



Migration Test Comparison White Paper

Flexible Magnetic Sheeting

August 28, 2007

INTRODUCTION

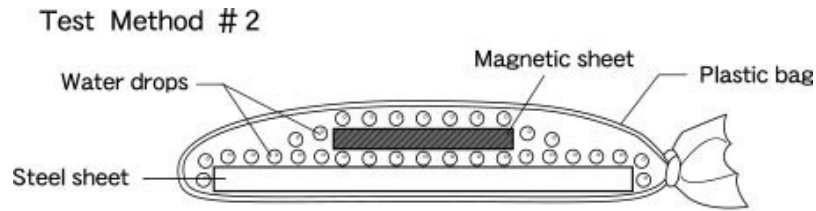
Comparison migration tests were conducted at the engineering and manufacturing laboratories of MagX Co., Ltd., in Tsukuba, Japan during the month of August 2007. Test samples were randomly purchased and/or acquired in the United States through normal channels during the month of July 2007.

TEST PRODUCTS LISTING

Samples were numbered, coded, and tested in "as received" condition.

Reference #	Material Code	Description
1	MOI, Vinyl Made in China	.030"White Matte with Matte Back Coating
2	JMC, Vinyl Made in Taiwan	.030" White Matte with Gloss Back Coating
3	MMC, Vinyl Made in USA	.030"White Matte without Back Coating
4	JMC, Vinyl Made in Taiwan	.030"White Matte without Back Coating
5	MMC, Vinyl Made in USA	.030"White Matte without Back Coating
6	FII, Vinyl Made in USA	.027" White Matte with Gloss Back Coating
7	FII, Vinyl Made in USA	.015" White Matte with Gloss Back Coating
8	FII, Plain Made in USA	.020"Plain Brown with Gloss Back Coating
9	FII, Plain Made in USA	.015"Plain Brown with Gloss Back Coating
10	PML, Plain Made in China	.015"Plain Brown without Back Coating
11	MAGX	.030" White Matte with Matte Back Coating

TEST METHOD



Water was sprayed from a 50 ml container onto the surface of a white coated steel sheet. Magnetic specimens were then placed onto the steel sheet surface. Additional water was then sprayed onto the steel as well as onto the applied magnetic specimens. In order to help accelerate the migration process, the steel and magnetic materials were placed into a plastic bag. The remaining water from the 50 ml container was also poured onto the surface of the steel sheet and magnetic specimens. Finally, the bag was sealed to prevent moisture from evaporating during the temperature cycling. The bag was deliberately positioned so that the water would remain on the surface of the steel and magnetic sheets and not drain off.

The bag containing the steel sheet and magnetic specimens was then placed in a chamber and temperature cycled. Each cycle consisted of 12 hours at 100°C / 212 °F and 12 hours at 20°C / 68°F. This was performed for a total of two cycles.

After conditioning, each specimen was individually tested by carefully lifting up one corner approximately 1/4 inch. The lifted corner was then secured to the load cell on the testing stand and pulled in a diagonal direction across the surface of the coated steel sheet. Each specimen was tested as described above until the specimen fully released from the steel sheet or the specimen exhibited a material failure.

GRADING SYSTEM - DEGREE OF MIGRATION:

<u>Force required to remove magnetic sheet from steel surface</u>	<u>Rating</u>
0 – 50 grams	A
50 – 150 grams	B
150 – 500 grams	C
500 – 1000 grams	D
1000 + grams – material failure	F

GRADING SYSTEM - DEGREE OF STAIN:

<u>Stain ratio left on steel surface after magnets were removed (%)</u>	<u>Rating</u>
Below 5%	1
5 – 20	2
20 – 40	3
40 – 60	4
60- entire area	5

TEST RESULTS

SCORING

The following tables were used to determine the proper rating based on the testing data obtained within this report for each specimen tested:

Reference #	Material Code	Description	Degree of Migration	Degree of Stain
1	MOI, Vinyl Made in China	.030"White Matte with Matte Back Coating	F Magnetic layer failed to release	5
2	JMC, Vinyl Made in Taiwan	.030" White Matte with Gloss Back Coating	C Partially fused	5
3	MMC, Vinyl Made in USA	.030"White Matte without Back Coating	F Magnetic layer failed to release	4
4	JMC, Vinyl Made in Taiwan	.030"White Matte without Back Coating	D Partially fused	5
5	MMC, Vinyl Made in USA	.030"White Matte without Back Coating	F Magnetic layer failed to release	5
6	FII, Vinyl Made in USA	.027" White Matte with Gloss Back Coating	D Partially fused	5
7	FII, Vinyl Made in USA	.015" White Matte with Gloss Back Coating	C	3
8	FII, Plain Made in USA	.020"Plain Brown with Gloss Back Coating	D Partially fused	4
9	FII, Plain Made in USA	.015"Plain Brown with Gloss Back Coating	F Magnetic layer failed to release	5
10	PML, Plain Made in China	.015"Plain Brown without Back Coating	F Magnetic layer failed to release	5
11	MAGX	.030" White Matte with Matte Back Coating	A	1

TESTING (cont'd)

DIGITAL PHOTOS

The following are digital photographs of all eleven flexible magnetic samples tested and the corresponding painted metal surface to which they were mounted after two complete cycles of testing:

