



DATA SHEET

Scalable. Responsive. Innovative.

## Exos X12



Seagate manufactures hard drives that specifically address the needs of the hyperscale storage market. As the flagship of the Seagate® X class, the Exos™ X12 enterprise hard drive is the highest-capacity hard drive in the fleet.



### Scales to Meet Your Growing Capacity Needs

Seagate Exos X12 enterprise hard drives offer the highest rack space efficiency — up to 10 PB of data in a single 42U rack. Enhanced caching makes it perfect for Big Data applications, providing the fastest hard drive data transfers in the datasphere. Hyperscale SATA models are tuned for large data transfers, providing low latency. You can easily customise your bulk storage requirements with innovative technology advancements (PowerBalance™, PowerChoice™ and RAID Rebuild®). Exos X12 drives help provide low data centre TCO, and are architected to offer low power and weight. Simplified infrastructure management is possible with FastFormat™ advanced format feature (4Kn and 512e). Advanced Write Caching helps ensure rapid response rates with a 20% boost in random write performance.<sup>1</sup>

### Best-Fit Applications

- Hyperscale applications/cloud data centres
- Massive scale-out data centres
- Big Data applications
- High-capacity density RAID storage
- Mainstream enterprise external storage arrays
- Distributed file systems, including Hadoop and Ceph
- Enterprise backup and restore — D2D, virtual tape
- Centralised surveillance

### Innovative Helium Design

The Exos X12 hard drive is built on a rock-solid sealed-drive design. A wrought-aluminium base and a helium sealed-drive design with no porosity and uniform density are designed with superior material and wide-weld design for a more robust, hermetically sealed-drive enclosure. Exos X12 hard drives incorporate digital environmental sensors for measuring pressure in the drive, helping to ensure high reliability, performance and quality.

### Enhanced Enterprise Reliability, Data Protection and Security

Seagate is the industry leader in data-at-rest protection with the broadest offering of technologies to help ensure reliable, trusted products. Seagate Secure™ models provide hardware-based security to help protect data-at-rest. With Instant Secure Erase, drive retirement is safe, affordable, fast and easy. Seagate Secure models meet the NIST 800-88 media sanitisation specification and support the Trusted Computer Group (TCG) standard.<sup>2</sup> The X class Exos X12 hard drive is a proven, enterprise-class hard drive with maximum reliability backed by a 2.5 million hour MTBF.

<sup>1</sup> Compared to 8 TB competitive product

<sup>2</sup> Seagate Secure models not available in all countries. May require TCG-compliant host or controller support.





