

Quality Control

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A Key to Successful Magnetic Stripe Card Transactions

Providing a high quality, highly reliable magnetic product requires a well-thought out and organized quality control program. In this article, Mark Persinko explains the different types of magnetic stripes, how they are applied and how to ensure their quality.

Smart cards have been seen as a revolution in card technology. However, this new application requires an overhaul of the point of sale processing infrastructure for the US market. Card manufacturers and issuers have realized the challenge of introducing this new card technology into a merchant's established infrastructure. The most likely scenario on the horizon for the US is cards that incorporate magnetic-stripe and chip technology, which creates ultimate versatility and compatibility with existing infrastructures and newer off-line systems. Furthermore, as a result of the established infrastructure for magnetic stripe transactions, and their simplicity in data access, magnetic stripes will most likely continue to be the most prevalent source of transaction methods in the US.

When the magnetic stripe is rendered useless through accidental erasure or poor card manufacturing, it is considered a "card killer" defect. Faulty magnetic media or encoding is a critical area of risk for both card manufacturers and card issuers, resulting in financial losses and ultimately loss of business. Therein lies the importance of a comprehensive process of quality checking magnetic stripes to ensure functionality and reliability.

Magnetic Stripe Material

Magnetic stripes are made of finely ground metallic ores and polymer. The ores can be magnetized. Information can be stored on magnetic tapes and the information can be removed by erasing it. However, all magnetic stripes are not created equal.

Types of Magnetic Stripes

Magnetic stripes differ in how easy they are to erase; this is called Coercivity. Low Coercivity particles are made of gamma ferric oxide and are needle shaped with the north and south poles at the ends. Low Coercivity is usually brown in color and can be easily erased with a kitchen magnet, however, the majority of financial cards and transit tickets used to date use LoCo magnetic media, due to the reduced costs associated with their production.

When the magnetic stripe is corrupted by stray magnetic fields, transactions have to be entered manually. Manual key entry avoids the use of any integral magnetic stripe security features and is prone to human error. Manual key entry also offers opportunities for fraudulent activity and, as a result, there is a new focused effort on the part of all card issuers to improve stripe quality and reduce the need for key entry.

Enter High Coercivity (HiCo) cards. To improve reliability against magnetic erasure and to minimize the number of manual key

entries, many financial card issuers have changed to High Coercivity. HiCo particles are barium ferrite and are "plate" shaped. The north and south poles are on flat surfaces (compared to the pointed ends with LoCo). HiCo is black or colored and is harder to erase because it requires a much higher level of energy (magnetic current) to change the polarity of the particles-typically 10 times more current than for LoCo. Many customers specify High Coercivity to prevent accidental erasure.

Stripe Application Process

Magnetic stripes also differ in their application process. Cold peel process involves applying tape to the overlay in roll form before lamination. In the roll-on process, the tape is applied after the card has been cut to size. Cold peel is the preferred method. Cold peel produces a flush magnetic stripe with less work. Since it is applied before lamination, the major challenge is ensuring that the overlay, with the magnetic stripe applied, is correctly placed.

Stripes also differ in how many tracks of information they can hold. A track is the area across the card's stripe where the information is stored. Two and three tracks are the industry standard. Two-track tape is 0.330 inches wide, and three-track tape is 0.460 inches or 0.500 inches wide.

Ensuring Quality of the Magnetic Stripe

Quality checks are performed in the following ways:

- Incoming inspection
- Tape layer template
- Sheet tic marks
- Magnetic gauges
- Machine inspection

For the incoming inspection, samples from each lot are made into cards and tested with a magnetic stripe analyzer. The next step involves the tape layer template, which checks the spacing of the magnetic strips on the overlay. Thirdly, tic marks on the card back are used to align the magnetic stripe and position at the collator. Then, magnetic gauges check the stripes position on the card. Lastly, the machine inspects magnetic stripe placements and integrity on final quality check for the entire card.

Currently, QualTeq's Magcheck process includes four parts for ultimate quality assurance:

1) Incoming inspection of magnetic stripe performed using the Mag3 Analyzer. Subject to internal specifications that are tighter than ISO. A sampling plan is used to determine the number of reels to test from any shipment by lot number. Samples of magnetic stripe from the outside of the reel are tested for compliance.

2) In-process testing is performed on samples (20) from each batch of cards (36,000) to insure usability-not the full test, but to ensure cards were manufactured correctly.

3) Compliance testing (five to eight) samples from each job are tested prior to shipment for compliance to the ISO standard.

4) Database archiving of test results by job number and magnetic tape number. This enables easy retrieval of information on any job manufactured in the last three years, and probably more importantly, allows tracking of each tape manufacturers' performance.

As outlined above, several steps need to be taken in order to ensure the quality of magnetic stripes on transaction cards. A beautifully designed card can be rendered useless if the magnetic stripe becomes dysfunctional. Magnetic stripe cards continue to serve as the predominant transaction enabler, as well as a viable complement to Smart Card technology, due to the established infrastructure and long history of the technology, as well as its functionality and relative cost.



Mark Persinko, quality facilitator for QualTeq, Inc., implements methods and procedures for QualTeq's card production to comply with customer requirements, any applicable standards and QualTeq's internal quality criterion. In addition, Persinko also oversees raw materials specifications and incoming testing. QualTeq is an industry provider of magnetic stripe quality and reliability, with its patented MagCheck process.

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