



AG&G SERVICES Testing and Validation

West Lab

Fume cabinet - s.n. 24-457570

July 2024

Test Report Number: 1304.24
Location: N.A.,
4 Cargo Way, Mitchell Park, VIC, 3350
Brand: West Lab
Model: CF-120-PPS
Contact: William Crick – 0437 088 576
Starting test date: 03/07/2024





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The tests result, calibrations and/or measurements included in this document are traceable to Australian/national standards.
Laboratory accreditation n.15401
Accredited for compliance with ISO/IEC 17025-Testing

1. INTRODUCTION

This protocol includes the periodic AG&G SERVICES testing, validation and reporting in the area in object, meeting the requirements stated in the correspondent current Australian and International Standards:

- AS 2243.1 (2005) – Safety in laboratories - Planning and operational aspects.
- AS 2243.3 (2010) – Microbiological safety and containment.
- AS 2243.9 (2009) – Safety in laboratories – Recirculating Fume cabinets.
- AS 1807:2021 Clause 4.5 - Determination of Illuminance.
- AS 1807:2021 Clause 4.7 – Determination of sound level at installed workstations, safety cabinets and pharmaceutical isolators.

2. RESPONSIBILITY

AG&G Services PTY LTD:

- Prepares and reviews the document in accordance with reference standards listed above.
- Performs the tests described in this protocol.
- Checks the correspondence of the data obtained with the criteria of acceptability.
- Fills in the deviation forms present in this document.

CUSTOMER:

- Certifies and reviews the approval of this Protocol pursuant to its contents, standards and customer's SOPs.
- Assists tests described in this protocol, ensures adherence of the activities carried out in this Protocol.
- Decides and approves the corrective action in case of deviation.



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3. EXECUTION PROCEDURE

3.1. Test modules

Each qualification test corresponds to a module composed by the following elements:

1. Module number: identifies the test. It's a progressive identification number.
2. Test title: briefly describes test object.
3. Execution method: short description of the procedures adopted for tests execution.
4. Acceptance criteria: defines the acceptance criteria to be applied to each test to determine the success or failure.
5. Comments: space for writing any information or observation taken at the moment of the test run. Each non-compliance is described briefly in the comments field.
6. Date of execution

3.2. How to Compile Modules

1. Data manually collected must be clearly written and readable, using blue ink pens non-erasable.
2. The format of the date is: "dd/mmm/yyyy" (e.g. 12/DEC/2004) or "dd/mm/yyyy" (e.g. 12/12/2004).
3. Data compiling must take place at the very moment when they are detected. The outcome of the execution is registered with the words "PASS" (or "POSITIVE") or "FAIL" (or NEGATIVE) in the field provided or by the use of an "X" on the word "PASS / FAIL" (if present in the pre-printed).
4. Any space for compiling left blank should be crossed out.
5. In case of compiling error, proceed as follow:
 - Mark with single line so as to maintain the readability of the data.
 - Enter the appropriate information, dated and initialed by the checker and if necessary justification.
 - It is not allowed to use covering of some kind.

3.3. Personnel Identification Module

In this module, all personnel involved in the execution of the tests described in this Document should identify themselves by writing their name, company affiliation and function and put their extended signature and initials.

3.4. Deviations Module

The presence of any deviation must be discussed by departments involved and indicated in proper section of the document.

Corrective actions must be plan together with the customer to overcome the deviation and identify the functions entrusted with the implementation of these corrective actions.

3.5. Final Module of Approval and Qualification

Once performed all tests present in this Document, compile the "TEST SUMMARY MODULE". In this module, functions described in Personnel Identification Module check, approve and sign the conclusion of the Document.



