

**EN 14175, Part 3 Type-Test Report for 1.5m Wide  
Bench-Type Fume Cupboard of Labtasarim Ltd**

by

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## 1. INTRODUCTION

EN 14175, Part 3 type tests carried out for 1.5m wide bench-type vertical-sash fume cupboard of Labtasarim Ltd are reported. General information on test methods, procedures and requirements can be found in references 1 - 3.

## 2. DESCRIPTION OF TEST ROOM FACILITIES

The tests were carried out in Invent UK's test room which is 9.6m long, 4.7m wide and 2.8m high. The tests facilities include a variable-speed extract air system to adjust the extract volume flow rate to the required value. The extract flow rate is measured by a venturimeter with an accuracy of better than 2%. The make-up air was brought in through the perforated ceiling tiles opposite the fume cupboard 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: | -3Pa                   |
| Room air temperature:       | 21°C - 22°C            |
| Room air relative humidity: | 50%                    |
| Room air velocity:          | much less than 0.1 m/s |

## 3. DESCRIPTION OF FUME CUPBOARD

The fume cupboard tested was 1.5m wide bench-type vertical-sash fume cupboard and designed & built by Labtasarim Ltd. The sash opening width was 1200mm and the test height 500mm from the bottom cill airfoil. Other geometric details of the cupboard are shown in Figure 1. Figure 1 also shows the fittings, services, outlet controls, taps etc installed on the type tested fume cupboard.

## 4. BS EN 14175 PART 3 TYPE TESTS

### 4.1 VELOCITY TESTS

Velocity tests were carried out in accordance with the procedure described in reference 3. Velocity tests were performed for the vertical sash set at 500mm from the top of the bottom cill airfoil. The velocity type-test grid for the test opening is shown in Figure 2. Figure 2 also shows the velocity test results.

### 4.2 CONTAINMENT TESTS

Containment tests were performed for the same test opening as in the velocity tests and in accordance with the procedure described in reference 3.

#### 4.2.1 Inner Measurement Plane Tests

Figure 3 shows the positioning of the test system with respect to the test opening. Figure 3 also summarises the test results for the mean SF<sub>6</sub> concentrations, C<sub>1</sub>, the protection factors, PF<sub>1</sub> and the containment factors, CF<sub>1</sub>.

#### 4.2.2 Outer Measurement Plane Tests

Figure 4 shows the positioning of the test system with respect to the test opening. Figure 4 also summarises the test results for the mean SF<sub>6</sub> concentrations, C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub> & C<sub>5</sub>, the protection factors, PF<sub>2</sub>, PF<sub>3</sub>, PF<sub>4</sub> & PF<sub>5</sub> and the containment factors, CF<sub>2</sub>, CF<sub>3</sub>, CF<sub>4</sub> & CF<sub>5</sub>.

### ***4.2.3 Robustness of Containment Test***

Figure 5 shows the positioning of the test system with respect to the test opening. Figure 5 also summarises the test results for the mean SF<sub>6</sub> concentration, CR, the protection factor, PFR and the containment factor, CFR.

### ***4.3 AIR EXCHANGE RATE TEST***

Air exchange rate test was performed using the procedure described in reference 3. At the volume flow rate of 0.340m<sup>3</sup>/s, the purge time was approx 8.0s which results in an air exchange rate of approx 450.

### ***4.4 PRESSURE DROP TEST***

The pressure drop of the fume cupboard was measured at the point of connection to the extract duct and in accordance with the procedure given in reference 3. The diameter of the connection point where the reading was taken was 250mm. The measured pressure drop at the flow rate of 0.340m<sup>3</sup>/s was 140Pa.

### ***4.5 SASH SUSPENSION TEST***

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

### ***4.6 SASH DISPLACEMENT TEST***

The sash displacement force was measured as required by reference 2. The maximum force for sash closing and opening was 30N.

### ***4.7 PROTECTION AGAINST SPLASHES***

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

### ***4.8 SASH STOP & ALARM TEST***

Fitted with a TSI AirGard 200 monitor/alarm which alarms when the sash is raised to 600mm or more.

