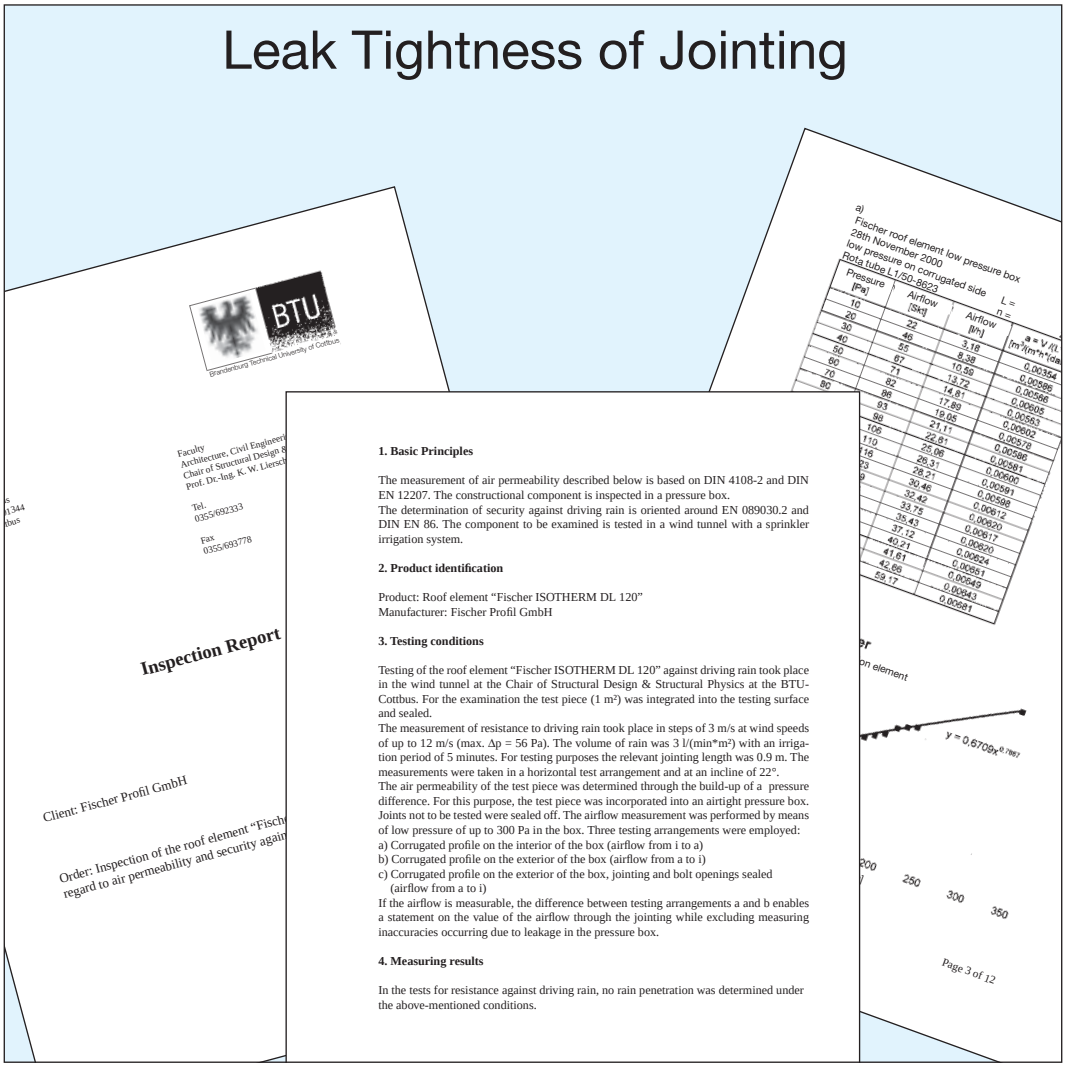
FISCHER PROFIL*

STEEL BUILDING ELEMENTS

Leak Tightness of Jointing



Inspection Report

Client: Fischer Profil GmbH

Order: Inspection of the roof element "Fischer ISOTHERM DL 120" with regard to air permeability and security against driving rain

1. Basic Principles

The measurement of air permeability described below is based on DIN 4108-2 and DIN EN 12207. The constructional component is inspected in a pressure box.
The determination of security against driving rain is oriented around EN 089030.2 and DIN EN 86. The component to be examined is tested in a wind tunnel with a sprinkler irrigation system.

