FOUNDATIONS OF GOOD DESIGN

A GUIDE TO EARLY-STAGE DECISION-MAKING FOR WALLS AND CEILINGS

HIMMEL™ SAINT-GOBAIN | CSR

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INTRODUCTION

The performance of internal wall and ceiling systems is determined as much by early specification choices as by final product selection and installation. Decisions made during concept and design shape how well a project meets National Construction Code (NCC) requirements, such as fire resistance and acoustic separation, while also influencing buildability, sustainability outcomes and service coordination. A holistic consideration of these factors at the early design stage ensures that walls and ceilings support the design intent while avoiding costly redesigns or construction inefficiencies.

In parallel, growing emphasis on embodied carbon, recyclability and VOC content means material selection has measurable impacts on certification pathways such as Green Star. Once the project advances to the construction stage, opportunities to address these interconnected requirements are significantly reduced.

This paper is structured around a three-stage decision process that architects can apply at the outset of design:

Stage 1. Compliance and performance definition
Establishing requirements for structural integrity, acoustics, fire safety, sustainability and aesthetics before product selection begins.

Stage 2. Design integration and buildability
Determining whether the selected wall and ceiling systems can deliver intended outcomes and be installed efficiently.

Stage 3. Evaluation and optimisation
Confirming that the design delivers the intended outcomes by verifying solutions against performance criteria and sustainability requirements.


Boardroom

1. COMPLIANCE AND PERFORMANCE DEFINITION

Defining performance for wall and ceiling systems requires early consideration of compliance frameworks spanning fire safety, acoustic control, structural integrity, accessibility and sustainability. At this stage, the objective is to establish the technical requirements these systems must achieve before products are selected.

Structural and seismic performance is governed by Part B1 of the NCC, which requires buildings and components to withstand expected loads in line with the AS/NZS 1170 series. AS 1170.4 sets criteria for seismic actions, with AS/NZS 2785:2020 providing complementary requirements for suspended ceiling restraint and installation. These considerations are particularly critical in health and education facilities, where failures can endanger occupants and disrupt essential services. Framing requirements, such as wall heights, anticipated loads and movement tolerances, must be assessed early.

Fire performance falls under Part C of the NCC, which requires compliance with fire hazard properties and Fire Resistance Levels (FRLs). Testing for FRL is guided by the AS/NZS 1530.4. FRL requirements should be established in accordance with building class, height and use, and continuity of fire protection maintained at penetrations and junctions through close coordination with fire engineers and services consultants. Internal wall and ceiling linings must be assigned a Group Number in accordance with AS 5637.1, which classifies materials based on their fire hazard properties and suitability for use under the NCC.

Acoustic performance is addressed in Part F7 of the NCC, applying to Class 2 and 3 residential buildings and Class 9c aged-care facilities. AS/NZS ISO 717 Parts 1 and 2 provide methods for airborne and impact sound ratings, while voluntary frameworks such as Green Star, WELL, and NABERS set higher benchmarks for internal acoustic quality. Rw, CAC, and NRC targets should be defined early, with strategies distinguishing between insulation (sound transmission) and absorption (reverberation control). Particular attention should be given to plenums, junctions and flanking paths, with treatments such as resilient mounts or seals applied as needed.

Accessibility is shaped by AS 1428.1, which influences wall configurations through requirements for dimensions, clearances and fixture placement. Beyond physical circulation and access, wall and ceiling design can also support diverse users by using consistent detailing, colour contrast and variations in height or finish to aid orientation and reinforce wayfinding.

Sustainability frameworks extend performance expectations to include embodied carbon and indoor air quality. Environmental Product Declarations (EPDs) provide transparent lifecycle data, while product certifications such as GECA and GREENGUARD verify compliance against recognised health, safety, and sustainability standards. Recycled content and material recovery pathways further support Green Star and WELL outcomes.

Finally, **thermal performance** and **durability** are integral to long-term value. Wall and ceiling assemblies should complement HVAC efficiency and passive design strategies, with finishes such as low-VOC or antimicrobial linings specified where required. In high-traffic or hygiene-sensitive areas, including corridors, healthcare and food-preparation spaces, robust, washable and/or impact-resistant finishes should be prioritised.