### ***4.9 OTHER OBSERVATIONS***

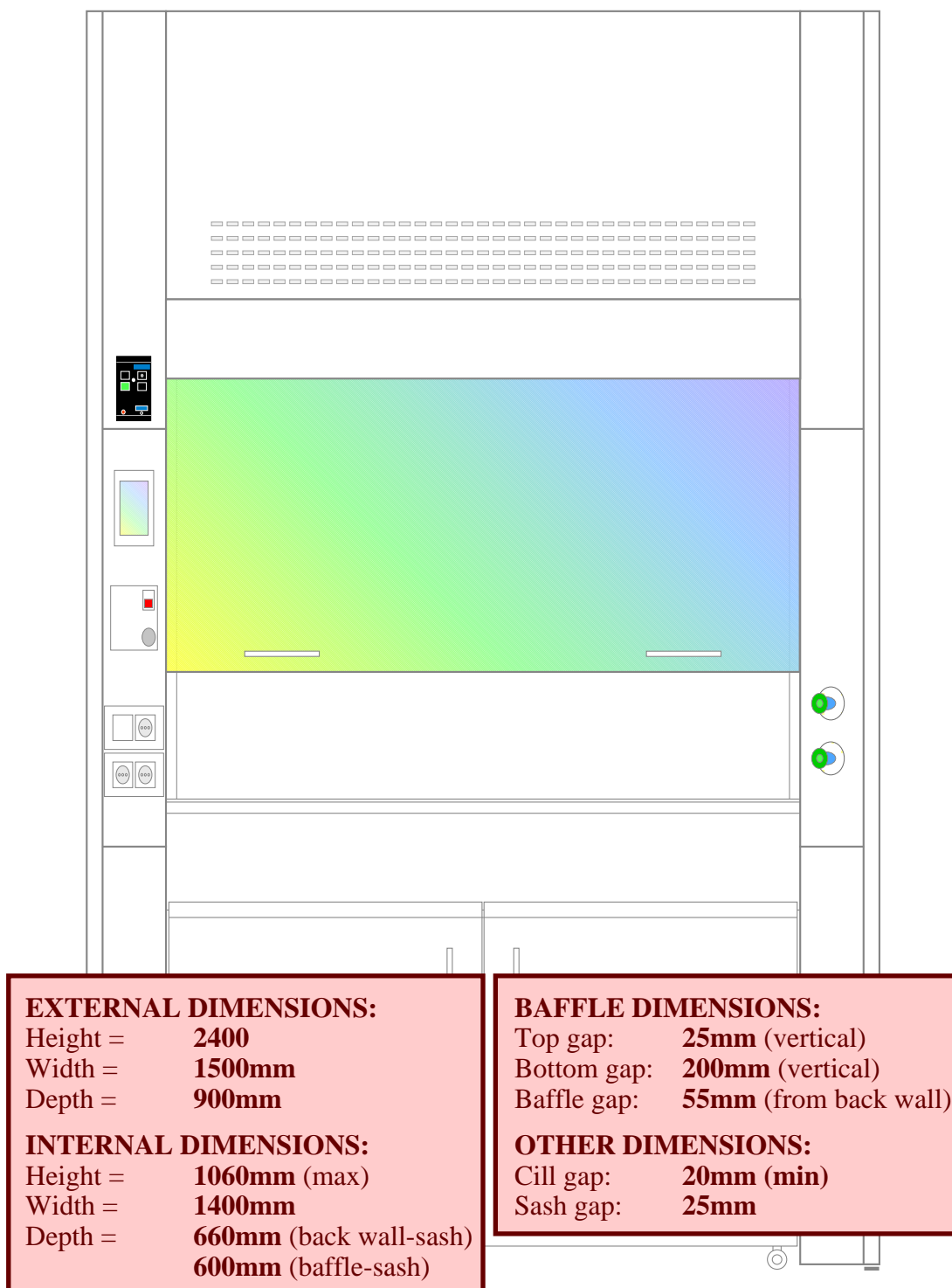
1. Low volume flow visualisation tests indicated that smoke moves inward at boundaries with no apparent flow reversals.
2. Work surface has a raised edge for spillage retention.
3. There is a "keep sash closed when not in use" marking.
4. Cupboard is not fitted with a pressure relief device.

