# THE NZ COMFORT GUIDE:

## Designing for Better Indoor Air Quality and Overheating Prevention

An industry guide for architects, builders and home owners embarking on new builds.



# TABLE OF CONTENTS


PAGE

2-5 —— I. INTRODUCTION

1.1 Balancing Winter and Summer Performance

1.2 H1 Code Overview

1.3 Incorporating BRANZ 2024-2025 Findings

6-7 —— 2. BEST PRACTICE FOR ARCHITECTS

2.1 Early Conceptual Coordination

2.2 Passive Shading and Solar Control

2.3 Mechanical Ventilation

2.4 Thermal Mass and Night Flush

2.5 Documentation and Handover

8-9 —— 3. BEST PRACTICE FOR BUILDERS

3.1 Airtightness and Insulation Quality

3.2 HVAC Installation

3.3 Shading and Glazing

3.4 Quality Communication

10-13 —— 4. BEST PRACTICE FOR BUILDING COMPANIES

4.1 Why Heat Recovery Ventilation (HRV) Over Positive Pressure?

4.2 Whole-Home Heating and Cooling

4.3 Combining Whole-Home Comfort with Heat Recovery Ventilation

4.4 Communicating the Benefits to Homeowners

4.5 Aligning with H1 and Looking to Exceed Expectations

4.6 Key Takeaway

PAGE


14-15 — 5. ADVICE FOR HOMEOWNERS

5.1 Key Questions to Ask Early

5.2 Operations and Maintenance Tips

5.3 Signs of Potential Overheating

16 — 6. HI COMPLIANCE AND CURRENT GUIDANCE

6.1 H1/VM1 Overview

6.2 H1 Modelling and Overheating

17-20 — 7. CONCLUSION

7.1 Future-Proofing with Mitsubishi Electric Solutions

7.2 Next Steps

7.3 Your Checklist

21 — 8. REFERENCES AND FURTHER READING




# INTRODUCTION



New Zealand's quest for energy-efficient, winter-ready homes has led to higher insulation standards and increasingly airtight construction. But as homes become better at retaining heat, they can also become vulnerable to poor indoor air quality and excessive indoor temperatures in summer - threatening occupant comfort, health, and budgets.

This guide weaves together insights from updated H1 Building Code compliance pathways for insulation requirements, pivotal BRANZ research, and leading industry reports on overheating.

By merging airtightness and robust insulation with effective shading, ventilation, and occupant education, architects, builders, and homeowners can create homes that are simultaneously cosy in winter without overheating in summer.

The result? A new generation of Kiwi residences designed to thrive year-round, no matter the season or climate challenges ahead.

# 1

## 1.1 BALANCING WINTER AND SUMMER PERFORMANCE

New Zealand's revised H1 Code sets stricter insulation and glazing standards to reduce winter heating demands and greenhouse gas emissions. As homes become more airtight and thermally efficient, summer performance increasingly depends on controlling solar gains, ventilation and internal heat gains.

