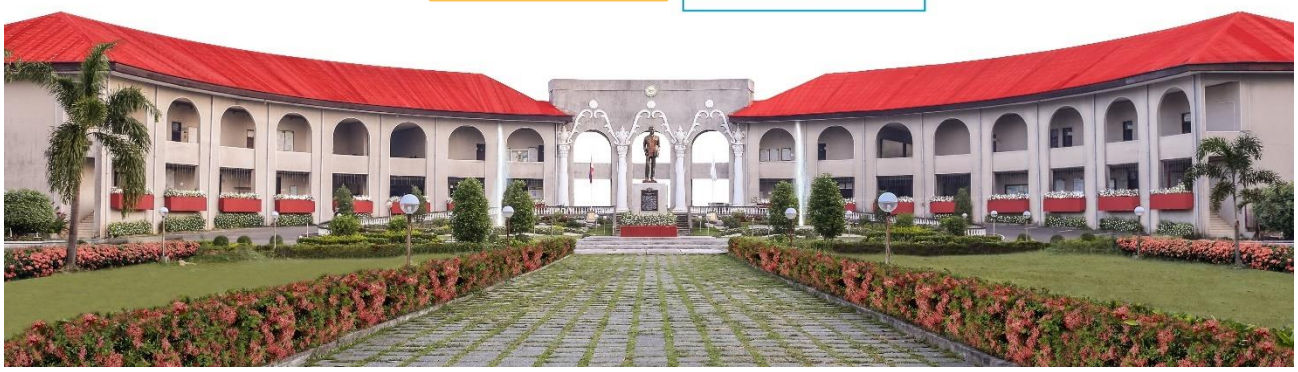
MARIANO MARCOS STATE UNIVERSITY

The reviewed and revised policy last February 2021 continue to be in effect and the basis for energy efficient renovations and new builds. This policy in place ensures that building renovations and new builds follow energy efficiency standards. The policy also includes power generation Further, plans and designs of future infrastructures follow energy efficient building designs. The policies and designs are indicated in the MMSU Land Use Development and Infrastructure Plan, which was approved by the Board Of Regents and adopted in 2021. It also adopts some of the provisions in the Green Building Code of the Philippines.

MARIANO MARCOS STATE UNIVERSITY

LAND USE, ZONING, WATER, AND ENERGY POLICIES



LAND USE POLICY

This part of the Land Use Development and Infrastructure Plan translates general guiding principles into corresponding policy statements to serve as enabling mechanism for the rational use of MMSU lands in the pursuit of the goals and objectives it is set to achieve and accomplish. For purposes of organized accounting and referencing, the principle-based policies are grouped into four clusters: moral-ethical and natural, social justice and equity and legal, scientific and technological, and sustainable development.

Moral-Ethical and Natural

Principle 1.0. Environmental integrity and ecological balance

Policy 1.1. Lands are nature's endowment to men for all generations today and in the future and it shall be the moral and ethical obligation of the university to be responsible and accountable steward for the sustainability of all its land resources.

Policy 1.2. The university shall observe and defer to the laws of nature in the exercise and observance of responsibility and accountability in the management of its land resources. The natural laws on regeneration, transformation, balance, and others as may be applicable shall be mandatory consideration in deciding the best options to allocate and use university lands.

Policy 1.3. The allocation and use of university lands shall aim to maintain, protect, conserve, restore, and enhance the integrity of the land itslef, the environment and ecological balance in all its campuses as it shall also effectively and positively influence the surrounding areas.

Policy 1.4. All land use options shall endeavor to preserve, promote and enhance the cultural heritage of and historical sites in the university including its immediate environs. University lands by their natural character and/or of the natural sightings or man-made structures found or established therein which has significant cultural and historical value shall be protected, maintained and enhanced.

Social Justice and Equity and Legal

Principle 2.0 Centrality in people

Policy 2.1 The use of lands of the university shall always put the interest of its constituents and clients a priority over any other and anything else. The use of university lands in the performance of its functions in instruction, research, community engagement, and business-like operations shall not be for their own sake but, first and foremost, for the interest of and as expressed by its people-constituents – students, personnel, and all other key stakeholders. The fundamental end in the allocation and use of university lands shall be to satisfy human needs as everyone will find pleasure, happiness, safety, security, and belongingness in any land-space to enjoy and be satisfied of the services of the university.

Principle 3.0 Social responsibility

Policy 3.1 University lands shall be allocated and used in a responsible manner to promote and sustain robust social processes in the university. As such, the active participation and involvement of all concerned parties, sectors and stakeholders shall be enlisted in the planning, implementation, monitoring and evaluation processes including the equitable and just sharing of benefits therefrom.

Principle 4.0 Obedience to government laws, rules and regulations
Policy 4.1 In the pursuit of social justice and equity in the allocation and use of university lands, all decisions pertinent thereto shall be in accordance with and in full compliance to pertinent laws, rules and regulations.

Policy 4.2 The MMSU-LUDIP shall be the basic institutional policy in the allocation and use of all university lands. In any case where a possible action cannot find basis in the present policy, the university, pursuant to applicable statutes and natural laws, shall formulate, approve and adopt the corresponding policy.

Policy 4.3 The university shall regulalry review, update and promptly communicate widely to all sectors the policies, rules and guidelines on land use.

Principle 5.0 Empowerment of all stakeholders
Policy 5.1 All MMSU constituents and stakeholders shall be deliberately enabled and capacitated through trainings, information and education campaigns and related activities for them to effectively understand, advocate and effectively mobilized such that each and everyone shall become vital instruments in the promotion of the rational allocation and use of university lands.

Principle 6.0 Public lands are for public use

Policy 6.1 University lands are public lands and shall be allocated and used strictly for public purposes only.

Scientific and Technological

Principle 7.0 Science-based decision-making

Policy 7.1 All decisions made to allocate and use university lands shall be based on valid and reliable science and all technologies applied thereunto shall be derived therefrom. This is especially so with regards to any intent to alter and/or convert the natural state of any piece of land of the university.

Policy 7.2 Only appropriate technologies based on science shall be applied in the use of any land resource of the university.

Policy 7.3 Where applicable, verified indigenous knowledge systems shall be made part of any decision including in the body of science utilized thereto to allocate and use university lands.

Sustainable Development

Principle 8.0 Balanced development for and of the university

Policy 8.1 All competing interests in the allocation and use of its land resources shall be evaluated and decided upon in favor for the option that is to the best interest of the university; Provided that the best interest option presents the optimal balance in the development of the different sectors and functions of the university.

Principle 9.0 Economic feasibility, the doctrine of best economic option possible

Policy 9.1 Any decision to allocate and use university lands shall be in consideration to the best economic benefits possible but shall be strictly in keeping, never in conflict, with the moral-ethical, natural, social, cultural, ecological and environmental worth and integrity of the land asset. Where any conflict may arise, the later elements shall prevail.

Principle 10.0 Suitability

Policy 10.1 All land allocation and use shall be on the basis of natural suitability for any and all kinds of intents before any kind of alteration, including conversion to make it suitable, for any purpose.

Policy 10.2 Physically and productively fragile lands on the one hand and protected areas on the other of the university shall be given special considerations in their management to satisfy the requisites and demands applicable to protect, conserve, enrich, rehabilitate, and or sustain them as the case may be.

Principle 11.0 Carrying capacity
Policy 11.1 Complementary to suitability assessment, every allocation and utilization option for all university lands shall be within the limits of their objectively assessed carrying capacity.

Principle 12.0 Inter-sectoral partnerships and collaboration
Policy 12.1 All sectors in and outside of the university are indispesable partners and that their involvement and participation in the planning and implementation of land allocation and use shall be enlisted at every opportunity.

References

Philippine Agenda 21

DENR. 2019. Land use planning.

Tamil, EG. 2018. Introduction to Town Planning and Planning Concepts.

HLURB. 2013. CLUP Guidebook: A Guide to Comprehensive Land Use Plan Preparation (Volume 1).

ZONING POLICY

The land use and zoning plans of the different campuses of the university as hereby conceived are made in accordance with the Comprehensive Land Use Plan (CLUP) of the cities and municipalities where they are located. In all the CLUPs, the campuses are categorized to belong in an institutional zone. In accordance with such zoning scheme and given the functional mandates of MMSU, a standard sub-zoning plan is adopted as follows:

a) Academic Zone
b) Research & Extension Zone
c) Residential Zone
d) Recreational Zone
e) Agri-industrial Zone
f) Economic Zone
g) Protected Land

Academic Zone

Principle 1. Accessibility and interconnectivity of academic building and related facilities.

Policy 1.1. Academic buildings shall be constructed and located for complementarity of utility across instructional needs and demands among disciplines.

Policy 1.2. Support facilities such as libraries, student center, clinic, auxiliary buildings and facilities shall be located and positioned for ease, safety and efficiency of access for all.

Research Zone

Principle 2. Promotion of sustained innovation and creativity for breakthrough knowledge and technologies

Policy 2.1 Proportionate suitable areas shall be appropriated in each of the campuses of for the whole university to serve as research zone.

Policy 2.2. The research zone shall be developed to support, complement and promote the function and services of the university.

Extension and Production Zone

Principle 3. Showcase of technology development, transfer, and technopreneurship.

Policy 3.1. Extension and production zones (EPZs) shall be established to highlight the operability of research results and developed technology.

Policy 3.2. EPZs shall have uniqueness of each but necessarily complementary with one another

to display functions and produce chain in all settings.

Policy 3.3. EPZs shall be established to the extent proportionate to the needs and demands and dynamics of resources of each campus or collectively in the university.

Residential Zone

Principle 4. Community Building

Policy 4.1. A compact area dedicated for residential purpose for personnel, students and visitors shall be developed to be known as residential zone in each of the campuses of the university.

Policy 4.2. The residential zone shall be located and situated for utmost security, peace, accessibility and convenience of residents.

Policy 4.3. The residential zones shall be developed to blend and be compatible with the overall design and structure of the each of the campus.

Recreational Zone

Principle 5. Social responsibility to promote health, recreation and well-being.

Policy 5.1 A proportionate area in each of the campuses shall be apportioned for leisure and cultural purposes.

Policy 5.2 The zones dedicated for leisure, cultural including spiritual facilities and activities shall be known as recreational zone.

Agro-Industrial Zone

Principle 6. Modeling agro-industrial development

Policy 6.1 Feasible land areas of the university shall be allocated to showcase agro-industrial development making these areas for breakthrough research, training modules as well as business models.

Policy 6.2 Agro-economic zones shall be in a scale proportionate to their needs and demands of the functions and services of the university.

Agri-fisheries

Principle 7. Compatibility with related university functions and services

Policy 7.1 Relevant land and water bodies owned by the university shall be appropriately developed to advance the functions and services of the university.

Economic Zone

Principle 8. Socioeconomic development

Policy 8.1 Suitable and feasible portion of MMSU lands shall be appropriated and utilized for economic activities to optimize their utility to generate additional income of the university.

Policy 8.2 University lands appropriated for economic purposes shall be in accordance with the standard rules of comparative advantages.

Protected Land

Principle 9. Protection, conservation and preservation

Policy 9.1 Protected landholdings of the university shall be conserved, preserved and to be excluded from any form of alteration except as may be permitted by operation of law.

WATER POLICY

This part of the Plan translates general guiding principles into corresponding policy statements to serve as enabling mechanism for the rational use of water resources in the pursuit of the goals and objectives it is set to achieve and accomplish, the LUDIP and the university as a whole. For legal guidance, this policy is primarily based from the Water Code of the Philippines with its Amended Implementing Rules and Regulations (WIRR) of 2005. Accordingly, the water policy of MMSU under SIRMATA 2040 shall be expressed as principles in the first order represented by the five (5) Rules in the WIRR, and, in the second order, are the corresponding applicable policies for MMSU for each rule. Wherefore, the water policy of the university shall adopt the first three (3) Rules of the WIRR 2005 as principal and the "principle" components as follows: 1) appropriation and utilization; 2) control, conservation, and protection of waters and related land resources; and 3) administration and enforcement. The sense of the two (2) other Rules are incorporated in the adopted first three (3) Rules.

Principle 1.0. Appropriation and Utilization of Waters

Policy 1.1. Moral obligation and legal covenant. It shall be the moral obligation and a legal covenant of the university to be a resposible and accountable steward of its water and related resources for sustainable use by the university today and in the future.

Policy 1.2. Support to the mandated functions of the university.Water resources of the university shall be wisely appropriated and used in support to the effective and efficient performance of its mandated functions and services.

Policy 1.3. Water as a social and economic good. The university shall ensure accessible, adequate and quality standard supply of in-campus water to its constituents. At the same time, water resources of the university shall be explored and appropriated wisely in their prescribed forms and standards to support the strategic operations of the university.

Policy 1.4. Compliance to government and quasi-government laws and declarations. The appropriation and use of water resources of the university shall be in accordance with pertinent government and quasi-government laws and doctrines. Quasi-governments include supra-regional groups like the ASEAN, international bodies like the UN, and others of global recognition.

Policy 1.5. Laws of nature. The university shall observe and defer to the laws of nature in the exercise and observance of responsibility, accountability and covenant in the appropriation and use of its water and related resources.

Policy 1.6 Aim. The appropriation and use of the water resources of the university shall aim to maintain, protect, conserve, restore, and enhance the integrity of the water resources itself, to the environment and ecological balance in all its campuses as to also effectively and positively influence the surrounding areas. Towards this end, management options and mechanisms therein shall hasten the university's ability to prevent, reduce, and/or mitigate risks and vulnerabilities from natural disasters.

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Principle 2.0. Control, Conservation and Protection of Waters, Watersheds and Related Land Resources

Policy 2.1. Science-based. The university shall be fully guided by sound ethical science in the appropriation and utilization and in the control, conservation and protection (CCP) practices of its water and related resources.The university shall endeavor to invest in research along this concern.

Policy 2.2. Guided by natural laws. The CCP practices on water and related resources of the university shall be guided by the laws of nature. Disobedience and disregard to natural laws portends calamities and unwanted consequences to men in general and to university operations and services in particular.

Policy 2.3 Appropriate technologies. Only appropriate technologies based on sound ethical science guided by natural laws and, if applicable, verified indigenous knowledge systems (VICKS), shall be applied in the appropriation and use and CCP practices of all water and related resources of the university.

Policy 2.4. Balanced development. All competing interests in the appropriation and use and in the CPP practices of its water and related resources shall be evaluated and decided upon in favor for the option that is to the best interest of the university; Provided, that the best interest option presents the optimal balance in the development of the different sectors and functions of the university.

Policy 2.5. Economic feasibility. Any decision to approrpiate and use and in the CPP practices of water and related resources of the university shall be in consideration to the best and balanced economic, social, political, cultural, ecological and environmental benefits possible but shall be strictly in keeping with the integrity and sustainability of the water asset.

Policy 2.6. Fragile and crifical resources. Fragile and critical water resources especially those in protected areas shall be given special considerations in their appropriation, operation and management in order to satisfy the requisites and demands for their protection, conservation, enrichment, rehabilitation, and sustenance.

Policy 2.7. Carrying capacity. Every appropriation and utilization and CCP practice-options of and for all water and related resources of the university shall be within the limits of their objectively assessed carrying capacity.

Policy 2.8. Conservation and rehabilitation. Water conservation measures like of establishment of water impoundments, catch basins, water treatment facilities, and related infrastructures shall be given importance. At the same time, activities to recharge water tables and the restoration of watersheds shall be a priority concern. Rehabilitation of "polluted" resources must be immediate.