Table 1. Compliance and performance: Early-stage design framework

Category	Requirements	Early design actions
Structural and seismic	NCC Part B1, AS/NZS 1170 series, AS 1170.4, AS/NZS 2785:2020	Design for expected loads, seismic actions and ceiling restraint requirements; coordinate framing, penetrations and suspended services early.
Fire performance	NCC Part C, AS/NZS 1530 (Parts 1–4), AS 5637.1	Define FRLs by building class, height and use; specify Group Numbers for linings; maintain fire continuity at penetrations and junctions.
Acoustic performance	NCC Part F7, AS/NZS ISO 717 (Parts 1–2), AS/NZS 2107, Green Star, WELL, NABERS	Set Rw, CAC, and NRC targets; distinguish between insulation and absorption; detail junctions to avoid flanking transmission.
Accessibility	AS 1428.1	Design walls with compliant dimensions, clearances and fixture placement (e.g. grab rails, partition spacing, door hardware).
Sustainability	Green Star, WELL, NABERS, EPDs, GECA, GREENGUARD	Assess embodied carbon via EPDs; verify low VOCs; consider recycled content where available.
Thermal and IEQ	NCC Section J, project-specific requirements	Integrate wall/ceiling assemblies with HVAC and passive design; coordinate services with ceiling grids; evaluate thermal mass vs lightweight linings.
Durability and maintenance	Project-specific requirements	Specify robust linings for high-traffic zones; select washable/ antimicrobial finishes for sensitive environments; avoid fissured or dust-trapping products.

2. DESIGN INTEGRATION AND BUILDABILITY

At this stage, the focus is on coordinating walls and ceilings with other design elements to ensure that systems can deliver on both aesthetic and functional outcomes. Wall and ceiling layouts influence how occupants perceive and navigate space, with variations in height, alignment or surface finish used to define zones and circulation pathways. Consistency in detailing and materials strengthens visual identity across interior spaces.

The next consideration is whether the solution can be delivered efficiently; this is the essence of buildability, which refers to how easily, safely and cost-effectively a design can be constructed without compromising performance or compliance. Where practical, prefabricated solutions offers additional benefits by shifting work off-site, reducing installation time, improving quality control and enhancing safety, particularly on complex projects or in environments with limited site access.

Early coordination with mechanical, electrical, plumbing and structural disciplines is essential to avoid later clashes, particularly around junctions, penetrations and service routes. At this stage, recessed lighting, diffusers and access panels can be integrated into ceiling grid and wall designs.

Material Safety Data Sheets (MSDS) inform buildability considerations by outlining handling, storage and installation requirements that affect ease, safety and sequencing on site. They also highlight health, environmental and maintenance considerations, such as VOC emissions or disposal methods, that influence long-term compliance and lifecycle performance of wall and ceiling systems.

Table 2. Buildability checklist

Ease of construction	• Can the system be installed with standard methods? • Are services integrated and coordinated with wall/ceiling layouts? • Is the installation sequence logical and compatible with other trades? • Can elements be standardised or prefabricated to simplify installation and reduce site work?
Safety in delivery and operation	• Do systems maintain structural, seismic, fire and acoustic performance during and after installation? • Are materials safe to handle, lift and install within site constraints? • Is future access for inspection and maintenance designed to be safe and practical?
Cost-effectiveness and lifecycle value	• Are materials and layouts optimised to reduce waste and labour time? • Does the system allow for straightforward maintenance, replacement and adaptability over time? • Are components locally supported and is the supply chain secure?

Early coordination with mechanical, electrical, plumbing and structural disciplines is essential to avoid later clashes, particularly around junctions, penetrations and service routes.

3. EVALUATION AND OPTIMISATION

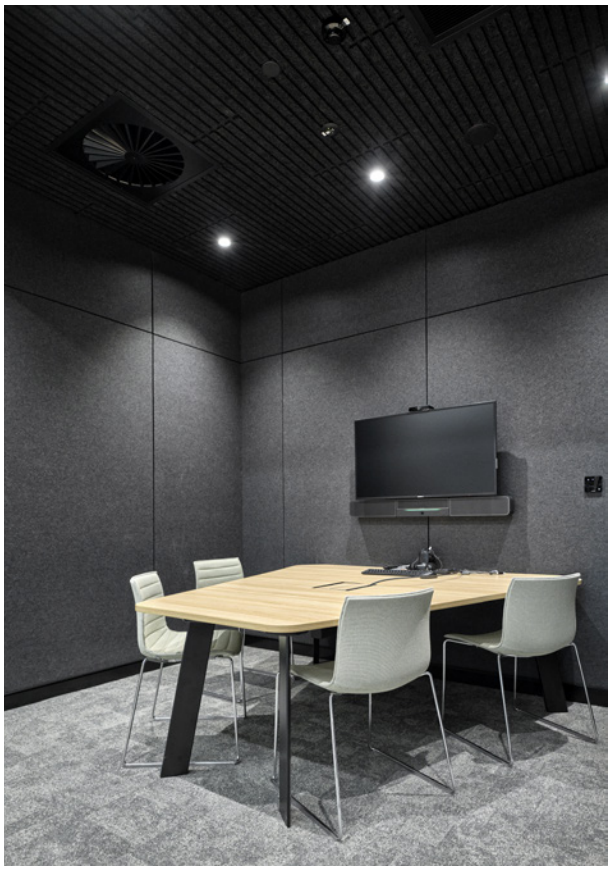
This stage is about confirming that the design translates into deliverable outcomes by stress-testing solutions against acoustic, fire, energy and structural requirements. Best practice involves the use of modelling tools, such as acoustic modelling, fire resistance testing and energy modelling, as well as collaboration with manufacturers and suppliers to validate that assemblies will perform as specified.

