above these parameters, up to 550TB/year and 60°C (device reported temperature). MTBF and AFR ratings do not predict an individual drive's reliability and do not constitute a warranty.
[6] Idle specification is based on use of Idle_A.
[7] 5°C ambient temperature, 60°C device reported temperature.

How to Read the Ultrastar Model Number

WSH7232XXALxxyz

W = Western Digital
S = Ultrastar SMR Technology
H = Helium (vs. S for Standard)
72 = 7200 RPM
32 = Maximum capacity
XX = Capacity this model
  00 = 30TB
  20 = 32TB
A = Generation code
L = z-height 26.1 (mm)

xx = Interface
  N6 = 4Kn SATA 6 Gb/s
  42 = 4Kn SAS 12Gb/s
y = Power Disable Pin 3 status
  0 = Power Disable Pin 3 support
  L = Legacy Pin 3 config - no Power Disable
z = Data Security Mode
  0 = Instant Secure Erase (ISE)
  1 = SED*: Self Encrypting Drive TCG-Enterprise and Sanitize Crypto Scramble Erase
  4 = Base (SE)*: No Encryption. Sanitize Overwrite only.
  5 = SED-FIPS*: Self Encrypting Drive TCG Enterprise FIPS
*ATA Security Feature Set comes standard on ATA

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