

Asbestos Encapsulation

Rust-Oleum Mathys Coatings

Dakfill System

DAKFILL

Asbestos-cement ROOFS

PROTECT THE ENVIRONMENT AGAINST ASBESTOS FIBRES

MATHYS

Packaging: 1 - 5 - 25 kg

MATHYS DAKFILL

Renovation of asbestos cement roof & vertical sheeting

Application of the priming coat

Dakfill New system

Until recently, an ignorance of the hazards involved with the handling of asbestos fibres allowed people to clean or repair asbestos cement sheets by methods which included scraping and wire brushing. It has, however, been proven that asbestos fibres migrating into the atmosphere constitute a real danger to people and to the environment. The replacement of such substrates, is an expensive option, orderly removal and disposal alone being costly. Studies carried out by an independent laboratory have proven the effectiveness of the Dakfill system in encapsulating unstable asbestos fibres. This allows us to encapsulate and waterproof in situ, resulting in a cost competitive option. Dakfill New is available in various colours. It is a semi-fluid product applied by brush, roller or airless spray gun. During the drying process Dakfill New forms a uniform and rubber like seamless coat, even on the most complicated roof configurations.

Dakfill New has 400 % elasticity and is 100 % waterproof. Dakfill New is a durable product which resists severe weather conditions, variations in temperature, atmospheric pollutants and the effects of acid rain ...

Application

Thorough cleaning of the asbestos sheeting conforming to current legislation is the first stage. When dry priming with a coat of Primer 44 diluted with 30 % Thinner 22 is the 2nd stage. Application of Dakfill New by brush, roller or airless spray gun, in one or two coats to meet the prescribed coverage is the final stage. Consumption : 1.3 to 3 kg/m² dependent on specification & substrate. Cracks and fissures require after stage 2 localized attention by covering the fault with Dakfill reinforcing fleece and the application of a localized coat of Dakfill New.

Your distributor :

MATHYS

N.V. MATHYS S.A. • B-3545 ZWIEM (BELGIË) • TEL. • 32 (0) 13 460 200 • FAX. • 32 (0) 13 460 201 • R.C. HASSELT 73.41

Roof Prior to Cleaning



Options for Safety



The most common method of Protection is Fall Arrestor

Internal nets option



Cleaning head / pump and Filter



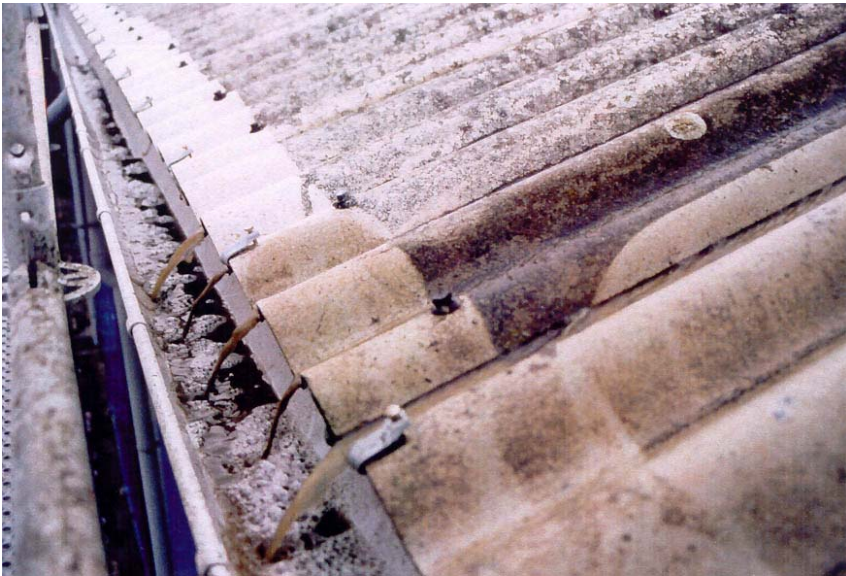
Cleaning Process



Cleaning Process



Cleaning Process



Completed roof.