Specifications	SATA 6 Gb/s	12 Gb/s SAS
Capacity	12 TB	12 TB
SATA Standard Model (512e)	ST12000NM0007	—
SATA SED Model (512e)	ST12000NM0017	—
SAS Standard Model FastFormat™ (512e/4Kn) <sup>1</sup>	—	ST12000NM0027
SAS SED Model FastFormat (512e/4Kn) <sup>1,2</sup>	—	ST12000NM0037
<b>Features</b>		
Superior Helium Sealed-Drive Design With Wide Weld	Yes	Yes
Digital Sensors for Helium Pressure	Yes	Yes
Protection Information (T10 DIF)	—	Yes
SuperParity	Yes	Yes
PowerChoice™/PowerBalance™ Technology	Yes	Yes
Seagate RAID Rebuild™	Yes	Yes
Low Halogen/Hot-Plug Support <sup>3</sup>	Yes	Yes
Cache, Multi-segmented (MB)	256	256
Organic Solderability Preservative	Yes	Yes
Secure Download and Diagnostics (SD&D) RSA 2048 signed firmware	Yes	Yes
<b>Reliability/Data Integrity</b>		
Mean Time Between Failures (MTBF, hours)	2,500,000	2,500,000
Reliability Rating @ Full 24x7 Operation (AFR)	0.35%	0.35%
Non-recoverable Read Errors per Bits Read	1 sector per 10E15	1 sector per 10E15
Power-On Hours per Year (24x7)	8,760	8,760
512e Sector Size (Bytes per Sector)	512	512, 520, 528
4Kn Sector Size (Bytes per Sector)	—	4,096, 4,160, 4,224
Limited Warranty (years)	5	5
<b>Performance</b>		
Spindle Speed (RPM)	7,200	7,200
Interface Access Speed (Gb/s)	6.0, 3.0	12.0, 6.0, 3.0
Max. Sustained Transfer Rate OD (MB/s, MiB/s)	Up to 261, 249	Up to 261, 249
Random Read/Write 4K QD16 WCD (IOPS)	170/400	170/400
Interface Ports	Single	Dual
Rotation Vibration @ 20-1500 Hz (rad/sec <sup>2</sup> )	12.5	12.5
<b>Power Consumption</b>		
Idle A (W) Average	5 W	5.4 W
Average Latency (ms)	4.16	4.16
Operating Power <sup>4</sup>	7.8	9.3
Power Supply Requirements	+12 V and +5 V	+12 V and +5 V
<b>Environmental</b>		
Temperature, Operating (°C)	5°C – 60°C	5°C – 60°C
Vibration, Non-operating: 10 Hz to 500 Hz (Grms)	2.27	2.27
Shock, Operating 2 ms (Read/Write) (Gs)	70	70
Shock, Non-operating 2 ms (GS)	250	250
<b>Physical</b>		
Height (mm/in, max) <sup>5</sup>	26.11 mm/1.028 in	26.11 mm/1.028 in
Width (mm/in, max) <sup>5</sup>	101.85 mm/4.01 in	101.85 mm/4.01 in
Depth (mm/in, max) <sup>5</sup>	147 mm/5.787 in	147 mm/5.787 in
Weight (lb/g)	705 g/1.554 lb	705 g/1.554 lb
Carton Unit Quantity	20	20
Cartons per Pallet / Cartons per Layer	40/8	40/8

1 FastFormat models ship in 512e format state. When switching from 512e to 4Kn by executing the FastFormat routine, all data on the drive will be deleted. Note that data must be aligned to 4K sectors to see improved performance in 4Kn format.

2 Self-Encrypting Drives (SED) and FIPS 140-2 Validated drives are not available in all models or countries; may require TCG-compliant host or controller support.

3 Supports Hotplug operation per Serial ATA Revision 2.6 specification.

4 SATA Random 8K1Q 50% Write/50% Read WCD @ 40 IO/s, SAS Random 4K4Q 50% Write/50% Read WCD @ 165 IO/s

5 These base deck dimensions conform to the Small Form Factor Standard (SFF-8301) found at [www.sffcommittee.org](http://www.sffcommittee.org). For connector-related dimensions, see SFF-8323.

AMERICAS Seagate Technology LLC 10200 South De Anza Boulevard, Cupertino, California 95014, United States, 408-658-1000  
ASIA/PACIFIC Seagate Singapore International Headquarters Pte. Ltd. 7000 Ang Mo Kio Avenue 5, Singapore 569877, 65-6485-3888  
EUROPE, MIDDLE EAST AND AFRICA Seagate Technology SAS 16-18, rue du Dôme, 92100 Boulogne-Billancourt, France, 33 1-4186 10 00

© 2017 Seagate Technology LLC. All rights reserved. Seagate, Seagate Technology and the Spiral Logo are registered trademarks of Seagate Technology LLC in the United States and/or other countries. Exos, the Exos logo, FastFormat, PowerBalance, PowerChoice, Seagate RAID Rebuild and Seagate Secure are either trademarks or registered trademarks of Seagate Technology LLC or one of its affiliated companies in the United States and/or other countries. All other trademarks or registered trademarks are the property of their respective owners. When referring to drive capacity, one gigabyte, or GB, equals one billion bytes; and one terabyte, or TB, equals one trillion bytes. Your computer's operating system may use a different standard of measurement and report a lower capacity. In addition, some of the listed capacity is used for formatting and other functions, and thus will not be available for data storage. Actual data rates may vary depending on operating environment and other factors, such as chosen interface and disk capacity. Seagate reserves the right to change, without notice, product offerings or specifications. DS1946.2-1712GB December 2017