

# Enterprise Capacity 3.5 HDD (Helium)

Channel Data Sheet

## Maximum Storage Capacity for Highest Rack Space Efficiency

- 10 TB per drive<sup>1</sup> for 25% more petabytes per rack<sup>2</sup>
- Industry's lowest power and weight for optimum data centre TCO
- Highest 10 TB HDD performance with enhanced caching, making it perfect for OLTP and HPC application
- Hyperscale SATA model tuned for large data transfers
- PowerBalance™ feature optimises IOPS/Watt
- Advanced Write Caching feature for 20% boost in random write performance<sup>2</sup>
- Forged, wrought-aluminium base and a helium sealed-drive design with no porosity and uniform density
- Superior material and weld-width design for a more robust, hermetically sealed-drive enclosure that protects from helium leaks
- Digital environmental sensors for measuring internal humidity, pressure and temperature, helping to ensure high reliability, performance and quality
- Latest hermetic interconnect technology supporting higher data rate heads and higher pin counts for extreme thermal conditions
- Proven enterprise-class reliability backed by 2.5M-hr MTBF



## Best-Fit Applications

- Hyperscale applications/cloud data centres
- Massive scale-out data centres
- OLTP and HPC 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

<sup>1</sup> Seagate recommends validating your configuration with your HBA/RAID controller manufacturer to ensure full capacity capabilities.

<sup>2</sup> Compared to 8 TB competitive product.