Dakfill Specification

- **GENERALESPECIFICATION**
- **Prepared By:** N.Morgan 08/06/04
- **Specification for :** Various
- **Subject:** Cement Fibre corrugated roof.
- **Exposure:**
- All types of external weathering i.e. rain/sunlight/UV.
- **Surface Condition:**
- **Cement Fibre Possible Asbestos corrugated roof.**
- Algae, moss, dirt, dust, etc.
- Some open joints, connections. In general sound condition
- **Preparation:**
- **Apply Mathys AMW fungicide to the roof leave for 3 days.**
- Clean with high-pressure water (min. 150 bar and rotating head encapsulated cleaning.)
- Inspect all fastenings, replace the failed ones. Any cracked or damaged sheets to be replaced.
- Brush, de-rust and with brush apply a thick coat of Noxyde on the fastenings and all other metallic parts.
- After drying: priming of all surfaces with Primer 44 diluted with 30% Thinner 22.
- Priming any metallic junctions with one layer of Noxyde diluted with 20% of water.
- Allow to dry for 24 hours.
- Fill up openings between plates, junctions with sky domes, junctions with parapets with Elastofill . Allow to dry.
- **Coating System**
- **Roofs (asbestos)**
- a) *Connection with skylight*
- - Use a piece of Dakfill-mesh and stick it over the junction with Dakfill through the mesh.
- - Locally, apply the same system over the joints which are too open as well at the connections with walls.
- b) *Entire Corrugated and border plates*
- - Apply overall two coats of Dakfill (consumption : 1 kg/m² per coat) in a contrasting colour.
- **Conditions of application**
- The works must be carried out during stable and dry weather on a well clean substrate.
- Respect a drying time of 24 h, unless it is stipulated otherwise by the technical service.
- Minimum temperature of the substrate and ambient air:
- + 5°C, preferably 15 to 25°C.
- Maximum temperature of the substrate: + 55°C.
- **Remark :**
- **If the metals are corroded, replace “Noxyde diluted with 20 % water” by pure Noxyde.**
- **This spec assumes gutters to be cleaned and repaired to wall joints as part of spec.**

CoRI Report Dakfill Encapsulation

Coatings Research Institute



Avenue Flavis Hulsbe
81342 (Invalde) Belgium
Tel: +32 2 653 09 60
Fax: +32 2 653 95 03

Procedure for the Fixing and Encapsulation of Asbestos Fibres on Weathered Asbestos Cement by Dakfill

Introduction

Old asbestos cement, and according to certain studies, new asbestos cement as well, have the bad property of burdening nature with asbestos fibres.

A possible solution to this problem is the application of a sufficiently durable coating that can resist an aggressive environment.

Purpose

The purpose of this study is to examine the effectiveness of a coating system of the Dakfill type with an organic solvent-based primer.

Description of the Coating System

Dakfill

Semi-liquid waterproofing product based on acrylic resins dispersed in water.
Solids content: 73 - 74 %
Specific weight: 1.510

Primer-44

Pigmented priming coat based on plastified chlorinated rubber.
Solids content: 54 - 55 %
Specific weight: 1.130
Viscosity: 75" Din cap No. 4

Primer-44 is diluted with 30 % Thinner-22 and applied to saturate the substrate. After 48 hours of drying, two more coats of Dakfill of 650 gr/m² are applied.

Experimental Part

A. Aging and Resistance of the Coating

Three types of weathering and aggression have been provided: the QUV test, the Kesternich test and an immersion test in an acid solution. Beside the coating applied, a part of the surface of the test panels is left naked in order to be able to follow the evolution of the asbestos cement during the aging process.

A.1. QUV test:

Five panels are subjected to the following cycle for 43 days:
- 4 hours of irradiation by a B 313 UV lamp at 60° next
- 4 hours of condensation at 100 % relative humidity and 40°C.
The test is done in conformity with the ASTM G53 standard.

A.2. Kesternich test:

four other panels are subjected for 25 days to a cycle of 8 hours of SO₂ injection in the atmosphere followed by 16 hours of rest, this according to DIN 50017 SK.

