



Confederation of Indian Industry

IGBC Green Healthcare Facilities Rating System

Pilot Version

Abridged Reference Guide
October 2016



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Foreword from the Indian Green Building Council (IGBC)

India is witnessing tremendous growth in healthcare infrastructure. The sector is growing at a rapid pace owing to the awareness and importance of good health and wellbeing. As the sector continues to grow, it would pose host of challenges including environmental sustainability.

To sensitise various forms of built environment, CII established the Indian Green Building Council (IGBC) in 2001. IGBC, is a consensus driven not-for-profit Council, represents the building industry, consisting of more than 1,923 committed members. The Council encourages, builders, developers, owners, architects, doctors, consultants and several other stakeholders to embrace green, thereby contributing to the National goals on sustainability.

The Green Building Movement in India has been spearheaded by IGBC since 2001, by creating awareness amongst the stakeholders. So far, the Council has been instrumental in enabling 3.84 Billion sq.ft of green buildings in the country. The Council's activities have enabled a market transformation with regard to green building materials and technologies.

IGBC continuously works to provide tools that facilitate the adoption of green building practices in India. The development of IGBC Green Healthcare rating system® is another important step in this direction.

Acknowledgement

The IGBC Green Health Buildings rating system® Abridged Reference Guide has been made possible through the efforts of many dedicated volunteers, staff members and others in the IGBC community. The Pilot Version was developed by the IGBC Green Healthcare Core Committee and many other members. Excellent inputs have emerged during 'IGBC Green Healthcare' Stakeholders meeting held in July 2016 and several interactions. IGBC places on record its sincere thanks to the participating organisations and individuals who enthusiastically volunteered during the breakout sessions.

IGBC would like to thank the following organisations for their participation and contribution in developing the rating programme:

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35. **Mr Vijay Kumar Mishra**, Director, Cradle Pvt Ltd

I. Introduction

The healthcare sector in India is growing at a rapid pace and contributing immensely to the growth of the quality of services. The sector is expected to grow several-fold in the next decade. While this augurs well for the country, there is an imminent need to introduce green concepts and techniques in this sector, which can aid growth in a sustainable manner.

Introducing green concepts in the healthcare facilities can help address National issues like infection, epidemics, handling of bio-medical waste, water efficiency, energy efficiency, reduction in fossil fuel use for commuting, consumer waste and in general conservation of natural resources. Most importantly, these concepts can enhance patients' health, recovery and well-being.

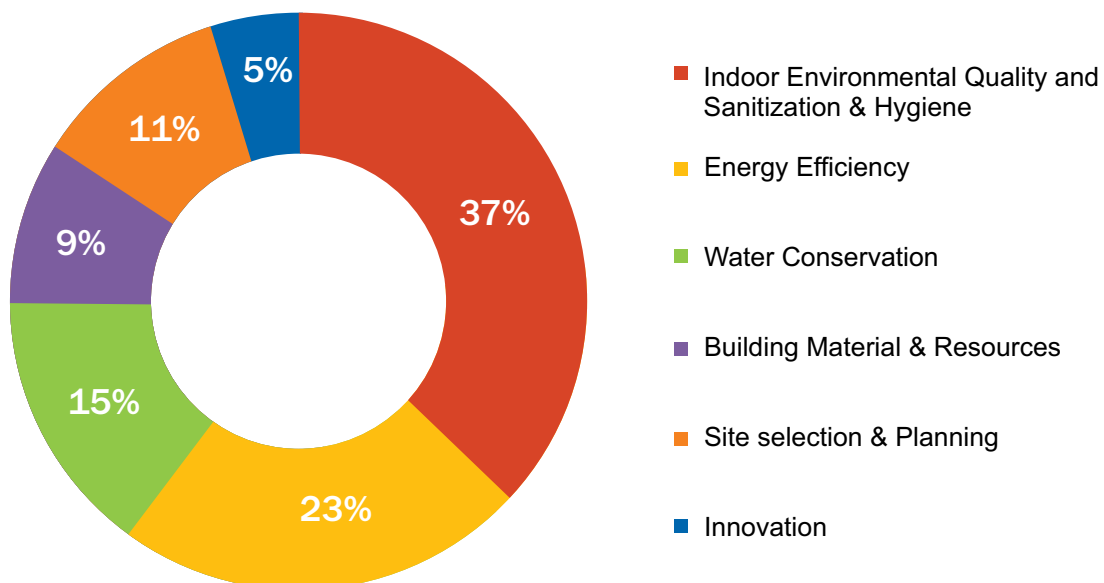
Against this background, the Indian Green Building Council (IGBC) has launched 'IGBC Green Healthcare rating system® to address National priorities. This rating programme is a tool which enables the designer to apply green concepts and reduce environmental impacts that are measurable. The rating system also covers diverse climatic zones.

IGBC has set up the Green Healthcare Facilities Core Committee to develop the rating programme. This committee comprises of key stakeholders, including doctors, hospital administrators healthcare experts, IEQ experts, architects, builders, consultants, developers, owners, institutions, manufacturers and industry representatives. The committee, with a diverse background and knowledge has enriched the rating system, both in its content and process.

II. Benefits of Green Healthcare Facilities

Green Healthcare facilities can have tremendous benefits, both tangible and intangible. The most tangible benefits are the reduction in water and energy consumption right from day one of occupancy. The energy savings could range from 20 - 30 % and water savings around 30 - 50%. The intangible benefits of green Healthcare facilities include enhanced air quality, faster patient recovery, daylighting for patients, connectivity to outdoor environment, health & hygiene of occupants & patients and safety benefits

IGBC GREEN HEALTHCARE RATING SYSTEM (NEW HEALTHCARE FACILITIES)



III. National Priorities Addressed in the Rating System

The IGBC Green Healthcare rating system addresses the most important national priorities which include water conservation, handling waste, energy efficiency, reduced use of fossil fuels, lesser dependence on usage of virgin materials and health & well-being of patients & occupants. The rating system requires the application of National standards and codes such Indian Health Facility Guidelines, NBC, ECBC, MoEF guidelines, CPCB guidelines, and several others. The overarching objective is to be better than the national standards so as to create Healthcare benchmarks

a) Health and Well-being of Patients & Occupants:

Health and well-being of patients & occupants are the most important aspects of IGBC Green Healthcare rating system. The rating system has addressed healing architecture / evidence based design, adequate ventilation, daylighting, infection control mechanisms and patients well-being, which are so essential in healthcare facilities. The rating system also recognises measures to minimise indoor air pollutants and infections.

b) Water Conservation

Most of the Asian countries are water stressed and in country like India, the water table has reduced drastically over the last decade. IGBC Green Healthcare rating system encourages use of water in a self-sustainable manner through reduce, recycle and reuse strategies. By adopting this rating programme, green Healthcare facilities can save potable water to an extent of 30 - 50%.

c) Handling of consumer & biomedical Waste:

Handling of waste in hospitals is extremely sensitive. This continues to be a challenge to the municipalities which needs to be addressed. The rating system intends to address this by encouraging buildings to have proper systems in place

d) Energy Efficiency:

The healthcare sector is a large consumer of electrical energy. Through IGBC Green Healthcare rating system, these facilities can reduce energy consumption through energy efficient - building envelope, lighting, air conditioning systems, etc., The energy savings that can be realised by adopting this rating programme can be to the tune of 20 - 30%.

e) Reduced Use of Fossil Fuels:

Fossil fuel is a slowly depleting resource, the world over. The use of fossil fuel for transportation has been a major source of pollution. The rating system encourages the use of alternate fuel vehicles for transportation.

f) Reduced Dependency on Virgin Materials:

The rating system encourages projects to use recycled & reused material and discourages the use of virgin materials, thereby, addressing environmental impacts associated with extraction and processing of scarce natural resources.

IV. IGBC Green Healthcare Rating System®

IGBC has set up the Green Healthcare Core Committee to develop the rating programme. This committee comprises of key stakeholders, including doctors, healthcare experts, administrators, architects, builders, consultants, developers, owners, institutions, manufacturers and industry representatives. The committee, with a diverse background and knowledge has enriched the rating system, both in its content and process.

a) Preamble

By opting to apply for the rating it is understood and implied that the healthcare facility have taken cognisance of naturally occurring events like earthquake, flood, tsunami and geological phenomena during design.

b) Features

IGBC Green Healthcare rating system® is a voluntary and consensus based programme. The rating system has been developed based on practices, materials and technologies that are presently available. The objective of IGBC Green Healthcare rating system is to facilitate a holistic approach to create environment friendly healthcare facilities.

The rating system evaluates certain mandatory requirements & credit points using a prescriptive approach and others on a performance based approach. The rating system is evolved so as to be comprehensive and at the same time user-friendly. The programme is fundamentally designed to address national priorities and quality of life for patients.

Some of the unique aspects addressed in this rating system are as follows:

- Healing Architecture / Evidence based design
- Emphasis on infection control strategies
- Recognition for architectural excellence through integrated design approach
- Recognition for passive architectural features
- Based on the feedback from green building proponents, use of certified green products will be encouraged. IGBC has launched a new initiative to certify green products to transform markets. Products would be evaluated right from extraction to disposal.
- A site visit and audit is proposed before award of the rating.
- Projects are encouraged to report energy and water consumption data on an annual basis, to facilitate research in this area.

c) Scope

IGBC Green Healthcare rating system® is designed primarily for air-conditioned and non-air-conditioned healthcare facilities

d) The Future of IGBC Green Healthcare Rating System

Many healthcare specific green building materials, equipment and technologies are being introduced in the market. With continuous up-gradation and introduction of healthcare specific green technologies and products, it is important that the rating programme also keeps pace with current standards and technologies.

Therefore, the rating programme will undergo periodic revisions to incorporate the latest advancement and changes. It is important to note that project teams applying for IGBC Green Healthcare rating system® should register their projects with the latest version of the rating system. During the course of implementation, projects have an option to transit to the latest version of the rating system.

IGBC will highlight Healthcare developments on its website (www.igbc.in).

V. Overview and Process

IGBC Green Healthcare rating system® addresses green features under the following categories:

- a) **Indoor Environmental Quality**
- b) **Sanitization & Hygiene**
- c) **Energy Efficiency**
- d) **Water Conservation**
- e) **Site Selection and Planning**
- f) **Building Materials and Resources**
- g) **Innovation in Design Process**

The guidelines detailed under each mandatory requirement & credit enables the design and construction of Healthcare facilities of all sizes and types (as defined in scope). Different levels of certification are awarded based on the total credits earned. However, every green Healthcare facilities should meet certain mandatory requirements, which are non-negotiable.

The various levels of rating awarded are as below:

Certification Level	Recognition
Certified	Best Practices
Silver	Outstanding Performance
Gold	National Excellence
Platinum	Global Leadership

VI. When to use IGBC Green Healthcare rating System®

IGBC Green Healthcare rating system® is designed for Subcentre, Primary Health Centre, Community Health Centre, District Hospital, Clinics, Private Hospitals and Medical Institutions.

The project team can evaluate all the possible points to apply under the rating system using a suitable checklist. The project can apply for IGBC Green Healthcare rating system® certification, if the project can meet all mandatory requirements and achieve the minimum required points.

VII. Registration

Organisations interested in registering their projects under IGBC Green Healthcare rating system Certification are advised to first register on IGBC website (www.igbc.in) under 'IGBC Green Healthcare rating System' tab. The website includes information on registration fee for IGBC member companies as well as non-members.

Registration is the first step which helps establish initial contact with IGBC and provides access to the required documents, templates, important communications and along with other necessary information.

IGBC website provides all important details on IGBC Green Healthcare rating system® registration & certification - process, schedule and fee.

VIII. Certification

To achieve the IGBC Green Healthcare rating, the project must satisfy all the mandatory requirements and the minimum number of credit points.

The project team is expected to provide supporting documents at preliminary and final stage of submission, for all the mandatory requirements and the credits attempted.

The project needs to submit the following:

- a) General information about project, including
 - i) Project brief stating project type, different type of spaces, occupancy, bed distribution, area / bed, number of floors, area statement, etc.,
 - ii) General drawings (in PDF format only):
 - ◆ Master/ Site plan
 - ◆ Macro zoning
 - ◆ Micro zoning (within the building)
 - ◆ Function planning
 - ◆ Parking plans
 - ◆ Floor plans
 - ◆ Elevations
 - ◆ Sections
 - ◆ Stack diagram
 - ◆ Medical equipment planning
 - iii) Photographs / Rendered images
- b) Filled-in templates
- c) Narratives and supporting documentation such as drawings, calculations (in excel sheets), declarations / contract documents, purchase invoices, manufacturer cut-sheets / letters / material test reports, etc., for each mandatory requirement and credit.

The project documentation is submitted in two phases - Preliminary submittal and Final submittal:

Preliminary phase involves submission of all documents, which shall include the mandatory requirements and the minimum number of credits. After the preliminary submission, review is done by third party assessors and review comments would be provided within 30 days.

The next phase involves submission of clarifications to preliminary review queries and final submittal. This review will also be provided within 30 days, after which the rating is awarded.

It is important to note that the mandatory requirements and credits earned at the preliminary review are only considered as expected. These mandatory requirements and credits are not awarded until the final documents are submitted, along with additional documents showing implementation of design features. If there are changes in any 'expected credits' after preliminary review, these changes need to be documented and resubmitted during the final review.

The next phase involves submission of clarifications to preliminary review queries and final submittal. This review will also be provided within 30 days, after which the rating is awarded

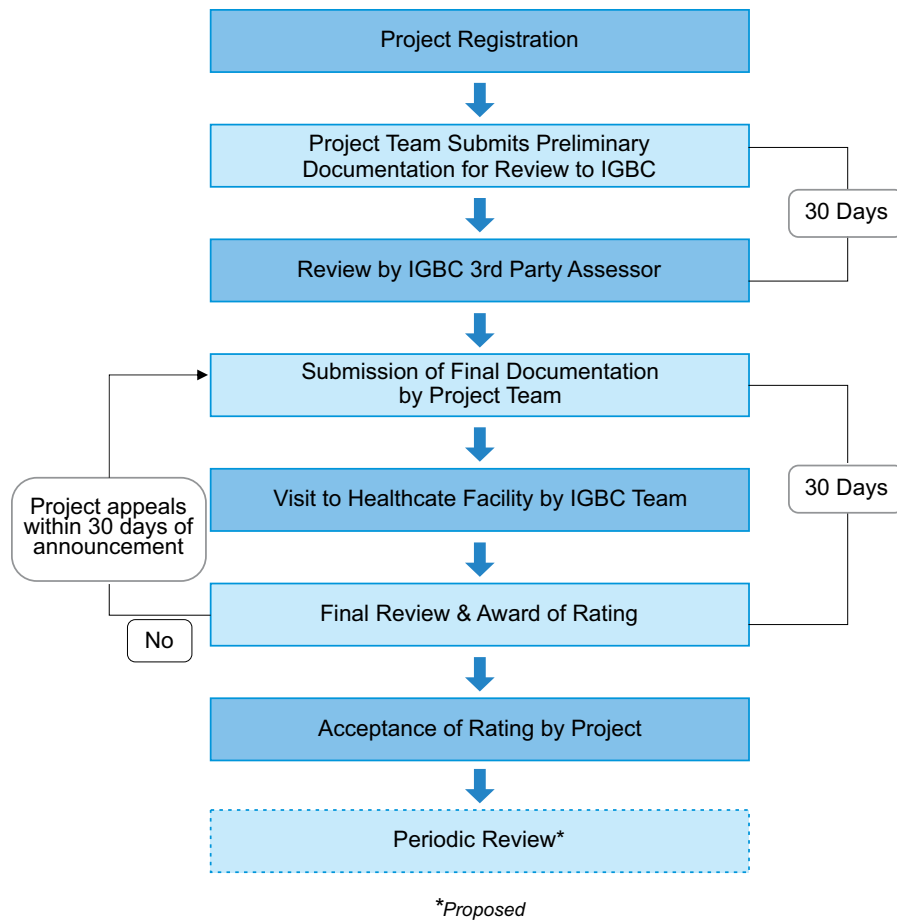
It is important to note that the mandatory requirements and credits earned at the preliminary review are only considered as expected. These mandatory requirements and credits are not awarded until the final documents are submitted, along with additional documents showing implementation of design features. If there are changes in any 'expected credits' after preliminary review, these changes need to be documented and resubmitted during the final review.

The threshold criteria for certification levels are as under:

Certification Level	Credits (New Healthcare facilities)	Credits (Existing Healthcare facilities)	Recognition
Certified	50-59	45-53	Best Practices
Silver	60-69	54-62	Outstanding Performance
Gold	70-79	63-71	National Excellence
Platinum	80-100	72-90	Global Leadership

IGBC will recognise Green Healthcare Facilities that achieve one of the rating levels with a formal letter of certification and a mountable plaque

IX. Certification Process



X. Credit Interpretation Ruling (CIR)

In some instances, there is a possibility that the design team may encounter certain challenges in applying or interpreting a mandatory requirement or a credit. It can also happen in cases where the project can opt to achieve the same intent through a different compliance route.

