

EVG

3D[®] Construction System

Test Result Thermal Behaviour

**Heat insulation test by the Municipality of Vienna
Austria (13 Aug. 1992)**



MUNICIPALITY OF VIENNA
Testing And Research Institute

MA39-F 696/92

Vienna, August 13, 1992

Clean Report Of Findings

on the tests carried out to determine the heat insulation
of a wall unit consisting of mineral wool panels
finished on both sides,
and of a reinforcing structure

Applicant: Alpenländische Veredelungs-Industrie
Ges.m.b.H.

Date of Application: June 22, 1992

Test specimen received: June 23, 1992

Test specimen: "3-D Wall Structure" provided with a
mineral wool core "MW-WD";
Manufacturer: Messrs. Wopfinger, AVI-EVG
Dimensions:
Mineral wool panel thickness: 8 cm
Total wall thickness: 18.6 cm
Undercoat plaster: "Wopfinger Spezifix",
ready-mixed in bags of 40 kgs each;
Shotcrete: "Wopfinger Spezifix MPA 35";
ready-mixed in bags of 40 kgs each.

Purpose of the test: To determine the resistance to heat
transmission and the k-value in
accordance with the bulletin of the
Bundesministerium für Bauten und Technik
(Department of Public Buildings and
Works): 'Determining The Resistance To
Heat Transmission Of Walls And Floor
Slabs, Laboratory Tests', Issue 1987.
(See also ÖNORM B 6250 [Austrian
Standards], Proposal of 04/10/1990, and
ÖNORM B 6015, tentative standard of
12/01/1989).

Summary report: A k-value of $k = 0.41 \text{ W/m}^2/\text{K}$ has been
determined for the wall unit tested,
taking as a basis a resistance to heat
transfer totalling $0.17 \text{ m}^2\text{K/W}$.

This report consists of 3 pages
and 1 enclosure (1 sheet).

Test Specimen

A 3-D wall structure provided with a reinforced mineral wool core (MW-WD) with a thickness of 8 cm and in a size of 2 m x 2 m was set up by the applicant in the research institute (see enclosed sketch provided by the applicant). An undercoat plaster (a cement-sand mixture) designated "Spezifix" was first applied onto both sides of the reinforced mineral wool panels, and subsequently a lime-cement plaster designated "Spezifix MPA 35" of Wopfinger was machine-applied as a final plaster.

Thicknesses of the plaster layers:

Internal surface (warm side):

"Spezifix" undercoat plaster: 2 - 3 cm

"MPA 35" shotcrete: 1 - 2 cm

External surface (cold side):

"Spezifix" undercoat plaster: 3 - 4 cm

"MPA 35" shotcrete: 1 - 2 cm

Test Procedure and test results

For carrying out the heat flow measurements, the wall structure was installed between a heating box (warm side) and a cooling chamber (cold side), and insulated with mineral wool on both sides. The temperature gradient was maintained by means of controllers, and a radiator and a cooling unit, respectively (approx. 25°C on the warm side and approx. 5°C on the cold side, resp.).

Heat flow measuring plates with a measuring surface of 50 x 50 cm (warm side) and 80 x 80 cm (cold side), respectively were applied to both sides of the test wall in order to measure the quantity of heat transmitted. The temperatures of the wall surfaces were measured by means of thermocouples.

In order to determine the moisture contents of the materials, samples have been taken from the wall structure tested.

The following average values have been obtained from the measurements:

Total wall thickness:	18.6 cm
Dry volume weight (Spezifix undercoat):	1759 kg/m ³
Dry volume weight (MPA 35 shotcrete):	1379 kg/m ³
Heat flow density:	7.1 W/m ²
Temperature difference between warm and cold surface:	16.2 K
Average temperature:	approx. 15°C

Percentage of moisture (mineral wool):	0.82 % by mass
Percentages of moisture (undercoat):	3.59 % by mass, 6.31 % by volume
Percentages of moisture (MPA 35 shotcrete):	1.09 % by mass, 1.50 % by volume
Resistance to heat transmission:	2.27 m ² K/W

Since the actual moisture contents of the mineral wool and the plasters used were already sufficiently close to the equilibrium moistures recommended in ÖNORM B 6015, a second measurement with the expected slightly differing actual moisture contents of the wall structure was renounced.

According to the bulletin of the Department of Public Buildings and Works, "Determining the Resistance to Heat Transmission of Walls and Floor Slabs - Laboratory Tests", issue 1987, the heat insulation is to be referred to (practical) moisture contents prevailing at average building conditions, moisture contents which are to be assumed to be 1 % by mass for the existing mineral wool panels and 5 % by volume for the plasters used.

In total, the following table values were taken as a basis for computing the practical moisture contents:

Practical moisture contents of the mineral wool (see table 1, ÖNORM B 6015, part 2)	1 % by mass
Increment related to mass of the thermal conductibility of the mineral wool (see table 1, ÖNORM B 6015, part 2)	0.3 %
Practical moisture contents of the plasters (see table 2, ÖNORM B 6250)	5 % by volume
Increment related to volume of the thermal conductibility of the plasters (see table 1, ÖNORM B 6015, part 2)	4 %

Under the conditions mentioned above, the corrected values for the heat insulation of the wall, calculated back to the equilibrium moisture, are the following for the wall structure tested:

Resistance to heat transmission:	D = 2.26 m ² K/W
K-value:	k = 0.41 W/m ² K

In accordance with ÖNORM B 8110, part 1, a resistance to heat transfer totalling 0.17 m²K/W was taken as a basis for computing the k-value.

