



Suspended Ceilings & INTEGRATED SERVICES

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TABLE OF CONTENTS

Background 3

Considerations 3

Summary 5

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Background

In commercial construction, the traditional suspended ceiling designs utilized a modular configuration containing grid and tile components. The integration of mechanical or electrical services was primarily achieved through full tile replacement or central apertures cut within a tile module.

The variety and complexity of ceiling solutions has increased in the past few years. Advancements in mechanical and electrical services have rapidly evolved which provides designers with increased flexibility options. As a result of this evolution, it has become increasingly common for the ceiling design to require more detailed service integration. This can be in the form of partial interfacing details, such as trims and sprinkler systems, or to fully integrated ceiling panels that contain both lighting and mechanical services.

As the trend continues, the requirement for the proper design and coordination of ceiling systems becomes stronger. Without these requirements being recognized, understood, and properly managed, the installing contractor may be exposed to unforeseen and unmanageable contractual and financial risk. This document identifies critical considerations and is intended to promote discussion between the architect, professional team, manufacturer, general contractor, and installer. This discussion will help mitigate the risks on all parties and ensure a successful project.

Considerations

Safety

Relative to current trades' competencies, new tasks may be introduced requiring training and education.

Preconstruction

Will the Mechanical, Electrical and Plumbing (MEP) services be supported by the ceiling system? Are any additional accessories required? Does the fixture weight comply or exceed allowable weight limits by supporting ceiling grid components or does the fixture require additional hanger wires or support?

Jurisdictions

Can you install those new elements in your region? An exact working demarcation point between trades needs to be set prior to installation. This applies to more than simple union jurisdictions but requires a concise understanding of each party and their respective responsibility. Once this is established, the agreed roles will reduce confusion, delays, and other jobsite conflicts.

Lead Times

Because integration points may require custom components and possibly onsite fabrication, additional overall time may be needed. Lead times might be increased due to custom material procurement, design coordination or other design and installation considerations. Coordination with other trades should be considered as well with possible increased lead times.

Added Costs

Check with the manufacturer or supplier to verify all integration components have been included in the cost. This would include fabrication, special components, factory cut penetrations and any other item that is necessary for the integral ceiling.

Installation Process and Schedule

Typically, a suspended ceiling would be installed in three distinct phases—grids and trims; cutting and placing required service tile and finally installing the remaining panels. Does the incorporation of integrated services alter this flow? Will the contractor need to allow additional visits, mobilization, or labor? Similarly has any interfacing trade been discussed and agreed with your client?

Interference with Supporting Gridwork or Independent Support

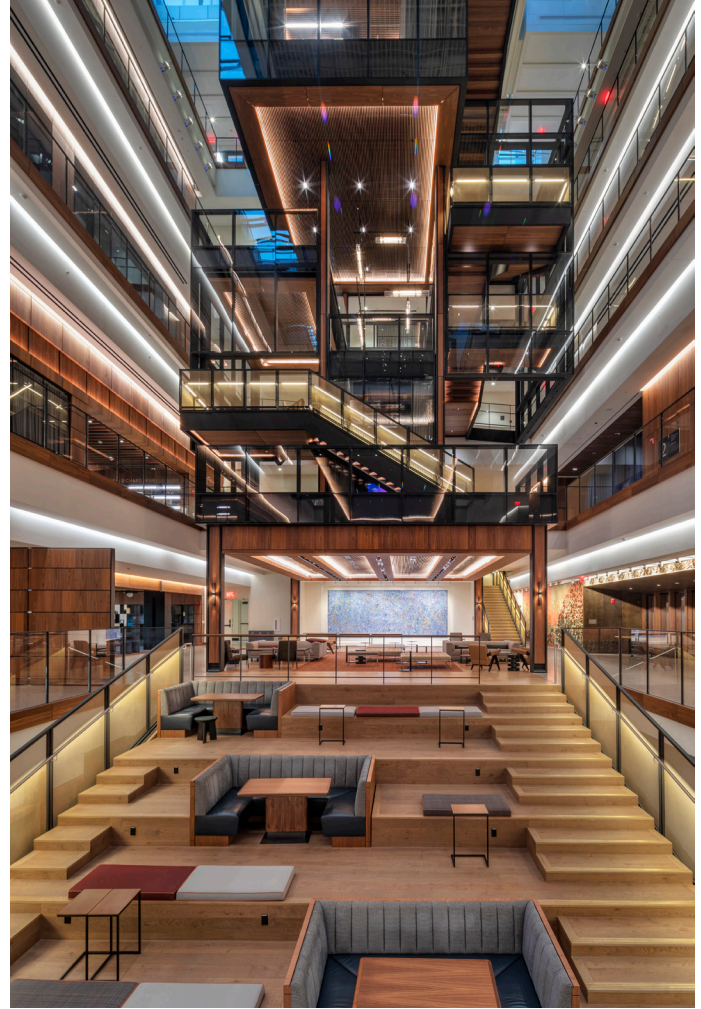
Is the selected ceiling system capable of supporting the weight of the services? Is this confirmed with the manufacturer? Is additional support required and does this impact any code? Do the supplied shop drawings address the loading issues?