To address this, IGBC uses the process of Credit Interpretation Ruling (CIR) to ensure that interpretations are consistent and applicable to other projects as well.

The following are the steps to be followed in case the project team encounters any difficulty:

- Refer the Abridged Reference Guide for description of the credit intent and compliance options.
- Review the intent of the mandatory requirement / credit and self-evaluate whether the project satisfies the intent.
- Review the Credit Interpretation Ruling web page for previous CIRs on the relevant mandatory requirement or credit. All projects registered under IGBC Green Healthcare rating system will have access to this page.
- If a similar CIR has not been addressed or does not answer the question sufficiently, submit a credit interpretation request. Only registered projects are eligible to post credit interpretation request. Two CIRs are answered without levying any fee, and for any CIR beyond the first two CIRs, a fee is levied.

XI. Appeal

In rare cases, mandatory requirements / credits get denied due to misinterpretation of the intent. On receipt of the final review and if the project team feels that sufficient grounds exist to appeal a credit denied in the final review, the project has an option to appeal to IGBC for reassessment of denying mandatory requirements / credits. The documentation of the mandatory requirements / credits seeking appeal may be resubmitted to IGBC along with necessary fees. IGBC will take 30 days to review such documentation. If an appeal is pursued, please note that a different review team will be assessing the appeal documentation. The following documentation should be submitted:

1. General information about project, including
 - a. Project brief stating project type, different type of spaces, occupancy, number of floors, area statement, etc.,
 - b. General drawings (in PDF format only):
 - i. Master/ Site plan
 - ii. Parking plans
 - iii. Floor plans
 - iv. Elevations
 - v. Sections
 - vi. Stack diagram
 - c. Photographs / Rendered views
2. Filled-in templates for respective mandatory requirement / credit.
3. Resubmittal and appeal submittal documentation for only those mandatory requirements / credits that the project is appealing for. Also, include a narrative for each appealed mandatory requirement / credit to describe how the documents address the reviewers comments and concerns.

XII. Fee

Registration, Precertification / Provisional Certification, Certification and CIR fee details are available on the IGBC website (www.igbc.in) or can be obtained from IGBC (igbc@cii.in).

XIII. Updates and Addenda

As the rating system continues to improve and evolve, updates, addenda and errata to the abridged reference guide will be made available through IGBC website. The additions thereof will be suitably incorporated in the next version of the rating system

IGBC Green Healthcare Rating- Checklist

Module		New Healthcare Facility	Existing Healthcare Facility
Indoor Environmental Quality & Wellbeing			
IEQ Mandatory Requirement 1	Minimum Fresh Air Ventilation	Required	Required
IEQ Mandatory Requirement 1	Tobacco Smoke Control	Required	Required
IEQ Credit 1.1	Healing Architecture- Day lit Spaces	2	2
IEQ Credit 1.2	Healing Architecture- Connectivity to Nature	2	2
IEQ Credit 1.3	Healing Architecture- Green Open Spaces	2	2
IEQ Credit 1.4	Healing Architecture- Healing Garden	2	2
IEQ Credit 1.5	Healing Architecture- Colour Psychology	2	2
IEQ Credit 2	Acoustical Design	3	3
IEQ Credit 3	Ergonomics	2	2
IEQ Credit 4	Stress Relieving Spaces	2	2
IEQ Credit 5	Low Emitting Materials	4	4
IEQ Credit 6	Building Flushout, During Construction & Before Occupancy	1	Not Applicable
IEQ Credit 7	Air Quality Monitoring & Testing, After Occupancy	1	2
		23	23

Sanitisation & Hygiene

SH Mandatory Requirement 1	Municipal Solid Waste Management, Post-occupancy	Required	Required
SH Mandatory Requirement 2	Bio-medical Waste Management, Floor & Centralised level	Required	Required
SH Credit 1	Infection control within the Spaces	5	5
SH Credit 2	Isolation Room	2	2
SH Credit 3	Sanitation Design & Cleaning Practices	3	3
SH Credit 4	Automated Solid Waste Management System	2	Not Applicable
SH Credit 5	Organic Waste Management	2	2
		14	2

IGBC Green Healthcare Rating- Checklist

Module		New Healthcare Facility	Existing Healthcare Facility
Energy Efficiency			
EE Mandatory Requirement 1	Ozone Depleting Substances	Required	Required
EE Mandatory Requirement 2	Minimum Energy Efficiency	Required	Required
EE Mandatory Requirement 3	Commissioning Plan for Building Equipment & Systems	Required	Not Applicable
EE Credit 1	Eco-friendly Refrigerants	1	1
EE Credit 2	Enhanced Energy Efficiency	12	12
EE Credit 3	On -site Renewable Energy	5	5
EE Credit 4	Off-site Renewable Energy	2	2
EE Credit 5	Commissioning, Post-installation of Equipment & Systems	1	Not Applicable
EE Credit 6	Energy Metering & Management	2	2
		23	22

Water Conservation

WC Mandatory Requirement 1	Rainwater Harvesting, Roof & Non-roof	Required	Required
WC Mandatory Requirement 2	Water Efficient Plumbing Fixtures	Required	Required
WC Credit 1	Rainwater Harvesting, Roof & Non-roof	3	3
WC Credit 2	Water Efficient Plumbing Fixtures	5	5
WC Credit 3	Landscape Design	2	2
WC Credit 4	Management of Irrigation Systems	1	1
WC Credit 5	Waste Water Treatment and Reuse	3	3
WC Credit 6	Water Metering	1	1
		15	15

Building Materials & Resources

BMR Mandatory Requirement 1	Handling of Waste Materials, During Construction	Required	Not Applicable
BMR Credit 1	Sustainable Building Materials	3	Not Applicable
BMR Credit 2	Certified Green Building Materials, Products & Equipment	5	5
BMR Credit 3	Eco-friendly furniture and medical furnishing	1	1
		9	6

IGBC Green Healthcare Rating- Checklist			
Module		New Healthcare Facility	Existing Healthcare Facility
Site Selection & Planning			
SSP Mandatory Requirement 1	Local Building Regulations & Safety Compliance	Required	Required
SSP Mandatory Requirement 2	Soil Erosion Control	Required	Required
SSP Credit 1	Integrated Design Process	1	Not Applicable
SSP Credit 2	Passive Architecture	2	Not Applicable
SSP Credit 3	Value Added Services	1	1
SSP Credit 4	Proximity to Public Transport	1	1
SSP Credit 5	Low-emitting Vehicles	1	1
SSP Credit 6	Heat Island Reduction, Non-roof	1	1
SSP Credit 7	Heat Island Reduction, Roof	1	1
SSP Credit 8	Outdoor Light Pollution Reduction	1	1
SSP Credit 9	Universal Design	1	1
SSP Credit 10	Basic Facilities for Construction Workforce	1	Not Applicable
		11	7
Innovation in Design Process			
ID Credit 1.1	Innovation in Design Process	1	1
ID Credit 1.2	Innovation in Design Process	1	1
ID Credit 1.3	Innovation in Design Process	1	1
ID Credit 1.4	Innovation in Design Process	1	1
ID Credit 2	IGBC Accredited Professional	1	1
		5	5
	TOTAL	100	90

INDOOR ENVIRONMENTAL QUALITY & WELL BEING

Minimum Fresh Air Ventilation

IEQ Mandatory Requirement 1

Required

Intent:

Ensure all regularly occupied spaces are adequately ventilated, thereby improving health and well-being of the occupants

Compliance Options:

❖ Case A: Mechanically Ventilated Spaces

- Demonstrate that the fresh air ventilation (minimum outdoor air change) in all regularly occupied areas to meet the minimum ventilation rates, as prescribed in ASHRAE 170-2013 'Ventilation of Health Care' – Table 7 'Design Parameter'

Type of space	Minimum out air change hour
Recovery Room	2
Critical & Intensive care	2
Trauma room	3
Laboratory, sterilizing	2
Medication room	2

Refer Annexure-II 'Ventilation design parameter' for elaborative list of spaces

Source: ASHRAE 170-2013 'Ventilation of Health Care' – Table 7 'Design Parameter'

The facility should also have air scavenging system in all critical areas.

❖ Case B: Non Air-conditioned Spaces

- Provide operable windows and / or doors to the exteriors, in atleast 50% of the regularly occupied areas*, such that the operable area is designed to meet the criteria as outlined in the Table below:

Category	Percentage of Openable Area
Regularly Occupied Area (< 100 sq.m)	8%
Regularly Occupied Area (> 100 sq.m)	12%

➤ Cross Ventilation

Ensure atleast 50% of the regularly occupied spaces shall have an opening (door/ ventilators/ windows) to the outdoor environment, in atleast two of the orientation

Note:

- *Regularly occupied spaces includes Administration & Recreational areas, Patient areas and Clinical support areas. Refer Annexure-I 'Classification of spaces in healthcare facilities' for elaborative list.*

Tobacco Smoke Control

IEQ Mandatory Requirement 2

Required

Intent:

Minimise exposure of non-smokers to the adverse health impacts arising due to passive smoking in the building.

Compliance Options:

- ❖ Demonstrate that smoking is prohibited in the building, and is in accordance with the regulations of Ministry of Health & Family Welfare, Government of India.
- ❖ Demonstrate that smoking is prohibited within 100 m of the site/ campus.
A no smoking signage at the main entrance indicating that smoking is prohibited within 100 meters from the hospital campus

Healing Architecture- Day lit Spaces

IEQ Credit 1.1

Point(s): 1, 2

Intent:

Incorporate principle of healing architecture through adequate daylighting, thereby facilitating faster recovery

Compliance Options:

❖ Day lit spaces

- Demonstrate that atleast 25% of regularly occupied spaces achieve daylight illumination levels of minimum 110 Lux. Areas with daylight illumination levels more 2,200 Lux shall not be considered.

The project can design the systems for reducing the glare.

Percentage of Patient area with daylighting	Percentage of other regularly occupied spaces with daylighting	Points
25 %	25 %	1
50 %	50 %	2

The project can demonstrate the compliance through either of two methodologies:

➤ Option 1: Simulation Approach

Demonstrate the compliance through computer simulation in a clear sky condition on 21st September at 12 noon, at working plane.

➤ Option 2: Measurement Approach

Demonstrate the compliance through portable Lux Meter with resolution of 10 lux. The measurement shall be taken after installation of furniture, equipment & systems at work plane height at 9 am, 12 pm, and 3 pm, on a 10 foot square grid. To show compliance, consider the average of the measurements taken at 9 am, 12 pm, and 3 pm.

Note:

- *Regularly occupied spaces includes Administration & Recreational areas, Patient areas, and Clinical support areas. Refer Annexure-I 'Classification of spaces in healthcare facilities' for elaborative list.*

Healing Architecture- Connectivity to Nature

IEQ Credit 1.2

Point(s): 1, 2

Intent:

Incorporate principle of healing architecture by connecting indoor environment with outdoors, thereby facilitating faster recovery

Compliance Options:

❖ Connectivity to Nature

- Demonstrate that atleast 25% of regularly occupied spaces achieve direct line of sight to vision glazing between 0.9 meters (3 feet) and 2.1 meters (7 feet) above the finished floor level.

Percentage of patient area with connectivity to nature	Percentage of other regularly occupied spaces with daylighting	Points
25 %	25 %	1
50 %	50 %	2

- Also, the project shall comply with the following criteria:
 - ◆ The building occupants must not have any obstruction of views at least 8 meters (26.2 feet) from the exterior vision glazing.
 - (Or)
 - ◆ The building occupants must have direct access either to sky or flora & fauna or both.

Note:

- *Regularly occupied spaces includes Administration & Recreational areas, Patient areas, and Clinical support areas. Refer Annexure-I 'Classification of spaces in healthcare facilities' for elaborative list.*

Healing Architecture- Green Open Spaces

IEQ Credit 1.3

Point(s): 1, 2

Intent:

Incorporate principle of healing architecture by integrating green spaces, thereby providing therapeutic environment for faster recovery

Compliance Options:

❖ Green Open Spaces

- Demonstrate that atleast 20% of the project area (excluding the building footprint) is covered with green open spaces.

Percentage of Green Open Space	Points
20%	1
30%	2

Notes:

- *Only native/ adaptive shall be considered for this credit compliance*
- *Potted plants & Artificial landscape shall not be considered for the credit calculations*
- *The green open spaces shall be accessible to visitors, patients & staff*

Healing Architecture- Healing Garden

IEQ Credit 1.4

Point(s): 1, 2

Intent:

Incorporate principle of healing architecture by integrating green spaces within the built environment, thereby providing therapeutic environment for faster recovery

Compliance Options:

❖ Healing Garden

- Demonstrate that atleast 10% of the green open spaces are designed as patient centric healing garden

Percentage of Healing Garden	Points
10%	1
20%	2

Notes:

- *Healing garden is one that comprises of natural landscape elements (such as trees & plants) and can foster restoration from stress and faster recovery of patients*
- *Trees & plants that generates more oxygen, medicinal plants shall be considered*
- *Vertical landscaping to the external wall shall be considered*
- *Vegetation on the ground as well as vegetation over built structures such as roofs, basement, podiums shall be considered*
- *Healing Gardens shall be no smoking zones, away from smoking rooms, exhaust air locations etc.*

Healing Architecture- Colour Psychology

IEQ Credit 1.5

Point(s): 1, 2

Intent:

Incorporate principle of healing architecture through concept of colour psychology, thereby providing therapeutic environment for faster recovery

Compliance Options:

❖ Colour Psychology

Ensure that the healthcare spaces (such as Patient areas, Administration & Recreational areas etc.), are designed considering the positive effects of colours on patients & staff.

The design scheme may cover (not limited to) the following (minimum 2):

- Interior walls & ceilings
- Furniture
- Soft furnishing
- Textile (Bed-linen, Curtain)

Health Problem	Healing Colour
Depression	Light red
Low level of oxygen supply to brain	Orange
Sore throat	Green Light
Tremors, twitching & muscle spasms	Green
Anxiety	Purple
Upset Stomach, Normal headaches	Pink
Nervousness & irritability	Blue light
Boredom, depressive affect & appetite, high heartbeat, high blood pressure, temperature, Muscle pain	Shades of Blue
Agitated, Hypertensive, or anxious individual	Cool colours (smoke, ash, chrome, white, frost, grey, charcoal, graphite, silver, stone)

Source: Colour + Design, Ron Reed, 2012: Functional Colour & Design in Healthcare Environments; by Glidden Professional

Acoustic Design

IEQ Credit 2

Point(s): 1, 2,3

Intent:

Encourage acoustic design, to promote patients' well-being and productivity & communication of staff

Compliance Option:

- ❖ Demonstrate that following area shall meet the acoustics design criteria:

Areas	Points
Administration & Recreational areas	1
Patient areas	1
Support areas	1

- ❖ Acoustic Design Criteria:

Acoustic design should meet the following criteria:

Acoustic Guidelines for Healthcare Facilities			
No	Room/Space	BNL ^{a)} (dBA)	RT ^{a)} (sec)
01	Assembly/preparation, Reception/clerical Lounge/ Activity room, Waiting room	40-50	< 0.5
02	Staff room, Staff station	40-45	< 0.7
03	Interview room, Consult room	35-45	< 0.5
04	Office, Staff & technical support	35-45	< 0.7
05	Treatment room, procedure room, Angiography procedure, Operating room, Birthing room-LDR, Multi-patient bed room, Patient bay	40-50	< 0.6
06	Quiet lounge/seclusion room, Private/single bedroom, Observation room	35-45	< 0.6
07	Laboratories, ECG, Echo room trans oesophageal, Radiopharmacy, CT/ MRI scanning room, Dental plant room, EP laboratory/ Microbiology Lab	45-55	< 0.6
08	Multi-function activity room, Occupational therapy room, Gymnasium, Dental surgery, Library/ study area, play area	40-45	< 0.6
09	Audiology testing room c)	< 35	< 0.4
10	Clean-up/ Decontamination, Sterilising/Dental sterilising	40-45	< 0.5
11	Courtyard, Secure courtyard, Corridor	40-50	< 0.6
12	Pharmacy counter	45-50	< 0.5
13	Staff dining	50-55	< 0.6
14	Meeting room	30-40	< 0.6
15	Record processing, Pantry/servery	40-50	< 0.7

Source: Indian Health facility Guidelines

The project can follow one of the below approaches for calculating the reverberation time:

- The reverberation time (RT) shall be calculated based on Sabine's Formula of RT 60

$$RT = 0.161 \times (V / A)$$

V = room volume in m³

A = $\alpha \cdot S$

α = absorption coefficient

S = surface area

- The measurement methodology of ISO 3382-2:2008- Measurement of room acoustic parameters - Part 2: Reverberation time in ordinary rooms shall be followed.