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4. MODULES LIST

This table lists the modules to be completed during tests execution:

INDEX	TEST METHOD	DESCRIPTION
Module 1	AS 2243.9	Annex A – Smoke test
Module 2	AS 2243.9	Annex B – Face velocity
Module 3	AS 1807:2021 Clause 4.5	Determination of illuminance .
Module 4	AS 1807:2021 Clause 4.7	Determination of sound level at installed workstations, safety cabinets and pharmaceutical isolators.
Module 5	/	Test equipment calibrations
Module 6	/	Personnel identification
Module 7	/	Deviations
Module 8	/	Test Summary

Comments:



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5. SMOKE TEST - MODULE 1

5.1. Objective

To provide visual evidence of fume containment within, or escape from, the fume chamber. Smoke is released in and around the fume cabinet and the visual pattern of airflow is observed.

5.2. Test Procedure

The smoke test shall be carried out as per below, and the results recorded before the face velocity of the fume cabinet is determined:

- Existing FC shall operate at normal condition, with any bulky apparatus normally located in the FC left inside the FC. New installation shall operate in “as built” condition, it means with the FC empty.
- Position the access window at manufacturer’s stated working position.
- Draw the smoke away from the recirculating fume cabinet and note the distance at which the smoke is no longer reliably collected. Watch for signs of turbulence.
- Observe the behaviour of the smoke released approximately 300 mm outside the center and 300 mm away from each corner in front of the face opening. Watch for signs of turbulence.
- Release smoke watching for eddies:
 - around any equipment, apparatus, tanks or sinks, if installed, within the FC.
 - along the floor, starting at the front of the FC.
 - along the internal walls of the FC.
 - behind and close to the aperture at several points across the width of the opening.
- In case of any condition potentially affecting the testing (door/window opened, air conditioning, traffic flow, etc.) repeat steps above and record results under those circumstances.

5.3. Documentation Procedure

As per AS 2243.9-2009 “Par. A4 – *Reporting of results*”, a plan or photograph of the fume cabinet, showing the size, shape and position of any fittings or equipment present in the fume cabinet during the smoke test, shall be provided as part of the report. The results shall be interpreted as follows:

- a) **Good** - Smoke travels straight to exhaust without reverse flow or eddies.
- b) **Satisfactory** - Reverse flow or eddies may be present but not to the extent that the smoke can escape from the confines of the FC.
- c) **Dangerous** - Reverse flows or eddies can escape from the confines of the FC.

5.4. Acceptance Criteria

The smoke should **flow smoothly into and through the FC**. The occurrence of looping or eddying may indicate the presence of room turbulence or fume containment problems.

The fume cabinet shall be deemed as **compliant if all results are satisfactory or better**.

The cabinet shall be deemed **noncompliant if any result is recorded as dangerous**.

(SOURCE 2243.9-2009 Annex A – *Smoke test*)



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5.5. Data recorded

Below table with data recorded accordingly to procedure above, and calculation of average speed and air changes per hour:

TEST POSITION	RESULTS	COMMENTS
Face opening airflow pattern	SATISFACTORY	NIL
Cabinet Air Flow	SATISFACTORY	NIL
Containment along bottom of cabinet	SATISFACTORY	NIL
Containment along walls of cabinet	SATISFACTORY	NIL
Containment with sash fully open	SATISFACTORY	NIL
Containment with sash half open	SATISFACTORY	NIL
Containment with sash at minimum opening	GOOD	NIL
Containment under abnormal conditions (e.g open doors, open windows, change in normal traffic)	N.A.	N.A.

NOTE:

Good—smoke travels straight to exhaust without reverse flow or eddies.

Satisfactory—reverse flow/eddies may be present but not to the extent that the smoke can escape from the confines of the fume cabinet.

Dangerous—reverse flows/eddies can escape from the confines of the fume cabinet.

