



**REPORT
ON
CHEMICAL RESISTANCE
OF**

**ABET LAMINATI STRATIFICATO
COMPACT GRADE LAMINATE**

October, 2008

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Test Product: ABET LAMINATI Stratificato Compact Grade Laminate

Sponsor: ABET Pty Limited
Trading as ABET Queensland
PO Box 4030
Forest Lake QLD 4078

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Date

1. Introduction

Samples of white ABET LAMINATI Stratificato Compact Grade Laminate (10mm) were received from the Sponsor, and were exposed to chemical testing.

The test samples were exposed to a variety of chemicals and solvents, and any effects on the test product were noted by visual examination. The testing was conducted by a single senior analyst in the test laboratory, in order to negate any inter-individual variability between observations.

The chemicals chosen for the tests were those which were considered most likely to come into contact with the laminate in a laboratory environment, and those which might be the most aggressive to this type of product.

Three series of chemical tests were performed on the laminate:

1. Effect of Spillage – conducted at room temperature
2. Effect of Spillage – conducted with chemicals at approximately 50 °C
3. Prolonged contact – achieved by immersion in the test solvents.

2. Reagents and Solvents

	Test Solutions	Supplier	Preparation
1	Bleach 12% available chlorine:	Elite Chemicals Pty. Ltd.	Available chlorine 12.5%. Used as is
2	Brine (saturated sodium chloride solution):	BDH, AnalaR grade Batch No.: 36159	Heat 200 ml deionised water to approx. 50°C. Add NaCl whilst stirring until salt remains in solution. Allow to cool to room temperature
3	Sulphuric Acid, 98% (18.4M):	BDH, AnalaR grade Batch No.: K21753655	Used as received
4	Sulphuric Acid, 1M:	BDH, AnalaR grade Batch No.: K21753655	Dilute 10.86ml sulphuric acid, 98% to 200ml with deionised water
5	Hydrochloric Acid, 32% (10.2M):	Ajax, Univar grade Batch No.: A2H030	Used as received
6	Hydrochloric Acid, 1M:	Ajax, Univar grade Batch No.: A2H030	Dilute 19.6ml hydrochloric acid, 32% to 200ml with deionised water
7	Ammonium Hydroxide, 28-30% (approx.8.3M):	Sigma, ACS reagent Batch No.: 02912AH	Used as received
8	Ammonium Hydroxide, 1M:	Sigma, ACS reagent Batch No.: 02912AH	Dilute 24.1ml ammonium hydroxide, 28-30% to 200ml with deionised water
9	Sodium Hydroxide, 10M:	Ajax, Univar grade Batch No.: F3D094	Dissolve 80g NaOH pellets in approx 120ml deionised water then add deionised water to 200ml
10	Sodium Hydroxide, 1M:	Ajax, Univar grade Batch No.: F3D094	Dissolve 8g NaOH pellets in approx 120ml deionised water then add deionised water to 200ml
11	Nitric Acid, 69% (15.6M):	BDH, AnalaR grade	Used as received
12	Ketone (acetone)	Agen Biomedical Ltd. AR grade	Used as received
13	Alcohol (ethanol)	APS Nuplex Speciality Product, AR grade	Used as received
14	Aromatic (toluene)	EM Science Batch No.: 40231	Used as received
15	Chlorinated Hydrocarbon (dichloromethane)	LabScan Batch No.: 07090007	Used as received
16	Hydrocarbon (hexane)	LabScan Batch No.: 07080209	Used as received

3. SPILLAGE TESTS

Approximately 1 mL of the test solution was pipetted onto a sample of the test product to cover an area about 50mm in diameter. This was then left for 10 minutes and any changes to the appearance of the laminate noted. The test was conducted with the solutions at room temperature and preheated to approximately 50°C. The laminate was at room temperature for all tests.

This test was intended to simulate the test product's resistance to short term exposure to hot and cold reagents, e.g. in the case of an accidental spillage which is cleaned up with minimal delay.

The results are presented in Tables 1 and 2 below.

TABLE 1: Results of Short Term Exposure: Room Temperature

Test Number	Test Substance	Colour change	Loss of shine	Loss of Texture	Surface bubbles	Surface cracks	Crumbliness
1	Bleach, 12.5%	-	-	-	-	-	-
2	Brine	-	-	-	-	-	-
3	Sulphuric Acid, 98%	-	+++	-	-	-	-
4	Sulphuric Acid, 1M	-	+	-	-	-	-
5	Hydrochloric Acid, 32%	-	-	-	-	-	-
6	Hydrochloric Acid, 1M	-	-	-	-	-	-
7	Ammonium Hydroxide, 28-30%	-	-	-	-	-	-
8	Ammonium Hydroxide, 1M	-	-	-	-	-	-
9	Sodium Hydroxide, 10M	-	-	-	-	-	-
10	Sodium Hydroxide, 1M	-	-	-	-	-	-
11	Nitric Acid, 69%	-	++	-	-	-	-
12	Ketone (acetone)	-	-	-	-	-	-
13	Alcohol (ethanol)	-	-	-	-	-	-
14	Aromatic (toluene)	-	-	-	-	-	-
15	Chlorinated Hydrocarbon (dichloromethane)	-	-	-	-	-	-
16	Hydrocarbon (hexane)	-	-	-	-	-	-