2. Product identification

Product: Roof element "Fischer ISOTHERM DL 120"
Manufacturer: Fischer Profil GmbH

3. Testing conditions

Testing of the roof element "Fischer ISOTHERM DL 120" against driving rain took place in the wind tunnel at the Chair of Structural Design & Structural Physics at the BTU-Cottbus. For the examination the test piece (1 m²) was integrated into the testing surface and sealed.
The measurement of resistance to driving rain took place in steps of 3 m/s at wind speeds of up to 12 m/s (max. Δp = 56 Pa). The volume of rain was 3 l/(min*m²) with an irrigation period of 5 minutes. For testing purposes the relevant jointing length was 0.9 m. The measurements were taken in a horizontal test arrangement and at an incline of 22°.
The air permeability of the test piece was determined through the build-up of a pressure difference. For this purpose, the test piece was incorporated into an airtight pressure box. Joints not to be tested were sealed off. The airflow measurement was performed by means of low pressure of up to 300 Pa in the box. Three testing arrangements were employed:
a) Corrugated profile on the interior of the box (airflow from i to a)
b) Corrugated profile on the exterior of the box (airflow from a to i)
c) Corrugated profile on the exterior of the box, jointing and bolt openings sealed (airflow from a to i)
If the airflow is measurable, the difference between testing arrangements a and b enables a statement on the value of the airflow through the jointing while excluding measuring inaccuracies occurring due to leakage in the pressure box.

4. Measuring results

In the tests for resistance against driving rain, no rain penetration was determined under the above-mentioned conditions.

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FischerTHERM

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Inspection Report

FischerTHERM **DL120**

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Inspection Report

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The air permeability of the test piece was determined through the build-up of a pressure difference. For this purpose, the test piece was incorporated into an airtight pressure box. Joints not to be tested were sealed off. The airflow measurement was performed by means of low pressure of up to 300 Pa in the box. Three testing arrangements were employed:
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If the airflow is measurable, the difference between testing arrangements a and b enables a statement on the value of the airflow through the jointing while excluding measuring inaccuracies occurring due to leakage in the pressure box.

4. Measuring results

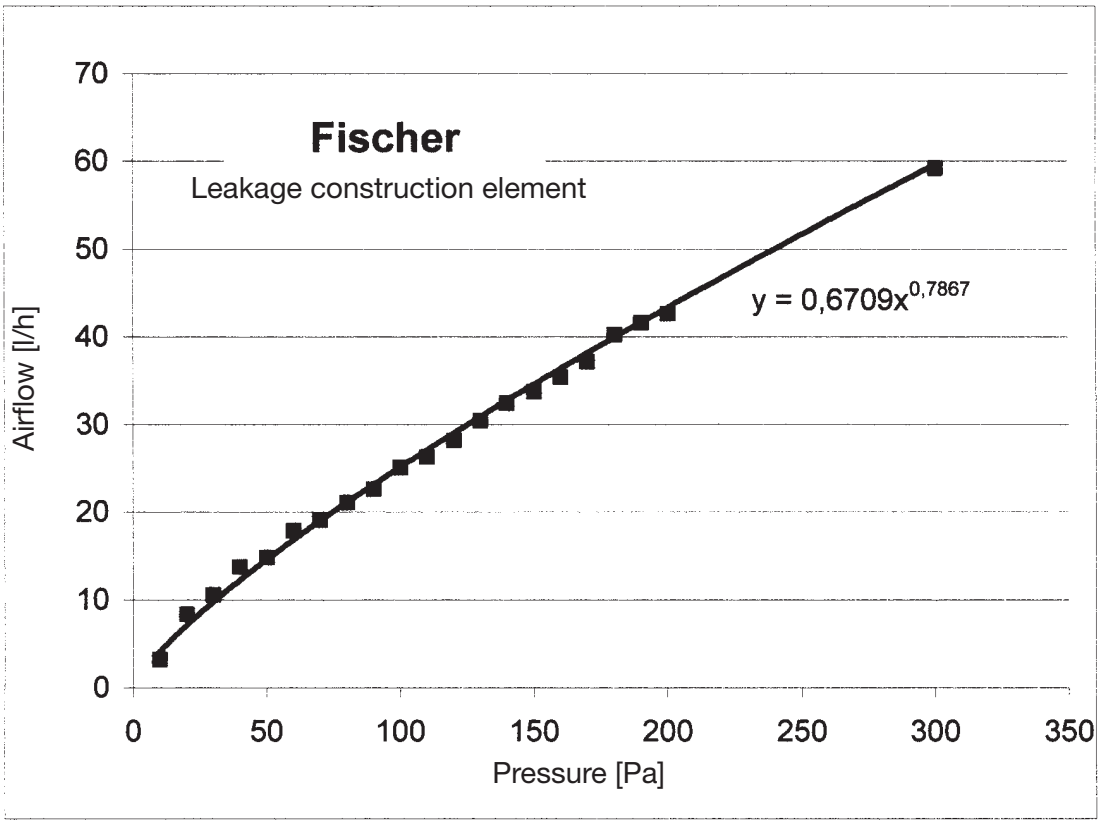
In the tests for resistance against driving rain, no rain penetration was determined under the above-mentioned conditions.