## REFERENCES

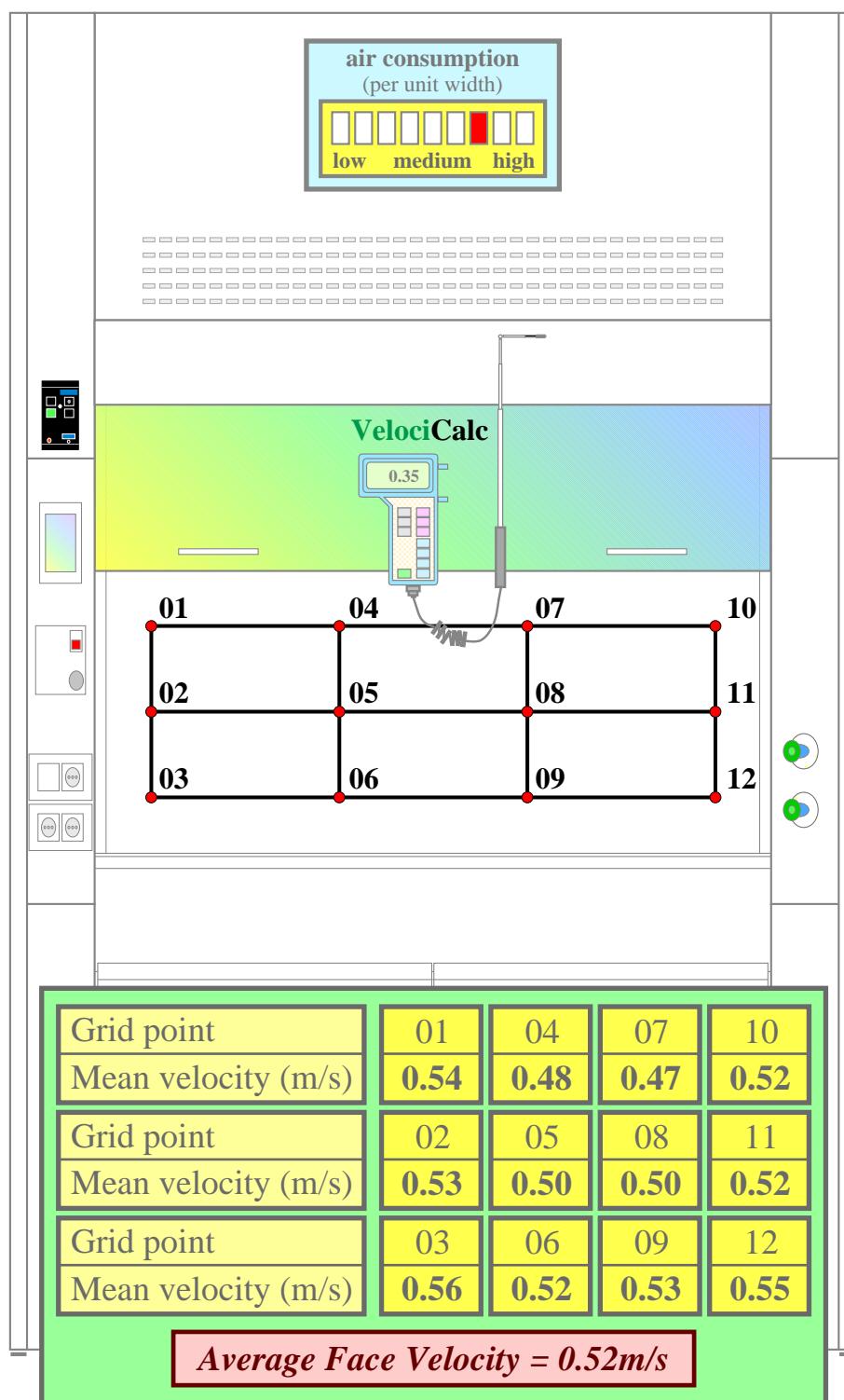
1. **BSI, British Standards Institution**, *BS EN 14175, Fume Cupboards-Part 1: Vocabulary*, 2003.
2. **BSI, British Standards Institution**, *BS EN 14175, Fume Cupboards-Part 2: Safety and Performance Requirements*, 2003.
3. **BSI, British Standards Institution**, *BS EN 14175, Fume Cupboards-Part 3: Type Test Methods*, 2004.

