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Dubai Municipality

Dubai Building Systems and MMC Guide 2026



Research & Building Systems Section
Building Permits Dept. – Dubai Municipality
August 2026

DUBAI BUILDING SYSTEMS AND MMC GUIDE

A Standardized Reference for Innovative Construction in Dubai

Aligning Regulatory Compliance with Industrial Delivery

This document establishes the technical framework for adopting Modern Methods of Construction (MMC) across the Emirate. By standardizing information for system owners, consultants, and contractors, this Guide bridges the gap between innovative construction techniques and existing regulatory pathways.

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Research & Building Systems Section

Building Permits Department

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1. Purpose

This Guide compiles a series of Building System Guides to support clear, consistent, and technically robust evaluation of building systems used in projects. It aims to:

- Standardize the information submitted by system owners/applicants,
- Support designers and reviewers in verifying compliance, performance, and limitations, and,
- Align system acceptance with applicable Dubai building regulatory frameworks and approval pathways.

2. Scope

The Guide covers a range of building systems used in Dubai's projects (structural and non-structural), including systems typically associated with MMC (such as modular, panelized, prefabricated, and hybrid assemblies). Each Guide is written as a system-level reference (not a project-specific design). Regulatory pathways for "new building systems" and related authority processes may apply depending on the system type and intended use.

3. Intended Users

- Developers and project owners
- System owners/manufacturers and their technical representatives
- Consultants preparing project specifications and submissions
- Contractors, specialist installers, and QA/QC teams
- Authority reviewers/technical assessors and relevant stakeholders

4. Structure of Each Building System Guide

Every Guide in this Manual follows the same standard sections:

- Building System Description
- Who Can Apply
- Where It Can Be Used
- Advantages
- Limitations & Special Conditions
- Key Components & Technical Details

- Performance Considerations
- Cross-Sections
- Illustrative Applications
- Additional Notes / Useful Information
- References

5. Compliance Framework

All systems and project applications remain subject to the applicable regulatory and code requirements, including (as relevant):

- Dubai Building Code (DBC), 2021 Edition, together with the standards it references.
- UAE Fire and Life Safety Code of Practice (UAEFLSC) and Dubai Civil Defence requirements
- Al Sa'fat – Dubai Green Building System, where applicable to the project classification; and Dubai Central Laboratory Department certification schemes for product conformity and factory assessment.
- Code of Construction Safety Practice in the Emirate of Dubai

6. Status and Limitation of this Guide

This Guide is published by the Research and Building Systems Section, Building Permits Department, Dubai Municipality, for information and guidance.

This Guide is not a regulation, a code or an approval. It does not create, amend or remove any legal obligation, and it does not by itself permit the use of any building system in any project in the Emirate of Dubai.

This Guide does not replace: the Dubai Building Code or any standard it references; the UAE Fire and Life Safety Code of Practice or any requirement of Dubai Civil Defence; Al Sa'fat – Dubai Green Building System; any Dubai Municipality regulation, circular, administrative resolution or approval procedure; a Building System Approval issued for a specific system together with the conditions attached to it; a building permit or any other approval required for a specific project; or project-specific engineering design. Where this Guide differs from any of the documents listed above, those documents prevail.

The inclusion of a building system in this Guide indicates that the system type has been evaluated by Dubai Municipality and that a regulatory pathway exists for

it. It does not indicate that any particular product, supplier, manufacturer or contractor holds current approval, and it does not indicate that a system may be used without limitation in every project, building type, height, occupancy, exposure condition or fire-risk category.

Responsibility for the design, specification, construction, inspection and performance of a building and of the systems used in it rests with the licensed and qualified parties appointed for the project. Nothing in this Guide transfers any part of that responsibility to Dubai Municipality.

7. The Building System Approval Service

7.1 Service Description: The Building System Approval service provides approval for complete or partial building systems, including structural, MEP, thermal, and other systems. The approval is issued by the Research and Building Systems Section following an assessment of the system's concept and methodology, design basis, components, production controls and installation procedures. Each approval is issued to a specified applicant for a specifically identified building system.

7.2 Matters Outside the Scope of Building System Approval: A Building System Approval is not a project approval. It does not review or approve the structural, architectural or building services design of any project. Those are reviewed at the building permit stage for each project, by the relevant authority, on the basis of documents submitted by the project's licensed consultant. A Building System Approval is also not a product certificate and not a material conformity certificate.

7.3 Relationship to the building permit: A Building System Approval shall be obtained before the building permit process begins for a project that uses the system. At permit stage, the submitted drawings and details shall demonstrate compliance with the approved system and with the conditions attached to its approval.

7.4 Conditions, validity and renewal: A Building System Approval is conditional on the applicant's maintaining, throughout its validity: the licenses on which eligibility was based; all product conformity certificates and third-party approvals relied upon; the factory production control and quality management arrangements assessed; and the competence of key personnel. Approval is valid

for a period of one year and may be renewed subject to continuous compliance with system requirements and approval conditions. An approval that is not renewed lapses.

7.5 Modification of an approved system: Any change to an approved system, including changes to materials, component specifications, thicknesses, connection details, production process or installation methodology, requires prior review and approval by the Research and Building Systems Section before it is used in a project.

