

# Enterprise Capacity 3.5 HDD (Helium)

Channel Data Sheet

## Maximum Storage Capacity for Highest Rack Space Efficiency

- 10TB per drive<sup>1</sup> for 25% more petabytes per rack<sup>2</sup>
- Industry's lowest power and weight for optimum data center TCO
- Highest 10TB HDD performance with enhanced caching, making it perfect for OLTP and HPC application
- Hyperscale SATA model tuned for large data transfers
- PowerBalance™ feature optimizes IOPS/Watt
- Advanced Write Caching feature for 20% boost in random write performance<sup>2</sup>
- Forged, wrought-aluminum 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 centers
- Massive scale-out data centers
- 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
- Centralized 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 8TB competitive product.

# Enterprise Capacity 3.5 HDD (Helium)



| Specifications  | SATA 6Gb/s Hyperscale |                    | SATA 6Gb/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>4</sup>                   | Yes                   | Yes                | Yes                  | Yes                |
| Cache, Multisegmented (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, 2,000,000 | 2,500,000          |
| Reliability Rating @ Full 24x7 Operation (AFR)              | 0.35%                 | 0.35%              | 0.35%                | 0.35%              |
| Nonrecoverable 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)                              | 8760                  | 8760               | 8760                 | 8760               |
| 512e Sector Size (Bytes per Sector)                         | 512                   | 512                | 512                  | 512                |
| 4Kn Sector Size (Bytes per Sector)                          | —                     | —                  | 4096                 | 4096               |
| Limited Warranty (years)                                    | 5                     | 5                  | 5                    | 5                  |
| <b>Performance</b>  |                       |                    |                      |                    |
| Spindle Speed (RPM)   | 7200                  | 7200               | 7200                 | 7200               |
| 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 @ 1500Hz (rad/s²)                      | 12.5                  | 12.5               | 12.5                 | 12.5               |
| <b>Power Consumption</b>                                    |                       |                    |                      |                    |
| Idle A (W) Average  | 4.5W                  | 4.5W               | 4.5W                 | 4.5W               |
| 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, Nonoperating: 10Hz to 500Hz (Gms)                | 2.27                  | 2.27               | 2.27                 | 2.27               |
| Shock, Operating 2ms (Read/Write) (Gs)                      | 70/40Gs               | 70/40Gs            | 70/40Gs              | 70/40Gs            |
| Shock, Nonoperating, 1ms/2ms (Gs)                           | 250                   | 250                | 250                  | 250                |
| <b>PHYSICAL</b>   |                       |                    |                      |                    |
| Height (mm/in, max) <sup>5</sup>                            | 26.11mm/1.028in       | 26.11mm/1.028in    | 26.11mm/1.028in      | 26.11mm/1.028in    |
| Width (mm/in, max) <sup>5</sup>                             | 101.85mm/4.010in      | 101.85mm/4.010in   | 101.85mm/4.010in     | 101.85mm/4.010in   |
| Depth (mm/in, max) <sup>5</sup>                             | 147.0mm/5.787in       | 147.0mm/5.787in    | 147.0mm/5.787in      | 147.0mm/5.787in    |
| Weight (g/lb)   | 650g/1.433lb          | 650g/1.433lb       | 650g/1.433lb         | 650g/1.433lb       |
| 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>

<sup>4</sup> Supports Hotplug operation per Serial ATA Revision 2.6 specification.

<sup>5</sup> 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.



# Enterprise Capacity 3.5 HDD (Helium)



| Specifications  | 12Gb/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>4</sup>                   | Yes                  | Yes                |
| Cache, Multisegmented (MB)                                  | 256                  | 256                |
| Organic Solderability Preservative                          | Yes                  | Yes                |
| <b>Reliability/Data Integrity</b>                           |                      |                    |
| Mean Time Between Failures (MTBF, hours)                    | 2,000,000, 2,500,000 | 2,500,000          |
| Reliability Rating @ Full 24x7 Operation (AFR)              | 0.35%                | 0.35%              |
| Nonrecoverable Read Errors per Bits Read                    | 1 sector per 10E15   | 1 sector per 10E15 |
| Power-On Hours per Year (24x7)                              | 8760                 | 8760               |
| 512e Sector Size (Bytes per Sector)                         | 512, 520, 528        | 512, 520, 528      |
| 4Kn Sector Size (Bytes per Sector)                          | 4096, 4160, 4224     | 4096, 4160, 4224   |
| Limited Warranty (years)                                    | 5                    | 5                  |
| <b>Performance</b>  |                      |                    |
| Spindle Speed (RPM)   | 7200                 | 7200               |
| 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 @ 1500Hz (rad/s²)                      | 12.5                 | 12.5               |
| <b>Power Consumption</b>                                    |                      |                    |
| Idle A (W) Average  | 5.5W                 | 5.5W               |
| 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, Nonoperating: 10Hz to 500Hz (Gms)                | 2.27                 | 2.27               |
| Shock, Operating 2ms (Read/Write) (Gs)                      | 70/40Gs              | 70/40Gs            |
| Shock, Nonoperating, 1ms/2ms (Gs)                           | 250                  | 250                |
| <b>PHYSICAL</b>   |                      |                    |
| Height (mm/in, max) <sup>5</sup>                            | 26.11mm/1.028in      | 26.11mm/1.028in    |
| Width (mm/in, max) <sup>5</sup>                             | 101.85mm/4.010in     | 101.85mm/4.010in   |
| Depth (mm/in, max) <sup>5</sup>                             | 147.0mm/5.787in      | 147.0mm/5.787in    |
| Weight (g/lb)   | 650g/1.433lb         | 650g/1.433lb       |
| Carton Unit Quantity  | 20                   | 20                 |
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4 Supports Hotplug operation per Serial ATA Revision 2.6 specification.

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.

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

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