Confederation of Indian Industry

IGBC

IGBC Green Factory Building Rating System

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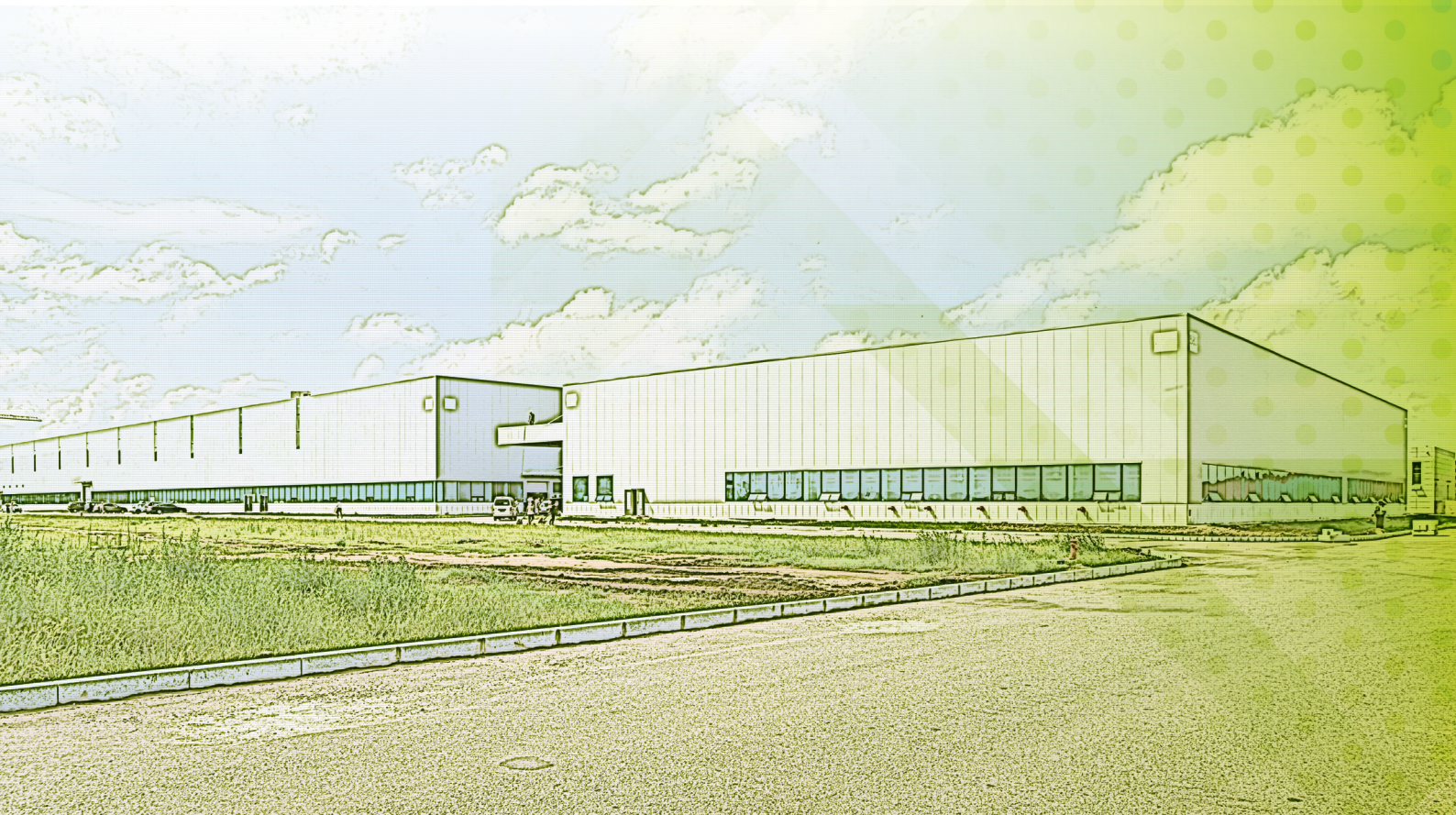

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Foreword from the Indian Green Building Council (IGBC)

India is witnessing tremendous growth in infrastructure and construction development. The construction industry in India is one of the largest economic activities and is growing at an average rate of 9.5% as compared to the global average of 5%. As the sector is growing rapidly,preserving the environment poses a host of challenges. To enable the construction industry to be environmentally sensitive, CII-Sohrabji Godrej Green Business Centre has established the Indian Green Building Council (IGBC). IGBC is a consensus driven not-for-profit council representing the building industry, consisting of more than 2,050 committed member organizations. The council encourages builders, developers and owners to build green to enhance the economic and environmental performance of buildings.

The Green Building Movement in India has been spearheaded by IGBC since 2001, by creating national awareness. The council's activities have enabled a market transformation with regardto green building concepts, materials and technologies.

IGBC continuously works to provide tools that facilitate the adoption of green building practices in India. The development of IGBC Green Factory Building Rating System is another important step in this direction.

IGBC Membership

IGBC draws its strength from its members who have been partners in facilitating the Green Building Movement in India. The local chapters led by individual champions and committed members have been instrumental in reaching out the vision of the IGBC at the regional levels. IGBC is today seen as a leader in spearheading the Indian Green Building Movement. The council is member driven and consensus based.

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Our special thanks to the following members for their participation and contributions in developing the rating programme:

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I. Introduction

With the advancement of green building movement in India, many companies have evinced keen interest in having a holistic green design and construction framework for upcoming factory buildings. The national GDP expected to grow at about 7% and the contribution of the manufacturing sector to the national GDP being quite significant at 25%, more and more factories would be set up in the country. While growth is imminent, it is imperative that the development should happen in an environmentally sustainable manner. In this context, the development and launch of a green rating programme for factory buildings would have far reaching impacts on saving natural resources, betterment of working conditions and enhanced productivity, there by leading to substantial national benefits.

Green concepts and techniques in the industry can help address national issues like energy efficiency, conservation of natural resources, handling of consumer waste, water efficiency and reduction in fossil fuel use in commuting. Most importantly, these concepts can enhance occupant health, happiness, and wellbeing. The concept of a rating would encourage designers to address these by design.

IGBC has set up the Green Factory Building Core Committee to develop the rating programme. This committee is comprised of key stakeholders including corporates, architects, consultants, developers, manufacturers, and institutions. The committee, with a diverse background and knowledge, has enriched the rating system both in its content and process.

This rating system would address the factory buildings and not the processes. It would be applicable to all sectors of industry and for all climatic zones of India.

National Benefits:

The anticipated long-term benefits, assuming a 600 green factory building stock erectedin the next 5-6 years are the following:

- Reduction in power demand by factory buildings
- Reduction in GHG emissions
- Reduction in potable water consumption
- Increase of green cover in new factory premises, thereby reducing heat islandeffect
- Recharge of aquifers with storm water
- Enhanced indoor air quality leading to at least 1% productivity gains

II. Benefits of Green Factory Building

Green factory building can have tremendous benefits, both tangible and intangible. The mosttangible benefits are the reduction in water and energy consumption right from day of occupancy. The energy savings could range from 30 – 40 % and water savings around20 – 30%. Intangible benefits of green factory include enhanced indoor air quality, good daylighting, health, well-being, and safety of the workforce.

National Priorities Addressed in the Rating System

Water Efficiency:

India is the second most populous nation in the world with a billion people. 70 percent of India's irrigation needs and 80 percent of its domestic needs are met by groundwater. According to World Bank estimates, by the year 2020 India is expected to experience severewater stress with the per capita availability of water projected to fall below 1,000 cubic meters per year as compared to 2,000 cubic meters per year in 1997. Water demand is expected to rise with the expanding urbanisation and industrialisation. Effective water management strategies are needed to address the crisis. The green factory building rating encourages use of water in a self - sustainable manner through reduce, recycle, and reuse strategies.

Handling of Waste:

With expanding industrialisation and urbanisation, the quantity of waste generated is increasing. Several studies indicate about 25 million tons of municipal waste and 10 milliontons of hazardous waste is generated annually. In the present waste management scenario, almost 90% of the waste generated requires around 1,200 hectares of land per year for disposal. The waste is either dumped or burnt, producing hazardous gases and leeching of toxins into the soil. Segregation of waste at source, diverting the material to the local recycling facilities and reuse of materials, thereby reducing waste dumped in the landfills are some of the strategies encouraged by the rating system.

Energy Efficiency:

Buildings consume a significant amount of energy, of which there is a potential to save 30 to40%. This rating system mainly addresses the efficiency in the factory building energy consumption. Considering the tremendous knowledge and awareness levels amongst factoryowners and designers, factory buildings are well positioned to embrace the latest trends andtechnologies in enhancing energy efficiency.

Reduced Use of Fossil Fuels:

Due to the rise in standard of living, economic activities are increasingly becoming energy andtechnology intensive. Fossil fuel consumption is increasing worldwide to keep up with thechanging needs. The dependence on fossil fuels also raises the risk of climate change. Major contributions to atmospheric pollution and climate change are believed to be from carbon emissions produced from combustion of fossil fuels. The rising fossil fuel demand has evoked a fear of running out of fuel reserves in the future. To reduce the dependency on fossil fuels and the resultant air pollution, the rating system encourages the use of alternatefuels for transportation, public transportation, biofuels for captive power generation, green power and on-site renewable energy generation.

Reduced Dependency on Virgin Materials:

Rising industrial needs demand greater use of materials for various activities. Use of non-renewable, virgin materials would pose a risk of depleting the available natural resources. The rating system encourages projects to use recycled & reused materials and discourages the use of virgin wood, thereby addressing environmental impacts associated with extractionand processing of virgin materials.

Occupational Health:

Occupational Health is the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations which requires good health, adaptation to work and controlling risks. Occupational health is one of the major concernsin providing safety and good working conditions in the industrial sector to reduce the risk of problems related to work. The rating system addresses some of the issues related to occupational health such as avoiding the use of asbestos in construction, provision of breakout spaces etc.

III. IGBC Green Factory Building Rating System

IGBC has set up the Core Committee to develop and maintain the ratings ongoing contemporary relevance to the industry. The committee constitutes of industry, academia, government, material manufacturers and institutions to provide strategic input and guidance. The diversity in the professions and experience of the members brings in a holisticperspective in the process of developing the rating programme.

a. Evolution of the Rating System

IGBC, in its endeavor to extend green building concepts to all building types, envisioned a rating programme for factory building in May 2008. A core committee was formed under the leadership of Mr. Pradeep Bhargava, Managing Director, Cummins Generator Technologies India Ltd. The committee drafted the pilot version of the programme which was launched in May 2009. The rating system is designed tosuit Indian climate and construction practices.

The rating system will be subject to review by the core committee, every 6 months, toensure that it is updated and contemporary.

b. Features of IGBC Green Factory

IGBC Green Factory Building Rating System is a voluntary and consensus based programme. The rating system has been developed based on materials and technologies that are currently available. This rating system would facilitate the development of energy efficient, water efficient, healthy, more productive, environmentally friendly factories.

The rating system evaluates certain credit points using a prescriptive approach and other credits on a performance-based approach. The rating system has evolved so as tobe comprehensive and at the same time user-friendly. The programme is fundamentally designed to address national priorities and quality of life for factory workforce.

The rating programme uses well-accepted national standards and wherever local or national standards are not available, appropriate international benchmarks have beenconsidered.

c. The Future of IGBC Green Factory Building

Many new green building materials, equipments and technologies are being introducedin the market. With continuous upgradation and introduction of new green technologies and products, it is important that the rating programme also keeps pace with current standards and technologies. Therefore, the rating programme will also undergo periodic revisions to incorporate the latest advances and changes. It is important to note that project teams applying for IGBC Green Factory Building shouldregister 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 ratingsystem. IGBC will highlight new developments on its website on a continuous basis at www.igbc.in

IV. Type of certification and process

- **Precertification**

Projects by developers can register for Precertification. This is an option provided for projects aspiring to get precertified at the design stage. Precertification also gives the developer a unique advantage to market the project to potential buyers.

The documentation submitted for precertification must detail the project design features which will be implemented. The rating awarded under precertification is based on the project's intention to conform to the requirements of IGBC Green Factory Building Rating system®.It is important to note that the precertification rating awarded need not necessarily correspond to the final rating.

Precertified projects are required to provide the status of the project to IGBC, in relation tothe rating, once every six months until the award of the final rating. Those projects whichseek precertification need to submit the following documentation:

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):
        - Master/ Site plan
        - Parking plans
        - Floor plans
        - Elevations
        - Sections
    c. Timestamp photographs/ Rendered views
    d. Filled-in templates
    e. Narratives and supporting documentation such as conceptual drawings, estimate / tentative calculations (in excel sheets), declarations from the owner, etc., for each of the mandatory requirements and credits

The Precertification is valid for 3 years from the date of award, after which projects are required to apply for the full certification (or) submit construction progress reports once in every six months to get an extension certificate for Precertification rating.

- **Certification**

The IGBC Green Factory Building addresses both the new and existing factory buildings.

The existing factory buildings should address the following measures (illustrative) before applying for certification:

- Soil erosion control measures in future
- Changes in design to accommodate requirements of differently abled people, likeeasy access to lifts, rest rooms etc.,
- Change to low flow water fixtures
- Rainwater harvesting
- Limit turf areas
- Have policy for use of green materials in future
- Minimum fresh air ventilation
- Comfort conditions
- Use of eco-friendly housekeeping materials

The rating system is valid for 3 years. On completion of 3 years, projects can validate / renew based on the prevailing latest version. The guidelines detailed under each credit enable the design and construction of green factory buildings of all sizes and types.

IGBC Green Factory Building rating addresses green features under the following categories:

- Site Selection and Planning
- Water Conservation
- Energy Efficiency
- Materials & Resources
- Indoor Environment Quality
- Innovation in Design & Operation

Different levels of green building certification are awarded based on the total credits earned. However, every green factory building should meet certain mandatory requirements, whichare non-negotiable.

- **IGBC Green Factory Building Certification Levels**

Certification Level	New Factory	Existing Factory	Recognition
Certified	50-59	43-50	Best Practices
Silver	60-69	51-58	Outstanding Performance
Gold	70-79	59-67	National Excellence
Platinum	80-100	68-85	Global Leadership

V. IGBC Green Factory Building Registration

Project teams interested in IGBC Green Factory Building Certification for their project must first register with IGBC. Projects can be registered on IGBC website (www.igbc.in) under'IGBC Green Factory Building'. The website includes information on registration fees for IGBC member companies as well as non-members. Registration is the initial step which helps establish contact with IGBC and provides access to the required documents, templates, important communications, and other necessary information. Consult the website for important details about IGBC Green Factory Building applicationas well as the certification review process, schedule and fee.