The minimum resolution and accuracy of the instrument Table 10- 'Specifications of the instruments to be used for measuring IEQ parameters' of ISHRAE's draft Indoor Environmental Quality standards

Notes:

- *Please note BNL & RT denote the background noise level and reverberation time, respectively*
- *Refer Part E - Access, Mobility, OH&S - Isolation Room for design details, Indian Health Facility Guidelines*

Ergonomic Design

IEQ Credit 3

Point(s): 1, 2

Intent:

Design a healthcare facility with Ergonomics design, so as to ensure the comfort & safety of the occupants

Compliance Options:

❖ Internal Furniture in Spaces

- Ensure that the internal furniture design meets the Indian Health facility Guidelines- Part C Access, Mobility OH&S, Section 2- Ergonomics, '2.3-Standard Table' (or) equivalent standard to design the spaces based on the function

Item	Condition	Depth mm	Height mm	Thickness mm
Workbench	Utility	600	900	32
Writing bench 1	Typing	900	720	Max 50
Writing bench 2	Typing	750	720	Max 50
High Counter (parcel Shelf)	Over bench	250	1150	20-32
Shelving	Over 900 ht bench	350	1520-1810	20
Shelving	Over 720 ht bench	350	1370-1710	20
Shelving Unit	Full Height	350-400	1500-1810	20

Source: Indian Health Facility Guidelines

❖ **Circulation Parameters in Spaces**

- Ensure that the circulation within the spaces meets the Indian Health Facility Guidelines- Part C Access, Mobility OH&S, Section 1- Space Standards & Dimensions, Table 1.5 'Schedule of Circulation Percentages' (or) equivalent standard to design the circulation spaces

No	Department or Functional Planning Unit (FPU)	Minimum Circulation (%)
01	Acute mental health units	32
02	Administration unit	20
03	Allied health unit	25
04	Biomedical engineering	20
05	Catering unit	25
06	Cleaning / housekeeping unit	10
07	Clinical information unit	15
08	Coronary care unit	35
09	Day surgery/ procedure unit	35
10	Dental unit	20
11	Education & training unit	15
12	Emergency unit	40
13	Engineering & maintenance unit	15
14	Inpatient accommodation unit	32
15	Intensive care units	40
16	Laundry/ linen handling unit	10
17	Medical imaging units	35
18	Mortuary unit	15
19	Nuclear medicine unit	30
20	Obstetric unit	35
21	Operating unit	40
22	Paediatric / adolescent unit	32
23	Pathology unit	25
24	Pharmacy unit	25
25	Public amenities unit	10
26	Radiation oncology unit	30
27	Rehabilitation unit	32
28	Renal dialysis unit	32
29	Staff amenities unit	10
30	Sterile supply unit	20
31	Supply unit	10
32	Waste management unit	20

Source: Indian Health Facility Guidelines

Stress Relieving Spaces

IEQ Credit 4

Point(s): 1, 2

Intent:

Design spaces to enhance physical, emotional & spiritual well-being, thereby minimizing stress and anxiety

Compliance Options:

❖ **Space designed for Physical Fitness**

Demonstrate that atleast one of the following facility is available for 10% of staff, throughout the day

- Adequate space for facilities such as gymnasium, aerobics
- Any indoor / outdoor games facility such as badminton, table tennis, carom, chess etc.

❖ **Space designed for Mental Relaxation**

Demonstrate that atleast three of the following facilities are available for 10% of staff, throughout the day

- Adequate space for facilities such as yoga, meditation etc.
- Recreation spaces such as TV room, spa facilities for staff
- Dedicated recreational space/ Music room for doctors
- Dedicated dining space for staff & visitors
- Crèche facility for staff
- Library

Low-emitting Materials

IEQ Credit 5

Point(s):1-4

Intent:

Encourage use of material with low emissions, so as to reduce adverse health impacts on the occupants

Compliance Options:

❖ Paints & Coatings

Use paints and coatings (including primers) with low or no VOC content (as specified in Table-9 given below) for 95% of interior wall and ceiling surface area.

S No	Type of Paints & Coatings	VOC Limit (g/L less water)
1	Non-flat (Glossy)	150
2	Flat mat	50
3	Anti-corrosive/ Anti-rust	250
4	Clear Wood Finish: Varnish	350
5	Clear Wood Finish: Lacquer	550
6	Floor Coatings	100

❖ Adhesives

For adhesives used in the interiors, ensure that the VOC content does not exceed the limits as specified in Table-10 given below.

S No	Type of Adhesives	VOC Limit (g/L less water)
1	Glazing adhesives	100
2	Ceramic tile adhesives	65
3	Drywall and panel adhesives	50
4	Wood substrata adhesives	30
5	Wood flooring adhesives	100
6	HVAC duct insulation	850
7	Indoor Carpet adhesives	50

❖ Carpets:

All carpets installed in the building interior must comply with CRI Green Label Plus Carpet Programme.

Notes:

- *Project is eligible for this credit point only if, the carpet is installed in at least 10% of the project total carpet area.*
- *Carpets certified by IGBC under Green Product Certification Programme can be used by the project to show compliance, as and when the certified materials are available.*

❖ **Composite Wood**

Composite wood and Agri-fiber materials used in the building must not contain added urea-formaldehyde resins.

Notes:

- *Composite wood consists of wood or plant particles or fibers bonded together by a synthetic resin or binder. Examples include plywood, particle-board, and Medium-Density Fiberboard (MDF).*
- *Composite wood that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

Building Flush out, During Construction & Before Occupancy

IEQ Credit 6

Point(s): 1

Intent

Reduce indoor air quality problems resulting from construction activities, and promote comfort and well-being of construction workers and building occupants

Compliance Options:

Develop and implement an Indoor Air Quality (IAQ) management plan during construction and pre-occupancy phase, addressing the following measures, as applicable:

Note:

Consider 'During Construction Indoor Air Quality Management Guidelines' from National Building Code (NBC) of India, Part 7 - Constructional Practices and Safety.

❖ Scheduling

- Coordinate construction activities to minimise disruption of occupied spaces
- Carefully sequence construction activities to minimise IAQ issues
- Protect stored on-site and installed absorptive materials from moisture damage. Do not install moisture-damaged materials unless they have been properly dried

❖ Electrical & Mechanical Equipment & Systems Protection

- Store equipment & systems in a clean, dry location
- Protect ducts and equipment by sealing openings
- Clean air plenums before use

❖ Housekeeping

- Implement practices to ensure a clean job site to control potential contaminants such as dirt, dust and debris
- Clean up spills, and keep work areas dry

❖ Isolate Clean Areas

- Isolate areas to prevent contamination of clean or occupied spaces using physical separation

❖ Source Control

- Avoid use of finish materials with high VOC and formaldehyde levels
- Isolate and ventilate, as appropriate, when using any toxic materials or creating exhaust fumes
- Implement measures to avoid the tracking of pollutants into the work area and occupied portions of the building

Air Quality Monitoring & Testing

IEQ Credit 7

Point(s): 1, 2

Intent:

Encourage monitoring and maintenance of indoor environmental quality, to ensure occupants' comfort and well-being

Compliance Options:

❖ Continuous Monitoring Systems

Demonstrate that the project is monitoring the following indoor environmental parameters:

- Temperature
- Humidity
- TVOC
- Particulates
- CO₂

Have a public display system in common spaces such as reception areas, waiting lounges indicating the above levels

❖ Quarterly Monitoring (Existing Healthcare Facilities)

Conduct baseline IAQ testing using testing protocols consistent with the ISO method and demonstrate that the maximum concentration levels of contaminants are not exceeded than follows

Category	Maximum Concentration
TVOC	500 micrograms per cubic meter
Particulates (PM 2.5)	60 micrograms per cubic meter
CO ₂	530 ppm differential

The minimum resolution and accuracy of the instrument can be referred from Table 10- 'Specifications of the instruments to be used for measuring IEQ parameters' of ISHRAE's draft Indoor Environmental Quality standards.

Notes:

- *The facility should also have air scavenging system in all critical areas.*

SANITISATION AND HYGIENE

Municipal Solid Waste Management, Post-occupancy

SH Mandatory Requirement 1

Required

Intent:

Segregate municipal waste generated in healthcare facilities at source, so as to prevent the waste being sent to land-fills

Compliance Options:

❖ Building-level Facility

Provide separate bins to collect dry waste (paper, plastic, metals, glass, etc.,) and wet waste (organic), at all floors and common areas of the facility, as applicable. Divert the collected waste to a centralised facility, which is easily accessible for hauling

(AND)

❖ Centralised Facility

In addition to dry and wet waste bins, provide separate bins for safe disposal of the following hazardous waste, at the centralised facility:

- **Battery**
- **'e' waste**
- **Lamps**

Note:

- *The project has to follow the Hazardous Waste Management Guidelines as prescribed by the Ministry of Environment & Forest (MoEF), Government of India.*

Bio-medical Waste Management, Floor & Centralised level

SH Mandatory Requirement 2

Required

Intent:

Segregate bio-medical waste at source, so as to prevent direct exposure, thereby improving sanitation & hygiene

Compliance Options:

❖ Solid Bio-medical Waste Management

Provide separate bins at all floor levels to collect biomedical waste. The segregation & storage shall adhere Schedule-I of Bio-Medical Waste (Management and Handling) Rules-2016

Refer Appendix-III 'Bio-medical waste categories'

Biomedical waste categories & colour coding of bins are as follows:

SNo	Type of Waste	Colour Coding
1	Human Anatomical Waste	Yellow
2	Animal Anatomical Waste	
3	Soiled Waste	
4	Expired or Discarded Medicines	
5	Chemical Waste	
6	Contaminated Waste (Recyclable)	Red
7	Waste sharps including Metals	White
8	Glassware	Blue
9	Metallic Body Implants	

Source: Bio-Medical Waste (Management and Handling) Rules-2016

❖ Chemical Liquid Bio-medical Waste Management

Provide separate collection system (at lab & centralized level) to carry chemical liquid waste leading to effluent treatment system (ETP)

The chemical liquid waste shall be pre-treated before mixing with other wastewater. The combined discharge shall conform to the discharge norms given below:

SNo	Parameter	Permissible Limits
1	pH	6.5-9.0
2	Suspended Solids	100 mg/l
3	Oil & Grease	10 mg/l
4	BOD	30 mg/l
5	COD	250 mg/l
6	Bio-assay test	90% survival of fish after 96 hours in 100% effluent

Notes:

- *Ensure the process of disposing the biomedical waste adhere to methodology indicated by MOEF's Biomedical Waste Management Rules 2016*
- *Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities. (Bio-Medical Waste-Management and Handling Rules)*
- *Chemical liquid waste is waste generated due to use of chemicals in production of biological and used or discarded disinfectants, Silver X-ray film developing liquid, discarded Formalin, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning, house-keeping and disinfecting activities etc. (Bio-Medical Waste- Management and Handling Rules)*

Infection Control within the Spaces

SH Credit 1

Point(s):1-5

Intent:

Provide appropriate infection control parameters & systems in healthcare facilities, thereby reducing the nosocomial infections

Compliance Options:

❖ Filtration

Demonstrate that the minimum efficiency reporting values in all spaces to meet ASHRAE 170 - 2013 'Ventilation of Health Care' – Table 6.4

SNo:	Space Designation (According to Function)	Filter Bank No. 1 (MERV) ^a	Filter Bank No. 2 (MERV) ^a
1	Operating rooms (Class B and C surgery); inpatient and ambulatory diagnostic and therapeutic radiology; inpatient delivery and recovery spaces	7	14
2	Inpatient care, treatment, and diagnosis, and those spaces providing direct service or clean supplies and clean processing (except as noted below);All (rooms)	7	14
3	Protective environment (PE) rooms	7	HEPA ^{c,d}
4	Laboratories; Procedure rooms (Class A surgery), and associated semi restricted spaces	13 ^b	NR
5	Administrative; bulk storage; soiled holding spaces; food preparation spaces; and laundries	7	NR
6	All other outpatient spaces	7	NR
7	Nursing facilities	13	NR
8	Psychiatric hospitals	7	NR
9	Resident care, treatment, and support areas in inpatient hospice facilities	13	NR
10	Resident care, treatment, and support areas in assisted living facilities	7	NR

❖ **Pressurization**

Demonstrate that the pressurization methodology in all regularly occupied spaces shall meet the pressure relationship to the adjacent areas, as prescribed in ASHRAE 170-2013 ‘Ventilation of Health Care’ – Table 7

Type of space	Pressure Relationship to the adjacent areas
Operating room	Positive
Delivery room	Positive
Medical/anesthesia gas storage	Negative
Laboratory, general	Negative

Refer Annexure-II ‘Ventilation Design Parameter’ for elaborative list of spaces

❖ **Purification**

➤ **Air-conditioned healthcare facilities:**

Install one of the following air purification technologies for meeting the compliance

- ◆ Germicidal/ UV lamps in Air Handling Unit (AHU) cooling coils
- ◆ Photo Hydro Ionization O+ (PHIO+) at duct level

➤ **Non Air-conditioned healthcare facilities:**

Install one of the following air purification technologies for meeting the compliance

- ◆ Upper room UVGI
- ◆ Standalone systems with minimum 90% microbial reduction capability

❖ **Antibacterial surfaces**

Demonstrate that the high touch surfaces that are prone to infections, adopt one of the following

- Copper/ copper coating approved by International Copper Association India (ICAI)
- Bacteriostatic coatings

Use coatings comprised of a material that is antimicrobial, abrasion-resistant, non-leaching and is supported by valid tests on common microbial.

Refer Annexure-III for list of high touch surfaces as defined by Centre for Disease Control & Prevention

Entryway System

- ◆ Install entryway systems of minimum 2 meters (6 feet) in length, at all building main entrances (public entrance and service entrance)

Isolation Room

SH Credit 2

Point(s):1,2

Intent:

Ensure adequate & well designed isolation rooms, thereby eliminate the risk of Hospital Acquired Infections (HAI)

Compliance Options:

❖ **Isolation Rooms**

- 10% of the total bed Inpatient Accommodation Units shall be designed as isolation room, Class S – Standard Pressure

Refer Part D- Infection Control- Isolation Room for design details, Indian Health Facility Guidelines

❖ **Filtration and Pressurization**

The Filtration and Pressurization Parameters shall meet the requirements as prescribed in ASHRAE 170-2013 'Ventilation of Health Care' – Table 7.1 'Design Parameter'

Refer Annexure-II 'Ventilation Design Parameter' for elaborative list of spaces

Sanitation Design & Cleaning Practices

SH Credit 3

Point(s):1,2,3

Intent:

Ensure good sanitation & hygiene, design & maintenance practices, to reduce cross infections, thereby reducing risk of Hospital Acquired Infections (HAI)

Compliance Option:

❖ Washroom Design

Ensure the washroom design shall adhere to the requirement of National Building Code-Part 9, Table 13, 14 & 15 or Indian Public Health Standards (IPHS) Guidelines.

Refer Annexure-V 'Wash Room Design' for elaborative list of spaces

The design & quantity for Indoor Patient Wards, Outdoor Patient Department, Administrative Block & Nursing Homes shall address (not limited to) the following:

- Water closets
- Washbasin
- Showers
- Urinals
- Ablution tap
- Drinking water fountain

❖ Eco-friendly Housekeeping Chemicals

Demonstrate that project is using housekeeping chemicals that meet green seal standard (GS-37) or other Indian/European equivalent standards, for all building applications

❖ Cleaning Protocol in spaces

➤ High Touch Surfaces

Ensure that the High Touch Surfaces in all regular occupied spaces are mopped, sanitized on a daily basis (frequency as required)

The project may adopt protocol provided by Centre for Disease Control & Prevention (CDC) for evaluating Environmental Cleaning in Hospitals

High-touch Surfaces	Cleaned	Not Cleaned	Not Present in Room
Bed rails / controls			
Tray table			
IV pole (grab area)			
Call box / button			
Telephone			
Bedside table handle			
Chair			
Room sink			
Room light switch			
Room inner door knob			
Bathroom inner door knob / plate			
Bathroom light switch			
Bathroom handrails by toilet			
Bathroom sink			
Toilet seat			
Toilet flush handle			
Toilet bedpan cleaner			

Source- CDC

Automated Solid Waste Management System

SH Credit 4

Point(s): 1, 2

Intent

Facilitate automatic waste collection system to reduce human intervention & exposure in handling hospital waste, thereby improving sanitation & Hygiene

Compliance Option:

❖ **New healthcare facilities**

Install automatic waste collection systems for handling atleast 25% of bio-medical waste

Percentage of bio-medical waste catered	Points
25 %	1
50 %	2

Organic Waste Management

SH Credit 5

Point(s): 1, 2

Intent:

Ensure effective organic waste management, so as to avoid domestic waste being sent to landfills

Compliance Options:

- ❖ Install an on-site waste treatment system for handling at least 50% of the organic (kitchen, landscape) waste generated in the facility. The generated manure shall be utilised for landscape requirement

Percentage of Organic waste treated	Points
50%	1
75%	2

Notes:

- *For calculation, food waste can be considered as 0.1 kg per person per day (i.e. 0.1 kg/ person/ day) or as prescribed by the local byelaw, whichever is more stringent*
- *If the project is having an organic waste convertor in an enclosed room, then design such area with exhaust system, self-closing door, deck-to-deck partition/ hard ceiling*

ENERGY EFFICIENCY

Ozone Depleting Substances

EE Mandatory Requirement 1

Required

Intent:

Encourage use of eco-friendly refrigerants and halons in the facility, thereby minimizing negative impact on the ozone layer.