7.6 Pilot projects: For certain building systems, Dubai Municipality requires the successful completion of a pilot project before general approval is issued. Where a pilot project is required, the pilot shall be approved by Dubai Municipality before it commences. A maximum of three pilot projects may be executed concurrently by one applicant; the pilot shall be carried out under enhanced oversight with defined inspection points and documented records. General approval may be issued following successful completion and technical assessment of a pilot.

7.7 References to codes and standards: Where this Guide cites a code or standard, the edition that applies to a project is the edition referenced by the Dubai Building Code, or the edition otherwise required by the applicable Dubai Municipality or Dubai Civil Defence requirement.

7.8 How to apply: Applications are made through Build in Dubai platform, https://buildindubai.gov.ae/.

8. BUILDING SYSTEMS GUIDE

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

PREFABRICATED STEEL MODULAR BUILDING SYSTEM

(Offsite Modular Construction)

Building System Category:	Offsite Modular Construction
Sub-Category:	Prefab 3D Volumetric Systems
Building System Name:	**Prefabricated Steel Modular Building System**
Description:	Offsite Modular Construction involves manufacturing three-dimensional modules in controlled factory conditions, transporting them to site, and assembling them at the final location. Modules may range from basic structural "shells" to fully furnished units including internal/external finishes and integrated services. The "Prefabricated Steel Modular Building System" consists of self-supporting steel modules that are fully manufactured offsite and installed on-site. The primary structural system typically comprises hot-rolled steel sections (columns, beams), or cold-formed steel (CFS) framing, together with engineered module-to-module connections. Non-loadbearing elements utilize lighter materials to maintain transportability. External walls and partitions often employ drywall systems or lightweight concrete panels. Floor assembly may consist of metal decking topped with fiber-reinforced concrete to enhance acoustic performance and structural integrity. Alternative floor assemblies may be permitted, subject to technical

assessment and approval as part of the modular system evaluation.





WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the modular system's design basis, production controls, and site installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the modular system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the modules on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of prefabricated building systems issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

The versatility of the Prefabricated Steel Modular Building System allows it to be deployed across various sectors.

- Residential: The system is highly suitable for low to mid-rise residential buildings, apartments, and villas. The repetitive nature of residential floor

plans aligns perfectly with the standardization required for modular manufacturing.

- Hospitality: Hotels and resorts are primary adopters. The need for identical room units allows for high-volume production runs.
- Commercial & Institutional: Office buildings, labor accommodations, and schools where standardized room dimensions are applicable.
- Industrial / Technical Facilities: The system may also be suitable for selected industrial and technical applications, such as data centers, laboratories, plant rooms, MEP installations, utility modules, and other specialized facilities, subject to project-specific technical assessment and compliance with the applicable regulatory, fire safety, structural, and operational requirements.

ADVANTAGES

- Accelerated Project Timelines

  A key advantage of steel modular building systems is program acceleration. Modules can be manufactured offsite while foundation and enabling works progress onsite, allowing parallel delivery and reducing exposure to site-driven delays. Once foundations are ready, modules can be erected rapidly through planned lifting and installation sequencing, enabling earlier building enclosure and earlier commencement of follow-on trades. For developers, this means a faster return on investment (ROI) and reduced financing costs.
- Quality and Precision

  Factory-controlled production reduces variability associated with weather, site congestion, and inconsistent workmanship.
- Tolerance Control: Manufacturing and assembly processes can be governed by defined tolerances and repeatable checks, supporting reliable module alignment during installation.
- Consistency: Standardized production workflows promote consistent outcomes across repetitive units.
- Defect Reduction: The "snagging" process is largely shifted to the factory, meaning modules arrive on site pre-inspected and approved, drastically reducing the time spent on rectifying defects at handover.

- **Improved Productivity and Safety Potential**
  Industrialized, offsite fabrication and pre-assembly can improve productivity by enabling structured workflows, dedicated tooling, and controlled sequencing. By reducing the amount of high-risk work performed at height and limiting onsite fabrication activities, modular delivery can also reduce certain onsite safety exposures, provided lifting plans, temporary stability measures, and interface works are properly engineered and supervised.
- **Environmental Sustainability**
  Factory-based modular delivery can support sustainability objectives by improving material control and reducing avoidable waste through optimized cutting, standardization, and better segregation for recycling. Steel modular structures can also enable efficient structural solutions that may reduce overall material demand and foundation loads where design conditions permit. In addition, modular systems can be designed for adaptability and disassembly, supporting reuse, refurbishment, or recycling at end of life, consistent with circular economy principles.

LIMITATIONS & SPECIAL CONDITIONS

1. **The Pilot Project Requirement**
   - **Condition:** New systems require a Pilot Project which must be pre-approved.
   - **Cap:** A maximum of 3 pilot projects may be executed simultaneously.
   - **Final Approval:** General approval for the system is issued upon the successful completion and technical assessment of one of these pilot projects. This ensures that the theoretical designs hold up under actual site conditions and local operational stresses.
2. **Height and Scale Limitations**
   Dubai Municipality currently adopts a cautious, risk-based approach by applying project-specific height limitations to initial approvals, based on the structural characteristics and demonstrated performance of each system. These limitations may be relaxed following the successful completion and evaluation of a pilot project.
3. **Modification Restrictions**

- **Constraint:** The walls and structural members of a module are integral to the global stability of the building. They cannot be easily removed or altered.
- **Requirement:** Developers shall inform owners and purchasers of the restrictions on alteration of modules and shall provide an operation and maintenance manual identifying the structural elements that shall not be altered without engineering assessment.

