



REPORT ON THE TESTING TO
DW142 OF THREE SIZES OF
EUROPROFIEL DUCT FLANGE

Report 11589/2
August 1994

Carried out for:

VENTO

Prepared by:

P J Heywood
A L Fricker



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Appendix A1

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The Building Services Research and Information Association

Old Bracknell Lane West, Bracknell, Berkshire. RG12 7AH
Tel: (0344) 426511. Fax: (0344) 487575

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INTRODUCTION

The object of the test work was to prove samples of Europrofiel duct flange to DW142. The sizes tested were E20, E30, and A40.

The tests were carried out at Vento n.v. Oudenaarde in Belgium, and were for:

Vento n.v.
Industriezone De Coupure 5
9700 Oudenaarde
Belgium

APPENDIX A1
TEST RESULTS

DESCRIPTION

The flanges tested were as follows:

Europrofil E20 with injected seal, corners H20, and clamps Cm.

Europrofil E30 with injected seal, corners H30, and clamps CM.

Europrofil A40 with applied mastic, corners H40, and clamps Cm.

All the flanges had self adhesive tape applied into the mating faces. Sizes were E20, 12x6, E30, 20x6, A40 40x6.

The joints were tested at 500, 1000, 2000, and 2500 Pa in accordance with the test standard. A copy of the procedure is attached to this report Dw142/TM1.

RESULTS

See enclosed table for the recorded results.

The results detail the required ducting and dimensions, sheet and flange material thickness, and the achieved leakage and deflection for both positive and negative tests.

CONCLUSIONS

The following flange sections compiled with DW142/TM1.

E20 J2 classes A, B, and C.

E30 J3 classes A, B, C, and D.

A40 J5 classes A, B, and C.

A40 J6 classes A, B, C, D.

All tests using the A40 had the flanges strengthened with two tie rods.

Table of results for DW142/TM1 tests carried out at
Vento n.v. Oudenaarde, Belgium

Flange E20		Pressure Pa	Flange thickness mm	Duct thickness mm	Leakage	
Class	Rating				pos l/s	neg l/s
J						
2	A	500	.75	1	.46	.4
2	B	1000	.75	.8	.47	.05
2	C	2000	.75	.8	.84	.56
2	D	2500	.75	.8	.33	.13
3	A	500	.75	1	1.6	*
3	B	1000	.75	1	.59	.46
3	C	2000	.75	.8	.98	.47
3	D	2500	.75	.8	-	-

* Bottom flange buckled under negative pressure test abandoned.

Flange E30		Pressure Pa	Flange thickness mm	Duct thickness mm	Leakage	
Class	Rating				pos l/s	neg l/s
J						
3	A	500	.95	1	>.1	.11
3	B	1000	.95	1	1.9	1.2
3	C	2000	.95	.8	1.05	.35
3	D	2500	.95	.8	.88	.11
4	A	500	.95	1	.46	.6
4	B	1000	.95	1	2.5	2.5
4	C	2000	.95	1	.82	.47
4	D	2500	.95	1	.81	.36

Flange A40		Pressure Pa	Flange thickness mm	Duct thickness mm	Leakage	
Class	Rating				pos l/s	neg l/s
J						
5	A	500	1.05	1.2	1.1	.65
5	B	1000	1.05	1	2.7	.9
5	C	2000	1.05	1.2	.1	.1
5	D	2500	1.05	1	.43	>.1
6	A	500	1.05	1.2	1	1.35
6	B	1000	1.05	1.2	.85	.85
6	C	2000	1.05	1.2	1.2	.9
6	D	2500	1.05	1.2	.86	.86

All flanges sealed with tape, sizes 12x6, 20x6, 40x6.