Evaluation should also identify and address potential performance limitations. Early design decisions may reveal shortcomings such as, for example, a ceiling grid unable to support concentrated service loads, a wall lining with insufficient acoustic insulation or a fire-rated junction that becomes vulnerable once penetrations are introduced. The optimisation process provides the opportunity to resolve these issues through detail refinement, product substitution or coordination with consultants before they become costly defects on site.

In addition to compliance, we should also consider long-term operation and adaptability. Systems with predictable maintenance cycles, consistent service access and reliable local product support reduce operational risk for owners and facility managers. In sectors such as healthcare and commercial offices, reconfigurable wall systems and flexible ceiling designs are especially valuable, as they accommodate frequent reconfigurations without undermining performance or compliance.

Table 3. Evaluation and optimisation checklist

Performance verification	• Have systems been tested against acoustic, fire, energy and structural requirements? • Have modelling tools (acoustic, fire, energy) or supplier/manufacturer input been used to validate performance?
Identify and address limitations	• Can the system support the loads and stresses it will be subjected to in service? • Does the design deliver adequate acoustic, thermal, and fire performance for its intended use? • Has coordination confirmed that services, fixings and finishes will not compromise performance?
Optimisation opportunities	• Can details be refined to improve constructability or reduce risk of failure? • Is product substitution or modularisation an option to improve performance or sustainability? • Do materials and assemblies support embodied carbon reduction and end-of-life recovery where possible?
Lifecycle considerations	• Are maintenance cycles predictable with reliable local support for replacement parts? • Is service access designed to be safe and consistent? • Can wall and ceiling systems be reconfigured or adapted for future changes in layout?



Why start with Himmel

Himmel is CSR's interior systems brand, supplying a wide range of wall, ceiling and acoustic solutions tailored to commercial and architectural applications. Its portfolio includes ceiling tiles, grid systems, metal ceilings, aluminium partitions and acoustic panels designed to meet compliance, performance and aesthetic requirements. As part of the CSR family, which includes **Gyprock, Cemintel, Martini** and other trusted Australian building brands, Himmel integrates seamlessly with complementary systems and partners with leading global brands, such as **OWA, Ecophon** and **Troldtekt**, to provide architects and specifiers with a complete, high-performance interior systems package from a single, reliable source.

Choosing Himmel at the earliest design stage provides access to comprehensive interior solutions that align with both architectural intent and technical performance. From day one, wall and ceiling systems can be integrated seamlessly with lighting, services and finishes, reducing the risk of downstream clashes. With expertise spanning compliance pathways, including the NCC, AS/NZS standards and sustainability frameworks such as Green Star and WELL, Himmel offers the assurance that specifications will meet regulatory and certification requirements without compromising design quality.

Himmel provides access to experienced technical specialists who help navigate project-specific challenges, ensuring coordination, compliance and constructability issues are addressed early. This collaborative approach streamlines delivery, minimises risk and supports more reliable design outcomes.

Himmel also provides the digital tools and performance data architects need to make informed decisions quickly. BIM and CAD content, backed by verified acoustic, fire and environmental data, can be embedded directly into project workflows to streamline coordination and documentation. This reduces the likelihood of rework, shortens approval processes and ensures that design teams have immediate access to the information they need to progress confidently from concept through to detailing.

Himmel delivers solutions that scale. Its systems are proven across sectors including commercial offices, education, healthcare, retail and public environments and are designed to support prefabrication, modularity and accelerated project delivery. Importantly, Himmel systems also emphasise accessibility and ease of maintenance, with consistent service access points and durable finishes that reduce operational risk over the building lifecycle. More than a supplier, Himmel acts as a design collaborator, supporting smarter planning, better integration, and ultimately more resilient and adaptable interior spaces.

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