Comments:

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Test conformity to acceptance criteria:	PASS <input checked="" type="checkbox"/> FAIL <input type="checkbox"/>	DATE: same as starting date
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6. FACE VELOCITY - MODULE 2

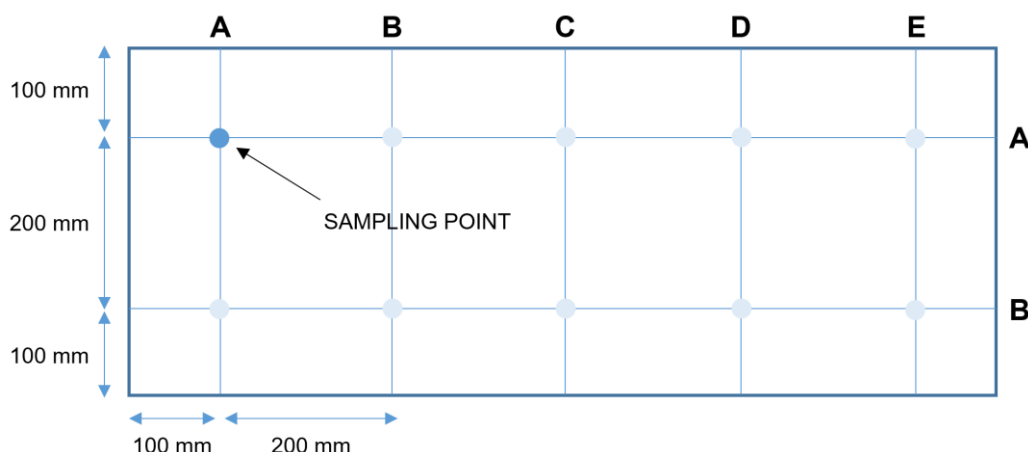
6.1. Objective

To determine the uniformity and stability of the airflow.

6.2. Test Procedure

Airflow face velocity readings are measured using an anemometer at a series of equally spaced points:

- Smoke study as per Module 1 shall be performed before carrying this test.
- Existing FC shall operate at normal condition, with any bulky apparatus normally located in the FC left inside the FC. New installation shall operate in “as built” condition, it means with the FC empty.
- Position the access window at manufacturer’s stated working position.
- To not to disturb the airflow, stand back approximately 0.5 m from the face of the cabinet, and to one side.
- Take velocity readings in a plane parallel to the working aperture at **100 mm from the edges** and at intervals of **200 mm apart**:



- Measure all points of the grid, waiting at least 15 seconds each to have a value sufficiently stable;

6.3. Documentation Procedure

Document the test by compiling the table in paragraph below.

6.4. Acceptance Criteria

As per AS 2243.9-2009 *Par.4.1.2 Face velocity*:

- The average face velocity shall be not less than 0.5 m/s.
- Individual measurements shall be equal to or greater than 0.3 m/s.
- A minimum airflow of five fume cabinet volumes per minute shall be maintained.

6.5. Data recorded

Below table with data recorded accordingly to procedure above, and calculation of average speed and air changes per hour:

FUME CABINET						
INTERNAL VOLUME						
Height [mm]	Width [mm]		Depth [mm]		Vol [m ³]	
700	1200		550		0.462	
SASH OPENING						
Length [mm]		Height [mm]			Records	
1200		400			12	
[m/s]	A	B	C	D	E	F
A	0.61	0.60	0.58	0.59	0.60	0.60
B	0.56	0.55	0.53	0.53	0.54	0.53



CORRECTION FACTORS APPLIED:

[m/s]	A	B	C	D	E	F
A	0.60	0.59	0.57	0.58	0.59	0.59
B	0.55	0.54	0.52	0.52	0.53	0.52

2243.9 ANNEX B - Face Velocity - ACCEPTANCE CRITERIA

Average Velocity:	0.56	[m/s]
Min velocity	0.52	[m/s]
Air changes / minute	34.68	[Vol/min]
Acceptance Criteria	Average Velocity	> 0.50 [m/s]
	Minimum Velocity	> 0.30 [m/s]
	Air changes / minute	> 5.0 [Vol/min]
COMPLIANCE:	PASS	

Uncertainty according to calibration certificate no. S32964 valid until NOV-2024

Comments:

Test conformity to acceptance criteria:	PASS <input checked="" type="checkbox"/> FAIL <input type="checkbox"/>	DATE: same as starting date
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7. ILLUMINANCE - MODULE 3

7.1. Objective

The normal lighting level is established to provide a reasonable level of illuminance for the process without causing the operator eye fatigue. The objective is to verify that illuminance meets acceptance criteria below.