A40 flanges sealed with mastic on inside of duct

All clamps used were type CM

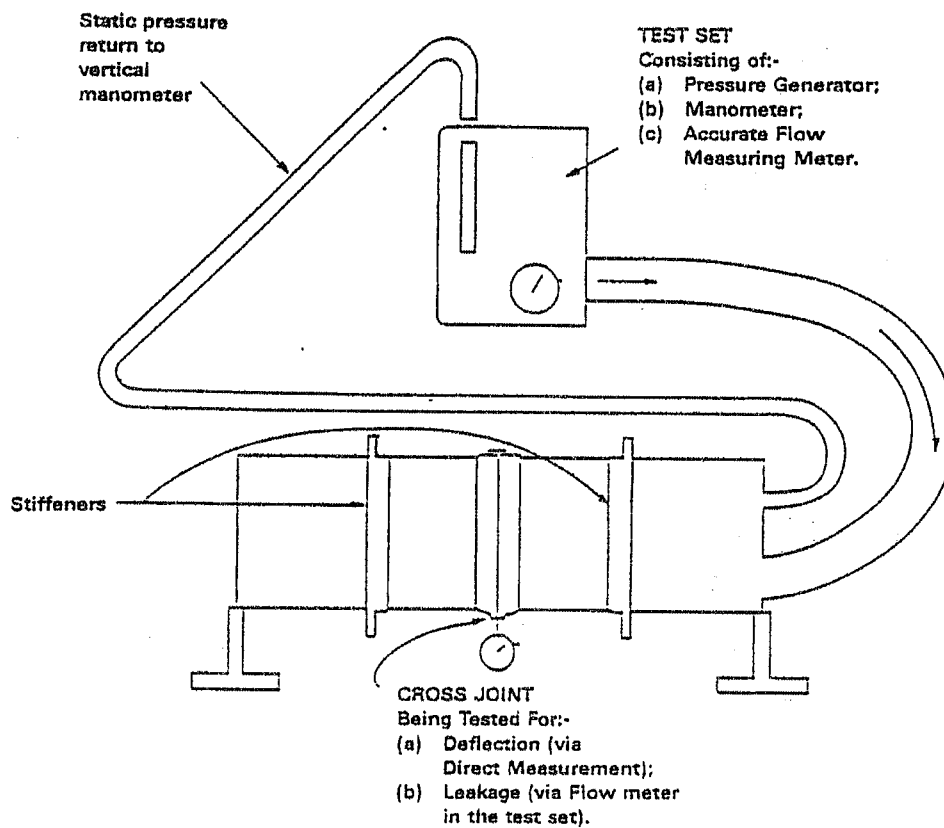
Corners used, E20 H20, E30 H30, A40 H40.

APPENDIX A2
TEST PROCEDURE

4. TEST PROCEDURE

The test equipment and the cross joint to be tested is to be set up as indicated in the diagram below.

All longitudinal seams in the test ductwork are to be in accordance with DW/142.



Testing should be carried out as follows:-

PRELIMINARY WORK

- 4.1 Connect joints to duct sections in accordance with manufacturer's instructions. (Where relevant take account of sealant curing time);
- 4.2 Ensure sufficient lifting equipment (or manpower) is available to place the ductwork in position;
- 4.3 Ensure adequate tools and accessories are to hand — i.e. spanners, screw drivers, sealing tape, spare manometer fluid, etc.:

WORK TO BE CARRIED OUT BY APPLICANT IN PRESENCE OF
WITNESSING OFFICER

- 4.4 Assemble the joint in accordance with the manufacturer's instructions:
- 4.5 Set up duct sections on supports.

POSITIVE PRESSURE TEST

- 4.6 Connect the pressure outlet of the test set to the test duct:
- 4.7 Connect the static pressure return tube (attached to the vertical manometer in the test set) to the test duct. Set the manometer to zero:
- 4.8 Set the dial gauge at zero before pressurisation such that it is in contact with the centre of the bottom of the cross joint under test or where a tie rod is used the contact point shall be midway between the tie rod and the duct corner:
- 4.9 Switch on the test set and bring up the pressure to that required for the test (either 500, 1000, 2000 or 2500 pascals);
- 4.10 Maintain the pressure by the controller on the test set to $\pm 5\%$:
- 4.11 Check following areas for air leakage:
 - (a) all air connections at the test set and the test duct:
 - (b) end caps of test duct:
 - (c) longitudinal seams of the test duct.

NOTE: SMOKE PELLETS SHOULD NOT BE USED UNDER ANY
CIRCUMSTANCES.

- 4.12 Repair any leakage areas brought to light by 4.11 above:
- 4.13 Start stop watch and simultaneously record initial flow meter reading:
- 4.14 After ten minutes, record deflection of the joint (as indicated on the dial gauge);
- 4.15 After fifteen minutes record total air leakage:
- 4.16 Release pressure;
- 4.17 Deflection and air leakage to be recorded on the certificate.

NEGATIVE PRESSURE TEST

- 4.18 Disconnect the test apparatus and reconnect to enable negative pressure to be recorded (-500pa for low pressure ducts and -750pa for medium and high pressure ducts);
- 4.19 Set up dial gauge such that it will record an inverted deflection;
- 4.20 Restart test set and repeat previous steps 4.10 to 4.17 (as for positive pressure);
- 4.21 Disconnect test apparatus and break joint;
- 4.22 Remove sample section of joint/profile as directed by witnessing officer — for his examination and retention.