a)

Fischer roof element low pressure box
28th November 2000
low pressure on corrugated side L = 0,9
Rota tube L1/50-8623 n = 2/3

Pressure [Pa]	Airflow [Skt]	Airflow [l/h]	$a = V/(L*p^n)$ $[m^3/(m*h*(daPa)^n)]$
10	22	3,18	0,00354
20	46	8,38	0,00586
30	55	10,59	0,00566
40	67	13,72	0,00605
50	71	14,81	0,00563
60	82	17,89	0,00602
70	86	19,05	0,00578
80	93	21,11	0,00586
90	98	22,61	0,00581
100	106	25,06	0,00600
110	110	26,31	0,00591
120	116	28,21	0,00598
130	123	30,46	0,00612
140	129	32,42	0,00620
150	133	33,75	0,00617
160	138	35,43	0,00620
170	143	37,12	0,00624
180	152	40,21	0,00651
190	156	41,61	0,00649
200	159	42,66	0,00643
300	204	59,17	0,00681

⬅ This is the value at 10 Pa pressure difference



b)

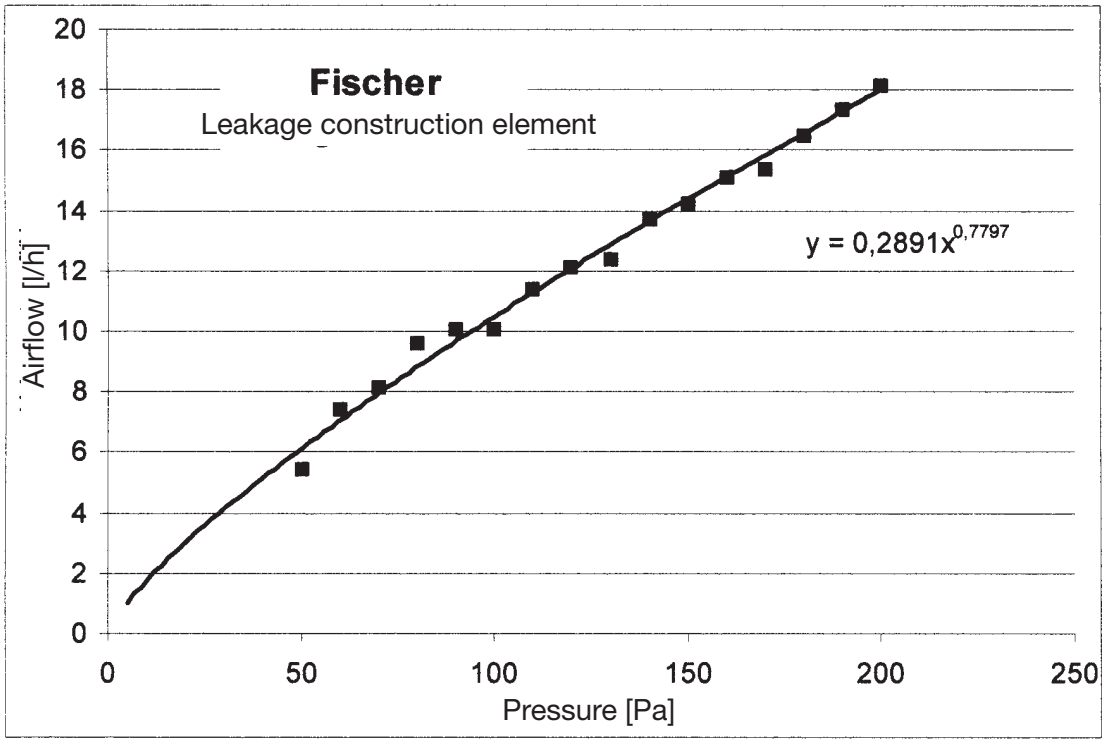
Fischer roof element low pressure box

4th December 2000

low pressure on flat side L = 0,9

Rota tube L1/50-8623 n = 2/3

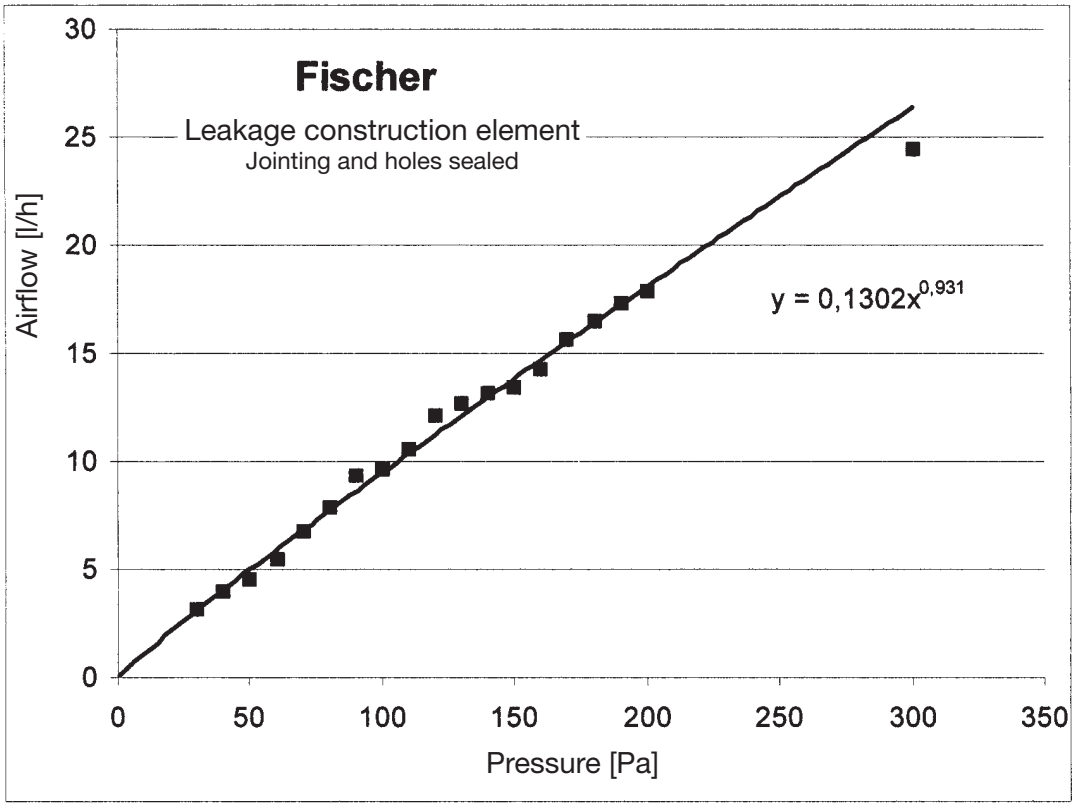
Pressure [Pa]	Airflow [Skt]	Airflow [l/h]	$a = V/(L*p^n)$ $[m^3/(m*h*(daPa)^n)]$
50	33	5,42	0,00206
60	42	7,44	0,00250
70	45	8,14	0,00247
80	51	9,59	0,00266
90	53	10,09	0,00259
100	53	10,09	0,00242
110	58	11,36	0,00255
120	61	12,14	0,00257
130	62	12,40	0,00249
140	67	13,72	0,00263
150	69	14,27	0,00261
160	72	15,08	0,00264
170	73	15,36	0,00258
180	77	16,47	0,00267
190	80	17,32	0,00270
200	83	18,18	0,00274



c)

Fischer roof element low pressure box
(Jointing and holes sealed)
