The following tests have been conducted by the National Institute of Technology (TI), Norway, Polymer Technology Section

Client:	Amfi-Top AS, P.O. Box 130, 5049 Sandsli
Client's representative:	Svein A. Fürstenberg Rysjedal
Title:	Testing of Amfi-Top Solid Surface
Department responsible:	Polymer Technology Section
Report no.	32140
Responsible for testing:	Jardar Malmo, Senior Eng.
Technical leader:	Jon Skogsfjord, Section Leader
Date:	1997-07-22

Summary:

The material based on acrylic modified isophthalic/neopentyl glycol polyester added ATH-filler has been tested with regard to:

- Flexure strength/modulus
- Abrasion resistance
- Scratch resistance
- Heat resistance
- Hydro-thermal shock
- Cigarette test
- Stain resistance
- Chemical resistance

1. Introduction

The Amfi-Top material samples received for testing were

- two plane plates with a thickness of 7 - 9 mm, and
- a sample shaped like a wash basin.

The cigarette test, stain test and chemical resistance test were performed by TI in Oslo, while the other tests were performed by Jotun Polymer AS in Sandefjord surveyed by TI.

2. Flexural strength/modulus ISO 178:1993, speed: 5 mm/min, 3-point bending

Results:	Flexural strength:	44 MPa
	Modulus:	3180 MPa

3. Abrasion resistance Standard Abrasion Tester, Model 503 CS-17 wheel, 1000 gram load

Results:	1000 cycles:	242 mg (average of 2 parallels)
	2000 cycles:	426 mg (average of 2 parallels)

4. Scratch resistance Erichsen Hardness and Adhesion Tester, Model 413

Result:	0,12 N

5. Heat resistance Test equipment: Heat plate Presitherm PZ-34
Digital surface thermometer

An aluminium kettle with 2 litres of oil was placed on the heated plate until the temperature of the contents was stabilised. The kettle was rapidly transferred to a plane plate of the test material. There it remained for 30 min before it was removed.

Results:	100 °C :	No colour change
	150 °C :	No colour change
	200 °C :	No colour change

6. Hydro-thermal shock Standard proposal, European Cultured Marble Association

The wash basin sample is exposed to hot and cold water using the following cycle:

- 90 s: hot water,79 °C
- 30 s: empty
- 90 s: cold water, 8 °C
- 30 s: empty

Minimum requirement: 500 cycles without cracks or crazing in the gel coat or laminate

Result: 500 cycles were passed without cracks, crazing or other damage.

7. Cigarette test CMI test, no. 5.5

The cigarette test was performed on a material test sample, approx. 15 x 15 cm wide. Three regular cigarette brands were chosen: Marlborough Lights, Prince Mild and Petterøe Mild (hand rolled).

One cigarette from each of the newly opened packets was lighted. After 3 puffs, the cigarette was placed on the material sample with the lighted end approx. one inch from the edge. After 2 minutes ±2 seconds the cigarettes were removed.

The material was not ignited, but there appeared a yellow to brownish mark of different size, smallest for Petterøe Mild, largest for Marlborough Lights and Prince Mild.

The marks were removed by rubbing relatively hard with a wet sponge and a dash of ATA mild scrubbing powder. Afterwards the surface was smoothed back to approximately the original appearance.

8. Stain test CMI test, no. 5.2

The staining substances were chosen in agreement with the client.

Samples of the material were first wet rubbed with ATA household scrubbing powder and wiped carefully with a soft cloth. Approx. 2 drops of the chosen fluid substances and a corresponding amount of the solid were put on the material surface in two different places. In one place, the substance was covered with a small watch glass. The substances were removed after 16 hours. Each substance was given a class dependent on how easy the stain or discoloration could be removed, according to the following graduation:

- Can be removed by rinsing with lukewarm water 1
- Can be removed using alcohol or petrol 2
- Can be removed by light wet rubbing with ordinary scrubbing powder 3
- Can be removed by hard wet rubbing with ordinary scrubbing powder 4
- Discoloration which cannot be removed with scrubbing powder 5

Results:

- Black colour marker 2
- Black liquid shoe polish 2
- Blue ink (washable) 1
- Lipstick 2
- Hair dye (Farandol, dark brown) 2
- Iodine solution (2 % iodine in spirits) 3
- Tomato ketchup 1
- Red wine 1
- Coca Cola 1

There were not found any differences between the places which were covered with a watch glass and those that were not.

9. Chemical resistance CMI test, no. 5.3

The chemicals were chosen in agreement with the client.

Two drops of the chosen chemicals were added on two separate places on the material samples according to the same procedure in Sec. 8.

The chemicals were removed after 16 hours and evaluated according to the same graduation as in Sec. 8.

Results:

-	Petrol (98 octane)	1
-	Alcohol (45 % ethyl alcohol)	1
-	Ammonium chloride (15 %)	1
-	Hydrogen peroxide (3 %)	1
-	Sodium hypochlorite (Klorin, 3-5 %)	1
-	Lacquer thinner (Lynol)	1
-	Acetone	1
-	Acetic acid (household vinegar, 7 %)	1

There were not found any differences between the places which were covered with a watch glass and those that were not.