MAGNETIC SURFACE

1. CHINA-MOI, VINYL



2. TAIWAN-JMC, VINYL



3. USA-MMC, VINYL

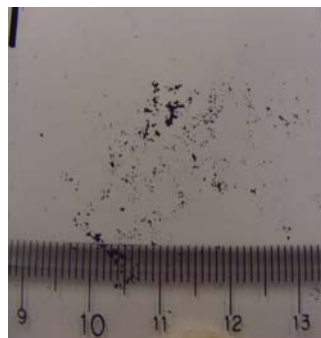


CORRESPONDING METAL SURFACE

1. CHINA-MOI, VINYL

Magnetic layer
failed to release

2. TAIWAN-JMC, VINYL



3. USA-MMC, VINYL

Magnetic layer
failed to release

TESTING (cont'd)

DIGITAL PHOTOS (cont'd)

MAGNETIC SURFACE

4. TAIWAN-JMC, VINYL



5. USA-MMC, VINYL

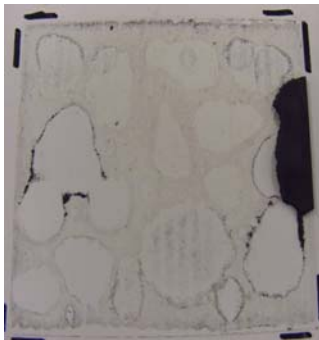


6. USA-FII, VINYL



CORRESPONDING METAL SURFACE

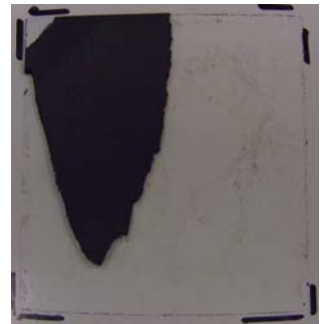
4. TAIWAN-JMC, VINYL



5. USA-MMC, VINYL

Magnetic layer
failed to release

6. USA-FII, VINYL



TESTING (cont'd)

DIGITAL PHOTOS (cont'd)

MAGNETIC SURFACE

7. USA-FII, VINYL



8. USA-FII, PLAIN

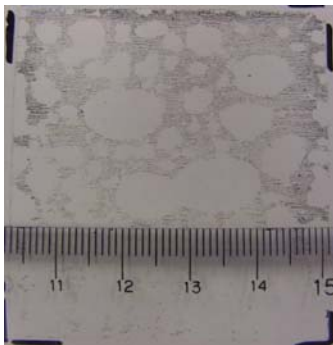


9. USA-FII, PLAIN



CORRESPONDING METAL SURFACE

7. USA-FII, VINYL



8. USA-FII, PLAIN



9. USA-FII, PLAIN

Magnetic layer
failed to release

TESTING (cont'd)

DIGITAL PHOTOS (cont'd)

MAGNETIC SURFACE

10. CHINA-PML, PLAIN



11. MagX

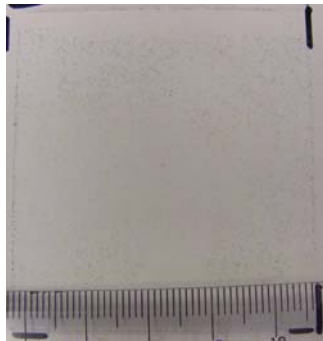


CORRESPONDING METAL SURFACE

10. CHINA-PML, PLAIN



11. MagX



Q & A'S

Q: What is a migration test?

A: A migration test is conducted by mounting flexible magnetic sheeting to a painted steel surface which is then subjected to extreme heat and moisture cycles.

Q: Why are these migration tests performed?

A: Migration tests are performed to determine just how flexible magnetic sheeting will perform when it is subjected to these extreme heat and moisture cycles.

Q: What is the relevance of the test methods?

A: These test methods are on par with automotive industry standards and provide the best simulation of hot, humid weather conditions. These conditions are the most conducive to migration.

Q: What is migration in regards to flexible magnetic sheeting?

A: Migration most commonly occurs in flexible magnetic sheeting produced with lower grade compound components. As an example, on an automobile's painted surface, migration initially manifests itself in a short period of time as a non-removable stain which is transferred from the magnet to the painted metal surface. Eventually, this lower quality flexible magnetic sheeting will fully bond itself to the automobile's painted surface. Staining and sticking of this type cause severe damage to the automotive finish.

Q: What causes this migration?

A: In rainy or humid conditions, moisture becomes trapped between the magnet and the painted metal surface, which then causes various chemical reactions when direct sunlight begins to heat the surface of both the vehicle and the flexible magnetic sheeting. It is these chemical reactions which migrate to the vehicle's surface causing permanent staining and bonding to the automotive finish.

Q: Is there a way to prevent migration?

A: The best preventive measure is to use flexible magnetic sheeting manufactured with higher grade components. Proper back coating of the flexible magnetic sheeting also adds a preventative measure.

Q: Can migration occur when the back coating system experiences prolonged usage?

A: MagX's advanced back coating system exhibits an extremely strong cross linking to the flexible magnetic sheeting substrate. There is virtually no chance of failure or migration even after repeated installation/removal cycles.

Q: In terms of migration, evaluate the performance of MagX flexible magnetic sheeting.

A: The successful results from the tests conducted clearly demonstrate that MagX's flexible magnetic sheeting greatly out performs all of the other manufacturer's product tested and unlike any of the others is not susceptible to migration. It should be noted that to date there has not been a single migration claim against MagX.