



Frequently Asked Question

Eco Niwas Samhita Karnataka 2020

1. What is Eco Niwas Samhita Karnataka (ENS-R) 2020?

ENS-R is an energy conservation building code for Residential Buildings in Karnataka. The code is developed by the Ministry of power to regulate energy conservation in the state of Karnataka. Residents/Owners/Builders/Developers are mandated to follow the guidelines from the code for the residential building construction.

2. What is the importance of ENR -R code?

By 2030, the increase in energy demand for the residential sector is expected to rise by 20-30% of current energy consumption. Hence ENS_R codes set minimum energy efficiency standards for residential building by reducing the energy consumption and retaining the thermal comfort inside the building.

3. Which parts of the state are the code applicable?

Karnataka has thirty districts. And these districts pose a different climatic condition. This code applies to all the districts under the jurisdiction of Govt of Karnataka (GoK).

4. What is the climatic zone under which Karnataka is categorized into?

The Union of India is divided into five climatic zones namely, Hot & dry, Warm & Humid, Composite, Temperate and Cold. The state of Karnataka has all the five climatic zones which are spread across all its thirty districts. The climatic map can be referred for the same.

5. What type of buildings are covered under the code?

As per Karnataka – ENS code applicable to all residential building(s)/complex (es)/multi storied building(s), in the state of Karnataka where the sanctioned/ requisitioned load is 35kW or more (or) Built up Area (BUA) is 800m² or more.

This applies to all private and government residential building.

6. Is ENS-R code applicable to mixed land use buildings?

Yes, the ENS-R code applies to the mixed land use building which has residential portions of $\geq 800\text{m}^2$ of the built-u area or $\geq 35\text{KW}$ connected load.



7. What all types of residential buildings come under the purview of ENS-R?

Residential building includes any building in which sleeping accommodation is provided for normal residential purposes with or without cooking or dining or both facilities. This definition includes One or two-family private dwellings, Apartment houses.

8. Can the ENS-R Compliance be checked through software simulation?

Yes, the parameters of the code can be checked through the ENS compliance tool which is readily available on the BEE website.

9. Is ENS-R applicable to existing buildings?

No, ENS-R is only applicable to new residential buildings with the built-up area of $\geq 800\text{m}^2$ or ≥ 35 KW connected load

10. What is U-value?

U-value is the measure of heat loss. It is measured in w/sqm.K . It shows the amount of heat lost in Watts per square meter of material (For example, wall, roof, etc). The lower the U-value, the better the performance of the material.

11. Where can we find the technical properties of the envelope material?

The user can find envelope material properties from suppliers/manufacturers and get the test certificates of the same. If the details are not available with the suppliers/manufacturers, then the person can refer to the ENS-R code.

12. Is the code applicable to all the climatic conditions of the state of Karnataka?

Yes, the code has been drafted based on the climatic zones and applies to all 5 climatic zones present in the state of Karnataka.

13. How to get the value of ESF from the projection factor?

After calculating the projection factor, the table provided in the code can be referred to get the respective ESF values for the overhangs, vertical and horizontal fins.

14. Can the clubhouse of an apartment building be considered for ENS Compliance?

No, the clubhouses should be excluded from the ENS-Compliance as the code is exclusively drafted for the residential building.



15. What are the different strategies used to reduce the heat ingress inside the building through the roof?

Following are the different strategies which can be referred for reducing the heat ingress inside the building-

- The best roof insulation material (EPF/XPF) of minimum 50 mm thickness
- Providing the roof garden/ green roof
- High SRI (solar reflective Index) coating with the minimum SRI of 78.
- China Mosaic tiles.

16. Does WWR (Window to wall area ratio) vary concerning the climatic conditions?

No, the WWR value does not vary based on the climatic condition. However, it is derived from total opaque and non-opaque portion the envelope area of the residential building.

17. Does the 35KW connected load include plug/miscellaneous load?

No, 35 KW does not include plug load.

18. Is basement area included as part of the total built-up area?

No, the basement areas are not to be considered while calculating the total built-up area.

19. Does ENS-R cover HVAC equipment parameters?

No, part -1 of the ENS-R code covers only building envelope.

20. Is this ENS-compliance software available free?

Yes, this software is available for free of cost. It is readily available on Econiwas.com website. It is a java based tool and it does not require internet for the evaluation.

It can be directly downloaded from the link below-

Link - <https://beeindia.gov.in/content/ecbc-residential>

21. In the case of jali, how to calculate the openable area?

For the jali, the openable area can be calculated by considering 90% of the total opening area as the openable area.

22. What is the recommended window frame?



The recommended window frame is UPVC as it has lesser U-value in comparison to Aluminium and frame.

23. What areas in the dwelling unit can be considered for carpet area calculations?

All the area in the dwelling unit, except the balcony areas, are to be considered for the calculation of the carpet area which is needed for the WFRop calculations.

24. What is the openable area percentage of 2-pane sliding door/window?

For calculating the openable area of the 2 panes sliding door/window, 50% of the opening area is to be considered for the WFRop calculations.

25. How should a resident/owner/builder/developer refer to the code?

The location and the climatic condition of the upcoming project are to be checked as per the annexure section of the codes.

Based on the climatic zones, there are 5 main criteria which need to be fulfilled to achieve compliance as per the code. The listed criteria in the code are to be referred and compliance has to be done accordingly.