A.3. Immersion test:

a third series of four plates is immersed for 46 days in demineralized water brought to pH 3.5 by means of an acid mixture consisting of 25 ml of H₂SO₄ and 11 ml of HNO₃.

After drying, one panel is chosen for every aggression test. A test piece of that panel is then taken from the protection system and from the naked asbestos cement to examine it further in the electron microscope.

B. Environment Protecting Effect of the Coating

The protection effect of the Dakfill system will be studied, and it will be examined to which extent the coating system can offer protection by preventing the asbestos fibres from entering the environment.

When preparing the test, we were inspired by an article entitled "Zur Emission von Asbestfasern aus Asbestzementplatten" from "Sonderdruck aus Staub-Reinhalung der Luft 39(1979) No. 11, S.422/427".

One of the ways in which asbestos fibres can enter the environment is by washing out caused by precipitation.

The test to simulate this is done as follows. An asbestos cement slab to which the coating system has been applied as described above is put up under an angle of 45°. A litre of demineralized water is brought to pH 5 by a mixture of 25 ml of H₂SO₄ and 11 ml of HNO₃. This solution simulating acid rain runs by drops over 5 to 6 cm of the put up slab for about 24 hours. The liquid that has run down is caught on a diaphragm filter with a 50 mm diameter and 0.1 µm pores size.

The test is done on the coating system and the naked panel. A piece of the diaphragm filter is examined on the presence of asbestos fibres by means of a frame electron microscope.

Comments on the Results

The photographs of which a list is attached bear a 4-digit number at the bottom left hand of which the code used appears in the table below.

TABLE 1: Explanatory code of the photographs			
	Coating	Naked	
		Before the test	After the test
QUV	0010	0050	0040
Kesternich	0100	0500	0400
Immersion	1000	5000	4000

CoRI Report Dakfill Encapsulation

A. Aging

The comparison of the initial samples of the asbestos cement (thus before they were subjected to the aggression test - photographs 0500-5000) shows a certain heterogeneity. So, for some samples there are more and for other there are less fibres of the surface, but the proceeding corrosion does not change the outer aspect of the naked asbestos cement much.

As regards the coating system, we have no remarks in respect of the visual judgment of the test panel. Neither was any corrosion found in the course of the further electron microscopic examination of the coating surfaces. The examination of the section of a coating applied to asbestos cement shows (photograph 1101) the close contact between the paint and its carrier of which all asbestos fibres are embedded or fixed.

B. Environment Protecting Character

When the examination was scaled up by $\times 10,000$, not carried away fibres were found on the filter as to the coating system.

On the other hand, in the case of the naked panel, asbestos fibres were found on the filter. Photographs 0401, 0402, 0403, 0404, 0405 and 0406 give an idea of some fields. 200 fields of $108 \mu\text{m}^2$ each have thus been examined and 88 pieces of asbestos fibres have been found. When extrapolating from these data to the total filter surface, which is 19.62 m^2 in area, it can be put that $8 \cdot 10^6$ pieces of fibre have been carried away.

This number will largely depend on the condition of the asbestos cement slab.

After a 1000-hour condensation test during which the test panels were kept in an atmosphere of water vapour condensation, another washing out test was done in the same circumstances as those described above.

As to the naked asbestos cement, $7.5 \cdot 10^6$ carried away pieces of asbestos fibre were counted. On the other hand, no such pieces were counted as to the intact coating system.

So, old asbestos cement keeps giving off free fibres to its environment if they are not fixed.

Conclusion

The Dakfill system can be applied to aged asbestos cement. It stands the aging tests successfully.

From the point of view of the pollution of the environment by asbestos fibres, the Dakfill system offers an efficient solution by preventing such fibres from spreading in nature.

