

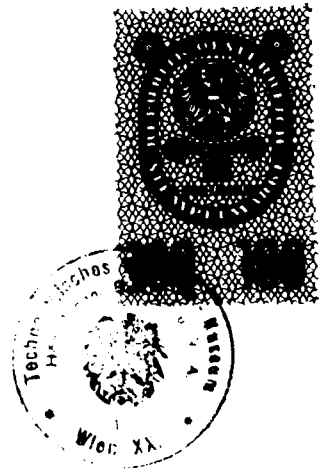
# TECHNOLOGISCHES GEWERBEMUSEUM

INDUSTRIAL MUSEUM OF TECHNOLOGY

FEDERAL HIGHER TECHNICAL EDUCATION AND RESEARCH INSTITUTE OF VIENNA XX



## STATE-LICENSED RESEARCH INSTITUTE FOR SILICATE TECHNOLOGY



EXPERT OPINION  
RE

## CONCRETE SEALING MATERIAL / 1ST PART

Application File Number: VA/Sil 610/63  
Application Received: Jan. 25th, 1983  
TGM (IMT) Number: 834/83

## **INDUSTRIAL MUSEUM OF TECHNOLOGY**

Federal Higher Technical Education and Research Institute of Vienna XX  
A-1200 Vienna, Wexstrasse 19-23  
Director: Hofrat (Privy Councillor) Dipl.-Ing. Dr. Techn. F. PLÖCKINGER

## **STATE-LICENSED RESEARCH INSTITUTE FOR SILICATE TECHNOLOGY**

Postal Address: A-1200 Vienna, Wexstrasse 19-23  
Delivery Address: A-1200 Vienna, Jägerstrasse 71  
Telephone: 0222/35 11 07  
Telex: 13-1924  
Banking Connection: Postal Cheque Account No. 5030.855

Head of the Research Institute: Prof.Dr.rer.nat. Hugo Hubacek  
The Research Institute has been licensed in accordance with RGBI. No. 185 of September 9th, 1910 (lex Exner).

### **Range of Authorization (Licence):**

Examinations/Tests, Try-outs and Texting of Materials in the following fields: silicate technology and applied mineralogy including related mechanical-technical, chemical-physical examinations of silicate raw materials, semi-finished and finished products, testing of silicate-technical devices, processes and testing methods.

- 
1. The test results used in this Opinion refer exclusively to the described testing material(s).
  2. Papers and Materials returned to the Applicant will be marked by the Research Institute insofar as this be necessary and possible.
  3. Any information re content of this Expert Opinion can only be given to a third party after receipt of a written authorization from the Applicant.
  4. The rendering of this Opinion in extracts shall require the previous permission in writing by the Research Institute.



## 1. DESCRIPTION OF SAMPLES RECEIVED

- (a) Quantity: about 5 kg of material  
Appearance: homogeneous, cementlike powder  
Designation: XYPEX
- (b) 3 concrete slabs measuring 20 x 20 x 12 cm

## 2. SUBSTANCE OF APPLICANT'S ORDER

"Testing of Sealing Effect re penetration of water"

## 3. TESTING METHODS

### 3.1. Tests now completed:

3.1.1. To test the waterproofing effect of XYPEX, the "**impermeability**" ("Wasserundurchlässigkeit") was tested according to ÖNORM B 3303 'Testing of Concrete, point 5.10.

3.1.2. In order to be able to ascertain a possible influence of the sealing material on the ultimate strength of the concrete, **compressive strength tests** (Druckfestigkeitsprüfungen") were carried out on at various times after its production coated and uncoated concrete in accordance with ÖNORM B 3303, point 5.4. The concrete test samples had the same composition and the same testing age.