Policy 2.9. Protection. All water and related resources of the university, ground and surface, shall be shielded from any kind of pollution, ground water exploitation, and of destruction induced by nature and/or perpetrated by man and/or animals.

Prinicple 3.0. Administration and Enforcement

Policy 3.1. University Water Resources Management (UniWaRM) Office. An office shall be created to manage and administer the water resources of the university. Where such task is an implicit or

implied function of an office already existing,, i.e., a directorate, a section for such shall be created and the role of water resources management to be assigned officially.

Policy 3.2. Support committe. In the pursuit of well deliberated, well-crafted and implemented water management and administration, the university may compose a university committee to assist the UniWaRM office in the crafting of policies, rules, guidelines, and in the implementation, monitoring and evaluation of its programs projects and sctivities. The committee may be an integral part of the structure of theUniWaRM office.

Policy 3.3. Concern of all. Effective and efficient administration of water and related resources of the university is a function of the collective effort of MMSU as a unified community. The university shall strategize to empower, engage and mobilize every constituent to become a responsible and accountable party to the cause.

Policy 3.4. Engagement with the extra-community. Complementary to Policy 3.3, the university shall endeavor to work with its adjacent communities, local government units, other communities, and government agencies, non-government and poeples' organizations, and stakeholders with joint or common interest on any given water and related resources, i.e., water sheds, lakes, springs, rivers, bays, gulfs, etc.

Policy 3.5. Immediate policy and corollary action. The MMSU-LUDIP shall be the immediate institutional policy in the appropriation and use of water and related resources of the university. In any case where a possible action cannot find basis in the present policy, the university, pursuant to applicable statutes and natural laws, shall formulate, approve and adopt the corresponding policy.

Policy 3.6. Review and communication. The university shall regularly review, update and promptly communicate widely to all sectors the policies, rules and guidelines on the appropriation and use of water and related resources.

Policy 3.7. Implementing rules and regulations. The UniWaRM office shall be responsible in translating this policy into specific implementing rules and guidelines and for the execution and internal monitoring and evaluation thereof.

References

Philippine Agenda 21

HLURB. 2013. CLUP Guidebook: A Guide to Comprehensive Land Use Plan Preparation (Volume 1).

Presidential Decree 1067. Water Code of the Philippines: Amended Implementing Rules and Regulations of 2005.

Republic Act 11396. The SUCs LUDIP Act of 2019 and Its Implementing Rules and Regulations.

United Nations. 2016. Sustainable Development Goals.

POLICIES ON ENERGY GENERATION AND UTILIZATION

Principle 1. Solar Energy Generation

Policy 1.1 Designs of new buildings shall integrate/incorporate the option for the construction of solar power facility (solar panels and accessories).

Policy 1.2 Roof deck (roof integrity) must be considered in the designs.

Policy 1.3 Consideration of south facing roof (around 18°) is recommended.

Policy 1.4 Buildings shall consider provision for the integration of interconnectivity with the grid/utility with net-metering.

Principle 2. Diesel/Gasoline Generator Sets for Power Generation (For 50 KVA And Larger)

Policy 2.1 Consideration of generator sets as standby units for power generation (not only during emergencies)

Policy2.2 Consideration of standby generator sets to operate on renewable fuels (such as biofuels – hybrid with fossil fuel)

Policy 2.3 Maintenance program for generator sets should be in place and to be strictly observed.

Principle 3. Net Metering

Policy 3.1 To optimize the potentials of distributed generation in the university, all generation facilities (large capacity) especially on renewables (solar) should consider net-metering scheme.

Principle 4. Integration of *green technologies* but not limited to:

Policy 4.1 Inverter-type of air conditioning units are preferred for new installations

Policy 4.2. Roof insulation should be installed for air conditioned areas.

Policy 4.3 LED lamps or high efficiency lights must be used in buildings/facilities including street lighting

Policy 4.4 Appropriate building orientation must be considered for new buildings to optimize energy conservation.

Policy 4.5 Sufficient shade (canopies) must be provided for outdoor units of split-type air conditioning units.

Principle 5. Energy Audit

Policy 5.1 There shall be periodic conduct of spot and detailed energy accounting and audit (electricity, water, fuel) by energy auditors within all energy centers of the university.

Policy 5.2 Spot energy audit shall be as often as possible. This can be done by coordinators.

Policy 5.3 Detailed energy audit by energy auditors shall be done at least once every three years.

Policy 5.4 University-wide Energy Efficiency and Conservation Technologies and Practices must be implemented.

Principle 6. Sustainability

Policy 6.1 The University shall sustain the conduct of research and development on alternative energy sources.

Policy 6.2 The University shall invest on energy-efficient infrastructure and facilities.

Policy 6.3 The University shall adopt and implement relevant government issuances on energy and power generation and utilization.

MARIANO MARCOS STATE UNIVERSITY

Board of Regents

BOR RESOLUTION NO. 050, s. 2021

RESOLVED, AS IT IS HEREBY RESOLVED, that upon its agreement, the Board approved the MMSU Sirmata 2040: Land Use Development and Infrastructure Plan, including the policies, plans and perspectives included therein.

Approved by the Board of Regents during the 138th (Regular) BOR Meeting held on 14 October 2021 via videoconferencing.

CERTIFIED TRUE AND CORRECT:

LUVEE HAZEL C. AQUINO
Board Secretary

ATTESTED BY:

SHIRLEY C. AGRUPIS
Vice Chair, MMSU BOR
and President, MMSU

Energy Efficient Design

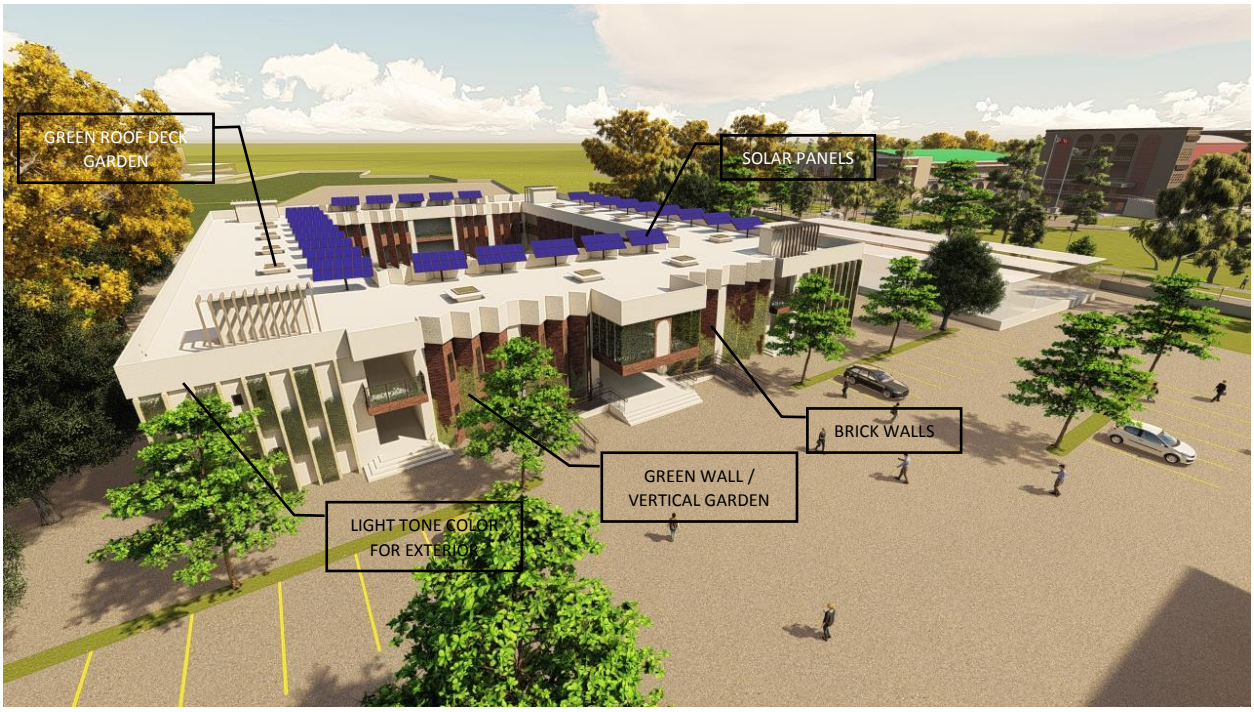
1. Green Wall / Vertical Garden and Green Roof Garden
    - Provides insulation to the building
2. White / Light tone color finish
    - White reflects heat, less heat absorption thus less use of artificial ventilation (high R-value)
3. Stone / Brick wall cladding
    - Additional insulation from heat going inside the building
4. Large Glass Windows at the northern part of the building
    - Takes advantage of natural light, less use of artificial lighting during the day
    - Using less than 40% window-to-wall ratio at the southern part of the building to prevent solar heat gain, treated with Low-E coating/window films
5. Solar Panels
    - Alternative way to generate electric energy to power the basic appliances of the building
    - It can save 60 to 90 percent of monthly electric bills, depending on the usage

CIT Laoag, 5 Storey Tech Voc Building

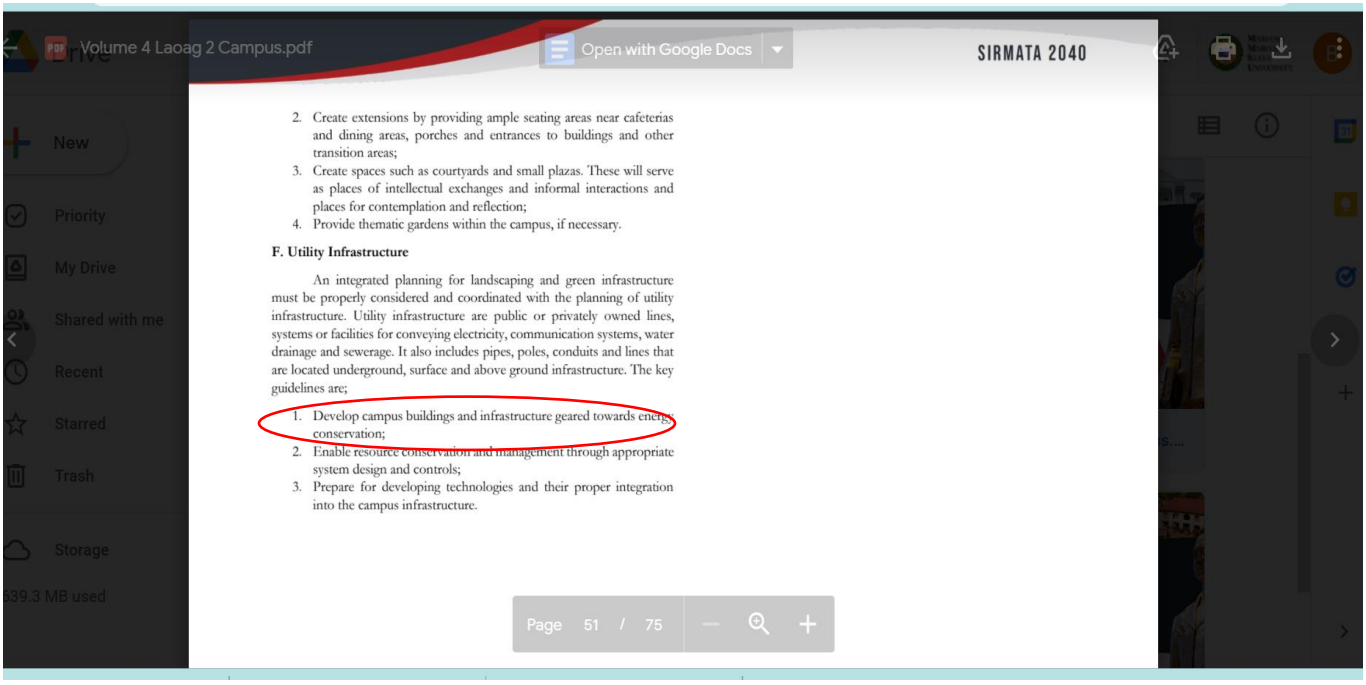
Batac Campus, 2 Storey Quality Assurance and Supply Building (Admin)

Batac Campus, 4 Storey International Residence (ELP)

Batac Campus, 2 Storey Academic Laboratory Building (CAFSD)



Excerpt from the Land Use Development and Infrastructure Plan




GB
CODE
PHILIPPINE GREEN BUILDING CODE

THE PHILIPPINE GREEN BUILDING CODE

June 2015

A Referral Code
of the
NATIONAL BUILDING CODE OF THE PHILIPPINES
(P.D. 1096)

Message

My warmest greetings to the Department of Public Works and Highways on the implementation of the Philippine Green Building Code of 2016.

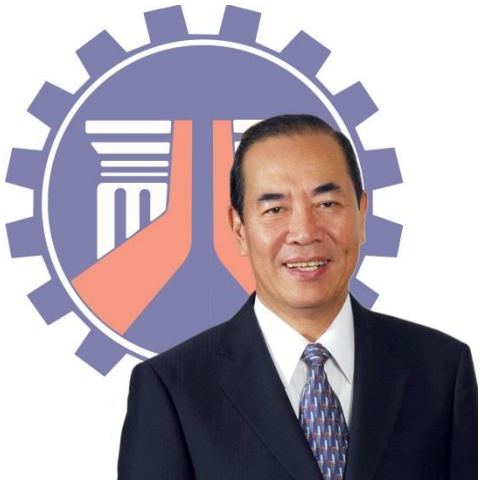
Today is an historic moment as the government, through the DPWH, implements the Green Building Code, or the “GB Code.” This manual will be one of our enduring legacies to succeeding generations and the fulfillment of our duty to secure their rights, welfare, and protection. I am filled with pride that the country is now part of the global movement towards ecological conscientiousness and sustainability.

I am confident that the ideas contained in this document will help ensure that all structures built from here on will have minimal impact on our environment, complying with various standards of quality and efficiency, and fulfilling criteria that allow occupants to lead meaningful lives.

Indeed, a new era has dawned over our nation. Informed by the lessons of the past, and mindful of the needs of the future, building better is not just an option but an indispensable part of our efforts towards achieving real, lasting progress. Through the observance of the principles and guidelines laid down in the GB Code, we will create a Philippines that we can be proud to bequeath to the next generation.

BENIGNO S. AQUINO III
President of the Philippines

Foreword



In recent years, countries in the Asia-Pacific region started to adopt measures that promote resource management efficiency and site sustainability while minimizing the effects of buildings on human health and environment by practicing Green Building.

The time has come for the Philippines to champion the implementation of greener measures to address climate change. With the Department of Public Works and Highways' partnership with International Finance Corporation of the World Bank group, the clamor for sustainable building regulations has been answered.

The Philippine Green Building Code, a referral code to the National Building Code of the Philippines, rallies to lessen the impacts of buildings to health and environment through resource management efficiency.

A gamut of minimum standards aimed to reduce greenhouse emissions and introduce electricity and cost savings for buildings is imposed to applicable building falling under certain gross floor area to deliver improved energy efficiency, water and wastewater management, materials sustainability, solid waste management, site sustainability and indoor environmental quality.

With the implementation of this Code and the promise of reducing greenhouse gas emissions and energy and water consumption by at least 20%, DPWH will herald the achievement of the Philippine Government's commitment to reduce carbon emissions by 70% in 2030.