5th December 2000
low pressure on flat side L = 0,9
Rota tube L1/50-8623 n = 2/3

Pressure [Pa]	Airflow [Skt]	Airflow [l/h]	a = V /(L*p^n) [m^3/(m*h*(daPa)^n)]
30	22	3,18	0,00170
40	26	3,96	0,00175
50	29	4,57	0,00174
60	33	5,42	0,00182
70	39	6,75	0,00205
80	44	7,90	0,00220
90	50	9,35	0,00240
100	51	9,59	0,00230
110	55	10,59	0,00238
120	61	12,14	0,00257
130	63	12,66	0,00254
140	65	13,19	0,00252
150	66	13,46	0,00246
160	69	14,27	0,00250
170	74	15,64	0,00263
180	77	16,47	0,00267
190	80	17,32	0,00270
200	82	17,89	0,00270
300	104	24,44	0,00281



5. Summary

An jointing permeability coefficient a-value of < 0.1 $m^3/mh(daPa^{2/3})$in the jointing was determined for the roof element “Fischer ISOTHERM DL 120” as per E DIN 4108-2. The requirements for air tightness in exterior building components are thereby fulfilled.
The greatest airflow of 59.17 l/h was measured with a pressure difference of 300 Pa (low pressure on corrugated side. This corresponds to a jointing permeability coefficient of 0.00681 $m^3/mh(daPa^{2/3})$.
According to DIN EN 12207 the roof element can be allocated to class 4. The reference air permeability at 100 Pa is 0.0278 $m^3/(h*m)$ with low pressure on the corrugated side.
The resistance to driving rain as per DIN 18055 i.e. with simultaneous exposure to wind and rain was given. No rain penetration could be measured in accordance with EN 089030.2 and DIN EN 86.

