

AFRC Simulation Procedures

AFRC Simulation Procedures
Version 3.0-2012

Table of Contents

1	Definitions	3
2	Objective	4
2.1	General Responsibilities of an AFRC Accredited Simulator	4
2.2	Simulator Procedures	4
3	Reference Documents	5
3.1	AFRC Document Structure	5
3.2	AFRC Document Schedule	5
4	AFRC Simulator Rights and Obligations	6
4.2	Qualifications	6
4.3	Conflict of Interest	6
4.4	Professional Indemnity Insurance	6
4.5	Recording Simulations Performed	6
4.6	Declaring Simulations to the AFRC	7
4.7	Nominated Government Departments	7
5	Quality Assurance	9
5.1	General Requirements	9
5.2	Code of Practice	11
6	Simulation Procedures	12
6.1	Minimum Simulation Requirements	12
7	Audit Submission Process	13

1 Definitions

1.1.1.1 AFRC

Australian Fenestration Rating Council, ABN: 45 092 250 506

1.1.1.2 AFRC Board

The Board of Directors and / or authorised representatives as defined in accordance with the AFRC Constitution.

1.1.1.3 Simulator (or AFRC Accredited Simulator or Accredited Simulator)

A person that has signed, and meets the requirements of, the AFRC Simulator Code of Conduct.

1.1.1.4 Simulator-in-Responsible charge

The individual responsible for assuring that the quality of services offered and provided by an AFRC Simulation Laboratory that provides AFRC simulation services.

This individual shall meet the requirements of the AFRC Simulator Code of Conduct.

1.1.1.5 Simulation Laboratory (or AFRC Accredited Simulation Laboratory or Accredited Simulation Laboratory)

A computer simulation laboratory which employs at least one AFRC Accredited Simulator, who has entered into an agreement with the AFRC as a Simulator-in-Responsible charge.

A Simulation Laboratory shall comprise at least one *Simulator-in-Responsible charge*. A simulation laboratory may have more than one Simulator-in-Responsible charge.

1.1.1.6 Accredited Simulator Number

A unique three-digit number assigned to a Simulator by the AFRC.

1.1.1.7 Audit

The provision of audit services by an Accredited Auditor.

1.1.1.8 Simulation

The provision of simulation services by an Accredited Simulator.

1.1.1.9 Shall

Action referred to as mandatory.

2 Objective

The AFRC is committed to the:

- Development, administration and approval of comparative energy and related rating programs that serve the public and satisfy the need of its private sector partners by providing a fair, accurate and credible, user-friendly information on fenestration product performance;
- Maintaining and improving the quality of services provided by professionals conducting simulations of fenestration products;
- Promoting the benefits, to regulators, building practitioners and consumers, of utilising the services provided by AFRC Accredited Simulators and Auditors.

This *Simulation Procedures* document is the principle document that defines procedures for all Simulators engaged in any type of fenestration simulation accredited by the AFRC.

2.1 **General Responsibilities of an AFRC Accredited Simulator**

An AFRC Accredited Simulator is responsible for

1. simulation of fenestration products to the procedures in this document which includes, but is not limited to, simulation using Window5, Therm5 and Optics5, and meeting requirements, as documented in the AFRC Technical Protocols and Procedures Manual reporting requirements.
2. providing the simulation results, associated files and written reports to both the manufacturer and the AFRC auditor
3. entering and uploading accurate and most current client certification data to the AFRC website;
4. meeting the requirements in the AFRC Simulator Code of Conduct
5. participating in the investigation of potential violations (prohibited activities) as requested by the AFRC Board

2.2 **Simulator Procedures**

2.2.1 This *AFRC Simulator Procedures* must be read in conjunction with *AFRC Simulator Code of Practice*, and documents referenced therein, which define procedures and rules for the conduct of Accredited Simulators.

2.2.2 *AFRC Simulator Procedures* are determined by the AFRC Board and are subject to regular amendment by the AFRC Board.