VI. Documentation

The project team is expected to provide supporting documents for all the mandatory requirements and the credits attempted. Supporting documents are those which provide, specific proof of meeting the required performance level, such as, specifications, drawings(in native format only), cutsheets, manufacturer's literature, purchase invoices and other documents.

These details are mentioned in this guide, under each credit / mandatory requirement.

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

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

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

It is important to note that the mandatory requirements and credits earned at the preliminaryreview are only considered as expected. These mandatory requirements and credits are notawarded 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 finalreview.

VII. Credit Interpretation Ruling

In some instances, the design team can face certain challenges in applying or interpreting amandatory requirement or a credit. It can also happen in cases where the project can opt toachieve the same goal through a different compliance route.

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

The following are the steps to be followed, in case the project team faces a problem:

- Consult the Reference Guide for description of the credit goal, compliance options andcalculations.
- Review the goal of the credit or mandatory requirement and self-evaluate whether theproject satisfies the goal.
- Review the Credit Interpretation web page for previous CIR on the relevant credit ormandatory requirement. All projects registered under IGBC Green Factory will haveaccess 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 CIRs. Two CIRs are answered without levying any fee and for any CIR beyond the first two CIRs, a fee is levied.

VIII. Appeal

Generally, credits get denied due to misinterpretation of the goal. On receipt of the final review, the project team has the option to appeal to IGBC for reassessment of denied creditsor mandatory requirements. The documentation for the mandatory requirements or creditsseeking appeal may be resubmitted to IGBC along with the necessary fee. IGBC will take 30 working days to review such documentation. These submissions would be reviewed by an assessor not involved in the earlier assessments. Documentation for appeals should includethe following:

i. Documentation submitted for design submission

ii. Documentation submitted for construction submission

iii. Clarifications along with necessary drawings and calculations

IX. Fee

Certification fee details can be found on IGBC website.

X. Updates and Addenda

This is the second version of IGBC Green Factory Building Reference Guide. As the rating system continues to improve and evolve, updates and addenda to the reference guide will be made available through the website. These additions will be incorporated in the next version of the rating system.

XI. IGBC Green Factory Building Checklist

IGBC Green Factory Building Rating System			
Requirement		**Available Points**	
		New Factory Building	**Existing Factory Building**
Site Selection and Planning			
SSP MR 1	Local Building Regulations	**Required**	**Required**
SSP MR 2	Soil Erosion Prevention & Control	**Required**	**Required**
SSP CR 1	Green Transportation	**1**	**1**
SSP CR 2	Basic Amenities	**2**	**2**
SSP CR 3	Natural Topography and Vegetation	**2**	**2**
SSP CR 4	Urban Heat Island Mitigation	**4**	**4**
SSP CR 5	Eco-Friendly Transportation	**3**	**3**
SSP CR 6	Universal Design	**2**	**2**
SSP CR 7	Outdoor Light Pollution Reduction	**1**	**1**
SSP CR 8	Awareness on Green Concepts	**1**	**1**
	Total Credit Points	**16**	**16**
Water Conservation			
WC MR 1	Rainwater Harvesting	**Required**	**Required**
WC MR 2	Water Efficient Plumbing Fixtures	**Required**	**Required**
WC CR 1	Sustainable Landscape Design	**3**	**3**
WC CR 2	Management of Irrigation System	**2**	**2**
WC CR 3	Enhanced Rainwater Harvesting	**4**	**4**
WC CR 4	Wastewater – Treatment	**1**	**1**
WC CR 5	Water Metering and Management	**2**	**2**
WC CR 6	Enhanced Water Efficiency	**4**	**4**
WC CR 7	Alternative Water Consumption	**4**	**4**
	Total Credit Points	**20**	**20**
Energy Efficiency			
EE MR 1	Eco-friendly Refrigerant	**Required**	**Required**
EE MR 2	Minimum Energy Performance	**Required**	**Required**
EE MR 3	Commissioning Plan for Building Systems	**Required**	**NA**
EE CR 1	Eco-friendly Refrigerant Management	**1**	**1**
EE CR 2	Enhanced Energy Performance	**12**	**10**
EE CR 3	Green Power	**6**	**6**
EE CR 4	Eco-friendly Power Backup Systems	**1**	**1**
EE CR 5	Energy Performance Monitoring	**4**	**4**
	Total Credit Points	**24**	**22**
Materials & Resources			
MR MR 1	Waste Management	**Required**	**Required**
MR CR 1	Sustainable Procurement	**2**	**1**
MR CR 2	Organic Waste Management	**2**	**2**
MR CR 3	Construction Waste Management	**2**	**NA**
MR CR 4	Materials with Recycled Content	**3**	**NA**
MR CR 5	Local Materials	**3**	**NA**
MR CR 6	Use of Salvaged Materials	**2**	**NA**
MR CR 7	Eco-friendly Wood Based Materials	**2**	**2**
	Total Credit Points	**16**	**5**

Indoor Environment Quality and Occupational Health			
IEQ MR 1	No Smoking Policy	**Required**	**Required**
IEQ MR 2	Minimum Fresh Air Requirements	**Required**	**Required**
IEQ MR 3	Avoid use of Asbestos in the Building	**Required**	**Required**
IEQ CR 1	Enhanced Fresh Air Ventilation	**4**	**4**
IEQ CR 2	Building Flush Out	**2**	**NA**
IEQ CR 3	Low VOC Materials	**2**	**2**
IEQ CR 4	Eco-Friendly Housekeeping Chemicals	**2**	**2**
IEQ CR 5	Indoor Air Quality	**3**	**3**
IEQ CR 6	Daylighting	**4**	**4**
IEQ CR 7	Occupant Well-being Facility	**2**	**2**
	Total Credit Points	**18**	**17**
Innovation in Design & Operation			
ID CR 1.1	Innovation in Design & Operation	**1**	**1**
ID CR 1.2	Innovation in Design & Operation	**1**	**1**
ID CR 1.3	Innovation in Design & Operation	**1**	**1**
ID CR 1.4	Innovation in Design & Operation	**1**	**1**
ID CR 1.5	Innovation in Design & Operation	**1**	**NA**
ID CR 2	IGBC AP (Accredited Professional)	**1**	**1**
	Total Credit Points	**6**	**5**
Total Credit Score		**100**	**85**

Site Selection & Planning

Local Building Regulations

SSP Mandatory Requirement 1

Intent

To ensure that the factory building design complies with the required statutory and regulatory codes

Compliance options:

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

- Approval of the Site Plan (and/or) Building Plan from the competent Government authority
- Approvals for all statutory requirements relating to construction and operation of the project

Documentation Required:

(i). Provide an approved Site Plan (and/or), Factory/Building Plan and Occupancy certificatefrom the competent Government authority such as State Industrial Corporation.

(ii). Submit consent to operate letter obtained from the competent authority (Central/ State Pollution Control Board)

(iii). No Objection Certificate from fire services department.

(iv). Factory 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 EnvironmentImpact Assessment Authority (SEIAA).

(v). To ensure that the building conforms to the requirements of the local bye-laws, submit declaration on company letter head from the authorised signatory ***(including name and designation)*** stating that the required clearances from all regulatory bodies are in place.

(vi). Timestamp photographs of the factory building at different stages of construction (during and post construction).

Soil Erosion Prevention & Control

SSP Mandatory Requirement 2

Intent

To control soil erosion and thereby reduce negative impacts to the site.

Compliance options:

New Factory

Adopt all the measures listed below to control erosion:

- Ensure soil erosion control measures before and during construction that confirm to the best management practices highlighted in the National Building Code of India 2016: Part 10, Section 1: Landscape Planning, Design and Development (Protection of Landscape During Construction and Soil and Water Conservation).
- Ensure that fertile topsoil is stockpiled prior to construction, for future reuse.
- Develop measures to address soil erosion, post occupancy
- Prepare Operation & Maintenance (O&M) Plan for soil erosion prevention and control measures.

Existing Factory

- Develop post occupancy erosion control measures such as maintenance of storm water network and green cover.
- In case of expansion/retrofitting, follow compliance options recommended for New Factory project.

Documentation Required:

New Factory:

(i). Narrative describing the Erosion and Sedimentation Control (ESC) measures implemented in the project as prescribed in NBC, during construction and post occupancy. Narrative shall include, but not limited to, the following ESC measures:

- Before Construction: Top-soil preservation, preservation of existingvegetation/trees
- During Construction: Barrication of site, wheel washing, sedimentation pit/ basin, swales/ temporary storm water drains, mulching, temporary vegetation
- Post Construction: Storm water channels, sediment pit/ basin, rainwater harvesting, vegetation.

(ii). Site drawings highlighting ESC measures implemented on-site, during construction andpost occupancy.

(iii). Timestamp photographs showing ESC measures taken at various stages of construction,before, during construction and post occupancy.

Existing Factory:

(i). Narrative and timestamp photographs of the measures implemented to prevent soil erosion.

(ii). Storm water layout along with timestamp photographs of trenches/pits/ rainwater collection tank provided.

(iii). Operation and Maintenance (O&M) plan to prevent soil erosion post construction.

(iv). For any retrofitting/ expansion/ addition in the factory, provide documents for compliance as per New Factory guideline.

Note: In case the topsoil (20 cm) is not fertile, please submit soil test report to justify compliance for the Mandatory Requirement.

Green Transportation

SSP Credit 1 **Points: 1**

Intent

Reduce air pollution and land development impacts from personal automobile use.

Compliance options:

New & Existing Factory:

Option-1: Public Transport **Credit Point: 1**

Locate the factory within 2.0 km walking distance from an intra-city railway station (or) a permanent bus stop within 1.0 km walking distance.

Or

Option-2: Shuttle Service **Credit Point: 1**

/Provide dedicated shuttle service to cover atleast 50% of the employees.

- *Employees mean permanent and contract employees in all shifts*

Documentation Required:

(i). Aerial map highlighting the distance of public transport (intra-city railway station and or permanent Bus Stop) within 1000m from the main entrance of the factory.
(ii). Timestamp Photographs showing the public transport.
(iii). Copy of contract agreement recently signed between factory management and shuttle service provider clearly indicating type and no. of vehicles, along with seating capacity and Timestamp photographs of shuttle.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Basic Amenities

SSP Credit 2 **Points: 2**

Intent

To enhance the overall quality of life by providing amenities within and closer to the site.

Compliance options:

Provide at least three amenities as listed in Exhibit A - Category 1, within a distance of 2 kmfrom the entrance of the factory. (1 point)

AND

Provide at least three in-situ amenities as listed in category 2. (1 point)

Note:

- Basic amenities within the campus can be considered to demonstrate compliance.
- Basic amenities shall be functional at the time of project certification.

Documentation Required:

(i). Provide an aerial map (to the scale) indicating the pedestrian walking distances from themain entrance of the factory site to the basic amenities.

(ii). Timestamp photographs of the amenities.

Exemplary Performance:

This credit is not applicable for exemplary performance.

Exhibit A - List of Basic Amenities

Category 1: Within 2 km from the factory

- Grocery / Retail Store
- School
- Bank
- Restaurant
- Multi-purpose halls
- Fire Station
- Medical clinic / Hospital / Dental
- Pharmacy
- Courier service

Category 2: Facilities provided in-situ

- First aid medical facility
- Crèche
- Lockers and showers
- Canteen
- Resting Rooms
- Gymnasium

Natural Topography and Vegetation

SSP Credit 3 **Points: 2**

Intent

Minimise disturbances to the site so as to reduce long-term environmental impacts, thereby promoting habitat and biodiversity.

Compliance Options:

Option 1: Natural Topography and/or Landscape

Avoid disturbance to the site by retaining natural topography (and/ or) design landscape spaceson the ground, for at least 20% of the site area.

Points are awarded as below:

Percentage of Site Area with Natural Topography and/or Landscape Area	Points
≥ 20%	1
≥ 30%	2

Notes:

- *Retaining 'Natural Topography' in its broad sense means preserving the natural features of the terrain such as exposed natural rocks, water body, etc.,*
- *Vegetation/ Soft landscape shall not be designed with monoculture plant species, since such species would not promote habitat and biodiversity.*
- *Vegetation on the ground shall only be considered; vegetation over built structures such as roofs, basement, podiums, etc., shall not be considered.*
- *Grass medians, grass pavers, jogging track, open-air theatre, parking areas, driveways, walkways, playground, swimming pool, etc., are considered as site disturbances.*
- *Only native / adaptive vegetation shall be considered for this credit calculation.*
- *Potted plants shall not be considered as vegetation.*
- *Artificial vegetation shall not be considered for this credit calculation.*

Option 2: Vegetation over Built Structures

Restore disturbed site area by designing vegetated spaces over built structures and on theground, for at least 30% of the site area (including development footprint).

Points are awarded as below:

Percentage of Site Area with Vegetation over built structures and on the ground	Points
≥ 30%	1
≥ 40%	2

Notes:

- *Development footprint includes building footprint and other hardscapes areas suchas parking, footpaths, walkways, roads, grass medians, grass pavers, etc.,*
- *Vegetation/ Soft landscape shall not be designed with monoculture plant species, since such species would not promote habitat and biodiversity.*
- *Vertical Landscaping to the external walls can also be considered for this credit calculation.*
- *Vegetation on the ground as well as vegetation over built structures such as roofs, basement, podiums, etc., can be considered.*
- *Partially vegetated areas and disturbed site areas such as grass pavers, grass medians, jogging track, open-air theatre, playground, is considered as site disturbances and shall not be considered.*
- *Potted plants shall not be considered as vegetation.*
- *Artificial vegetation shall not be considered.*
- *Only fully developed landscape area is considered for credit compliance (partial or landscape under development cannot considered for compliance).*

Documentation Required:

Option 1:

(i). Provide landscape plan clearly indicating the site / roof area with natural topography andlandscape developed.

(ii). Landscape area calculations along with timestamp photographs of each bedding area.

(iii). Declaration on company letter head from the authorised signatory ***(including name anddesignation)*** stating that the landscape/open area will remain open for life of the project.

Option 2:

(i). Provide site drawing and building roof plans clearly indicating the area with vegetation as applicable.