Cottbus, 24th April 2002

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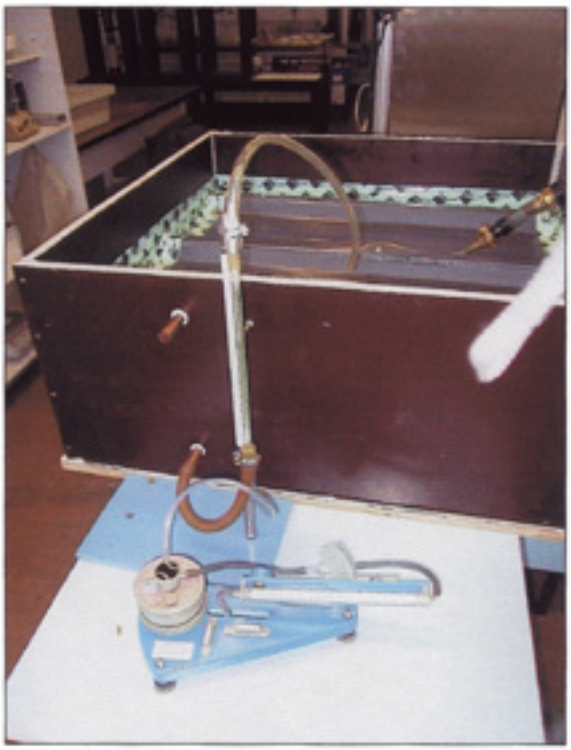
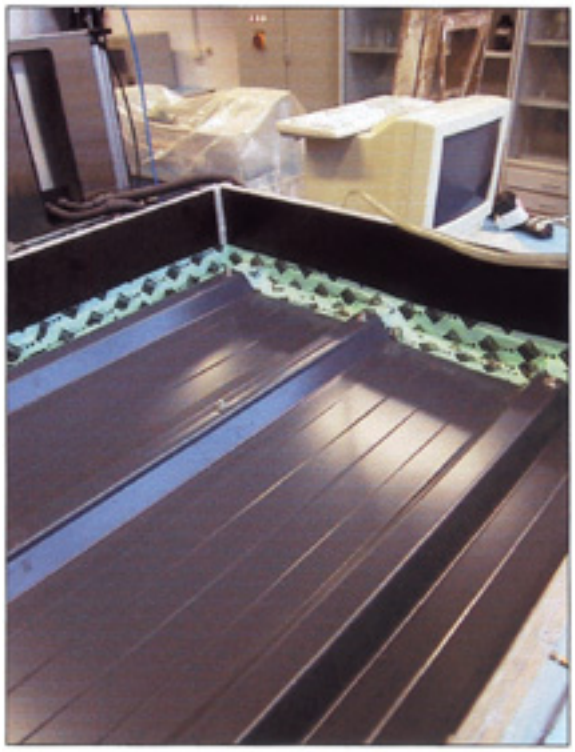
Prof. Dr.-Ing. K.W. Liersch Chair holder	Dipl. Ing. N Langner Clerical assistant