3 Reference Documents

The reference documents listed here can be found on the AFRC and NFRC websites. (www.afrc.org.au) (www.nfrc.org)

- AFRC Simulator Code of Conduct
- AFRC Document Register
- AFRC Technical Protocols and Procedures Manual
- AFRC Technical Interpretations
- AFRC Louvre Window System Simulation Manual
- AFRC Skylight Simulation Manual
- NFRC Simulation Manual, THERM6 / WINDOW 6
- NFRC 100
- NFRC 200
- NFRC 300
- NFRC 500
- NFRC LAP - Laboratory Accreditation Program
- NFRC Technical Interpretations

3.1 AFRC Document Structure

- 3.1.1 This document is part of a set of documents which define auditing procedures and standards of conduct that AFRC Accredited Simulators must maintain.
- 3.1.2 This structuring of AFRC documentation has been designed to accommodate Simulators providing simulation services.
- 3.1.3 The AFRC Document Schedule lists all current AFRC Documents.

3.2 AFRC Document Schedule

- 3.2.1 The *AFRC Document Schedule* identifies documents related to the practice of AFRC Accredited Auditors as well as the date and content of revisions of these documents.
- 3.2.2 Simulators will be notified by email, by the AFRC Board, prior to the implementation of any additions or amendments to documents included in the *AFRC Document Schedule*.
- 3.2.3 The *AFRC Document Schedule*, and included documents, are made available to Simulators at the AFRC website (www.afrc.org.au). Accredited Simulators that refer to printed copies of these documents must ensure that they maintain current editions.

4 AFRC Simulator Rights and Obligations

4.1.1 Accredited Simulators must follow the simulation procedures as set out in this document.

4.1.2 Accredited Simulators must be members of the AFRC.

4.1.3 Accredited Simulators that are AFRC members may have rights and obligations defined in the AFRC constitution, additional to those defined in the Code of Practice.

4.2 Qualifications

Prior to seeking accreditation, Simulators must achieve a qualification in accordance with the requirements outlined below.

4.2.1 Competencies

- Understanding of window design
- Understanding of window thermal performance
- Understanding the use of Window6, Optics5 and Therm6 software
- A Degree or Diploma in engineering or associated field from one of the physical sciences
- Understanding in CAD software or drawings

4.2.2 Certified Australian Trainers (CAT)

Simulators must be confirmed as being a competent Certified Australian Trainer by the AFRC.

In order to maintain this qualification with the AFRC, the Simulator must also fulfil the AFRC requirements with respect to, but not limited to, participation and successful completion of all training workshops and round robin examinations.

4.3 Conflict of Interest

An AFRC Simulator must declare any conflict of interest with respect to performing the role of Simulator for any job.

4.4 Professional Indemnity Insurance

An AFRC Simulator must provide evidence to the AFRC of current Professional Indemnity Insurance to commensurate with the volume and scope of work they undertake.

4.5 Recording Simulations Performed

The AFRC Simulator must maintain a record of the simulations that have been performed and submit this record to the AFRC upon request. The minimum requirements for the recording of simulations are as follows:

- Manufacturer details
- Simulator details
- Auditor details

- Date of initial simulation submission (to AFRC Auditor)
- Date of successful completion of simulation audit
- Date of issue of final report
- Number of products simulated and supplied for audit
- Pass/Fail result of the simulation audit
- Detail of any modification that was necessary for Failed simulation audits
- Number of Fail attempts on a particular simulation job

4.6 Declaring Simulations to the AFRC

An AFRC Simulator must provide records of all simulations, as detailed in Section 4.5, to the AFRC on a quarterly basis. A quarterly basis is every three months from commencement of the Simulators agreement with the AFRC. Failure to provide the AFRC with this documentation may result in disciplinary action as defined in the AFRC Simulator Code of Conduct.

4.7 Nominated Government Departments

A number of government departments, government-appointed regulating agencies and research organisations are involved as stakeholders in the AFRC.