4. **Logistics and Transportation**

   The benefits of offsite construction are contingent on the ability to move the units.

   - **Size Limits:** Module dimensions are constrained by road transport regulations. Moving large volumetric units requires specialized trailers and route planning to avoid low bridges or narrow roads.
   - **Cost:** Transportation and craneage (heavy lifting) represent a significant cost center that can offset some of the savings from labor reduction.

5. **Fire Compartmentation and Penetrations**

   Modular interfaces increase the importance of tested/approved fire-stopping, continuity of fire barriers, and controlled penetrations aligned with UAE fire requirements and Dubai Civil Defence approvals (where applicable).

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description (typical)
Structural Framework	The primary steel module frame (columns/beams) utilizes hot-rolled steel sections. Light-gauge steel / cold-formed steel framing may also be considered for limited-height modular applications.
Module-to-Module Connections	Vertical and horizontal connections governing gravity, lateral load transfer, robustness, and erection stability. Connections shall be engineered for the full range of design actions, including handling, lifting, erection and in-service conditions, and shall be detailed to provide the structural continuity and robustness required by the Dubai Building Code. Connection components, fasteners and any proprietary connectors shall be specified with

	traceable material certification and, where relied upon, supported by test evidence for the declared capacities.
Floor Assemblies	The floor must act as a rigid diaphragm to transfer lateral loads to the vertical elements. A typical solution comprises a metal decking profile topped with fiber reinforced concrete and supported with steel beams. *Alternative floor assemblies may be permitted, subject to technical assessment and approval as part of the modular system evaluation.*
Wall Systems	Wall assemblies in steel modular systems are multi-functional elements and should be designed and detailed to achieve the required thermal performance, acoustic separation, fire compartmentation, robustness, and durability, while maintaining continuity at module-to-module interfaces and service penetrations. Typical wall system options include: ▪ Internal Drywall Partitions: Non-loadbearing partitions typically comprising galvanized steel studs and gypsum board linings, with insulation and service voids as required. ▪ Demising Walls (between units): Separating walls shall achieve enhanced fire resistance and acoustic ratings and, where applicable, higher impact/robustness performance (e.g. severe duty partitions), including tested and approved detailing at junctions and penetrations. ▪ External Façade Wall Assemblies: Typically, non-loadbearing infill/envelope systems that shall provide the primary barrier to heat, moisture, and air infiltration, and shall be detailed for water-tightness, vapour control, thermal bridging mitigation, corrosion resistance, and movement accommodation at modular joints. ▪ 3D Panel Wall System (Innovative Option): Panels consisting of a 3D welded-wire space truss with an integral EPS insulation, with concrete/shotcrete applied to both faces to form a lightweight insulated wall element that may function as an external envelope and/or internal partition, subject to performance validation and approval. ▪ Lightweight Concrete Panels: Prefabricated panels composed of lightweight concrete (often incorporating

polystyrene beads) formed as a core and faced with fiber-cement boards, with optional additional thermal insulation as required. The panels may be used as internal partitions and/or external walls.

Alternative wall assemblies may be proposed; however, all wall systems must have a valid Building System Approval certificate from Dubai Municipality for the intended application.

PERFORMANCE CONSIDERATIONS

1. Structural Design and Load Paths

- System details, structural design provisions, and submission deliverables shall define the design basis and loading criteria and include calculations addressing vertical and horizontal module connections, overall structural robustness, and lifting/handling conditions, etc. The system shall demonstrate compliance with the Dubai Building Code (DBC) and relevant local regulations, including the relevant DBC-referenced codes and standards.

2. Thermal Performance

- U-value calculations for external walls, roofs, and exposed floors shall demonstrate compliance with Dubai Building Code and Al Sa'fat (Green Building Regulations), as applicable to the project classification.
- Insulation materials should be supported by conformity evidence including Dubai Central Laboratory (DCL) certificates.

3. Acoustic Performance

- Test evidence shall demonstrate acoustic performance compliance with DBC and Al Sa'fat requirements where applicable.

4. Water-Tightness and Moisture Control

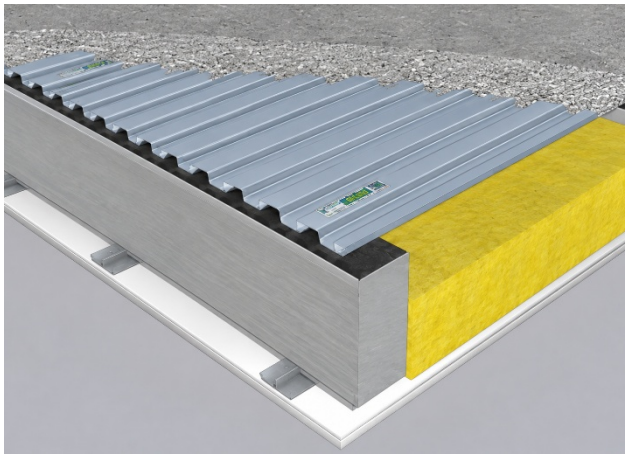
- System details and installation methods shall ensure effective control of water seepage from façades and roof, particularly at module-to-module joints, through appropriate detailing, sealing, and verified interface continuity.