We took the first steps in engineering this Code with the help of professional associations and stakeholders to answer the call for a sustainable building regulation. We now call upon our stakeholders, end-users, customers and other relevant parties to lend your hands to us as, together, we achieve an environmentally sound Philippines.

ROGELIO L. SINGSON
Secretary

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Manila

THE PHILIPPINE GREEN BUILDING CODE
AS A REFERRAL CODE OF
THE NATIONAL BUILDING CODE OF THE PHILIPPINES

Pursuant to the General Powers vested to the Secretary of Department of Public Works and Highways by Section 203 of Presidential Decree 1096 otherwise known as the National Building Code of the Philippines, and its Implementing Rules and Regulations, the Philippine Green Building Code endorsed by relevant stakeholders, private sectors and other government agencies, various Accredited Professional Organizations, the National Building Code Board of Consultants and the DPWH Management Committee, the proposed **Philippine Green Building Code** is hereby approved as a Referral Code of the National Building Code of the Philippines.

Approved in the City of Manila, Philippines
this 22nd day of June, in the year of our Lord
Two Thousand Fifteen

ROGELIO L. SINGSON
Secretary, Department of Public Works and Highways

Department of Public Works and Highways
Office of the Secretary
WIN5V15336

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PHILIPPINE GREEN BUILDING CODE
A Referral Code of the
NATIONAL BUILDING CODE (P.D. 1096)

CHAPTER I. GENERAL PROVISIONS

Section 1. Title

This document shall be known as the “Philippine Green Building Code” hereinafter referred to as the “GB Code”.

Section 2. Policy

The state shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature against harmful effects of climate change. It shall safeguard the environment, property, public health, in the interest of the common good and general welfare consistent with the principles of sound environmental management and control; and for this purpose, prescribe acceptable set of standards and requirements for relevant buildings to regulate their location, site, planning, design, quality of material, construction, use, occupancy, operation and maintenance.

Section 3. Objectives

The GB Code seeks to improve the efficiency of building performance through a framework of acceptable set of standards that will enhance sound environmental and resource management that will counter the harmful gases responsible for the adverse effects of climate change, throughout the building’s life-cycle including efficient use of resources, site selection, planning, design, construction, use, occupancy, operation and maintenance, without significant increase in cost. This GB Code is a set of regulations setting minimum standards for compliance and not intended to rate buildings.

Section 4. Principles

4.1 The technical professionals, developers, contractors, property managers and building owners involved in the planning, design, construction and management of buildings have the opportunity and responsibility to help government address the adverse effects of climate change by ensuring that buildings are planned, designed, constructed, operated and maintained to the required efficiency level.

4.2 Resources must be used efficiently to equitably meet the developmental and environmental needs of the present and future generations.

4.3 Occupants of green buildings will benefit from improved indoor environmental quality, which promotes higher productivity and better comfort.

Section 5. Definition of Terms

The words, terms and phrases as used in this GB Code shall have the meaning or definition as indicated in the National Building Code (NBC) and Annex 1.

Section 6. Green Building Concept

Green building is the practice of adopting measures that promote resource management efficiency and site sustainability while minimizing the negative impact of buildings on human health and the environment. This practice complements the conventional building design concerns of economy, durability, serviceability and comfort.

Section 7. Approach

The GB Code adopts a staggered or incremental approach and is subject to periodic review by the Secretary of the Department of Public Works and Highways (DPWH), through the National Building Code Development Office (NBCDO), to modify or include new aspects and emerging efficient technologies and expand the coverage to other building use / occupancy or replace outmoded measures.

Section 8. Building Use / Occupancy Coverage and Application

8.1 The provisions of the GB Code shall apply to all new construction and/or with alteration of buildings in the following classification with the required minimum Total Gross Floor Areas (TGFA) as indicated in Table 1 below:

Table 1. Minimum TGFA for Building Use / Occupancy

USE / OCCUPANCY CLASSIFICATION of any jurisdiction	**TGFA** as defined by NBC
Residential Dwelling: Condominium [1]	20,000 sqm
Hotel / Resort	10,000 sqm
Educational: School	10,000 sqm
Institutional: Hospital	10,000 sqm
Business: Office	10,000 sqm
Mercantile: Mall	15,000 sqm
Mixed Occupancy [2]	10,000 sqm

Sources: NBC, Baseline Studies, IFC Philippine Green Building Code Project, May 2013

[1] *For Residential Dwelling: Condominium, the TGFA is the sum of the dwelling areas, common and accessory areas within the building.*

[2] *The areas for Mixed Occupancy classification shall have a total aggregate area equal to the TGFA*

8.2 GB Code does not apply to existing buildings of the above use / occupancy classification constructed before the effectivity of the GB Code.

8.3 When alterations, additions, conversions and renovations of existing buildings constructed after the effectivity of the GB code, which reached the TGFA as indicated in Table 1 are to be made, the whole building shall be subject to the applicable provisions of the GB Code.

8.4 A building of mixed occupancy with combination of classification as indicated in Table 1, shall use appropriate measures applicable to each classification.

CHAPTER II. GREEN BUILDING REQUIREMENTS

Section 9. Performance Standards

The GB Code shall be subject to the following performance standards:

9.1 Energy Efficiency
9.2 Water Efficiency
9.3 Material Sustainability
9.4 Solid Waste Management
9.5 Site Sustainability
9.6 Indoor Environmental Quality

Section 10. Energy Efficiency

Energy efficiency requires the adoption of efficient practices, designs, methods and technologies that reduce energy consumption resulting in cost savings.

10.1 BUILDING ENVELOPE

10.1.1 Air Tightness and Moisture Protection

a. General
As the humidity levels are very high in the Philippines, the unwanted infiltration and humidity ingress into the spaces can cause additional load on the air conditioning system and a detrimental impact on air quality. Buildings must be planned and designed with specific details to ensure that air tightness is maximized. Details should precisely include joints, service entry points, windows and doors. The implementation of these measures requires only increased attention to the construction details and it can be implemented at practically no cost.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
Buildings shall be planned and designed with:

i. Complete gaskets, weather-stripping, door bottom sweeps and seals within and around window and door assemblies

ii. Moisture protection on the surface of the external façade to reduce vapor or moisture migration from external spaces

d. Exceptions
Buildings and spaces without provisions for air conditioning systems are exempt.

10.1.2 **Glass Properties**

a. General
Compared to wall assemblies, glazing transfers more heat and hence, it is ideal to reduce the amount of glazing with respect to the wall in order to reduce internal heat gains.

The requirement of Window to Wall Ratio (WWR) needs to be balanced with the amount of daylight coming through the glazed area.

Solar Heat Gain Coefficient (SHGC) is used to determine the amount of solar heat admitted through the glass divided by the total solar radiation incident on the glass.

Visible light Transmittance (VLT) is used to determine the amount of light transmitted through the glass.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

WWR shall be balanced with SHGC to maintain flexibility in design. To further describe, the higher the designed building WWR, the lower the required SHGC in glass windows shall be and vise-versa. This does not however, remove the option for building owners to apply windows with low SHGC for building with low WWR.

i. The size of the opening (with or without glass) shall be in accordance with the NBC.

For each WWR value, the SHGC and VLT shall be in accordance with Table 2.

Table 2. SHGC and VLT for different WWR

WWR	Maximum SHGC	Minimum VLT
10	0.80	0.80
20	0.70	0.70
30	0.60	0.70
40	0.45	0.60

50	0.44	0.55
60	0.37	0.50
70	0.31	0.45
80	0.27	0.40
90	0.24	0.35

Source: Prescribed Requirements, IFC Philippine Green Building Code Project, May 2013

The SHGC requirement in Table 2 can be adjusted if sun breakers are provided in the windows. Sun breaker plays a very important role in reducing solar heat gain as it stops the solar radiation before it enters the building and doing so reduces the cooling loads considerably. External shading has the additional positive effect of improving the internal comfort cutting part of the direct radiation on occupants. This must be applied only to windows that are shaded.

SHGC limits can be adjusted by multiplying it with the correction factors summarized in the following tables, using the formula:

$$SHGCadj = f \times SHGC$$

where:

$SHGC_{adj}$ is the adjusted solar heat gain coefficient limit for windows with external shading

SHGC is the solar heat gain coefficient

f is the SHGC correction factor for the external shading

ii. For intermediate values of D/H or D/W the lower figure of correction factor should be used as stated in Tables 3 and 4.

iii. D is the depth of the shading device as projected from the building exterior wall and H or W is the height or distance of the bottom sill of the window from the bottom of the shading device as shown in Figure 1.

iv. Shading which is not attached to windows or placed on a wall with no window should not be counted.

Figure 1. Schematic representation of a window and related horizontal overhang or vertical fin

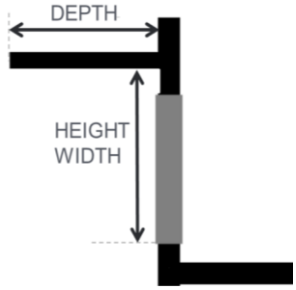

Table 3. Correction factor for each horizontal overhang shading projection

D/H	Correction Factor
0.1	1.03
0.5	1.06
1	1.08

Table 4. Correction factor for each vertical fin shading projection

D/W	Correction Factor
0.1	1.04
0.5	1.12
1	1.17

Source: Prescribed Requirements, IFC Philippine Green Building Code Project, May 2013

For glass products, see Annex 2 Glass Library.

d. Exceptions
There are no exceptions to this provision.

10.2 NATURAL VENTILATION

a. General
This measure will give building occupants the flexibility and opportunity to use natural ventilation for free cooling and fresh air in regularly occupied spaces. This measure will limit the tendency to create glass-sealed box type buildings. Size of each room and space shall be consistent with the occupancy load of the NBC.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

i. Operable windows or balcony door shall be provided in regularly occupied spaces. The size of the opening shall be equal to at least ten percent (10%) of the floor area of regularly occupied spaces.

ii. All operable windows shall be provided with safety features for protection against strong winds, water penetration and protection for building occupants including child safety and security.

c. Exceptions
There are no exceptions to this provision.

10.3 BUILDING ENVELOPE COLOR

a. General
Light-colored building envelope, especially the roof areas which are the most vulnerable, can reduce heat transfer from the outside to the inside of the building by having surfaces with high Solar Reflectance Index (SRI).

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

i.

METAL SURFACE	SRI
Reflective white	86 to 92
Basic white	80 to 88
Beige / Tan	74 to 80
Dark brown	0 to 33
Light to medium brown	45 to 56

Building metal roof surfaces shall either
be colored white or have a minimum SRI of 70. *See Table 5.*

Table 5. Solar Reflectance Index Values Of Basic Colored Coatings

Light to medium grey	39 to 63
Dark grey	0 to 41
Blue	23 to 30
Light to medium blue	35 to 38
Red	28 to 36
Terracotta red	38 to 40
Green	25 to 32
Light to medium green	30 to 48

Source: PPG Cool Color Series - www.coolcolorsdatabase.ppg.com
as rated by the Cool Roof Rating Council, US

d. Exceptions. There are no exceptions to this provision.

10.4 ROOF INSULATION

a. General
Insulation can help reduce heat gain in a building thus improving thermal comfort, acoustic quality and reducing the load on the air conditioning system.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
Buildings shall be provided with roof insulation so that the average thermal resistance value (R-Value) of the roof is at least R-8. *See Annex 4 (Insulation R-Value).*

For Insulating Values of Common Building Materials see Annex 3

Table 6. R-Value of Common Roof Insulation

INSULATION	R-Value / inch (25.4 mm)
Polyisocyanurate	5.6 to 8.0
Polyurethane	5.6 to 6.5
Closed cell spray foam	5.5 to 6.0
Phenolic foam	4.8
Urea formaldehyde foam	4.6
Plastic fiber	4.3
Mineral fiber	4.2 to 4.5
Cementitious foam	3.9
Polystyrene	3.8 to 5.0
Fiberglass	3.7
Rockwool	3.7
Rigid foam	3.6 to 6.7
Cellulose	3.6 to 3.8
Open cell spray foam	3.6
Sheep's wool	3.5
Hemp	3.5
Cotton	3.4
Loose cellulose	3.0 to 3.7
Mineral wool	2.8 to 3.7
Straw	2.4 to 3.0
Vermiculite / Perlite	2.4
Reflective bubble foil	1 to 1.1

Source: U.S. Department of Energy – Insulation Materials

d. Exceptions. There are no exceptions to this provision.

10.5 MECHANICAL SYSTEMS

10.5.1 Air Conditioning System

a. General

Air conditioning typically accounts for more than fifty percent (50%) of total electricity costs in a centrally air conditioned building. Hence, the efficiency of an air conditioning system is of prime importance. The heart of the air conditioning system is the cooling system, typically chillers in large buildings and is important to procure an efficient cooling system.

b. Applicability

This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

The cooling equipment shall meet or exceed the minimum efficiency requirements as indicated in Tables 7 and 8.

Table 7. Electrically Operated Unitary Air Conditioners and Condensing Units

Equipment Type	Size Category		Sub-Category or Rating Conditions	Minimum Efficiency	Test Procedure
	(in Btu/h)	(in kJ/h)			
Air conditioners, air-cooled	<65,000	<68,585	Split systems	14.0 SEER 12.0 EER	AHRI 210/240; PNS ISO 5151:2014; PNS ISO 16358-1
			Single packaged	14.0 SEER 11.6 EER	
Through-the-wall, air-cooled	<30,000	<31,655	Split systems	12.0 SEER	AHRI 210/240; PNS ISO 5151:2014; PNS ISO 16358-1
			Single packaged	12.0 SEER	
Small-duct high velocity, air-cooled	<65,000	<68,585	Split systems	10.0 SEER	AHRI 210/240; PNS ISO 5151:2014; PNS ISO 16358-1
Air conditioners, air-cooled	≥65, 000 & <135,000	≥68, 585 & <142,447	Split systems and single packaged	11.5 EER	AHRI 340/360; PNS ISO 5151:2014; PNS ISO 16358-1
				11.3 EER	
	≥135, 000 & <240,000	≥142, 447 & <253,238		11.5 EER	
				11.3 EER	
	≥240, 000 & <760,000	≥253, 238 & <801,922		10.0 EER	
				9.8 EER	
	≥760, 000	≥801, 922		9.7 EER	
				9.5 EER	
Air conditioners, water and evaporative cooled	<65,000	<68,585	Split systems and single packaged	14.0 EER	AHRI 210/240; PNS ISO 5151:2014; PNS ISO 16358-1
	≥65, 000 & 135,000	≥68, 585 & 142,447		14.0 EER	AHRI 340/360; PNS ISO 5151:2014; PNS ISO 16358-1
				13.8 EER	
	≥135, 000 & 240,000	≥142,447 & 253,238		13.8 EER	
				13.8 EER	
	≥ 240,000	≥ 253,238		14.0 EER	
				13.8 EER	

Source: 2010 PSVARE Standards

Table 8. Water Chiller Packages – Minimum Efficiency Requirements

Equipment Type	Size category		Minimum Efficiency	Test Procedures
			Full Load	
Air-cooled chillers with, condenser, electrically operated	< 150 tons	EER	10	AHRI 550/590
	≥150 tons	EER	10	
Air-cooled chillers without condenser, electrically operated	All capacities	EER	Condenserless units shall be rated with matched condensers	AHRI 550/590
Water-cooled, electrically operated, positive	All capacities	Kw/ton	Reciprocating units required to comply with water-cooled positive displacement requirements	AHRI 550/590
Water-cooled, Electrically operated, positive displacement	< 75 tons	Kw/ton	0.78	AHRI 550/590
	≥ 75 tons and < 150 tons	Kw/ton	0.775	
	≥ 150 tons and < 300 tons	Kw/ton	0.68	
	≥ 300 tons	Kw/ton	0.62	
Water-cooled electrically operated, centrifugal	< 150 tons	Kw/ton	0.634	AHRI 550/590
	≥ 150 tons and < 300 tons	Kw/ton	0.634	
	≥ 300 tons and < 600 tons	Kw/ton	0.576	
	≥ 600 tons	Kw/ton	0.57	
Air-cooled absorption single effect	All capacities	COP	0.6	AHRI 560
Water-cooled absorption single effect	All capacities	COP	0.6	
Absorption double effect indirect-fired	All capacities	COP	1	
	All capacities	COP	1	

Source: 2010 PSVARE Standards

d. Exceptions
Buildings with no air-conditioning systems are exempt.

