



**EASTMAN**

Greater **performance**  
from your card.

Greater **security**  
for your customers.



Until now, smart cards and other security-critical documents have been limited by the material used to make them. Some couldn't withstand the dynamic stress of daily use and aging. Some couldn't accommodate recent advances in composite card structures, more powerful electronics, and security technology. Many required frequent replacement, increasing their total cost of ownership.

## Durability at the heart of your card

The increased need for durability has completely changed the secure credentialing market.<sup>1</sup> The increased investment in technology now far overshadows the investment in substrate and film. The traditional favorite, polycarbonate (PC), has material deficiencies related to:

- Chemical attack (including skin oils and lotions)
- Stress corrosion cracking
- Difficulties in processing and composite card structures due to high lamination temperature

Because of these failures, PC-based security cards often require replacement long before their expected 10-year life span.<sup>1</sup> Replacing cards is costly, especially if they fail before their expected life span is reached.

## Security in the hands of your customers

New technologies offer enhanced security against forgery and data theft. Packing this technology into a smart card is the industry's next challenge.

- Today's smart cards require the capability to be digitalized and completely IT-compatible.
- With more electronics installed between the lamination layers of the cards, stress corrosion cracking becomes a major security concern.

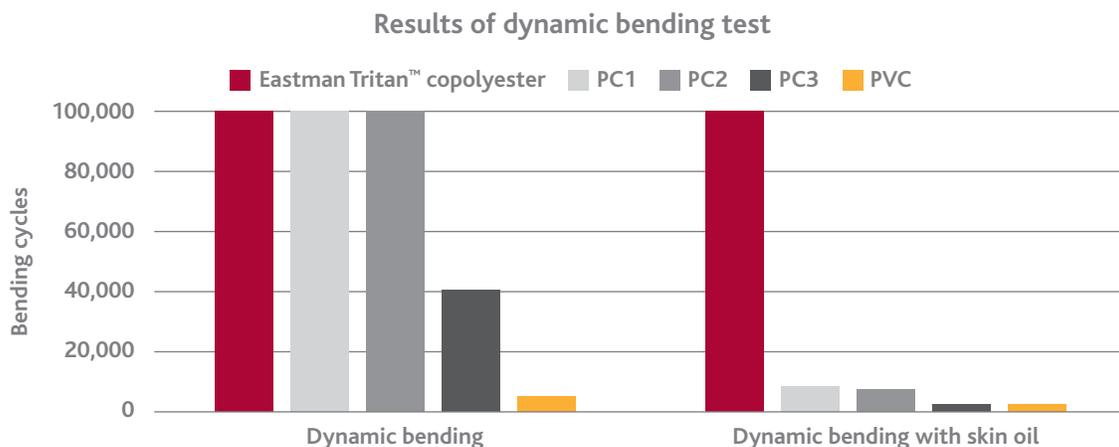
Keeping pace with new security features requires a new generation of polymers.

## A material difference in smart-card polymers

To justify an investment in advanced smart-card technology, the card itself must be able to withstand the combined rigors of repeated stress and exposure to a variety of chemicals.

- Polycarbonate (PC) is not sufficiently resistant to chemicals—skin oils, in particular—and is subject to stress corrosion cracking.
- Polyvinyl chloride (PVC) is neither durable nor chemical resistant.
- Eastman Tritan™ copolyester offers a combination of durability and chemical resistance.

The chart below shows the results of dynamic bending tests—with and without exposure to skin oil—that support these conclusions.



Sources: Fogra 08/2015, Fogra 11/2015, Fogra 06/2016

<sup>1</sup>Martin, Zack. "Evaluating card durability." *SecureIDNews.com*. *SecureIDNews*, 18 Jan. 2016.

Tritan is a high performance material with a combination of properties that makes it ideal for smart cards and other security-critical documents:

- Outstanding durability
- Excellent resistance to skin oils
- Excellent printability and ink compatibility
- Excellent resistance to stress corrosion cracking
- Simple processing and adhesive compatibility
- Free of bisphenol A (BPA) and bisphenol S (BPS)

The unique material properties of Eastman Tritan™ copolyester make it possible to further advance the functionality of smart cards. Tritan allows the integration of state-of-the-art electronics and multiple security elements for enhanced personalization. Cards made with Tritan have been tested and passed accelerated aging tests simulating 10 years of real-life usage.<sup>2</sup>

## Tritan is a new benchmark for security-critical documents.

There is a material difference between polymers used for the substrates and films used to make smart cards. The following table compares the material properties of Tritan with traditional polymers—properties that define durability and impact the integration of advanced security technology.