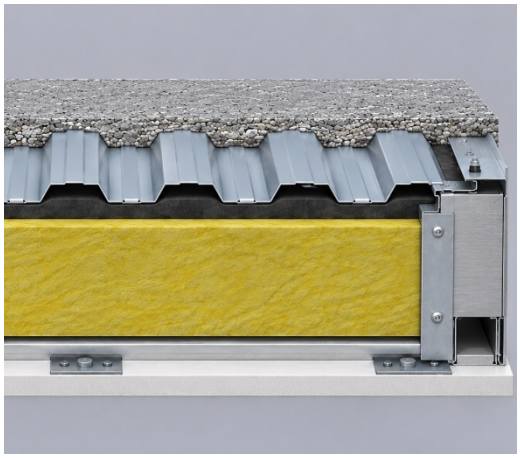
5. MEP Integration and Maintainability

- System details and onsite installation/connection methods shall ensure proper integration of MEP services between modules, while providing adequate access for maintenance and inspection (including access to concealed elements) and enabling ongoing inspection and maintenance checks throughout the building lifecycle.

6. Fire and Life Safety
   - System details, design provisions, and installation methods shall ensure compliance with required fire-rated compartments and assemblies, supported by relevant approvals and fire test documentation and shall align with the UAE Fire and Life Safety Code of Practice and Dubai Civil Defence requirements.

SYSTEM SECTIONS









Deck Slab

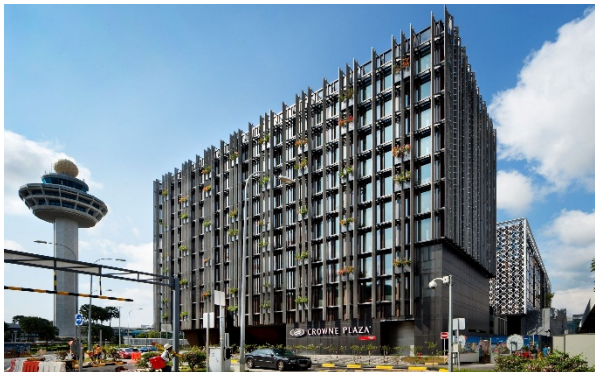
Module Frame

ILLUSTRATIVE APPLICATIONS









ADDITIONAL NOTES / USEFUL INFORMATION

- Evidence-Based Approval Approach: Where available, third-party evaluation reports and certifications for the building system can strengthen confidence in performance claims (structural, durability, envelope, etc.).
- Factory Controls: Applicants should maintain clear fabrication processes, inspection/QC procedures and checklists, and documented competence of key personnel and certified welders.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat – Dubai Green Building System
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. ANSI/AISC 360 (Structural Steel Buildings)
5. Dubai Central Laboratory Certification Schemes

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

PREFABRICATED PRECAST CONCRETE MODULAR BUILDING SYSTEM

Building System Category:	Offsite Modular Construction
Sub-Category:	Prefab 3D Volumetric Systems

Building System Name:	Prefabricated Precast Concrete Modular Building System
Description:	Offsite Modular Construction (or 3D Volumetric Construction) involves the production of three-dimensional units in controlled factory conditions prior to transportation to site. Modules can be brought to site in a variety of forms, ranging from a basic structure to one with all internal and external finishes and services installed, all ready for



assembly. The casting of modules uses the benefits of factory conditions to create service-intensive units where a high degree of repetition and a need for rapid assembly on-site make its use highly desirable.
Prefabricated Precast Concrete Modules are composed of precast concrete elements (walls, floor slabs, roof slab…) fully produced and assembled at the factory and then transported to the construction site for installation.

WHO CAN APPLY

Manufacturers of precast concrete building systems/elements that operate a prefabrication facility within the Emirate of Dubai and are seeking official Dubai Municipality (DM) approval for their products. Applicants must also hold a valid Industrial License issued by the Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

3D Volumetric Module Units:

- Applicable to all building types (villas, hotels, residential apartments, student residences, education buildings, healthcare buildings, commercial and mixed-use buildings, correctional facilities).
- Suitable for projects benefiting from high repetition and fast installation; sites that can support delivery routes, crane capacity/reach, and just-in-time logistics for large volumetric modules.

ADVANTAGES

- Fast Installation – Volumetric "building block" modules can be erected quickly, with a significant portion of work completed off-site.
- High Quality and Consistency – Factory-controlled fabrication supports more consistent workmanship and QC than fully site-built processes.
- Reduced Onsite Labor – Moving activities off-site can deliver major manpower/time savings.
- Acoustic and Thermal Comfort – Concrete's inherent mass supports acoustic separation and thermal comfort, and insulated precast panels can enhance envelope performance.

