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11  
12 **UNITED STATES DISTRICT COURT**  
13 **NORTHERN DISTRICT OF CALIFORNIA**

14  
15 EDWARD TROMBLE, individually and on  
behalf of all others similarly situated,

16 Plaintiff,

17 v.

18 WESTERN DIGITAL CORPORATION,

19 Defendant.  
20

Case No. 4:20-cv-08102-YGR

**FIRST AMENDED CLASS ACTION  
COMPLAINT**

**JURY TRIAL DEMANDED**

1 Plaintiff Edward Tromble (“Plaintiff”), by and through his attorneys, brings this action on  
2 behalf of himself and all others similarly situated against Defendant Western Digital Corporation  
3 (“Western Digital” or “Defendant”). Plaintiff makes the following allegations pursuant to the  
4 investigation of his counsel and based upon information and belief, except as to allegations  
5 specifically pertaining to himself and his counsel, which are based on personal knowledge.

6 **NATURE OF THE ACTION**

7 1. This is a class action lawsuit on behalf of purchasers of the following Western  
8 Digital hard drives: WD Blue 3.5" 2 terabyte (WD20EZZ), WD Blue 3.5" 6 terabyte  
9 (WD60EZZ), WD Blue 2.5" 1 terabyte (WD10SPZX), WD Blue 2.5" 2 terabyte (WD20SPZX)  
10 (collectively, the “WD Blue Drives”), and WD Black 2.5" 1 terabyte WD10SPSX (the “WD  
11 Black Drives”) (collectively, the “Hard Drives” or the “Products”).

12 2. Defendant has failed to disclose that the Hard Drives utilize Shingle Magnetic  
13 Recording (“SMR”) technology, which results in slower performance and inferior stability  
14 compared to higher-performance Conventional Magnetic Recording (“CMR”) technology.

15 3. Defendant previously utilized CMR technology in the Hard Drives, but  
16 surreptitiously switched to SMR technology in the last several years without disclosing this  
17 change to consumers.

18 4. This inferior technology is cheaper to manufacture for Defendant. But despite the  
19 downgrade, the pricing for the Hard Drives has remained the same.

20 5. In this regard, Defendant was able to increase its profits by reducing its costs of  
21 goods sold while still bringing in the same amount of revenue for each of the Hard Drives sold.

22 6. Had Defendant disclosed that the Hard Drives use SMR technology, Plaintiff and  
23 putative Class members would not have purchased the Hard Drives, or would have paid less for  
24 the Hard Drives than they did.

25 7. Plaintiff and Class members were accordingly injured by the price premium they  
26 paid for inferior hard drives.

## BACKGROUND

### I. OVERVIEW OF HARD DRIVE TECHNOLOGY

8. A hard drive disk (“HDD”) is a form of magnetic mass storage. Each hard drive contains a stack of circular plates of magnetic material called “platters,” divided into billions of tiny areas called “bits” that can be independently magnetized (to store a 1) or demagnetized (to store a 0). Data is “read” (retrieved) or “written” (recorded) onto an HDD by converting strings of bits into electrical current fed through an electromagnet that changes the magnetization of each bit. Once the information is written onto the HDD, the HDD uses a magnetic reader to turn the data back into a useful form (the file to be stored or retrieved), much like a record player’s needle translates a record’s grooves into music.<sup>1</sup>

9. To store the amount of data that HDDs store today, the HDDs must contain billions of bits. Thus, “areal density” comes into play, which is the number of bits of data that can be recorded onto a platter and is measured by the number of bits or gigabits (one billion bits) per square inch. Higher areal density values allow for greater storage using the same amount of disk space.<sup>2</sup>

10. There are several methods that exist to read and write data to HDDs and maximize areal density. The first of these is Perpendicular or Conventional Magnetic Recording (“CMR”). CMR “works by aligning the poles of the magnetic elements, which represent bits of data, perpendicularly to the surface of the disk. Magnetic tracks are written side-by-side, without overlapping.”<sup>3</sup>