Compliance Options:

❖ **CFC-free Refrigerants**

Demonstrate that refrigerants used in the facility Heating, Ventilation & Air-conditioning (HVAC) equipment are CFC (Chloro Fluoro Carbon)-free.

(AND)

❖ **Halon-free Fire Suppression Systems**

Demonstrate that fire suppression systems used in the facility are free from Halons or any other ozone depleting substances

Minimum Energy Efficiency

EE Mandatory Requirement 2

Required

Intent:

Optimise energy consumption, so as to reduce negative environmental impacts from excessive energy use.

Compliance Options:

❖ New healthcare facilities

➤ Case A - Air-conditioned healthcare facilities

Design the facility to comply with Energy Conservation Building Code (Revised Version May, 2008) (or) ASHRAE Standard 90.1-2013 (without amendments) through one of the following approaches:

- ◆ Option 1 - Performance based approach (Whole building simulation)
- ◆ Option 2 - Prescriptive approach

The total annual energy consumption of the building should not exceed the total base case energy consumption computed, as per ECBC (or) ASHRAE Standard 90.1-2013.

- ◆ Option 1 - Performance Based Approach (Whole Building Simulation)

Demonstrate compliance of the facility performance by whole facility simulation, as per the baselines outlined in ECBC (or) ASHRAE Standard 90.1-2013 (without amendments), Appendix - G. Simulation is to be carried out at comfort temperatures of 24 ± 2 deg C.

Notes:

- *In cases where lighting systems are yet to be installed, the proposed case LPD during simulation shall be same as the base case.*
- *Projects that use on-site renewable energy sources (such as solar energy, wind power, biomass, etc.) can subtract renewable energy generated from the total annual energy consumption of the proposed case.*
- *Projects that use solar hot water systems can model the systems in the proposed case, as against electrical heaters in the base case, to show energy savings.*
- *Projects which have process loads not related to building operations should be considered during simulation. While reporting, such loads can be excluded from the base case and proposed case annual energy consumption. The process loads which are excluded shall be justified with a narrative.*
- *Project with multiple buildings (including projects with common basement) must independently meet the Minimum Energy Performance criteria for each building.*

◆ Option 2 - Prescriptive Approach

The project should meet the applicable criteria as established in prescriptive measures of ECBC (or) ASHRAE Standard 90.1-2013 (without amendments).

➤ **Case B - Non air-conditioned healthcare facilities: (Prescriptive Approach)**

Non air-conditioned facilities are those which are not serviced and will not be serviced in the future, either through central air-conditioned systems or unitary air-conditioners.

- Air-conditioning may be considered for critical areas, not more than 10% of the total regularly occupied area.
- Spaces with unitary air-conditioners shall comply with IEQ Mandatory Requirement
1 - Fresh Air Ventilation, Non air-conditioned buildings criteria

Non air-conditioned buildings shall meet the following prescriptive measures, as applicable:

1) Building Envelope:

The project must ensure that the following building envelope measures meet the baseline criteria as outlined in Annexure - VII

- Solar Heat Gain Coefficient (SHGC) *
- Window Glazing U-value (only if WWR > 40%) **
- Overall Wall Assembly U-value
- Overall Roof Assembly U-value

Notes:

- *For Climatic Zones of India, please refer Annexure - VI.*
- **Low SHGC value can be achieved through chajjas or other sun shading devices or efficient fenestration or a combination of both. For details, refer ECBC section 4.3.3 - Vertical Fenestration, Exception to ECBC 4.3.3.*
- ***Compliance for window glazing U-value should be shown only if Window-to-Wall Ratio (WWR) is more than 40%.*

2) Lighting:

The Lighting Power Density (LPD) in the building interior, exterior and parking areas shall be reduced by minimum 10% over ECBC base case.

Notes:

- *Compliance for the lighting power density shall be shown either through 'Building Area Method' or 'Space Function Method'. If 'Building Area Method' is considered, compliance for parking area lighting shall be shown separately.*
- *Exterior areas illuminated by lighting only should be considered for lighting power density calculations.*
- *The LPD should include power consumption of complete fixture, including lamps and ballasts*

3) Air-conditioning Systems:

Projects having air-conditioners (as per criteria the defined for non air-conditioned buildings), shall consider unitary air-conditioners with BEE 3-star rating (or) air-conditioners with a COP equivalent to 3.1 (EER of 10.58), or more.

4) Heating Systems:

Projects having more than 150 Heating degree days** (HDD18) shall consider heating systems in proposed case to meet a base line COP of 2.5 (EER of 8.53), when heat pumps are installed in the building.

Notes:

- *** Degree day: The difference in temperature between the outdoor mean temperature over 24 hour period and a given base temperature.*
- ***Heating degree day base 18oC, (HDD 18): For any one day, when the mean temperature is less than 18oC, there are as many degree-days as degree centigrade temperature difference between the mean temperature for the day and 18oC.*

Annual heating degree-days (HDDs) are the sum of the degree-days over the calendar year.

5) Fans:

Fans installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

6) Pumps & Motors:

Pumps & Motors installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

General Notes:

- *Projects which use on-site renewable energy sources (such as solar energy, wind power, biomass, etc.,) can subtract renewable energy generated from the total energy of the proposed case.*
- *Projects installing solar hot water systems can assume electrical heating in the base case.*
- *Energy efficient materials, products and equipment that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance*

❖ Existing healthcare facilities:**➤ Option 1- EPI Approach**

Demonstrate that the annual energy consumption in the facility is within the Energy Performance Index (EPI) limits as mentioned in the table below:

Climatic Zone	EPI range
Warm & Humid	275
Composite	264
Hot & Dry	261
Moderate	247

Source: Implementing Energy Efficiency in Buildings (A report by UNDP, BEE)

➤ Option 2 - Performance Based Approach (Whole Building Simulation)

Demonstrate compliance of the facility performance by whole building simulation, as per the baselines outlined in ECBC (or) ASHRAE Standard 90.1-2010 (without amendments), Appendix - G. Simulation is to be carried out at comfort temperatures of 24 ± 2 deg C

Commissioning Plan for Building Equipment & Systems

EE Mandatory Requirement 3

Required

Intent:

Verify and ensure that the facility's equipment & systems are commissioned to achieve performance as envisaged during the design stage.

Compliance Options:

The project shall comply with the following requirements:

- ❖ Demonstrate that the project owner has signed an agreement with third party commissioning authority, not involved in the design. The commissioning authority is also required to have at least 3 years prior experience in equipment & systems.

Notes:

- Air-conditioned healthcare facilities: Projects with less than 2,000 sq.m of built-up area, the owner or the designer can submit the commissioning plan.
- Non air-conditioned healthcare facilities: For non-air-conditioned projects, the owner or the designer can submit the commissioning plan.

(AND)

- ❖ Document owners brief in terms of performance expectations from the facility.
- ❖ Submit a plan to show how the facility would be audited for its green building performance after occupancy, with regard to the following:
 - HVAC systems - chiller, VRV systems, primary & secondary water pumps, cooling tower, AHU fans, fresh air fans and flow settings, fresh air treatment units, heat recovery wheel, VFDs
 - Unitary air-conditioners
 - Temperature and RH measurements in individual spaces
 - Pumps & motors
 - Lighting systems
 - Renewable energy systems
 - CO2 monitoring system
 - Energy & Water metering
 - Building management system
 - DG sets or Back-up systems
 - Sewage treatment plant
 - Any other equipment and systems

- ❖ Report specific observations and variations identified by commissioning authority to the project owner, for each equipment & system, with respect to commissioning plan and how they were addressed.
- ❖ Submit measurement & verification plan for yearly reporting.
- ❖ Submit post-occupancy survey to verify occupant comfort (lighting levels, temperature, relative humidity, noise levels, etc.,)
- ❖ Report on green building performance of the equipment & systems listed in commissioning plan. The report for each of the equipment & systems should cover the following:
 - Equipment specifications
 - Test results with specific comments from the Commissioning Authority, at the time of commissioning
 - Key monitoring aspects to sustain performance
 - Estimated energy & water consumption
 - Scope for performance enhancing in future, and savings thereof

Eco-friendly Refrigerants

EE Credit 1

Point(s): 1

Intent

Encourage use of eco-friendly refrigerants in the facility, thereby minimising impact on the ozone layer.

Compliance Options

- ❖ Demonstrate that refrigerants used in the facility Heating, Ventilation & Air-conditioning (HVAC) equipment are eco-friendly and have low or no Ozone Depletion Potential (ODP) and Global Warming Potential (GWP).

The projects HVAC equipment must comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential:

$$\text{LCGWP} + \text{LCODP} \times 10^5 < 13$$

LCODP : $[\text{ODPr} \times (\text{Lr} \times \text{Life} + \text{Mr}) \times \text{Rc}] / \text{Life}$

LCGWP : $[\text{GWPr} \times (\text{Lr} \times \text{Life} + \text{Mr}) \times \text{Rc}] / \text{Life}$

LCODP : Lifecycle Ozone Depletion Potential (kg CFC 11 / kW-Year)

LCGWP : Lifecycle Direct Global Warming Potential (kg CO₂ / kW-Year)

GWPr : Global Warming Potential of Refrigerant (0 to 12,000 kg CO₂ / kg r)

ODPr : Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC 11 / kg r)

Lr : Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)

Mr : End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)

Rc : Refrigerant Charge (0.065 to 0.65 kg of refrigerant per kW of gross AHRI rated cooling capacity or Eurovent Certified cooling capacity)

Life : Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

Notes:

- For multiple types of equipment, a weighted average of all base building HVAC&R equipment must be calculated using the following formula:

$$\sum \frac{(\text{LCGWP} + \text{LCODP} \times 10^5) \times Q_{\text{unit}}}{Q_{\text{total}}} \leq 13$$

Q_{unit} = Eurovent Certified cooling capacity of an individual HVAC or refrigeration unit (kW) (or) Gross AHRI rated cooling capacity of an individual HVAC or refrigeration unit (kW)

Q_{total} = Total Eurovent Certified cooling capacity of all HVAC or refrigeration (kW) (or) Total gross AHRI rated cooling capacity of all HVAC or refrigeration

- Small HVAC units (containing less than 0.25 kg of refrigerant) need not be considered in calculation

Enhanced Energy Efficiency

EE Credit 2

Point(s): 1-12

Intent:

Optimise energy consumption, to reduce negative environmental impacts from excessive energy use.

Compliance Options:

❖ New Healthcare facilities

➤ Case A - Air-conditioned healthcare facilities:

Design the facility to comply with ASHRAE Standard 90.1-2013, Appendix - G (without amendments) through Performance based approach (Whole building simulation). Simulation is to be carried out at comfort temperatures of 24 + 2 deg C.

Points are awarded based on energy cost percentage savings as detailed below:

Percentage of Energy Cost Savings over ASHRAE Standard 90.1-2013 Base case	
New Healthcare Facilities	Points
6%	1
8%	2
10%	3
12%	4
14%	5
16%	6
18%	7
20%	8
22%	9
24%	10
26%	11
28%	12

Notes:

- *Project with multiple buildings (including projects with common basement) must independently meet the minimum energy performance criteria for each building, to be eligible for Enhanced Energy Performance.*
- *Major Renovation Buildings are those buildings where significant modifications have been made in the building envelope, mechanical and electrical systems.*
- *Energy efficient materials, products and equipment that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

➤ **Case B - Non air-conditioned healthcare facilities: (Prescriptive Approach)**

Non air-conditioned facilities shall meet or exceed the following prescriptive measures, as applicable:

1) Building Envelope: (3 Points)

The project must ensure that at least three of the following building envelope measures meet the baseline criteria as outlined in Annexure - VIII.

- ◆ Solar Heat Gain Coefficient (SHGC)
- ◆ Window Glazing U-value
- ◆ Overall Wall Assembly U-value
- ◆ Overall Roof Assembly U-value

2) Lighting:

◆ **Lighting Power Density: (2 Points)**

The lighting power density in the building interior, exterior and parking areas shall be reduced by minimum 20% over ECBC base case.

Points are awarded as below:

Reduction in Lighting Power Density	Points
≥ 20 %	1
≥ 30 %	2

◆ **Lighting Controls: (1 point)**

All non-emergency exterior & common area lighting such as façade, pathways, landscaping, surface and covered parking, street lighting, staircases should have at least one of the following:

- ◆ Daylight sensor
- ◆ Occupancy / Motion sensor
- ◆ Timer

3) Air-conditioning Systems: (2 Point)

Projects having 90% of air-conditioners (as per the criteria defined for non-air conditioned buildings), shall consider unitary air-conditioners with BEE 5-star rating (or) air-conditioners with a COP equivalent to 3.5 (EER of 11.95), or more.

4) Heating Systems: (1 Point)

Projects having more than 150 Heating degree days** (HDD18) shall consider heating systems in proposed case and show a minimum of 10% efficiency over the baseline COP of 2.5 (EER of 8.53), when heat pumps are installed in the building.

5) Fans: (2 Points)

Fans installed in the building shall have an efficiency equivalent to BEE 5-star rating

6) Pumps & Motors: (1 Point)

Pumps & Motors installed in the building shall have an efficiency equivalent to BEE 5-star rating.

Note:

- *Energy efficient materials, products and equipment that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ Existing healthcare facilities:**➤ Option 1- EPI Approach**

Demonstrate that the annual energy consumption in the building is within the Energy Performance Index (EPI) limits as mentioned in the table below.

Climatic Zone	EPI range
Warm & Humid	275
Composite	264
Hot & Dry	261
Moderate	247

Source: *Implementing Energy Efficiency in Buildings (A report by UNDP, BEE)*

➤ Option 2 - Performance Based Approach (Whole Building Simulation)

Demonstrate compliance of the building performance by whole building simulation, as per the baselines outlined in ECBC (or) ASHRAE Standard 90.1-2013 (without amendments), Appendix - G. Simulation is to be carried out at comfort temperatures of 24 + 2 deg C

Points are awarded based on energy percentage savings as detailed below:
(for Option 1 & Option 2)

Percentage of Energy Savings over EPI	
New Healthcare Facilities	Points
6%	1
8%	2
10%	3
12%	4
14%	5
16%	6
18%	7
20%	8
22%	9
24%	10
26%	11
28%	12

On-site Renewable Energy

EE Credit 3

Point(s): 1-5

Intent:

Encourage the use of on-site renewable technologies, to minimise the environmental impacts associated with the use of fossil fuel energy

Compliance Options:

❖ Option 1:

Demonstrate on-site renewable energy generation for at least 1% of total annual energy consumption of the facility (interior & exterior areas).

Points are awarded as below:

Percentage of On-site Renewable Energy Generated to the Total Annual Energy Consumption	Points
≥ 1 %	1
≥ 2 %	2
≥ 3 %	3
≥ 4 %	4
≥ 5 %	5

❖ Option 2:

If the annual energy consumption is not yet known, demonstrate on-site renewable energy generation for at least 4% of total connected load (interior & exterior areas).

Percentage of On-site Renewable Energy Generated to the Total Annual Energy Consumption	Points
≥ 4 %	1
≥ 8 %	2
≥ 12 %	3
≥ 16 %	4
≥ 20 %	5

Off-site Renewable Energy

EE Credit 4

Point(s): 1, 2

Intent:

Encourage the use of off-site renewable technologies, to minimise the environmental impacts associated with fossil fuel energy use.

Compliance Options

❖ Option 1: Off-site Renewable Energy Investments

- Demonstrate that the project has invested in off-site renewable energy equivalent to at least 50% of the total annual energy consumption of the facility.