# Enterprise Capacity 3.5 HDD (Helium)



| Specifications  | SATA 6 Gb/s Hyperscale |                    | SATA 6 Gb/s Standard |                    |
|---|------------------------|--------------------|----------------------|--------------------|
|   | 10TB                   | 8TB                | 10TB                 | 8TB                |
| Capacity  | 10TB                   | 8TB                | 10TB                 | 8TB                |
| Standard Model (512e) <sup>1</sup>                          | —                      | —                  | ST10000NM0086        | ST8000NM0206       |
| Hyperscale Model (512e) <sup>1</sup>                        | ST10000NM0016          | ST8000NM0016       | —                    | —                  |
| Standard Model (4Kn) <sup>1</sup>                           | —                      | —                  | ST10000NM0146        | —                  |
| SED Model (512e) <sup>1,2</sup>                             | —                      | —                  | ST10000NM0156        | —                  |
| SED Model (4Kn) <sup>1,2</sup>                              | —                      | —                  | ST10000NM0166        | —                  |
| SED-FIPS Model (512e) <sup>1,2,3</sup>                      | —                      | —                  | ST10000NM0176        | —                  |
| SED-FIPS Model (4Kn) <sup>1,2,3</sup>                       | —                      | —                  | ST10000NM0186        | —                  |
| <b>Features</b>   |                        |                    |                      |                    |
| Helium Sealed-Drive Design With Wide Weld                   | Yes                    | Yes                | Yes                  | Yes                |
| Digital Environmental Sensors                               | Yes                    | Yes                | Yes                  | Yes                |
| Protection Information (T10 DIF)                            | —                      | —                  | —                    | —                  |
| SuperParity   | Yes                    | Yes                | Yes                  | Yes                |
| PowerChoice™/PowerBalance™ Technology                       | Yes                    | Yes                | Yes                  | Yes                |
| Low Halogen/Hot-Plug Support <sup>3</sup>                   | Yes                    | Yes                | Yes                  | Yes                |
| Cache, Multi-segmented (MB)                                 | 256                    | 256                | 256                  | 256                |
| Organic Solderability Preservative                          | Yes                    | Yes                | Yes                  | Yes                |
| <b>Reliability/Data Integrity</b>                           |                        |                    |                      |                    |
| Mean Time Between Failures (MTBF, hours)                    | 2,500,000              | 2,500,000          | 2,500,000            | 2,500,000          |
| Reliability Rating @ Full 24x7 Operation (AFR)              | 0.35%                  | 0.35%              | 0.35%                | 0.35%              |
| Non-recoverable Read Errors per Bits Read                   | 1 sector per 10E15     | 1 sector per 10E15 | 1 sector per 10E15   | 1 sector per 10E15 |
| Power-On Hours per Year (24x7)                              | 8,760                  | 8,760              | 8,760                | 8,760              |
| 512e Sector Size (Bytes per Sector)                         | 512                    | 512                | 512                  | 512                |
| 4Kn Sector Size (Bytes per Sector)                          | —                      | —                  | 4,096                | 4,096              |
| Limited Warranty (years)                                    | 5                      | 5                  | 5                    | 5                  |
| <b>Performance</b>  |                        |                    |                      |                    |
| Spindle Speed (RPM)   | 7,200                  | 7,200              | 7,200                | 7,200              |
| Interface Access Speed (Gb/s)                               | 6.0, 3.0, 1.5          | 6.0, 3.0, 1.5      | 6.0, 3.0, 1.5        | 6.0, 3.0, 1.5      |
| Max. Sustained Transfer Rate OD (MB/s)                      | 249MB/s                | 249MB/s            | 254MB/s              | 249MB/s            |
| Random Read/Write 4K QD16 WCD (IOPS)                        | 170, 138               | 170, 138           | 170, 370             | 170, 370           |
| Average Latency (ms)  | 4.16                   | 4.16               | 4.16                 | 4.16               |
| Interface Ports   | Single                 | Single             | Single               | Single             |
| Rotational Vibration @ 1,500 Hz (rad/s <sup>2</sup> )       | 12.5                   | 12.5               | 12.5                 | 12.5               |
| <b>Power Consumption</b>                                    |                        |                    |                      |                    |
| Idle A (W) Average  | 4.5 W                  | 4.5 W              | 4.5 W                | 4.5 W              |
| Max Operating Power, Random Write (WCD) 4K/4Q RR50% / RW50% | 8.0                    | 8.0                | 8.0                  | 8.0                |
| Max Operating Power, Random Read 4K/16Q (W)                 | 8.4                    | 8.4                | 8.4                  | 8.4                |
| Power Supply Requirements                                   | +12 V and +5 V         | +12 V and +5 V     | +12 V and +5 V       | +12 V and +5 V     |
| <b>Environmental</b>  |                        |                    |                      |                    |
| Temperature, Operating (°C)                                 | 5°C – 60°C             | 5°C – 60°C         | 5°C – 60°C           | 5°C – 60°C         |
| Vibration, Non-operating: 10 Hz to 500 Hz (Gms)             | 2.27                   | 2.27               | 2.27                 | 2.27               |
| Shock, Operating 2 ms (Read/Write) (Gs)                     | 70/40 Gs               | 70/40 Gs           | 70/40 Gs             | 70/40 Gs           |
| Shock, Non-operating, 1 ms/2 ms (Gs)                        | 250                    | 250                | 250                  | 250                |
| <b>PHYSICAL</b>   |                        |                    |                      |                    |
| Height (mm/in, max) <sup>7</sup>                            | 26.11 mm/1.028 in      | 26.11 mm/1.028 in  | 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  | 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    | 147 mm/5.787 in      | 147 mm/5.787 in    |
| Weight (lb/g)   | 650 g/1.433 lb         | 650 g/1.433 lb     | 650 g/1.433 lb       | 650 g/1.433 lb     |
| Carton Unit Quantity  | 20                     | 20                 | 20                   | 20                 |
| Cartons per Pallet / Cartons per Layer                      | 40/8                   | 40/8               | 40/8                 | 40/8               |

<sup>1</sup> Invoice SPA required for most SED and SED-FIPS models.

<sup>2</sup> 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.

<sup>3</sup> See FIPS 140-2 Level 2 Certificate at: <http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2011.htm#1635>.