4.7.1 Federal/National

4.7.2	Department of Climate Change and Energy Efficiency	DCCEE
	Australian Building Codes Board	ABCB
	Association of Building Sustainability Assessors	ABSA
	Building Products Innovation Council	BPIC
	CSIRO Sustainable Ecosystems	

4.7.3 State

4.7.3.1 *New South Wales*

Department of Infrastructure, Planning and Natural Resources (includes BASIX)

4.7.3.2 *Victoria*

Sustainability Victoria

4.7.3.3 *Queensland*

Building Codes Queensland BCQ

4.7.3.4 *South Australia*

Department of Planning

4.7.3.5 *Western Australia*

Department of Housing and Works

AFRC Simulation Procedures

4.7.3.6 *Tasmania*

Department of Building Standards and Regulations

4.7.3.7 *Australian Capital Territory (ACT)*

Department of Planning and Land Authority

4.7.3.8 *Northern Territory*

Department of Building and Infrastructure

5 Quality Assurance

An Accredited Simulator must have a quality assurance system in place for ensuring Simulators conduct simulations in a satisfactory and repeatable manner.

5.1 General Requirements

The NFRC LAP Sections 4.6 and 4.7 defines the minimum quality assurance measures, as applicable to simulation and simulation reports, that an AFRC Accredited Simulator must maintain.

Alternative demonstration of compliance to these minimum quality assurance measures may be acceptable upon application to, and approval by the AFRC Board.

NFRC LAP extract:

“4.6 Laboratory Quality Control Program and Quality Control Manual Requirements

- A. Each accredited laboratory shall have and maintain an internal quality control program, which meets the criteria of this section. The program shall be set forth in either a stand-alone manual or the thermal operations manual. The manual may be electronic or hard-copy, or a combination of both. Accessibility and organization of the manual shall be demonstrated upon laboratory inspection. The manual shall contain at a minimum the following:
 - i. Copies of all current NFRC test methods, procedures, technical and LAP interpretations, user manuals, and instructions;
 - ii. Methodology for ensuring accuracy, precision and consistency of such test methods and procedures;
 - iii. Equipment calibration procedures, in the case of a testing laboratory;
 - iv. Methods for ensuring personnel competence; and
 - v. Procedures for correcting quality deficiencies.
[*Note:* Any of the aforementioned items that have been documented in the operations manual need not be duplicated in the Quality Control Manual.]
- B. The manual shall be made available to the NFRC Inspector at any time and shall be available to laboratory staff at all times.
- C. The adequacy of the quality control program and quality control manual shall be determined in connection with the annual review (see Section 5.1).

4.7 Record Keeping Requirements

- A. Each accredited laboratory shall maintain a system of record keeping that will allow for verification and/or reconstruction by NFRC of any test or simulation report.

- i. The record keeping system shall provide retention of original specimen data, observations and notes, calculations and derived results and other pertinent data. Testing laboratory equipment shall be capable of recording and storing test data at least every five minutes throughout the steady-state test period. This data shall include temperatures; heat flows and any other data listed in applicable test methods. Simulation laboratory equipment shall employ such data storage and retrieval systems as are necessary to permit review and reconstruction of all simulations.
 - ii. Each laboratory shall keep all test and simulation records and reports confidential and in locked or sealed files in a secure location with its access limited to specified employees.
- B. Each accredited laboratory shall make its records and files available for review by NFRC at any time during customary business hours.
- C. Records, including final reports and relevant data, shall be retained for a period of at least four years from date of issuance.
- D. The adequacy of a laboratory's record keeping shall be determined in connection with the annual review (see Section 5.1).
- E. The Testing Laboratories follow the following guidelines for accepting and processing test specimens at the laboratory.
 - i. The testing laboratory should maintain records documenting the condition of the test specimen upon its arrival at the testing facility.
 - ii. The testing laboratory should notify the manufacturer in writing if the product arrives damaged (i.e. broken glass, damaged frame/sash components, etc.). The test laboratory shall request in writing a replacement of the test specimen be sent, if necessary.
- F. As an additional requirement to requirements in NFRC 102, the testing laboratory shall measure and report the initial glazing deflection upon arrival at the testing facility. If the glazing is found to be concave (collapsed) or convex (over-filled), documentation as to the condition and the extent of deflection from the designed overall IG thickness shall be reported. If the product is a prototype or initial validation product, the test laboratory shall request in writing from the manufacturer the course of action to take in regards to the IG unit(s) condition. A copy of these transactions shall be submitted with the final test reports to the manufacturer's IA for their records. The following guidelines describe the glazing conditions for which documentation is necessary:
 - i. For IG units $\leq 1/2"$ or less, deflection of $1/8"$ or greater

