

**EN 14175, Part 3 Type Test Report for 150cm Wide
Bench Type Ductless Fume Hood of Topair Systems INC**

Ref: EN 14175, Part 3

Model: CF-150-PP

by

Dr A F Bicen

Invent UK Ltd

85 Southdown Road

Harpenden AL5 1PR

m: +44 (0) 7785 245077

email: bicen@invent-uk.com

INV/EN14175/1030

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1. INTRODUCTION

EN 14175, Part 3 type tests carried out to 150cm wide bench type ductless fume hood of Topair Systems INC are reported. General information on the test methods and procedures can be found in reference 1. The EN 14175 test methods and procedures were used to determine frontal flow and containment characteristic of the fume hood. The fume hood was connected to the test room extract system. In this way the test gas was exhausted to outside rather than back into the room.

2. DESCRIPTION OF TEST ROOM FACILITIES

The test room was approx 10.0m long, 5.0m wide and 4.0m high. The tests facilities include a variable-speed extract air system to adjust the flow rate to the required value. The extract flow rate is measured by a venturimeter with an accuracy of better than 3%. The make-up air was brought in through the perforated ceiling tiles opposite the fume hood so as to allow a test room pressure in the range of -1Pa to -5Pa. The test room differential pressure, temperature, relative humidity and velocity during tests were:

Room differential pressure:	-2Pa (+/-10%)
Room air temperature:	21°C (+/-10%)
Room air relative humidity:	50% (+/-10%)
Room air velocity:	much less than 0.1 m/s

3. DESCRIPTION OF FUME HOOD

The fume hood tested is a 150cm wide bench-type ductless fume hood, designed & built by Topair Systems INC, **Model CF-150-PP**.

External dimensions:	Width = 1500mm Height = 2060mm Depth = 700mm (max)
Internal dimensions:	Width = 1425mm Height = 700mm (max) Depth = approx 620mm
Baffle slots/dimensions:	Top baffle slots = approx 40nos of 75mm x 8mm Bottom baffle slots = approx 150nos of 75mm x 8mm
Other dimensions:	Sash opening width = 1425mm Sash opening height = 500mm from bottom cill Air assisted sash airfoil with approx 15mm air gap Sash internal top gap when sash at 500mm = approx 20mm Sash gap from bottom cill when sash closed = approx 20mm Bottom cill air gap = approx 25mm

4. EN 14175 PART 3 TYPE TESTS

4.1 VELOCITY TESTS

Velocity tests were carried out in accordance with the procedure described in reference 1. Tests were performed for a sash opening of 500mm from the bottom cill airfoil. The velocity type-test grid for this opening is shown in Figure 1. Figure 1 also summarises the test results.

4.2 CONTAINMENT TESTS

Containment tests were performed using the procedures described in reference 1.

4.2.1 Inner Measurement Plane Tests

Figure 2 shows the positionings of the test system with respect to the test opening. Figure 2 also summarises the test results, C_1 and protection factor PF_1 .

4.2.2 Outer Measurement Plane Tests

Figure 3 shows the positioning of the test system with respect to the test opening and summarises the test results, C_2 , C_3 , C_4 & C_5 and protection factors PF_2 , PF_3 , PF_4 & PF_5 .

4.2.3 Robustness of Containment Test

Figure 4 shows the positioning of the test system with respect to the test opening and summarises the test results, C_R and protection factor PF_R .

4.3 SASH SUSPENSION TEST

The sash suspension test was carried out as required by 6.1 of EN 14175, Part 2, see reference 2. The sash remains in its test position when one of the suspension devices is disconnected.

4.4 SASH DISPLACEMENT TEST

The sash displacement force was measured as required by reference 2. The maximum force for sash closing and opening was approx 20N (+/-10%).

4.5 PROTECTION AGAINST SPLASHES

Good protection. The sash closes with a minimum gap of 20mm from the bottom cill airfoil.

4.6 OTHER OBSERVATIONS

1. Low volume flow visualisation tests indicated that smoke moves inward at boundaries with no apparent flow reversals.
2. Work surface has a raised edge for spillage retention.
3. There is no "keep sash closed when not in use" marking.
4. Hood is not fitted with a pressure relief device.

REFERENCES

1. *BS EN 14175, Fume Cupboards-Part 3: Type Test Methods*, 2019.
2. *BS EN 14175, Fume Cupboards-Part 2: Safety and Performance Requirements*, 2003.
3. *BS EN 14175, Fume Cupboards-Part 1: Vocabulary*, 2003.

