
The facts about “recertified” cartridges

# RISKY business

In the interest of saving money or cutting operational costs, some data centers are considering "recertified" or "reconditioned" data cartridges. These previously used cartridges are usually purchased from end users, sometimes run through a quick load test process and sold at a discount.

Buying used cartridges, however, could put your company's data at risk. By introducing used cartridges into your data center, you are introducing a huge set of unknowns. Where did the cartridges come from? Were they handled properly during their use? Has error-causing debris worked its way into the cartridge? How many read/write cycles has the cartridge gone through?

The answers to these key questions are connected to your mission critical data. Tape manufacturers today offer extremely high quality media that's designed for processing, storing and archiving data. You need the highest quality and performance. When it comes to your data, you cannot afford to risk using anything but the highest quality tape cartridges. StorageTek® sells magnetic media which has been manufactured under rigorous process controls — over 200 individual tests throughout the manufacturing process — so that expecations for performance, durability and archival stability will be met.

Bottom line, customers electing to purchase used media need to know that what they may be buying is another company's waste. Once a decision is made by a company to sell their used media to a distributor, little if any care or expense may be incurred to protect the media. "For sale" media is often tossed into boxes and shipped to the reseller with little if any regard for proper handling or transportation conditions. This, combined with pre-existing use and even abuse of the media, is what causes most of the problems with used media. These problems can wreak havoc in the data center — quickly negating any cost savings from the media itself.

## What is "recertification"?

Recertification is not a standardized process — it means different things to different companies. What's more, it does not necessarily mean you are receiving "blank" cartridges. Some cartridges, for example, can be degaussed to erase data, but high capacity media, such as Ultrium, 3590/3590E, 9840 and 9940, cannot be degaussed because it erases the factory-written servo pattern. If degaussing is not performed, used media sellers often claim to write a test pattern to the complete length of the tape to remove the data. Considering the time it takes to write a test pattern to a standard high capacity tape, a mere four-twelve cartridges could be processed per drive in a standard workday (presuming maximum throughput can be maintained and no failures are encountered).

The question is, how are these cartridges being "certified"? What criteria are they being measured against? How have they been handled? What data remains on the tape? There is no single, comprehensive test available that can verify what a cartridge has been exposed to technically, physically or environmentally.

The point is, a definitive way to ascertain the remaining useful life of a cartridge does not exist. Nor is there a way to detect handling damage, which could significantly compromise the quality level of the recertified cartridges.

Furthermore, StorageTek's media manufacturers have tested "recertified" cartridges and have found that often these tapes were merely put through a load test — the full length of the tape was not actually tested. The end result is that customers purchasing used tape cartridges are actually doing the "testing" of the tapes when they use them for the first time in their storage environments.

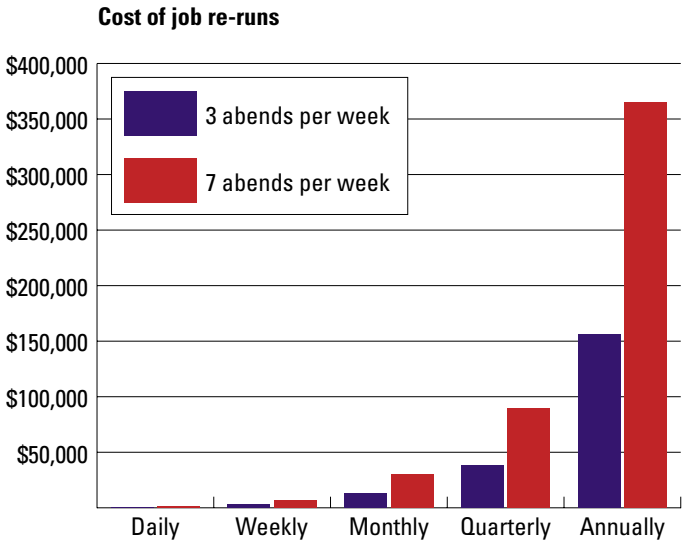
## The cost of errors in the data center

How much can errors cost your data center? Studies show that the cost of a job abend can range from $375 to $6,775 and beyond, depending on the event. If we assume a modest abend cost of $1,000 per occurrence and abends increase by just one per week from integrating used tape into your data center, you could be spending over $50,000 annually in increased operating expenditures (see chart below).

Depending on the technology, today's media has a usage life expressed in full file passes or archival life expectancy. The archival life of magnetic media may reasonably be expected to be about 15 to 30 years under normal usage conditions. However, without the media usage and storage history, you cannot know what condition used media is in and how it will perform in your data center.