- Durability and Long Service Life – Precast provides high resistance to weathering and deterioration, supporting lower maintenance over the building lifecycle.
- Improved Site Safety – Reduced site activities (e.g., less formwork and fewer workers on-site for shorter durations) can lower exposure to construction hazards.
- Fire Resistance – Concrete is non-combustible and provides inherently high fire resistance as part of passive fire protection strategies.
- Environmental Performance – Controlled waste management in factories, and potential reuse of molds and recycling of concrete waste.
- Aesthetics and Finishing Flexibility – Precast supports a wide range of colors, textures, and architectural finishes with consistent repeatability.

LIMITATIONS & SPECIAL CONDITIONS

1. Pilot Project – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.
2. Certification Conditions – Approvals are issued only to manufacturers with production facilities located within the Emirate of Dubai. Concrete batching units at precast factories shall be certified by Dubai Central Laboratory (DCL).
3. Material Conformity – Dubai Central Laboratory certificates of product conformity are required for insulation materials, steel reinforcement, welded wire mesh, coatings, sealants, and paints.
4. Early Design and Coordination – Layouts, openings, embeds, and MEP penetrations should be confirmed early because modules are fabricated in advance, and late changes can be costly. Precast projects also require manufacturing lead time and benefit from early supplier involvement to optimize design.
5. Transport and Lifting Constraints – Delivery routes must accommodate module dimensions/weights, and the crane must be planned to reach all installation zones and safely lift the heaviest modules.

6. Site Logistics – Large volumetric modules often require limited on-site storage and "just-in-time" delivery/installation to avoid double handling and congestion.
7. Temporary Stability and Inter-Module Integrity – Erection sequencing, temporary restraint/bracing (where needed), and structural continuity between modules must be engineered as part of the system.
8. Tolerances and Interfaces – Module-to-module alignment, floor levels, façade lines, and service interfaces must accommodate realistic fabrication/erection tolerances; special tolerances should be explicitly specified where required.
9. Maintenance and Modifications – Provide clear user/maintenance guidance; renovations should follow the system instructions and use appropriate tools/approved methods.
10. Best Economics (Repetition and Volume) – Precast is typically more efficient when there is sufficient repetition to justify molds, setup, and standardized production/erection cycles.

KEY COMPONENTS DETAILS

Component	Description
Precast Concrete Modules (Volumetric "3D" Units)	
Primary Module Structural Frame	Typically comprises walls + floor + roof/ceiling forming a rigid "box" module. Example Precast PPVC configuration include precast concrete walls (often on the two long sides), precast concrete slabs spanning on beams, and a precast concrete roof slab. Project-specific add-ons can include cantilever balcony.
Within-Module Partitions	(Most common). Internal room subdivisions are often formed using lightweight partition systems installed during module fit-out stage (to speed production and allow easier future changes).
Module Structural Partitions	In many concrete modular schemes, the module's RC walls define rooms/corridors and can function as internal separating walls.
Internal Precast Partitions	Where robustness, impact resistance, or compartmentation is needed, internal partitions can be precast wall panels designed as non-loadbearing or loadbearing, depending on the structural scheme.

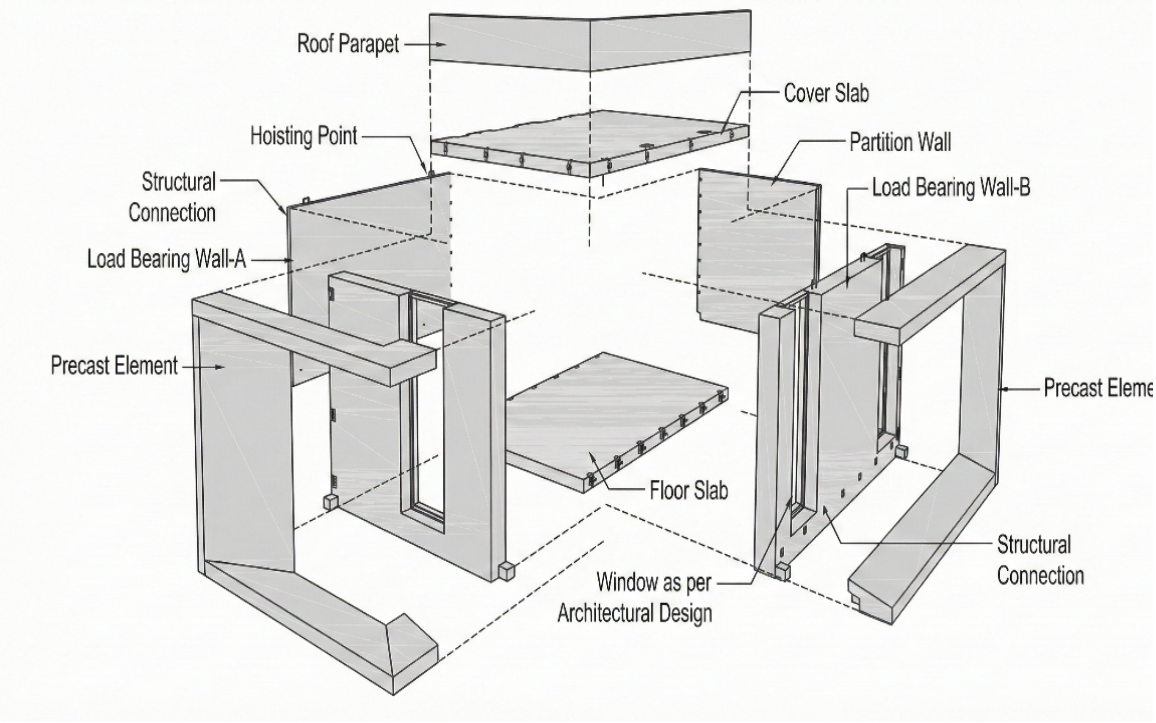
Internal Finishes / Fittings / Fixtures	Modules can be delivered pre-finished with a significant portion of architectural fit-out completed off-site (fit-out level depends on procurement scope).
Embedded Services	Modular delivery commonly includes embedded MEP and planned service zones (e.g., wall-embedded pipes, ceiling/service clearances) with final connections completed on-site.
Handling and Lifting Provisions	Modules are designed for crane-based installation and planned logistics (e.g., lifting and placement as part of the modular erection cycle).
Building-Level Components	
Support Structure	Modular buildings often use a supporting structure (e.g., transfer slab / podium level) prepared to receive and align stacked modules.
Inter-Module Connections	Building performance depends on the inter-module connection strategy and continuity across stacked units. In precast concrete modular systems, walls and floors act together as a diaphragm system, and integrity provisions are central to overall behavior.
Inter-Module Joints	The module interface must be designed to maintain structural & fire safety, enable MEP continuity, preserve integrity between modules, and support maintenance accessibility.