**Overheating Concerns**

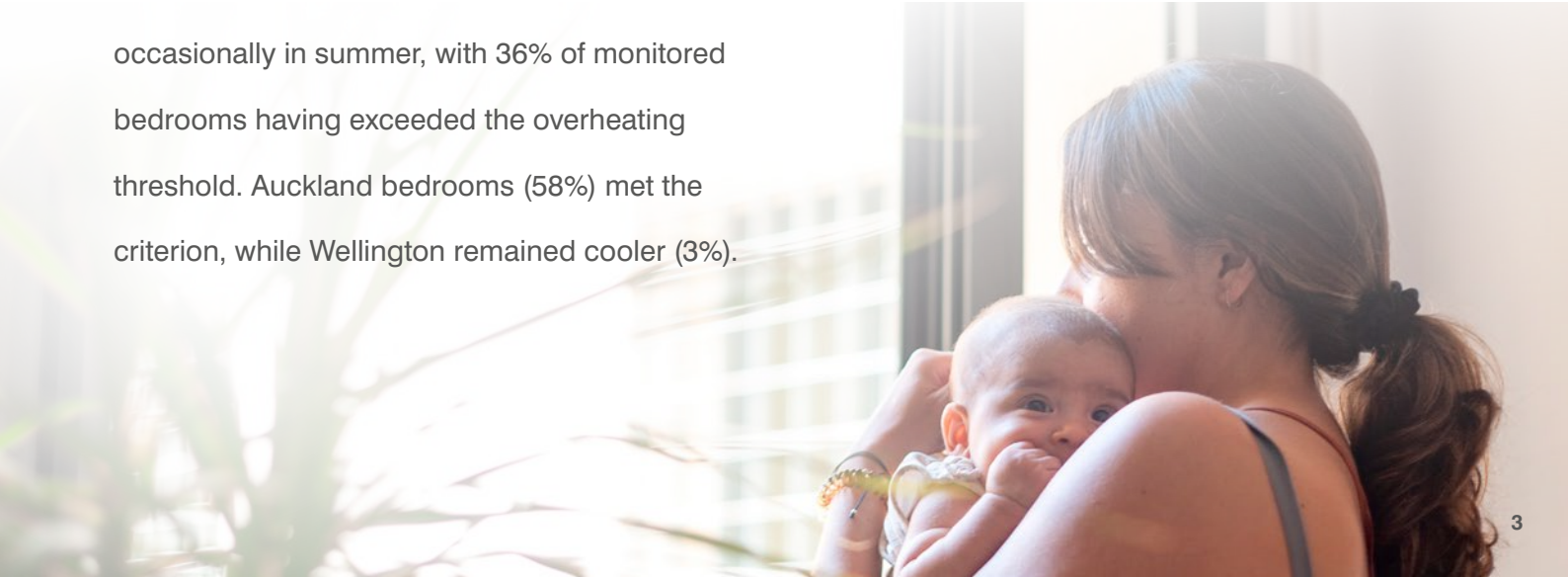
BRANZ Bulletin 656 (Dec 2022) and Study Report SR089 (2000) show New Zealand's new-build and renovated homes can easily hit 25–30°C+ indoors on hot days.

Preliminary BRANZ HEEP2 findings (2025) revealed about 70% of surveyed Kiwi households experience warmer-than-desired indoor conditions at least occasionally in summer, with 36% of monitored bedrooms having exceeded the overheating threshold. Auckland bedrooms (58%) met the criterion, while Wellington remained cooler (3%).

Indoor bedrooms often stay above 24°C at 2am in heat events, impacting sleep quality and health. Large unshaded windows, dark roofs, and inadequate ventilation can trap heat, exacerbated by airtight designs.

**Consequences of Ignoring Overheating**

- Health risks for children, the elderly, and vulnerable groups.
- High electricity bills in summer occur if occupants rely on air conditioning to compensate.
- Negative occupant satisfaction, numerous media reports (2024–25) highlight Auckland terrace owners calling their units "saunas."



## 1.2 HI CODE OVERVIEW

The Revised H1 Clauses (2022 onward) Introduce:

**Increased Minimum R-values**

This is especially true for roofs/ceilings, windows, and floors, which vary by six new climate zones across New Zealand.

**Focus on Energy Efficiency**

H1/VM1 is an energy-efficiency compliance pathway rather than an occupant-comfort standard. However, the Sixth Edition explicitly addresses summer performance through annual cooling-load modelling, a 25°C maximum modelling temperature for housing, and passive cooling requirements before artificial cooling where conditions allow.

**Synergy with Ventilation (G4)**

Tighter thermal envelopes make compliance with G4 ventilation requirements (and beyond) more critical, to ensure indoor air quality and mitigate heat build-up.

**The Takeaway**

Meeting or exceeding H1 is crucial for energy efficiency, but must be paired with overheating mitigation measures such as; shading, orientation, and ventilation to achieve genuinely year-round comfort.



## I.3 INCORPORATING BRANZ 2024–2025 FINDINGS

Key insights from the latest BRANZ research underline why early planning for overheating prevention is vital:

**1. Overheating Is a Growing Concern**

Preliminary BRANZ comparisons reported indoor summer temperatures 6-10% higher over 20 years, compared with outdoor rises of 4-8%.

**2. Insulation Alone Isn't the Cause**

BRANZ found no clear correlation between higher insulation levels and occupant reports of overheating. Design choices drive heat gains more than R-values.