## List of instrumentation used during tests:

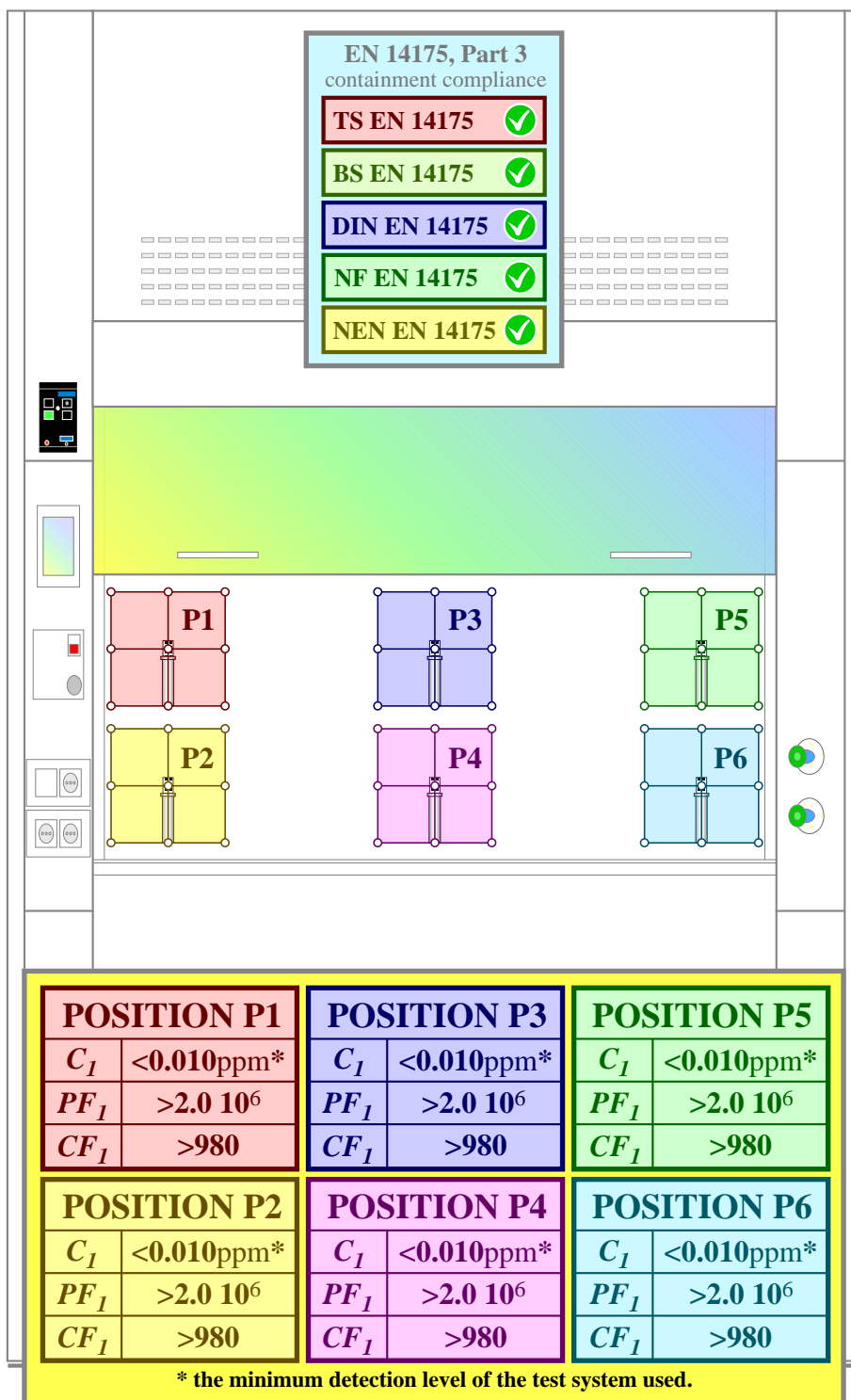
1. Miran 205-B infrared gas analyser - SN: 76185-382
2. M+W Inst D-5110 flow meter - SN: 1309-50H0030-By
3. VelociCalc 9545-A - SN: 0713014
4. Furness Control micromanometer
5. Mecmesin compact force gauge - SN: 05-0074-11
6. PCE-L335 light meter - SN: 100103357
7. Smoke pen