(ii). Calculations indicating the total area with vegetation over the built structures and on-ground to the total site area along with timestamp photographs showing the vegetation.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation, if more than 40% of the site area is leftundisturbed (no-change in site topography).

Urban Heat Island Mitigation

SSP Credit 4 **Points: 4**

Intent

Mitigate Urban Heat Island effect to minimize negative impact on the microclimate.

Compliance Option

Exposed Roof: **Points: 2**

Implement green measures to minimize Urban Heat Island effect by covering atleast 50% ofthe exposed roof area.

Points are awarded as below:

Percentage of exposed roof area covered with High Reflective Material	Points
> 50%	1
> 75%	2

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

Table 1 Minimum Solar Reflective Index (SRI) values for different roof types

Roof Type	Slope	Minimum SRI Value	Maximum SRI Value
Low-sloped roof	< 2:12	78	-
Steep-sloped roof	> 2:12	29	64

Note:

- *Exposed roof area does not include equipment platforms, areas with Solar Photovoltaic(SPV) & Solar Water Heaters (SWH), skylights and other service requirements.*
- *Exposed parking area covered with either metal roof or permanent concrete structure would be considered under roof area calculation, else parking area would be considered under non-roof area calculation.*
- *SRI (Solar Reflective Index) value of high reflectance materials should be as per ASTM Standards.*

And/or

Non-Roof: **Points: 2**

Implement green measures to minimize Urban Heat Island effect by covering at least 50% ofnon-roof impervious areas

Provide one or combination of the following, for at least 50% of exposed non-roof imperviousareas 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 than64)

Percentage of non-roof area covered with High Reflective Material	Points
> 50 %	1
> 75 %	2

Note:

- *Non-roof impervious areas include, but not limited to, footpaths, pathways, roads, driveways, uncovered surface parking, and other impervious areas.*
- *The non roof compliance credit is not applicable to existing factory buildings.*

Documentation Required:

(i). Site and Roof plans indicating UHI mitigation measures over roof and non-roof areas.

(ii). Calculations indicating the exposed roof and non-roof areas (including the total number of covered and non-covered parking spaces) along with the percentage of area covered with UHI mitigation measures.

(iii). Manufacturer datasheet or Test certificate from a NABL certified test laboratory indicatingthe SRI value.

(iv). Purchase Invoices of the UHI mitigation measures.

(v). Timestamp photographs of UHI mitigation measures implemented.

(vi). Declaration from the project for maintaining the vegetation over roof surfaces, as applicable.

Exemplary Performance:

This credit is eligible for exemplary performance if the project has implemented UHI measures to 95% of the roof areas.

Eco-Friendly Transportation

SSP Credit 5 **Point: 3**

Intent

To encourage the use of electric and non-fossil fuel vehicles to reduce pollution from automobile use.

Compliance options:

Option-1: Electric Charging Infrastructure **Point: 2**

Provide Electric Vehicle Charging Infrastructure (EVCI) for electric vehicles within the sitefor at least 10% of the total parking capacity, for both two & four-wheeler (excluding visitor's parking).

Percentage of the total parking capacity	Points
10%	1
20%	2

And/Or

Option-2: Eco-friendly Transport Facility **Point: 1**

Provide eco-friendly transport service (non-fossil fueled vehicles not limited to E-Vehicles/Compressed Natural Gas – CNG/Liquified Natural Gas – LNG/ Hydrogen/ Fuel-cell/ Hybrid vehicle/ Bicycles etc.) for outside work (or) indoor transit.

Note:

Total parking capacity for EVCI shall proportionally be segregated into 4-wheelers and 2-wheelers as per the approved parking plan.

Documentation Required:

(i). Provide parking plan and calculations demonstrating credit compliance.

(ii). Purchase Invoice (PI) of EVCI indicating type and no. of charging points installed.

(iii). Cut sheet/ specifications and Timestamp photographs of charging points provided.

(iv). Provide copy of PI/agreement clearly indicating type of vehicle, fuel used, seating capacity and photographs.

Note:

- *The agreement between the project and service provider shall be for at least three years.*
- *Fast charging can be considered for multiple uses based on their usage in 12 hrs of a day.*

Exemplary Performance:

This credit is eligible for exemplary performance if electric vehicle charging infrastructure(EVCI) for electric vehicles within the site for at least 30% of the total parking capacity.

Universal Design

SSP Credit 6 **Points: 2**

Intent

To ensure that the factory building is user-friendly for differently abled people.

Compliance options:

The factory building design should incorporate the following provisions for differently abled and senior citizens in accordance with the guidelines of the National Building Code (NBC) of India 2016**:**

- Appropriately designed preferred car parking spaces in areas which have easy access to the main entrance or closer to the lift.
- Provision for easy access to the main entrance
- Uniformity in flooring level / ramps in the factory areas
- Rest rooms (toilets) designed for differently abled people
- Visual warning signages in common areas & exterior areas

Note:

- *Surface parking for two car spaces shall be provided near entrance for the physically differently abled persons with maximum travel distance of 30.0 m. from the building entrance*
- *The width of parking bay shall be minimum 3.6 meter*
- *Guiding floor materials shall be provided or a device, which guides visually impaired persons with audible signals, or other devices, which serves the same purpose, shall be provided.*
- *Ramp shall be finished with non-slippery material to enter the building. Minimum widthof ramp shall be 1800 mm with maximum gradient 1:12. Length of ramp shall not exceed 9.0 meter having 800 mm high hand-rail on both sides extending 300 mm beyondtop and bottom of the ramp. Minimum gap from the adjacent wall to the hand-rail shall be 50mm.*

- *Water Closet (WC) shall be provided for the use of differently abled with essentialprovision of washbasin near the entrance for the differently abled.*
    - *The minimum size shall be 1500 mm x 1750 mm.*
    - *Minimum clear opening of the door shall be 900mm and the door shall swingout/slide.*
    - *Suitable arrangement of vertical / horizontal handrails with 50mm clearancefrom wall shall be made in the toilet.*
    - *The W.C. seat shall be 500 mm from the floor*
- *For lift, graphic/braille signage, as per the harmonized guidelines, shall be providedin the lift lobby.*

Documentation Required:

(i). Provide Site plan/drawings highlighting design provisions made for differently abled people.

(ii). Provide permanent signages displaying that space is reserved for wheelchair users.

(iii). Submit Timestamp photographs of facilities provided along with permanent signages.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Outdoor Light Pollution Reduction

SSP Credit 7 **Point: 1**

Intent

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

Compliance Option

Upward Lighting:

Design exterior lighting such that no external light fixture emits more than 5% of the totalinitial 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 90.1-2016 baselines, Section 9.4.2-2 - Individual Lighting Power Allowances for Building Exteriors (tradable & non-tradable surfaces).

Notes:

- *Total initial designed fixture Lumens shall be based on the total of all fixtures installed on site.*
- *Classify the project under one of the lighting zones, as defined in ASHRAE Standard 90.1-2016, 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 CII under Green Product Certification Programme (GreenPro) or an ecolabel can be used by the project to show compliance.*

Documentation Required:

(i). Provide lighting drawings indicating the location and type of fixtures used in the project.

(ii). Provide the list of lighting fixtures with make and model, photometric data including exterior Lighting Power Density (LPD) calculations based on ASHRAE Standard 90.1-2016 to show compliance.

(iii). Provide Timestamp photographs of the exterior lighting fixtures (day and night time).

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 horizontalLux) 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 90degrees 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 angleof 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 angleof 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 centerlineof the public roadway as the site boundary for a length of 2 times the driveway width centered onthe centerline of the driveway.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Awareness on Green Concepts

SSP Credit 8 **Point: 1**

Intent

Promote green education by involving occupants, facility staff, and visitors through outreach initiatives and clear guidelines, fostering awareness and ultimately contributing to positive environmental outcomes

Compliance Options:

Green Education Activities

Demonstrate compliance through atleast two of the following green education activities/ programmes, to increase awareness on eco-friendly practices to the warehouse/ building occupants and visitors:

- Develop promotional materials (posters, brochures, etc.,) and information on organisation portal with green concepts
- Install permanent educational signage in common areas of the park/ warehouse with green concepts such as Go Green, Save Earth; Water is Precious, Save it; Turn off Lights, when not in use; Say no to Mixed Waste; Plant a Tree, Save the Environment, etc.
- Organise atleast two outreach/ educational programmes in a year on eco-friendly practices/ green initiatives.

  The outreach/ educational programmes can include, but not limited to, clean & green, water conservation, energy conservation, waste segregation & recycling, use bio-degradable plastic/ avoid single use plastic, air pollution, world green building week and earth hour.

Documentation Required:

(i). Submit narrative describing the measures implemented for Green Education program.

(ii). Submit details of promotional material and photographs showing signage and posters placed in the project showing green concepts, as applicable.

(iii). Provide details of outreach/ educational programmes on eco-friendly practices/ green initiatives, as applicable.

(iv). Presentation on green features of the project and how the green features were incorporated, for occupants and visitors training programme.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Water Conservation

Rainwater Harvesting

Mandatory Requirement 1

Intent

To increase the ground water table or to reduce water demand through effective and appropriaterainwater management.

Compliance Options:

Case A: Rainwater Harvesting, Roof & Non-roof

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

Table 2 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%

Case B: High Ground Water Table

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

Table 3 Runoff coefficients for Typical Surface Types

S.No	Surface Type	Runoff Coefficient
1	Cemented / Tiled Roof	0.95
2	Roof Garden (<100 mm thickness)	0.95
3	Roof Garden (100 – 200 mm thickness)	0.30
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)	0.2
14	Concrete Pavement	0.95
15	Gravel Pavement	0.75
16	Open –grid Concrete Pavement	0.75
17	Open –grid Concrete Pavement	0.5

Notes:

- *For rainfall information, refer Indian Meteorological Department (IMD) at http://www.imd.gov.in*
- *Runoff volume = Surface area x Runoff Coefficient x One-day Rainfall*.*
- ** One-day rainfall can be derived from 'percentage of average peak month rainfall' given in Table X. To arrive at average peak month rainfall, consider an average of at least last 5 years peak month rainfall (of the respective year).*
- *In areas where the water percolation is limited, rainwater harvesting tank/pond (water*

body) shall 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.*
- *Centralized rainwater harvesting is encouraged in an industrial city, Industrial Park/Corridor/Zone/SEZ projects wherein, the project has approved rainwater/stormwater system.*

Documentation Required:

Case A:

(i). Site plan highlighting location and cross-sectional drawings of RWH systems (tank/recharge pit/ pond).

(ii). Submit rainwater harvesting design which shall include roof catchment gutters, downpipes rainwater/ storm water drains, trenches, filter chamber, storage tanks/ pits/ sumps.

(iii). Provide rainwater harvesting calculation indicating run-off volume captured or harvested from roof or non-roof for complying with one-day rainfall as indicated in table (criteria to arrive at "One-day Rainfall) and timestamp photographs of RWH system installed at the project.

Case B:

Hydrology report (approved by third party) indicating the level of water table, at different locations within the project site.

Water Efficient Plumbing Fixtures

Mandatory Requirement 2

Intent

To enhance the water efficiency of the factory, thereby reducing dependence on potable water.

Compliance Options

Use water efficient plumbing fixtures whose flow rates meet the baseline criteria in aggregate. The total annual water consumption of the factory should not exceed the total base case water consumption.

Table 4 Baseline Water Consumption for Fixtures

S. No	Fixture type	Maximum Flow Rate/ Consumption	Duration	Estimated Daily Uses per FTE **
1	Water Closets (Full-flush)	6 LPF	1 Flush	1 for male and female
2	Water Closets (Half-flush)	3 LPF	1 Flush	2 for female
3	Urinals	3.8 LPF	1 Flush	2 for male
4	Faucets/ taps	6 LPM	15 seconds	4
5	Showers/ Handheld Spray	10 LPM	8 minutes	0.1
6	Health Faucets	6.0 LPM	15 seconds	1

#Source: Uniform Illustrated Plumbing Code of India (UPC)-2022.

Notes

- **The baseline flows can be demonstrated at flowing water pressure of 4 bar. Flowing water pressure of 4 bar does not mean that the water supply in the building is at 4 bar. The building fixtures can operate at lower pressures but, to show compliance under this credit, the design flow rates are to be submitted at 4 bar.*
- *** Full Time Equivalent (FTE) represents a regular occupant who spends 8 hours per day in the factory/building. Visitor/part-time or employee working overtime have FTE values based on their hours per day divided by 8.*

- *Plumbing water fixtures include but not limited to faucets/taps installed for hand washing in rest rooms and canteen, dish washing and washing clothes shall be considered for calculation. However, water fixtures do not include irrigation applications.*
- *Default occupancy shall be considered as 50% for male and female.*

Document Required:

(i). Submit water saving calculations clearly indicating baseline and design/actual water consumption along with FTE occupancy calculations (for occupants and visitors).

(ii). Provide list of plumbing fixtures installed along with manufacturer cut sheets indicating the flowrates at 4 bar flowing water pressure.

(iii). Purchase Invoice and timestamp photographs of installed water fixtures indicating the make & model.

Sustainable Landscape Design

WC Credit 1 **Points: 3**

Intent:

Design landscapes to ensure minimum water consumption, thereby reducing dependence on potable water.

Compliance Options:

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

Notes*:*

- *This credit is applicable only for those projects which have at least 15% of the site arealandscaped.*
- *Landscape areas over built structures such as basements, podium, roofs, etc., can beconsidered for this credit calculation.*

Points are awarded as below:

Type of Landscape	Percentage of the Total Landscaped Area	Points
Turf Area	≤ 30% ≤ 20%	1 2
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 specieswould 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).*

Documentation Required:

(i). Landscape plan(s) highlighting the area covered with turf, drought tolerant species & other plant species, on the ground and over built structures.

(ii). Calculations indicating the total landscape area, turf and drought tolerant / native/ adaptive species (on the ground and over built structures) to the total site area, in percentage.

(iii). List of turf, drought tolerant, native and adaptive species used in the project.

(iv). Timestamp photographs showing the landscaped areas.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation if the project has more than 75% of the landscaped area is planted with drought tolerant / native / adaptive species or 10% of the total landscaped area with source fruit/ vegetable bearing plants.

Management of Irrigation System

WC Credit 2 **Points: 2**

Intent

Reduce the demand for irrigation water through water-efficient management, thereby reducing the use of potable water.