END OF TEST

5. RULES OF THE SCHEME

- 5.1 THIS TEST HAS BEEN DEVELOPED AS A MEANS OF ESTABLISHING PERFORMANCE RATINGS FOR BOTH AIR LEAKAGE AND DEFLECTION FOR CROSS JOINTS NOT INCLUDED IN DW/142. PARTICIPATION IN THE TEST IS SEEN AS AN ACCEPTANCE OF THE CONDITIONS. THE TESTING PRINCIPLES AND THE ENSUING RESULTS. SHOULD THIS NOT BE THE CASE THEN IT IS SUGGESTED THAT SUCH JOINTS ARE PROMOTED INDEPENDENTLY OF THE HVCA DUCT WORK GROUP.
- 5.2 THE DECISION OF THE WITNESSING AUTHORITY IS FINAL AND NEITHER THEY NOR THE HVCA ARE PREPARED TO ENTER INTO CORRESPONDENCE ON THE SUBJECT OF INDIVIDUAL RESULTS.

TABLE 1 — MAXIMUM LEAKAGE AND DEFLECTION VALUES

INFORMATION EXTRACTED FROM DW/142							CALCULATIONS		
Joint Rating	Class and Max Press (Pa)	Duct Size	Length per Section (2 of)	Sheet Thickness	R. S. Angle Stiffener	Stiffener dist. from Joint	Surface Area (Sq mtrs)	Max test Leakage (Litres/Sec)	Max. Deflection
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
J1	Low 500	1000 × 350	1250	0.8	25×25×3	625	6.75	4.13	4.00
J1	Med 1000	800 × 300	1250	0.8	25×25×3	625	5.50	1.76	3.20
J1	High 2000	600 × 200	1250	0.8	25×25×3	625	4.00	0.67	2.40
J1	High 2500	600 × 200	1250	0.8	25×25×3	625	4.00	0.26	2.40
J2	Low 500	1250 × 450	1250	1.0	25×25×3	625	8.50	5.20	5.00
J2	Med 1000	1000 × 350	1250	0.8	25×25×3	625	6.75	2.16	4.00
J2	High 2000	800 × 300	1500	0.8	25×25×3	800	6.60	1.11	3.20
J2	High 2500	800 × 300	1250	0.8	25×25×3	625	5.50	0.35	3.20
J3	Low 500	1600 × 550	1500	1.0	30×30×5	800	12.90	7.89	6.40
J3	Med 1000	1250 × 450	1500	1.0	30×30×5	800	10.20	3.26	5.00
J3	High 2000	1000 × 350	1500	0.8	30×30×5	800	8.10	1.36	4.00
J3	High 2500	1000 × 350	1250	0.8	30×30×5	625	6.75	0.43	4.00
J4	Low 500	2000 × 700	1500	1.0	40×40×5	800	16.20	9.92	8.00
J4	Med 1000	1600 × 550	1500	1.0	40×40×5	800	12.90	4.13	6.40
J4	High 2000	1250 × 450	1500	1.0	40×40×5	800	10.20	1.71	5.00
J4	High 2500	1250 × 450	1250	1.0	40×40×5	625	8.50	0.54	5.00
J5	Low 500	3000 × 1000	1250	1.2	50×50×5	625	20.00	12.24	12.00
J5	Med 1000	2500 × 850	1250	1.0	50×50×5	625	16.75	5.36	10.00
J5	High 2000	2000 × 700	1250	1.2	50×50×5	625	13.50	2.27	8.00
J5	High 2500	1600 × 550	1250	1.0	50×50×5	625	10.75	0.69	6.40
J6	Low 500	3000 × 1000	1250 1500	1.2	60×60×5	625 800	24.00	4.69 4.69	12.00
J6	Med 1000	3000 × 1000	1250	1.2	60×60×5	625	20.00	6.40	12.00
J6	High 2000	2500 × 850	1250	1.2	60×60×5	625	16.75	2.81	10.00
J6	High 2500	2500 × 850	1000	1.2	60×60×5	500	13.40	0.86	10.00

NOTES

- (i) Information is extracted from DW/142 Tables 5 — 8 inclusive and relates each joint rating (Col. 1) to the maximum duct size (Col. 3) per pressure class (Col. 2);
- (ii) The duct depth (Col. 3) gives an approximate duct aspect ratio of 3 : 1;
- (iii) Stiffening frames (Col. 6) must be rolled steel angle as DW/142 Figure 44 and must match the rating of the joint i.e. J3/S3;
- (iv) The surface area (Col. 8) does not include the end caps;
- (v) Maximum test leakage (Col. 9) is based on 40% of the maximum system leakage contained within DW/142, Table 31.
i.e. Calculation for Line 1 in the Table is:-
Surface Area × Max. System Leakage × 40% = Max Test Leakage
6.75 sq. m × 1.53 litres/sec/sq. m × 40% = 4.13 litres/sec.
- (vi) Max deflection (Col. 10) is duct width (Col. 3) × 1/250 or where tie rods are used 1/250 of the span between the central tie rod and the side of the duct;
- (vii) In ducts where tie rods are fitted 50% of the values in Column 10 shall be used;
- (viii) The above information also applies to negative pressure tests apart from the static pressure limits which are 500pa for low pressure and 750pa for medium and high pressure — i.e. as Table 1, DW/142.