# WD Red™ Pro

## For the Demands of Big Business

Designed specifically with medium or large scale business customers in mind, WD Red™ Pro drives are available for up to 24-bay NAS systems. Engineered to handle high-intensity workloads in 24×7 environments, WD Red Pro is ideal for archiving and sharing, as well as RAID array rebuilding on extended operating systems such as ZFS or other file systems. These drives add value to your business by enabling your employees to quickly share their files and back-up folders reliably in your NAS solution.

## Exclusive NASware™ 3.0 Technology

Our exclusive advanced firmware technology, NASware™ 3.0, enables seamless integration, robust data protection and optimal performance for NAS systems operating under heavy demand. Built into every WD Red Pro hard drive, NASware 3.0's advanced technology improves storage performance by increasing compatibility, integration, upgradeability, and reliability.

## Built for Optimum NAS Compatibility

WD Red Pro drives with NASware technology takes the guesswork out of selecting a drive. Optimized for NAS systems, our unique algorithm balances performance and reliability in NAS and RAID environments. Simply put, a WD Red Pro drive is one of the most compatible drives available for NAS enclosures. But don't take our word for it. WD Red Pro drives are a reflection of extensive NAS partner technology engagement and compatibility-testing.

## Larger NAS Bay Shock Protection

WD Red Pro drives are equipped with a multi-axis shock sensor that automatically detects subtle shock events and dynamic fly height technology which adjusts each read-write function to compensate and protect the data. This combination of technology further protects the drives in larger 24-bay NAS environments and helps increase hard drive reliability.

## 3D Active Balance Plus

Our enhanced dual-plane balance control technology significantly improves the overall drive performance and reliability. Hard drives that are not properly balanced may cause excessive vibration and noise in a multi-drive system, reduce the hard drive life span, and degrade the performance over time.

## Error Recovery Prevention

Built specifically for RAID and NAS environments, WD Red Pro drives come equipped with error recovery controls as part of NASware 3.0 technology to help reduce drive fallout in RAID applications.

## Extended Drive Testing

A NAS environment that has up to 24 bays is very demanding on a hard drive with added vibration and heat. This is why every WD Red Pro drive is shipped with extended thermal cycle burn-in testing to help ensure each drive is tested for extended reliable operation.

## Longer Warranty Coverage

WD Red Pro drives comes with a 5-year limited warranty for an even greater peace of mind.

## Product Highlights

- 7200RPM performance class
- Available in capacities ranging from 2–14TB with support for up to 24 bays
- Supports up to 300 TB/yr workload rate
- Enhanced reliability with 3D Active Balance™ Plus technology and error recovery controls with NASware™ 3.0 technology
- Extended drive testing to ensure each drive is tested for extended reliable operation
- 5-year limited warranty

## Desktop Drives vs. WD Red™ Pro

Do right by your NAS and choose the drive purpose-built for NAS with an array of features to help preserve your data and maintain optimum performance. Take the following into consideration when choosing a hard drive for your NAS:

- **Compatibility**: Unlike desktop drives, these drives are specifically tested for compatibility with NAS systems for optimum performance.
- **Reliability**: The always-on environment of a NAS or RAID is a hot one, and desktop drives aren't typically designed and tested under those conditions like WD Red™ Pro drives are.
- **Error Recovery Controls**: WD Red Pro NAS hard drives are specifically designed with RAID error recovery control to help reduce failures within the NAS system.
- **Noise and Vibration Protection**: Designed to operate solo, desktop drives typically offer little or no protection from the noise and vibration present in a multi-drive system. WD Red Pro drives are designed to thrive in multi-bay NAS system environments.

