HOMESTAR VERSION 5

OCULUS EXPLAINS THE KEY CHANGES BETWEEN HOMESTAR V4 AND THE LATEST HOMESTAR V5.

Homestar is a rating tool from the New Zealand Green Building Council (NZGBC) for residential housing covering sustainability, performance and environmental impact. The tool has been designed around New Zealand specific housing but is generally similar to rating schemes from overseas, such as Breem and Lead. Homestar has been around for over 10 years now and has become an established rating across the industry. The available credits and categories can lead to a rating between 6-10 stars (if you're wondering where stars 1-5 went, they're for describing older buildings built before Homestar was established).

Version 5 was rolled out in August 2021, and from our perspective it's a huge upgrade over version 4.1 because it has mandatory minimums and checks that will lead to warm, dry, healthy homes. This guide is a general summary of the new manual to help give an outline of how the new version works and show where we can help though design.

VERIFIED YEAR-ROUND COMFORT IS THE NEW FOCUS OF HOMESTAR

They have simplified the number of categories from 8 to 5...

EF Efficient

LV Liveable

IN Innovation - Remains as an additional credit but does not count towards the core credits.

HC Healthy and Comfortable

EN Environmentally Responsible

... and there are now a large amount of credits dedicated to comfort and operational efficiency, while still including the items that were highly weighted in V4.

The focus on comfort has also introduced criteria that are more aligned with the international Passive House Standard, which is great news. Energy performance is now calculated using a new tool from the NZGBC called ECCHO which is a more user-friendly interface linked to PHPP (Passive House Planning Package), but you can still use PHPP to achieve the EF and HC credits, since a certified Passive House will automatically receive a full point score for all credits that would have related to ECCHO calculations.

Because V5 now includes a simplified but effective approach to energy modelling, a few more intricate criteria were introduced, such as the minimum surface temperature factor (fRsi factor). This credit (within HC4) is important, as it ensures that the project considers thermal bridging and related cold surfaces/condensation to eliminate risk of mould growth.

HOW CAN OCULUS HELP WITH YOUR HOMESTAR PROJECT?

Oculus can provide the necessary calculation to meet the following credit criteria to enable Homestar certification:

Category	Points available	
	Apartments and terraces	Points available through Oculus service
Efficient	37	18
Healthy and comfortable	43	35
Liveable	11	
Environmentally responsible	29	4
Total	120	57
Innovation	10	

While we do not do full Homestar assessments or certifications, we will help guide design and liaise with the project's assessor to speed things along. Oculus does not generally provide energy modelling for standalone residential homes unless required for Passive House Design, but we can do so if requested in certain circumstances. In general, we can provide guidance on assemblies, sizing, layouts and orientation, and we can use modelling to provide sensitivity analysis and help show the project team how changes to the building will affect its comfort and efficiency.

MINIMUM ENTRY REQUIREMENTS

When you want to get any Homestar rating for a new build, you are required to meet these minimum entry requirements:

Requirement	Credit
The main living area must have an adequately sized fixed heating system.	HC1
All doors between conditioned space and garage must be fully sealed.	HC3
All combustion appliances must be room sealed.	HC3
Windows must be thermally broken.	HC4
All junctions between external walls, floors and roofs must be demonstrated to meet the minimum fRsi factors for the respective climate zone.	HC4
Ground vapour barrier must be installed to the ground below all suspended floors.	HC4

Table source: Homestar Technical Manual v5 - NZGBC - page 24/25

All of these mandatory minimums are within the health and comfort credit! Great to have the focus on comfort!

WHAT ARE THE CREDITS AND WHAT IS THEIR AIM?

Here's a quick rundown of the credits within each of the categories:

EF **EFFICIENT**

EF1 **Resource Efficiency:** To promote smaller and more efficient dwellings that require fewer resources to build, operate and occupy. Smaller interior spaces get more points.

EF2 **Urban Density:** To promote developments with smaller footprints, recognising the benefits of denser urban planning such as affordability and efficiencies in infrastructure and space utilization. Higher density housing and tall buildings are rewarded with higher points.

EF3 **Water Use:** To reduce water use through more efficient fixtures and rainwater harvesting. Maximum water use benchmarks for each star rating is shown below. Example: Roof type allowing for rainwater harvesting and reuse.