Eng. R. Verbist

Eng. R. VERBIST

Limalette, May 17, 1990

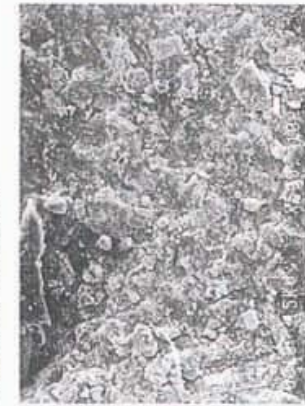
Dr. M. Piens

Dr. M. PIENS

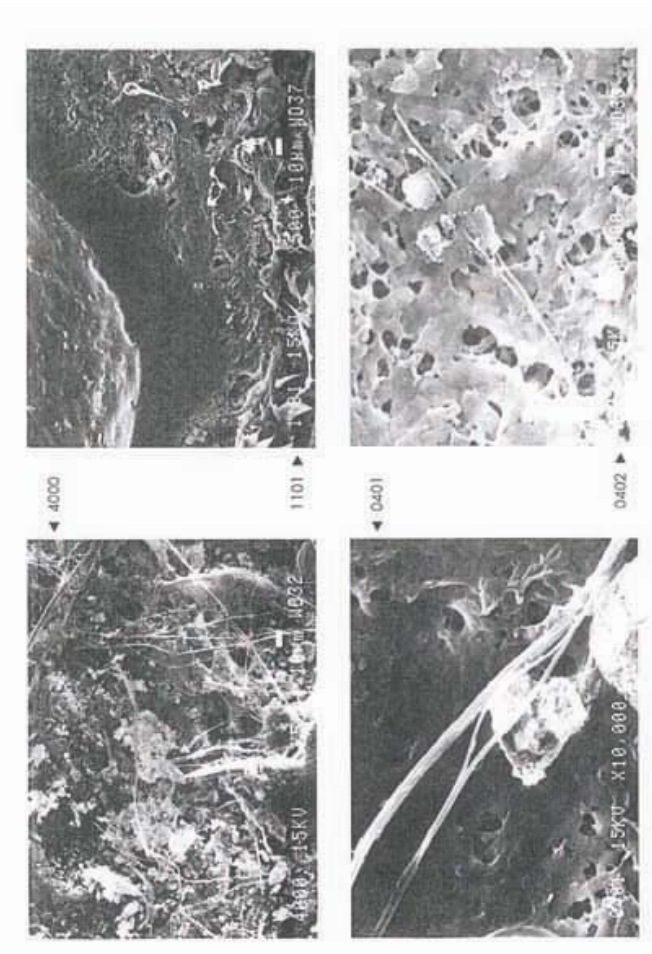
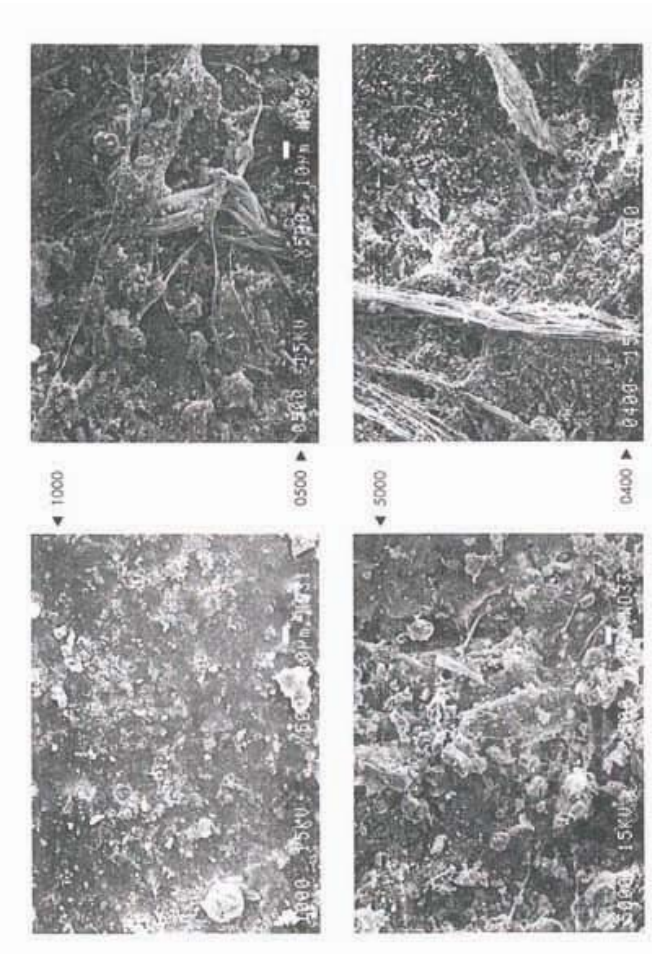
Annex