**3. Design Must Address Room-by-Room Risks**

Overheating varies by orientation, glazing and shading. Early-stage modelling identifies problem zones (e.g. west-facing bedrooms) for targeted solutions.

**4. Ventilation and Shading Are Front-Line Defences**

Effective ventilation systems and external shading can significantly reduce overheating risk.

Ventilation has the additional benefit of improving indoor air quality. Integrating these findings ensures projects meet both H1 energy goals and occupant comfort expectations.

# BEST PRACTICES FOR ARCHITECTS

Architects shape the envelope and play a pivotal role in preventing overheating. Combine H1 compliance with proactive design as follows:

## 2.1 EARLY CONCEPTUAL COORDINATION

**Engage HVAC Specialists from Day 1:**
Ensure space reservations for heat pumps, VRF plant, and HRV units.

**Model Summer Performance Early:**
Use EnergyPlus or similar to test glazing ratios, overhang depths, and ventilation strategies.

**Apply BRANZ Zone-Specific Data:**
Tailor shading and ventilation based on local findings (e.g., Auckland bedrooms at high risk).

## 2.2 PASSIVE SHADING AND SOLAR CONTROL

**Optimised Window-Wall Ratios:**
North-facing glazing for winter gain; limit east/west exposure or equip with low-SHGC glazing.

**Deep Eaves and Adjustable Shading:**
Calculate eave overhangs to block high summer sun; install external blinds/louvres on hot elevations.

## 2.3 MECHANICAL VENTILATION

**Specify MVHR/ERV with Summer Bypass:**
Choose systems with verified manufacturer heat-recovery performance at the intended airflow and operating conditions.

**Duct Routing in Design:**
Conceal ducts in bulkheads or ceiling voids - coordinate with structural beams early.

## 2.4 THERMAL MASS AND NIGHT FLUSH

**Expose Mass for Heat Absorption:**
Polished concrete or masonry floors can dampen daytime peaks.

**Automated Night-Purge Vents:**
Integrate clerestory or skylight vents with controls to flush heat overnight.



2

## 2.5 DOCUMENTATION AND HANDOVER

**Detailed Drawing Notes:**

Call out shading device dimensions, insulation continuity, and ventilation schedules.

**Client Briefing:**

Educate on system operation and the health/comfort benefits of integrated HVAC.



# BEST PRACTICE FOR BUILDERS

Builders are the stewards of design intent. Precision in installation makes all the difference.

## 3.1 AIRTIGHTNESS AND INSULATION QUALITY

**Seal All Junctions and Penetrations:**

Use tapes, gaskets, and membranes recommended by BRANZ guidelines.

**Avoid Compression of Insulation:**

Gaps at slab edges, roof-wall junctions, and around frames undermine both winter and summer performance.

## 3.2 HVAC INSTALLATION

**Follow the Design Exactly:**

Install MVHR ductwork, heat pump linesets, and outdoor units per consultant layouts.

**Commission and Balance:**

Test airflow rates, verify summer bypass operation, and provide filter-change guidance.

## 3.3 SHADING AND GLAZING

**Build Shading to Spec:**

Install shading devices to the dimensions and tolerances specified in the approved design.

**Frame Sealing and Flashing:**

Ensure window installs meet H1 air-tightness and thermal-bridge requirements.

## 3.4 QUALITY COMMUNICATION

**Site Coordination Meetings:**

Resolve any shading, insulation, or ducting queries before enclosures close in.

**Handover Walk-Through:**

Demonstrate MVHR boost/bypass, heat pump controls, and shading operations to the owner.

# 3



# BEST PRACTICES FOR BUILDING COMPANIES

Building companies offering off-the-plan homes frequently aim to minimise upfront costs for their customers, but the outcome is often installing only a single heat pump in the living area. However, under tightened H1 standards, which demand higher insulation and airtightness, such minimal HVAC solutions risk creating uncomfortably hot interiors, poor air quality, and moisture issues under serviced areas in the home.

Below are practical strategies to future-proof your builds by prioritising heat recovery ventilation (HRV) and whole-home heating/cooling. This will help ensure each residence meets or exceeds new H1 expectations while preventing summertime discomfort.