10.5.2 **Water Heating System**

a. General
The use of energy-efficient water heating systems in buildings, by observing minimum power performance requirements, will help reduce energy consumption due to heating of water.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements. Applicable buildings shall comply with the minimum performance requirements for water heating in the 2010 PSVARE Standards, as shown in Table 9.

d. Exceptions
Buildings with no water heating systems and buildings with using solar water heating and/or heat pump for water heating are exempt.

Table 9. Minimum Performance Requirements for Water Heating Equipment

Equipment Type	Size Category (Input)		Subcategory or Rating Condition		Performance Required		Test Procedure
	I-P	SI	I-P	SI	I-P	SI	
Electric Water Heaters	12 kW	12 kW	Resistance ≥ 20 gal	Res ≥ 76 L	EF ≥ 0.97 - 0.00132V	EF ≥ 0.97 - 0.00132V	DOE 10 CFR Part 430
	> 12 kW	> 12 kW	Resistance ≥ 20 gal	Res ≥ 76 L	SL ≤ 20 + 35√V, Btu/h		ANSI Z21.10.3
	All sizes	All sizes	Heat Pump	Heat Pump	EF ≥ 2.0	EF ≥ 2.0	DOE 10 CFR Part 430
Gas Storage Water Heaters	≤ 75,000 Btu/h	≤ 22 kW	≥ 20 gal	≥ 76 L	EF ≥ 0.67	EF ≥ 0.67	DOE 10 CFR Part 430
	> 75,000 Btu/h	> 22 kW	< 4,000 (Btu/h)/gal	< 0.31 kw/L	E ≥ 80% and SL ≤ (Q/800 + 110√V), Btu/h		ANSI Z21.10.3
Gas Instantaneous Water Heaters	> 50,000 Btu/h and < 200,000 Btu/h	> 15 kW and < 58kW	≥ 4,000 (Btu/h)/gal and < 2 gal	≥ 0.31 kw/L and 7.57 L	EF ≥ 0.82	EF ≥ 0.82	DOE 10 CFR Part 430
	≤ 200,000 Btu/h	≤ 58 kW	≥ 4,000 (Btu/h)/gal and < 10 gal	≥ 0.31 kw/L and 37.85 L	E ≥ 80%	E ≥ 80%	ANSI Z21.10.3
	≥ 200,000 Btu/h	≥ 58 kW	4000 (Btu/h)/gal and ≥ 10 gal	0.31 kw/L and≥ 37.85 L	E ≥ 80% and SL ≤ (Q/800 + 110√V), Btu/h		
Oil Storage Water Heaters	≤ 105,000 Btu/h	≤ 31 kW	≥ 20 gal	≥ 76 L	EF ≥ 0.59 - 0.0019V	EF ≥ 0.59 - 0.0019V	DOE 10 CFR Part 430
	> 105,000 Btu/h	>31 kW	< 4,000 (Btu/h)/gal	< 0.31 kw/L	E ≥ 78% and SL ≤ (Q/800 + 110√V), Btu/h		DOE 10 CFR Part 430
Oil Instantaneous Water Heaters	≤ 210,000 Btu/h	≤ 62 kW	≥ 4,000 (Btu/h)/gal and < 2 gal	≥ 0.31 kw/L and <7.87 L	EF ≥ 0.59 - 0.0019V	EF ≥ 0.59 - 0.0019V	
	> 210,000 Btu/h	> 62 kW	≥ 4,000 (Btu/h)/gal and < 10 gal	≥ 0.31 kw/L and <37.85 L	E ≥ 80%	E ≥ 80%	ANSI Z21.10.3
	> 210,000 Btu/h	> 62 kW	≥ 4,000 (Btu/h)/gal and ≥10 gal	≥ 0.31 kw/L and ≥37.85 L	E ≥ 78% and SL ≤ (Q/800 + 110√V), Btu/h		
Hot-water supply boilers, gas and oil	300,000 Btu/h and < 12,500,000 Btu/h	88 kW and < 3664 kW	≥ 4,000 (Btu/h)/gal and < 10 gal	≥ 0.31 kw/L and <37.85 L	E ≥ 80%	E ≥ 80%	ANSI Z21.10.3
Hot-water supply boilers, gas			≥ 4,000 (Btu/h)/gal and ≥10 gal	≥ 0.31 kw/L and ≥37.85 L	E ≥ 80% and SL ≤ (Q/800 + 110√V), Btu/h		
Hot-water supply boilers, oil			≥ 4,000 (Btu/h)/gal and ≥10 gal	≥ 0.31 kw/L and ≥37.85 L	E ≥ 78% and SL ≤ (Q/800 + 110√V), Btu/h		
Pool heaters oil and gas	All sizes	All sizes			E ≥ 78%	E ≥ 78%	ASHRAE 146
Heat pump pool heaters	All sizes	All sizes			≥ 4.0 COP	≥ 4.0 COP	ASHRAE 146
Unfired storage tanks	All sizes	All sizes			≥ R-12.5	≥ R-12.5	none

Source: 2010 PSVARE Standards

10.5.3. **Variable Speed Drives and High Efficiency Motors**

a. General
Variable Speed Drive (VSD) describes the equipment used to control the speed of machinery by changing the frequency of the motor that is being operated. Where process conditions demand adjustment of flow from a pump or fan, varying the speed of the drive may save energy compared with other techniques for flow control.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

i. All motors for mechanical equipment over five (5) kW shall be provided with variable speed drive and high efficiency motors in accordance with Table 10.

ii. All motors of cooling towers shall be provided with variable speed drive and high efficiency motors.

iii. All motors for domestic pumps shall have high efficiency motors as indicated in Table 10.

d. Exceptions
Kitchen ventilation fans are exempt from this requirement. Non-centralized air-conditioning systems in buildings are not required to employ variable speed controllers.

Table 10. Motor Efficiencies

Number of Poles =====>		2	4	6	2	4	6
Synchronous Speed (RPM) =====>		3600	1800	1200	3600	1800	1200
Motor Horsepower		Open Motors			Enclosed Motors		
IP	SI						
(HP)	(kW)						
1	0.75	77.0	85.5	82.5	77.0	85.5	82.5
1.5	1.10	84.0	86.5	86.5	84.0	86.5	87.5
2	1.50	85.5	86.5	87.5	85.5	86.5	88.5
3	2.20	85.5	89.5	88.5	86.5	89.5	89.5
5	4.00	86.5	89.5	89.5	88.5	89.5	89.5
7.5	5.50	88.5	91.0	90.2	89.5	91.7	91.0
10	7.50	89.5	91.7	91.7	90.2	91.7	91.0
15	11.00	90.2	93.0	91.7	91.0	92.4	91.7
20	15.00	91.0	93.0	92.4	91.0	93.0	91.7
25	18.50	91.7	93.6	93.0	91.7	93.6	93.0
30	22.00	91.7	94.1	93.6	91.7	93.6	93.0
40	30.00	92.4	94.1	94.1	92.4	94.1	94.1
50	37.00	92.0	94.5	94.1	93.0	94.5	94.1
60	45.00	93.6	95.0	94.5	93.6	95.0	94.5
75	55.00	93.6	95.0	94.5	93.6	95.4	94.5
100	75.00	93.6	95.4	95.0	94.1	95.4	95.0
125	90.00	94.1	95.4	95.0	95.0	95.4	95.0
150	110.00	94.1	95.8	95.4	95.0	95.8	95.8
200	150.00	95.0	95.8	95.4	95.4	96.2	95.8
250	185.00	95.0	95.8	95.4	95.8	95.6	95.8
300	225.00	95.4	95.8	95.4	95.8	96.2	95.8
350	260.00	95.4	95.8	95.4	95.8	96.2	95.8
400	300.00	95.8	95.8	95.8	95.8	96.2	95.8
450	335.00	95.8	96.2	96.2	95.8	96.2	95.8
500	375.00	95.8	96.2	96.2	95.8	96.2	95.8

Source: 2010 PSVARE Standards

10.5.4. **Enthalpy Recovery of Exhaust Air**

a. General
When buildings have outside air or fresh air supply and extract system through mechanical means, using heat exchangers can use the air extracted from the building areas to pre-condition the incoming outdoor air. This process exploits the fact that the extract air is usually already conditioned and therefore colder and drier.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements.
All buildings with centralized air supply system shall use enthalpy recovery wheels with efficiency of at least sixty percent (60%) of ninety percent (90%) exhaust air.

d. Exceptions.
Buildings without centralized cooling systems are exempt.

10.6 ELECTRICAL SYSTEMS

10.6.1 **Daylight Provision**

a. General
Building should be planned and designed to maximize the use of natural light ~~so~~ to reduce the use of artificial illumination.

b. Applicability.
This measure applies to all building occupancies as indicated in Table 1. For residential condominiums, it does not apply to individual dwelling units.

c. Requirements.
All regularly occupied spaces inside the building shall have a view of any combination of the following features that can allow daylight into the room space:

i. Window
ii. Light shelf
iii. Clerestory
iv. Skylight
v. Light monitor / light scoop
vi. Other devices that can allow daylight inside

d. Exceptions
Spaces where daylight access hinders its intended function are exempt from this provision with justification for exemption.

10.6.2 **Daylight Controlled Lighting System**

a. General
Building interior perimeter zones exposed to daylight generally do not require artificial lighting during the day. However, sub-optimal design and operation of the building results in use of artificial lighting when not required.

Photoelectric sensors connected to luminaires help in dimming or switching off lamps that do not require to be operated due to presence of adequate daylight.

b. Applicability
This measure applies to all building occupancies as stated in Table 1. For residential condominiums, this applies only to common indoor areas with access to daylight.

c. Requirements
Applicable buildings shall comply with the following:

i. Lighting fixtures within the daylight zone shall be controlled with photoelectric sensors with an auto on-off basis or continual dimming. The photoelectric sensor shall be located approximately at half (½) the depth of daylight zone.

ii. If occupancy sensors are installed in the daylight zone, the occupancy sensor shall override the photoelectric sensor during non-occupancy period.

d. Exceptions
Installed lighting fixtures within the day-lit zones are exempt from using photoelectric sensor if this hinders its intended function, with justification for exemption.

10.6.3 **Lighting Power Density (LPD)**

a. General
Limitation of LPD will help to design the lighting system in the most efficient way and reduce the lighting and cooling load in the buildings. [3] The maximum allowed LPD for each space type is specified in Table 11.

[3] *The IIEE Manual on the Practice of Efficient Lighting System can be a reference for the design of building lighting systems*

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
All applicable building types shall comply with the LPD limits in the 2010 PSVARE Standards, as shown in Table 11.

Table 11. Maximum Allowed LPD[4]

USE / OCCUPANCY CLASSIFICATION	Building Average LPD (W/m^2)
Residential Dwelling: Condominium	10.8
Hotel / Resort	10.8
Educational: School	12.9
Institutional: Hospital	12.9
Business: Office	10.8
Mercantile: Mall	16.1 (excluding accent lighting)

Source 2010 PSVARE Standards

[4] *Above requirement excludes parking and exterior lighting (see Table 12)*

Table 12. Maximum Allowed LPD

Other Uses	Average LPD (W/m^2)
Covered parking	3.2
Open and outdoor parking	1.6
Exterior Façade	2.15
Active entrance (pedestrian conveyance)	98.4
Inactive entrance (normally locked / inactive use)	65.6

Source : ASHRAE - IESNA 90.1

d. Exceptions

There are no exceptions to this provision.

10.6.4 **Occupancy Sensors for Lighting Control**

a. General
Occupancy sensors linked to lighting shall be installed in areas with variable occupancy.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1, except for hospitals and malls.

c. Requirements
Applicable buildings shall comply with the following:

i. In order to limit the use of electricity in unoccupied areas of buildings, occupancy sensors linked to lighting (except for emergency and security lighting) shall be installed in the following areas with variable occupancy:
- corridors
- private offices
- storage rooms
- common toilets
- meeting rooms
- stairways
- other similar areas

ii. For covered car parks: minimum of sixty per cent (60%) of the lighting must be controlled by the occupancy sensors.

d. Exceptions
Provisions for emergency and security lighting are exempted from this requirement.

10.6.5 **Elevators and Escalators / Moving Ramps / Walkways**

a. General
Escalators / Moving Ramp / Walkway must be fitted with controls to automatically reduce speed or stop when no traffic is detected. Elevators must be fitted with mechanisms to reduce energy demand.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

Applicable buildings shall comply with the following:

i. Escalators / Moving Ramps / Walkways

- Escalators / Moving Ramps / Walkways shall be fitted with automated controls to reduce to a slower speed when no activity has been detected for a maximum period of one and a half (1-1/2) minutes and duration may be adjusted depending on the demand.
- The escalator / moving ramp / walkway shall automatically be put on a standby mode when no activity has been detected for a maximum period of five (5) minutes and duration may be adjusted depending on the demand.
- These escalators / moving ramps / walkways shall be designed with energy efficient soft start technology. Activation of reduced speed, power off and power on modes shall be done through sensors installed in the top or bottom landing areas.

ii. Elevators

- Elevators shall be provided with controls to reduce the energy demand. To meet this requirement, the following features must be incorporated:
  - Use of Alternating Current (AC) Variable Voltage and Variable Frequency (VVVF) drives on non-hydraulic elevators
  - Use of energy efficient lighting and display lighting in the elevator car shall have an average lamp efficacy, across all fittings in the car, of more than 55 lumens / watt
  - Lighting shall switch off after the elevator has been inactive for a maximum period of five (5) minutes
  - The elevators shall operate in a stand-by condition during off-peak periods

d. Exceptions

There are no exceptions to this provision.

10.6.6 **Transformer**

a. General
The transformer shall be tested in accordance with relevant Philippine National Standards (PNS) at test conditions of full load, free of harmonics and at unity power factor.

b. Applicability
This measure applies to all building occupancies, with own transformer, as indicated in Table 1.

c. Requirements
Transformers that are part of the building electrical system shall have efficiencies not lower than 98% as prescribed in the DOE Guidelines on Energy Conserving Design of Buildings.

d. Exceptions
There are no exceptions to this provision.

10.6.7 **Overhead or Elevated Water Storage**

a. General
To reduce dependence on motorized systems to supply and distribute potable or non-potable water within the building, thus help reduce energy consumption, overhead or elevated water storage systems are used, provided there's a twenty percent (20%) fire reserve over and above the average daily demand supply. The system relies mostly on elevation and gravity to distribute water within the building.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
Applicable buildings shall include in the water distribution system the integration of overhead or elevated water tanks that will facilitate the distribution of potable and / or non-potable water into the building spaces, without compromising the required water volume and pressure based on demand and the Plumbing Code of the Philippines.

d. Exceptions
Buildings below ten (10) storeys high are exempt from this provision.