Key:

- no effect
- + slight effect
- ++ moderate effect
- +++ strong effect

TABLE 2: Results of Short Term Exposure: 50 °C

Test Number	Test Substance	Colour change	Loss of shine	Loss of Texture	Surface bubbles	Surface cracks	Crumbliness
1	Bleach, 12.5%	-	-	-	-	-	-
2	Brine	-	-	-	-	-	-
3	Sulphuric Acid, 98%	-	+++	-	-	-	-
4	Sulphuric Acid, 1M	-	+	-	-	-	-
5	Hydrochloric Acid, 32%	-	-	-	-	-	-
6	Hydrochloric Acid, 1M	-	-	-	-	-	-
7	Ammonium Hydroxide, 28-30%	-	-	-	-	-	-
8	Ammonium Hydroxide, 1M	-	-	-	-	-	-
9	Sodium Hydroxide, 10M	-	-	-	-	-	-
10	Sodium Hydroxide, 1M	-	-	-	-	-	-
11	Nitric Acid, 69%	-	++	-	-	-	-
12	Ketone (acetone)	-	-	-	-	-	-
13	Alcohol (ethanol)	-	-	-	-	-	-
14	Aromatic (toluene)	-	-	-	-	-	-
15	Chlorinated Hydrocarbon (dichloromethane)	-	-	-	-	-	-
16	Hydrocarbon (hexane)	-	-	-	-	-	-

Key:

- no effect
- + slight effect
- ++ moderate effect
- +++ strong effect

4. Immersion Tests

Samples of the test product were suspended and partially submerged in each of the chemicals described in Section 1 for a period of 1 week. The solutions were replenished as required to compensate for evaporation.

After 1 week the laminate samples were removed from the test solutions, washed and allowed to dry. Any changes to the appearance of the laminate were noted.

The results are presented in the following Table.

TABLE 3: Results of Immersion for 1 Week

Number	Test Substance	Colour change	Loss of shine ^a	Loss of texture	Surface bubbles	Surface cracks	Crumbliness
1	Bleach, 12.5%	++	+	-	-	-	-
2	Brine	-	-	-	-	-	-
3	Sulphuric Acid, 98%	+++	+++	+++	+++	++	++
4	Sulphuric Acid, 1M	-	+	-	-	-	-
5	Hydrochloric Acid, 32%	+	+++	+++	+++	+	+
6	Hydrochloric Acid, 1M	-	-	+	++	-	-
7	Ammonium Hydroxide, 28-30%	-	-	-	-	-	-
8	Ammonium Hydroxide, 1M	-	-	-	-	-	-
9	Sodium Hydroxide, 10M	+	++	-	-	-	-
10	Sodium Hydroxide, 1M	-	-	-	-	-	-
11	Nitric Acid, 69%	+++	+++	+++	+++	XXX ^b	+++
12	Ketone (acetone)	-	-	-	-	-	-
13	Alcohol (ethanol)	-	-	-	-	-	-
14	Aromatic (toluene)	-	-	-	-	-	-
15	Chlorinated Hydrocarbon (dichloromethane)	-	-	-	-	-	-
16	Hydrocarbon (hexane)	-	-	-	-	-	-

Key: - no effect + slight effect ++ moderate effect +++ strong effect

Notes: ^a for loss of shine, all observations were more severe than those observed following short term exposure (Tables 1 and 2); i.e. a value of "+" in Table 3 does not necessarily equate to a "+" in Table 1 or 2.

^b deterioration in nitric acid was the most severe; the white laminate surface had come away from the backing, was floating in the solution and had partially dissolved.

5. Summary

The Test Product (ABET LAMINATI Stratificato Compact Grade Laminate) performed very well in the spillage tests with only sulphuric acid and nitric acid having any visible effects.

In the immersion tests, there were severe changes with concentrated sulphuric, nitric and hydrochloric acids. The most severe effect was caused by concentrated nitric acid, which caused a severe deterioration of the test product and with the surface leaving the backing material, which itself had severely deteriorated. All other solutions, with the exception of bleach, sodium hydroxide (10M), and dilute sulphuric and hydrochloric acid, caused no observable changes to the test product.

Organic solvents had no observable effect on the test product following either short or long-term exposure, and an excellent resistance to these reagents was observed.

In considering the results of the immersion tests, it should be remembered that prolonged immersion of the test product in these very corrosive chemicals should represent a worst case scenario, and would be an unlikely occurrence in the average laboratory situation.

END
