

Putting LTO cartridge cases to the test:

What the science says about critical case design and protection

The use of tape cartridges for data storage and backup is growing, in both the amount of data being stored and the value of the content itself.

According to studies, tape provides significant cost savings compared to disk storage, with lower cost per GB, lower operating expenses and lower energy costs.¹ In addition, compliance and legal factors drive many companies to rely on tape. Most major internet enterprises understand this--that's why companies like Google, YAHOO, IBM, and many other massive data creators move their data to tape storage on a regular basis.

All of these factors make the cases used for protection more important than ever. Yet there have been few scientific studies of case performance.

This paper examines the importance of proper tape storage, the claims made by case makers, and then presents the results of scientific testing, using certified procedures.

There have been few scientific studies of case performance. Do tape storage cases live up to their claims? Which cases actually provide the best protection?

What the tape manufacturers say

Fuji Film, the world's largest storage tape manufacturer, emphasizes the importance of careful handling of tape cartridges. The company's literature makes several recommendations², including:

- Do not transport or store cartridges without adequate protection
- Magnetic tape data cartridges should be protected from impact loads, vibration and extremes of temperature and humidity during transportation
- Always ship data cartridges in original manufacturer or better packaging
- **Packaging should be free of dust, debris and contaminants, such as foam and adhesives**
- Cartridges should be packed snugly in a rigid shipping case with adequate impact protection

In practice, most tape users don't bother with the manufacturer's case, instead preferring to store tapes in specially built cases with their own protection slots. During shipment especially, these cases, like all packages, can be dropped, kicked, run over or rained on.

¹ Enterprise Strategy Group, 2011

² FujiFilm Technical Support

While container companies claim their cases provide sufficient protection, there have been few scientific tests to verify these claims. Do storage cases live up to their claims? Which cases actually provide the best protection?

What case makers say

For years, one of the providers of tape storage cases, Turtle, has claimed their double-walled cases provide protection for tapes. Their basic design has remained unchanged for more than 20 years. However, *there are no published tests that verify whether this type of case adequately protects the tapes or not.*

XpresspaX was founded to address the storage industry demand for a better system. The company has poured tens of thousands of dollars into research and development to create a completely different and vastly improved case system. To prove that these XpresspaX innovations provide an improvement in tape protection, XpresspaX funded a series of tests and scientific evaluations following the approved standards and protocols of the ISTA (International Transit Association), an independent testing organization devoted to testing and certifying packaging performance.

XpresspaX has invested tens of thousands of dollars in R&D to create an improved case system.

What the scientific tests show

IMPACT PROTECTION

A series of drop tests was conducted conforming to ISTA 1A testing protocols³. Tests were performed on cartridges with no case, cartridges in a Turtle LTO case, and cartridges in an XPX case with the patented XpresspaX insert.

Cases were dropped from a height of 30 inches ten times each from a variety of angles, as indicated by ISTA procedures. In each drop test, an accelerometer was attached directly to a cartridge inside the case in order to measure the actual impact of the drop on the cartridge itself.

****ADD CHART FROM CERT SHEET****

The results were conclusive. As shown in the chart, the impact force on the cartridge was 51% lower in the XpresspaX case than when dropped as a single tape, and 33% lower than in the Turtle case, proving that XpresspaX cases outperform the competition by absorbing more energy on impact, helping to maintain data integrity.

³ Tests were conducted by the laboratories of Rand Whitney and National Technical Systems. Visit XpresspaX.com to learn more about test procedures and results.

Additional tests and certifications

WATER and PARTICULATE

XpresspaX cases have also undergone rigorous testing for protection against ingress of water and particulates.

IEC-certified to resist penetration

The International Electrotechnical Commission (IEC) defines how packages should protect against penetration by water or solid objects. XpresspaX cases passed IEC Level 4 tests for water penetration and intrusion by very small objects.

Water test (Level 4): 10 minutes under oscillating spray. **Test result: PASS**

Intrusion test (Level 4): 1mm probes test gaskets and seams. **Test result: PASS**

XpresspaX cases are the *only* specifically designed media case with these certifications:

ISTA-certified to withstand vibration and shock

International Safe Transit Association (ISTA) defines how packages should perform to ensure protection of their contents. XpresspaX cases passed ISTA tests for vibration and shock.

Vibration test: 55 minutes, more than 1,400 impacts. **Test result: PASS**

Shock test: 10 free fall drops from 10 different angles. **Test result: PASS**

Why XpresspaX cases provide superior protection

The scientific data are clear: XpresspaX cartridge tape cases provide superior protection against such dangers as impact, vibration, particulates and water.

XpresspaX is the case of choice for the world's largest tape storage vaults, data creators, and the world's largest maker of tapes.

This is no accident. XpresspaX invests heavily in R&D year after year, as part of our commitment to provide a superior solution to cartridge protection. By researching, testing, and constant improvement, XpresspaX has advanced the science of cartridge tape cases and delivered superior protection for the vital data that is stored on them.

Advantages of XpresspaX cases include:

- **Strong outside.** XpresspaX cases are made of a custom-formulated rubberized polymer blend, designed to protect and absorb impact.

Visit XpresspaX.com to learn more about test procedures and results.

- **Customized inserts inside.** XpresspaX cases are designed with media-specific inserts that provide a second layer of defense, protecting each individual cartridge in the case.
- **Steel latches.** Integrated lockable steel latch provides for more secure closing.
- **No foam.** Turtle cases use foam inserts, and foam is known to create particles. XpresspaX uses no foam for tape-specific containers, eliminating the threat of foam particles damaging tapes.

Conclusion

The science clearly shows that XpresspaX cases provide better protection than other competitive cases. XpresspaX outperformed a major competitor in drop tests by 33%, and are the only cases certified for protection against vibration, shock and penetration. Furthermore, XpresspaX continues to invest in research and development, and is committed to continually improving case performance as technology advances.

The bottom line: When put to the test, there is a dramatic difference in case technology and performance. Shouldn't you choose the only cases proven and certified to protect your valuable data cartridges?

About XpresspaX

XpresspaX, Inc. was founded in 2000 to design and deliver a better solution for companies that need to transport and store large volumes of media, such as backup tapes, drives and CDs. Developed in cooperation with a leading media storage company and a leading tape and media manufacturer, the XpresspaX system is specifically designed to be space-efficient and cost-effective, while meeting the requirements for storage facilities and transport vehicles.

XpresspaX has sold more than a quarter million cases and counting. The company also serves other markets that ship and store valuable items, such as pharmaceuticals and water processing.

All XpresspaX cases and inserts are made in the USA. XpresspaX cases come with a lifetime warranty against manufacturer's defects in material or workmanship. Please see our complete warranty at www.xpresspax.com.

To learn more visit www.xpresspax.com.