Section 11. WATER EFFICIENCY

Water efficiency requires the adoption of efficient practices, plan, design, materials, fixtures, equipment and methods that reduce water consumption resulting in cost savings.

11.1 WATER FIXTURES

a. General
Efficient water fixtures include faucets, showerheads and water closets that use less water in order to perform the same function of cleaning as effectively as standard models. Water efficiency is an important aspect, especially as fresh water resources start getting depleted at a rate faster than they are replenished. Use of efficient plumbing fixtures, sensors, auto control valves, aerators, flow control and pressure-reducing devices, wherever possible, can result in significant reduction in water consumption.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
Applicable buildings shall comply with the requirements as shown in Table 13.

d. Exceptions.
There are no exceptions to this provision.

Table 13 Water Fixture Performance Requirements

Type of Fixtures	Maximum Flow Rate	
Dual Flush Water Closet	≤6 full 3 low	liters / flushing cycle
Single Flush Water Closet	4.9	L0iters / flushing cycle
Shower	≤9 (80PSi)	liters / min at 551.6 kPa
Urinals	≤1	liters / flushing cycle
Lavatory taps	≤4.8 (60PSi)	liters / min at 417.7 kPa
Kitchen faucets	≤4.8 (60PSi)	liters / min at 417.7 kPa
Handheld bidet sprays	≤4.8 (60PSi)	liters / min at 417.7 kPa

Source: Prescribed Requirements, IFC Philippine Green Building Code Project, May 2013

11.2 WATER MANAGEMENT

11.2.1 **Rainwater Harvesting**

a. General
Rainwater is one of the purest sources of water available. Rainwater from roofs and hardscape must be collected and reused for non-potable purposes.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

i. Minimum storage tanks size (in cu.m) shall be calculated by dividing the building footprint area by 75.

ii. Collected water shall be used for non-potable purposes such as toilet flushing, irrigation and cooling towers.

d. Exceptions.
There are no exceptions to this provision.

11.2.2 **Water Recycling**

a. General
Recycled water from Sewage Treatment Plants (STP) shall be reused for non-potable purposes.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
The recycled water produced on site shall be reused for non-potable purposes such as toilet flushing, irrigation and cooling towers, through a distinct and separate piping system from the potable water supply system.

d. Exceptions
Buildings with no dedicated STP are exempted from this requirement.

Section 12. MATERIAL SUSTAINABILITY

Material Sustainability governs all matters related to resource efficiency and material selection and use with the least impact on the environment.

12.1 Non-Toxic Materials

a. General

Non-Toxic building materials refer to building materials without hazardous or toxic chemicals that could cause Sick Building Syndrome (SBS) and eventually lead to Building Related Illness (BRI).

b. Applicability

This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

i. Paints, coatings, adhesives and sealants used indoors or non-ventilated areas shall not contain Volatile Organic Compounds (VOC) or should be within levels tolerable to humans as specified in Table 14.

ii. Composite wood shall not have urea formaldehyde content.

iii. All other materials containing chemicals used in construction shall not compromise and be deleterious to the health and safety of the workers and occupants of the building.

iv. Specifications shall comply with the allowable VOC limits as stated in Table 14 with Material Safety Data Sheet (MSDS) from supplier and other certification to justify the compliance of the material.

d. Exceptions

There are no exceptions to this provision.

Table 14. VOC Limits

Application / Product Type	Maximum VOC Limit (g/L less water)
Flat paint	50
Non-flat paint	150
Anti-rust paint	250
Lacquer (clear wood finish)	550
Sanding Sealer (clear wood finish)	350
Varnish (clear wood finish)	350
Floor coating	100
Shellac (clear)	730
Shellac (pigmented)	550
Stain	250
Faux Finish Coating	350
Architectural sealant	250
Non-membrane roof sealant	300
Single ply roof membrane	450
Waterproofing sealer	250
Waterproofing sealer (concrete / masonry)	400
All other sealers	200
Indoor adhesive	50
Wood flooring adhesive	100
Subfloor adhesive	50
Ceramic tile adhesive	65
Contact adhesive	80
Drywall panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Special purpose contact adhesive	250
PVC welding	510
Concrete curing compound	350
Wood preservative	350

VOC levels are measured in grams of VOC per liter of material
Source: USGBC LEED Addenda # 100000419, 14 April 2010

Section 13. SOLID WASTE MANAGEMENT

Efficient waste management requires the adoption of efficient waste management practices and use of eco-friendly materials.

13.1 Material Recovery Facility (MRF)

a. General
MRF shall be provided for the collection and segregation of solid waste materials

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements

i. Buildings shall be provided with a minimum area for MRF as specified in Table 15.

ii. MRF shall be fully enclosed and easily accessible from within the building and from the outside for easy collection of waste.

iii. Solid waste containers shall be provided for at least four (4) types of wastes:
- compostable (biodegradable)
- non-recyclable (to be disposed off in the landfill)
- recyclable (paper, cardboard, plastic, metal, wood, etc.)
- special waste

iv. For hospitals, isolated bins for hazardous wastes shall be provided to avoid contamination.

d. Exceptions
There are no exceptions to this provision.

Table 15. MRF Minimum Daily Storage Space Requirements

Use / Occupancy	Requirement
Residential Dwelling: Condominium	1.0 sqm waste storage space per 2,500 sqm TGFA + 50% circulation space
Hotel / Resort	1.0 sqm waste storage space per 2,500 sqm TGFA + 50% circulation space
Educational: School	1.0 sqm waste storage space per 300 sqm TGFA + 50% circulation space
Institutional: Hospital	1.0 sqm waste storage space per 1,250 sqm TGFA + 50% circulation space
Business: Office	1.0 sqm waste storage space per 1,400 sqm TGFA + 50% circulation space
Mercantile: Mall	1.0 sqm waste storage space per 400 sqm TGFA + 50% circulation space

Source: DENR (EMB Report on Solid Waste Generation) and NBC

Section 14. SITE SUSTAINABILITY

Site sustainability requires the adoption of planning, design, construction and operation practices that minimize the adverse impact of buildings on ecosystems and water resources.

14.1 Site / Ground Preparation and Earthworks

a. General
Site clearing, grading and excavation shall be planned at the start of construction to mitigate pollution caused by erosion and sedimentation taking into consideration existing endemic foliage as regulated by the DENR.

All existing utilities and water bodies and waterways, shall be protected and shall not be disturbed.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
Measures for site protection shall be in place before the start of construction.

i. Building site erosion and sedimentation control plan that outlines measures to be applied to prevent soil that can run-off at the natural bodies of water, causing water pollution.

ii. Additional measures to mitigate the effect of pollution and safety on construction conforming to Rule XI of the NBC

iii. Storm water collection management plan

iv. Structures or facilities for storm water collection

d. Exceptions
There are no exceptions to this provision.

14.2 Open Space Utilization

a. General
The inclusion of green areas or landscaped areas for indigenous or adaptable species of grass, shrubs and trees will help in providing more permeable surface for the building development's open space and thus allow the re-charging of natural ground water reservoir, control storm water surface run-off, cool the building surroundings, and provide indoor to outdoor connectivity for the building occupants.

b. Applicability
This measure applies to all building occupancies as indicated in Table 1.

c. Requirements
A minimum of fifty percent (50%) of the required Unpaved Surface Area (USA), as required in Rule VII and VIII of the NBC, shall be vegetated with indigenous and adaptable species.

d. Exceptions
There are no exceptions to this provision.

Section 15. INDOOR ENVIRONMENTAL QUALITY

Indoor Environmental Quality requires the adoption of efficient design and operation practices that take into consideration the building environment to improve occupant health, productivity and safety.

15.1 Minimum Fresh Air Rates

a. General
The building indoor environment can contain more contaminants many times over than the outside. Various studies have shown that indoor air contaminants can cause health disorders, through symptoms of SBS and BRI. The introduction and application of minimum fresh air rates will maintain acceptable indoor air quality thru the constant replacement of indoor air in buildings.

b. Applicability
This measure applies to all buildings occupancies as indicated in Table 1.

c. Requirements
Compliance to the minimum fresh air rates provided in the latest Philippine Society of Ventilating, Air-Conditioning and Refrigerating Engineers (PSVARE) Standards. *See Table 16.*

d. Exceptions
There are no exceptions to this provision.

Table 16. Minimum Ventilation Rates in Breathing Zone

Occupancy Category	People Outdoor Air Rate		Area Outdoor Air Rate		Max. Default Occupancy Density
	(cfm / person)	(cmh / person)	(cfm / sqft)	(cmh / sqm)	(people / 1,000 sqft {90 sqm})
Hotel / Resort and Residential Dwelling: Condominium					
Bedroom / Living Room	5	8.5	0.06	0.1968	10
Lobbies / Pre-function	7.5	12.75	0.06	0.1968	30
Common Corridors	-		0.06	0.1968	-
Multi-purpose Assembly	5	8.5	0.06	0.1968	120
Laundry Rooms, Central	5	8.5	-0.12	0.3936	10
Laundry Rooms within Dwelling Rooms	5	8.5	0.12	0.3936	10
Office Buildings					
Office Spaces	5	8.5	0.06	0.1968	5
Reception areas	5	8.5	0.06	0.1968	30
Telephone / data entry	5	8.5	0.06	0.1968	60
Main Entry Lobbies	5	8.5	0.06	0.1968	10
Bank vaults / safe deposit	5	8.5	0.06	0.1968	5
Mercantile: Mall					
Sales area	7.5	12.75	0.12	0.3936	15
Mall common areas	7.5	12.75	0.06	0.1968	40
Barbershop	7.5	12.75	0.06	0.1968	25
Beauty and Nail salons	20	34	0.12	0.3936	25
Pet shops (animal areas)	7.5	12.75	0.18	0.5904	10
Supermarket	7.5	12.75	0.06	0.1968	8
Laundries	7.5	12.75	0.06	0.1968	20
Photo Studios	5	8.5	0.12	0.3936	10
Pharmacy (prep area)	5	8.5	0.18	0.5904	10
Computer (not printing)	5	8.5	0.06	0.1968	4
Restaurant dining rooms	7.5	12.75	0.18	0.5904	70
Cafeteria / fast food dining	7.5	12.75	0.18	0.5904	100
Bars, cocktail lounges	7.5	12.75	0.18	0.5904	100
Educational: School					
Day Care (through age 4)	10	17	0.18	0.5904	25
Classrooms (ages 5-8)	10	17	0.12	0.3936	25
Classrooms (ages 9 plus)	10	17	0.12	0.3936	35
Lecture classroom	7.5	12.75	0.06	0.1968	65
Lecture Hall (fixed seats)	7.5	12.75	0.06	0.1968	150
Art classroom	10	17	0.18	0.5904	20
Science laboratories	10	17	0.18	0.5904	25
Wood / metal shop	10	17	0.18	0.5904	20
Computer lab	10	17	0.12	0.3936	25
Media Center	10	17	0.12	0.3936	25
Music / theater / dance	10	17	0.06	0.1968	35
Multi-use assembly	7.5	12.75	0.06	0.1968	100
University / College Laboratories	10	17	0.18	0.5904	25
Sports Arena (play area)	-		0.3	0.984	-
Gym, stadium (play area)	-		0.3	0.984	-
Spectator area	7.5	12.75	0.06	0.1968	150
Swimming (pool & deck)	-		0.48	1.5744	-

Occupancy Category	People Outdoor Air Rate		Area Outdoor Air Rate		Max. Default Occupancy Density
	(cfm / person)	(cmh / person)	(cfm / sqft)	(cmh / sqm)	(people / 1,000 sqft {90 sqm})
General					
Conference / meeting	5	8.5	0.06	0.1968	50
Corridors	-		0.06	0.1968	-
Storage Rooms	-		1.12	3.6736	-
Break room	5	8.5	0.06	0.1968	25
Coffee room	5	8.5	0.06	0.1968	20
Disco / dance floors	20	34	0.06	0.1968	100
Health club (aerobics room)	20	34	0.06	0.1968	40
Health club (weights room)	20	34	0.06	0.1968	10
Bowling gallery (seating)	10	17	0.12	0.3936	40
Gambling casino	7.5	12.75	0.18	0.5904	120
Game arcades	7.5	12.75	0.18	0.5904	20
Stages, Studios	10	17	0.06	0.1968	70
Public Assembly Spaces					
Auditorium seating areas	5	8.5	0.06	0.1968	150
Places of religious worship	5	8.5	0.06	0.1968	120
Courtrooms	5	8.5	0.06	3.6736	70
Legislative chambers	5	8.5	0.06	0.1968	50
Libraries	5	8.5	0.12	0.1968	10
Lobbies	5	8.5	0.06	0.1968	150
Museums (children's)	7.5	12.75	0.12	0.1968	40
Museums / galleries	7.5	12.75	0.06	0.1968	40

Source: 2010 PSVARE Standards

15.2 **Designated Smoking Area**

a. General

Environmental Tobacco Smoke (ETS) is one of the leading causes of respiratory illnesses in building occupants. RA 9211, the Tobacco Regulations Act, restricts tobacco smoking in public spaces and the prescription of designated smoking areas inside buildings.

b. Applicability

This measure applies to all buildings occupancies as indicated in Table 1.

c. Requirements

i. If smoking is banned within the building and property premises, "NO SMOKING" signs in compliance with the RA 9514 (Fire Code of the Philippines 2008), shall be posted in conspicuous areas of the building and property premises to remind building occupants of the policy.

ii. If smoking is only allowed outdoors, designated smoking areas shall be naturally ventilated, outside of the building shell and away from building entrances, windows and outside supply air (OSA) intakes by at least ten (10) meters.

iii. If smoking is allowed indoors, designated smoking areas shall be provided, partitioned from the rest of the indoor areas. Partitions shall be from floor to soffit of the next floor or roof structure. Enclosed smoking areas shall be equipped with adequate exhaust system with exhaust rate in accordance with the latest PSVARE Standards. Exhaust shall directly vent out to the outside of the building and away from any building openings or air intakes.

iv. Doors and windows of enclosed smoking area shall always be closed and well sealed. Negative pressure within is recommended to prevent smoke infiltration to adjacent spaces.

d. Exceptions
Buildings with a general policy of "no smoking" within building premises may be exempted from having designated smoking areas.

CHAPTER III. INSTITUTIONAL ARRANGEMENTS

Section 16. OFFICE OF THE NATIONAL BUILDING OFFICIAL

The Secretary of the Department of Public Works and Highways (DPWH), as the concurrent National Building Official, pursuant to Section 203 of the NBC, through the NBCDO, shall regularly review the GB Code not to exceed three (3) years from the date of effectivity and every three (3) years thereafter.

For this purpose, the NBCDO shall convene the Technical Working Group (TWG) to review and update the GB Code implementation vis-à-vis current and emerging trends in the industry and make recommendations for reform.

The NBCDO shall serve as the center for the development and promotion of green buildings in the Philippines. As such, it shall be the repository of resource materials relating to green buildings. It shall also be responsible for developing modules and providing green building training.

Section 17. TECHNICAL STAFF

The Secretary is hereby authorized to constitute and provide in his department a professional staff composed of highly qualified architects, engineers and technicians

who possess diversified and professional experience in the field of green building planning, design and construction.