Commissioning

What is the requirement upon the ceiling installer? Will the contractor need to provide installers 'in attendance' while the integrated services are commissioned? If so, for how much time and what is the contractor's role and responsibility?

Building Inspection and Code Compliance

What were trade specific requirements for a typical non-integrated ceiling system may be an issue for an inspector that is not familiar with an integral system. It would be a good idea to have trades communicate with each other in areas that will have an overlap of responsibilities and inspections. Having inspectors attend preconstruction meetings could prove to be useful.



Ongoing Maintenance / Operating and Maintenance Manuals

Is this something that is to be provided by one manufacturer or is the contractor liable to compile and issue this information? Some attention needs to be given to assisting with future replacement and maintenance needs.

Warranties

Who receives warranty protection and exactly what things are covered? Also, the warranty must be clear as to what things would invalidate the warranty.

Seismic Considerations

What code requirements would apply if the integral ceiling was installed in a seismic sensitive zone? What additional supporting attachments are required for each fixture? Do the integration points need seismic considerations?

Fire Testing and Safety Considerations

A comprehensive approach to fire testing and safety considerations should be an integral part of the design and installation process. These may include but are not limited to:

Materials and Fire Ratings

When designing and selecting materials for the ceiling system, it is essential to choose materials with appropriate fire resistance ratings that align with local building codes and regulations. Materials should be tested and certified by UL for specific locations and designs.

Integrated Components

In instances where ceiling panels house integrated components such as lighting fixtures and MEP elements, fire-resistant properties must be maintained. The inclusion of these components should not compromise the overall fire performance of the ceiling system.

Installation

The proper installation of the ceiling system is crucial for maintaining the fire resistance as indicated in the manufacturer's approved UL assembly. Any penetrations made for the installation of mechanical or electrical services should be carefully managed to avoid compromising the fire integrity of the system.



It is common that specific specification clauses may contradict what is shown on plans, on details or indeed on any other contractual documents. It should be clearly recorded as to which construction document takes precedence in the contract should conflict occur.

Building Information Modeling (BIM)

Not every project requires BIM; however, if a project is using BIM an integrated ceiling may add complexity to the standard modeling. This could be problematic if the lighting or MEP items are not specified in the acoustical ceiling specification, yet they could have integration responsibilities by the acoustical contractor. This concern should be defined early and flagged as a potential issue for BIM design requirements and potential cost. The acoustical ceiling contractor may have to participate in MEP BIM coordination and incur significant costs. The BIM participation may also require the contractor to provide submittals and product data outside their normal realm. This should be discussed pre-bid with the general contractor. The installer should know up front if and what level of BIM modeling is required.

Clarity of Specifications to Installer and Client

Many points have been raised within this document around who is responsible for carrying out an activity or task. It is common that specific specification clauses may contradict what is shown on plans, on details or indeed on any other contractual documents. It should be clearly recorded as to which construction document takes precedence in the contract should conflict occur. Ideally any conflicting statements or conflicts in the documents should be removed or struck out.



Summary

Improved manufacturing capabilities, new materials and designs have enabled a new chapter in the possibilities for acoustical ceilings in form and function. Integration of lighting and MEP elements into these ceilings has transformed the basic acoustical ceiling to complex fully integrated ceiling systems. We need to be aware that while specification sections may be lacking with respect to this evolution, the modern movement is taking place.

Although conflicts may arise, we need the owners, architects, general contractors, manufacturers, vendors, suppliers, independent agents and finally the acoustical contractors, to be proactive in looking ahead at where this evolution is heading. The future is looking up and with an integrated option!

- **Review your bid documents** thoroughly and fully understand your scope and responsibilities.
- **Engage with manufacturers, suppliers and vendors** that understand and will support you in both bidding and installing systems with integrated services.
- **Ensure that your clients' expectations and requirements** are clearly communicated and understood by your suppliers.
- **Formally raise questions** pre-bid when possible.
- **Clearly ascertain who is to coordinate the design** – Mechanical, Electrical, Plumbing, AV, BIM Modelling.
- **Be wary of clauses in your contract** that may get you involved in disciplines you are not familiar with and those which will add greater costs and liabilities.



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