Compliance

Option-1

Provide or install highly efficient irrigation systems incorporating features mentioned below:**(**1Credit Point for every two measures**)**:

- ❖ Provide central shutoff valve
- ❖ Pressure regulating device(s) to maintain optimal pressure to prevent loss
- ❖ Install time-based controller for the valves such that the evaporation loss is minimum and plant health is ensured
- ❖ Each type of bedding including turf area must be segregated into independent zones based on watering needs. Atleast 50% of landscape planting beds must be equipped with drip irrigation system to reduce evaporation.
- ❖ Any other innovative methods for watering

Notes:

- *This credit is applicable only for the projects which have minimum 15% of the site area aslandscape area.*
- *Landscape areas over built structures such as basements, podium, roofs, etc., can be considered for this credit calculation.*

Documentation Required:

(i). Landscape plan highlighting the irrigation systems, including soil moisture sensors.

(ii). Schematic drawing indicating the location of the irrigation systems such as central shut-off valve, soil moisture sensors, drip irrigation layout, pressure regulating device(s) etc.

(iii). Manufacturer cut-sheets/ brochures of the installed water efficient irrigation systems and techniques.

(iv). Timestamp photographs showing the installed irrigation systems and techniques.

(v). Provide a detailed description about the management of installed irrigation systems.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation

Enhanced Rainwater Harvesting

WC Credit 3 **Points: 4**

Intent

To increase the ground water table or to reduce water demand through effective and appropriaterainwater management.

Compliance

Options

Provide rainwater harvesting system (storage/percolation pit/water harvesting pond or combination) to capture run-off volume greater than 'one-day rainfall' as specified in Case A and Case B.

Case A: Rainwater Harvesting, Roof & Non-roof

Credit Points are awarded based on rainwater harvesting system type and run-off volume captured:

Table 5 Criteria to arrive at "One-day Rainfall"

S No	Average Peak Month Rainfall (mm)	One-day Rainfall (% of Average Peak Month Rainfall)		
		2 points	3 points	4 points
1	Upto 250	12%	15%	18%
2	251 – 350	10%	12.5%	15%
3	351 – 500	8%	10%	12%
4	501 – 700	6%	7.5%	9%
5	701 & above	4%	5%	6%

Case B: High Ground Water Table

Credit Points are awarded based on rainwater harvesting system type and run-off volume captured:

Table 6 Criteria to arrive at "One-day Rainfall"

S No	Average Peak Month Rainfall (mm)	One-day Rainfall (% of Average Peak Month Rainfall)		
		2 points	3 points	4 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 (IMD) at http://www.imd.gov.in*
- *Captured Runoff volume = Surface area x Runoff Coefficient x % Average peak monthRainfall.*
- *Project in the area which has high water table (less than 8 meter) is not exempted for this credit.*

Notes:

1. This credit is only applicable if the project captures atleast 'one-day rainfall' as per themandatory compliance requirements.
2. The captured rainwater shall be used for useful purposes to reduce the dependency onpotable water demand.

Documentation Required:

Case A:

Provide rainwater harvesting calculation indicating run-off volume captured or harvested from roof or non-roof for complying with one-day rainfall as indicated in table given under Case A.

Case B:

(i). Site plan highlighting location and cross-sectional drawings of RWH systems (tank/recharge pit/ pond).

(ii). Submit rainwater harvesting design which shall include roof catchment gutters, downpipes rainwater/ storm water drains, trenches, filter chamber, storage tanks/ pits/ sumps.

(iii). Provide rainwater harvesting calculation indicating run-off volume captured or harvested from roof or non-roof for complying with one-day rainfall as indicated in table given under Case B and timestamp photographs of RWH system installed at the project.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Wastewater – Treatment

WC Credit 4 **Points: 1**

Intent

Treat waste water so as to be fit for reuse (or) disposal, thereby saving potable water (or) preventing contamination of water receiving streams

Compliance Options:

Waste Water Treatment **Points: 1**

Provide an on-site wastewater treatment system to treat 100% of wastewater generated in the factory building/ campus, to the quality standards suitable for reuse as prescribed by Central (or) State Pollution Control Board, as applicable.

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.*
- *Potted plants should not be considered under landscaping.*
- *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 litres/sqm/ day) for turf and 2 litres per sqm per 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.*

Documentation Required:

(i). Submit daily and annual water balance for the project including water demand for landscaping, flushing and air-conditioning cooling tower make-up water (if the project uses water-cooled chillers), and quantity of waste water reused for such applications.

(ii). Provide a detailed description of the installed on-site waste water treatment system, along with the capacity & efficiency of treatment plant and test reports of treated water after commissioning (in case of new factory) and for the preceding month (in case of existing factory).

(iii). Schematic drawing showing the plumbing lines connected to flush fixtures, cooling tower and landscaping, if treated waste water is reused for these applications.

(iv). Submit timestamp photographs of waste water treatment system.

(v). Provide detailed calculations indicating the water requirement for landscaping, flushing and air-conditioning cooling tower make-up water (including evaporative losses, blow down losses and drift losses) of the usage of treated wastewater within the factory building.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Water Metering and Management

WC Credit 5 **Points: 2**

Intent:

To encourage water use monitoring to improve overall water performance,thereby reducing potable water demand.

Compliance Options:

Realtime Water Monitoring **Points: 2**

Demonstrate water monitoring for at least 60% of the total raw water consumption in the project for various applications including flushing, irrigation, domestic use, process water, cooling tower make-up water any other major source of water consumption, by installation of sub-meters as applicable.

$$\%\ Use\ of\ \text{water metered} = \frac{\text{Total water metered for different end uses}}{Total\ \text{Raw}\ Water\ Consumption}$$

Points are awarded as follows:

Percentage of water metered for different end uses:	Point
≥ 60 %	1
≥ 80%	2

Documentation Required:

(i). Submit daily and annual water balance for the project including water demand for landscaping, flushing and air-conditioning cooling tower make-up water (if the project uses water-cooled chillers) and any other major source of water consumption.

(ii). Provide daily and annual meter data logs for the quantity of water used for each application or end use.

(iii). Provide detailed description of water meters installed for various usage along with manufacturer cutsheet/ specifications and schematic diagram showing the location of water meters installed in the project.

(iv). Timestamp photographs of meters installed.

Exemplary Performance:

This credit is eligible for exemplary performance in the Innovation in Design & Operation category with implementation of an online water monitoring system. The water dashboard would facilitate the project's understanding of water balance by incorporating innovative design processes.

Enhanced Water Efficiency

WC Credit 6 **Points: 4**

Intent

To enhance the water efficiency of the factory, thereby reducing dependence on potable water.

Compliance Options:

Option 1: Savings through Individual Water Fixtures

Select the water efficient fixtures with individual flow and flush rates (to calculate the watersavings) are as indicated in the table below:

Table 8 Baseline Flow Rates for Water Fixtures

S.No	Fixture type	Maximum Flow Rate/ Consumption	Duration	Estimated Daily Uses per FTE **
1	Water Closets (Full-flush)	6 LPF	1 Flush	1 for male and female
2	Water Closets (Half-flush)	3 LPF	1 Flush	2 for female
3	Urinals	3.8 LPF	1 Flush	2 for male
4	Faucets/ taps	6 LPM	15 seconds	4
5	Showers/ Handheld Spray	10 LPM	8 minutes	0.1
6	Health Faucets	6.0 LPM	15 seconds	1

** At a flowing water pressure of 4 bar*

Source: Illustrated Uniform Plumbing Code of India

The points are awarded as specified as below:

Percentage of Potable Water Savings over Baseline	Credit Points
≥ 15 %	1
≥ 20 %	2
≥ 25 %	3
≥ 30 %	4

Notes:

- *The baseline flows can be demonstrated at flowing water pressure of 4 bar. Flowing water pressure of 4 bar does not mean that the water supply in the building is at 4 bar. The building fixtures can operate at lower pressures but, to show compliance under this credit, the design flow rates are to be submitted at 4 bar.*
- *Existing building flow rates can show compliance through measurement at actual operating pressures.*
- *Water fixtures do not include irrigation applications.*
- *It's recommended for the water fixtures to be eco-labelled and meet the technical requirements specified above for compliance.*

Documentation Required:

(i). Submit calculations indicating the reduction in total water consumption by atleast 15%using the desired water efficient fixtures.

(ii). In the case of measurement approach for existing factory buildings, provide short videos less than a minute duration indicating the flow rates at actual operating pressures along with calculations for all water efficient fixtures.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation if water consumption is 35% lesser than the baseline criteria.

Alternative Water Consumption

WC Credit 7 **Points: 4**

Intent

To encourage the use of alternate water so as to reduce dependence on potable water.

Compliance Options

Demonstrate alternate water use at least 30% of the total water consumption in the project for various applications including flushing, irrigation, domestic use, cooling tower make-up water etc.

$$\%\ Use\ of\ Alternate\ water\ (Water\ Performance\ Ratio) = \frac{Alternate\ Water\ Consumption}{Total\ Water\ Consumption}$$

Points awarded are as follows:

Water Performance Ratio (% Alternate Water to the Total Water Consumption)	Credit Points
30	1
40	2
50	3
60	4

Notes:

- Use of alternate water includes the rainwater (captive use), treated waste water, condensate water or any purchased treated waste water.
- Treated waste water sourced from other sites / local authorities through permanent piped connections or other means can also be considered to show compliance for 'alternate water'.
- Captured rainwater 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 litres/sqm/ day) for turf and 2 litres per sqm per day for a minimum of 300 days, (or) justify if the water requirement and theaverage number of watering days for landscaping is less than the above

requirement.

- This credit is applicable only for existing factory projects.

Documentation Required:

(i). Calculation indicating the percentage of alternate water used in the project to the total water consumption of the project along with a break-up of sources of alternate water.

(ii). In case of any purchased waste water, provide the agreement copy indicating the quantity of waste water on daily/annual basis.

(iii). Submit daily and annual water balance for the project including water demand for landscaping, flushing and air-conditioning cooling tower make-up water (if the project uses water-cooled chillers), and quantity of waste water reused for such applications.

(iv). Schematic drawing showing the plumbing lines connected to flush fixtures, cooling tower and landscaping, if treated waste water is reused for these applications.

(v). Provide detailed calculations indicating the water requirement for landscaping, flushing and air-conditioning cooling tower make-up water (including evaporative losses, blow down losses and drift losses) of the usage of treated wastewater within the factory building.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation if water performance ratio is greater than 70%.

Energy Efficiency

Eco-friendly Refrigerant

Mandatory Requirement 1

Intent:

Encourage the use of eco-friendly refrigerants and gases, that do not deplete ozone layer and negatively impact the environment.

Compliance Options

Refrigerant/gases used in Heating, Ventilation & Air-conditioning (HVAC) equipment installed shall be Zero ODP (Ozone Depleting Potential).

(AND)

Halon-free Fire Suppression Systems

Demonstrate that fire suppression systems used in the building are free from Halons or anyother ozone depleting substances.

Notes:

- *In existing factory building project wherein ODP based refrigerant/gases are still used,the phase-out plan shall be submitted.*
- *New building/factory projects shall only use refrigerant/gas which has Zero ODP todemonstrate compliance.*

Documentation Required:

i.) Provide a comprehensive list of HVAC&R equipment installed in the factory along with the details of refrigerant, technical specifications/ manufacturer cut sheets and photographs of the equipment.

ii.) Submit declaration letter clearly mentioning that the ODP based refrigerant/gases are notused in HVAC&R equipment and fire suppression systems.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Minimum Energy Performance

Mandatory Requirement 2

Intent:

Improve energy efficiency for non-process use in the factory building(s) to reduce environmental impacts from excessive energy consumption.

Compliance Options:

Demonstrate compliance for proposed factory building as per ASHRAE 90.1 – 2016 for building blocks in the project through following any of the compliance method:

- **Prescriptive Method**
- **Whole Building Performance Method**

The project following the whole building performance method shall calculate total annual energy use for the base case and proposed case and, the total non-process energy consumptionin proposed case should not exceed the base case, as per NBC 2016 /ASHRAE Standard 90.1- 2016.

Option-1: Prescriptive Method

Factory 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 - II.

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

Notes:

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

- **Low SHGC value can be achieved through chajjas or other sun shading devices orefficient fenestration or a combination of both. For details, refer NBC 2016 Vol2 Part 11 – Approach to Sustainability, Annex B-3 Table 11&13.*

2) Lighting:

The Lighting Power Density (LPD) in the building interior, exterior and parking areas shall bereduced by minimum 10% over NBC 2016 base case as outlined in Annexure-III.

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 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)Fans:

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

5)Pumps & Motors:

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

And / Or

Option-2: Whole building Performance Method

Demonstrate compliance of the building performance by whole building simulation, as per thebaselines outlined in NBC 2016 (or) ASHRAE Standard 90.1-2016.

Notes:

- *Calibrated simulation approach shall be followed in case of existing factory project todemonstrate compliance under Option-2.*
- *Onsite Renewable Energy (RE) shall not be considered in energy saving calculation.*
- *Simulation shall be carried out for thermostat settings essential for process or as perthe recommendation of ECBC 2017.*

- *All the process loads are to be factored in both the base and proposed case. However,process loads can be excluded while reporting the building energy savings.*
- *Interior, exterior, common, and parking area lighting shall be calculated separately.*
- *LPD calculations should include power consumption of complete fixture, including lamps and ballasts.*

Documentation Required

- Narrative stating the climate zone and the list of Energy Conservation Measures (ECMs) implemented in the project.
- Window-to-wall ratio (WWR) calculations for each building.
- Comparison between the baseline building performance and the proposed building performance with percentage improvement *(Applicable only for simulation approach)*
- The schedules for lighting power, thermostat set-point, HVAC system, miscellaneous equipment power, etc., for the proposed building, as determined by the designer *(Applicable only for simulation approach)*
- Input and output report(s) from the simulation program or compliance software including a breakdown of energy usage for the following components, but not limited to: interior lighting and exterior lighting, space cooling & heat rejection equipment, space heating equipment, fans, other HVAC equipment (such as pumps), internal and external equipment loads, etc., The output reports should also show the unmet hours by the HVAC system, for both the proposed design and baseline building design *(Applicable only for simulation approach)*
- An explanation of any error messages noted in the simulation program output *(Applicable only for simulation approach)*
- Details of the glazing along with the specifications (SHGC value, U-value and VLT).
- Construction details and sectional drawings of the wall assembly (including wall insulation material, etc.,), along with the U-value of the overall wall assembly.
- Construction details and sectional drawings of the roof assembly (including roof insulation material, etc.,), along with the U-value of the overall roof assembly.
- Details of the lighting systems and controls including the list of interior and exterior lighting fixtures, with make and model.
- Detailed LPD calculations, as per 'Building Area Method' or 'Space-by-Space method / Space function method'.
- Drawings indicating interior and exterior lighting layout.