# WD Red™ Pro

## Specifications

| | 14TB | 12TB | 10TB | 10TB | 8TB |
|---|---|---|---|---|---|
| Model Number[1] | WD141KFGX | WD121KFBX | WD102KFBX | WD101KFBX | WD8003FFBX |
| Recording Technology | CMR | CMR | CMR | CMR | CMR |
| Interface | SATA 6 Gb/s | SATA 6 Gb/s | SATA 6 Gb/s | SATA 6 Gb/s | SATA 6 Gb/s |
| Formatted capacity[2] | 14TB | 12TB | 10TB | 10TB | 8TB |
| Form factor | 3.5-inch | 3.5-inch | 3.5-inch | 3.5-inch | 3.5-inch |
| Native command queuing | Yes | Yes | Yes | Yes | Yes |
| Advanced Format (AF) | Yes | Yes | Yes | Yes | Yes |
| RoHS compliant[3] | Yes | Yes | Yes | Yes | Yes |
| **Performance** | | | | | |
| Interface Transfer Rate (max) Interface Speed | 6 Gb/s | 6 Gb/s | 6 Gb/s | 6 Gb/s | 6 Gb/s |
| Interface Transfer Rate (max)[4] Internal Transfer Rate | 255 MB/s | 240 MB/s | 265 MB/s | 240 MB/s | 235 MB/s |
| Cache (MB)[5] | 512 | 256 | 256 | 256 | 256 |
| Performance Class | 7200 RPM Class | 7200 RPM Class | 7200 RPM Class | 7200 RPM Class | 7200 RPM Class |
| **Reliability/Data Integrity** | | | | | |
| Load/unload cycles[6] | 600,000 | 600,000 | 600,000 | 600,000 | 600,000 |
| Non-recoverable errors per bits read | <10 in $10^{14}$ | <10 in $10^{14}$ | <10 in $10^{14}$ | <10 in $10^{14}$ | <10 in $10^{14}$ |
| MTBF (hours)[7] | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| Workload Rate (TB/year)[8] | 300 | 300 | 300 | 300 | 300 |
| Limited warranty (years)[9] | 5 | 5 | 5 | 5 | 5 |
| **Power Management[10]** | | | | | |
| 12VDC ±5% (A, peak) | 1.85 | 1.8 | 1.75 | 1.8 | 2.08 |
| 5VDC ±5% (A, peak) Average power requirements (W) | | | | | |
|   Read/Write | 6.2 | 6.0 | 8.4 | 5.7 | 8.8 |
|   Idle | 3.0 | 2.8 | 4.6 | 2.8 | 4.6 |
|   Standby and Sleep | 0.8 | 0.6 | 0.5 | 0.5 | 0.7 |
| **Environmental Specifications[11]** | | | | | |
| Temperature (°C) | | | | | |
|   Operating | 0 to 65 | 0 to 65 | 0 to 65 | 0 to 65 | 0 to 65 |
|   Non-operating | -40 to 70 | -40 to 70 | -40 to 70 | -40 to 70 | -40 to 70 |
| Shock (Gs) | | | | | |
|   Operating, (2 ms, read/write) | 30 | 30 | 30 | 30 | 30 |
|   Operating, (2 ms, read) | 65 | 65 | 65 | 65 | 65 |
|   Non-operating (2 ms) | 300 | 300 | 250 | 300 | 300 |
| Acoustics (dBA)10 | | | | | |
|   Idle | 20 | 20 | 34 | 20 | 29 |
|   Seek (average) | 36 | 36 | 38 | 36 | 36 |
| **Physical Dimensions** | | | | | |
| Height (in./mm, max) | 1.028/26.1 | 1.028/26.1 | 1.028/26.1 | 1.028/26.1 | 1.028/26.1 |
| Length (in./mm, max) | 5.787/147 | 5.787/147 | 5.787/147 | 5.787/147 | 5.787/147 |
| Width (in./mm, ± .01 in.) | 4/101.6 | 4/101.6 | 4/101.6 | 4/101.6 | 4/101.6 |
| Weight (lb/kg , ± 10%) | 1.52/0.69 | 1.46/0.66 | 1.65/0.75 | 1.43/0.65 | 1.58/0.72 |

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# WD Red™ Pro

## Specifications

|  | 6TB | 4TB | 2TB |
|---|---|---|---|
| Model Number[1] | WD6003FFBX | WD4003FFBX | WD2002FFSX |
| Recording Technology | CMR | CMR | CMR |
| Interface | SATA 6 Gb/s | SATA 6 Gb/s | SATA 6 Gb/s |
| Formatted capacity[2] | 6TB | 4TB | 2TB |
| Form factor | 3.5-inch | 3.5-inch | 3.5-inch |
| Native command queuing | Yes | Yes | Yes |
| Advanced Format (AF) | Yes | Yes | Yes |
| RoHS compliant[3] | Yes | Yes | Yes |
| **Performance** | | | |
| Interface Transfer Rate (max) Interface Speed | 6 Gb/s | 6 Gb/s | 6 Gb/s |
| Interface Transfer Rate (max)[4] Internal Transfer Rate | 238 MB/s | 217 MB/s | 164 MB/s |
| Cache (MB)[5] | 256 | 256 | 64 |
| Performance Class | 7200 RPM Class | 7200 RPM Class | 7200 RPM Class |