### 3.2. Tests being carried out:

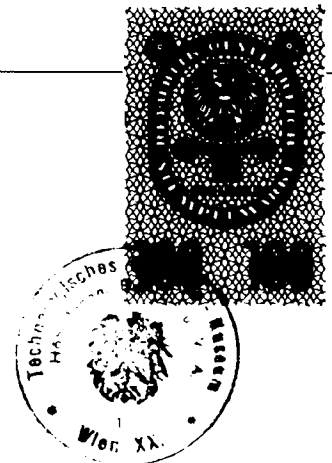
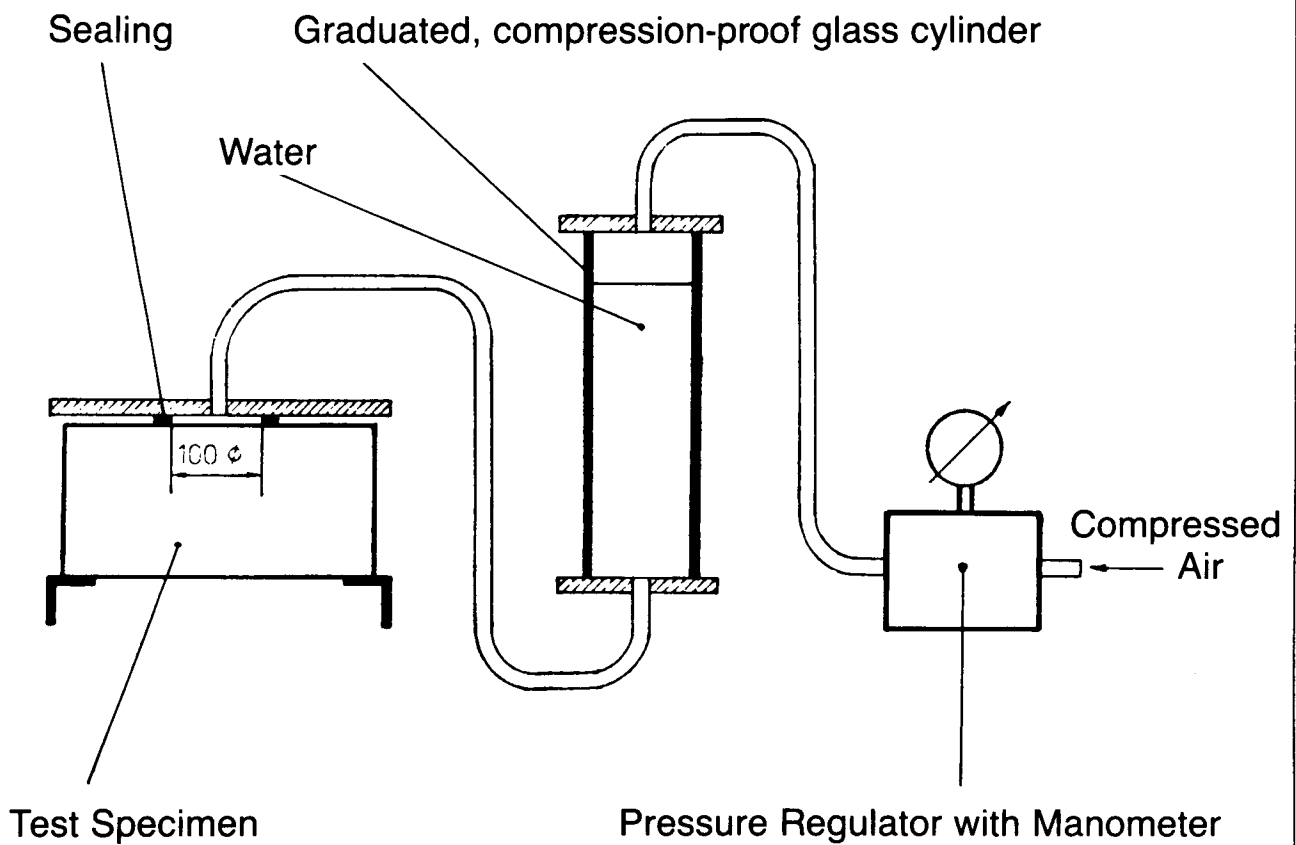
Going beyond ÖNORM B 3303 as the suitability test for concrete, the "spontaneous absorption of water upon short-time storage" with which to determine the **capillary absorbency** will be examined. The tests will be carried out as described in the following literature: Concrete-technical Information, Research Institute of the Cement Industry; "On the effectiveness of sealing (leakproofing) material for concrete", G. Wischers & E. Drum, No. 8, 9 and 10/75. The **frost-melting salt test** on coated and uncoated concrete specimens is carried out according to ÖNORM B 3303 of March 1st, 1983.