List of instrumentation used during tests:

1. Miran 205-B infrared gas analyser - SN: 76185-382
2. Critical orifice for inner-plane test gas metering: SN: 053
3. Critical orifice for outer-plane and robustness test gas metering: SN: 065
4. VelociCalc 9545-A: SN: 0713014
5. Smoke pen

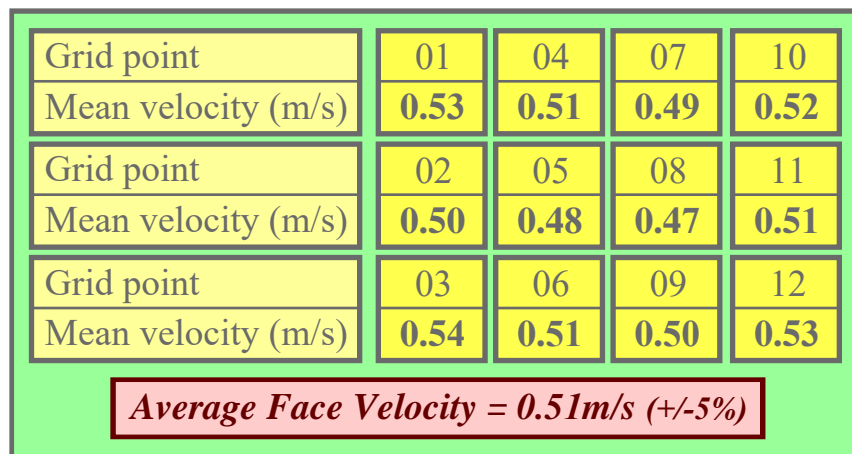


Figure 1 Velocity type-test results
(see 5.2 of EN 14175, Part 3).