List of Photographs

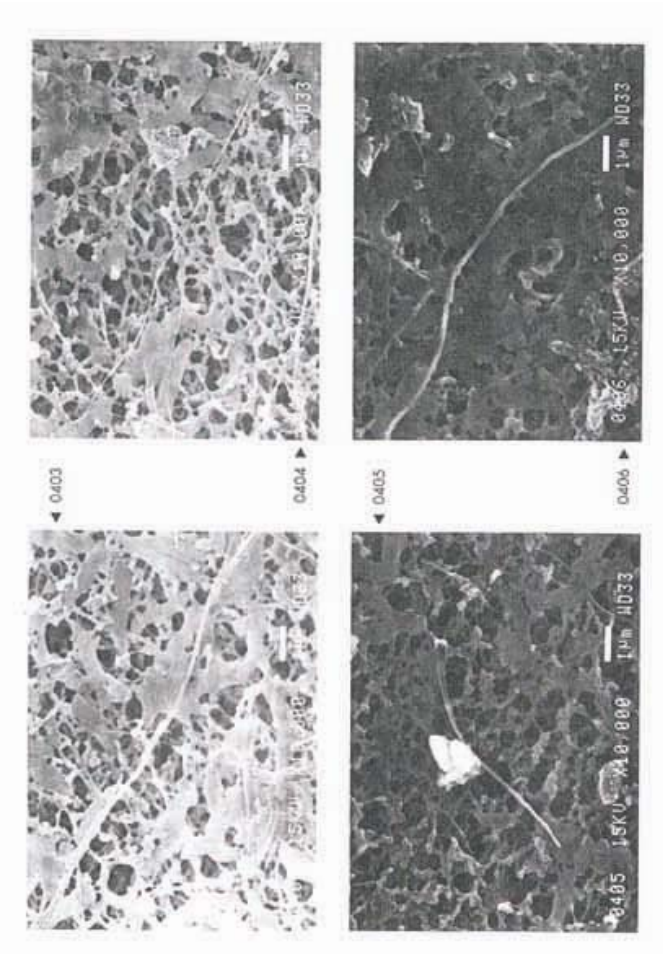
- 0010 paint system 1 after QUV
- 0100 paint system 1 after Keimlich
- 0200 paint system 1 after immersion in acid bath
- 0300 paint system 1 after immersion in acid bath
- 0500 naked asbestos cement before immersion in acid bath
- 0600 naked asbestos cement after immersion in acid bath
- 0700 naked asbestos cement after immersion in acid bath
- 0800 naked asbestos cement after immersion in acid bath
- 1101 cross-section paint system 1
- 0401 asbestos fibre on diaphragm filter
- 0402 asbestos fibre on diaphragm filter
- 0403 asbestos fibre on diaphragm filter
- 0404 asbestos fibre on diaphragm filter
- 0405 asbestos fibre on diaphragm filter
- 0406 asbestos fibre on diaphragm filter



CoRI Report Dakfill Encapsulation



CoRI Report Dakfill Encapsulation



CoRI Report Noxyde Encapsulation

Translation Beproeuvingsverslag - CoRI

TEST REPORT

BS980108.A P. 1/2

IDENTIFICATION NUMBER: ES-980108.a DATE: 20.01.1998

TESTING LABORATORY: Coatings Research Institute
Avenue P. Hoeffe
1342 LIMLESTE

CUSTOMER: Mathys N.V.
Kolenberg 23
3345 Zelten-Halen

OBJECT: Your fax, ref. SR/dv/2143 dated 27.10.97

DATE RECEPTION OF SAMPLES: 28.10.97

NUMBER OF RECEPTION DOCUMENT: ES/2129

TESTING OBJECTS: Noxyde grey-beige

TEST(S) + METHOD(S):

Application and drying

The product has been applied by brush in 3 coats (consumption: 1 kg/m²) on old asbestos cement sheets which have been brushed and sanded before application. After 18 days of drying at ambient conditions, the following tests were done.