7.2. Test Procedure

A portable photoelectric photometer with digital or analog display shall be used.

Following test procedure is valid, as per Standard AS 1807-2021 Clause 4.5, for cleanroom, workstations, safety cabinets and pharmaceutical isolators.

- a) Operate the lamps for at least 1 h.
- b) For workstations, safety cabinets and pharmaceutical isolators, take measurements in the normal working area surface on the centre-line across the full width of the cabinet at approximately 300 mm centres, starting in 150 mm from each side.
- c) For cleanrooms, take measurements at representative locations, or where required at critical work levels
- d) Record each measurement.

7.3. Documentation Procedure

Document the test by compiling the table(s) below.

7.4. Acceptance Criteria

As per AS 2243.9-2009 *Par.2.3.6 Lights*, the illuminance shall be not less than **400 LUX** at all work levels.

7.5. Data recorded

In following page table with data recorded and calculated accordingly to procedure above.



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FUME CABINET				
Test method:	Length [mm]			Records:
AS 1807.2021 - 4.5	900			4
INSTRUMENTS READING:				
	A	B	C	D
[LUX]	1000	1020	1030	1010
	↔	↔	↔	↔
[mm]	150	300	300	150



CORRECTION FACTORS APPLIED				
	A	B	C	D
[LUX]	1290	1316	1329	1303
	↔	↔	↔	↔
[mm]	150	300	300	150

ILLUMINANCE ACCEPTANCE CRITERIA		
Average Illuminance	1309.7	[LUX]
Acceptance Criteria according to 2243.9 (2009)	400.0	[LUX]
COMPLIANCE:	PASS	

Comments:

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Test conformity to acceptance criteria:	PASS <input checked="" type="checkbox"/> FAIL <input type="checkbox"/>	DATE: same as starting date
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8. SOUND LEVEL - MODULE 4

8.1. Objective

The purpose of this test is to verify, using a suitably calibrated sound-meter or equivalent instrument, that the noise level meets the limit described below.

8.2. Test Procedure

As per AS 1807.2021 Par.4.7.4, sound levels are measured at specified positions under operating conditions and also with cabinet or isolator turned off.

1. Ensure that equipment is operating within specification (airflow, containment, etc.).
2. Using the acoustic calibrator, check the performance of the sound level meter prior to making any measurements.
3. All measurements shall be made using the meter on A-weighting and fast response.
4. Using the sound meter determine sound level in each chosen location at the simulated operator user head level, at approximately 300mm from the front and geometric centre of the viewing window.
5. Determine the sound level under operating conditions for a minimum of 10s at the point of measurement, and record data.
6. Shut down the device under test and allow sufficient time for it to run down completely. Measure ambient sound level at the same measurement point as for operating sound level
7. Check again using the acoustic calibrator and estimate the sound level with appropriate correction factors.

8.3. Documentation Procedure

Document the test by filling the table in paragraph below.

8.4. Acceptance Criteria

When measured in accordance with AS 1807.2021 Par.4.7.4 the sound level measured shall be not greater than 62 dB(A), as per AS 2243.9 (2009) *Par.5.2.5 – Noise Level*.