PERFORMANCE CONSIDERATIONS

- Structural Continuity & Integrity Between Modules – The building's gravity/lateral load paths depend on module-to-module connection concept, including integrity/robustness provisions.
- Acoustic Performance – Must meet Dubai Building Code and Al Sa'fat performance requirements. Performance depends on joint continuity, closest paths, and penetrations.
- Fire and Compartmentation – Concrete is non-combustible, and precast can support rated assemblies; however, building fire performance depends on correct firestopping of joints and penetrations.

- Durability and Maintainability – Long-term performance is often governed by joint sealants, interfaces, and periodic inspection/repair, especially for building envelopes.
- Architectural Finish / Weathering – For exposed architectural precast, consider finish selection, staining risk, drainage detailing, and visual acceptance criteria early to avoid post-installation defects.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Future Modifications – Because structural integrity can depend on module walls/corners and their continuity, any major modification should be engineer-reviewed (robustness implications).
- Early supplier engagement is highly recommended to optimize module sizes, connections, erection sequence, and tolerances before design freeze.
- Plan Maintenance Access – Modular design should explicitly preserve maintenance accessibility (especially around inter-module interfaces and services).
- Mock-ups and visual acceptance criteria are recommended for architectural precast (color/texture consistency, patching expectation, and panel alignment).
- Quality Management is a key advantage. Precast benefits from controlled production and systematic QA/QC, which should be backed by documented inspection/testing procedures.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire & Life Safety Code of Practice (UAEFLSC)
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System
5. ACI 318-19 Building Code Requirements for Structural Concrete
6. PCI Journal – Structural integrity of precast concrete modular construction

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

INTERMODAL SHIPPING CONTAINERS

Building System Category:	Offsite Modular Construction
Sub-Category:	Prefab 3D Volumetric Systems

Building System Name: **Intermodal Shipping Containers**

Description:

Intermodal Shipping Containers are a six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials. Those containers are repurposed and modified at the factory with features like insulation, windows, and doors, for use as a building, or a structure, or part of a building or structure. The modules are transported to the jobsite and assembled to form a complete building or structure.



This method takes advantage of the inherent strength and versatility of shipping containers while enabling faster construction, minimizing material waste, and providing greater design flexibility than traditional building techniques. Internationally, modular shipping container construction is used in a range of commercial, retail, industrial and office applications. In the Emirate of Dubai, permitted applications are set out in "Where it can be used" and are subject to the restrictions in "Limitations and special conditions", which exclude residential use.

WHO CAN APPLY

Consultants assigned and authorized to apply for approval of the shipping container system for a specific project. However, manufacturer or supplier shall be involved in the design phase.

WHERE IT CAN BE USED

- 3D Volumetric Module Units:
  Applicable for commercial, retail, industrial and offices building types/usage.
- Off-site Modular Construction:
  Applicable for use in building projects where modular methods are suitable.

ADVANTAGES

- Cost – Offer lower overall construction cost compared to tradition methods.
- Quick & Fast Installation – Speed up construction time and reduce labor costs.
- Standardized Geometry – Enables repeatable design, modular grids, and predictable interface detailing.
- Flexibility and Design Scalability – Containers can be modified, stacked, and arranged in various configurations (single units, multi-module, or volumetric arrangements) to meet architectural requirements.

- **Proven Logistics** – Shipping containers are built for intermodal movement (ship-road-rail), enabling streamlined delivery planning and reduced lifting/handling risk.
- **Thermal Comfort** – Reduces energy consumption for heating and cooling, and improved thermal efficiency, if insulation is added.
- **Durability** – Extremely sturdy and weather-resistant.
- **Eco Friendly** – Reusing containers reduces waste and the demand for new materials, promoting sustainability.
- **Security** – Provide strong protection against break-ins and damage.