# Enterprise Capacity 3.5 HDD (Helium)



| Specifications  | 12 Gb/s SAS Standard |                     |
|---|----------------------|---------------------|
|   | 10TB                 | 8TB                 |
| Capacity  |                      |                     |
| Standard Model (512e) <sup>1</sup>                          | ST10000NM0096        | ST8000NM0156        |
| Hyperscale Model (512e) <sup>1</sup>                        | —                    | —                   |
| Standard Model (4Kn) <sup>1</sup>                           | ST10000NM0206        | —                   |
| SED Model (512e) <sup>1,2</sup>                             | ST10000NM0216        | —                   |
| SED Model (4Kn) <sup>1,2</sup>                              | ST10000NM0226        | —                   |
| SED-FIPS Model (512e) <sup>1,2,3</sup>                      | ST10000NM0236        | —                   |
| SED-FIPS Model (4Kn) <sup>1,2,3</sup>                       | ST10000NM0246        | —                   |
| <b>Features</b>   |                      |                     |
| Helium Sealed-Drive Design With Wide Weld                   | Yes                  | Yes                 |
| Digital Environmental Sensors                               | Yes                  | Yes                 |
| Protection Information (T10 DIF)                            | Yes                  | Yes                 |
| SuperParity   | Yes                  | Yes                 |
| PowerChoice™/PowerBalance™ Technology                       | Yes                  | Yes                 |
| Low Halogen/Hot-Plug Support <sup>3</sup>                   | Yes                  | Yes                 |
| Cache, Multi-segmented (MB)                                 | 256                  | 256                 |
| Organic Solderability Preservative                          | 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, 520, 528        | 512, 520, 528       |
| 4Kn Sector Size (Bytes per Sector)                          | 4,096, 4,160, 4,224  | 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)                               | 12.0, 6.0, 3.0       | 12.0, 6.0, 3.0      |
| Max. Sustained Transfer Rate OD (MB/s)                      | 254MB/s              | 249MB/s             |
| Random Read/Write 4K QD16 WCD (IOPS)                        | 170, 370             | 170, 370            |
| Average Latency (ms)  | 4.16                 | 4.16                |
| Interface Ports   | Dual                 | Dual                |
| Rotational Vibration @ 1,500 Hz (rad/s <sup>2</sup> )       | 12.5                 | 12.5                |
| <b>Power Consumption</b>                                    |                      |                     |
| Idle A (W) Average  | 5.5 W                | 5.5 W               |
| Max Operating Power, Random Write (WCD) 4K/4Q RR50% / RW50% | 9.0                  | 9.0                 |
| Max Operating Power, Random Read 4K/16Q (W)                 | 9.4                  | 9.4                 |
| 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 (Gms)             | 2.27                 | 2.27                |
| Shock, Operating 2 ms (Read/Write) (Gs)                     | 70/40 Gs             | 70/40 Gs            |
| Shock, Non-operating, 1 ms/2 ms (Gs)                        | 250                  | 250                 |
| <b>PHYSICAL</b>   |                      |                     |
| Height (mm/in, max) <sup>4</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)   | 650 g/1.433 lb       | 650 g/1.433 lb      |
| Carton Unit Quantity  | 20                   | 20                  |
| Cartons per Pallet / Cartons per Layer                      | 40/8                 | 40/8                |

<sup>1</sup> Invoice SPA required for most SED and SED-FIPS models.

<sup>2</sup> 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.

<sup>3</sup> See FIPS 140-2 Level 2 Certificate at: <http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2011.htm#1635>.

SEAGATE.COM

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. Printed in USA. Seagate, Seagate Technology and the Spiral logo are registered trademarks of Seagate Technology LLC in the United States and/or other countries. FastFormat, PowerBalance and PowerChoice 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. The export or re-export of Seagate hardware or software is regulated by the U.S. Department of Commerce, Bureau of Industry and Security (for more information, visit [www.bis.doc.gov](http://www.bis.doc.gov)), and may be controlled for export, import and use in other countries. Seagate reserves the right to change, without notice, product offerings or specifications. DS1863.7C-1705GB May 2017