Note:

- *The contract with the off-site renewable energy developer to generate energy shall be for a minimum period of two years.*

Points are awarded as below:

Percentage of Off-site Renewable Energy Generated to the Total Annual Energy Consumption	Points
≥ 50%	1
≥ 95%	2

(OR)

❖ Option 2: Renewable Energy Certificates (RECs)

- Demonstrate that the project has purchased Renewable Energy Certificates (RECs) equivalent to at least 25% of the total annual energy consumption of the building

Points are awarded as below:

Percentage of Renewable Energy Certificates (RECs) Purchased	Points
≥ 25%	1
≥ 50%	2

Notes:

- *Composite wood consists of wood or plant particles or fibers bonded together by a synthetic resin or binder. Examples include plywood, particle-board, and Medium-Density Fiberboard (MDF).*

General Notes:

- *Type of renewable energy source shall be in compliance with the Ministry of New and Renewable Energy (MNRE), Government of India and respective State Regulatory Commissions.*
- *Off-site renewable energy so generated shall be counted only once.*
- *Hydro power projects with 25 MW or lesser size shall only be considered under this credit.*
- *For credit calculations, RECs purchased in the last 6 months of building operation can also be considered, to show compliance.*
- *In case, the Project purchases RECs through an Authorised Agency of exchange, then a legal contract should exist between the Authorised Agency and the Project*
- *The total annual energy consumption can be arrived either through Performance based approach (Whole building simulation) or Prescriptive approach*

Commissioning, Post-installation of Equipment & Systems

EE Credit 5

Point(s): 1

Intent:

Verify and ensure that the facility equipment & systems are commissioned to achieve performance as envisaged at the design stage.

Compliance Options:

The project shall comply with the following requirements:

- ❖ Report specific observations and variations vis-à-vis the plan drawn under EE MR 3, identified during post occupancy commissioning and report how they were addressed.
- ❖ Demonstrate that there is an agreement in place for post occupancy commissioning by a third party commissioning authority for a period of one year, to ensure that the commissioned equipment & systems perform efficiently.

Energy Metering & Management

EE Credit 6

Point(s): 2

Intent:

Encourage sub-metering and continuous monitoring to identify improvement opportunities in facility's energy performance.

Compliance Options:

❖ **Case A: Energy Metering: (1 point)**

Demonstrate sub-metering for at least five of the following energy use applications, as applicable:

- Interior & Common area lighting
- Exterior area lighting
- Municipal water pumping
- Ground water pumping
- Treated waste water pumping
- Renewable energy generation
- Power backup systems (Generators sets, Gas turbines, etc.,)
- Elevators, Escalators, Travelators, etc.,
- Any other energy consuming equipment and systems

(And / Or)

❖ **Case B: Building Management System: (1 point)**

Demonstrate that the building management system is in place to monitor and control the following systems, as applicable:

- Air-conditioning management system
- Lighting management system
- Renewable energy management system
- Elevator management system
- Fresh air monitoring system
- CO2 control and monitoring system

Also, commit to provide the annual total building energy consumption data to IGBC. The energy data shall be provided for all the major energy consuming equipment and systems

WATER CONSERVATION

Rainwater Harvesting, Roof & Non-roof

WC Mandatory Requirement 1

Required

Intent:

Enhance ground water table and reduce municipal water demand through effective rainwater management.

Compliance Options:

- ❖ Design rainwater harvesting system to capture at least 'one-day rainfall*' runoff volume from roof and non-roof areas.

* One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table below

To arrive at average peak month rainfall, consider an average of at least last 5 years peak month rainfall (of the respective year).

Table - Criteria to arrive at 'One-day Rainfall'

S No	Average Peak Month Rainfall (in mm)	One-day Rainfall (% of Average Peak Month Rainfall)
1	Upto 250	9%
2	251 – 350	7.5%
3	351 – 500	6%
4	501 – 700	4.5%
5	701 & above	3%

In areas where the Central / State Ground Water Board does not recommend artificial rain water recharge (or) if the groundwater table is less than 8 meters, the project is required to provide justification for not implementing rainwater harvesting system.

Notes:

- For rainfall information, refer Indian Meteorological Department data at <http://www.imd.gov.in>
- $Runoff\ volume = Surface\ area \times Runoff\ Coefficient \times Rainfall.$
- Consider Rainwater Harvesting Guidelines (as and when available) from the National Building Code (NBC) of India, Part 11 - Approach to Sustainability, Section 7.2 - Rainwater Harvesting-Surface Runoff.
- In areas where the water percolation is limited, collection tanks / water bodies may be provided to meet the above requirement.
- Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies, municipal storm water drains

Runoff Coefficients for Typical Surface Types

S No	Surface Type	Runoff Coefficient
1	Cemented / Tiled Roof	0.95
2	Roof Garden (<100 mm thickness)	0.5
3	Roof Garden (100 – 200 mm thickness)	0.3
4	Roof Garden (201 – 500 mm thickness)	0.2
5	Roof Garden (> 500 mm thickness)	0.1
6	Turf, Flat (0 - 1% slope)	0.25
7	Turf, Average (1 – 3% slope)	0.35
8	Turf, Hilly (3 - 10% slope)	0.4
9	Turf, Steep (> 10% slope)	0.45
10	Vegetation, Flat (0 - 1% slope)	0.1
11	Vegetation, Average (1 - 3% slope)	0.2
12	Vegetation, Hilly (1 - 3% slope)	0.25
13	Vegetation, Steep (> 10% slope)	0.3
14	Concrete Pavement	0.95
15	Gravel Pavement	0.75
16	Open-grid Concrete Pavement	0.75
17	Open-grid Grass Pavement	0.5
18	Water Bodies (lined) Ex: Swimming Pool	0.95
19	Water Bodies (un-lined) Ex: Water Pond	0

Water Efficient Plumbing Fixtures

WC Mandatory Requirement 2

Required

Intent:

Enhance efficiency of plumbing fixtures, thereby minimising potable water use.

Compliance Options:

- ❖ Use water efficient plumbing fixtures (as applicable) whose flow rates meet the baseline criteria in aggregate. The total annual water consumption of the healthcare facility should not exceed the total base case water consumption computed.

Note:

- *Use of treated waste water/ captured rain water shall not be considered to show water savings.*

The baseline criteria is as below:

Baseline Flow Rates / Consumption for Plumbing Fixtures

Fixture Type	Maximum Flow Rate/ Consumption	Duration	Estimated Daily Uses per FTE **
Water Closets (Full-flush)	6 LPF	1 flush	1 for male; 1 for female
Water Closets (Half-flush)	3 LPF	1 flush	2 for female
Urinals	4 LPF	1 flush	2 for male
Faucets / Taps*	6 LPM	15 seconds	4
Health Faucet*	6 LPM	15 seconds	1
Showerhead / Handheld Spray*	10 LPM	8 minutes	0.1

Source: *Uniform Plumbing Code - India*

*Reporting pressure for these fixtures shall be at 3 bar.

**Full Time Equivalent (FTE) represents a regular building occupant who spends 8 hours per day in the building. Part-time or overtime occupants have FTE values based on their hours per day divided by 8.

Notes:

- *Water fixtures do not include irrigation systems.*
- *Faucets / Taps installed for hand wash in rest rooms and canteen shall be considered; whereas, faucets / taps installed for dish washing and washing clothes need not be considered.*
- *Rain showers (if any) need to be considered in the calculations under Showerhead.*
- *The baseline flows can be demonstrated at a flowing water pressure of 3 bar. Flowing water pressure of 3 bar does not mean that the water supply in the building is at 3 bar. The building fixtures can operate at lower pressures, however to show compliance under this credit, the design flow rates are to be submitted at 3 bar.*
- *Default occupancy shall be considered as 50% for male and female.*
- *FTE occupancy shall be considered in calculation, including visitors.*
- *Plumbing fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC, can be used by the project to show compliance*

Rainwater Harvesting, Roof & Non-roof

WC Credit 1

Point(s): 1, 2, 3

Intent:

Enhance ground water table and reduce municipal water demand through effective rainwater management.

Compliance Options:

- ❖ Design rainwater harvesting system to capture at least 'one-day rainfall*' runoff volume from roof and non-roof areas.

* One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table below

To arrive at average peak month rainfall, consider an average of at least last 5 years peak month rainfall (of the respective year).

Table - Criteria to arrive at 'One-day Rainfall'

S No	Average Peak Month Rainfall (mm)	One-day Rainfall (% of Average Peak Month Rainfall)		
		1 point	2 points	3 points
1	Upto 250	6%	9%	12%
2	251 – 350	5%	7.5%	10%
3	351 – 500	4%	6%	8%
4	501 – 700	3%	4.5%	6%
5	701 & above	2%	3%	4%

Notes:

For rainfall information, refer Indian Meteorological Department data at <http://www.imd.gov.in>

- *Runoff volume = Surface area x Runoff Coefficient x Rainfall.*
- *Consider Rainwater Harvesting Guidelines (as and when available) from the National ode (NBC) of India, Part 11 - Approach to Sustainability, Section 7.2 - Rainwater Harvesting-Surface Runoff.*
- *In areas where the water percolation is limited, collection tanks may be provided to meet the above requirement.*
- *Filtering of suspended solids shall be ensured by providing suitable filtering media before letting the water into the collection tanks, water bodies, and municipal storm water drains.*

Water Efficient Plumbing Fixtures

WC Credit 2

Point(s): 1-5

Intent:

Enhance efficiency of plumbing fixtures by design, thereby minimizing potable water use

Compliance Options:

- ❖ Use water efficient plumbing fixtures (as applicable) whose flow rates are 8% less than the baseline criteria table given below, in aggregate.

Note:

- Use of treated waste water / captured rain water shall not be considered to show potable water savings.

The baseline criteria is as below:

Baseline Flow Rates / Consumption for Plumbing Fixtures

Fixture Type	Maximum Flow Rate / Consumption	Duration	Estimated Daily Uses per FTE**
Water Closets (Full-flush)	6 LPF	1 flush	1 for male;
Water Closets (Half-flush)	3 LPF	1 flush	2 for female
Urinals	4 LPF	1 flush	2 for male
Faucets / Taps*	6 LPM	15 seconds	4
Health Faucet*	6 LPM	15 seconds	1
Showerhead / Handheld Spray*	10 LPM	8 minutes	0.1

Source: Uniform Plumbing Code - India

*Reporting pressure for these fixtures shall be at 3 bar

**Full Time Equivalent (FTE) represents a regular building occupant who spends 8 hours per day in the building. Part-time or overtime occupants have FTE values based on their hours per day divided by 8.

Points are awarded as below:

Water Efficient Plumbing Fixtures (Individually or in aggregate)	Points
8% less than baseline criteria	1
12% less than baseline criteria	2
16% less than baseline criteria	3
20% less than baseline criteria	4
24% less than baseline criteria	5

Notes:

- *Water fixtures do not include irrigation systems.*
- *Faucets / Taps installed for hand wash in rest rooms and canteen shall be considered; whereas, faucets / taps installed for dish washing and washing clothes need not be considered.*
- *Rain showers (if any) need to be considered in the calculations under 'Showerhead'.*
- *The baseline flows can be demonstrated at a flowing water pressure of 3 bar. Flowing water pressure of 3 bar does not mean that the water supply in the building is at 3 bar. The building fixtures can operate at lower pressures, however to show compliance under this credit, the design flow rates are to be submitted at 3 bar.*
- *Default occupancy shall be considered as 50% for male and female.*
- *FTE occupancy shall be considered in calculation, including visitors.*
- *Plumbing fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance*

Landscape Design

WC Credit 3

Point(s): 1, 2

Intent:

Design landscape to ensure minimum water consumption.

Compliance Option:

Limit use of turf on the site to conserve water and / or ensure that landscaped area is planted with drought tolerant / native / adaptive species.

Notes:

- *This credit is applicable only for those projects which have at least 10% of the site area landscaped.*
- *Landscape areas over built structures such as basements, podium, roofs, etc., can be considered for this credit calculation.*

Points are awarded as below:

Type of Landscape	Percentage of the Total Landscaped Area	Points
Turf Area	< 30%	1
Drought Tolerant / Native / Adaptive Species Area	> 30%	1

Notes:

- *The landscape here refers to soft landscaping, which includes only pervious vegetation.*
- *Landscape shall not be designed with monoculture plant species, since such species would not promote habitat and biodiversity.*
- *Drought tolerant species are those species that do not require supplemental irrigation. Generally accepted time frame for temporary irrigation is 1 - 2 years.*
- *Vertical Landscaping to the external walls can also be considered for this credit calculation.*
- *Potted plants shall not be considered as vegetation.*
- *Areas planted with turf should not exceed a slope of 25 percent (i.e. 4 to 1 slope).*

Management of Irrigation Systems

WC Credit 4

Point(s): 1

Intent:

Reduce water demand for irrigation through water efficient management systems and techniques

Compliance Options:

Provide or install highly efficient irrigation systems incorporating the features mentioned below:

(Minimum four features)

- ❖ Central shut-off valve
- ❖ Soil moisture sensors integrated with irrigation system
- ❖ Turf and each type of bedding area must be segregated into independent zones based on watering needs
- ❖ At least 75% of landscape planting beds must have a drip irrigation system to reduce evaporation
Time based controller for the valves such that evaporation loss is minimised and plant health is ensured
- ❖ Pressure regulating device(s) to maintain optimal pressure to prevent water loss
- ❖ Any other innovative methods for watering

Notes:

- *This credit is applicable only for those projects which have at least 10% of the site area landscaped.*
- *Landscape areas over built structures such as basements, podium, roofs, etc., can be considered for this credit calculation.*

Waste Water Treatment and Reuse

WC Credit 5

Point(s): 1, 2, 3

Intent:

Treat waste water generated on-site, so as to avoid polluting the receiving streams by safe disposal.
Use treated waste water, thereby reducing dependence on potable water.

Compliance Options:

❖ Waste Water Treatment: (1 Point)

Have an on-site treatment system to handle 100% of waste water generated in the healthcare, to the quality standards suitable for reuse, as prescribed by Central (or) State Pollution Control Board, as applicable.

(And)

❖ Waste Water Reuse: (2 Points)

Use treated waste water for at least 25% of the total water required for landscaping, flushing, and cooling tower make-up water (if the project uses water-cooled chillers).

Points are awarded as below:

Application (in aggregate)	Percentage of Total Water catered through Treated Waste Water	Points
Landscaping, Flushing and Cooling tower make-up	≥ 25%	1
Landscaping, Flushing and Cooling tower make-up	≥ 50%	2

Notes:

- *Waste water here refers to both grey and black water.*
- *The credit point(s) can be claimed only if the waste water is treated in-situ and reused in-situ. In case the local authorities insist the project to divert waste water to a centralized / common waste water treatment plant, then the project can show compliance with 'Case-2' given above, by reusing treated wastewater from the centralised / common / any other waste water treatment plant*
- *Treated waste water sourced from other sites / local authorities through permanent piped connections or other means can also be considered to show compliance for 'waste water reuse'.*
- *Water from sources such as bore wells, natural wells, municipal water systems is considered as potable water.*

- *Captured rain water can also be considered to show compliance.*
- *The water requirement and average number of watering days for landscaping shall be considered as 6 liters per sq.m. per day (i.e. 6 liters / sq.m. / day) for a minimum of 300 days, (or)*
- *Justify if the water requirement and the average number of watering days for landscaping is less than the above requirement.*
- *Potted plants shall not be considered under vegetation*

Water Metering

WC Credit 6

Point(s): 1

Intent:

Encourage sub-metering to improve water performance of the healthcare facilities, and thereby save potable water.

Compliance Options:

❖ **Building-level Metering**

Demonstrate sub-metering for at least three of the following water use applications, as applicable:

- Municipal water supply
- Bore water consumption
- Treated waste water consumption
- Water consumption for landscape requirements
- Water consumption for flushing
- Water consumption for air-conditioning cooling tower makeup
- Any other major source of water consumption

BUILDING MATERIALS & RESOURCES

Handling of Waste Materials, During Construction

BMR Mandatory Requirement 1

Required

Intent:

Facilitate segregation of construction and demolition waste at source to encourage reuse or recycling of materials, thereby avoiding waste being sent to landfills.

Compliance Options:

Demonstrate that at least 50% of waste generated during construction (as per owner / developer's scope) is diverted from landfills, for reuse or recycling. Use consistent metrics, either weight or volume, to show compliance.

Notes:

- *Construction waste here refers to civil & interior building waste.*
- *Excavated earth & stones should not be considered under this credit, as these are natural resources.*
- *Temporary materials such as materials used for formwork, scaffolding, etc., shall not be considered for this credit calculation*

Sustainable Building Materials

BMR Credit 1

Point(s): 1, 2, 3

Intent:

Encourage the use of building materials to reduce dependence on materials that have associated negative environmental impacts.

Compliance Options

❖ Materials with Recycled Content:

Use materials with recycled content in the building (as per owner / developer's scope) such that the total recycled content constitutes at least 10% of the total cost of building materials.