## 4.1 WHY HEAT RECOVERY VENTILATION (HRV) OVER POSITIVE PRESSURE?

**Airtightness Demands Balanced Ventilation**

Because positive-pressure systems rely on air leaking through the building envelope, they become less suitable as airtightness increases. A correctly designed, commissioned and maintained balanced ventilation system is generally better suited to airtight homes.

**Seasonal Adaptability**

In cooler seasons, HRV systems reclaim warmth from outgoing air, reducing heating requirements. Many units include a summer bypass mode, which brings cooler outdoor air in at night and helps mitigate overheating, particularly valuable for airtight homes that trap heat.

**Improved Indoor Air Quality**

Continuous, balanced ventilation removes stale air, moisture, and pollutants, replacing them with filtered fresh air.

This is especially important in airtight builds, where high humidity can quickly lead to condensation or mould problems if moisture cannot escape.



# 4

## 4.2 WHOLE-HOME HEATING AND COOLING

**Beyond a Single Heat Pump**

Limiting HVAC to one heat pump in the living space may leave bedrooms and other areas sweltering in summer and insufficiently warmed in winter.

A multi-room heat pump system gives independent temperature control across multiple zones, and can provide more consistent temperatures across conditioned rooms when correctly sized, designed and commissioned.

**Synergy with the Building Envelope**

Even the best mechanical systems benefit from fundamental design features like shading, orientation, and cross-ventilation, which reduce overall heating/cooling loads.

Incorporating exposed thermal mass (e.g., concrete floors) further stabilises indoor temperatures by absorbing daytime heat and releasing it when cooler.

## 4.3 COMBINING WHOLE-HOME COMFORT WITH HEAT RECOVERY VENTILATION

**Ducted Heat Pump + HRV**

Occupants benefit from filtered, balanced ventilation plus more consistent heating or cooling across conditioned rooms where a system is correctly sized, designed, balanced and commissioned, reducing “hot” or “cold” spots.

**Summer Bypass or Smart Controls**

Where available, an HRV summer bypass function cools the house by drawing in evening air without recovering heat.

Integrated “smart” controllers coordinate ventilation and HVAC operation, automatically optimising energy use and indoor comfort.

**Straightforward Maintenance and Operation**

Homeowners often worry about complexity. Emphasise easy filter changes and intuitive controls.

Clear handover documentation and demonstrations reduce the risk of misuse or neglect, ensuring fewer post-occupancy complaints.

## 4.4 COMMUNICATING THE BENEFITS TO HOMEOWNERS

**Year-Round Comfort**

A balanced HRV system keeps air fresh and tempered in winter, while a bypass (or night purge mode) helps prevent overheating in summer.

Ducted heat pumps can help ensure uniform temperatures across all living areas and bedrooms, thus eliminating zones of discomfort.

**Health and Air Quality**

Filtered outdoor-air ventilation can reduce some airborne contaminants and help manage indoor moisture, depending on filter performance, ventilation rate and outdoor conditions.

Occupants avoid the stale air or condensation issues that often plague airtight builds lacking proper ventilation.

**Reduced Future Complaints**

By proactively designing for balanced ventilation and whole-home climate control, homeowners are far less likely to seek costly retrofits or file complaints about hot bedrooms or stuffy air.

Satisfied customers become brand ambassadors, underscoring comfort as a core selling feature of your off-the-plan offerings.

## 4.5 ALIGNING WITH HI AND LOOKING TO EXCEED EXPECTATIONS

**Stay Ahead of Regulatory Changes**

Including HRV can help future-proof a design by supporting controlled ventilation, energy efficiency and indoor air quality objectives that may become more prominent as Building Code requirements and guidance evolve.

**Team Coordination**

Collaboration with architects is key: ensure shading, window placement, and orientation support your chosen ventilation and HVAC strategies. A well-planned envelope can dramatically lower mechanical loads.

**Protect Your Reputation**

A home that remains comfortable year-round, thanks to HRV and whole-home heating/cooling, yields fewer callbacks and more positive word-of-mouth.

Early integration of ducted heat pumps with HRV cements your standing as a quality-focused, future-ready builder.