6. Appendix

6.1 Photos showing the test for air permeability



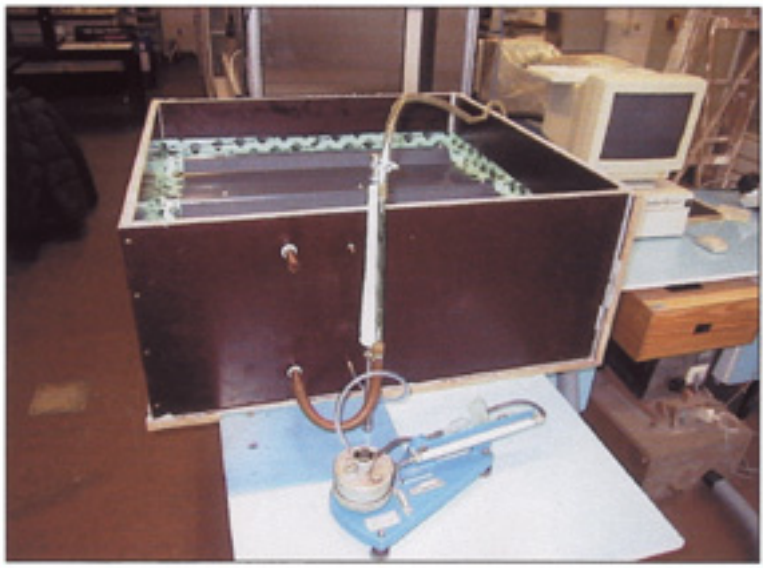
1. Pressure box with testing equipment



2. Corrugated side exterior, sealed

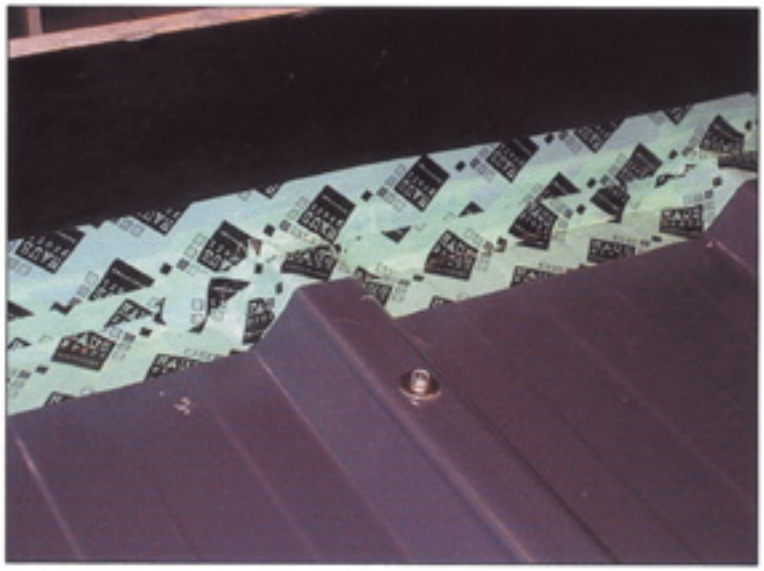
3. Sealing of corners

4. Manometer, Rota tube



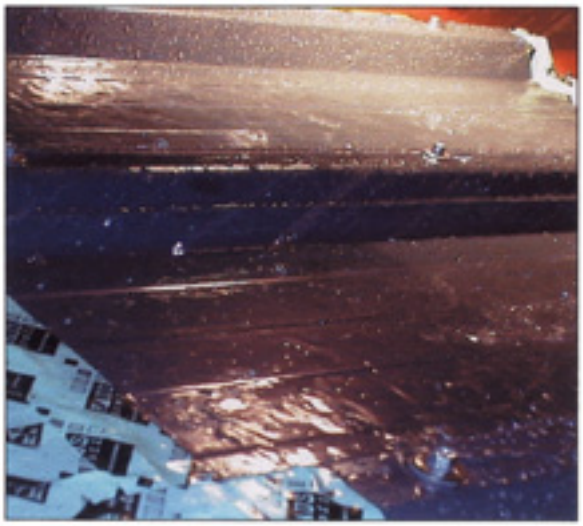
5. Pressure box with testing equipment

6. Assembled: flat side with low pressure



7. Edge sealing

6.2 Photos showing the test for driving rain



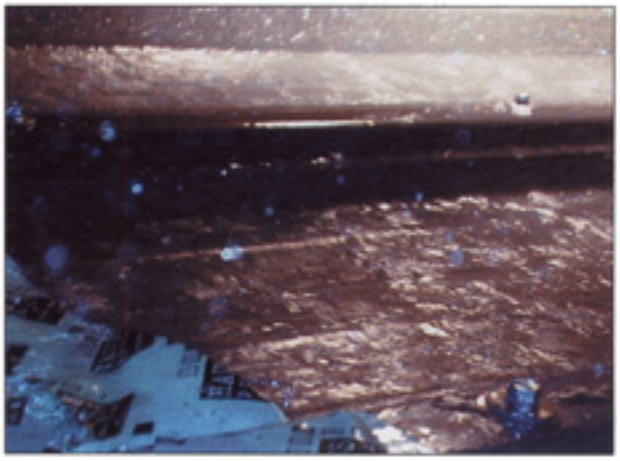
11. Roof element at 3 m/s

12. Testing construction in wind tunnel

13. Irrigation at 3 m/s

14. Testing construction in wind tunnel at 3 m/s

15. Rain test at 12 m/s

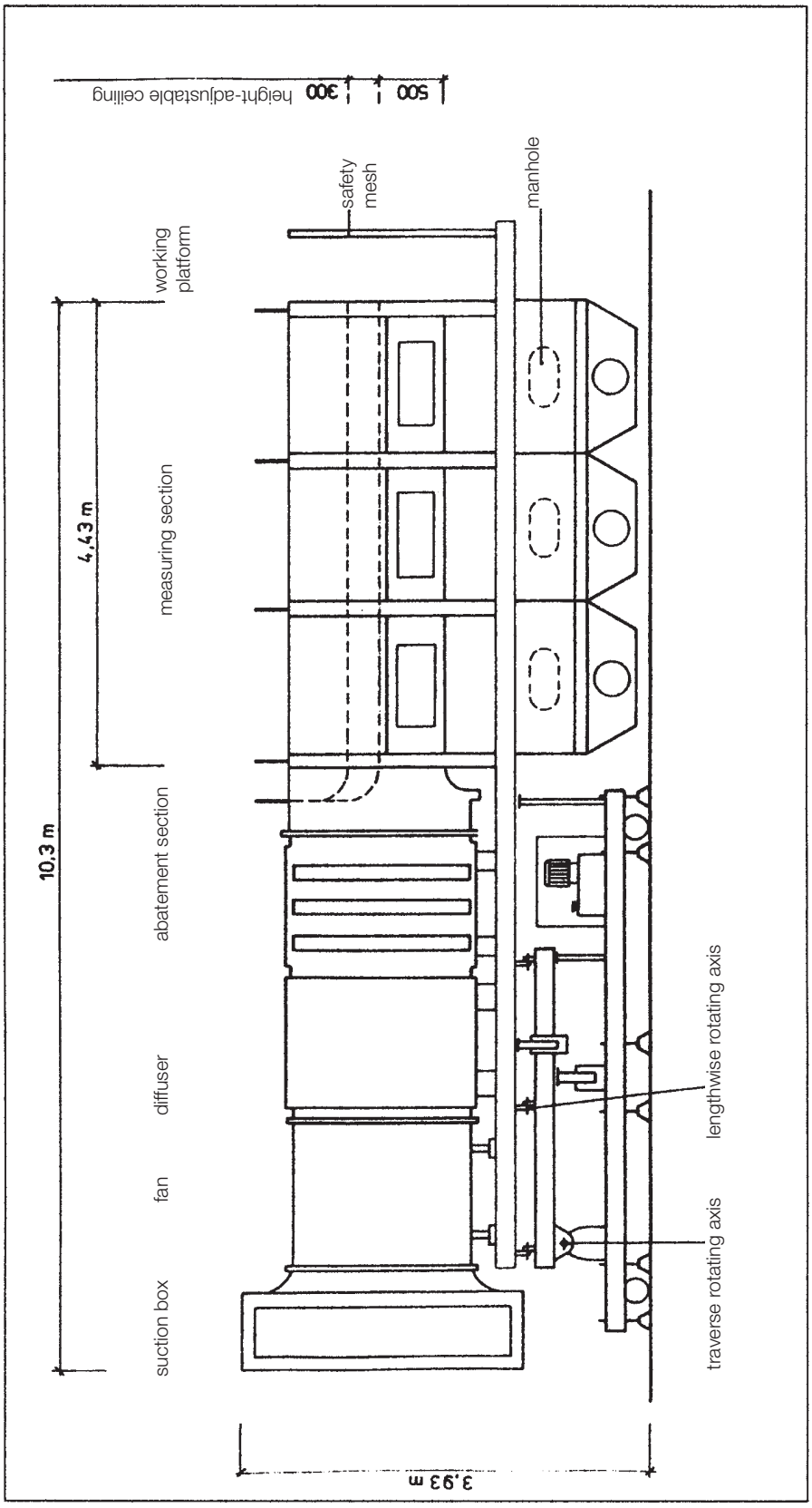


16. Roof element at 12 m/s

17. Rain test at 12 m/s

18. Roof element joint at 12 m/s

Wind tunnel at the BTU Cottbus



Inspection Report

FischerTHERM **WL80**

Inspection report
No. 10421417

Windows
Doors
Facades
Materials
Accessories

ift ROSENHEIM

Date of report 29th April 1999

Client
Fischer Profil
Waldstr. 67
57250 Netphen

Order Test of joint permeability and resistance to driving rain in the butt joint area of the Fischer ISOTHERM WL 80 wall

Object 2 Fischer ISOTHERM WL 80 wall sections with butt joint

Contents

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DAP-P-00.808-01-97-00

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1. Task

The i.f.t. Rosenheim was commissioned by Fischer Profil GmbH, 57250 Netphen to test the jointing permeability and resistance to driving rain of a butt joint between two Fischer ISOTHERM WL 80 wall sections.

2. Object

2 Fischer ISOTHERM WL 80-wall sections; vertically butted, 80 mm wall section thickness

Wall construction	corrugated, strip galvanised steel sheet with plastic coating; element core with PUR rigid foam with ≥ 40 kg/m³ gross density; lined inner strip galvanised steel sheet with plastic coating
Outer dimensions	595 x 1400 mm per wall section
Jointing length	1360 mm
Sealant	EPDM sealing profile, 7 mm open-cell PUR strip

3. Implementation

The tests were implemented in accordance with
– DIN EN 42 testing procedure for windows; test of jointing tightness
– DIN EN 86 testing procedure for windows; test of resistance to driving rain under static pressure.

