



Indian Society of Heating
Refrigerating & Air Conditioning
Engineers

Advance, Disseminate, Educate
HVAC&R Industry in India.

GRIHA Rating System ISHRAE

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ISHRAE

GRIHA



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- **GRIHA has been developed in the context of India's varied climate and building practices**
- **Resource conservation and efficient utilization**
 - **9 Criteria**
- **Building Planning and Construction**
 - **22 Criteria**
- **Building Operation and Maintenance**
 - **2 Criteria**
- **Innovation Points**



(Green Rating for Integrated Habitat Assessment)

GRIHA



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- **Building Planning and Construction**
 - Criterion 13 Optimize building design to reduce conventional energy demand
 - Criterion 14 Optimize energy performance of building within specified comfort limits



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Criterion 13

Optimize building design to reduce conventional energy demand

Commitment

In order to optimize the building design appropriate climate responsive design strategies should be adopted, such as-

- 1 Optimize the orientation of the building;
- 2 Place the buffer spaces (such as - toilets, corridors, staircases, lifts and service areas etc.) along western and eastern facades
- 3 Provide maximum openings on North and South;
- 4 Shade the building surfaces getting maximum solar exposure (such as— wall, roof, courtyard) with the use of external shading devices;
- 5 Design appropriate shading for all the fenestrations getting direct solar radiation by using sun path analysis

Integrated System Design Methodologies

More commitments . . .

Criterion 14 - Optimize energy performance of building within specified comfort limits



Objective

To optimize use of energy systems in buildings that maintain a specified indoor climate conducive to the functional requirements of the building.

Commitment

1 Follow mandatory compliance measures (for all applicable buildings) as recommended in the Energy Conservation building Code 2007 of the BEE, Government of India.

2 Perform hourly calculation to show that in air conditioned areas the thermal comfort conditions as specified in the NBC 2005 (BIS 2005e) are met for 100% of all occupied hours.

3 Perform hourly calculations to show that in non-air conditioned areas, the thermal comfort conditions as specified in the NBC 2005 (BIS 2005e) are met for 90% of all occupied hours for buildings in composite, moderate and hot-dry climate and are met for 60% of all occupied hours for buildings in warm-humid climate .

More commitments . . .

Criterion 14 - Optimize energy performance of building within specified comfort limits

Technologies and Systems

- ❖ **High Performance Building Design with**
 - **High Efficiency Chillers**
 - **Earthwise System Design**
 - **Variable Primary Flow Designs in CHW Systems**
 - **Passive Air Conditioning Designs**

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- **Building Operation and Maintenance**
 - Criterion 32 Energy audit and validation
 - Criterion 33 Operation and maintenance

Building Operation and Maintenance

- Criterion 32 Energy audit and validation

Objective

Validate the performance of the energy and environmental systems in the building as predicted during the design and development stage.

Commitment

1 After occupying the building, conduct audits for the following within two years of full occupancy and submit audit data as per the specified format. The energy consumption data submitted should be for at least 12 months.

1. Energy audit
 - a. Energy consumption
 - b. Thermal comfort
 - c. Visual comfort
2. Water and waste audit
 - a. Water quality
 - b. Solid waste generation
 - c. Solid waste disposal process

2 After occupying the building, conduct sound level audit as specified in Criterion 29, to measure the following:

- a. Indoor noise levels
- b. Outdoor noise levels

Building Operation and Maintenance

- Criterion 33 Operation and maintenance

Objective

To ascertain efficient functioning of the building's systems through regular monitoring of building's energy and water consumption and implementation of appropriate operation and maintenance program.

Commitments

- 1 Ensure regular monitoring of building's energy and water consumption by installing digital Meters
- 2 Provide a core facility/service management group that will be responsible for the O&M
- 3 Prepare a fully-documented O&M manual
- 4 Include a specific clause in the contract document of the systems supplier for the commissioning (installation and test run) and systematic handing over of all electrical and mechanical systems to the core facility/ service group responsible for the O&M of the building systems after installation.
- 5 Include a specific clause in the contract document of the systems suppliers for providing training to the core facility/ service group responsible for the O&M of the building

ISHRAE



The Indian Society of Heating, Refrigerating & Air-conditioning Engineers

www.ishrae.in



Aims & Objects



- Advancement of the arts & sciences of Heating, Refrigerating and Air-conditioning and other building services.
- Continuing Education in the said sciences through lectures, workshops, seminars, exhibitions and publications.
- Rendition of Career Guidance and Financial Assistance to students of said Sciences.
- Encouragement of Scientific Research.

Brief History



- Founded in 1981
- Has been growing steadily over the last 30 years
- Now has about 40 chapters and sub-chapters all across the country in all major towns and cities.
- There are presently about 10,000 members and 3000 student members.
- Membership in ISHRAE is individual and not company or corporate.

Present Activities



- **ACRECONF** – An annual international conference held in New Delhi. Acreconf 2013 will be held on **7&8 Feb. 2013** with 4 to 5 parallel sessions, 100 speakers and over 1500 delegates. The theme is “Emerging Mega Trends in Building Design”.
- **ACREX** – An annual international exhibition held in Mumbai, New Delhi & Bangalore. Acrex 2013 will be in Mumbai on **7,8 & 9 March 2013**. Over 10,000 sqm of stall space, >400 exhibitors and 25000 visitors. Workshops ...
- About **10 national level seminars/conferences/catalog shows** in major cities – ventilation, cold chain, data centres, fire & security, energy efficiency and others.

ACREX 2013 - Workshops



- Concurrent with the exhibition, a series of workshops are planned during Acrex 2013.
- The workshops will be spread over 5 days (5 to 9 March) covering about 18 sessions.
- Subjects covered are energy efficient data centre design, IAQ Ashrae standard 62.1, low energy cooling systems, draft less air distribution, HVAC Commissioning, noise & vibration, VRF standards and more.
- Active participation by REHVA, ASHRAE & AHRI in terms of speakers.



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REGISTRATION IS ONLINE @



International Exhibition on
Air Conditioning, Refrigeration & Building Services
Bombay Exhibition Centre, Goregaon (E), Mumbai / India

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To summarize
the outlook for enhanced building energy
efficiency in India is very bright as there is a huge
potential for energy savings and for use
of energy saving technologies, equipments and
systems.

Thank you for your attention



The Energy and Resources Institute
New Delhi



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