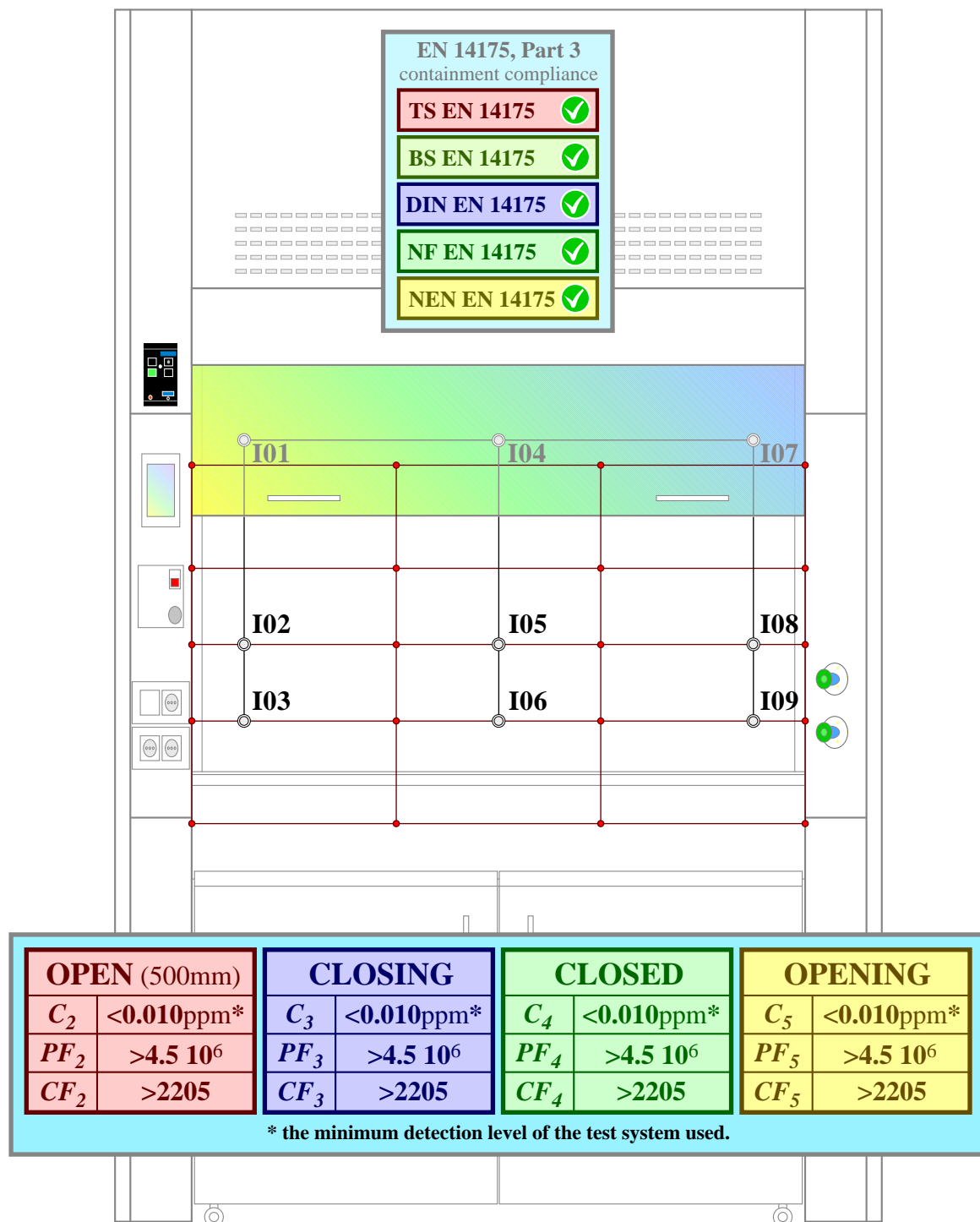
**Figure 1** Geometric features of 1.5m bench-type fume cupboard of Labtasarim.