## 4.6 KEY TAKEAWAY

By installing balanced heat recovery ventilation and offering whole-home heating/cooling via a ducted heat pump, building companies can support delivery of energy efficient homes and improve the likelihood of year-round comfort, subject to the complete building design, installation and commissioning. This approach not only reduces the risk of overheating complaints and poor air quality but also showcases a commitment to occupant health, energy efficiency, and top-tier craftsmanship. Ultimately fostering repeat business, glowing referrals, and a strong market reputation.



# ADVICE FOR HOMEOWNERS

Ultimately, homeowners live with the design and construction outcomes. H1 improves the thermal efficiency of the building envelope but active occupant participation is also essential to avoid overheating and high summer energy bills.

## 5.1 KEY QUESTIONS TO ASK EARLY

**How Does the Design Meet H1?**

Inquire about the insulation levels in the roof, walls, windows, and floor.

Consider whether higher-than-minimum R-values are appropriate for the project, taking account of climate, glazing, solar gain and whole-building performance.

**What's the Overheating Strategy?**

Ask the architect or builder how the home prevents excessive summer temperatures (shading, orientation, mechanical ventilation, etc).

**Are There Secure, User-Friendly Ventilation Options?**

If street noise or security is a concern, check for high louvre windows or mechanical systems that allow fresh air without wide-open windows.

**Do I Need Air Conditioning?**

A well-designed, well-shaded, and well-ventilated home can often avoid (or minimise) air conditioning. If included, ensure it's sized appropriately for an efficient envelope.



# 5

## 5.2 OPERATIONS AND MAINTENANCE TIPS

**Use Windows and Vents Wisely**

On hot days, close windows and curtains before the sun hits. In the evening, open higher vents or skylights for night purge if the outside air is cooler.

BRANZ Bulletin 656 emphasises occupant behaviour as crucial - homes designed to stay cool still need active involvement (opening/closing windows, blinds).

**Manage Shading**

Deploy external blinds or louvres during peak afternoon sun.

Where possible, keep western windows shaded from around 2pm to prevent intense late-afternoon heat gains.

**Ventilation System Care**

Replace or clean filters per the manufacturer's guidelines.

If your system has a summer bypass or "boost mode," learn to switch it on when indoor temps rise above comfortable levels and the outside air is cooler.

## 5.3 SIGNS OF POTENTIAL OVERHEATING

**Rooms Consistently Above 25-27°C in Summer**

Check if shading or ventilation features are being used properly.

**Persistent Humidity >60%**

High moisture can compound discomfort. Confirm that the mechanical or natural ventilation is adequate.



# H1 COMPLIANCE AND CURRENT GUIDANCE

## 6.1 H1/VM1 OVERVIEW

The purpose of H1/VM1 is to provide a recognised verification method for demonstrating compliance with Building Code clause H1 Energy Efficiency, principally by assessing the thermal performance of the building envelope.

## 6.2 POTENTIAL OVERHEATING CODE INCLUSIONS

H1/VM1 Sixth Edition effective from 27 November 2025 requires housing and applicable buildings up to 300m$^2$ to demonstrate thermal-envelope compliance by modelling the proposed building against a reference building, with the combined annual heating and cooling load of the proposed building not exceeding the reference building.

For housing, H1VM1 modelling must use a minimum indoor temperature of 18°C and a maximum of 25°C or lower. Passive cooling through openable windows, doors, skylights or vents must be modelled before artificial cooling when the specified conditions are met.

# 6



# CONCLUSION



Combining H1 energy-efficiency compliance with appropriate overheating mitigation is increasingly recognised as good residential design practice.

**1. Architects should consider advanced insulation (per H1) with shading, orientation, ventilation, and thermal mass to keep homes comfortable year-round.**

**2. Builders ensure precise construction to meet higher R-values, maintain airtightness, and install shading/ventilation systems exactly as designed.**

**3. Homeowners are more likely to enjoy a warm, dry home in winter that also remains cool in summer, provided they deploy shading, operate ventilation features (mechanical or natural), and maintain the building systems properly.**

By addressing both winter and summer thermal requirements from the start, we future-proof New Zealand's housing stock against rising climate pressures, ensure occupant health and well-being, and maintain alignment with the country's energy efficiency and sustainability goals.