- Details of the air-conditioning system indicating the COP/ EER values, along with make and model.
- Details of the space heating system indicating the COP/ EER values, along with make and model.
- Details of solar water heating system such as calculations, plans showing location of solar water heating system.
- Details of the fans indicating the BEE star rating or efficiency, along with make and model.
- Details of the pumps & motors indicating the BEE star rating or efficiency, along with make and model.
- Other Energy Conservation Measures (ECMs) details

  Note: The list should include all ECMs that differ from the baseline building performance to proposed building performance. (Applicable only for simulation approach)
- Manufacturer brochures/ cut-sheets/ letters indicating the efficiency parameters for glazing (SHGC value, U-value and VLT), wall and roof insulation materials, lighting fixtures & systems, air-conditioning system and space heating system, solar water heating system, as applicable.
- Purchase invoices of energy conservation measures implemented in the project such as glass, wall and roof insulation, lighting systems, chillers, heat recovery wheel, solar hot water system, etc., as applicable.

Commissioning Plan for Building Systems

Mandatory Requirement 3

Intent:

Verify and ensure that the project's non-process equipment & systems are commissioned to achieve performance as envisaged during the design stage, thereby reducing environmental impacts.

Compliance Options:

The project shall comply with the following requirements as per the scope:

Demonstrate that the project owner/ developer/ tenant has signed an agreement with a third-party commissioning authority, not involved in the design, for pre-occupancy and post-occupancy commissioning for a period of one year.

The commissioning authority is required to have at least 3 years prior experience in equipment & systems and should be an ISHRAE Certified Professional to evaluate & validate the performance of HVAC systems.

AND

Commissioning plan to evaluate the building for its factory 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 and Temperature & RH measurements in individual spaces

  Note: *The Commissioning for HVAC Systems shall be in accordance with ISHRAE Standard: 10003-2020.*

- Pumps & motors
- Lighting systems
- Renewable energy systems
- CO_2 monitoring system
- Energy & Water metering
- Energy management system
- DG sets or Back-up systems
- Sewage treatment plant – Pumps and Motors
- Any other energy consuming equipment and systems (Non-process)

Note: This credit is not applicable for Existing Factory Buildings.

Documentation Required:

i. Copy of an agreement signed between the owner and the third-party commissioning authority highlighting the period of contract, along with the scope of work.

ii. The project may choose not to disclose the financials.

iii. Owners brief in terms of performance expectations from the factory building.

iv. Commissioning plan describing how the factory building would be audited for its building performance after occupancy, with regard to the equipment and systems.

v. Design & construction review report with specific observations and variations identified by commissioning authority to the project owner, for each equipment and system with respect to commissioning plan and how they were addressed.

vi. Commissioning report on green factory 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 enhancement in future, and savings thereof

Eco-friendly Refrigerant Management

EE Credit 1 **Point: 1**

Intent

To encourage use of eco-friendly refrigerant/substances having lower global warming impact, thereby reducing the negative impacts on environment.

Compliance Options

Demonstrate that refrigerants used in the buildings Heating, Ventilation & Air-conditioning (HVAC) equipment are eco-friendly and have no Ozone Depletion Potential (ODP) and low 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:

$$LCGWP + LCODP \times 10^5 \leq 13$$

LCODP = [ODPr x (Lr x Life +Mr) x Rc]/Life

LCGWP = [GWPr x (Lr x Life +Mr) x Rc]/Life

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

LCGWP : Lifecycle Direct Global Warming Potential (kg CO_2 / kW-Year)

GWPr : Global Warming Potential of Refrigerant (0 to 12,000 kg CO_2 / 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&Requipment must be calculated using the following formula:*

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

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.*

Documentation Required:

Calculations indicating the combined contributions of the refrigerant installed in the HVAC system, to ozone depletion and global warming.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation, if the average GWP of refrigerant used is lessthan 500.

Enhanced Energy Performance

EE Credit 2 **Points: 10**

Intent

Optimise energy efficiency for non-process use in the factory building to reduce environmentalimpacts from excessive energy consumption.

Compliance Options:

The project can choose any one of the following options, as applicable, to demonstrate compliance:

- Option 1 - Prescriptive Approach
- Option 2 - Simulation Approach

❖ **Option 1 - Prescriptive Approach:**

The project shall meet or exceed the following prescriptive measures, as applicable:

Points are awarded as below:

=	Measures	New	Existing
1	Building Envelope	3	2
2	Interior LPD	1	2
3	Lighting Controls	1	1
4	Air-conditioning Systems	4	5
5	Pre-cooling or Low EnergyMechanical Cooling Techniques	2	1
6	HVLS Fans	1	1
7	Pumps & Motors	2	1
	Total Applicable Points	**14**	**13**
	Total Possible Points	**12**	**10**

1) Building Envelope: (3 Points)

The project shall ensure to comply with the following building envelope measures asoutlined in Annexure - II.

Points are awarded as below:

Measures	Points
Fixed Glazing Solar Heat Gain Coefficient (SHGC)	1
Skylights SHGC	1
Overall Roof Assembly U-value	2
Overall Wall Assembly U-value	2

Note: *For Climatic Zones of India, please refer Annexure - I.*

2) Lighting:

- **Lighting Power Density:** ***(2 Point)***

The Lighting Power Density (LPD) in the factory building exterior & parking areas and interior areas shall be reduced, as prescribed in the table given below, over NBC 2016 (Annex D) or ASHRAE Standard 90.1 – 2016 (Section 9) base case.

Points are awarded as Below: Interior areas:

Reduction in Lighting Power Density	Points
≥ 25 %	1
≥ 30 %	2

Notes:

- *Only exterior areas that require artificial illumination should be considered forlighting power density calculations.*
- *The LPD should include power consumption of the complete fixture, includinglamps and ballasts.*

- **Lighting Controls:** ***(1 point)***

Lighting of all non-emergency exterior & interior areas such as warehouses, staircases, corridors, façade, pathways, landscaping, surface and covered parking, driveways, street lighting, should have at least one of the following lighting controls, as applicable:

- Timers / Dimmer
- Occupancy / Motion sensor
- Daylight sensor

3) **Air-conditioning Systems:** ***(5 Points)***

For projects having air-conditioners with one or combination of the following systems,the points would be awarded as below:

- **Unitary Air-conditioners:**

BEE Star Rating/ equivalent	**No of Points**
4-star rated	1
5-star rated	2

- **Variable Refrigerant Flow:**

Efficiency of VRF systems over ASHRAE 90.1 2016 baseline	**No of Points**
$\geq$ 2.5%	1
$\geq$ 5%	2
$\geq$ 7.5%	3

- **Water Cooled and Air-Cooled Chillers:**

Efficiency of Chillers systems over ASHRAE 90.1 2016 baseline	No of Points
≥ 2.5%	1
≥ 5%	2
≥ 7.5%	3

Note: *For details of ASHRAE Standard 90.1 - 2016 refer Annexure IV.*

4) **Pre-cooling or Low Energy Mechanical Cooling Techniques:** ***(2 Points)***

Atleast 25% of the factory building spaces shall comply with minimum one Pre-cooling or Low Energy Mechanical Cooling Technique or in a combination, as prescribed in National Building Code 2016, Part 11- Approach to Sustainability, Section 11.6 & 11.7.

The Pre-cooling or Low Energy Mechanical Cooling Techniques include, but not limited to, Demand Control Ventilation, Heat Recovery, Economizer cycles, Evaporative cooling (Direct or Indirect, Passive down draft evaporative cooling system), Desiccant De-humidification/ cooling systems, Geo-thermal cooling, Earth Air Tunnel systems and Radiant cooling or thermally active warehouse/ building systems.

5) **HVLS Fans:** ***(1 Points)***

Install High Volume Low Speed (HVLS) fans for atleast 50% of the factory building area.

6) **Pumps & Motors:** ***(2 Points)***

- Pumps (1 Point): Install BEE 5-star rated Pumps (or) IE 3 class (or) Minimum 70%efficiency.
- Motors (1 Point): Install BEE 5-star rated (or) IE 3 class (or) Minimum 85%efficiency.

Note:

- *Pumps & motors which are installed only for domestic and sewage water supply should be considered.*

Or

❖ **Option 2: Simulation Approach**

Design the building to be compliant with NBC 2016 or ASHRAE Standard 90.1-2016, Appendix - G through Whole building simulation.

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

Percentage of Energy Cost Savings over NBC 2016 or ASHRAE Standard 90.1-2016Appendix G Base case			
% Energy Savings	Credit points (New)	% Energy Savings	Credit points (Existing)
2.5%	1	2%	1
5%	2	4%	2
7.5%	3	6%	3
10%	4	8%	4
12.5%	5	10%	5
15%	6	12%	6
17.5%	7	14%	7
20%	8	16%	8
22.5%	9	18%	9
25%	10	20%	10
27.5%	11	-	-
30%	12	-	-

Notes:

- *All the process loads are to be factored in both the base and proposed case. However,process loads shall be excluded while reporting the building energy savings.*
- *Calibrated simulation approach shall be followed in case of existing factory projects to demonstrate compliance.*
- *Onsite Renewable Energy (RE) shall not be considered in energy saving calculation.*
- *Simulation shall be carried out with thermostat settings either recommended for process requirement or as per the NBC 2016 guideline.*

Documentation Required

i.) For option 2 simulation approach, submit energy simulation report according to the documentation required as per EE Mandatory Requirement 2.

ii.) For option 1 prescriptive approach, submit detailed document specifying the different prescriptive measures attempted along with supporting documents as applicable.

Supporting Documents:

- Manufacturer brochures/ data-sheets/ letters/ name plates indicating the efficiency parameters for lighting fixtures, air-conditioning system, fans, pumps & motors, DG sets, distribution transformers, energy saving appliances, as applicable.
- Purchase invoices of energy conservation measures implemented in the project such as wall & roof insulation, glazing & skylights, lighting fixtures, air-conditioning systems, fans, pumps & motors, DG sets, distribution transformers, energy saving appliances as applicable.
- Photographs of the wall & roof insulation, glazing & skylights, lighting fixtures, air-conditioning system, fans, pumps & motors, DG sets, distribution transformers, energy saving appliances, as applicable
- Drawings/ sketches/ rendered images (such as site plan, floor plans, sections & elevations, images, as applicable) indicating the area covered with pre-cooling or low energy mechanical cooling techniques along with area calculations in percentage.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation, if minimum energy cost savings for new buildings is over 35% and existing buildings over 25%.

Green Power

EE Credit: 3 **Points: 6**

Intent

To encourage use of renewable energy sources to reduce dependence on fossil-fuel based energy generation

Compliance Options:

Install on-site/offsite renewable energy system to off-set fossil-fuel based energy consumption. Credit points are awarded based on the percentage of total annual non-process energy consumption of the factory building (including HVAC, Interior & Exterior Lighting, pumps & motors and excluding process loads).

Percentage of onsite/offsite renewable energy or total renewable energy generated to the total annual non-process energy consumption	Credit Point
≥ 50%	1
≥ 60%	2
≥ 70%	3
≥ 80%	4
≥ 90%	5
≥ 100%	6

Notes:

- *On-site energy supply system installation such as fuel cell will be considered as greensource of power.*
- *Energy through biomass would be considered as green power, project team shall submit calculation to show equivalent energy generation (use).*

Documentation Required:

i.) Submit drawing showing the location of installed renewable energy systems, as applicable.

ii.) Provide calculations indicating the total annual energy generation from the on-site/ off-site renewable energy systems (kWh) or combination of both to the total annual energy consumption (kWh) of the building (interior & exterior areas), in percentage along with, the capacity of the renewable energy system (kW).

iii.) Submit latest copy of utility/ energy bill for the preceding year.

iv.) Submit purchase invoice of the installed renewable energy systems as applicable.

v.) Provide detailed report with technical details for the off-site renewable energy systems

vi.) Submit copy of Power Purchase Agreement (PPA) signed between the project owner/ developer and the green power developer, as applicable.

vii.) Timestamp photographs showing the on-site renewable energy systems.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.
.

Eco-Friendly Power Backup Systems

EE Credit: 4 **Points: 1**

Intent

To reduce dependence on fossil fuels for in-situ power generation, thereby reducing the environmental impacts

Compliance Options:

Project shall use diesel generator sets which are certified by Central Pollution Control Board (CPCB) for emissions and noise compliance. For compliance, generator set shall meet the following criteria:

- ❖ Compatibility with biofuels or non-edible oils or any other non-fossil-based fuel for captive power generation.
- ❖ LPG /CNG fuelled Generator set or bio-diesel blend (for at least 5%) are also acceptablefor compliance.

Note:

- *This credit point is applicable only if at least 50% of the total load is catered by the DG Set.*

Documentation Required:

i.) Provide manufacturer's cut sheets and purchase invoice of DG Set clearly indicating the type of fuel used and compatibility for using Biodiesel.

ii.) Submit calculations indicating the specific fuel consumption value along with timestamp photographs.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Energy Performance Monitoring

EE Credit 5 **Points: 4**

Intent

To encourage continuous performance monitoring and improve energy performance, thereby reducing the environmental impacts.

CASE A

Sub-metering **Point 2**

Demonstrate that sub-meters are installed to measure end-use energy for the following applications (1 point for every three meters).

- Air-conditioning energy usage
- Internal lighting energy consumption
- External lighting energy consumption
- Btu meter for chilled water consumption
- Energy meter for onsite RE generation
- Energy meter for process energy consumption
- Pumping system (municipal water, grey water, landscaping water)
- Any individual energy end use that constitute at least 10% of total energy use

Notes:

- *Meters must be permanently installed and should record energy use on hourly or dailybasis.*
- *Energy meters installed shall have capability to report at least daily, monthly, andannual energy consumption.*

CASE B

Option-2: Realtime Energy Performance **Point: 2**

Demonstrate online energy monitoring system through dashboard (online platform) to visualize daily/ monthly performance.