Mandatory Minimums

Dwellings must not exceed the following indoor water consumption in litres per person per day:

6 Homestar	7 Homestar	8 Homestar	9 & 10 Homestar
165	150	110	90

Table source: Homestar Technical Manual v5 - NZGBC - page 35

EF4

Pleae note: The Oculus logo next to the credit means that Oculus can assist you with achieving it.

Energy Use: To reduce operational energy consumption, energy costs and greenhouse gas emissions associated with the use of heating, hot water, ventilation, lighting and refrigerants within the home.

There are 3 compliance pathways (using ECCHO):

1. Compliance by calculation
2. Compliance by energy modelling
3. Compliance by Passive House certification

Oculus can help with energy modelling and Passive House design or certification to obtain points under this credit. Calculation through ECCHO can be completed by a homestar assessor.
Maximum energy use and greehouse gas emission benchmarks for each star rating are shown below:

Mandatory Minimums

Maximum delivered electricity (kWh/m^2/year) associated with operational energy (excluding appliances) for each star rating:

Climate Zone	6 Homestar	7 Homestar	8 Homestar	9 & 10 Homestar
1	40	30	20	15
2	50	36	22	15
3	60	42	24	15
4	70	48	26	15
5	80	53	28	15
6	90	59	29	15

Maximum onsite greenhouse gas emissions (kg.CO_2-e/m^2) associated with space heating, hot water and refrigerants for all climate zones:

6 Homestar	7 Homestar	8, 9 and 10 Homestar
8	4	2

Table source: Homestar Technical Manual v5 - NZGBC - page 40

HC HEALTHY AND COMFORTABLE

HC1

Winter comfort: Smaller conditioned area per bedroom gets higher points. To recognise the reduction of purchased energy associated with space heating and cooling of the home, through good design of the thermal envelope.

- Same energy demands for heating as per EF4
- Min heater size 1.5KW (except PH), In most cases, the acceptable types of heater(s) will be a larger fixed heating device like a heat pump, wood burner, pellet burner or flued gas heater. In some cases, such as small apartments, a fixed electric heater may be enough. Unacceptable heater sources include:
  - open fire
  - un-flued combustion heater
  - heat pumps or electric heaters without a thermostat
  - electric heaters when the required heating capacity is more than 2.4kW

Oculus can help with energy modelling, assembly choice and building size /layout.

HC2

Summer comfort: To reduce the risk of summertime overheating.
Oculus can help using solar modelling and specification of coatings on glass or exterior shading to reduce solar gains.

Mandatory Minimums

Using an approved calculation method, the home must be demonstrated to not exceed 25°C for more than the following percentage of the year, for each star band:

6 Homestar	7 & 8 Homestar	9 & 10 Homestar
7%	5%	3%

Alternatively, for any star rating, projects may demonstrate by dynamic simulation compliance with CIBSE TM59.

Table source: Homestar Technical Manual v5 - NZGBC - page 47

HC3 **Ventilation:** To encourage and recognise ventilation measures that control indoor moisture levels, improve indoor environment for occupants, reduce respiratory illnesses and the risk of mould, and increase the durability of the dwelling. (Must be continuous exhaust or balanced ventilation, ideally with heat recovery).
Oculus can help with specification of ventilation systems.

HC4 **Moisture control:** To encourage and recognise measures that reduce condensation on and within building components to improve the indoor environment for occupants, reduce the risk of mould and respiratory illness, and to increase the durability of the dwelling.
Oculus can help with hygrothermal modelling and surface temperature checks.

Mandatory Minimums

<u>Any Homestar rating:</u>

All junctions between external walls, floors and roofs must be demonstrated to meet the following minimum fRsi factors for the respective climate zone:

Climate Zone	1	2, 3, 4 and 5	6
Minimum temperature factor fRsi	0.55	0.65	0.7

Windows must be thermally broken.

Ground vapour barrier must be installed on the ground below all suspended timber floors.

<u>8 Homestar and above:</u>

Homes must be pressure tested and achieve the following maximum air leakage:

Homestar rating	8 Homestar	9 Homestar	10 Homestar
Maximum pressure test result at 50Pa, $m^3/m^2/hr$	3.0	2.0	1.0

Air and vapour control must be identified for all external walls and roofs.