The test results apply only to the composition of the wall structure described in detail in the clean report of findings. Therefore, these results may be used only in connection with a detailed description of the test specimen.

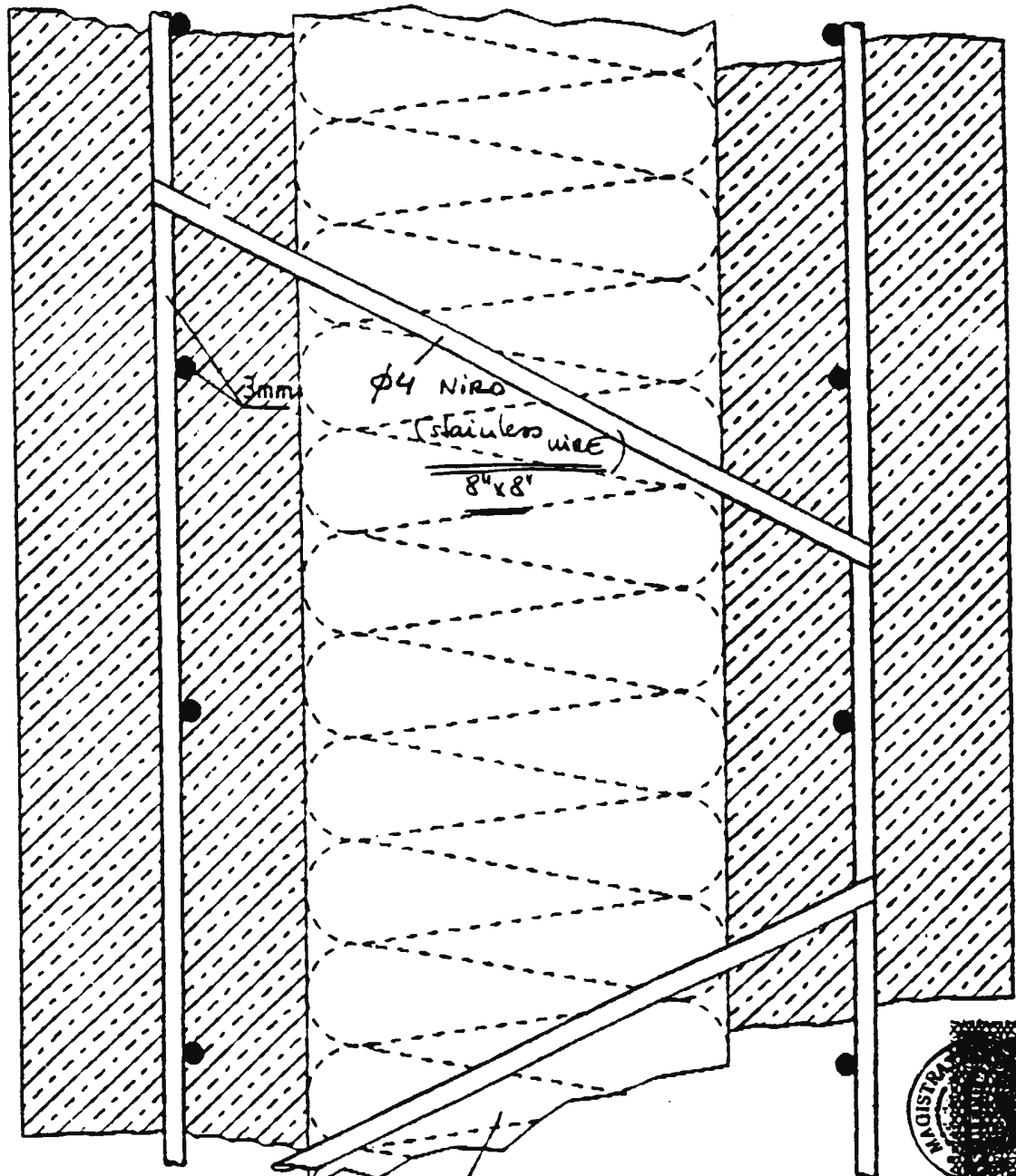
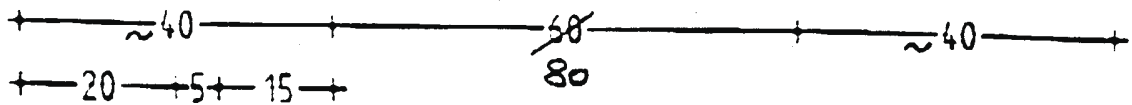
Official in charge:

The head of the Testing and
Research Institute

Dipl.Ing. W. Kuhnert

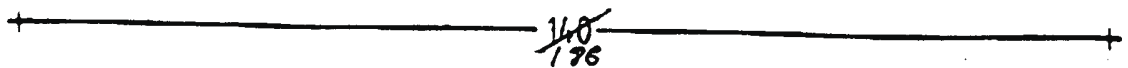
Dipl.Ing. Dr. techn. K. Miedler

VERSUCH Nr ② MINERALWOLLE
Mineral Wool



ROOF 8

MW-WD nach ONORM B6035



Note:

The dimensions of the wall structure tested differed from those of the above schematic diagram provided by the applicant.