- ii. For IG units \square greater than 1/2", deflection of 1/4" or greater
 - iii. Any over-fill shall be reported
- G. An accredited testing laboratory shall retain, in a safe and protected location, each whole fenestration product tested or representative corner and cross sections of all the fenestration product components for a period not less than 2-1/2 years after the date a test report is first issued by the laboratory. The date of issuance shall be the first date of submittal to the IA.
[*Note:* It is recommended that a laboratory retain test samples for a minimum of four years.]
- H. Test laboratories shall retain the following additional information described in Appendix D: Required information for thermal transmittance test (U-factor and Condensation Resistance):
- i. Sealing and pressure balance technique employed during testing;
 - ii. Warm side and cold side area-weighted frame surface temperatures;
 - iii. Warm side and cold side area-weighted edge-of-glass surface temperatures;
 - iv. Warm side and cold side area-weighted center-of-glass surface temperatures;
 - v. Warm side and cold side product surface temperature instrumentation scheme and when applicable the area assigned to each sensor, and the average temperature of each sensor that was used to calculate the final results;
 - vi. Total window U-factor, both measured (U_s) and standardized (U_{st});
 - vii. Interior and exterior surface conductance calculated from measurements;
 - viii. Surface to surface total conductance; and
 - ix. Glass deflection and effective gap width during testing.
 - x. Values for CR_f , CR_{eog} and CR_{cog} . (when applicable)"

5.2 Code of Practice

The *AFRC Simulator Code of Practice* defines the principles and standards of conduct that AFRC Accredited Simulators must maintain.

6 Simulation Procedures

Simulations are to be performed in compliance to the following documents.

- AFRC Technical Protocols and Procedures Manual
- NFRC Simulation Manual, THERM6/WINDOW6
- AFRC Louvre Window System Simulation Manual
- AFRC Skylight Simulation Manual
- NFRC 100
- NFRC 200
- NFRC 300
- NFRC 500 and
- All current NFRC and AFRC Technical Interpretations as applicable.

The AFRC Technical Protocols and Procedures Manual and AFRC Technical Interpretations are the overriding document where any differences occur between AFRC and NFRC documents.

The AFRC Document Register lists the current version of all AFRC documents.

6.1 *Minimum Simulation Requirements*

An AFRC Simulator must perform simulations in compliance with the documents listed in Section 6 and provide a written report that satisfies the minimum requirements documented in the AFRC Technical Protocols and Procedures Manual.

All AFRC simulations are subjected to audit by an AFRC Auditor. The Simulator shall submit the following information to an AFRC Auditor:

- Product Detail, including, but not limited to:
 - manufacturer drawings, bills of materials and CAD files;
 - All completed simulation files;
 - Therm 6 files, Window 6 databases and Optics 5 databases;
 - Input and downstream calculations (where relevant), e.g. spreadsheet calculations of K_{eff} , in both hard-copy and electronic form;
- Final Simulation Laboratory rating reports in both electronic and hard-copy form.

7 Audit Submission Process

The Simulator shall submit the minimum simulation requirements as detailed in Section 6.1 of this document.