8.5. Data recorded

Below table with data recorded and calculated accordingly to procedure above:

Area	Ambient Sound level [dB]	Operating Sound level [dB]	Corrected Sound level [dB]	Acceptance Criteria [dB]	COMPLIANCE
Fume Cabinet	55.4	60.1	57.4	< 62	PASS

Comments:

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Test conformity to acceptance criteria:	PASS <input checked="" type="checkbox"/> FAIL <input type="checkbox"/>	DATE: same as starting date
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9. TEST EQUIPMENT CALIBRATIONS – MODULE 5

9.1. Objective

To verify that all instruments used for the qualification in object are properly calibrated and have a currently valid calibration certificate:

Test	Instrument	Brand	Model	Serial number	Calibration certif. No.	Next calibr. due	Equipment used
Air velocity and uniformity	ANEMOMETER VANE	TESTO	0635 9370	20980953	S32964	NOV-2024	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Pressure differential	PRESSURE INDICATOR	TESTO	0560 0400	61915499	D82291	NOV-2024	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Airborne particle counting	PARTICLE COUNTER	TSI	Aerotrak 9500-01	95002203006	C232383	MAY-2025	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
HEPA Integrity	AEROSOL PHOTOMETER	MicronAir	AS1807	101010	C0528-23	SEP-2024	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
HEPA Integrity (DPC method)	PARTICLE COUNTER	TSI	Aerotrak 9500-01	95002203006	C232383	MAY-2025	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Temperature	HOTWIRE	TESTO	0635 1570	20663978	T226126	NOV-2024	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Humidity	HOTWIRE	TESTO	0635 1570	20663978	F87682	NOV-2024	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Light intensity	LUXMETER	DIGITECH	QM1587	130502059	LL24916	NOV-2024	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
UV intensity	UVC Meter	LUTRON	UVC-254	Q2868741	UVC230228/01	FEB-2025	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Sound level	SOUND METER	CASTLE	GA216	069732	CT-7695	FEB-2025	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	ACUSTIC CALIBRATOR	CASTLE	GA601	044957	CT-7696	FEB-2025	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>



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10. PERSONNEL IDENTIFICATION – MODULE 6

All the people involved in the tests execution described in the present protocol are identified filling the following table, pointing out his/her name and surname in capital, the signature, the initials, the company of affiliation and the activities beginning date.

Name and surname	Signature	Initials	Department/Company	Date
Tung Le		TJ	AG&G Services	03/07/2024



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11. DEVIATION – MODULE 7

DEVIATION # _____ PAGE 1 OF _____

TITLE OF THE TEST: _____

DEVIATION DESCRIPTION:

DEVIATION CAUSES:

TJ

03/07/2024

CORRECTIVE ACTIONS PROPOSAL:

CORRECTIVE ACTIONS RESULT: COMPLIANT NOT COMPLIANT

CLOSED DEVIATION: YES NO

NECESSITY OF ADDITIONAL TEST: YES NO

Test conformity to acceptance criteria:	PASS <input checked="" type="checkbox"/> FAIL <input type="checkbox"/>	DATE: same as starting date
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12. TEST SUMMARY – MODULE 8

TEST DESCRIPTION		RESULT		
AS 2243.9	Annex A – Smoke test	PASS <input checked="" type="checkbox"/>	FAIL <input type="checkbox"/>	N.A. <input type="checkbox"/>
AS 2243.9	Annex B – Face Velocity	PASS <input checked="" type="checkbox"/>	FAIL <input type="checkbox"/>	N.A. <input type="checkbox"/>
AS 1807:2021 Clause 4.5	Light intensity	PASS <input checked="" type="checkbox"/>	FAIL <input type="checkbox"/>	N.A. <input type="checkbox"/>
AS 1807:2021 Clause 4.7	Sound level	PASS <input checked="" type="checkbox"/>	FAIL <input type="checkbox"/>	N.A. <input type="checkbox"/>
/	Test equipment calibrations	PASS <input checked="" type="checkbox"/>	FAIL <input type="checkbox"/>	N.A. <input type="checkbox"/>

Comments:

Filters: (1) standard carbon filter 1050x300x70mm with gasket
(1) prefilter 1050x300x25mm G4 panel

AG&G SERVICES
Signatory:

TUNG LE

03/07/2024

ENDING DATE

Checked by:

DARREN WIND

05/07/2024

ISSUE DATE

JULY 2025
NEXT TEST DUE

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