# 7

## 7.1 FUTURE-PROOFING WITH MITSUBISHI ELECTRIC SOLUTIONS

Leverage proven technologies to embed comfort into every project:

**Heat Pumps / Air Conditioning**

From single-room high wall units, floor consoles, and ceiling cassettes to discreet whole-home ducted systems and flexible OmniCore Multi Room setups, the Mitsubishi Electric range offers solutions for a wide range of residential applications, subject to appropriate system selection and design.

**Lossnay HRV/ERV**

Recover up to 92% of heat energy from outgoing extract air to pre-warm or pre-cool incoming fresh filtered air. Free Cooling Modes*[1] allow incoming air to bypass the core for cooling when outdoor air is cooler, which is helpful for spaces that may have overheated during the day.

The unit will continue to use a small amount of power to bring colder, fresh air from outside.

**Smart Wi-Fi Control**

The Mitsubishi Electric Wi-Fi Heat Pump and Lossnay Ventilation Control App visualises real-time temperature*[2], energy use*[3], and system status, bridging the information gap buyers face about comfort.

**Action:**

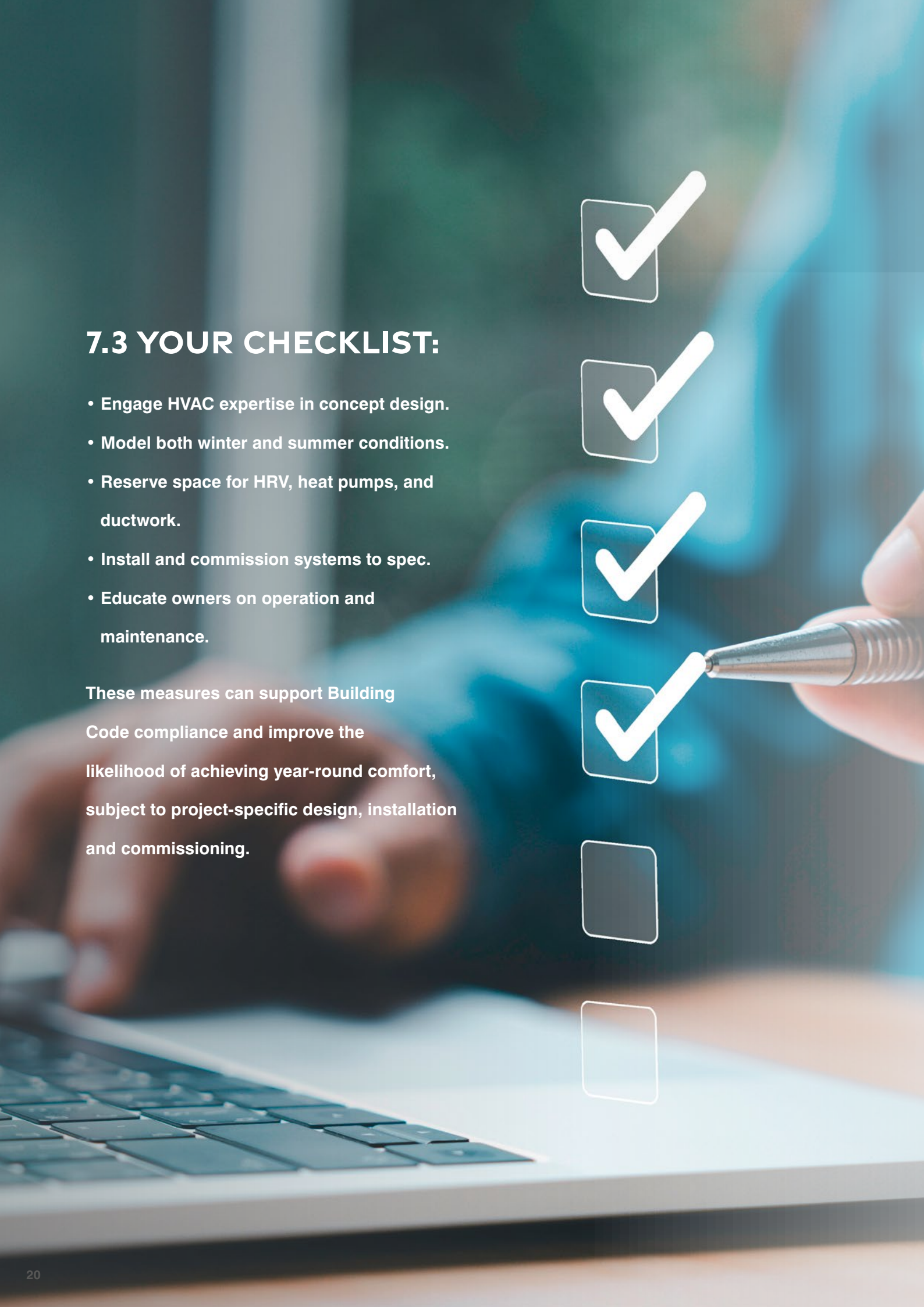
Specify Mitsubishi Electric systems early, partner with certified installers, and highlight these features in marketing to demonstrate comfort credentials.