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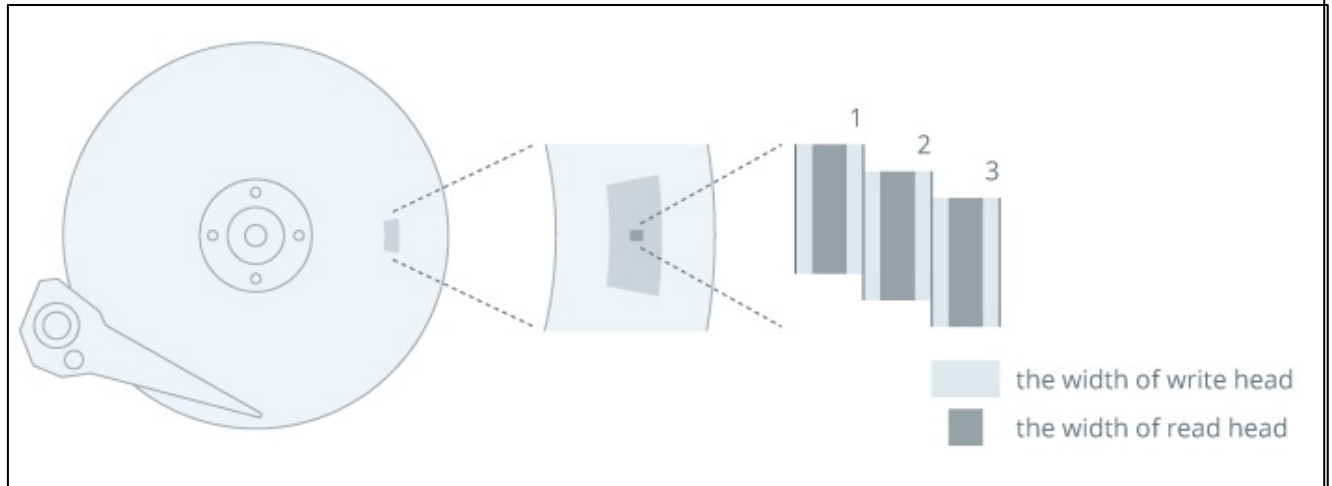
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<sup>1</sup> Kanawat Senanan, *How do Hard Drives Work?*, TED-ED, <https://www.youtube.com/watch?v=wteUW2sL7bc>; How a Hard Disk Drive Works, SEAGATE, <https://www.youtube.com/watch?v=NtPc0jI21i0>.

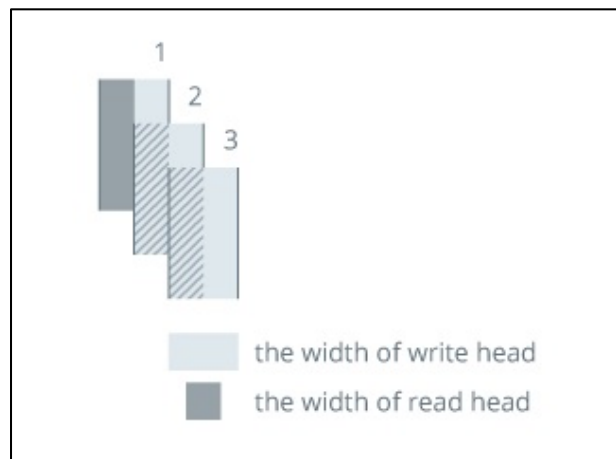
<sup>2</sup> *What are PMR and SMR Hard Disk Drives?*, SYNOLOGY, [https://www.synology.com/en-us/knowledgebase/DSM/tutorial/Storage/PMR\\_SMR\\_hard\\_disk\\_drives](https://www.synology.com/en-us/knowledgebase/DSM/tutorial/Storage/PMR_SMR_hard_disk_drives) (last accessed June 11, 2020).

<sup>3</sup> *Id.*



11. CMR HDDs “delivery excellent random-access performance,” and are as such “widely used not only in PCs but also for online storage applications.”<sup>4</sup> CMR is used in most standard HDDs.<sup>5</sup>

12. Another method of reading and writing data is Shingled Magnetic Recording (“SMR”). “Rather than writing each magnetic track without overlapping, SMR overlaps each new track with part of the previously written track, much like shingles on a roof. By overlapping the tracks, write heads become thinner, thus expanding areal density.”<sup>6</sup>



<sup>4</sup> Shimomura Kazuhito, *Shingled Magnetic Recording Technologies for Large-Capacity Hard Disk Drives*, 1 TOSHIBA REVIEW GLOBAL EDITION 33, 33 (2015), [https://www.toshiba.co.jp/tech/review/en/01\\_02/pdf/a08.pdf](https://www.toshiba.co.jp/tech/review/en/01_02/pdf/a08.pdf).