Section 18. PROFESSIONAL AND TECHNICAL ASSISTANCE

The Executive Director of NBCDO shall chair the Technical Working Group (TWG) and may make arrangements with the Secretary for compensation of the services of the TWG. He may also engage and compensate within appropriations available thereof, the services of such number of consultants, experts and advisers on full or part-time basis as may be necessary coming from any concerned government agency or private business, Accredited Professional Organizations (APO) and other associations to carry out the provisions of the GB Code. The members are the duly authorized representatives from the following:

18.1 **CCC** (Climate Change Commission)
18.2 **DENR** (Department of Environment and Natural Resources)
18.3 **DILG** (Department of Interior and Local Government)
18.4 **DOE** (Department of Energy)
18.5 **DOST** (Department of Science and Technology)
18.6 **DTI** (Department of Trade and Industry)
18.7 **GEP** (Geodetic Engineers of the Philippines)
18.8 **IECEP** (Institute of Electronics Engineers of the Philippines)
18.9 **IIEE** (Institute of Integrated Electrical Engineers)
18.10 **PALA** (Philippine Association of Landscape Architects)
18.11 **PICE** (Philippine Institute of Civil Engineers)
18.12 **PIEP** (Philippine Institute of Environmental Planners)
18.13 **PIID** (Philippine Institute of Interior Designers)
18.14 **PSME** (Philippine Society of Mechanical Engineers)
18.15 **PSSE** (Philippine Society of Sanitary Engineers)
18.16 **UAP** (United Architects of the Philippines)
18.17 **BOMAP** (Building Owners and Managers Association of the Philippines)
18.18 **PABA** (Philippine Association of Building Administrators)
18.19 **PABO** (Philippine Association of the Building Officials)

CHAPTER IV. CERTIFICATION PROCESS

Section 19. GREEN BUILDING PERMIT PROCESS

The Office of the Building Official shall review the building permit application for Green Buildings as prepared by the design professionals in compliance with the requirements of the GB Code and the various referral codes in accordance with Rule 3 of the NBC.

CHAPTER V. FINAL PROVISIONS

Section 20. SEPARABILITY CLAUSE

Should any part or provision of the GB Code be held unconstitutional or invalid by a competent court, the other parts or provisions hereof which are not affected thereby shall continue to be in full force and effect.

Section 21. EFFECTIVITY

This GB Code shall take effect fifteen (15) days after its publication once a week for three (3) consecutive weeks in a newspaper of general circulation.

Section 22. TRANSITORY PROVISION

Those projects with building designs and plans that have already been prepared and signed by all duly licensed design professionals shall be exempt from the coverage, provided that the request for exemption shall be filed with the Office of the Building Official within 30 days after the effectivity of this Code.

ANNEX 1 DEFINITION OF TERMS

Accredited Professional Organizations (APO) - professional organizations accredited by the Professional Regulatory Commission (PRC)

Addition - any new construction which increases the height and / or floor area of existing buildings / structures

Air Conditioning - the process of treating air so as to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the requirements of conditioned space

Air-Conditioning, Heating, and Refrigeration Institute (AHRI) - trade association representing manufacturers of HVACR and water heating equipment within the global industry7

Alteration - works in buildings / structures involving changes in the materials used, partitioning, location / size of openings, structural parts, existing utilities and equipment but does not increase the building height and/or floor area

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) - global society founded in 1894, advancing human well-being through sustainable technology for the built environment with focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability within the industry

Applicable Provision – any requirement that relates to a given condition

Building Owners and Managers Association of the Philippines (BOMAP) - helps members ensure tenants' satisfaction, maximize profits, and enhance asset values for building owners and investors through market intelligence, education, networking, and government advocacy

British thermal unit (Btu) - amount of heat energy needed to raise the temperature of one pound of water by one degree Fahrenheit

Building Official (BO) - the Executive Officer of the Office of the Building Official (OBO) appointed by the Secretary

Building Permit - document issued by the Building Official (BO) to an owner / applicant to proceed with the construction, installation, addition, alteration, renovation, conversion, repair, moving, demolition or other work activity of a specific project/building/structure or portions thereof after the accompanying principal plans, specifications and other pertinent documents with the duly notarized application are found satisfactory and substantially conforming with the NBC and its Implementing Rules and Regulations (IRR).

Building Related Illness (BRI) - diagnosable illness whose cause and symptoms can be directly attributed to a specific pollutant source within a building

Car, elevator – the load-carrying unit including its platform, enclosure and door or gate

Clerestory - high windows above eye level

Climate Change - refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period

Climate Change Commission (CCC) - the lead policy-making body of the government tasked to coordinate, monitor and evaluate programs and action plans on climate change

Coefficient of Performance (COP) - ratio of heating or cooling provided to electrical energy consumed where higher COPs equate to lower operating costs

Common Area - part of the building premises is used by the occupants, owners, tenants or other building users of which the landlord retains control and is responsible to maintain in a reasonably safe condition that includes spaces such as lobby, corridor, hallway, toilet, elevator or stairway

Compostable waste - mixture of various organic substances that can be placed into a composition of decaying biodegradable materials which eventually turns into a nutrient-rich material, used for fertilizing soil

Construction - all on-site work done in the site preparation, excavation, foundation, assembly of all the components and installation of utilities, machineries and equipment of buildings / structures

Conversion - change in the use or occupancy of buildings / structures or any portion/s thereof, which has different requirements

Daylight - the natural light of day, which is a combination of all direct and indirect sunlight during the daytime

Daylight Zone - area substantially illuminated by daylight consistently receiving significant quantities of daylight during the day (ASHRAE/IES 90.1-2010 energy standard)

Demolition - systematic dismantling or destruction of a building/structure, in whole or in part

Department - the Department of Public Works and Highways

Department of Energy (DOE) - the executive department of the Philippine Government responsible for preparing, integrating, coordinating, supervising and controlling all plans, programs, projects and activities of the Government relative to energy exploration, development, utilization, distribution and conservation

Department of Environment and Natural Resources (DENR) - the executive department of the Philippine Government responsible for supervising and managing the different programs and implementing rules governing the use and development of the country's natural resources

Department of Interior and Local Government (DILG) - the executive department of the Philippine Government responsible for promoting peace and order, ensuring public safety and strengthening local government capability aimed towards the effective delivery of basic services to the citizenry

Department of Public Works and Highways (DPWH) - executive department of the Philippine Government that functions as the engineering and construction arm of the Government tasked to continuously develop its technology for the purpose of ensuring the safety of all infrastructure facilities and securing for all public works and highways the highest efficiency and quality in construction

Department of Science and Technology (DOST) - the executive department of the Philippine Government responsible for the coordination of science and technology-related projects in the Philippines and to formulate policies and projects in the fields of science and technology in support of national development

Department of Trade and Industry (DTI) - the executive department of the Philippine Government tasked to expand Philippine trade, industries and investments as the means to generate jobs and raise incomes for Filipinos

Door assembly - unit composed of a group of parts or components which make up a closure for an opening to control passageway through a wall which consists of the following parts: door; hinges; locking device or devices; operation contacts (such as handles, knobs, push plates); miscellaneous hardware and closures; the frame, including the head, threshold and jambs plus the anchorage devices

Elevator - a hoisting and lowering mechanism other than a dumbwaiter or freight elevator which is designed to carry passanger or authorized personnel, in a protected enclosure (elevator car) which moves along fixed guides in a vertical direction serving two or more fixed landings/ floors on a hoistway.

Energy Efficiency Ratio (EER) - energy efficiency rating for room air conditioners that lists how many Btu per hour are used for each watt of power it draws

Enthalpy Recovery Wheel – an energy recovery device that transfers outgoing temperature and humidity to the incoming outdoor air

Environmental Tobacco Smoke (ETS) - secondhand smoke consisting of airborne particles emitted from the burning end of cigarettes, pipes, and cigars, exhaled by smokers containing about 4,000 compounds, up to 50 of which are known to cause cancer

Environmental Management Bureau (EMB) - national authority in the Philippines that sets air and water quality standards and monitors ambient and point source pollutants

Escalator – a power driven, inclined, continuous stairway for raising or lowering passengers

Executive Director - the executive officer or head of the NBCDO

Geodetic Engineers of the Philippines (GEP) - accredited professional organization of Geodetic Engineers composed of technically competent engineers with a high degree of integrity, moral standards and professionalism and at pace with modern geodetic engineering technologies

Government Agency - refers to any of the various units of the government including a department, bureau, office, instrumentality, or government owned or controlled corporation

Harmonics - increased heating in equipment and conductors, the reduction of which is desirable

Hazardous – anything that involves risk or danger to the safety and welfare of the public

Heat Island Effect (HIE) - describes built up areas that are hotter than nearby rural areas

Heating, Ventilating and Air Conditioning (HVAC) - system that helps maintain good indoor air quality through adequate ventilation with filtration and provide thermal comfort

Illuminating Engineering Society of North America (IESNA) – a non-profit learned society whose mission is to improve the lighted environment by bringing together those with lighting knowledge and translating that knowledge into actions that would benefit the public

Implementing Rules and Regulations (IRR) - rules and regulations necessary in the implementation of the provisions of GB Code

Indoor Environmental Quality (IEQ) - conditions inside the building that includes air quality, access to daylight and views, pleasant acoustic conditions, and occupant control over lighting and thermal comfort

Institute of Electronics Engineers of the Philippines (IECEP) - the integrated accredited professional organization of professional electronics engineers, electronics engineers and electronics technicians, whose objective is to promote, through scientific inquiry and study the advancement of electronics in theory and practice, and its application to allied fields of engineering and to human needs

Institute of Integrated Electrical Engineers of the Philippines (IIEE) - the accredited organization of Electrical Engineers that aims to instill excellence to Electrical Engineers and to give contribution to the development of the Philippines

Joint - a space between the adjacent surfaces of two bodies joined and held together

Light Monitor - raised structure running along the ridge of a double-pitched roof, with its own roof running parallel with the main roof

Light Scoop - south-facing skylight, that uses tilted panels of transparent glass to strategically bring daylight into an interior space.

Light Shelf - a horizontal surface that reflects daylight deep into a building, placed above eye-level with high-reflectance upper surfaces, which reflect daylight onto the ceiling and deeper into the space

Lighting Power Density (LPD) - amount of electric lighting, usually measured in watts per square foot, being used to illuminate a given space

Material Recovery Facility (MRF) - a facility designed to receive, sort, process, and store compostable and recyclable materials efficiently and in an environmentally sound manner

Material Safety Data Sheet (MSDS) - data providing procedures for handling or working with a material or product in a safe manner, which includes information such as physical data, toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment and spill handling procedures

Mixed Occupancy - enclosed structure with two or more primary usages and where at least two of these primary usages fall into different classification of use

Moving Ramp / Walkway – a type of horizontal passenger-carrying device on which passengers stand or walk, with its surface remaining parallel to its direction of motion is uninterrupted

National Building Code (NBC) – P.D. 1096 is a uniform building code in the Philippines which embodies up-to-date and modern technical knowledge on building design, construction, use, occupancy and maintenance

National Building Code Development Office (NBCDO) - created through DPWH Department Order, assist the Secretary in the administration and enforcement of the provisions of the GB Code and its IRR

Non-recyclable Waste - not able to be processed or treated for reuse in some form

Office of the Building Official (OBO) - the office authorized to enforce the provisions of NBC and its IRR in the field as well as the enforcement of orders and decisions made pursuant thereto

Operable Window - a window unit with one or more sections that can be opened for ventilation

Overall Thermal Transfer Value - (OTTV) measure of the energy consumption of a building envelope

Outside Supply Air (OSA) - air containing at least the minimum volume of outside air filtered and conditioned to the required temperature and humidity

Parking, Covered - parking under roof that does not contribute to the heat island effect

Parking, Open - parking structure with wall openings open to the atmosphere, distributed over 40 percent of the building perimeter or uniformly over two opposing sides to provide ventilation

Philippine Association of Building Administrators (PABA) – a non-profit organization for Building Administrators and Property Managers

Philippine Association of Building Officials (PABO) – association of Building Officials in the Philippines

Philippine Association of Landscape Architects (PALA) - the integrated and accredited organization of landscape architecture professionals responsible for the advancement of the profession as an instrument of service in improving the quality of life within a better natural and built environment

Philippine Institute of Civil Engineers (PICE) - a professional organization for civil engineers in the Philippines formed by merging two separate organizations of civil engineers: one group working from government sector and the second group working in the private sector

Philippine Institute of Environmental Planners (PIEP) - a national organization of professionally trained planners who will make an advancement in the studies of environmental planning in the best interest of the nation

Philippine Institute of Interior Designers (PIID) – the accredited professional organization of Interior Designers creating platforms for learning and sustainable creativity, adhering to international standards while preserving the Filipino heritage

Philippine National Standards (PNS) - documents established by consensus through technical committees and approved by the Department of Trade and Industry Bureau of Product Standards that ensures desirable characteristics of products and services such as quality, environmental friendliness, safety, reliability, efficiency and interchangeability

Philippine Society of Mechanical Engineers (PSME) – the organization of Mechanical Engineers in the Philippines uniting and enjoining the mechanical engineers in the pursuit of further professional growth and to uplift the profession

Philippine Society of Sanitary Engineers (PSSE) - the only professional organization of Sanitary Engineers in the Philippines accredited by PRC and soon to be renamed to Philippine Society of Environmental and Sanitary Engineers, Inc. (PSEnSE)

Philippine Society of Ventilating Air-Conditioning and Refrigerating Engineers (PSVARE) - is a duly registered non-stock, non-profit organization, the members of which are consultants, contractors, manufacturers, suppliers who are all involved in the practice of air conditioning, ventilation, and refrigeration systems

Professional Regulatory Commission (PRC) - the instrument of the Filipino people in securing for the nation a reliable, trustworthy and progressive system of determining the competence of professionals by credible and valid licensure examinations and standards of professional practice that are globally recognized

Photoelectric Sensor - a device used to detect the distance, absence, or presence of an object by using a light transmitter, often infrared and a photoelectric receiver

R-Value - resistance value or the capacity to resist heat loss or its thermal resistance

Recyclable Waste - an item or material capable of being used again

Referral Codes – the applicable provisions of the various agency and technical professional codes supplementary to the NBC and GB Code

Regularly Occupied Space - areas where one or more individuals normally spend time (more than one hour per person per day on average) seated or standing as they work, study, or perform other focused activities inside a building

Renovation - any physical change made on buildings/structures to increase the value, quality, and/or to improve the aesthetic

Repair - remedial work done on any damaged or deteriorated portion/s of building / structure to restore to its original condition

Seasonal Energy Efficiency Ratio (SEER) - energy efficiency rating for central air conditioners

Secretary - head or chief executive officer of the DPWH

Sewage Treatment Plant (STP) - an industrial structure designed to remove biological or chemical waste products from water, thereby permitting the treated water to be used for other purposes

Sick Building Syndrome (SBS) - Building whose occupants experience acute health and/or comfort effects that appear to be linked to time spent therein, but where no specific illness or cause can be identified

Smoking Area - a designated area in which smoking is permitted

Solar Heat Gain Coefficient (SHGC) - fraction of solar gain admitted through a window, expressed as a number between 0 and 1

Solar Reflectance Index (SRI) - a measure of a material's ability to reflect heat with white or light colors having high reflectance and dark or black surfaces with low or little reflectance thereby having higher temperatures

Special Waste - a class of waste that has unique regulatory requirements with potential environmental impacts that needs to be managed to minimize the risk of harm to the environment and human health

Staff - personnel of the NBCDO

Storey – portion of a building/structure included between the uppermost surface (or finish level) of any floor and the uppermost surface (or finish level) of the next floor above or below it. If the uppermost surface (or finish level) of a floor/level above the uppermost surface (or finish level) of a basement, cellar or unused under-floor space is more than 3.60 meters above established grade as defined herein at any point, such basement, cellar or unused under-floor space shall be considered a storey.