LIMITATIONS & SPECIAL CONDITIONS

1. **Pilot Project** – Not required for the approval of Shipping Containers Structures.
2. **Building Type** – Shipping containers may not be used for residential purposes; while containers to be used as storage are not required to be approved.
3. **Project-Based Approval** – Shipping containers are approved on a project basis submitted by the project consultant.
4. **Renewal Process** – The approval for shipping containers is project-specific and does not require renewal.
5. **Container Condition** – Repurposing is only recommended where the unit condition is demonstrably suitable. Units that exhibit severe corrosion/pitting, distorted corner fittings/posts, rail damage or any evidence of structural repairs that cannot be traced/verified, are not acceptable. Units shall be inspected and their condition verified before repurposing by an inspector certified by the Institute of International Container Lessors (IICL) or an equivalent competent inspector acceptable to Dubai Municipality. This inspection establishes the condition of the unit; it does not constitute structural verification of the unit in its proposed building use, which shall be carried out by the project's structural engineer.
6. **Structural Modifications** – Extensive modifications (e.g. large openings, removal of side walls, multiple door cuts) can significantly reduce racking resistance and load transfer continuity. Units must meet project-specific structural design verification.

7. Exposure and Durability – Repurposed containers require enhanced corrosion protection and detailing at cut edges and weld zones, bolted penetrations, and interfaces with foundations and wet areas.
8. Fire Rating – Fire-rating assemblies must be approved and listed by Dubai Civil Defence.
9. Material Conformity – Dubai Central Laboratory certificates of product conformity are required for insulation materials.

KEY COMPONENTS DETAILS

Component	Description
Shipping Container Frame	The container's primary structural resistance is provided by a steel perimeter frame system, designed to transfer gravity loads, stacking loads, handling forces, and racking effects primarily through the corners and edge members (corner castings, corner posts, top and bottom side and end rails, and transverse floor cross members).
Shipping Container Shell/Envelope	Overall stiffness and racking resistance are enhanced by the container's steel envelope, consisting mainly of corrugated side and end panels, and corrugated roof sheets.
Openings (Door & Windows)	Standard container doors can be retained or replaced; windows are cut into walls and framed.
Floor System	Typically consists of a floor deck over the steel cross-member support zone. For building use, the floor buildup is often upgraded or replaced to address durability, hygiene, fire performance, and acoustic/insulation requirements.
Insulation Material	Added inside or outside the container walls to improve thermal performance and comfort.
MEP Connection	Internal utilities including electrical, plumbing, and HVAC can be pre-installed or modified on-site.
Sealants & Joint	External and internal joints must be sealed using fire-rated and weather-resistant materials.

PERFORMANCE CONSIDERATIONS

- Acoustic Performance – Must meet Dubai Building Code and Al Sa'fat performance requirements.

- Thermal Performance – Steel containers are inherently prone to thermal bridging. Thermal insulation strategy shall implement continuous insulation or engineered internal insulation with controlled thermal bridges.
- Fire Resistance – Assemblies requiring a specific fire-rating must have valid DCD approval/license.
- Indoor Environmental Quality – Where containers are reused from service, it is recommended to evaluate surface coatings and potential contaminants (especially floors and internal paints) and moisture control around wet areas.
- Impact Resistance – External wall assemblies shall provide impact resistance appropriate to their exposure, with enhanced impact resistance in zones subject to pedestrian access, vehicle movement or maintenance activity.
- Structural Stability – Stacked or joined containers must meet engineered load bearing, lateral stability, and foundation design requirements.

ILLUSTRATIVE APPLICATIONS











ADDITIONAL NOTES / USEFUL INFORMATION

- CSC Plate and Traceability – The CSC plate is a mandatory element for containers used in international transport and provides useful traceability data such as approval number and date of manufacture. It supports transport safety recognition but does not replace building compliance evidence.
- Sealant & Joint – External and internal joints must be sealed using approved fire-rated and weather resistant materials.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire Safety Code
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System
5. 2021 International Building Code (IBC) – 3115 Intermodal Shipping Containers
6. ICC G5-2019 Guideline for the Safe Use of ISO Intermodal Shipping Containers Repurposed as Buildings and Building Components
7. Institute of International Container Lessors (IICL) – Guide for Container Equipment Inspection, 6th Edition

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

3D Concrete Printing (3DCP)

(Non-loadbearing)

Building System Category:	Site Construction Methods and Technologies
Sub-Category:	Additive Manufacturing
Building System Name:	3D Concrete Printing (3DCP)
Description:	3D Concrete Printing (3DCP), also known as Additive Construction (AC), is an automated construction method that uses robotics arms or gantry systems to deposit proprietary concrete mortar (ink) layer-by-layer to form building elements without the use of traditional formwork. This guide specifically covers non-loadbearing applications, where the printed elements act as partitions, infill walls, or architectural cladding and do not support the building's primary structural loads. The system typically utilizes continuous mixing and pumping unit synchronized with the printer movement.

WHO CAN APPLY

The following entities are eligible to apply for system approval and project permits in Dubai:

- Specialized Contractors: Contractors classified and registered by Dubai Municipality (DM) specifically for 3D printing activities.