### Reliability/Data Integrity

|  | 6TB | 4TB | 2TB |
|---|---|---|---|
| Load/unload cycles[6] | 600,000 | 600,000 | 600,000 |
| Non-recoverable errors per bits read | <10 in $10^{14}$ | <10 in $10^{14}$ | <10 in $10^{14}$ |
| MTBF (hours)[7] | 1,000,000 | 1,000,000 | 1,000,000 |
| Workload Rate (TB/year)[8] | 300 | 300 | 300 |
| Limited warranty (years)[9] | 5 | 5 | 5 |

### Power Management

|  | 6TB | 4TB | 2TB |
|---|---|---|---|
| 12VDC ±5% (A, peak) | 1.79 | 1.79 | 1.9 |
| 5VDC ±5% (A, peak) Average power requirements (W) | | | |
| Read/Write | 7.2 | 7.2 | 7.8 |
| Idle | 3.7 | 3.7 | 6.0 |
| Standby and Sleep | 0.4 | 0.4 | 1.4 |

### Environmental Specifications[11]

|  | 6TB | 4TB | 2TB |
|---|---|---|---|
| Temperature (°C) | | | |
| Operating | 0 to 65 | 0 to 65 | 0 to 65 |
| Non-operating | -40 to 70 | -40 to 70 | -40 to 70 |
| Shock (Gs) | | | |
| Operating, (2 ms, read/write) | 30 | 30 | 30 |
| Operating, (2 ms, read) | 65 | 65 | 65 |
| Non-operating (2 ms) | 300 | 300 | 300 |
| Acoustics (dBA) | | | |
| Idle | 29 | 29 | 29 |
| Seek (average) | 36 | 36 | 31 |

### Physical Dimensions

|  | 6TB | 4TB | 2TB |
|---|---|---|---|
| Height (in./mm, max) | 1.028/26.1 | 1.028/26.1 | 1.028/26.1 |
| Length (in./mm, max) | 5.787/147 | 5.787/147 | 5.787/147 |
| Width (in./mm, ± .01 in.) | 4/101.6 | 4/101.6 | 4/101.6 |
| Weight (lb/kg , ± 10%) | 1.58/0.72 | 1.58/0.72 | 1.58/0.72 |

Specifications subject to change without notice.

[1] Not all products may be available in all regions of the world

[2] As used for storage capacity, one megabyte (MB) = one million bytes, one gigabyte (GB) = one billion bytes, and one terabyte (TB) = one trillion bytes. Total accessible capacity varies depending on operating environment. As used for buffer or cache, one megabyte (MB) = 1,048,576 bytes. As used for transfer rate or interface, megabyte per second (MB/s) = one million bytes per second, and gigabyte per second (Gb/s) = one billion bits per second. Effective maximum SATA 6 Gb/s transfer rate calculated according to the Serial ATA specification published by the SATA-IO organization as of the date of this specification sheet. Visit www.sata-io.org for details.

[3] WD hard drive products manufactured and sold worldwide after June 8, 2011, meet or exceed Restriction of Hazardous Substances (RoHS) compliance requirements as mandated by the RoHS Directive 2011/65/EU.

[4] Controlled unload at ambient condition.

[5] MTBF specifications are based upon internal testing using a 40°C base casting temperature. MTBF is based on a sample population and is estimated by statistical measurements and acceleration algorithms. MTBF does not predict an individual drive's reliability and does not constitute a warranty.

[6] Workload Rate is defined as the amount of user data transferred to or from the hard drive. Workload Rate is annualized (TB transferred X (8760 / recorded power-on hours)). Workload Rate will vary depending on your hardware and software components and configurations.

[7] See http://support.wd.com/warranty for regionally specific warranty details.

[8] Power measurements at room-ambient temperature.

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