Documentation Required:

i.) Provide technical cutsheet of submeters along with Timestamp photographs.

ii.) Submit Single Line Diagram (SLD) or schematic diagram of the electrical system highlighting the location of the meters.

iii.) Submit the photographs or screen shots of the online energy metering system highlighting the energy end uses (sub- metering system integration with the BMS).

iv.) Submit energy use data for twelve consecutive months (one full year) in case of existing factory building.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Materials & Resources

Waste Management

Mandatory

Requirement 1Intent

To encourage eco-friendly waste management practices, thereby reducing waste going to landfills

Compliance Option:

Provide waste management policy (process and non-process) that ensures proper segregation of all different type of wastes in the factory and also directs to install separate bins (to collect waste such as paper, plastics, metals, glass, e-waste, wet waste etc.,) for types of wastes in the factory premises.

Policy shall also become the guiding document for organisation to set goal for reduction in waste materials and shall encourage reuse, recycling of materials and safe disposal as per the guidelines from Central/State Pollution Control Board. Policy shall include but not limited to quantity of waste generated/ recycled/ reused/ disposed on monthly/annual basis.

Note:

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

Documentation Required:

i.) Submit Waste Management Policy (can be an integral part of organisation's SustainabilityPolicy) signed by the Chief Executive of the company or Plant Head.

ii.) Submit drawings of area designated for waste storage and their location within the factorypremises.

iii.) Provide floor plans and timestamp photographs of waste bins at floor level, common areas and centralized waste collection yard(demarcated for types of waste to be stored) along with permanent signages installed as applicable.

Sustainable Procurement

MR Credit 1 **Points: 2**

Intent:

Use certified green building material, product and equipment so as to reduce negative environmental impact.

Compliance Options:

New Factory **Points: 2**

The project shall develop Sustainable Procurement Policy following IGBC Green Factory Building rating system (version-2) during any construction/renovation/retrofitting/expansion to meet minimum requirement of local material, material with recycle content, use of salvaged material and green certified products.

And

Ensure that the project procures GreenPro or equivalent eco-labelled products & materials for building construction. The purchased quantity of eco-labelled products to be at least 10% ofthe total cost of construction (material and products).

Points are awarded as below:

Percentage of Ecolabelled Products Procured	Points
$\geq$ 10%	1
$\geq$ 20%	2

Existing Factory **Points: 1**

The project shall develop Sustainable Procurement Policy following IGBC Green Factory Building rating system (version-2) during any renovation/retrofitting/expansion to meet minimum requirement of local material, material with recycle content, use of salvaged material and green certified products.

Documentation Required:

i.) Submit the cost of Ecolabelled products and the total cost of materials/products purchased.

ii.) Provide GreenPro certificate or equivalent ecolabelled certificate along with the proof of validity.

iii.)Submit sustainable procurement policy signed by Chief Executive of the company or Plant Head highlighting the use of materials as per the IGBC Green Factory Building rating (version-2.0).

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Organic Waste Management

MR Credit 2 **Points: 2**

Intent:

Encourage effective waste management practices to prevent waste being sent to land-fills.

Compliance Options:

New/Existing Factory **Point: 1-2**

Install an on-site organic waste management (treatment) system for handling organic (kitchen & garden etc.) waste generated in the project. The manure or bio-gas generated shall be utilised as appropriate.

The project can also achieve this credit if the Waste to Energy (WTE) plant is commissioned.

Points are awarded as below:

Organic Waste	Percentage of Waste Treated	Points
Food Waste	≥ 75%	1
Garden waste	≥ 25%	1

Notes:

- *Food waste shall be considered for all factory employees.*
- *For calculation, food waste can be considered as 0.1 kg per person (i.e. 0.1 kg/ sq.m/ day) or as prescribed by the local byelaw, whichever is more stringent; landscaped waste can be considered as 0.2 kg per sq.m per day (i.e. 0.2 kg/ sq.m/ day).*

Documents Required:

i.) In case of existing factory buildings, submit the quantity of waste generated (as applicable) to showcase recycling or reuse of waste material on an annual basis.

ii.) Letter from vendor/ service provide or copy of receipt clearly indicating the type of wasteand quantity collected on monthly/annual basis.

iii.) Submit manufacturer brochure or cut sheet, purchase invoice/ payment receipts of the installed organic waste treatment system.

iv.) Submit quantity of organic waste generated on daily basis and the capacity of OrganicWaste System (or WTE plant) installed and timestamp photographs.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Construction Waste Management

MR Credit 3 **Points: 2**

Intent:

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

Compliance Option:

Waste Reduction

Demonstrate that at least 75% of waste generated during construction is diverted from landfills,for reuse or recycling. Use consistent metrics, either weight or volume, to show compliance.

Points are awarded as below:

Percentage of Construction Waste Diverted	Points
≥ 75 %	1
≥ 95 %	2

Notes:

- *Construction waste here refers to civil & interior building waste.*
- *Excavated earth & stones should not be considered under this credit, as these arenatural resources.*
- *Temporary materials such as materials used for form-work, scaffolding etc., shall notbe considered for credit calculations.*
- *This credit is not applicable for existing factory building project.*

Documentation Required:

i.) Submit calculations indicating the quantity of construction waste generated to the total quantity of construction waste reused, recycled and sent to landfill, in percentage.

ii.) Letters from scrap dealers/ contractors stating the type and quantity of construction waste received/ reused from the project site, for recycling/ reuse.

iii.) Timestamp photographs taken at various stages of the project showing the construction waste materials reused in the project.

Exemplary Performance:

This credit is not applicable for exemplary performance under Innovation in Design & Operation.

Materials with Recycled Content

MR Credit 4 **Points: 3**

Intent:

Encourage use of materials which contain recycled content, thereby reducing negative environmental impacts.

Compliance Option

Use materials with recycled content such that the total recycled content constitutes atleast 5%of the total cost of the materials used in the project. Points are awarded as below.

Points for Recycled Content:

Percentage of Recycled content	Points
$\geq$ 5 %	1
$\geq$ 15 %	2
$\geq$ 25 %	3

Notes:

- *Material Cost = Total Cost – (Labour Cost + Installation Cost)*
- *If Labour and Installation cost is not known, the default material cost can be consideredas 60% of the total cost of the component*
- *Cost of equipment, systems, lighting fixtures, appliances, movable furniture need not beconsidered in the total material cost*
- *This credit is not applicable for Existing Factory Building Project.*

Documentation Required:

i.) Provide details of all materials used in the project along with the specifying recycled content with manufacturer name.

ii.) Submit project specific letters from manufacturers or cut sheets/ brochures clearly indicating with percentage of recycle content in the material sourced.

iii.) Submit calculations indicating the materials with recycled content (in terms of cost) to the total materials cost of the project, in percentage.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation if total recycled content constitutes ≥ 30% of the total cost of the materials used in the project.

Local Materials

MR Credit 5 **Points: 3**

Intent:

Encourage the use of building materials available locally, thereby minimizing the associated environmental impacts.

Compliance Option

Ensure that atleast 25% of the total factory building materials (by cost), used in the factory building(s)/ campus, are manufactured within a radius of 400 kms.

Points are awarded as follows:

Percentage of local materials	Point
≥ 25 %	1
≥ 50 %	2
≥ 75%	3

Note:

This credit is not applicable for existing factory building project.

Documentation Required:

i.) Provide details of all materials used in the project along with the cost of material indicatingdistance between manufacturing facility and project site.

ii.) Submit calculations indicating the local materials sourced (in terms of cost) to the total materials cost of the project, in percentage.

iii.) Submit project specific letters from manufacturers indicating dispatch/supply of material (quantity) along with distance between project and manufacturing facility.

Exemplary Performance:

This credit is not applicable for exemplary performance under Innovation in Design & Operation.

Use of Salvaged Materials

MR Credit 5 **Points: 2**

Intent:

Encourage the use of salvaged building materials and products to reduce the demand for virgin materials, thereby minimising the environmental impacts

Compliance Option

Ensure atleast 2.5% of the total cost of the building materials is salvaged, refurbished etc.

Points are awarded for use of Salvaged Materials

Percentage of Salvaged Materials Used	Points
≥ 2.5 %	1
≥ 5%	2

Note: This credit is not applicable for existing factory building project.

Documentation Required:

i.) Submit the list of the salvaged materials, their applications and source of salvaged material.

ii.) Provide calculations indicating the salvaged materials sourced by the project (in terms of cost) to the total building materials cost, in percentage.

iii.) Quotation/ Purchase invoice/ Payment receipts from vendors indicating the present market value (in terms of cost) of salvaged materials used in the project.

iv.) Timestamp photographs showing the salvaged materials used (before & after).

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation, if 10%of the total cost of the building materials is salvaged, refurbished etc.

Eco-friendly Wood Based Materials

MR Credit 6 **Points: 2**

Intent:

Minimise use of new wood based products, thereby reducing impacts of deforestation.

Compliance Option

Ensure atleast 75% (by cost) of all wood (including furniture) based products used in the building(s)/ campus are Rapidly renewable (and /or) Wood certified by Forest Stewardship Council (FSC) or Programme for the Endorsement for Forest Certification (PEFC) of equivalent or Composite / Agri based wood or Recycled Waste wood/ GreenPro Certified.

Points are awarded as below:

Percentage of FSC/Forest Department certified / Rapidly renewable/PEFC/Composite/Agri based/Recycled waste wood/ GreenPro Certified	**Points**
≥ 75%	1
≥ 95%	2

***Notes**:*

- *For assemblies, consider the value of only wood-based materials*
- *Rapidly renewable materials are those that can be harvested and used within a ten year cycle. Example: Bamboo, Eucalyptus, Bagasse based materials, Jute based materials, cotton blinds; rubber wood*
- *Certified wood shall be compliant with Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) or GreenPro or equivalent system. For a list of certified wood suppliers and product manufacturers, visit the official website of respective certification bodies*
- *Composite / Agri based wood / Recycled Waste wood examples include (but not limited to) MDF boards, particle boards, linoleum boards etc.*
- *Salvaged wood based materials shall not be considered under 'Wood Based materials' calculations.*
- *Wood based Materials that are certified by CII under Green Product Certification Programme (GreenPro) or by a third party agency approved by IGBC can be used by the project to show compliance.*

Documentation Required:

i.) Provide a list of rapidly renewable material (and/ or) certified wood by FSC/ PEFC/ GreenPro/ equivalent, with their applications and manufacturer name.

ii.) Calculations indicating the cost of rapidly renewable material (and/ or) certified wood by FSC/ (PEFC)/ GreenPro/ equivalent to the total cost of new wood in the project, in percentage.

iii.) If FSC certified wood is sourced, provide Manufacturer Chain-of-Custody (CoC) certificate and purchase invoices from the manufacturers indicating the CoC number and the type of wood e.g. pure, mixed, etc. whereas for PEFC/ GreenPro/ equivalent, provide the certificates from supplier to validate the procured wood.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Indoor Environment Quality

No Smoking Policy

Mandatory Requirement 1

Intent

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

Compliance Options

Projects are encouraged to prohibit smoking in the factory premise. For prohibition of smoking in public areas, refer guideline published by Ministry of Health & Family Welfare (Notification, 30 May 2008).

Compliance Options:

Case A : No Smoking

Demonstrate that smoking is prohibited in the project and is in accordance with the regulations of Ministry of Health & Family Welfare, Government of India.

(And / Or)

Case B : Outdoor Smoking Areas

In case the project has assigned outdoor smoking areas, locate such areas at a minimum of 7.6 meters from all outdoor air intakes (entrance doors, window openings etc.)

(And / Or)

Case C : Designated Smoking Rooms

Alternately, compliance can be shown through designated smoking rooms which capture and remove tobacco smoke from the building.

Notes for Designing a Smoking Room:

- *The smoking room shall be completely sealed.*
- *The conditioned air entry into the smoking zone shall not return or be transferred to theair-handling units. This air shall be completely exhausted.*
- *The exhaust air louver / duct should be located at least 7.6 meters away from buildingentry or fresh air intakes.*
- *The smoking room shall be maintained at a negative pressure of 5 Pascals (0.00005bar).*

Documentation Required:

(i). Submit organizational/HR policy signed by the authorized signatory (Company CEO/ Plant Head) indicating that smoking is prohibited in the facility.

(ii). Provide timestamp photographs of signages permanently installed/displayed at various eye-catching locations (at least 3) in the facility to educate occupants and visitors.

(iii). In the case of designated smoking rooms, submit design details along with timestamp photographs

Minimum Fresh Air Requirements

Mandatory Requirement 2

Intent

To provide adequate ventilation rates for maintaining indoor air quality, thereby minimizing adverse health impacts.

Compliance Options:

Design and install ventilation system for occupied spaces of the factory building to meet thecriteria below:

Case A: Mechanically Ventilated Spaces

Demonstrate that the fresh air ventilation in all regularly occupied areas meet the minimum ventilation rates, as prescribed in NBC 2016 or ASHRAE Standard 62.1 - 2016.

(And/ Or)

Case B: Non Air-conditioned Spaces

Provide operable windows and / or Doors to the exteriors, in all regularly occupied areas, suchthat the operable area ratio of openings to carpet area is at least 2%.

Notes:

- *Windows / doors should not have any obstruction within 2 m from the exteriorsurface. Shading devices can be excluded.*
- *For sliding windows / doors, only openable area to the exteriors shall be consideredin calculations.*
- *Rolling shutters to the exteriors, which remain open during the working hours of factory can be considered in openable area calculations.*

General Notes:

- *Regularly occupied areas are those where people sit or stand as they work, irrespective of the number of days occupied in a year. Regularly occupied areas shall include only enclosed spaces.*
- *Regularly occupied areas include work stations, cabins, meeting rooms, conference rooms, waiting areas, cafeteria, etc.,*
- *Non-regularly occupied areas include toilets, storerooms, etc.,*
- *Project shall calculate volume considering the maximum ceiling height as 4.25 meters from the floor.*
- *Project shall refer National Building Code (NBC) 2016 for further requirement*

onventilation defined for industrial facilities.

Documentation Required:

(i). Provide a design narrative describing the project's ventilation strategy implemented.

(ii). Floor plans along with building elevation drawings indicating window & door schedule and location of AHU's, TFA's and fresh air intake louvers as applicable.

(iii). Submit calculations indicating the openable area of windows and doors to the carpet area, for each of the regularly occupied spaces in percentage, fresh air intake volumes in all regularly occupied spaces, for each zone, as per annexure v, as applicable.

(iv). Provide technical specifications of the fresh air system and purchase invoices, as applicable.

(v). Timestamp photographs showing the operable windows, doors to the exteriors, AHU's, TFA's and fresh air intake louvers as applicable in all the regularly occupied areas.