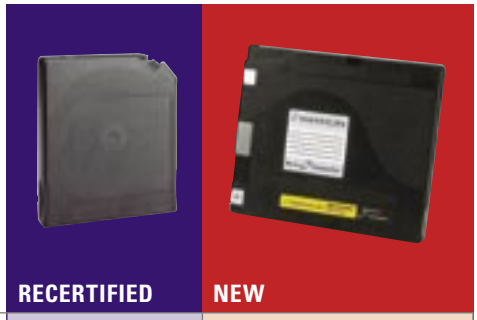
In addition, tests can't show what used media has been exposed to before it was resold as "certified." A certification process will not detect the amount of degradation on the tape and cannot ascertain the remaining life of the media. Tape damage may manifest itself over the remaining life of the media and may not have effects until later in its life. For example, many used tape cartridges exhibit excessive temporary errors, the silent killer in the tape process. By introducing marginally performing media into your process, you may be introducing the risk of data loss and job failure or extending your job processing schedules to accommodate additional recovery time from temporary errors.

Unfortunately, it's impossible to go back and evaluate the environments that used media came from. You can't interview the staff and management from the companies that used the cartridges before the reseller bought them. And you can never know how the tapes were used, stored or transported. All of this is extremely important to the expected life and successful use of tape cartridges.



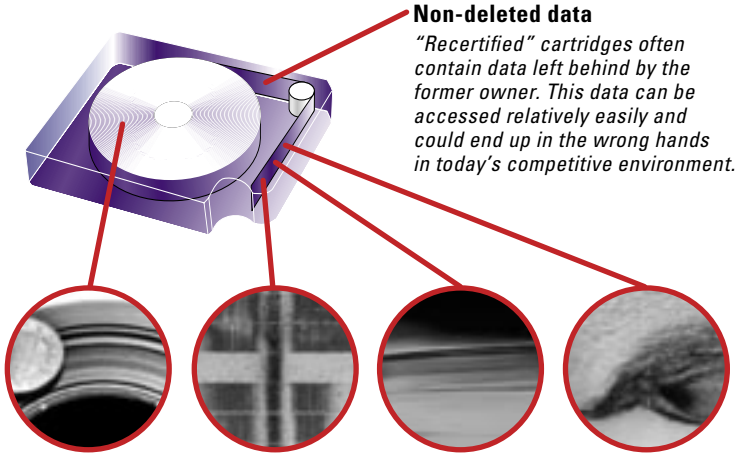
They may look the same, but what you get couldn't be more

# DIFFERENT



| | RECERTIFIED | NEW |
|---|---|---|
| **Expected archival life** | Unknown | 15 to 30 years |
| **Care and handling history** | Unknown | New and packaged properly |
| **Environmental history** | Unknown | New |
| **Amount of debris on tape surface** | Unknown | Sealed in shrink wrap from our factory cleanroom until delivery to your data center |
| **Ability to meet standard specification requirements** | Unknown | Meets or exceeds all published specifications |
| **Quality control processes** | Dubious | More than 200 individual tests |
| **Technical service support** | None | Direct from StorageTek |
| **Problem resolution support** | None | StorageTek's technical service engineers perform root cause analysis |
| **Warranty** | No manufacturer's warranty | Backed by StorageTek |

## The trouble with used data cartridges



**Non-deleted data**

*"Recertified" cartridges often contain data left behind by the former owner. This data can be accessed relatively easily and could end up in the wrong hands in today's competitive environment.*

**Elevated tape**

*Used cartridges often show wraps of tape that are elevated above the plane of the cartridge. This is caused by repeated back-and-forth motion of the tape over time from the mechanics of file access.*

**Z fold**

*Data should be continuous along the length of a tape. A "Z-fold" shown here causes data to drop out.*

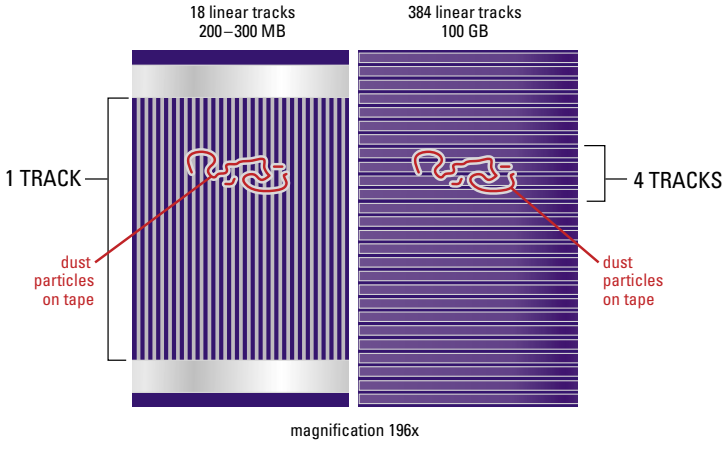
**Tape cinch**

*Drive-induced damage often results from inadequate preventative maintenance procedures. This illustration shows a tape cinch created by a drive that had not been properly maintained. Data in the cinch area is typically unreadable.*

**Edge damage**

*Dropping can cause impact damage on tape edges that can eventually affect performance.*

## Debris on tape




Today's data storage technologies can feature densities of more than 500 tracks on a half-inch wide tape. Tracks are not only smaller and closer together but also closer to the edges of the tape. Debris-causing errors that were recoverable in the past may cause catastrophic problems today.