<u>9 and 10 Homestar:</u>

The window installation detail must be demonstrated to meet the minimum fRsi factors for the respective climate zone.

Table source: Homestar Technical Manual v5 - NZGBC - page 56

HC5 **Natural light:** To encourage and recognise dwellings that provide good levels of natural light for occupants.

HC6 **Acoustic performance:** To encourage and recognise the provision of an improved acoustic environment.

HC7 **Healthy materials:** To encourage and recognise the specification and use of interior finishes that have a reduced impact on indoor air quality and occupant health.

LV LIVABLE

LV1 **Inclusive design:** To encourage and recognise dwellings that are inclusive, visitable, easily adaptable, and accessible, to meet the changing needs of current and future occupants.

LV2 **Occupant amenities:** To recognise homes that are designed, built and located such that they meet occupants needs and are convenient to live in.

LV3 **Eco-friendly living:** To encourage and promote developments that provide a safe and sustainable community that promotes an active lifestyle.

LV4 **Sustainable transport:** To encourage and recognise the reduction of greenhouse gas emissions and improved resident wellbeing through provision of safe and convenient access to sustainable transport options.

EN ENVIRONMENTALLY RESPONSIBLE

EN1 **Renewable energy:** To encourage and recognise the installation and operation of local renewable electricity generation systems to reduce carbon dioxide (CO2) emissions as part of everyday dwelling operations.
Oculus can help with sizing of on-site solar, wind, or geothermal.

Offset	Points
20% offset	Up to 1 point
40% offset	2 points
60% offset	3 points
80% or more offset	4 points

Table source: Homestar Technical Manual v5 - NZGBC - page 90/91

EN2 **Embodied carbon:** To reduce greenhouse gas emissions associated with products and materials used to construct a home.
Oculus can help with material choice and design of efficient assemblies.

Percentage increase on emissions target	Materials and construction stage (A1-A5) emissions: kg.CO_2-e/m^2	Points
<160%	156	2 points
<120%	132	3 points
<80%	108	4 points
<40%	84	5 points
NZ residential carbon budget required to limit global warming to 1.5°C.	60	6 points

Table source: Homestar Technical Manual v5 - NZGBC - page 92

EN3 **Sustainable materials:** To encourage and recognise the specification and use of responsibly sourced materials that have lower environmental impacts over their lifetime.

EN4 **Construction waste minimisation:** To encourage and recognise effective strategies that reduce the environmental impact of construction waste. See table on page 103 of the Homestar Technical Manual v5.

EN5 **Water sensitive design and ecology:** To encourage a whole-of-site approach that improves the ecological value of the site while reducing stormwater runoff, flooding, pollution and erosion.

EN6 **Responsible contracting:** To encourage and recognise best environmental practice by contractors during construction and renovation.

IN INNOVATION

IN1

Innovation: To recognise and encourage the uptake of building initiatives which significantly reduce the environmental impact of the dwelling.

Method	Approach	Points
(1)	Completion of a published innovation challenge	Up to 10 points
(2)	A design feature, technology or strategy that results in a quantified environmental benefit which significantly exceeds an existing Homestar benchmark or which is currently not included in the Homestar tool.	

Table source: Homestar Technical Manual v5 - NZGBC - page 117

CONCLUSION

As shown above with our logo next to certain credits, there are some items we can help with and others that will be shown by your architect, mechanical engineer, or Homestar assessor. Generally, the items we consider are those that deal with interior environment and energy efficiency.

Further information about the rating tool, including the full manual, checklists, and other forms can be found on the web-site of the New Zealand Green Building Council.

Overall, we think version 5 is a huge step in the right direction, and we're excited for when it becomes mandatory in 2023. We highly recommend just getting ahead of it and using version 5. It's an easy process to future-proof your building, and put your designs in line with the recent H1 changes and the future changes alluded to within MBIE's building for climate change (BfCC) document.

For more information please contact
Oculus Architectural Engineering Ltd

Website: oculusltd.co.nz
Email: info@oculusltd.co.nz
Phone: 09 820 0364

Find us on
Instagram | Facebook | LinkedIn