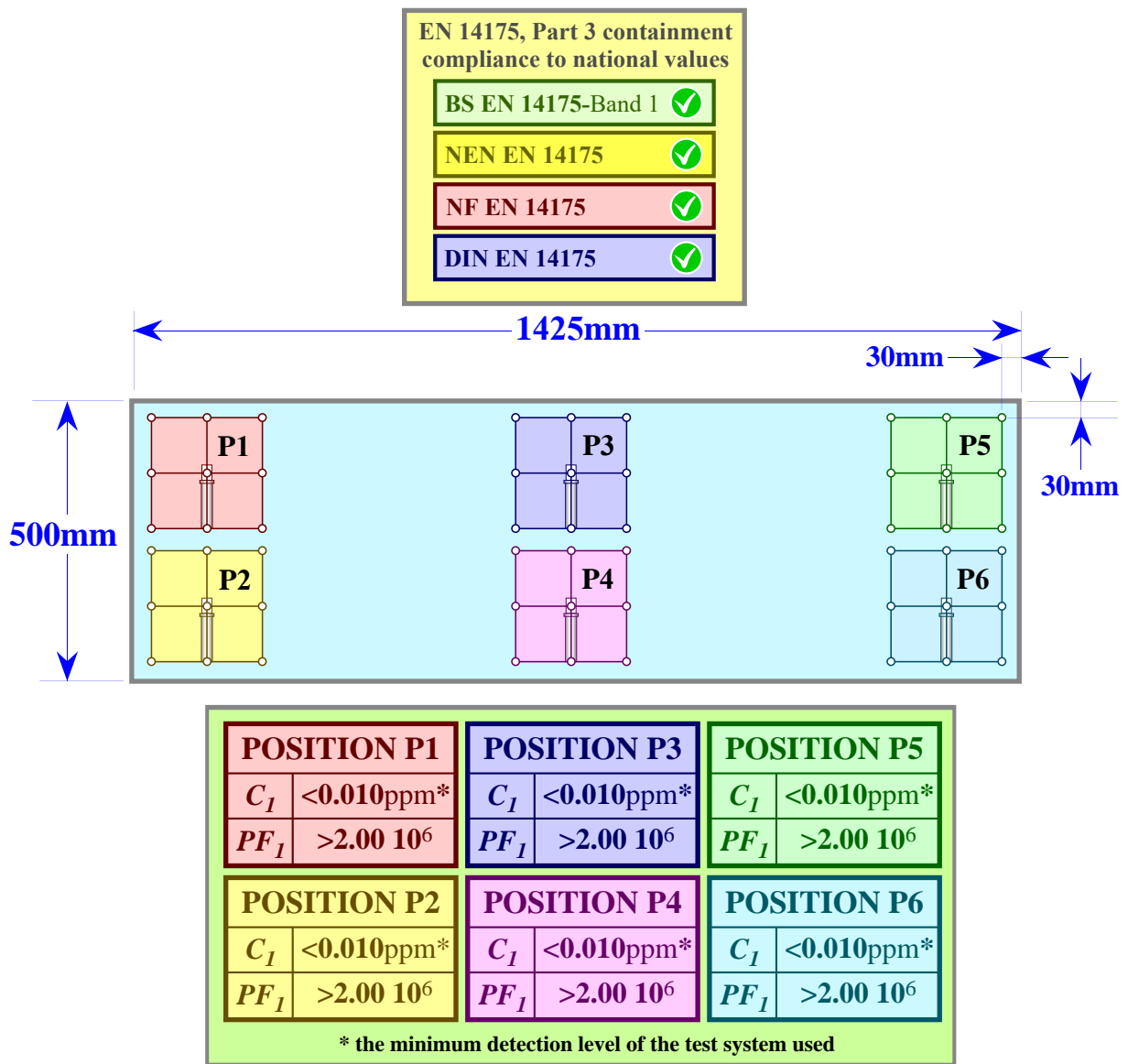


Figure 2 Inner plane containment test results
(see 5.3 of EN 14175, Part 3).