26. Are there any exceptions to residential buildings under the scope of the code?

As per the applicability of the code, lodging & rooming houses, dormitories and hotels are exempt from the code compliance.

27. Why do I have to meet the minimum criteria described in the code?

The code is derived from international and national reference standards. These references are derived based on research, which is defined accordingly to meet requirements for that particular climate. Adopting these in the regular construction practice will indeed augment the comfort standards of the occupant and consume low energy.

28. Is the compliance requirements for all the climatic zones different?

Yes. Concerning ENS-R -part 1-building envelope, the compliance requirement of the openable window to floor area ratio (WFR_{op}), Visible light Transmittance (VLT) and Thermal transmittance for the roof (U_{roof}) is common for all the climatic zones. For cold climates, thermal transmittance ($U_{envelope,cold}$) is exclusively mentioned. Residential Envelope Transmittance Value (RETV) does not apply to cold climates.

29. What is Residential Envelope Heat Transmittance (RETV)?



RETV is the net heat gain rate (over the cooling period) through the building envelope of dwelling units (excluding roof) divided by the area of the building envelope (excluding roof) of dwelling units. Its unit is W/m^2 .

30. How will adopting the code benefit me as an owner/occupant/resident/builder?

Modern buildings are built considering various aspects that are prevalent at the site. Climatic condition is the most critical aspect that influences occupants comfort. Buildings built as per the climate prove to have optimum conditions at lower costs of energy during the operational period. Enhanced daylight saving, better natural ventilation, lower ingress of heat, usage of standard equipment, lower energy bills etc... are some of the benefits owner/occupant/resident/builders shall gain after the adoption of the code. And opting to construct energy-efficient residential units owner/occupant/resident/builder are also contributing towards national energy security and sustainable development.

31. I am a builder/developer and engaged with upcoming projects in Kodagu and Bengaluru. What should be my approach?

Chapter-2 Scope describes upcoming residential buildings under its purview. This should be well understood for the residential project. Next, Kodagu and Bengaluru are certainly two different locations in Karnataka. Annexure-2, Table -4 describes the climate of these locations. After knowing the climatic conditions, Chapter-4 Code Compliance section describes the requirements to achieve compliance in a cold region and temperate region. These are climatic conditions of Kodagu and Bengaluru respectively. The technical sections described are simple to infer and apply for any residential projects. These simple approaches towards the code will cater to your specific needs.

32. Can I have higher values of WFR_{op} than the prescribed minimum value?

The values suggested in table-1 of the code is the minimum requirement as per the climatic conditions. Higher percentages of Window areas are suggested in certain climatic zones provided it does not influence the subsequent compliance requirements like applicable RETV, VLT and Thermal transmittance of the envelope in cold climates.

33. How do I achieve ENS KA compliance for group housing projects?

If a building project has more than one building block, each building block is required to comply with the code. However, for identical building blocks with the same orientation, the compliance has to be shown for one building block. Annexure-6 of the code explains in detail.



34. What are the prime parameters to achieve compliance to ENS KA Code?

The parameters have to be referred according to climatic conditions where the building is being built. According to Part-1 of KA ENS: (a) Openable Window to Floor Area Ratio (WFRop) (b) Visible Light Transmittance (VLT) (c) Thermal Transmittance of Roof (Uroof) (d) Residential Envelope Heat Transmittance (RETV) (e) Thermal Transmittance of the building envelope (except the roof) for cold climate ($U_{envelope, cold}$) are the parameters to be satisfied.

35. How difficult is it to understand the code?

The code is defined in a simple to apply format requiring only simple calculations based on inputs from the architectural drawings of residential buildings. This is easy to read and apply to all architects and engineers. Also, the examples and annexures in the code do explain in detail about the inputs to the formulas described in the code. Annexure 8 explains with an example to achieve code compliance specific to Karnataka for different climatic zones.

36. Can I get any assistance to choose materials to satisfy the minimum criteria defined as per the code for the compliance?

Building envelope configuration and orientation majorly influence human comfort in dwelling units. Annexure 5, Table 7 describes a list of materials with their relevant thermal & physical property which are generally considered for residential building envelope construction. When the suitable combinations and their thermal properties are evaluated, the criteria can be met as per the requirements of climatic condition.

37. Does providing a cool roof prove to be an alternative to the code requirement?

Cool roof / Roof Garden is not seen as an alternative to the thermal transmittance requirement of the roof as per the code. It is always encouraged to have cool roof application over roof assembly complying with the maximum thermal transmittance value given in the code.

38. Are there any books available for the understanding of this code?



A manual has been developed where details of all the terminologies and code parameters are discussed in detail. It details out all the terminologies, parameters discussed in code and explain it in details to impart a clear understanding of the code.

39. Is it mandatory to check ENS compliance of the identical building oriented in the same direction?

No, if the identical buildings are oriented in the same direction and same envelope parameters, it is suggested to do the ENS compliance check for anyone building among them.

40. Can the doors and windows provided towards the balcony be used for the calculations to check the WFRop compliance?

If the doors and windows provided in the balconies are exposed to ambient, then they can be considered for the calculations. If the doors and windows are opening towards the shafts or the corridors, then they are not considered for the WFRop compliance check.