*“Card producers can use Eastman Tritan™ copolyester to build all mechanical, electronic, optical, biometric, and cryptographic security features, which can be used to protect a smart card against forgery and data theft, without a negative effect on the required durability. Tritan sets a new benchmark for smart cards.”*

### Daniel Lützelshwab

Representative for Folienwerk Wolfen, a world leader in specialized foils

### Comparison of materials and films commonly used for security-critical documents

| Capabilities/usage     | Eastman Cadence™ copolyester (PETG) | Eastman Tritan™ copolyester | PVC (polyvinyl chloride) | PC (polycarbonate)                                  | ABS (acrylonitrile butadiene styrene) | BOPET (biaxially-oriented polyethylene terephthalate) |
|------------------------|-------------------------------------|-----------------------------|--------------------------|---|---------------------------------------|---|
| Lamination             | Excellent                           | Excellent                   | Excellent                | Fair<br><i>Requires high-temperature lamination</i> | Fair                                  | <i>Requires a coating<sup>a</sup></i>                 |
| Printing               | Excellent                           | Excellent                   | Excellent                | Good  | <i>Requires corona treatment</i>      | <i>Requires a coating<sup>a</sup></i>                 |
| Laser engraving        | Good                                | Excellent                   | Poor                     | Excellent   | Poor                                  | —   |
| Flex crack resistance  | Good                                | Excellent                   | Good                     | Excellent   | Poor                                  | —   |
| Chemical resistance    | Good                                | Excellent                   | —                        | —   | —                                     | Excellent   |
| Processing flexibility | Extrusion/calendering               | Extrusion                   | Extrusion/calendering    | Extrusion   | Extrusion                             | Extrusion   |

<sup>a</sup>BOPET is a semicrystalline thermoplastic; the other materials listed are amorphous polymers.

<sup>2</sup>ISO 10373-1 / 24789-2 certificate and Fogra AGE F02 (10) certificate



Eastman is a global advanced materials and specialty additives company that produces a broad range of products found in items people use every day. With a portfolio of specialty businesses, Eastman works with customers to deliver innovative products and solutions while maintaining a commitment to safety and sustainability. Its market-driven approaches take advantage of world-class technology platforms and leading positions in attractive end-markets such as transportation, building and construction, and consumables. Eastman focuses on creating consistent, superior value for all stakeholders. As a globally diverse company, Eastman serves customers in more than 100 countries and had 2016 revenues of approximately \$9.0 billion. The company is headquartered in Kingsport, Tennessee, U.S.A., and employs approximately 14,000 people around the world. For more information, visit [www.eastman.com](http://www.eastman.com).



For more information about Tritan, visit [www.eastman.com/Tritan](http://www.eastman.com/Tritan).

**EASTMAN**  
The results of insight™

**Eastman Corporate Headquarters**  
P.O. Box 431  
Kingsport, TN 37662-5280 U.S.A.

U.S.A. and Canada, 800-EASTMAN (800-327-8626)  
Other Locations, +(1) 423-229-2000

[www.eastman.com/locations](http://www.eastman.com/locations)

Although the information and recommendations set forth herein are presented in good faith, Eastman and its subsidiaries make no representations or warranties as to the completeness or accuracy thereof. You must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment, or formulation in conflict with any patent, and we make no representations or warranties, express or implied, that the use thereof will not infringe any patent. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS AND NOTHING HEREIN WAIVES ANY OF THE SELLER'S CONDITIONS OF SALE.

Safety Data Sheets providing safety precautions that should be observed when handling and storing our products are available online or by request. You should obtain and review available material safety information before handling our products. If any materials mentioned are not our products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

© 2017 Eastman. Eastman brands referenced herein are trademarks of Eastman or one of its subsidiaries or are being used under license. The ® symbol denotes registered trademark status in the U.S.; marks may also be registered internationally. Non-Eastman brands referenced herein are trademarks of their respective owners.