**Figure 2** Velocity tests results: 500mm test opening.  
(see 5.2 of EN 14175, Part 3).

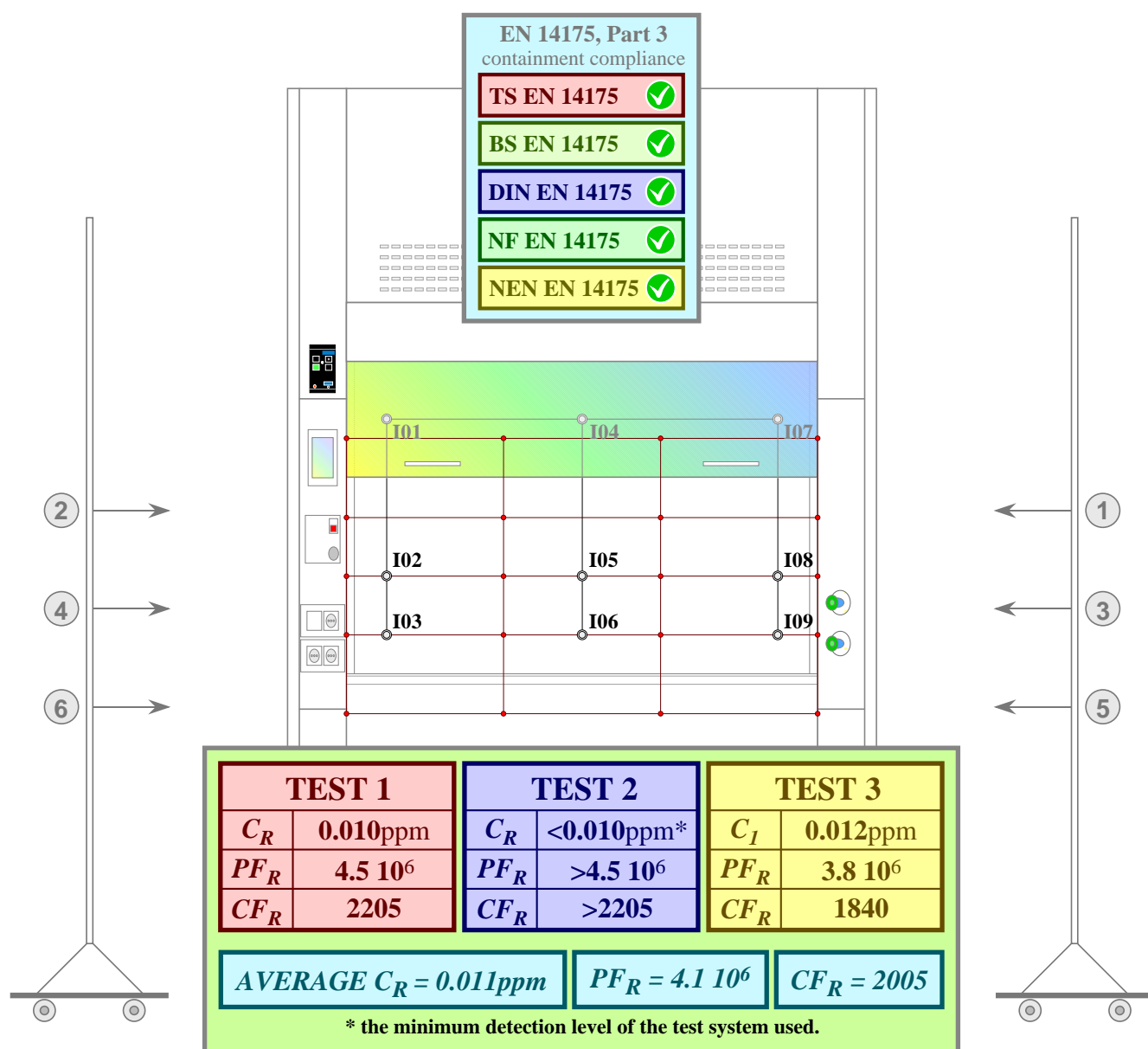


**Figure 3** Inner plane containment test results: 500mm test opening.  
(see 5.3 of EN 14175, Part 3).



**Figure 4** Outer plane containment test results: 500mm test opening.  
(see 5.3 of EN 14175, Part 3).





**Figure 5** Robustness of containment test results: 500mm test opening.  
(see 5.4 of EN 14175, Part 3).

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

CERTIFICATE & REPORT NO: INV/EN14175/781

DATE: 25th July 2017

**Fume Cupboard Manufacturer:**

**Labtasarim Endustriyel  
Laboratuvar Sistemleri  
Ic ve Dis Ticaret Sanayi Ltd  
Ikitelli OSB, Dersankoop Sanayi Sitesi  
S6 F Blok, No 106, Basaksehir  
Istanbul - TURKEY**