Avoid use of Asbestos in the Building

Mandatory

Requirement 3Intent

To encourage factory design that eliminates the risk of major health effects associated withasbestos exposure.

Compliance Options

Eliminate the use of asbestos in new factory building design.

In case of existing buildings, if asbestos is already being used, have a phase-out plan in place.

Documentation Required:

(i). Provide declaration from authorized signatory mentioning that Asbestos has not used inthe factory.

(ii). Submit phase out plan (as per PCB/CPCB norms) for existing factory buildings to eliminate exposure of occupants to Asbestos.

Enhanced Fresh Air Ventilation

IEQ Credit 1 **Points: 4**

Intent

To provide adequate ventilation rates for maintaining indoor air quality, thereby minimizing adverse health impacts.

Compliance Options

Install fresh air delivery systems in all the occupied spaces of the factory building to meet thecriteria below:

For Air-conditioned factory buildings, provide ventilation rates higher than those mentionedin IEQ mandatory requirement 2.

The points are awarded as specified below:

Percentage Improvement over Minimum Fresh Air Requirements	Credit Points
≥ 15 %	1
≥ 20 %	2
≥ 25 %	3
≥ 30 %	4

For naturally ventilated factory buildings, comply with the following requirement:

Openings to Carpet Area ratio	Credit Points
3 %	1
4 %	2
5 %	3
6 %	4

For buildings with forced ventilation, provide increased Air Changes per Hour (ACH) thanthose mentioned in IEQ mandatory requirement 2.

Points for providing increased ACH in the occupied spaces

Percentage Improvement over Minimum Air Changes per Hour*	Credit Points
≥ 15 %	1
≥ 20 %	2
≥ 25 %	3
≥ 30 %	4

Documentation Required:

Submit calculations indicating the percentage of openable area for windows and doors to the carpet area is atleast 3%, for each of the regularly occupied spaces, minimum fresh air intake requirement in all regularly occupied spaces is atleast 15% more than the required intake for each zone, as per annexure v, as applicable.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Building Flush Out

IEQ Credit 2 **Points: 1**

Intent

To avoid occupants' exposure to indoor airborne contaminants, so as to reduce the adverse health impacts on occupants.

Compliance Options:

New Factory:

- **Option-1: Natural Ventilation**
  Before the building is occupied (after paints, adhesives and sealants have been used), building flush out needs to be carried out for ten days by keeping all windows/doors open.

  Or

- **Option-2: Forced Ventilation**
  Project shall perform building flush out using forced ventilation systems, the flush out can be carried out for five days. The ventilation system shall be deployed/ installed to replace or flush out indoor air by outdoor air at 6 ACH for 24 hours and shall be continued for at least 5 days.

Documentation required:

(i). Provide a narrative along with declaration from authorized signatory confirming/ describing the flush out procedure along with Timestamp photographs.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Low VOC Materials

IEQ Credit 3 **Points: 2**

Intent

Encourage the use of materials with low emissions, to reduce adverse health impacts onoccupants.

Compliance Options:

Use of Eco-friendly Paints and Coatings **Point: 1**

Use paints with low or no VOC content (as specified in below Table) to the extent of 100% ofinterior wall surface area.

Table 10 VOC Limits for Paints & Coatings

Type of Paints & Coatings	VOC Limit (g/L less water)
Non-flat (Glossy)	150
Flat (Mat)	50
Anti-corrosive/ Anti-rust	250
Clear Wood Finish: Varnish	350
Clear Wood Finish: Lacquer	550
Floor Coatings	100
Non-flat (Glossy)	150

AND

Use of Eco-friendly Adhesives and Sealants **Point: 1**

Use adhesives and sealants within the interiors which do not exceed the VOC content limits asspecified in the table below.

Table 11 VOC Limits for Adhesives

Type of Adhesives	VOC Limit (g/L less water)
Glazing adhesives	100
Ceramic tile adhesives	65
Drywall and panel adhesives	50
Wood substrata adhesives	30
Wood flooring adhesives	100
HVAC duct insulation	400
Indoor Carpet adhesives	50
Multipurpose construction adhesives	70

Documentation Required

(i). Provide list of low or no VOC content, paints, coating and adhesives (make & model used in the building interiors along with the VOC content (in g/L less water).

(ii). Provide manufacturer cut-sheets/ brochures/ material safety data sheets from the manufacturer indicating VOC content in paint, coating and adhesive used in the project (VOC limit shall be tested and validated by a third-party laboratory certified by NABL).

(iii). Submit purchase invoices for paint, coating and adhesive containers specifying the make & model.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Eco-Friendly Housekeeping Chemicals

IEQ Credit: 4 **Point: 2**

Intent

Encourage the use of eco-friendly housekeeping chemicals, to reduce associated adverse health and environmental impacts

Compliance Options

Option 1: Policy for Eco-friendly Housekeeping Chemicals **Point: 1**

Project shall opt eco-friendly green housekeeping policy to ensure safe and healthy environmentfor occupants. The policy document shall outline the sustainable procurement of eco-friendly housekeeping chemicals. Following strategies shall be adopted:

- Procurement of housekeeping chemicals that meets GreenPro or any other ecolabel standards.
- Guidelines for using appropriate disinfectants and sanitizers to provide healthier environmental conditions to building occupants.
- Guidelines for safe storage and handling of housekeeping materials.

And

Option 2: Use of Eco-friendly Housekeeping Chemicals **Point: 1**

Project shall use eco-friendly housekeeping chemicals for all cleaning purposes.

Documentation required:

(i). Submit copy of policy signed by authorized signatory (company CEO or Plant Head) forcommitting procurement of only eco-friendly housekeeping chemicals.

(ii). Provide manufacturer cut-sheets/ brochures/ material safety data sheets of housekeeping chemicals procured.

(iii). For existing factory projects, submit inspection/audit report along with purchase invoices of housekeeping chemicals procured in the preceding year.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Indoor Air Quality

IEQ Credit: 5 **Point: 3**

Intent

To maintain optimal indoor air quality levels in the building to ensure occupant comfort and wellbeing

Compliance Options

Option-1: Monitor IAQ Parameters **Point: 2**

Measure IAQ parameters in all regularly occupied spaces and ensure that 80% of the measurements are well within the threshold values of Class C as specified in Annexure-VI.

Points are awarded as follows:

IAQ Parameters	Point
Basic IAQ parameters *(CO2, PM 2.5, CO, TVOC)*	1
Basic and Complementary IAQ parameters *(PM 10, CH2O, SO2 ,NO2, O3, Total Microbial Count)*	2

AND

Option-2: CO2 Monitoring **Point: 1**

Demonstrate that the project has installed CO2 sensors in return air ducts to maintain a differential CO2 level of maximum 530 ppm in all regularly occupied areas.

Notes:

- *Regularly occupied areas are those where people sit or stand as they work, irrespective of the number of days occupied in a year. Regularly occupied areas shall include only enclosed spaces.*
- *Regularly occupied areas include work stations, cabins, meeting rooms, conference rooms, waiting areas, cafeteria, etc.,*
- *Non-regularly occupied areas include toilets, store rooms, etc.,*
- *Depending upon the building location, interiors and other local factors, pollutants that significantly affect human health should be also considered and corresponding threshold standard should be referred.*

Documentation required:

(i). Submit a detailed air quality testing report conducted quarterly, validated by a third-party testing laboratory (NABL Accredited).

(ii). Submit report describing the strategies implemented to monitor CO_2 levels in each zone.

(iii). Provide HVAC ducting layouts showing the location of CO2 sensors in return air ducts, for each zone.

(iv). Provide technical specifications of the installed CO2 sensors.

(v). Submit Purchase invoice/ Payment receipts of the installed CO2 sensors along with timestamp photographs.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Daylighting

IEQ Credit 6 **Points: 4**

Intent

To ensure providing natural lighting and visual comfort, thereby enhancing connectivity between the indoor & outdoor environment

Compliance Options:

Project shall provide adequate daylighting to meet or exceed the Useful Daylight Illuminance (UDI) between 100 lux and 2000 lux for at least 15% of the total floor area (regularly occupied spaces) for 90% of the potential daylit time in a year. The project may choose one of the following options to show credit compliance.

Table 12 Daylighting for regularly occupied spaces

Percentage of regularly occupied space meeting UDI requirement			Points
Multi floor	**Combination**	**Single floor**	
≥ 15%	≥ 30%	≥ 50%	1
≥ 20%	≥ 40%	≥ 55%	2
≥ 25%	≥ 50%	≥ 60%	3
≥ 30%	≥ 60%	≥ 65%	4

Option 1: Simulation Approach

Project team shall perform lighting simulation (computer based) to demonstrate compliancefor daylighting following UDI concept. The period of analysis shall be fixed for 8 hours per day, anytime between 8:00 AM IST to 5:00 PM IST, resulting in 2,920 hours. For further details, please refer ECBC 2017 (latest version published in Nov 2019).

Or

Option 2: Measurement Approach

This method can be used for demonstrating compliance with daylighting requirements manually. Daylight extent factors (DEF) shall be used for manually calculating % of above grade floor area meeting the UDI requirement for 90% of the potential daylit time in a year. For further details, please refer ECBC 2017 (latest version published in Nov 2019).

Additionally the project can demonstrate the daylight illuminance levels for a minimum of 300 lux levels for regularly occupied spaces.

Measurements shall be taken after installation of equipment & systems at work plane height on a 10 foot square grid. To show compliance, consider the average of the measurements taken at 9 am, 12 pm, and 3 pm.

Notes:

- *Regularly occupied areas include manufacturing zone (shop floor), assembly zone, packing zone, storage area, Labs, cabins, workstations, warehouse, meeting rooms, etc.; whereas, areas with audio-visual facilities such as auditoriums, conference rooms, etc., can beexcluded from this credit calculation, with justification and supporting documents.*
- *Any space where daylighting will interfere with the functions or processes are exempted in daylight requirement.*
- *Single floor buildings are those buildings where 100% of built-up area has exposed roof, Multi floor buildings are those buildings where 100% of built-up areas span more than one floor. Combination Case should be used for buildings where the built up area has certain portions with exposed roof while other sections comprise multiple floors.*

Documentation Required:

i. Daylight simulation report (for simulation approach) with sky conditions (such as date & month; time; ambient Lux levels) and wall, floor & roof reflectance properties, for all the regularly occupied spaces in the building.
   - Summary describing the results of the analysis and output file from simulation tool outlining point wise compliance for the analysis grid and compliance in percentage.
   - Explanation of any significant modelling assumptions made.
   - Explanation of any error messages noted in the simulation program output.
   - Building floor plans, building elevations & sections, and site plan with surrounding building details (if modeled).
   - Material reflectance, analysis grid size, total number of grid size/resolution, total number of grid points.
   - During simulation, consider shading devices and 'shadow effect' of adjacent buildings.

ii. Daylight Analysis report / daylight extent factors (for measurement approach) indicating the illuminance levels measured at work plane height for all the regularly occupied spaces in the building

iii. Site/ master plan showing all the buildings.

iv. Floor/ roof plans with window and skylight schedule.

v. Manufacturer brochure/ cut-sheet/ letter of the glass installed showing the Visual Light Transmittance (VLT).

vi. Photographs showing the building elevations (all sides) and interiors spaces at different floors.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation in Design & Operation, more than 70% of regularly occupied area meeting the UDI requirement.

Occupant Well-being Facility

IEQ Credit: 7 **Points: 2**

Intent

Provide facilities for the workforce to minimize fatigue, thereby improving health and well-being

Compliance Options

Option-1: Indoor and Outdoor Games **Point: 1**

Provide at least three indoor (and/or) outdoor games to reduce workmen fatigue.

Table 13 List of indoor and outdoor games (list is illustrative only)

Indoor Games		Outdoor Games	
(i).	Table tennis	(i).	Badminton Court
(ii).	Carom board	(ii).	Volleyball Court
(iii).	Squash	(iii).	Basketball Court
(iv).	Foos ball	(iv).	Tennis Court
(v).	Air hockey	(v).	Football/Cricket Ground
(vi).	Snooker, etc.	(vi).	Kabaddi, etc.

And/or

Option-2: Break Out Space **Point-1**

Provide break out spaces within the factory campus to cater 8% of the regular employees pershift. The spaces should be located within a walkable distance of 0.3 km from the shop floor.

Notes:

- *Definition of Break-out Space: A quiet area away from the bustle of the workplace where informal meetings can be held (or) just a space for staff to take a break to relax or overcomefatigue.*
- *Break-out space shall be shaded to use during rainy/ harsh summer or winter conditions.*
- *Break-out spaces shall not be part of the shop or work floor and shall not be part of anycirculation area (such as pedestrian, corridors, lobby etc).*

- *Indoor spaces such as canteen, meeting areas, seating arrangement near water coolers,board games etc., cannot be considered under break-out spaces.*
- *Library and outdoor sitting space (shaded) can be considered under break-out spaces.*

Documentation Required

(i). Submit floor plans highlighting the locations of the breakout spaces provided.

(ii). Provide list of recreation spaces (such as breakout spaces or any indoor / outdoor games) provided in the project along with timestamp photographs.

(iii). Provide calculations indicating the number of building occupants catered through recreation spaces to the total number of building occupants, in percentage.

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation in Design & Operation.

Innovation in Design & Operation

Innovation in Design & Operation

ID Credit 1.1 – 1.5 **Points: 5**

Intent

Provide design teams and projects the opportunity to be awarded points for exemplary performance above requirements set by the IGBC Green Factory rating system and/or innovative performance in Green Factory Building categories not specifically addressed by the IGBC Green Factory Building Rating System.

Compliance Options:

Some of the points that can be earned under this credit are as

follows: Credit 1.1: Innovation in Design & Operation

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

Credit 1.2: Innovation in Design &

OperationSame as credit 1.1

Credit 1.3: Innovation in Design &

OperationSame as credit 1.1

Credit 1.4: Innovation in Design &

OperationSame as credit 1.1

Credit 1.5: Innovation in Design &

OperationSame as credit 1.1

Note: *Existing factory building is applicable for a maximum of 4 points and New factorybuilding is applicable for a maximum of 5 points.*

IGBC Accredited Professional

ID Credit 2 **Point: 1**

Intent

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

Compliance Options

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

Note: IGBC Accredited Professional (AP) shall be one of the participants from the project team.