Sun breaker - feature of a building commonly used as external shading devices, which reduces heat gain within that building by deflecting solar rays to reduce energy cooling loads

Total Gross Floor Area (TGFA) - the total floor space within the main auxiliary buildings primarily consisting of the GFA and all other enclosed support areas together with all other usable horizontal areas/surfaces above and below established grade level that are all physically attached to the building/s which shall consists of the following: Covered areas used for parking and driveways, services and utilities.

Toxic Materials - substances that may cause harm to an individual if it enters the body through inhalation, skin contactor ingestion

U-Value - describes how well a building element conducts heat, measuring the rate of heat transfer through a building element over a given area, under standardized conditions

United Architects of the Philippines (UAP) - the Integrated and Accredited Professional Organization of Architects in the Philippines responsible in the improvement and sustainability of the quality of built environment

Unity Power Factor - power factor of 1.0 obtained when current and voltage are in phase, as in a circuit containing only resistance or in a reactive circuit at resonance.

Unpaved Surface Area (USA) - the portion of the lot that shall remain unpaved and reserved for softscaping / planting; expressed as a percentage (%) of the Total Lot Area or TLA and may be combined with the Impervious Surface Area (ISA) to satisfy the Total Open Space within Lot (TOSL), i.e., the total open space requirement for each type of use or occupancy

Urea formaldehyde - combination of urea and formaldehyde used in some glues and adhesives, particularly in composite wood products, emitting formaldehyde at room temperature, which is a toxic and possibly carcinogenic gas

Variable Speed Drive (VSD) - a piece of equipment that regulates the speed and rotational force, or torque output, of an electric motor.

Variable-Voltage and Variable-Frequency (VVVF) - employs frequency inverter technology which regulates input voltage and frequency throughout the journey, drawing much less current during acceleration and deceleration

Ventilation – process of supplying or removing air by natural or mechanical means to or from any space.

Visible Transmittance (Tvis) - the ratio of total transmitted light to total incident light with the higher value allowing more incident light to pass through the glazing

Volatile Organic Compound (VOC) - organic chemicals with have a high vapor pressure at ordinary room temperature that are dangerous to human health or cause harm to the environment

Weather-Stripping - narrow piece of material, such as plastic, rubber, felt, or metal, installed around doors and windows to protect an interior from external extremes in temperature.

Window assembly - a unit, which includes a window and the anchorage between the window and the wall

Window to Wall Ratio (WWR) - ratio of the total area of a building facade, which is occupied by windows (glass area and frame)

ANNEX 2 GLASS LIBRARY

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type Code	# Panes	IP (in)	SI (mm)	Gas Fill	IP (BTU / sqft-h-°F)	SI (W / sqm-°C)	SHGC	SC	Tvis
Single Clear	1000	1	n/a	n/a	n/a	1.11	6.30	0.86	1	0.9
Single Tint Bronze	1200	1	n/a	n/a	n/a	1.11	6.30	0.73	0.84	0.69
Single Tint Green	1202	1	n/a	n/a	n/a	1.11	6.30	0.72	0.83	0.82
Single Tint Grey	1204	1	n/a	n/a	n/a	1.11	6.30	0.71	0.83	0.61
Single Low Iron	1003	1	n/a	n/a	n/a	1.1	6.25	0.90	1.04	0.91
Single Ref-D Clear	1417	1	n/a	n/a	n/a	1.08	6.13	0.50	0.58	0.33
Single Ref-D Tint	1418	1	n/a	n/a	n/a	1.08	6.13	0.46	0.53	0.25
Single Ref-B Clear-H	1407	1	n/a	n/a	n/a	0.97	5.51	0.39	0.45	0.3
Single Ref-B Tint-H	1410	1	n/a	n/a	n/a	0.97	5.51	0.34	0.4	0.18
Single Ref-B Clear-L	1406	1	n/a	n/a	n/a	0.96	5.45	0.31	0.35	0.2
Single Ref-A Clear-L	1402	1	n/a	n/a	n/a	0.95	5.39	0.31	0.36	0.2
Single Ref-C Clear-H	1413	1	n/a	n/a	n/a	0.94	5.34	0.35	0.41	0.22
Single Ref-C Tint-H	1416	1	n/a	n/a	n/a	0.94	5.34	0.31	0.37	0.13
Single Ref-A Tint-H	1405	1	n/a	n/a	n/a	0.93	5.28	0.29	0.34	0.1
Single Ref-C Clear-M	1412	1	n/a	n/a	n/a	0.92	5.22	0.32	0.37	0.19
Single Ref-C Tint-M	1415	1	n/a	n/a	n/a	0.92	5.22	0.29	0.34	0.11
Single Ref-A Clear-L	1401	1	n/a	n/a	n/a	0.9	5.11	0.25	0.29	0.14
Single Ref-A Tint-M	1404	1	n/a	n/a	n/a	0.9	5.11	0.25	0.29	0.09
Single Ref-B Tint-M	1409	1	n/a	n/a	n/a	0.89	5.05	0.28	0.33	0.13
Single Low-E Clear (e2=.4)	1600	1	n/a	n/a	n/a	0.88	5.00	0.78	0.91	0.85
Single Ref-C Clear-L	1411	1	n/a	n/a	n/a	0.88	5.00	0.25	0.29	0.13
Single Ref-C Tint-L	1414	1	n/a	n/a	n/a	0.88	5.00	0.25	0.29	0.08
Single Ref-B Tint-L	1408	1	n/a	n/a	n/a	0.87	4.94	0.23	0.26	0.05
Single Ref-A Tint-L	1403	1	n/a	n/a	n/a	0.87	4.94	0.22	0.26	0.05
Single Ref-A Clear-L	1400	1	n/a	n/a	n/a	0.86	4.88	0.19	0.23	0.08
Single Low-E Clear (e2=.2)	1601	1	n/a	n/a	n/a	0.76	4.32	0.77	0.89	0.82
Double Low Iron	2006	2	0.25	6.35	Air	0.57	3.24	0.83	0.96	0.84
Double Clear	2000	2	0.25	6.35	Air	0.57	3.24	0.76	0.88	0.81
Double Tint Bronze	2200	2	0.25	6.35	Air	0.57	3.24	0.62	0.72	0.62
Double Tint Green	2206	2	0.25	6.35	Air	0.57	3.24	0.62	0.72	0.74
Double Tint Grey	2212	2	0.25	6.35	Air	0.57	3.24	0.61	0.71	0.55
Double Low Iron	2009	2	0.25	6.35	Air	0.56	3.18	0.82	0.95	0.83
Double Ref-D Clear	2460	2	0.25	6.35	Air	0.56	3.18	0.42	0.49	0.31
Double Ref-D Tint	2470	2	0.25	6.35	Air	0.56	3.18	0.35	0.41	0.23
Double Ref-B Clear-H	2426	2	0.25	6.35	Air	0.53	3.01	0.30	0.35	0.27
Double Ref-B Tint-H	2436	2	0.25	6.35	Air	0.53	3.01	0.25	0.29	0.16
Double Ref-C Clear-H	2446	2	0.25	6.35	Air	0.52	2.95	0.27	0.32	0.2
Double Ref-A Clear-H	2406	2	0.25	6.35	Air	0.52	2.95	0.23	0.27	0.18

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type	#	IP	SI	Gas	IP	SI			
	Code	Panes	(in)	(mm)	Fill	(BTU / sqft-h-°F)	(W / sqm-°C)	SHGC	SC	Tvis
Double Ref-B Clear-L	2420	2	0.25	6.35	Air	0.52	2.95	0.23	0.27	0.18
Double Ref-D Tint-H	2456	2	0.25	6.35	Air	0.52	2.95	0.23	0.26	0.12
Double Ref-C Clear-M	2443	2	0.25	6.35	Air	0.51	2.90	0.24	0.28	0.17
Double Ref-A Tint-H	2416	2	0.25	6.35	Air	0.51	2.90	0.21	0.24	0.09
Double Ref-C Tint-M	2453	2	0.25	6.35	Air	0.51	2.90	0.21	0.24	0.1
Double Low-E (e3=.4) Clear	2600	2	0.25	6.35	Air	0.5	2.84	0.72	0.84	0.77
Double Ref-B Tint-M	2433	2	0.25	6.35	Air	0.5	2.84	0.20	0.24	0.12
Double Ref-A Clear-M	2403	2	0.25	6.35	Air	0.5	2.84	0.19	0.22	0.13
Double Ref-C Clear-L	2440	2	0.25	6.35	Air	0.5	2.84	0.19	0.22	0.12
Double Ref-C Tint-L	2450	2	0.25	6.35	Air	0.5	2.84	0.18	0.21	0.07
Double Ref-A Tint-M	2413	2	0.25	6.35	Air	0.5	2.84	0.17	0.2	0.08
Double Low Iron	2007	2	0.50	12.70	Air	0.49	2.78	0.83	0.96	0.84
Double Low Iron	2010	2	0.50	12.70	Air	0.49	2.78	0.82	0.95	0.83
Double Clear	2001	2	0.50	12.70	Air	0.49	2.78	0.76	0.89	0.81
Double Tint Bronze	2201	2	0.50	12.70	Air	0.49	2.78	0.62	0.72	0.62
Double Tint Green	2207	2	0.50	12.70	Air	0.49	2.78	0.61	0.71	0.74
Double Tint Grey	2213	2	0.50	12.70	Air	0.49	2.78	0.61	0.71	0.55
Double Ref-A Tint-L	2410	2	0.25	6.35	Air	0.49	2.78	0.15	0.18	0.05
Double Ref-B Tint-L	2430	2	0.25	6.35	Air	0.49	2.78	0.15	0.18	0.05
Double Ref-A Clear-L	2400	2	0.25	6.35	Air	0.49	2.78	0.14	0.17	0.07
Double Clear	2004	2	0.50	12.70	Air	0.48	2.73	0.70	0.81	0.78
Double Tint Bronze	2204	2	0.50	12.70	Air	0.48	2.73	0.49	0.57	0.47
Double Tint Green	2210	2	0.50	12.70	Air	0.48	2.73	0.49	0.57	0.66
Double Tint Blue	2219	2	0.50	12.70	Air	0.48	2.73	0.49	0.57	0.5
Double Tint Grey	2216	2	0.50	12.70	Air	0.48	2.73	0.47	0.54	0.38
Double Ref-D Clear	2461	2	0.50	12.70	Air	0.48	2.73	0.42	0.49	0.31
Double Ref-D Tint	2471	2	0.50	12.70	Air	0.48	2.73	0.35	0.4	0.23
Double Low Iron	2008	2	0.50	12.70	Argon	0.46	2.61	0.83	0.96	0.84
Double Clear	2002	2	0.50	12.70	Argon	0.46	2.61	0.76	0.89	0.81
Double Low-E (e3=.2) Clear	2610	2	0.25	6.35	Air	0.46	2.61	0.72	0.84	0.74
Double Tint Bronze	2202	2	0.50	12.70	Argon	0.46	2.61	0.62	0.72	0.62
Double Tint Green	2208	2	0.50	12.70	Argon	0.46	2.61	0.61	0.71	0.74
Double Tint Grey	2214	2	0.50	12.70	Argon	0.46	2.61	0.61	0.7	0.55
Double Low Iron	2011	2	0.50	12.70	Argon	0.45	2.56	0.82	0.95	0.83
Double Clear	2005	2	0.50	12.70	Argon	0.45	2.56	0.70	0.81	0.78
Double Low-E (e3=.2) Clear	2613	2	0.25	6.35	Air	0.45	2.56	0.66	0.77	0.72
Double Tint Bronze	2205	2	0.50	12.70	Argon	0.45	2.56	0.49	0.56	0.47
Double Tint Green	2211	2	0.50	12.70	Argon	0.45	2.56	0.49	0.57	0.66

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type Code	# Panes	IP (in)	SI (mm)	Gas Fill	IP (BTU / sqft-h-°F)	SI (W / sqm-°C)	SHGC	SC	Tvis
Double Tint Blue	2220	2	0.50	12.70	Argon	0.45	2.56	0.49	0.56	0.5
Double Tint Grey	2217	2	0.50	12.70	Argon	0.45	2.56	0.47	0.54	0.38
Double Ref-D Clear	2462	2	0.50	12.70	Argon	0.45	2.56	0.42	0.49	0.31
Double Ref-D Tint	2472	2	0.50	12.70	Argon	0.45	2.56	0.34	0.4	0.23
Double Low-E (e3=.1) Clear	2640	2	0.25	6.35	Air	0.44	2.50	0.63	0.74	0.77
Double Low-E (e2=.1) Clear	2630	2	0.25	6.35	Air	0.44	2.50	0.60	0.69	0.77
Double Ref-B Clear-H	2427	2	0.50	12.70	Air	0.44	2.50	0.29	0.34	0.27
Double Ref-B Tint-H	2437	2	0.50	12.70	Air	0.44	2.50	0.23	0.27	0.16
Double Ref-A Clear-H	2407	2	0.50	12.70	Air	0.44	2.50	0.22	0.26	0.18
Double Ref-B Clear-L	2421	2	0.50	12.70	Air	0.44	2.50	0.22	0.25	0.18
Double Electrochromic Absorbing Bleached/Colored, 6.3-mm Gap	2800	2	0.25	6.35	Air	0.43	2.44	0.73	0.85	0.76
Double Electrochromic Reflecting Bleached/Colored, 6.3-mm Gap	2820	2	0.25	6.35	Air	0.43	2.44	0.63	0.73	0.73
Double Low-E (e2=.1) Clear	2633	2	0.25	6.35	Air	0.43	2.44	0.56	0.65	0.75
Double Low-E (e2=.1) Tint	2636	2	0.25	6.35	Air	0.43	2.44	0.39	0.45	0.44
Double Ref-C Clear-H	2447	2	0.50	12.70	Air	0.43	2.44	0.26	0.3	0.2
Double Ref-D Tint-H	2457	2	0.50	12.70	Air	0.43	2.44	0.21	0.24	0.12
Double Ref-A Tint-H	2417	2	0.50	12.70	Air	0.43	2.44	0.19	0.22	0.09
Double Electrochromic Absorbing Bleached/Colored, 6.3-mm Gap	2801	2	0.25	6.35	Air	0.43	2.44	0.18	0.21	0.12
Double Electrochromic Reflecting Bleached/Colored, 6.3-mm Gap	2821	2	0.25	6.35	Air	0.43	2.44	0.17	0.2	0.14
Double Low-E (e2=.04) Clear	2660	2	0.25	6.35	Air	0.42	2.38	0.44	0.51	0.7
Double Low-E (e3=.04) Clear	2663	2	0.25	6.35	Air	0.42	2.38	0.42	0.49	0.68
Double Low-E (e2=.04) Tint	2666	2	0.25	6.35	Air	0.42	2.38	0.31	0.35	0.41
Double Ref-C Clear-M	2444	2	0.50	12.70	Air	0.42	2.38	0.23	0.27	0.17
Double Ref-C Tint-M	2454	2	0.50	12.70	Air	0.42	2.38	0.19	0.22	0.1
Double Low-E (e3=.4) Clear	2601	2	0.50	12.70	Air	0.41	2.33	0.73	0.85	0.77
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 6.3-mm Gap	2860	2	0.25	6.35	Air	0.41	2.33	0.46	0.54	0.64

