NSW GOVERNMENT Education School Infrastructure

EFSG Design Guide 55.01

Thermal Comfort and Indoor Air Quality - Policy

Document Control
Document Name: DG55 Final 14 Dec 2020.Docx

Last Saved: 15 February 2021

Version	Date	Prepared by	Reviewed By	Comments

As funding will allow, School Infrastructure NSW (SINSW) approach to the provision of air cooling within NSW Government schools will be as follows

1. EXISTING SCHOOLS

***Refer to the Cooler Classrooms Program (CCP) Design Guideline (DG 55.03) for further detail on air-conditioning existing permanent teaching spaces and libraries.*

1.1 Schools with a long-term average mean maximum January temperature of 33ºC and above.

Air-conditioning will be provided to all permanent learning spaces. Schools may source their own funding to air-condition administration and staff areas. The EFSG recommends that the same energy efficient parameters used in permanent learning spaces are applied, including the use of natural ventilation.

1.2 Schools with a long-term average mean maximum January temperature of 30ºC and above.

Air-conditioning is to be installed in all permanent learning spaces and libraries.

1.3 Schools with a long-term average mean maximum January temperature below 30ºC.

Schools may apply to SINSW to have air-conditioning installed in permanent learning spaces and libraries.

Applications will be assessed and prioritised based on a number of (weighted) criteria including but not limited to:

- the long-term average mean maximum January temperature;
- heat stress zone;
- the proportion of air cooled/non-air cooled learning spaces;
- the number of students impacted;
- whether the funding will support students with special learning needs;
- the ability of the school to provide assistance through co-funding (though co-funding is not requisite);
- how air-conditioning will contribute to educational outcomes and benefit the school as a whole;
- the built form and how this may impact thermal comfort and indoor air quality; and
- the extent of any electrical infrastructure upgrades, restoration, remedial and/or other work that may be required to facilitate the installation of air-conditioning.

2. NEW SCHOOLS / MAJOR UPGRADES / REDEVELOPMENTS / RELOCATED SCHOOLS

2.1 Schools with a long-term average mean maximum January temperature of 33ºC and above.

Generally, air-conditioning is to be provided to all new school buildings, including permanent learning spaces, staff and administration areas. For schools undergoing major upgrade, provision of air-conditioning to administration and staff areas will be dependent on inclusion of these spaces in the upgrade scope. Schools may also source their own funding to include these spaces in the project. The EFSG recommends that the same energy efficient parameters used in permanent learning spaces are applied, including the use of natural ventilation.

2.2 Schools with a long-term average mean maximum January temperature of below 33ºC.

Air-conditioning is to be installed in all permanent learning spaces, libraries and administration and staff areas where these spaces are included in the upgrade project scope and inclusion is required to achieve compliance with the relevant standards. Where these spaces are not included in the upgrade project, schools may source their own funding in accordance with the parameters outlined in Clause 2.1.

3. DESIGN PRINCIPLES

3.1 Existing Schools

Air-conditioned spaces shall be designed to meet the thermal comfort, indoor air quality and associated acoustic performance criteria nominated in the Cooler Classroom Programme Design Guideline.

Air-conditioning and ventilation systems shall be sized to achieve the specified thermal comfort and indoor air quality with all doors and windows closed and without the need for any human intervention, e.g. without the need for windows or doors to be manually opened.

3.2 New Schools / Major Upgrades / Redevelopments / Relocated Schools

Air-conditioned spaces shall be designed to meet the thermal comfort, indoor air quality and associated acoustic performance criteria nominated in the Thermal Comfort and Indoor Air Quality Performance Brief.

Air-conditioning and ventilation systems shall be sized to achieve the specified thermal comfort and indoor air quality with all doors and windows closed and without the need for any human intervention, e.g. without the need for windows or doors to be manually opened.

Non air-conditioned spaces shall be designed in accordance with the applicable Acts, Regulations, Codes and Standards.

The need for active cooling and heating shall be minimised by

employing passive / sustainable design principles.