#### 4. DESCRIPTION OF EXPERIMENTAL PLANT FOR THE WATER LEAKAGE (IMPERMEABILITY) TEST

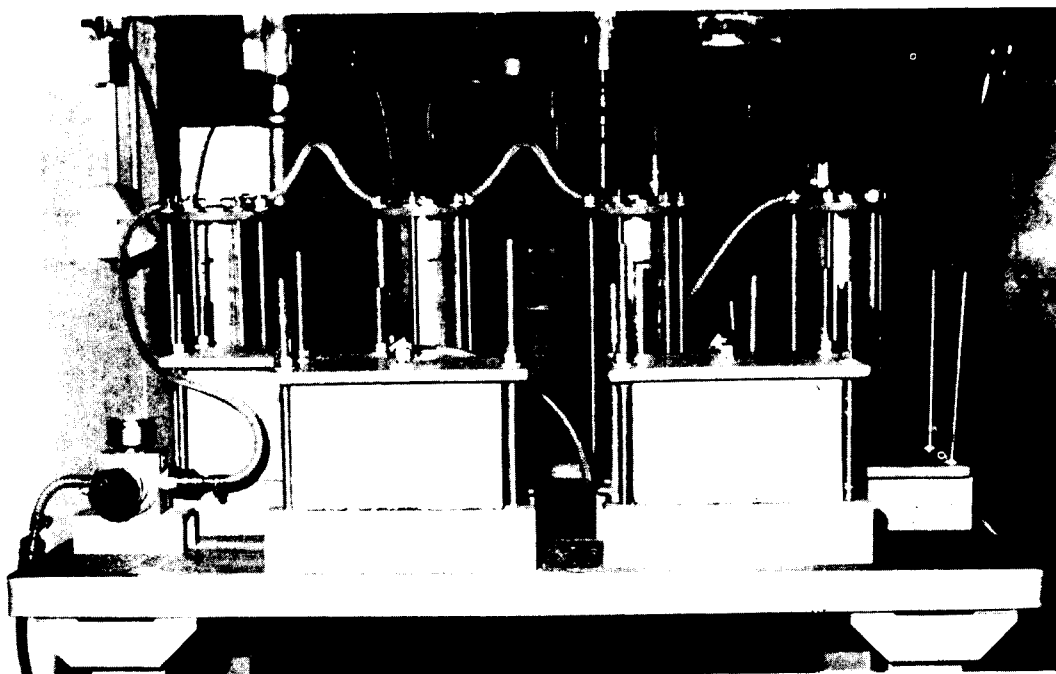
The experimental plant built in the Research Center is shown schematically in Picture 1.

### Schematic Design (Construction) of Testing Apparatus.





Picture 2 is a photo of the original testing arrangement.



The concrete test areas of 100 mm in diameter — to be admitted with water — were picked (roughened) as prescribed (Picture 3).

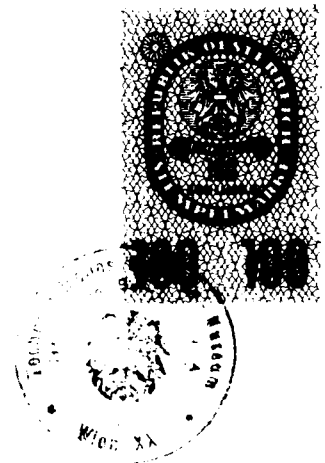
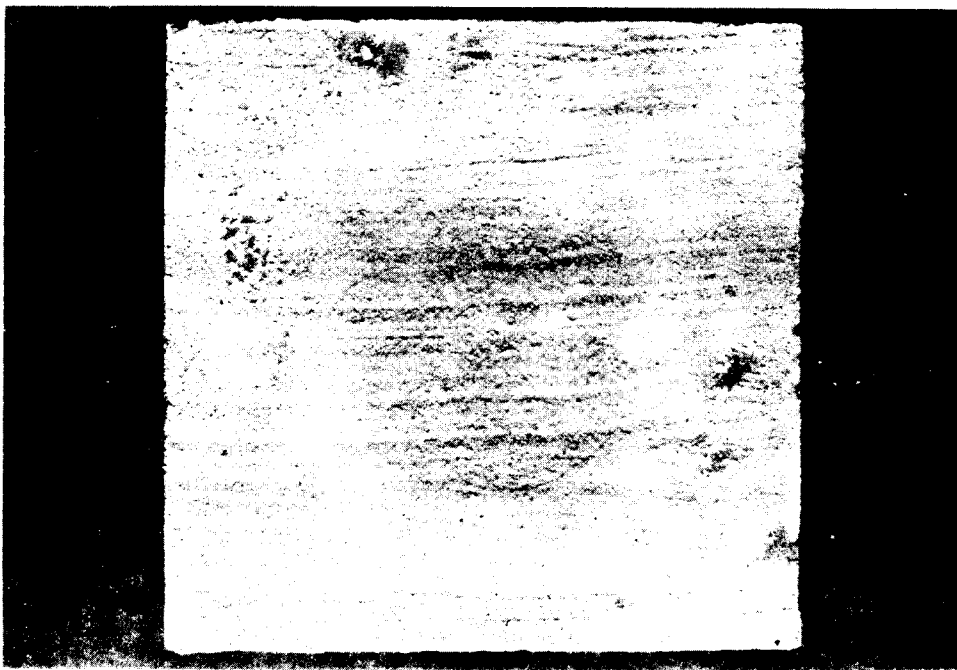




The water pressure amounted to 1.4 bar on the 1st and 2nd day  
2.8 bar on the 3rd day  
4.2 bar on the 4th day  
7.0 bar on the 5th to 15th day.