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type Code	# Panes	IP (in)	SI (mm)	Gas Fill	IP (BTU / sqft-h-°F)	SI (W / sqm-°C)	SHGC	SC	Tvis
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 6.3-mm Gap	2840	2	0.25	6.35	Air	0.41	2.33	0.44	0.51	0.66
Double Ref-B Clear-H	2428	2	0.50	12.70	Argon	0.41	2.33	0.29	0.34	0.27
Double Ref-B Tint-H	2438	2	0.50	12.70	Argon	0.41	2.33	0.23	0.27	0.16
Double Ref-B Tint-M	2434	2	0.50	12.70	Air	0.41	2.33	0.19	0.22	0.12
Double Ref-C Clear-L	2441	2	0.50	12.70	Air	0.41	2.33	0.18	0.2	0.12
Double Ref-A Clear-M	2404	2	0.50	12.70	Air	0.41	2.33	0.17	0.2	0.13
Double Ref-C Tint-L	2451	2	0.50	12.70	Air	0.41	2.33	0.16	0.19	0.07
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 6.3-mm Gap	2841	2	0.25	6.35	Air	0.41	2.33	0.16	0.18	0.1
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 6.3-mm Gap	2861	2	0.25	6.35	Air	0.41	2.33	0.16	0.18	0.12
Double Ref-A Tint-M	2414	2	0.50	12.70	Air	0.41	2.33	0.15	0.18	0.08
Double Ref-A Clear-H	2408	2	0.50	12.70	Argon	0.4	2.27	0.22	0.25	0.18
Double Ref-B Clear-L	2422	2	0.50	12.70	Argon	0.4	2.27	0.21	0.25	0.18
Double Ref-B Tint-L	2431	2	0.50	12.70	Air	0.4	2.27	0.14	0.16	0.05
Double Ref-A Clear-L	2401	2	0.50	12.70	Air	0.4	2.27	0.13	0.15	0.07
Double Ref-A Tint-L	2411	2	0.50	12.70	Air	0.4	2.27	0.13	0.15	0.05
Triple Clear	3001	3	0.25	6.35	Air	0.39	2.21	0.68	0.79	0.74
Double Ref-C Clear-H	2448	2	0.50	12.70	Argon	0.39	2.21	0.26	0.3	0.2
Double Ref-D Tint-H	2458	2	0.50	12.70	Argon	0.39	2.21	0.20	0.24	0.12
Double Ref-A Tint-H	2418	2	0.50	12.70	Argon	0.39	2.21	0.19	0.21	0.09
Double Ref-C Clear-M	2445	2	0.50	12.70	Argon	0.38	2.16	0.23	0.26	0.17
Double Ref-C Tint-M	2455	2	0.50	12.70	Argon	0.38	2.16	0.19	0.21	0.1
Double Ref-A Clear-M	2405	2	0.50	12.70	Argon	0.38	2.16	0.17	0.2	0.13
Double Ref-A Tint-M	2415	2	0.50	12.70	Argon	0.38	2.16	0.15	0.17	0.08
Double Ref-B Tint-M	2435	2	0.50	12.70	Argon	0.37	2.10	0.18	0.21	0.12
Double Low-E (e3=.4) Clear	2602	2	0.50	12.70	Argon	0.36	2.04	0.73	0.85	0.77
Double Ref-C Clear-L	2442	2	0.50	12.70	Argon	0.36	2.04	0.17	0.2	0.12
Double Ref-C Tint-L	2452	2	0.50	12.70	Argon	0.36	2.04	0.15	0.18	0.07
Double Ref-A Tint-L	2412	2	0.50	12.70	Argon	0.36	2.04	0.13	0.15	0.05
Double Ref-B Tint-L	2432	2	0.50	12.70	Argon	0.36	2.04	0.13	0.15	0.05
Double Ref-A Clear-L	2402	2	0.50	12.70	Argon	0.36	2.04	0.12	0.14	0.07
Double Low-E (e3=.2) Clear	2611	2	0.50	12.70	Air	0.35	1.99	0.73	0.85	0.74
Double Low-E (e3=.2) Clear	2614	2	0.50	12.70	Air	0.35	1.99	0.67	0.78	0.72

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type Code	# Panes	IP (in)	SI (mm)	Gas Fill	IP (BTU / sqft-h-°F)	SI (W / sqm-°C)	SHGC	SC	Tvis
Triple Clear	3002	3	0.50	12.70	Air	0.32	1.82	0.68	0.79	0.74
Double Low-E (e3=.1) Clear	2641	2	0.50	12.70	Air	0.32	1.82	0.64	0.75	0.77
Double Low-E (e2=.1) Clear	2631	2	0.50	12.70	Air	0.32	1.82	0.60	0.69	0.77
Triple Low-E (e5=.1) Clear	3601	3	0.25	6.35	Air	0.32	1.82	0.57	0.67	0.7
Triple Low-E Film (88) Clear	3641	3	0.25	6.35	Air	0.32	1.82	0.57	0.66	0.71
Triple Low-E Film (77) Clear	3651	3	0.25	6.35	Air	0.32	1.82	0.46	0.53	0.64
Double Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap	2802	2	0.50	12.70	Air	0.31	1.76	0.74	0.86	0.76
Double Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap	2822	2	0.50	12.70	Air	0.31	1.76	0.64	0.74	0.73
Double Low-E (e2=.1) Clear	2634	2	0.50	12.70	Air	0.31	1.76	0.56	0.65	0.75
Double Low-E (e2=.1) Tint	2637	2	0.50	12.70	Air	0.31	1.76	0.37	0.43	0.44
Triple Low-E Film (66) Clear	3661	3	0.25	6.35	Air	0.31	1.76	0.35	0.41	0.54
Triple Low-E Film (55) Clear	3671	3	0.25	6.35	Air	0.31	1.76	0.30	0.35	0.45
Triple Low-E Film (66) Tint	3663	3	0.25	6.35	Air	0.31	1.76	0.26	0.3	0.32
Triple Low-E Film (55) Tint	3673	3	0.25	6.35	Air	0.31	1.76	0.23	0.26	0.27
Double Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap	2803	2	0.50	12.70	Air	0.31	1.76	0.20	0.19	0.12
Triple Low-E Film (44) Tint	3681	3	0.25	6.35	Air	0.31	1.76	0.20	0.23	0.22
Triple Low-E Film (33) Tint	3691	3	0.25	6.35	Air	0.31	1.76	0.16	0.19	0.17
Double Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap	2823	2	0.50	12.70	Air	0.31	1.76	0.15	0.17	0.14
Double Low-E (e3=.2) Clear	2612	2	0.50	12.70	Argon	0.3	1.70	0.74	0.86	0.74
Double Low-E (e2=.04) Clear	2661	2	0.50	12.70	Air	0.3	1.70	0.44	0.51	0.7
Double Low-E (e3=.2) Clear	2615	2	0.50	12.70	Argon	0.29	1.65	0.68	0.79	0.72
Triple Clear	3002	3	0.50	12.70	Argon	0.29	1.65	0.68	0.79	0.74
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap	2842	2	0.50	12.70	Air	0.29	1.65	0.51	0.59	0.66
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap	2862	2	0.50	12.70	Air	0.29	1.65	0.47	0.55	0.64

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type Code	# Panes	IP (in)	SI (mm)	Gas Fill	IP (BTU / sqft-h-°F)	SI (W / sqm-°C)	SHGC	SC	Tvis
Double Low-E (e3=.04) Clear	2664	2	0.50	12.70	Air	0.29	1.65	0.42	0.48	0.68
Double Low-E (e2=.04) Tint	2667	2	0.50	12.70	Air	0.29	1.65	0.29	0.33	0.41
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap	2863	2	0.50	12.70	Air	0.29	1.65	0.14	0.16	0.12
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap	2843	2	0.50	12.70	Air	0.29	1.65	0.13	0.15	0.1
Triple Low-E (e2=e5=.1) Clear	3621	3	0.25	6.35	Air	0.27	1.53	0.47	0.54	0.66
Double Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap, Argon	2804	2	0.50	12.70	Argon	0.26	1.48	0.74	0.86	0.76
Double Low-E (e3=.1) Clear	2642	2	0.50	12.70	Argon	0.26	1.48	0.65	0.75	0.77
Double Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap, Argon	2824	2	0.50	12.70	Argon	0.26	1.48	0.64	0.74	0.73
Double Low-E (e2=.1) Clear	2632	2	0.50	12.70	Argon	0.26	1.48	0.59	0.69	0.77
Double Low-E (e2=.1) Clear	2635	2	0.50	12.70	Argon	0.26	1.48	0.56	0.66	0.75
Double Low-E (e2=.1) Tint	2638	2	0.50	12.70	Argon	0.26	1.48	0.37	0.43	0.44
Double Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap, Argon	2805	2	0.50	12.70	Argon	0.26	1.48	0.15	0.18	0.12
Double Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap, Argon	2825	2	0.50	12.70	Argon	0.26	1.48	0.15	0.16	0.14
Double Low-E (e2=.04) Clear	2662	2	0.50	12.70	Argon	0.24	1.36	0.43	0.5	0.7
Triple Low-E (e5=.1) Clear	3602	3	0.50	12.70	Air	0.23	1.31	0.58	0.67	0.7
Triple Low-E Film (88) Clear	3642	3	0.50	12.70	Air	0.23	1.31	0.57	0.67	0.71
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap, Argon	2844	2	0.50	12.70	Argon	0.23	1.31	0.52	0.6	0.66
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap, Argon	2864	2	0.50	12.70	Argon	0.23	1.31	0.48	0.56	0.64
Double Low-E (e3=.04) Clear	2665	2	0.50	12.70	Argon	0.23	1.31	0.42	0.48	0.68

WINDOW / DOOR	Glass		Gap Thickness		Gap	Center Glass U-Value		Solar Heat Gain Coefficient	Shading Coefficient	Visible Transmit-tance
	Type Code	# Panes	IP (in)	SI (mm)	Gas Fill	IP (BTU / sqft-h-°F)	SI (W / sqm-°C)	SHGC	SC	Tvis
Double Low-E (e2=.04) Tint	2668	2	0.50	12.70	Argon	0.23	1.31	0.28	0.32	0.41
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap, Argon	2865	2	0.50	12.70	Argon	0.23	1.31	0.13	0.15	0.12
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap, Argon	2845	2	0.50	12.70	Argon	0.23	1.31	0.12	0.14	0.1
Triple Low-E Film (77) Clear	3652	3	0.50	12.70	Air	0.22	1.25	0.47	0.54	0.64
Triple Low-E Film (66) Clear	3662	3	0.50	12.70	Air	0.22	1.25	0.36	0.42	0.54
Triple Low-E Film (55) Clear	3672	3	0.50	12.70	Air	0.22	1.25	0.31	0.36	0.45
Triple Low-E Film (66) Tint	3664	3	0.50	12.70	Air	0.22	1.25	0.25	0.29	0.32
Triple Low-E Film (55) Tint	3674	3	0.50	12.70	Air	0.22	1.25	0.22	0.25	0.27
Triple Low-E Film (44) Tint	3682	3	0.50	12.70	Air	0.21	1.19	0.19	0.22	0.22
Triple Low-E Film (33) Tint	3692	3	0.50	12.70	Air	0.21	1.19	0.15	0.17	0.17
Triple Low-E (e5=.1) Clear	3603	3	0.50	12.70	Argon	0.19	1.08	0.58	0.67	0.7
Triple Low-E (e2=e5=.1) Clear	3622	3	0.50	12.70	Air	0.17	0.97	0.47	0.55	0.66
Triple Low-E (e2=e5=.1) Clear	3623	3	0.50	12.70	Argon	0.14	0.79	0.47	0.55	0.66
Quadruple, Two Low-E Glass, Two Low-E Film, Clear. Krypton	4651	4	0.31	7.87	Krypton	0.12	0.68	0.45	0.52	0.62

Source: US Department of Energy

ANNEX 3 Insulating Values of Common Building Materials

MATERIAL	R-VALUE (1/C)		R-VALUE PER inch (1/K)	
	sqft-hr deg F/Btu	sqm deg C/W	sqft-hr deg F/Btu	sqm deg C/W
METAL ROOF	0.04	0.00704		
ALUMINUM ALLOY	0.01	0.00176		
PLASTIC ROOF				
CEMENT TILE ROOF	0.21	0.03698		
CLAY TILE - 3 inch [75mm] (1 CELL DEEP)	0.8	0.14088		
ASPHALT SHINGLES	0.44	0.07748		
ASPHALT			0.12 - 0.34	0.02113 to 0.05987
STRAW THATCH			2.04	0.35924
FIBERBOARD - 1/2 inch [12.5mm]	1.32	0.23245		
PLYWOOD - 1/2 inch [12.5mm]	0.62	0.10918		
PLYWOOD - 3/4 inch [18.75mm]	0.94	0.16553		
CONCRETE (sand, gravel) 140 lb/cu ft [2246 kg/cu m]			0.05 - 0.11	0.00881 to 0.01937
CONCRETE (sand, gravel) 80 lb/cu ft [1283 kg/ cu m]			0.24 - 0.30	0.04226 to 0.05283
CEMENT MORTAR			0.10	0.01761
STONE			0.01	0.00176
MARBLE/GRANITE, LIMESTONE			0.03 - 0.12	0.00528 to 0.02113
CERAMIC TILE - 1 inch [25mm]	0.08	0.01409		
STONE TILE - 1 inch [25mm]	0.05	0.00881		
AIR SPACE UP TO 4 inches [100mm]	1	0.1761		
INSIDE SURFACE AIR FILM	0.61	0.10742		
EXTERIOR SURFACE AIR FILM	0.17	0.02994		
MEMBRANE	0.06-0.12	0.01057 to 0.02113		
SOIL (with 20% moisture content)			0.25 - 1.0	0.04403 to 0.17610
SAND - 1/2 inch [12.5mm]	0.1	0.01761		

Source: 2013 ASHRAE Handbook of Fundamentals / 1958 ASHAE Guide / www.inspectApedia.com

ANNEX 4 Philippine Green Building Code Activities

Philippine Green Building Code Multi-Stakeholders Consultation

Baguio City (Regions 1, CAR)
November 3-7, 2014

Tagaytay City
(Regions IV-A, IV-B, V)
December 11, 2014

Head Office
(NCR)
January 21, 2015

Davao City
(Regions IX, XI, XIII)
January 30, 2015

Cebu City
(Regions VI, VII, VIII)
February 10, 2015

Cagayan de Oro
(Regions X, XII)
February 24, 2015

BALANGA, BATAAN
(Regions II, III)
MARCH 10-11, 2015

Philippine
Green Building Code Writeshop (Clark, Pampanga)
April 27-28, 2015




Philippine Green Building Code Launching
"Green Breakthroughs 2015"
June 25, 2015, Philippine Trade Training Center




Philippine Green Building Code Training of Trainers

Regions I, IV-B and CAR

Regions III, IV-A

Regions V, VII, VIII, IX, X, XI, XII, XIII, and other agencies

NCR

Other Philippine GB Code Meetings/ Activities

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

IFC International Finance Corporation
World Bank Group