4. Results

4.1 Test under ideal conditions with 8 mm visible butt joint width on room side

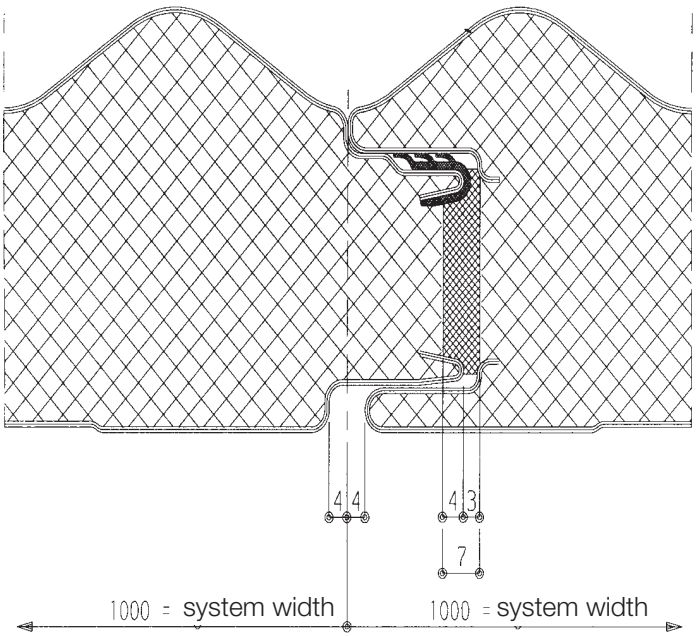

Fig. 1 Butt joint formation

4.1.1 Joint permeability

The tests were performed with wind pressure and wind suction up to ± 1100 Pa.
No measurable air permeability was detected.

4.1.2 Resistance against driving rain

No water penetration was detected through the butt joint up to the implemented pressure difference of 600 Pa with an irrigation of 2 l/min m².

ROSENHEIM

4.2 Test with 11 mm visible butt joint width on room side

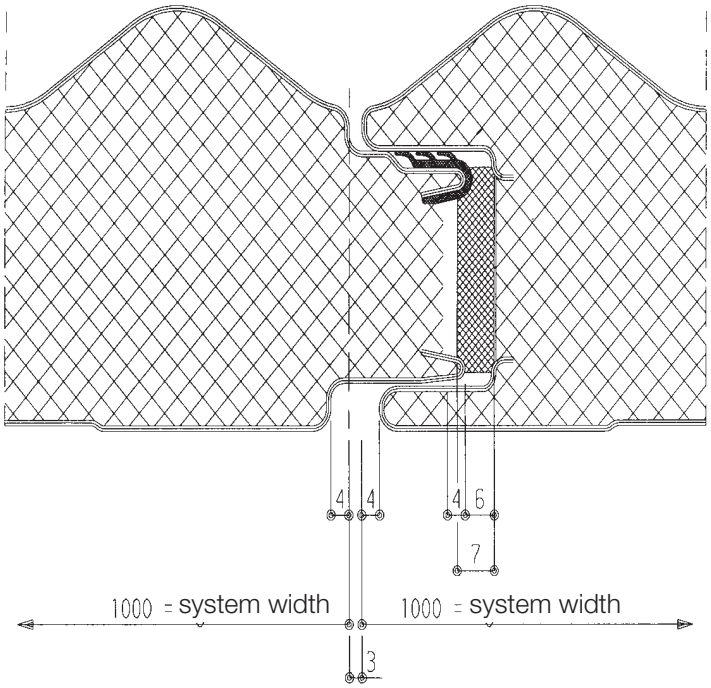

Fig. 2 Butt joint formation

4.2.1 Joint permeability

Table 1 Joint permeability

Pa	600	700	800	900	1000	1100	-1100
m^3/h	0,1	0,2	0,2	0,3	0,3	0,3	0,1
m^3/hm	0,07	0,15	0,15	0,22	0,22	0,22	0,07

The joint permeability coefficient is calculated according to DIN 18055:

$a = \frac{V \cdot 10^{\frac{2}{3}}}{\Delta p^{\frac{2}{3}}}$ · The joint permeability can be expressed as < 0.1 $m^3/hm(10\ Pa)^{2/3}$.

4.2.2 Resistance against driving rain

The first penetration of water through the butt joint was determined at 600 Pa.

4.3 Validity of inspection results

The values given in this inspection report refer exclusively to the objects described and tested under point 2.

4.4 Transference of inspection results

The results measured were determined when the objects were new and thus contain no changes which might result from the effects of weathering and/or ageing.

5 Notes on the use of i.f.t. inspection reports

The rules for the use of inspection reports are stated in the enclosed information sheet "Notes on the use of i.f.t. inspection reports for advertising purposes and for the publication of their contents".

i.f.t. Rosenheim
29th April 1999

Director of Institute
Professor Josef Schmid

Component Testing Division
Florian Sewald

FISCHER PROFIL*

STEEL BUILDING ELEMENTS

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