#### 5. EXECUTION OF COATING OF CONCRETE AREA

The coating was carried out on moist concrete surfaces by persons not connected with the Research Center, i.e. by technicians of the Applicant in the Research Center while being under observation by personnel of the said Research Center (Picture 4).



For the impermeability (to water) test according to ÖNORM B 3303 a concrete test area of the test specimen (= one side) was coated; for the capillary absorbency all concrete test areas (= all sides) of a test piece will be coated.

The first test slab was coated 36 hours after its production, the second test slab after 28 days.

The actual tests were started only after an additional 12 days of storage since according to the Applicant only after this period of time the effectiveness of the sealing material is assured.



With regard to the coating, and contrary to the ÖNORM, all test specimens, i.e. also the uncoated ones, were kept not under water during the entire period of storage but in a steam-saturated atmosphere at room temperature.

## 6. TEST RESULTS

### 6.1. Impermeability to water

	Penetration in ml after			
	1 hour	2 days	3 days	15 days
Uncoated concrete test specimen (A)	10 ml	10 ml	18 ml	25ml
Concrete test specimen coated 36 hours after its production (B)	no longer measurable within accuracy of reading			
Concrete test specimen coated 28 days after its production (C)	no longer measurable within accuracy of reading			

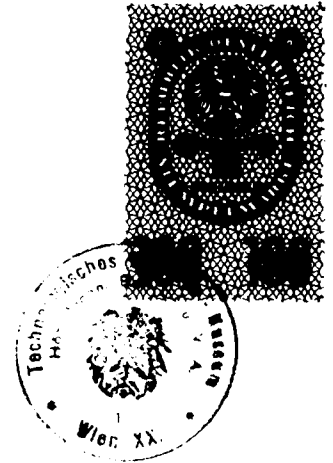
All concrete test specimens were broken up in the middle and judged visually. The uncoated test specimens clearly showed a penetration of water to the depth of 15 mm; the coated test specimens showed no penetration of water.



**6.2. Compression Strength**

Cubes with a 100 mm long edge were cut from the broken-up test specimens and the compression areas polished 'plane-parallel' (or: 'with parallel faces').

	kN/cm <sup>2</sup>
Uncoated concrete test specimen (A)	6.6
Concrete test specimen coated 36 hours after its production (B)	7.7
Concrete test specimen coated 28 days after its production (C)	6.9



**EXPERT OPINION**

As requested by the Applicant, an Interim Report regarding the current tests is herewith given: The sofar executed tests demonstrate that the concrete test specimens coated with XYPEX have an impermeability to water quite superior to the uncoated ones.

\* \* \* \* \*



Enclosures:

Vienna, May 10th, 1983

Seal: "State-licensed Research Institute for Silicate Technology in Vienna:



*H. Hubacek*

Prof.Dr.rer.nat. H. Hubacek  
Appraiser

*H. Hubacek*

Prof.Dr.rer.nat. H. Hubacek  
Head of the Research Institute

*F. Plöckinger*

Hofrat Dipl.-Ing. Dr.techn.  
Friedrich Plöckinger

# XYPEX NEWS

ISSUE NO. 85 - 7 (TECHNICAL)

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## FEDERAL RESEARCH INSTITUTE OF VIENNA

### PERMEABILITY STUDY OF XYPEX

**XYPEX** has now been tested by the prestigious Federal Higher Technical Education and Research Institute of Vienna, in Austria.

The subject of the test was "Testing of Sealing Effect re: Penetration of Water" and was performed according to Austrian Standard ONORM-B-3303 "Testing of Concrete", Point 5.10, and ONORM-B-3303, Point 5.4.

The results of the tests showed that **XYPEX-treated concrete specimens exhibited no measurable leakage whatsoever.**

In addition, "All test specimens were broken up in the middle and judged visually. The uncoated test specimens clearly showed a penetration of water to the depth of 15 mm.; **the coated specimens showed no penetration of water.**"

The compressive strength of the **XYPEX-treated specimens** was an average of **11% higher** than the untreated specimen.

Expert Opinion by Prof. Dr. Hugo Hubacek, Head of the Institute:

".... The sofar executed tests demonstrate that the concrete test specimens coated with **XYPEX** have an impermeability to water quite superior to the uncoated ones. "

Concrete Waterproofing by Crystallization™

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