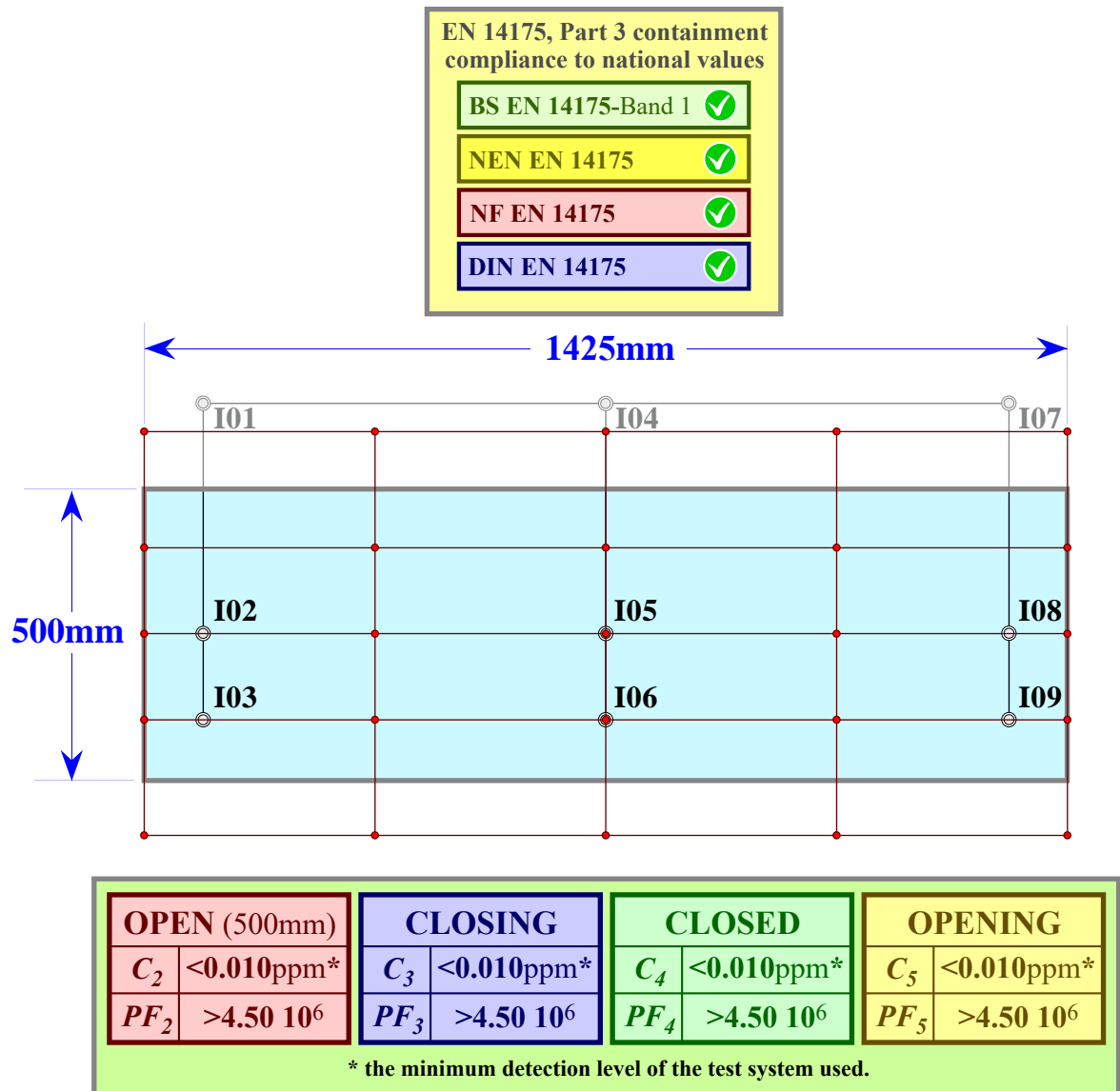


Figure 3 Outer plane containment test results
(see 5.3 of EN 14175, Part 3).