## 7.2 NEXT STEPS

New Zealand's climate imperatives and the latest BRANZ research make it clear: overheating prevention is as critical as insulation.

By integrating shading, ventilation, and HVAC systems from concept to completion, stakeholders can deliver homes and buildings that meet H1, avoid summer discomfort, and provide healthy indoor environments.

*1 Compared to using a dedicated cooling device. The unit will continue to use a small amount of power to bring colder, fresh air from outside.
*2 Excludes VL-100EU/ZSKRT and VL-220 models.
*3 Energy Monitoring capable heat pumps only.



## 7.3 YOUR CHECKLIST:

- Engage HVAC expertise in concept design.
- Model both winter and summer conditions.
- Reserve space for HRV, heat pumps, and ductwork.
- Install and commission systems to spec.
- Educate owners on operation and maintenance.

These measures can support Building Code compliance and improve the likelihood of achieving year-round comfort, subject to project-specific design, installation and commissioning.

# REFERENCES AND FURTHER READING

8


- H1 Energy Efficiency Verification Method H1/VM1, Sixth Edition (MBIE, effective 27 November 2025) – current verification-method requirements and guidance for housing and relevant small buildings.
- MBIE Operational Efficiency Assessment: Technical Methodology (July 2023) – proposed methodology for predictive operational efficiency, thermal comfort and indoor air quality; it does not itself prescribe Building Code requirements.
- BRANZ Bulletin 656: Minimising Overheating in Housing (Dec 2022).
- BRANZ Study Report SR89: Summertime Overheating in New Zealand Houses – Influences, Risks, and Mitigation Strategies (2000).
- BRANZ Study Report SR502: Household Energy End-Use Project 2 (HEEP2) Preliminary Findings on Summer Indoor Temperatures (March 2025).
- BRANZ Annual Review 2024: Safe & Resilient Built Environment (2024), section on overheating in buildings.
- Life in Medium Density Housing in Tāmaki Makaurau Auckland – Chapter 10: Discussion and Recommendations (2024).




MITSUBISHI ELECTRIC

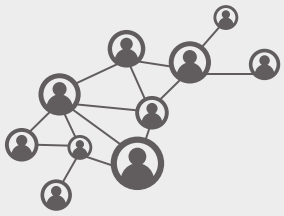
100% NZ OWNED

## Black Diamond Technologies and Mitsubishi Electric – an Exclusive Partnership Since 1981

The Mitsubishi Electric Product Range has been exclusively distributed by 100% locally Owned and Operated Black Diamond Technologies Limited for over 45 years in New Zealand.

The combination of an internationally trusted brand with the comfort of a locally owned and operated company means that you will always get the best products, the best local service and the best local support.

Based in Wellington with a further 4 support offices throughout New Zealand, Black Diamond Technologies Limited is here to help.



## Our Vision – Creating New Zealand's Sustainable Future

Black Diamond Technologies Limited in partnership with Mitsubishi Electric, strives to develop and introduce new technologies for New Zealanders that will make our lives more comfortable while also creating a greener tomorrow.




DISCLAIMER

This document is a guide only. It should not be used as a substitute for legislation or legal advice. Black Diamond Technologies are not responsible for the results of any actions taken on the basis of information in this document, or for any errors or omissions.

For more information please visit our website or call our Customer Service Team.

**www.mitsubishi-electric.co.nz | 0800 784 382**

PUBLISHED OCT 2026

PLEASE LOOK AFTER THE ENVIRONMENT AND RECYCLE