Points are awarded as below:

Percentage of Materials with Recycled Content	Points
≥ 10%	1

Notes:

- *Recycled Content is the content in a material or product derived from recycled materials versus virgin materials. Recycled content can be materials from recycling programs (post-consumer) or waste materials from the production process or an industrial/agricultural source (pre-consumer or post-industrial)*
- *Materials (with recycled content) that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ Local Materials

Ensure at least 20% of the total building materials (by cost) used in the building (as per owner / developer's scope) are manufactured locally within a distance of 400 km.

Points are awarded as below:

Percentage of Local Materials Sourced	Points
≥ 20%	1

Notes:

- *Local Materials are those which are manufactured within a distance of 400 km. Assembly of building materials shall not be considered.*
- *Extraction and processing of raw materials need not be considered as part of this credit calculation.*
- *Local Materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

❖ **Wood Based Materials**

Ensure at least 50% of all new wood based materials (by cost) used in the building (as per owner / developer’s scope) are:

- Rapidly renewable
(And / Or)
- Wood certified by Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) or equivalent

Points are awarded as below:

Percentage of Rapidly Renewable or Certified Wood	Points
≥ 50%	1

Notes

- *Rapidly renewable materials are agricultural products that take 10 years or less to harvest.*
- *Certified wood shall be compliant with Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) or equivalent system. For a list of certified wood suppliers and product manufacturers, visit the official website of respective certification bodies.*
- *Salvaged wood based materials shall not be considered under ‘Wood Based materials’ calculations.*
- *Wood based Materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

General Notes:

- *Building materials here refer to civil & interior materials.*
- *Material Cost = Total Cost - (Labour Cost + Installation Cost).*
- *If Labour and Installation Cost is not known, the default material cost should be considered as 60% of the total cost of the material.*
- *The cost of electrical, mechanical & plumbing - equipment, systems & appliances, and movable materials & furniture shall not be considered in the total material cost.*
- *Temporary materials such as materials used for formwork, scaffolding, etc., should not be considered for this credit calculation*

Certified Green Building Materials, Products & Equipment

BMR Credit 2

Point(s): 1-5

Intent:

Use certified green building materials, products, and equipment, so as to reduce dependence on materials that have associated negative environmental impacts.

Compliance Options:

Ensure that the project uses at least five passive or active green building materials, products, and equipment that are certified by IGBC under Green Product Certification Programme (Green Pro) or by a third party agency approved by IGBC.

Points are awarded as below:

Number of Certified Green Products used	Points
1	1
2	2
3	3
4	4
5	5

Notes:

- *Passive Products & Materials include glazing, insulation, paints & coatings, adhesives & sealants, flyash blocks, cement, concrete, composite wood, certified new wood, housekeeping chemicals, false ceiling materials, flooring materials, gypsum based products, high reflective materials & coatings, etc.,*
- *Active Products include Electrical systems (Lighting Systems & Controls, Pumps & Motors, etc.), Mechanical systems (unitary air conditioners, etc.), Plumbing Fixtures (faucets, showers, etc.)*
- *Until CII-IGBC launches Green Product Certification Programme, materials, products and equipment (eg. high reflective materials, water fixtures, lighting fixtures, carpets, etc.,) certified by any third party agency will be accepted to show credit compliance*

Eco-friendly Furniture & Medical Furnishings

BMR Credit 3

Point(s): 1

Intent:

Encourage the use of eco-certified interior products that consider impacts through the life cycle, thereby resulting in lower environmental impacts

Compliance Options:

Procure atleast 10% (by cost) of furniture & medical furnishings shall be certified by certified by IGBC under Green Product Certification Programme (Green Pro) or equivalent standard

SITE SELECTION & PLANNING

Local Building Regulations & Safety Compliance

SSP Mandatory Requirement 1

Required

Intent:

Ensure that the building complies with necessary statutory and regulatory codes.

Compliance Options:

The project shall comply with following statutory approvals from the Government of India or State Government authorities, as applicable:

- ❖ Approved site plan (and/ or) building plans for construction, as applicable
- ❖ Status of completion or Completion certificate signed by Architect/Engineer/Owner or Third party Commissioning Authority (OR) Occupancy certificate from Local Authority
- ❖ Structural Safety Certificate
- ❖ Non Structural Safety Certificate
- ❖ No Objection Certificate (NOC) for fire safety
- ❖ Approved Parking plans
- ❖ Environmental clearance certificate, if applicable
- ❖ Radiation clearance from Atomic Energy Regulation Board (AERB), if applicable

Note:

- *Buildings with 20,000 sq.m built-up area or more shall submit 'Environmental Clearance Certificate' or 'Environmental Impact Assessment (EIA) Study Report', as applicable, approved by Ministry of Environment & Forests (MoEF) or State Environment Impact Assessment Authority (SEIAA) to show compliance for certification.*

Soil Erosion Control

SSP Mandatory Requirement 2

Required

Intent:

Control soil erosion and sedimentation, thereby, reducing negative impacts to the site and surroundings.

Compliance Options:

Implement the following measures, as applicable:

❖ **New healthcare facilities**

- Soil erosion control measures taken before construction and during construction must conform to the best management practices highlighted in the National Building Code (NBC) of India 2005, Part 10, Section 1, Chapter 4 - Protection of Landscape during Construction and Chapter 5 - Soil and Water Conservation.
- Fertile topsoil to be stockpiled prior to construction, for future reuse or donation.
- Develop appropriate measures to address soil erosion, after occupancy.

❖ **Existing healthcare facilities**

- Adopt measures to prevent carrying away of soil during storms
- Develop appropriate measures to address soil erosion, after occupancy

Note:

- *If the top soil (10-20 cm) in the project is not fertile (or) suitable for preservation, in such a case the project may provide relevant justification.*

Integrated Design Approach

SSP Credit 1

Point(s):1

Intent:

Encourage integrated design approach to construct a high performance healthcare facility, thereby reducing negative environmental impacts.

Compliance Options:

- ❖ Demonstrate that the project has involved team members from multi-disciplinary fields for effective decision-making and enhanced building performance, right from conceptual stage till completion of the project.
 - Ensure that the project owner involves the following project team members, as applicable, at each stage of the project:
 - Architect, Commissioning Authority, Healthcare Consultant, Energy Modeler, Facility Managers, General Contractor, Green Building Consultant, Interior Designer, Landscape Architect, MEP Consultant, Project Management Consultant, Structural Consultant, and other project team members.
 - Document at least three project meetings at different stages of the project.

Passive Architecture

SSP Credit 2

Point(s):1, 2

Intent:

Adopt passive architectural design features to minimise negative environmental impacts

Compliance Options:

❖ Option 1: Simulation Approach

Demonstrate that the passive architecture measures implemented in the project has resulted in at least 2% energy savings of total annual energy consumption (through whole building simulation approach).

The approach shall address the following aspects, but not limited to:

- Climate-responsive concepts and design features
- (Eg: orientation, skylights, light wells, courtyard, shaded corridors, shading devices, shading from trees & adjacent buildings, pergolas, punched windows, extended louvers, horizontal and vertical landscaping)
- Passive cooling / heating technologies
- (Eg: wind tower, earth tunnel, geothermal technologies)
- Points are awarded as below:

Percentage of Energy Savings achieved through Passive Architecture	Points
≥ 2%	1
≥ 4%	2

❖ Option 2: Prescriptive Approach

Demonstrate that the project has implemented at least one of the following passive measures that result in energy savings: (1 point for each measure; maximum 2 points)

➤ Exterior Openings

At least 80% of the exterior openings (fenestration) have a Projection Factor* of 0.5 or more

*Projection Factor is a ratio of the length of overhang projection divided by height from window sill to the bottom end of the overhang (must be permanent). For more details, please refer Energy Conservation Building Code (ECBC).

➤ **Skylights**

Skylights shall comply with the maximum U-factor and maximum SHGC requirements as prescribed in Energy Conservation Building Code 2007 (ECBC), Table 4.6: Skylight U-Factor and SHGC Requirements.

Climate Zone	Maximum U-factor		Maximum SHGC	
	With Curb	Without Curb	0 - 2% SRR	2.1 - 5% SRR
Composite	11.24	7.71	0.40	0.25
Hot and Dry	11.24	7.71	0.40	0.25
Warm and Humid	11.24	7.71	0.40	0.25
Moderate	11.24	7.71	0.61	0.40
Cold	11.24	7.71	0.61	0.40

SRR: Skylight Roof Ratio which is the ratio of the total skylight area of the roof, measured to the outside of the frame, to the gross exterior roof

➤ **Daylighting**

50 % of the regularly occupied spaces with daylight illuminance levels for a minimum of 110 Lux (and a maximum of 2,200 Lux) in a clear sky condition on 21st September at 12 noon, at working plane (through simulation or measurement approach)

➤ **Passive Cooling / Heating Technologies**

(Eg: wind tower, earth tunnel, geothermal technologies)

➤ **Any other passive measures**

Notes:

- All enclosed roof areas, including podium, covered surface parking and utility blocks, which are exposed to the sky (at and above ground level) shall be considered for this credit calculation.
- Exposed roof area need not include equipment platforms, areas covered with solar photovoltaic & solar water heaters, water body, driveways, pathways, roads, play areas etc.,
- Skylights provided on the basement/ podium areas can also be considered for credit calculations

Value Added Services

SSP Credit 3

Point(s):1

Intent:

Provide access to Value Added Services, so as to reduce negative impacts caused from automobile use.

Compliance Options:

Select a site with access to at least seven Value Added Services, within a walking distance of 1 km from the building entrance.

List of Value Added Services:

- ❖ ATM / Bank
- ❖ Crèche / School
- ❖ Grocery store / Supermarket
- ❖ Laundry / Dry cleaners
- ❖ Courier service
- ❖ Restaurant / Cafeteria
- ❖ Service apartment / Hotel
- ❖ Place of worship
- ❖ Pharmacy
- ❖ Library
- ❖ Park
- ❖ Fitness Centre

Notes:

- *The Value Added Services shall be functional at the time of project completion.*
- *Restaurants & Pharmacy can be considered twice. Rest amenities are to be considered only once.*
- *The services shall be accessible to building occupants and other users of the building.*
- *Value Added Services within the campus can also be considered to show compliance.*

Proximity to Public Transport

SSP Credit 4

Point(s):1

Intent:

Encourage use of public transport, so as to reduce negative impacts caused from automobile use.

Compliance Options:

❖ Option 1: Public Transport

Locate the building within 800 meters walking distance from an intra-city railway station (or) a bus-stop (or) other modes of public transport.

Note:

- *For campus projects with multiple buildings, the compliance can be shown from the entrance of the campus/ zone*

❖ Option 2: Shuttle Service

The project can operate or have a contract in place for shuttle services (from / to the nearest intra-city railway station or bus-stop), for atleast 25% of the building occupants.

Low-emitting Vehicles

SSP Credit 5

Point(s):1

Intent:

Encourage the use of non-fossil fuel vehicles, thereby reducing negative impacts resulting from fossil fuel based automobiles.

Compliance Options:

❖ Option 1: Low-emitting Vehicles

➤ Option 1 A: Electric Vehicles

Use electric vehicles within or outside the site, to cater at least 5% of the building occupants (excluding visitors). Also, designate preferred parking spaces for such vehicles within the site.

Additionally, the project shall install electric charging facilities within the projects' parking area to cater to the electric vehicles.

➤ Option 1 B: Compressed Natural Gas (CNG) Powered Vehicles

Use Compressed Natural Gas (CNG) powered vehicles within or outside the site, to cater at least 5% of the building occupants (excluding visitors). Also, designate preferred parking spaces for such vehicles within the site.

Additionally, the project shall have at least one CNG filling station within 5 km distance from the projects' campus entrance.

❖ Option 2: Charging Facilities for Low-emitting Vehicles

Provide charging facilities for low-emitting vehicles within the site, to cater atleast 5% of the total parking capacity (excluding visitor parking).

Notes:

- Preferred parking spaces refer to the spaces that are easily accessible to the building entrance.
- Low-emitting vehicles sourced on contract by the owner/ developer for building occupants can also be considered to show credit compliance
- Charging facilities for low-emitting vehicles include electric, Compressed Natural Gas (CNG), bio-diesel, etc.

Heat Island Reduction, Non-roof

SSP Credit 6

Point(s):1

Intent:

Minimise heat island effect so as to reduce negative impact on micro-climate

Compliance Options:

❖ Option 1: Non-roof Impervious Areas

Provide one or combination of the following, for at least 50% of exposed non-roof impervious areas within the project site:

- Shade from existing tree cover/ newly planted saplings within 5 to 8 years of planting
- Open grid pavers or grass pavers
- Hardscape materials (including pavers) with SRI of at least 29 (and not higher than 64) Points are awarded as below:

Notes:

- *Non-roof impervious areas include, but not limited to, footpaths, pathways, roads, driveways, uncovered surface parking, and other impervious areas.*
- *Trees / Saplings shall be in place at the time of occupancy.*
- *SRI values of reflectance materials shall be as per ASTM Standards.*
- *SRI materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC, can be used by the project to show compliance.*
- *Exposed non-roof area need not include utility areas such as areas covered with DG sets, transformer, STP etc.,*

❖ Option 2: Covered Parking

Provide at least 50% of the parking spaces under cover.

Notes:

- *'Parking spaces under cover' here refers to structured covered parking.*
- *The exposed roof of the parking shall meet 'Heat Island Effect - Roof' criteria*

Heat Island Reduction, Roof

SSP Credit 7

Point(s):1

Intent:

Minimise heat island effect so as to reduce negative impact on micro-climate.

Compliance Options:

❖ Option 1: High Reflective Materials

Use material with a high solar reflective index to cover at least 75% of the exposed roof area, including covered parking.

Note:

- *Material with high solar reflectance index (SRI) include white / light colored broken China mosaic tiles or white cement tiles or other high reflective materials / coatings.*

Minimum Solar Reflective Index (SRI) values for different roof types are provided below:

Roof Type	Slope	Minimum SRI value	Maximum SRI value
Low-sloped roof	≤ 2:12	78	-
Steep-sloped roof	≥2:12	29	64

(OR)

❖ Option 2: Vegetation

Provide vegetation to cover at least 50% of the exposed roof area, including covered parking. Points are awarded as below:

(OR)

❖ Option 3: Combination of High Reflective Materials and Vegetation

Install combination of materials with high solar reflective index and vegetation to cover at least 75% of the exposed roof area, including covered parking.

Points are awarded as below:

Notes:

- *All roof areas, including podium, covered surface parking and utility blocks, which are exposed to the sky (at and above ground level) shall be considered for this credit calculation.*
- *Exposed roof area need not include equipment platforms, areas covered with solar photovoltaic & solar water heaters, skylights, water body, driveways, pathways, roads, play areas etc.,*
- *Artificial vegetation shall not be considered*
- *SRI values of high reflectance materials shall be as per ASTM Standards. Broken China mosaic tiles are exempted from showing SRI value.*
- *SRI materials that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC, can be used by the project to show compliance.*
- *Pavers installed over basement shall have SRI of at least 29 (and not higher than 64).*

Outdoor Light Pollution Reduction

SSP Credit 8

Point(s):1

Intent

Reduce light pollution to increase night sky access and enhance the nocturnal environment

Compliance Options:

❖ Option 1: Prescriptive Approach

➤ Upward Lighting:

Design exterior lighting such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir (straight down).

(AND)

➤ Lighting Power Density:

The lighting power density should be reduced by 30% for building facades and exterior areas vis-à-vis the ASHRAE Standard 90.1-2010 baselines, Section 9.4.3 - Exterior Building Lighting Power (tradable & non-tradable surfaces).

Notes:

- *Total initial designed fixture Lumens shall be based on the sum total of all fixtures installed on site.*
- *Classify the project under one of the lighting zones, as defined in ASHRAE Standard 90.1-2010, and follow all the requirements of the respective zone. The justification shall be provided for the selected lighting zone.*
- *Exterior light fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance*

❖ Option 2: Simulation Approach

➤ Upward Lighting:

Design exterior lighting such that all site and building-mounted luminaires produce a maximum initial illuminance values, as defined in ASHRAE Standard 90.1-2010.

(AND)

➤ Lighting Power Density:

The lighting power density should be reduced by 30% for building facades and exterior areas vis-à-vis the ASHRAE Standard 90.1-2010 baselines, Section 9.4.3 - Exterior Building Lighting Power (tradable & non-tradable surfaces).