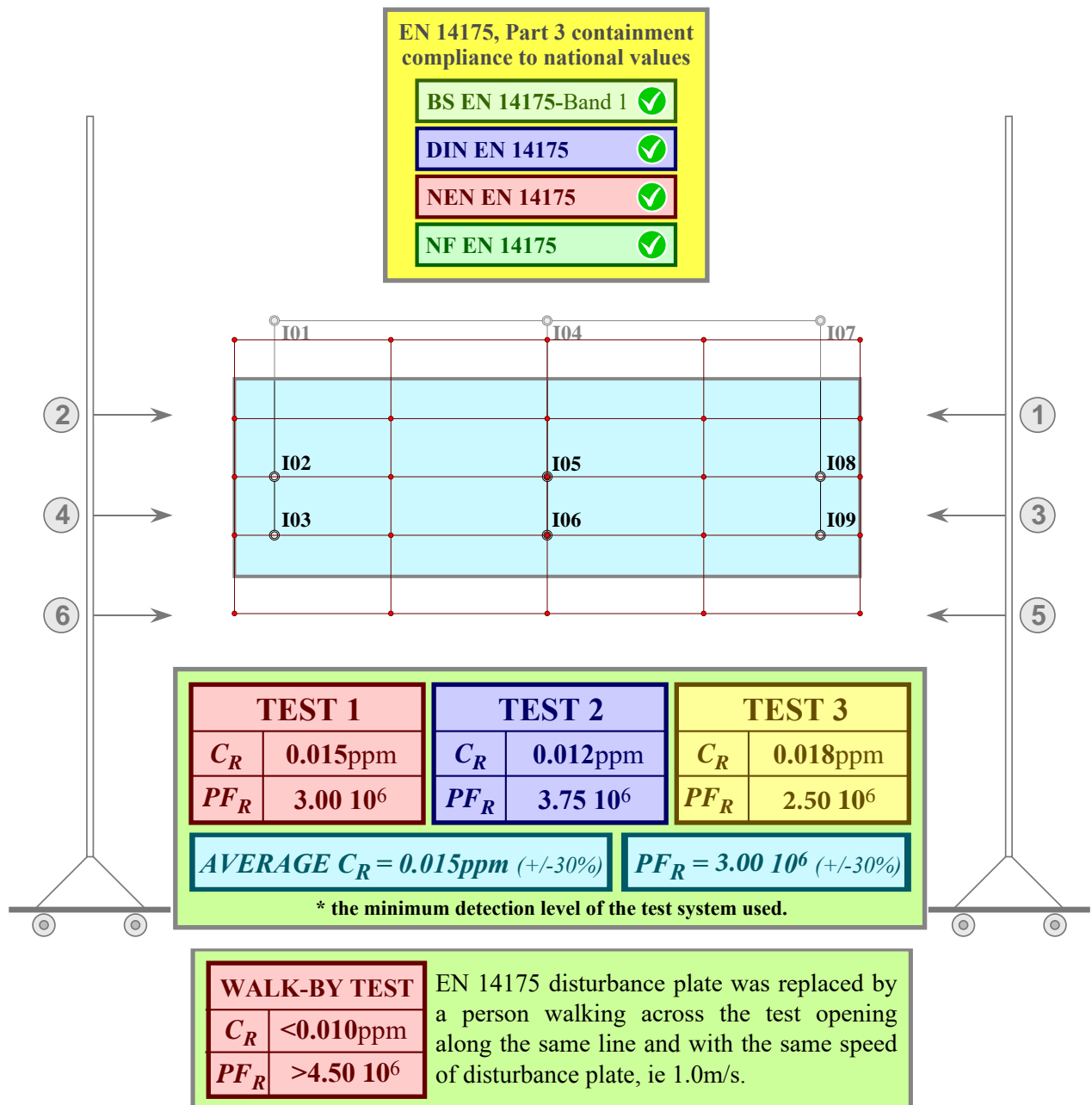


Figure 4 Robustness of containment test results.
(see 5.4 of EN 14175, Part 3).

CERTIFICATE OF TYPE TESTING IN ACCORDANCE WITH EN 14175, PART 3

CERTIFICATE & REPORT NO: INV/EN14175/1030

Fume Hood Manufacturer:

Topair Systems INC
300 First Avenue, Suite 102
Needham
MA 02494
USA



Fume Hood Model:

CF-150-PP

Fume Hood Type:

150cm wide bench-type
ductless

External Dimensions:

Height = 2060mm
Width = 1500mm
Depth = 700mm(max)
Internal Dimensions:
Height = 700mm(max)
Width = 1425mm
Depth = 620mm (max)

Test Opening:

Width: 1425mm

Height: 500mm

Fume Hood Flow:

Face velocity: 0.51m/s (+/-5%)

Fume Hood Containment:

Inner-plane containment:

C1: <0.010ppm at all locations

Outer-plane containment:

C2, C3, C4, C5: <0.010ppm

Robustness of containment:

CR: 0.015ppm (+/-30%)

This is to certify that the fume hood described above has been type tested in accordance with Part 3 of EN 14175, in compliance with the requirements of Part 2 and with reference to Part 1, and resulted in performance characteristics given in test report, INV/EN14175/1007.

Tested and Certified by:

Invent UK Ltd, 85 Southdown Road,
Harpenden, Herts AL5 1PR
t: +44 (0) 7785 245077
email: bicen@invent-uk.com

Dr A F Bicen

A handwritten signature in blue ink that reads 'A.F. Bicen'.



Appendix A

EN 14175, PART 3: FUME HOOD CONTAINMENT BORDER VALUES IN EUROPE

	Border Value (SF ₆ concentration)	Protection Factor
GERMANY outer plane & robustness of containment	0.650ppm	0.07 10 ⁶
FRANCE inner plane	0.100ppm	0.20 10 ⁶
NETHERLANDS outer plane - <i>open & closing</i>	0.020ppm	2.25 10 ⁶
NETHERLANDS robustness of containment	0.650ppm	0.07 10 ⁶

BS EN 14175, PART 3: FUME HOOD CONTAINMENT BORDER VALUES IN THE UK (*draft*)

		Border Value (SF6 concentration)	Protection Factor
RESEARCH LABS	UK - BAND 1 inner plane	0.010ppm	2.00 10 ⁶
	UK - BAND 1 outer plane - <i>open, closed, closing</i>	0.010ppm	4.50 10 ⁶
	UK - BAND 1 outer plane - <i>opening</i>	0.020ppm	2.25 10 ⁶
	UK - BAND 1 robustness of containment	0.100ppm	0.45 10 ⁶
TEACHING LABS	UK - BAND 2 inner plane	0.020ppm	1.00 10 ⁶
	UK - BAND 2 outer plane - <i>open, closed, closing</i>	0.020ppm	2.25 10 ⁶
	UK - BAND 2 outer plane - <i>opening</i>	0.040ppm	1.13 10 ⁶
	UK - BAND 2 robustness of containment	0.200ppm	0.23 10 ⁶
SCHOOL LABS	UK - BAND 3 inner plane	0.040ppm	0.50 10 ⁶
	UK - BAND 3 outer plane - <i>open, closed, closing</i>	0.040ppm	1.13 10 ⁶
	UK - BAND 3 outer plane - <i>opening</i>	0.080ppm	0.56 10 ⁶
	UK - BAND 3 robustness of containment	0.400ppm	0.11 10 ⁶