<sup>5</sup> Joel Hruska, *Western Digital, Seagate Are Shipping Slow SMR Drives Without Informing Customers: Reports*, EXTREME TECH, Apr. 14, 2020, <https://www.extremetech.com/computing/309389-western-digital-seagate-reportedly-shipping-slow-smr-drives-without-informing-customers>.

<sup>6</sup> *What are PMR and SMR Hard Disk Drives?*, SYNOLOGY.

1 13. SMR thus allows for low-cost, high-capacity HDDs.<sup>7</sup> “However, if new (or  
2 modified) data needs to be placed near existing data, the drive will have to overwrite the  
3 neighboring shingled tracks ... That makes [SMR] drive[s] significantly slower at writing tasks,  
4 especially for random writes.”<sup>8</sup>

5 14. In addition, the design of SMR drives makes permanent data loss more likely.  
6 Whereas data engineers can rebuild certain components on other storage types and recover lost  
7 data, the SMR data translators cannot be repaired. This can result in permanent data loss if the  
8 translators are damaged.<sup>9</sup>

9 15. In short, while SMR HDDs boast high areal density, they are at a disadvantage in  
10 nearly every other category.<sup>10</sup> For these reasons, SMR HDDs are typically only used “for cold  
11 data storage, like archives and backups, because of their poor performance,”<sup>11</sup> and are typically  
12 marked as “archival” to designate the use of the technology.<sup>12</sup> SMR HDDs are not  
13 recommended for use by the ordinary consumer.<sup>13</sup>

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17 <sup>7</sup> *Shingled Magnetic Recording Technologies for Large-Capacity Hard Disk Drives*, 1 TOSHIBA  
18 REVIEW GLOBAL EDITION at 33.

19 <sup>8</sup> Paul Alcorn, *Western Digital Fesses Up: Some Red HDDs Use Slow SMR Tech Without*  
20 *Disclosure*, TOM’S HARDWARE, Apr. 14, 2020, [https://www.tomshardware.com/news/wd-fesses-](https://www.tomshardware.com/news/wd-fesses-up-some-red-hdds-use-slow-smr-tech)  
21 [up-some-red-hdds-use-slow-smr-tech](https://www.tomshardware.com/news/wd-fesses-up-some-red-hdds-use-slow-smr-tech).

22 <sup>9</sup> David Blizzard, *WD Shingled Magnetic Recording – New Road Blocks For Data Recovery*  
23 *Pros*, BLIZZARD DATA RECOVERY, [https://www.blizzarddr.com/wd-smr-translation-new-road-](https://www.blizzarddr.com/wd-smr-translation-new-road-blocks/)  
24 [blocks/](https://www.blizzarddr.com/wd-smr-translation-new-road-blocks/).

25 <sup>10</sup> Joel Hruska, *Western Digital, Seagate Are Shipping Slow SMR Drives Without Informing*  
26 *Customers: Reports*.

27 <sup>11</sup> Paul Alcorn, *Western Digital Fesses Up: Some Red HDDs Use Slow SMR Tech Without*  
28 *Disclosure*.

<sup>12</sup> Jim Salter, *Buyer Beware—That 2TB-6TB “NAS” Drive You’ve Been Eyeing Might be SMR*,  
ARS TECHNICA, Apr. 17, 2020, [https://arstechnica.com/gadgets/2020/04/caveat-emptor-smr-](https://arstechnica.com/gadgets/2020/04/caveat-emptor-smr-disks-are-being-submarined-into-unexpected-channels/)  
[disks-are-being-submarined-into-unexpected-channels/](https://arstechnica.com/gadgets/2020/04/caveat-emptor-smr-disks-are-being-submarined-into-unexpected-channels/).

<sup>13</sup> Joel Hruska, *Western Digital, Seagate Are Shipping Slow SMR Drives Without Informing*  
*Customers: Reports*.

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