Notes:

- *Classify the project under one of the lighting zones, as defined in ASHRAE Standard 90.1-2010, and follow all the requirements of the respective zone. The justification shall be provided for the selected lighting zone.*
- *Exterior light fixtures that are certified by IGBC under Green Product Certification Programme or by a third party agency approved by IGBC can be used by the project to show compliance.*

LZ1: Dark (Developed Areas of National Parks, State Parks, Forest Land and Rural Areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.01 horizontal and vertical footcandles (0.1 horizontal and vertical Lux) at the site boundary and beyond. Document that 0% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2: Low (Areas predominantly consisting of residential zones, neighborhood business districts, light industrial areas with limited night time use and residential mixed-use areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.1 horizontal and vertical footcandles (1.0 horizontal and vertical Lux) at the site boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal Lux) 10 feet (3 meters) beyond the site boundary. Document that no more than 2% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down)

LZ3: Medium (All other areas not included in LZ1, LZ2 or LZ4, such as commercial/ industrial, and high-density residential)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.2 horizontal and vertical footcandles (2.0 horizontal and vertical Lux) at the site boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal Lux) 15 feet (4.5 meters) beyond the site. Document that no more than 5% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ4: High14 (High-activity commercial districts in major metropolitan areas)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.6 horizontal and vertical footcandles (6.5 horizontal and vertical Lux) at the site boundary and no greater than 0.01 horizontal footcandles (0.1 horizontal Lux) 15 feet (4.5 meters) beyond the site. Document that no more than 10% of the total initial designed fixture Lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ2, LZ3 and LZ4: For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary.

For All Zones

Illuminance generated from a single luminaire placed at the intersection of a private vehicular driveway and public roadway accessing the site is allowed to use the centerline of the public roadway as the site boundary for a length of 2 times the driveway width centered on the centerline of the driveway

Universal Design

SSP Credit 9

Point(s):1

Intent:

Ensure that the building design caters to differently abled and senior citizens

Compliance Options:

Design the building / campus to provide the following, as applicable, for differently abled and senior citizens in accordance with the guidelines of the National Building Code (NBC) of India 2005.

- ❖ Appropriately designed preferred car park spaces having an easy access to the main entrance or closer to the lift lobby.

(Provide at least one car park space for the first 100 car park spaces and one additional for every 250 car park spaces thereafter or as defined by local byelaw).

- ❖ Easy access to the main entrance of the building.
- ❖ Non-slippery ramps, with handrails on at least one side (as applicable).
- ❖ Braille and audio assistance in lifts for visually impaired people.
- ❖ Seating area near lift lobbies.
- ❖ Uniformity in floor level for hindrance-free movement in common areas & exterior areas.
- ❖ Restrooms (toilets) in common areas designed for differently abled people.
Restrooms (toilets) in common areas designed for differently abled people. (Provide at least one restroom in the building or as defined by the local byelaw, in an easily accessible location)
- ❖ Main walkways / pathways with adequate width in exterior areas.
- ❖ Visual warning signage in common areas & exterior areas

Basic Facilities for Construction Workforce

SSP Credit 10

Point(s):1

Intent:

Promote welfare of the construction workforce by providing safe and healthy work conditions.

Compliance Options:

Provide basic facilities for construction workforce to exceed the guidelines of 'The Building and other Construction Workers Act, 1996 & Rules, 1998'.

- ❖ Adequate housing to meet or exceed local / labour byelaw requirement.
- ❖ Sanitary facilities:
Provide at least 3 toilet seats & 3 urinals for the first 100 workers and one additional toilet seat & urinal for every 100 workers thereafter (or) as defined by local / labour byelaw.
(The sanitary measures should be provided separately for men and women).
- ❖ First-aid and emergency facilities.
- ❖ Adequate drinking water facilities.
- ❖ Personal protective equipment (by owner / contractor).
- ❖ Dust suppression measures.
- ❖ Adequate illumination levels in construction work areas.
- ❖ Site emergency alarm.
- ❖ Day care/ crèche facility for workers' children.

(Only if, more than 50 female building workers are employed full time)

Note:

- *The project can consider 'Constructional Practices and Safety Guidelines' from National Building Code (NBC) of India 2005, Part 7 - Constructional Practices and Safety*

INNOVATION IN DESIGN PROCESS

Innovation in Design Process

ID Credit 1

Intent:

Provide design teams and projects an opportunity to be awarded points for innovative design & performance in healthcare buildings not specifically addressed by the IGBC Green Healthcare Buildings rating system and / or exemplary performance above the requirements set by the IGBC Green Healthcare Buildings rating system.

Compliance Options:

❖ Credit 1.1: Innovation & Design Process

➤ Option 1: Innovation

Identify the intent of proposed innovation credit, proposed requirement for compliance, and proposed documentation to demonstrate compliance, and the design approach used to meet the required measures.

(Or)

➤ Option 2: Exemplary performance

The project is eligible for exemplary performance, if the design and / or construction measures greatly exceed the credit requirements of the IGBC Green Healthcare Buildings rating system.

❖ Credit 1.2: Innovation & Design Process

Same as credit 1.1

❖ Credit 1.3: Innovation & Design Process

Same as credit 1.1

❖ Credit 1.4: Innovation & Design Process

Same as credit 1.1

Notes:

- *As a general rule, points for exemplary performance are awarded for doubling the credit requirements and / or achieving the next incremental percentage threshold.*
- *Eligibility criteria for various credits in the IGBC Green Healthcare Buildings rating system are defined in respective credits.*

General Notes:

The project shall also meet the following criteria for achieving an Innovation point:

- *Quantitative performance improvements (comparing a baseline and design case).*
- *Strategy must be significantly better than standard sustainable design practices.*
- *Measures must be voluntary. Measures that are mandated by the local byelaws and not addressed in the rating system are not eligible for Innovation.*
- *Measures should be implemented both in interior and common areas, as applicable.*

IGBC Accredited Professional

ID Credit 2

Intent:

Support and encourage involvement of IGBC Accredited Professional in green building projects, so as to integrate appropriate design measures and streamline the certification process.

Compliance Options:

At least one principal participant of the project team shall be an IGBC Accredited Professional.

ANNEXURES

CLASSIFICATION OF SPACES IN HEALTHCARE FACILITIES

Administration & Recreational Areas		Patient Areas		Support Areas	
Office areas	Private cabins	Treatment /Observation areas	Consultation/Observation room	Clinical support area	shower room
	Double shared		Patient change cubicle		Staff room
	Open office		Medication/ Treatment Room		Staff station
	Meeting rooms		Play therapy room		Changing room
	Teleconference rooms		ICU		Dirty/Clean utilities
	Cashier's area		X ray room		Food Preparation area
Reception/Waiting	Waiting area		X ray processing	Trolley Stripping	
	Reception		Body Holding room	Washing areas	
	Play Areas		Patients Bed room / ward	Cool Room	
	Family room		Respiratory Biomedical Workshop	Store	
	Ambulance Triage	Surgery Areas	Dental surgery	Preparation	
	Triage Cubicle		Operation room	Cooking	
	Recreational areas		Yoga room/ Meditation room	Clean-up room	
Spa		Discharge lounge	Housekeeping areas	Cleaners Room	
Music room				Preparation/ Processing / Serology/ Infection Serology	Disposal Room
Crèche		Blood Storage/Dispatch		Store General	
Gymnasium		Clean-up/ Sterilization	Bay areas	Linen	
Indoor sports area		IVF/ICSI Laboratory		Handwashing	
		Laboratory areas		Andrology	Blood Collection
				Genetics	Staff Property
	Bay areas	Resuscitation		Wheel chair park	
		Recovery		Beverage	
		Ultrasound		Trolley	
					Blanket warming

For exhaustive list of spaces in healthcare facilities, the projects can refer Indian Health Facility guidelines (<http://www.healthdesign.com.au/i/hfg/india-v1.2/>)

VENTILATION DESIGN PARAMETERS

(Extract from Table 7 : ASHRAE-170

'Ventilation of Health Care')

ANNEXURES

Sl. No:	Function of Space	Pressure Relationship to Adjacent Areas (n)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	Design Relative Humidity (k),%	Design Temperature (l), °F/°C
DIAGNOSTIC AND TREATMENT								
1	Bronchoscopy, sputum collection, and pentamidine administration (n)	Negative	2	12	Yes	No	NR	68–73/20–23
2	Laboratory, general (v)	Negative	2	6	NR	NR	NR	70–75/21–24
3	Laboratory, bacteriology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
4	Laboratory, biochemistry (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
5	Laboratory, cytology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
6	Laboratory, glasswashing	Negative	2	10	Yes	NR	NR	NR
7	Laboratory, histology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
8	Laboratory, microbiology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
9	Laboratory, nuclear medicine (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
10	Laboratory, pathology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
11	Trauma room (crisis or shock) ©	Positive	3	15	NR	No	20-60	70–75/21–24
12	Medical/anesthesia gas storage ®	Negative	NR	8	Yes	NR	NR	NR
13	Laser eye room	Positive	3	15	NR	No	20-60	70–75/21–24
14	ER waiting rooms	Negative	2	12	Yes(q)	NR	Max 65	70–75/21–24
15	Triage	Negative	2	12	Yes(q)	NR	Max 60	70–75/21–24
16	ER decontamination	Negative	2	12	Yes	No	NR	NR
17	Radiology waiting rooms	Negative	2	12	Yes (q)(w)	NR	Max 60	70–75/21–24
18	Procedure room (Class A surgery) (o), (d)	Positive	3	15	NR	No	20-60	70–75/21–24
19	Emergency department exam/treatment room (p)	NR	2	6	NR	NR	Max 60	70–75/21–24
IMPATIENT NURSING								
1	Patient room	NR	2	4 (y)	NR	NR	Max 60	70–75/21–24
2	Nourishment area or room	NR	NR	2	NR	NR	NR	NR
3	Toilet room	Negative	NR	10	Yes	No	NR	NR
4	Newborn nursery suite	NR	2	6	NR	No	30-60	72–78/22–26
5	Protective environment room (t)	Positive	2	12	NR	No	Max 60	70–75/21–24
6	All room (u)	Negative	2	12	Yes	No	Max 60	70–75/21–24
7	Combination All/PE room	Positive	2	12	Yes	No	Max 60	70-75/21-24
8	All anteroom (u)	(e)	NR	10	Yes	No	NR	NR
9	PE anteroom (t)	(e)	NR	10	NR	No	NR	NR
10	Combination All/PE anteroom	(e)	NR	10	Yes	No	NR	NR

ANNEXURES

Sl. No:	Function of Space	Pressure Relationship to Adjacent Areas (n)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	Design Relative Humidity (k),%	Design Temperature (l), °F/°C
11	Labor/delivery/recovery/postpartum (LDRP) (s)	NR	2	6	NR	NR	Max 60	70–75/21–24
12	Labor/delivery/recovery (LDR) (s)	NR	2	6	NR	NR	Max 60	70–75/21–24
13	Patient Corridor	NR	NR	2	NR	NR	NR	NR
NURSING FACILITY								
1	Resident room	NR	2	2	NR	NR	NR	70–75/21–24
2	Resident gathering/activity/dining	NR	4	4	NR	NR	NR	70–75/21–24
3	Resident unit corridor	NR	NR	4	NR	NR	NR	NR
4	Physical therapy	Negative	2	6	NR	NR	NR	70–75/21–24
5	Occupational therapy	NR	2	6	NR	NR	NR	70–75/21–24
6	Bathing room	Negative	NR	10	Yes	No	NR	70–75/21–24
RADIOLOGY (v)								
1	X-ray (diagnostic and treatment)	NR	2	6	NR	NR	Max 60	72–78/22–26
2	X-ray (surgery/critical care and catheterization)	Positive	3	15	NR	No	Max 60	70–75/21–24
3	Darkroom (g)	Negative	2	10	Yes	No	NR	NR
DIAGNOSTIC AND TREATMENT								
1	Bronchoscopy, sputum collection, and pentamidine administration (n)	Negative	2	12	Yes	No	NR	68–73/20–23
2	Laboratory, general (v)	Negative	2	6	NR	NR	NR	70–75/21–24
3	Laboratory, bacteriology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
4	Laboratory, biochemistry (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
5	Laboratory, cytology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
6	Laboratory, glasswashing	Negative	2	10	Yes	NR	NR	NR
7	Laboratory, histology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
8	Laboratory, microbiology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
9	Laboratory, nuclear medicine (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
10	Laboratory, pathology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
11	Laboratory, serology (v)	Negative	2	6	Yes	NR	NR	70–75/21–24
12	Laboratory, sterilizing	Negative	2	10	Yes	NR	NR	70–75/21–24
13	Laboratory, media transfer (v)	Positive	2	4	NR	NR	NR	70–75/21–24
14	Nonrefrigerated body-holding room (h)	Negative	NR	10	Yes	No	NR	70–75/21–24
15	Autopsy room (n)	Negative	2	12	Yes	No	NR	68–75/20–24

ANNEXURES

Sl. No:	Function of Space	Pressure Relationship to Adjacent Areas (n)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	Design Relative Humidity (k),%	Design Temperature (l), °F/°C
16	Pharmacy (b)	Positive	2	4	NR	NR	NR	NR
17	Examination room	NR	2	6	NR	NR	max 60	70–75/21–24
18	Medication room	NR	2	4	NR	NR	max 60	70–75/21–24
19	Gastrointestinal endoscopy procedure room (x)	NR	2	6	NR	No	20–60	68–73/20–23
20	Endoscope cleaning	Negative	2	10	Yes	No	NR	NR
21	Treatment room (x)	NR	2	6	NR	NR	Max 60	70–75/21–24
22	Hydrotherapy	Negative	2	6	NR	NR	NR	72–80/22–27
23	Physical therapy	Negative	2	6	NR	NR	Max 65	72–80/22–27
24	Dialysis treatment area	NR	2	6	NR	NR	NR	72–78/22–26
25	Dialyzer reprocessing room	Negative	NR	10	Yes	No	NR	NR
26	Nuclear medicine hot lab	Negative	NR	6	Yes	No	NR	70–75/21–24
27	Nuclear medicine treatment room	Negative	2	6	Yes	NR	NR	70–75/21–24
STERILIZING								
1	Sterilizer equipment room	Negative	NR	10	Yes	No	NR	NR
CENTRAL MEDICAL AND SURGICAL SUPPLY								
1	Soiled or decontamination room	Negative	2	6	Yes	No	NR	72–78/22–26
2	Clean workroom	Positive	2	4	NR	No	Max 60	72–78/22–26
3	Sterile storage	Positive	2	4	NR	NR	Max 60	72–78/22–26
SERVICE								
1	Food preparation center (i)	NR	2	10	NR	No	NR	72–78/22–26
2	Warewashing	Negative	NR	10	Yes	No	NR	NR
3	Dietary storage	NR	NR	2	NR	No	NR	72–78/22–26
4	Laundry, general	Negative	2	10	Yes	No	NR	NR
5	Soiled linen sorting and storage	Negative	NR	10	Yes	No	NR	NR
6	Clean linen storage	Positive	NR	2	NR	NR	NR	72–78/22–26
7	Linen and trash chute room	Negative	NR	10	Yes	No	NR	NR
8	Bedpan room	Negative	NR	10	Yes	No	NR	NR
9	Bathroom	Negative	NR	10	Yes	No	NR	72–78/22–26
10	Janitor’s closet	Negative	NR	10	Yes	No	NR	NR
SUPPORT SPACE								
1	Soiled workroom or soiled holding	Negative	2	10	Yes	No	NR	NR
2	Clean workroom or clean holding	Positive	2	4	NR	NR	NR	NR
3	Hazardous material storage	Negative	2	10	Yes	No	NR	NR

Notes For Table 7.1

- a. Except where indicated by a “No” in this column, recirculating room HVAC units (with heating or cooling coils) are acceptable for providing that portion of the minimum total air changes per hour that is permitted by Section 7.1 (subparagraph [a][5]). Because of the cleaning difficulty and potential for buildup of contamination, recirculating room units shall not be used in areas marked “No.” Recirculating devices with HEPA filters shall be permitted in existing facilities as interim, supplemental environmental controls to meet requirements for the control of airborne infectious agents. The design of either portable or fixed systems should prevent stagnation and short circuiting of airflow. The design of such systems shall also allow for easy access for scheduled preventative maintenance and cleaning.
- b. Pharmacy compounding areas may have additional air change, differential pressure, and filtering requirements beyond the minimum of this table depending on the type of pharmacy, the regulatory requirements which may include adoption of USP 797, the associated level of risk of the work (see USP [2013] in Informative Appendix B), and the equipment utilized in the spaces
- c. The term trauma room as used herein is a first-aid room and/or emergency room used for general initial treatment of accident victims. The operating room within the trauma center that is routinely used for emergency surgery is considered to be an operating room by this standard.
- d. Pressure relationships need not be maintained when the room is unoccupied.
- e. See Section 7.2 and its subsections for pressure-relationship requirements.
- f. This letter is not used in this table.
- g. All air need not be exhausted if darkroom equipment has a scavenging exhaust duct attached and meets ventilation standards regarding NIOSH, OSHA, and local employee exposure limits.^{2, 3}
- h. A nonrefrigerated body-holding room is applicable only to facilities that do not perform autopsies on-site and use the space for short periods while waiting for the body to be transferred.
- i. Minimum total air changes per hour (ach) shall be that required to provide proper makeup air to kitchen exhaust systems as specified in ANSI/ASHRAE Standard 154.4 In some cases, excess exfiltration or infiltration to or from exit corridors compromises the exit corridor restrictions of NFPA 90A,⁵ the pressure requirements of NFPA 96,⁶ or the maximum defined in the table. During operation, a reduction to the number of air changes to any extent required for odor control shall be permitted when the space is not in use. (See FGI [2010] in Informative Appendix B.)
- j. In some areas with potential contamination and/or odor problems, exhaust air shall be discharged directly to the outdoors and not recirculated to other areas. Individual circumstances may require special consideration for air exhausted to the outdoors. To satisfy exhaust needs, constant replacement air from the outdoors is necessary when the system is in operation.
- k. The RH ranges listed are the minimum and/or maximum allowable at any point within the design temperature range required for that space.
- l. Systems shall be capable of maintaining the rooms within the range during normal operation. Lower or higher temperature shall be permitted when patients’ comfort and/or medical conditions require those conditions.
- m. National Institute for Occupational Safety and Health (NIOSH) criteria documents regarding occupational exposure to waste anesthetic gases and vapors, and control of occupational exposure to nitrous oxide⁷ indicate a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are utilized. Refer to NFPA 99 for other requirements.⁸
- n. If pressure-monitoring device alarms are installed, allowances shall be made to prevent nuisance alarms. Short-term excursions from required pressure relationships shall be allowed while doors are moving or

temporarily open. Simple visual methods such as smoke trail, ball-in-tube, or flutterstrip shall be permitted for verification of airflow direction.