Debris contamination comes from a number of sources: within the data center, exposure during shipping and transportation, or cross-contamination from other problem cartridges. As with handling damage, the effects of debris contamination may not show up immediately. However, even one piece of debris embedded into the surface of your tape can cause a "print through" or an image of the debris on adjacent wraps of the media. The tape drive can usually error-correct around a debris defect during a write operation, but after some time this image will cause distortion to the areas of the tape that were previously unaffected, creating hundreds of errors. Debris that would not have caused problems in technologies from the 1980s and 1990s can have serious, adverse impact on today's high performance, high capacity, high density media.

# YOUR DATA

## here today, gone tomorrow

### Are used cartridges worth the risk to your data?

Over the past five decades, tape capacities have grown at an incredible rate — nearly doubling every 24 months on average — and will likely exceed terabyte capacities in this decade. This is a tremendous amount of data to be put into a space that is the same size it was 20 years ago. This is why the quality of the tape media is more important than it has ever been — there is, literally, no room for error. In essence, your information lives on your tape media. Your data may spend a few hundred hours in your drives, but in a typical year of 24 x 7 operations, it may have to spend nearly 8,000 hours on your tapes. So it doesn't take a rocket scientist to understand the importance of tape quality. The smallest of tape errors can wreak havoc on a wide swath of your data.

### The dangers of selling used cartridges

Many data center managers are tempted to sell their old used cartridges to help boost their bottom lines. But is the small payoff really worth the risk? Most distributors selling cartridges have neither the time nor the test bandwidth to invest in proper testing of used media. If any testing is done, it is usually a simple load test and doesn't cover testing the entire surface of the tape — so some or all of the data on the tape surface may be left "intact," with customer's data exposed. Alternatively, a recertifier may simply erase the file index of a tape, which in effect removes the map to the data but not the data itself. The result? Some or all of your data remains behind — vulnerable to anyone with a modest amount of tech savvy.

### StorageTek's professional media services

What is the best way to guarantee that your data doesn't fall into the wrong hands? Let StorageTek's professional service organization destroy your confidential and sensitive data through incineration. We provide secure handling and eventual destruction in an environmentally sound facility. Contact your StorageTek sales representative for more information about this service.



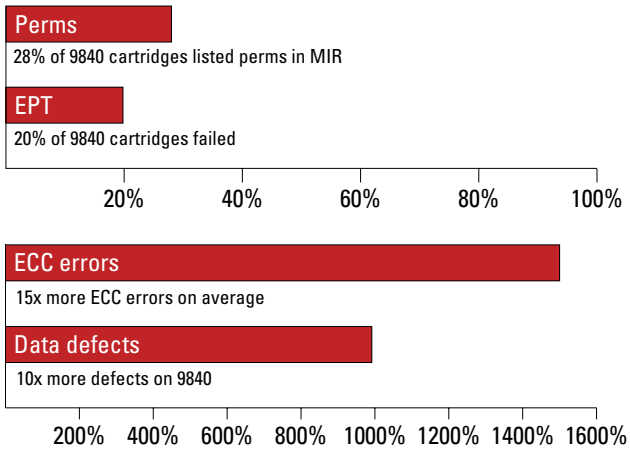
### Testing for errors

**StorageTek's testing consistently uncovers performance robbing errors in used tapes**

Our engineers constantly analyze and test cartridges as part of helping customers optimize their data center operations. They also test a selection of used tapes from customers and have classified error types into the following categories.

- **Permanent error testing.** This testing entails measuring the number of permanent errors which lead to job failure or a job abort. This often results in the 3:00 a.m. phone call to the data center manager or in ongoing job re-runs. In one sample, 28 percent of the used 9840 cartridges tested contained "perms" or permanent errors on the tapes.
- **End point testing.** In this test (EPT), technicians assess the quality of media compared to performance specifications. In our manufacturing facilities, cartridges that fail the end point testing process are scrapped. In one sample of used cartridges, 20 percent of the 9840 cartridges tested failed end point testing.
- **ECC errors.** Error Correction Code (ECC) errors are recoverable errors that the drive detects during job processing. ECCs tie up processor time and decrease throughput, resulting in longer processing time for each job, often causing jobs to be completed late and reducing productivity. As ECCs increase, processing time increases exponentially. In one sample of returned used cartridges, the media exhibited tens of thousands of errors that would have resulted in dramatic increases in job processing time. On 9840 tape cartridges tested, the used tapes had on average, 15 times (1,500 percent) more ECC errors than a random sample of new tape cartridges.
- **Data defects.** Generally speaking, data transients, temps or defects are defined as what the drive corrects "on-the-fly." They usually occur during the write process, which causes the drive to retry once or several times in order to write effectively. The more defects, transients or temps that are encountered on the tape, the longer it will take to write data to the tape cartridge. On 9840 tape cartridges tested, the used tapes had on average 10 times (1,000 percent) more data defects than a random sample of new 9840 tape cartridges.

**Used tape errors/defects**



# WHAT CAN YOU DO? >>>

## Make sure you don't pay for new and get used.

Always specify "new" when you order your tape cartridges.

## Don't let your corporate data get into the wrong hands.

Destroy your used cartridge inventory through environmentally-friendly destruction processes.



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