ARI

Air-conditioning and Refrigeration Institute

ASHRAE

The American Society of Heating, Refrigerating and Air-conditioning Engineers

BEE

Bureau of Energy Efficiency

CFM

Cubic Feet per Minute

COP

Coefficient of Performance

CRI

Carpet and Rug Institute

ECBC

Energy Conservation Building Code

EER

Energy Efficiency Ratio

FSC

Forest Stewardship Council

HDD

Heating Degree Days

HVAC

Heating Ventilation and Air-conditioning

IPLV

Integrated Part Load Value

LPD

Lighting Power Density

LPF

Liters per Flush

LPM

Liters per Minute

MSDS

Material Safety Data Sheet

NA

Not Applicable

NBC

National Building Code

PTHP

Packaged Terminal Heat Pumps

SHGC

Solar Heat Gain Coefficient

SRI

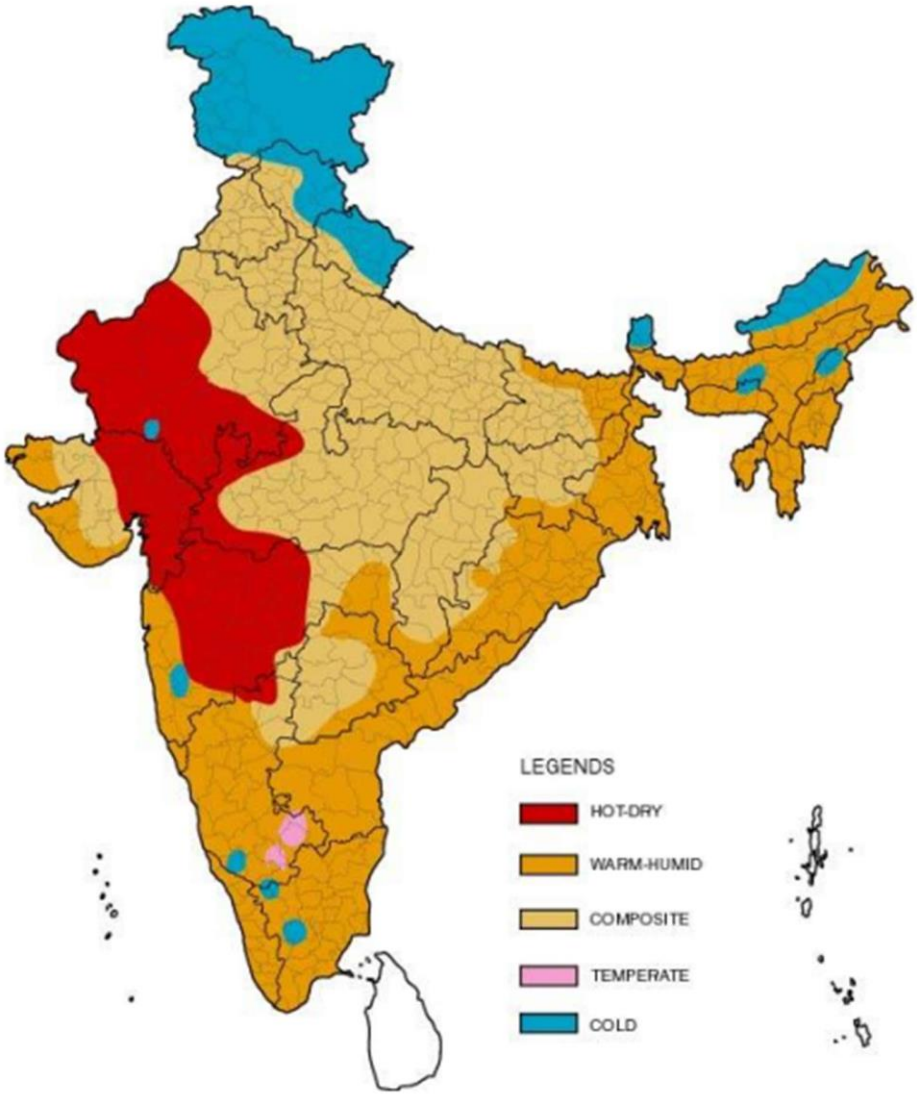
Solar Reflective Index

VOC

Volatile Organic Compound

Annexures

Annexure I: Climatic Zone Map of India



Source: NBC 2016

Annexure - II: EE Mandatory Requirement 2 - Minimum Energy Performance & EECredit 2 – Optimise Energy Performance

Building Envelope Measures

Table 1: Roof Assembly U – value

Climate Zone *	24 h Use Buildings	Daytime Use Buildings
	Maximum U-Value of the overall Assembly ($W/m^2°C$)	
Composite	0.261	0.409
Hot and Dry	0.261	0.409
Warm and Humid	0.261	0.409
Moderate	0.409	0.409
Cold	0.261	0.409

Table 2: Opaque Wall Assembly U – value

Climate Zone *	24 h Use Buildings	Daytime Use Buildings
	Maximum U-Value of the overall Assembly ($W/m^2°C$)	Maximum U-Value of the overall Assembly ($W/m^2°C$)
Composite	0.440	0.440
Hot and Dry	0.440	0.440
Warm and Humid	0.440	0.440
Moderate	0.431	0.397
Cold	0.369	0.352

Table 3: Fenestration U-Value and SHGC Requirements

Climate Zone *	Maximum U value ($W/m^2°C$)	Maximum SHGC	
		WWR ≤ 40%	40% < WWR ≤ 60%
Composite	3.30	0.25	0.20
Hot and Dry	3.30	0.25	0.20
Warm and Humid	3.30	0.25	0.20
Moderate	6.90	0.40	0.30
Cold	3.30	0.51	0.51

Table 4: Skylights SHGC Value

Climate Zone *	Maximum U value		Maximum SHGC	
	With curb	Without curb	0-2% SRR	2.1-5% SRR
Composite	11.24	7.71	0.4	0.25
Hot and Dry	11.24	7.71	0.4	0.25
Warm and Humid	11.24	7.71	0.4	0.25
Moderate	11.24	7.71	0.61	0.4
Cold	11.24	7.71	0.61	0.4

* *SRR- Skylight Roof Ratio*

** For Climatic Zones of India, please refer Annexure – I*

Source: NBC-2016, Part 11- Approach to Sustainability, Table 09, 10, 11, 13.

Annexure - III: EE Mandatory Requirement 2 - Minimum Energy Performance & EECredit 2 – Optimise Energy Performance

Interior Lighting

Table 1: Interior LPD (Building Area Method)

Sr. No	Building Area Type	LPD W/m^2
1	Automotive facility	9.7
2	Dining: cafeteria/fast food	15.1
3	Dormitory	10.8
4	Exercise center	10.8
5	Gymnasium	11.8
6	Healthcare clinic	10.8
7	Manufacturing facility	14.0
8	Office	10.8
9	Transportation	10.8
10	Warehouse	8.6
11	Workshop	15.1

Note: For additional information kindly refer to exhaustive list from the below source

Source: NBC-2016, Part 11- Approach to Sustainability, Table 20

Annexure - IV: EE Mandatory Requirement 2 - Minimum Energy Performance & EECredit 2 – Optimise Energy Performance

Air Conditioning Systems

➢ **Unitary/ Split/ Packaged Air-conditioners:**

• ASHRAE 90.1, 2016

TABLE 6.8.1-1 Electronically Operated Unitary Air Conditioners and Condensing Units - Minimum Efficiency Requirements.

➢ **Variable Refrigerant Flow:**

Table 5-6 as per the ANSI/AHRI Standard 1230 while the Indian Standard on VRF is being developed. BEE Standards and Labelling requirements for VRF shall take precedence over the current minimum requirement.

* The revised EER and IEER values as per Indian Standard for VRF corresponding to values in this table will supersede as and when the revised standards are published.

• ASHRAE 90.1, 2019

TABLE 6.8.1-9 Electrically Operated Variable Refrigerant Flow Air Conditioners Minimum Efficiency Requirements.

➢ **Water Cooled and Air-Cooled Chillers:**

• ASHRAE 90.1, 2016

TABLE 6.8.1-3 Water Chilling Packages-Efficiency Requirements

Annexure - V: IEQ Mandatory Requirement 2 - Minimum Fresh Air Requirements &IEQ Credit 1 – Improved Fresh Air Ventilation

Fresh Air Ventilation Rates

Table 1: Minimum Ventilation Rates in Breathing Zone

	People Outdoor Air Rate R_p		Area Outdoor Air Rate R_a	
Occupancy Category	**cfm/ person**	**L/s. person**	**cfm/ ft^2**	**L/s. m^2**
Dining rooms	7.5	3.8	0.18	0.9
Cafeteria/ fast-food dining	7.5	3.8	0.18	0.9
Kitchen (cooking)	7.5	3.8	0.12	0.6
Breakrooms	5	2.5	0.12	0.6
Corridors	-	-	0.06	0.3
General manufacturing (excludes heavy industrial and processes using chemicals)	10	5.0	0.18	0.9
Transportation waiting	7.5	3.8	0.06	0.3

Note: For additional information kindly refer to exhaustive list from the below source

Source: ASHRAE 62.1 – 2016, Ventilation for Acceptable Indoor Air Quality

Annexure – VI: ISHRAE Standard 10001-2019

Indoor Air Quality

Table 1: Threshold values for indoor air quality parameters

Parameters		Units	Classification		
			Class A	Class B	Class C
Basic IAQ parameters	CO_2	ppm	Ambient + 350	Ambient + 500	Ambient + 700
	PM 2.5	µg/m^3	< 15	< 25	< 25
	CO	ppm	< 2	< 9	< 9
	TVOC (equivalent to isobutylene)	µg/m^3	< 200	< 400	< 500
Complementary IAQ parameters	PM 10	µg/m^3	< 50	< 100	< 100
	CH_2O	µg/m^3	< 30	< 100	-
	SO_2	µg/m^3	< 40	< 80	-
	NO_2	µg/m^3	< 40	< 80	-
	O_3	µg/m^3	< 50	< 100	-
	Total Microbial Count	CFU/m^3	Indoor = ambient	Indoor = ambient	-
Occupant Satisfaction		%	90	80	-

Note: In case the values of TVOC are higher than the specified threshold value as given in Table 1, individual VOCs shall be analyzed. At least the following VOCs that are toxic and common in indoor environments, need to be analyzed.

Table 2: Threshold value for various VOCs in IAQ

Parameter	Unit	Threshold value
Formaldehyde (HCHO)	µg/m3	30
Toluene	µg/m3	300
Benzene	µg/m3	3
Acetaldehyde	µg/m3	140
Epichlorohydrin (106-89-8)	µg/m3	3
Naphthalene (91-20-3)	µg/m3	9

Table 3: IAQ Parameter Test method and measurement equipment – for Path A measurement

IAQ element	Test method
CO_2	ISO 16000-26 Sampling strategy for Carbon dioxide (CO); 2 Note: Except for the screening measurement using sampling tubes, the CO2 concentration is recorded continuously using an automatic instrument
CO	Annex C of ISO 16000-26 Sampling strategy for Carbon dioxide (CO); 2 Note: Except for the screening measurement using sampling tubes, the CO2 concentration is recorded continuously using an automatic instrument.
NO_2	ISO 16000-15 Sampling strategy for Nitorgen dioxide (NO);
Formaldehyde	ISO 16000-3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air – Active sampling method or ISO 16000 – 4: Determination of formaldehyde – Diffusive sampling method
VOCs	ISO 16000 – 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA® sorbent, thermal desorption and gas chromatography using MS or MS-FID
O_3	ISO 13964 : Determination of Ozone in ambient air – Ultraviolate photometric method
PM 10 and PM 2.5	ISO 16000-34: Strategies for the measurement of airborne particles

Table 4: Instrumentation requirement – for Path B measurement

Parameter	Sensor Quality Specifications for Path B
CO_2	Data Output Interval - 10 Minutes for each reading max Operating Temp Range: 0-40 degrees C Operating Range of RH - 10-85% (non condensing) Measurement Range : 400ppm - 5000ppm Resolution : 5 ppm maximum Accuracy: 400 - 2000ppm : ±5% 2000 - 5000ppm : ±5% Lower Detection Limit - 400ppm Recalibration capability – Required
CO	Data Output Interval - 1 Minutes for each reading max Operating Temp Range: 0-40 degrees C Operating Range of RH : 10-85% (non condensing) Measurement Range from : 0ppm till 1,500ppm Resolution: 1 ppm maximum Accuracy: 2% of reading Lower Detection Limit - 0ppm Recalibration capability – Required
PM2.5	Data Output Interval - 10 Minutes for each reading max Operating Temp Range: 0-40 degrees C Operating Range of RH - 10-85% (non condensing) Measurement Range: 0 ug/m3 to 500 ug/m3 Resolution : 1 ug/m3 Accuracy: 0 - 150 ug/m3 : ±5ug/m3 150 - 500 : ±5ug/m3 Lower Detection Limit - 0 ug/m3 Recalibration capability – Required
TVOC	Data Output Interval - 10 Minutes for each reading max Operating Temp Range: 0-40 degrees C Operating Range of RH - 10-85% (non condensing) Installation - should have ability to install permanent Measurement Range: 150 ug/m3 to 2000 ug/m3 Resolution of 10 ug/m3 Accuracy: 150 - 600 ug/m3 : ±20ug/m3 600 - 2000 : ±20ug/m3 Lower Detection Limit - 150 ug/m3 Recalibration capability – Required

Source: Indoor Environment Quality ISHRAE Standards 10001- 2019, Sec 6.3.2 and Sec 6.3.3.5

About
Confederation of Indian Industry (CII)

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 around 9000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 300,000 enterprises from around 288 national and regional sectoral industry bodies.

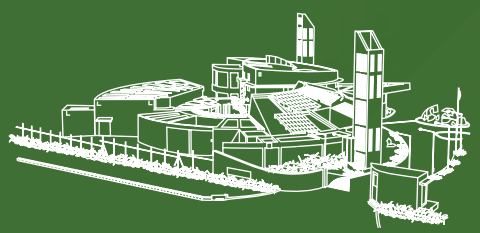
With 68 offices, including 10 Centres of Excellence, in India, and 8 overseas offices as well as institutional partnerships with 394 counterpart organizations in 133 countries, CII serves as a reference point for Indian industry and the international business community.

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 Sustainable Built-Environment for all, and to make India, one of the world 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. The Council also closely works with several State Governments, Central Governament, World Green Building Council, bilateral multi-lateral agencies in promoting green building concepts in the country



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