- o. Surgeons or surgical procedures may require room temperatures, ventilation rates, humidity ranges, and/or air distribution methods that exceed the minimum indicated ranges.
- p. Treatment rooms used for bronchoscopy shall be treated as bronchoscopy rooms. Treatment rooms used for procedures with nitrous oxide shall contain provisions for exhausting anesthetic waste gases.
- q. In a recirculating ventilation system, HEPA filters shall be permitted instead of exhausting the air from these spaces to the outdoors provided that the return air passes through the HEPA filters before it is introduced into any other spaces. The entire minimum total air changes per hour of recirculating airflow shall pass through HEPA filters. When these areas are open to larger, nonwaiting spaces, the exhaust air volume shall be calculated based on the seating area of the waiting area. (Note: The intent here is to not require the volume calculation to include a very large space [e.g., an atrium] just because a waiting area opens onto it.)
- r. See NFPA 99 for further requirements.⁸
- s. For intermediate care, labor/delivery/recovery rooms, and labor/delivery/recovery/postpartum rooms, four total ach shall be permitted when supplemental heating and/or cooling systems (radiant heating and cooling, baseboard heating, etc.) are used.
- t. The protective environment airflow design specifications protect the patient from common environmental airborne infectious microbes (i.e., Aspergillus spores). Recirculation HEPA filters shall be permitted to increase the equivalent room air exchanges; however, the outdoor air changes are still required. Constant-volume airflow is required for consistent ventilation for the protected environment. The pressure relationship to adjacent areas shall remain unchanged if the PE room is utilized as a normal patient room. Rooms with reversible airflow provisions for the purpose of switching between protective environment and All functions shall not be permitted.
- u. The All room described in this standard shall be used for isolating the airborne spread of infectious diseases, such as measles, varicella, or tuberculosis. Supplemental recirculating devices using HEPA filters shall be permitted in the All room to increase the equivalent room air exchanges; however, the minimum outdoor air changes of Table 7.1 are still required. All rooms that are retrofitted from standard patient rooms from which it is impractical to exhaust directly outdoors may be recirculated with air from the All room, provided that air first passes through a HEPA filter. When the All room is not utilized for airborne infection isolation, the pressure relationship to adjacent areas, when measured with the door closed, shall remain unchanged and the minimum total air change rate shall be 6 ach. Switching controls for reversible airflow provisions shall not be permitted.
- v. When required, appropriate hoods and exhaust devices for the removal of noxious gases or chemical vapors shall be provided in accordance with NFPA 99.⁸
- w. The requirement that all room air is exhausted directly to outdoors applies only to radiology waiting rooms programmed to hold patients who are waiting for chest x-rays for diagnosis of respiratory disease.
- x. If the planned space is designated in the organization's operational plan to be utilized for both bronchoscopy and gastrointestinal endoscopy, the design parameters for "bronchoscopy, sputum collection, and pentamidine administration" shall be used.
- y. For single-bed patient rooms using Group D diffusers, a minimum of six total ach shall be provided and calculated based on the volume from finished floor to 6 ft (1.83 m) above the floor.

BIO-MEDICAL WASTE CATEGORIES

*(Extract from Bio-Medical Waste - Management and
Handling Rules, 2016)*

Category	Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
Yellow	(a) Human Anatomical Waste: Human tissues, organs, body parts and fetus below the viability period (as per the Medical Termination of Pregnancy Act 1971, amended from time to time).	Yellow coloured non-chlorinated plastic bags	Incineration or Plasma Pyrolysis or deep burial*
	(b) Animal Anatomical Waste : Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.		
	(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components.		Incineration or Plasma Pyrolysis or deep burial* In absence of above facilities, autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery.
	(d) Expired or Discarded Medicines: Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.	Yellow coloured non-chlorinated plastic bags or containers	Expired cytotoxic drugs and items contaminated with cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature >1200 0C or to common bio-medical waste treatment facility or hazardous waste treatment, storage and disposal facility for incineration at >12000C Or Encapsulation or Plasma Pyrolysis at >12000C. All other discarded medicines shall be either sent back to manufacturer or disposed by incineration.

	(e) Chemical Waste: Chemicals used in production of biological and used or discarded disinfectants.	Yellow coloured containers or non-chlorinated plastic bags	Disposed of by incineration or Plasma Pyrolysis or Encapsulation in hazardous waste treatment, storage and disposal facility.
	(f) Chemical Liquid Waste : Liquid waste generated due to use of chemicals in production of biological and used or discarded disinfectants, Silver X-ray film developing liquid, discarded Formalin, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning,house-keeping and disinfecting activities etc.	Separate collection system leading to effluent treatment system	After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other wastewater. The combined discharge shall conform to the discharge norms given in Schedule- III.
	(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid.	Non-chlorinated yellow plastic bags or suitable packing material	Non- chlorinated chemical disinfection followed by incineration or Plazma Pyrolysis or for energy recovery. In absence of above facilities, shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery or incineration or Plazma Pyrolysis.
	(h) Microbiology,Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines,human and animal cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures.	Autoclave safe plastic bags or containers	Pre-treat to sterilize with nonchlorinated chemicals on-site as per National AIDS Control Organisation or World Health Organisation guidelines thereafter for Incineration.

Red	Contaminated Waste (Recyclable) (a) Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urinebags, syringes (without needles and fixed needle syringes) and vaccutainers with their needles cut) and gloves	Red coloured non-chlorinated plastic bags or containers	Autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making, whichever is possible. Plastic waste should not be sent to landfill sites.
White (Trans-lucent)	Waste sharps including Metals: Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharp	Puncture proof, Leak proof, tamper proof containers	Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete; combination of shredding cum autoclaving; and sent for final disposal to iron foundries (having consent to operate from the State Pollution Control Boards or Pollution Control Committees) or sanitary landfill or designated concrete waste sharp pit.
Blue	(a) Glassware: Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.		Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling.
	(b) Metallic Body Implants	Cardboard boxes with blue colored marking	

HIGH-TOUCH SURFACES

(Extract from Centre for Disease Control & Prevention)

- Bed rails / controls
- Tray table
- IV pole (grab area)
- Call box / button
- Telephone
- Bedside table handle
- Chair
- Room sink
- Room light switch
- Room inner door knob
- Bathroom inner door knob / plate
- Bathroom light switch
- Bathroom handrails by toilet
- Bathroom sink
- Toilet seat
- Toilet flush handle
- Toilet bedpan cleaner

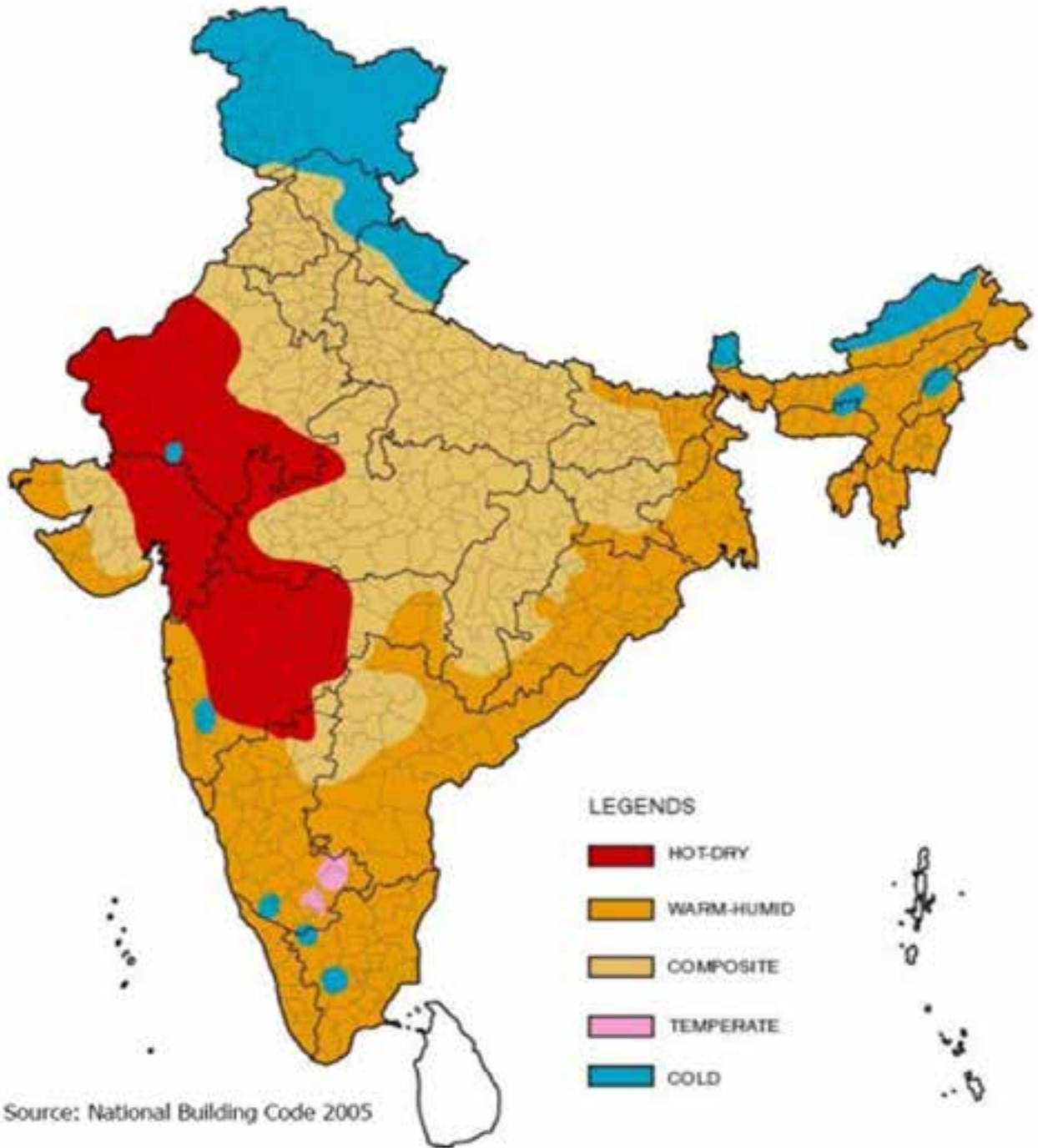
Source- High touch surfaces as defined by Centre for Disease Control & Prevention

WASHROOM DESIGNS
(Extract from National Building Code-2005)

Table 5.7 Sanitation Requirements for Institutional (Medical) Occupancy- Hospital

Sno:	Sanitary Unit	Hospitals With indoor Patient Ward	Hospitals With outdoor Patient Wards	
		For Males & females	For Males	For Females
1.	Water Closet (W.C.)	One for every 6 beds or part thereof	One for every 100 persons or part thereof	Two for every 100 persons or part thereof
2.	Ablution taps	One in each W.C.	One in each W.C.	One in each W.C.
2.	Ablution taps	One in each W.C.	One in each W.C.	One in each W.C.
3.	Wash Basins	Two upto 30 bed; add one for every additional 30 beds; or part thereof	One for every 100 persons or part thereof	One for every 100 persons or part thereof.
4.	Baths with Shower	One bath with shower for every 8 beds or part thereof.	--	--
5.	Bed pan washing sink	One for each ward	-	--
6.	Cleaner' Sinks	One for each ward	One per floor minimum	One per floor minimum
7.	Kitchen sinks & dish Washers (where Kitchen is provided)	One for each ward	--	--
8.	Urinals	--	One for every 50 persons or part thereof	--

CLIMATE ZONE MAP OF INDIA



**EE MR 2 - MINIMUM ENERGY EFFICIENCY
BASELINE CRITERIA FOR BUILDING ENVELOPE
MEASURES UNDER CASE 2 - NON AIR-
CONDITIONED BUILDINGS**

1) Envelope Measures:

(* For Climatic Zones of India, please refer Annexure - I)

❖ **Fenestration - SHGC value**

Climate Zone *	Maximum SHGC Value	
	WWR ≤ 40%	WWR > 40%
Hot and Dry	0.42	0.36
Warm and Humid	0.42	0.36
Composite	0.42	0.36
Temperate	0.48	0.4
Cold	0.8	0.8

❖ **Glazing U-value**

(Applicable only if Window-to-Wall Ratio WWR > 40%)

Climate Zone *	Maximum U-value (W/m ² K) (WWR > 40%)
Hot and Dry	5.7
Warm and Humid	5.7
Composite	5.7
Temperate	5.7
Cold	5.7

❖ **Wall Assembly U-value**

Climate Zone *	Maximum U-value of the overall wall assembly (W/m ² K)
Hot and Dry	2.5
Warm and Humid	2.5
Composite	2.5
Temperate	2.5
Cold	1.1

❖ **Roof Assembly U-value**

Climate Zone *	Maximum U-value of the overall roof assembly (W/m ² K)
Hot and Dry	1.2
Warm and Humid	1.2
Composite	1.2
Temperate	1.8
Cold	1.2

**EE CREDIT 2 ENHANCED ENERGY EFFICIENCY
BASELINE CRITERIA FOR BUILDING ENVELOPE
MEASURES UNDER CASE 2 - NON-AIR
CONDITIONED BUILDINGS**

1) Envelope Measures:

(* For Climatic Zones of India, please refer Annexure - I)

❖ Fenestration - SHGC value

Climate Zone *	Maximum SHGC Value	
	WWR \leq 40%	WWR > 40%
Hot and Dry	0.32	0.27
Warm and Humid	0.32	0.27
Composite	0.32	0.27
Temperate	0.40	0.30
Cold	0.8	0.8

❖ Glazing U-value

Climate Zone *	Maximum SHGC Value	
	WWR < 40%	WWR > 40%
Hot and Dry	3.3	2.8
Warm and Humid	3.3	2.8
Composite	3.3	2.8
Temperate	5.7	3.3
Cold	3.3	2.8

❖ Wall Assembly U-value

Climate Zone *	Maximum U-value of the overall wall assembly (W/m ² K)
Hot and Dry	1.8
Warm and Humid	1.8
Composite	1.8
Temperate	1.8
Cold	0.8

❖ Roof Assembly U-value

Climate Zone *	Maximum U-value of the overall roof assembly (W/m ² K)
Hot and Dry	0.5
Warm and Humid	0.5
Composite	0.5
Temperate	0.75
Cold	0.5

About CII (Confederation of Indian Industry)

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 2,00,000 enterprises from around 240 national and regional sectoral industry bodies.

With 66 offices, including 9 Centres of Excellence, in India, and 9 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Singapore, UK, and USA, as well as institutional partnerships with 320 counterpart organizations in 106 countries, CII serves as a reference point for Indian industry and the international business community.



Confederation of Indian Industry

About IGBC (Indian Green Building Council)

The Indian Green Building Council (IGBC), part of Confederation on Indian Industry (CII) was formed in the year 2001. The vision of the council is 'To enable a sustainable built environment for all and facilitate India to be one of the global leaders in sustainable built environment by 2025'.

The council offers a wide array of services which include developing new green building rating programmes, certification services and green building training programmes. The council also organises Green Building Congress, its annual flagship event on green buildings.

The council is committee-based, member-driven and consensus-focused. All the stakeholders of construction industry comprising of architects, developers, product manufacturers, corporate, government, academia and nodal agencies participate in the council activities through local chapters.



Confederation of Indian Industry

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