**Fume Cupboard Type:**

**1.5m wide bench-type vertical-sash**

**External Dimensions:**

Height = 2400mm

Width = 1500mm

Depth = 900mm

**Internal Dimensions:**

Height = 1060mm

Width = 1400mm

Depth = 660mm (wall-sash)

600mm (baffle-sash)

**Baffle Gap Dimensions:**

Top gap: 25mm

Bottom gap: 200mm

**Test Opening:**

**Width:** 1200mm

**Height:** 500mm

**Fume Cupboard Flow:**

**Flow rate:** 0.340m<sup>3</sup>/s

**Face velocity:** 0.52m/s

**Press drop:** 140Pa  
at 250mmD

**Fume Cupboard Containment:**

**Inner-plane containment:**

**C1:** <0.010ppm

**Outer-plane containment:**

**C2, C3, C4, C5:** <0.010ppm

**Robustness of containment:**

**CR:** 0.011ppm

**This is to certify that the fume cupboard 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 the corresponding test report.**

**Tested and Certified by:** Dr A F Bicen

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## Appendix A

### EN 14175, PART 3: CONTAINMENT BORDER PERFORMANCE VALUES IN EUROPE

|  | Border Value<br>(SF6 concentration)                       | Protection Factor   |                     |
|--|---|---------------------|---------------------|
| <b>GERMANY</b><br>outer plane & robustness of<br>containment | 0.650ppm  | 6.9 10 <sup>4</sup> |                     |
| <b>FRANCE</b><br>inner plane                                 | 0.100ppm  | 2.0 10 <sup>5</sup> |                     |
| <b>NETHERLANDS</b><br>outer plane - open & closing           | 0.020ppm  | 2.2 10 <sup>6</sup> |                     |
| <b>NETHERLANDS</b><br>robustness of containment              | 0.650ppm  | 6.9 10 <sup>4</sup> |                     |
| RESEARCH LABS  | <b>UK - BAND 1</b><br>inner plane                         | 0.010ppm            | 2.0 10 <sup>6</sup> |
|  | <b>UK - BAND 1</b><br>outer plane - open, closed, closing | 0.010ppm            | 4.5 10 <sup>6</sup> |
|  | <b>UK - BAND 1</b><br>outer plane - opening               | 0.020ppm            | 2.2 10 <sup>6</sup> |
|  | <b>UK - BAND 1</b><br>robustness of containment           | 0.100ppm            | 4.5 10 <sup>5</sup> |
| TEACHING LABS  | <b>UK - BAND 2</b><br>inner plane                         | 0.020ppm            | 1.0 10 <sup>6</sup> |
|  | <b>UK - BAND 2</b><br>outer plane - open, closed, closing | 0.020ppm            | 2.2 10 <sup>6</sup> |
|  | <b>UK - BAND 2</b><br>outer plane - opening               | 0.040ppm            | 1.1 10 <sup>6</sup> |
|  | <b>UK - BAND 2</b><br>robustness of containment           | 0.200ppm            | 2.2 10 <sup>5</sup> |
| SCHOOL LABS  | <b>UK - BAND 3</b><br>inner plane                         | 0.040ppm            | 5.0 10 <sup>5</sup> |
|  | <b>UK - BAND 3</b><br>outer plane - open, closed, closing | 0.040ppm            | 1.1 10 <sup>6</sup> |
|  | <b>UK - BAND 3</b><br>outer plane - opening               | 0.080ppm            | 5.6 10 <sup>5</sup> |
|  | <b>UK - BAND 3</b><br>robustness of containment           | 0.400ppm            | 1.1 10 <sup>5</sup> |