Ageing test: QUV-test

According to the ASTM G 53-standard "Operating light- and water-exposure apparatus (fluorescent UV - condensation type) for exposure of non-metallic materials".

- Cycle: 4 hours of UV-radiation at 40°C
4 hours of condensation at 50°C

- Duration: 1000 hours of continuous exposition.

The UV-source is composed of a series of UV-B-313-lamps. The condensation is produced by exposing the testing surface in a heated mixture of saturated air and steam and the back to the cooling influence of the ambient temperature.

After the ageing test, the following hereunder described test was done.

Fixation and encapsulating of asbestos fibres

Based on the article "Zur Fixation von Asbestfasern aus Asbestzementplatten" from "Baudruck aus Stadt-Reinhaltung der Luft", (1978 n° 11, S.422/427).

The asbestos cement sheets (1 non-coated and non-aged, 1 coated and non-aged, 1 coated and aged in the QUV, 1 non-coated and aged) were placed under an angle of 45°. During 24 hours, 1 litre of pH3-solution (demineralized water + a solution of 25 ml H2SO4 and 11 ml HNO3), which stimulates acid rain, ran in drops over the sheets.

Translation Beproeuvingsverslag : CoRI

TEST REPORT

BS980108.A P. 2/2

The liquid which flowed off was caught in a membrane filter with a pore size of 0.1 µm. This filter was being examined with the scanning electron microscope for the presence of asbestos fibres (enlargement x 10.000).

Pictures (enlarged x 500) were taken of the surfaces of the sheets.

DATE OF EXECUTION OF THE TESTS: November 1997 - January 1998

RESULTS:

In each case, 200 fields of 12 to 9 µm were examined.

Non-coated, non-aged asbestos cement sheets

In total of the 200 fields, there were found 108 fields with 1 or more fibres.

Reference of the picture of the coated surface (enlargement x 500): MATN56.

Coated, non-aged asbestos cement sheets

No fibres were found on the 200 examined fields.

Reference of the picture of the coated surface (enlargement x 500): MATN70.

Non-coated, aged asbestos cement sheets

In total of the 200 fields, there were found 101 fields with 1 or more fibres.

Reference of the picture of the coated surface (enlargement x 500): MATN60.

Coated, aged asbestos cement sheets

No fibres were found on the 200 examined fields.

Reference of the picture of the coated surface (enlargement x 500): MATN60.

Executed by: R. Guns
M. Verdist
E. Voncken

Approved by: E. Trockels

Note: During 6 months, we keep the samples in our possession. After this time, they will be eliminated in accordance with the legislation of waste. If you wish that we keep them longer, we ask you to send us a written request. They can also be taken back on your own expenses.

CoRI Report Noxyde Encapsulation

Translation Beproevingsverslag : COR1

E2980108.a/b Enclosure p.1



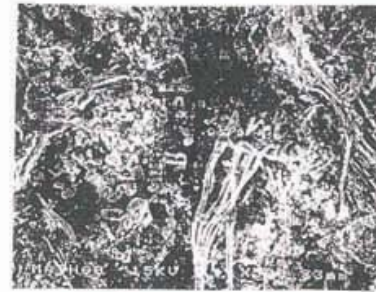
MATH50: non-aged, non-coated sheet



MATH70: non-aged, coated sheet

Translation Beproevingsverslag : COR1

E2980108.a/b Enclosure p.2



MATH50: non-coated, aged sheet



MATH80: coated, aged sheet