3.3 All Schools

Systems shall be designed to minimise energy consumption. System design / equipment selection is to be based on whole of life cost analysis.

3.4 Document Precedence

Where conflict exists between SINSW documents the following precedence shall apply:

- The SINSW DG55 – Thermal Comfort and Indoor Air Quality Policy
- The SINSW Thermal Comfort and Indoor Air Quality Performance Brief
- The thermal comfort and indoor air quality minimum requirements nominated with the Department of Education, Educational Facilities Standards and Guidelines (EFSG)
- Project specific documentation

4. CEILING / WALL FANS

- Where currently installed, ceiling fans shall be retained. Where they do not already exist and it is feasible / practical to do so, ceiling or wall fans shall be installed in permanent learning spaces and libraries;
- Ceiling fans shall be installed where ceiling height is equal to or greater than 2,700mm. Wall fans shall be installed where ceiling heights are less than 2,700mm; and
- Fans shall be manually controlled via a switch and speed controller located in the space (preferably near the light switch).

5. HEATERS

In rooms where reverse cycle air-conditioning is installed gas heaters shall not be provided or in the case of existing spaces, existing gas and/or electric heaters shall be removed. The only exception to this may be in the coldest parts of the state where reverse cycle air-conditioning may be unable to provide effective heating in which case it may be necessary to supplement the reverse cycle air-conditioning system/s with flued gas, electric or water heaters.

6. CONTROLS

- Both the thermal comfort and indoor air quality shall be controlled automatically within specified parameters;
- Controls shall be simple and intuitive to use;
- A prominent green light shall highlight to occupants when conditions are suited to opening windows and doors to utilise natural ventilation;
- A prominent blue light shall highlight to occupants when the air-conditioning is operating. The lights shall be clearly labelled with trafolyte

labels as follows:

- Green light – “External conditions are suited to opening windows and doors”
- Blue light – “Air-conditioning is operating. Windows and doors should be closed”

- Temperature and CO_2 sensors are to be installed within the space and be readily accessible for maintenance;
- Sensors must be located so as to accurately record the actual room temperature and indoor air quality (CO_2);
- Controls shall be designed to minimise energy consumption – e.g. by minimising over cooling and heating and automatically switching off when the space is unoccupied;
- Controls shall be designed so that the system/s will shut down automatically if a room is unoccupied for greater than 10 minutes (except in specific cases such as designated computer rooms); and
- Controls shall be properly labelled and suitably located in the space (preferably near the light switch) and incorporate:
  - a key operated auto / manual / off switch; and
  - a push on / push off adjustable hour run timer. The run timer shall be adjustable from 1 to 4 hours and initially be set at 2 hours.

7. SOLAR PHOTOVOLTAIC (PV) SYSTEMS

With the aim of minimising the financial and environmental impact of installing air-conditioning and mechanical ventilation, where feasible to do so solar photovoltaic (PV) systems shall be installed to offset as much of the electricity consumed by the school as is practicable.

8. ENERGY STORAGE (BATTERIES)

Where electrical infrastructure upgrades are required to provide the additional electrical capacity to supply the air-conditioning are cost prohibitive and/or are unable to be delivered in an acceptable timeframe, energy storage, in the form of batteries may be considered.

9. WHOLE OF LIFE COST ANALYSIS

System design / equipment selection is to be based on whole of life cost analysis so as to provide:

- value for money;
- fitness for purpose;
- reliability;
- minimal running cost;

- minimal maintenance; and
- minimal maintenance cost.

Specifically air-conditioning equipment should:

- support sustainable design principles including reducing energy consumption; and
- be easily accessible and serviceable – easy to maintain with minimal impact on school operations / activities when maintenance is being performed.

When calculating the whole of life cost the following must be considered:

- the total initial capital cost of the system/s – including design, project management, builder and building services works in connections etc.;
- resources (energy and where applicable water) consumption;
- maintenance ;
- replacement of component parts; and
- disposal costs.

The whole of life cost shall be calculated over the estimated life of the asset/s.