- System Suppliers / Technology Providers: Companies providing the 3DCP technology, provided they have a local trade license and partnership with a classified contractor.
- Manufacturers: Producers of 3D printable concrete mixtures (ink) who hold a valid Dubai Central Laboratory (DCL) certification (Factory Assessment Scheme).

Note: All entities must comply with Decree No. (24) of 2021, which regulates the use of 3D printing in the construction sector in Dubai.

WHERE IT CAN BE USED

- Internal Partitions: Interior dividing walls within residential, commercial, or industrial buildings.
- Infill Walls: External envelope walls (non-structural) within a skeletal frame (RC or Steel), subject to connection details.
- Architectural Features: Urban furniture, landscape elements, and non-structural façade cladding.
- Formwork: Printed concrete shells acting as "Stay-in-Place" formwork for structural columns or walls (where the printed shell is not considered for loadbearing capacity).

ADVANTAGES

The adoption of 3DCP technology aligns with Dubai's 3D Printing Strategy and offers the following distinct advantages over conventional building systems:

1. Design Freedom & Customization:
   - Enables the construction of complex, curved, and double-curved geometries that are expensive or impossible to achieve with traditional formwork.
   - Allows for "Parametric Design", where wall thickness and shape can be optimized digitally for acoustic or thermal performance without adding manufacturing cost.
2. Sustainability & Waste Reduction:
   - Zero Formwork: Eliminates the need for timber or steel shuttering, significantly reducing construction waste.

- Material Efficiency: Prints material only where needed (topology optimization), potentially reducing concrete consumption compared to solid walls.
- Lower Carbon Footprint: When combined with eco-friendly cement replacements (e.g. GGBS/Fly Ash), the total embodied carbon is reduced.

3. Speed & Productivity:
   - Continuous Operation: capable of printing 24/7 (subject to site noise regulations), significantly reducing wall construction timelines.
   - Integration: Electrical conduits and plumbing voids can be integrated directly into the print path, reducing downstream chasing and cutting work.
4. Safety & Labor Optimization:
   - Reduces the reliance on manual labor in harsh outdoor climates, shifting workers to supervisory roles (machine operators).
   - Minimizes "Work at Height" risks and manual handling injuries associated with moving heavy masonry blocks.

LIMITATIONS & SPECIAL CONDITIONS

1. Height & Size Restrictions
   - Vertical Reach: Building height is strictly limited by the vertical reach of the printer (Gantry or Robotic Arm).
   - Slenderness Ratio: For non-loadbearing walls, the height-to-thickness ratio is critical to prevent buckling during the "fresh state" (printing phase) before the concrete hardens. Maximum wall height often requires temporary bracing or specific wave-pattern geometries to increase stability.
2. Climatic Constraints (Hot Weather)
   - Open Time: Dubai's high ambient temperatures accelerate the hydration of the "ink", significantly reducing the "open time" (window to print before the mix hardens).
   - Mitigation: Printing often requires night-time operation, chilled water in the mix, or climate-controlled enclosures (tents) to prevent nozzle blockages and ensure proper layer bonding.

3. Cold Joints & Layer Adhesion
   - Interlayer Bond Strength: A "cold joint" may form if the time gap between depositing two layers is too long, creating a weak point in the wall.
   - Condition: Strict time limits (per layer loop) must be calculated and adhered to. If a print is paused for too long, a bonding agent or mechanical connector may be required before resuming.
4. Surface & Finish Aesthetics
   - Ribbed Texture: The natural finish of 3DCP is a ribbed texture. Achieving a smooth, flat wall requires additional manual rendering or plastering, which can offset labour savings.
   - Defects: Minor bulging or "elephant foot" (bottom layer compression) can occur if the print speed is too fast for the material's setting time.
5. Structural Dependencies
   - Non-Loadbearing Status: While these walls do not carry slab loads, they must be anchored to the main structure (columns/beams) to resist Wind Loads and Seismic Forces (Out-of-Plane). Connection details (sliding joints or dowels) must be approved by a structural engineer.
6. Integration of Services
   - MEP Coordination: Unlike drywall, it is difficult to cut into 3D printed walls after they harden. All electrical conduits, plumbing voids, and socket boxes should be planned in the digital model and placed during the print process.
7. Factory Production Control (FPC)
   - The "Ink" manufacturer must hold a DCL Conformity Certificate (Factory Assessment Scheme).
   - The factory must have an internal Quality Control (QC) laboratory to test fresh density, flowability, and setting time for every batch.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
3D Printer	The motion system (Gantry, Robotic Arm, or Crane-based) that positions the nozzle.

Print Material (Ink)	Proprietary cementitious mix (mortar) designed for extrudability and buildability. May only be supplied by factories holding a factory certification of conformity and Conformity Mark under the Dubai Central Laboratory Department Certification Scheme for 3D Printing Concrete Mix Manufacturers.
Mixer-Pump System	Automated unit that mixes dry material with water/additives and pumps it to the nozzle. Must ensure continuous flow without segregation.
Slicing Software	Software that converts the 3D model (CAD/BIM) into machine code (G-code), defining toolpaths, layer heights, and print speeds.
Reinforcement	For non-loadbearing walls, this may include horizontal joint reinforcement (mesh/wire) placed between layers or post-installed vertical grouting/bars in voids.

PERFORMANCE CONSIDERATIONS

- Structural Stability: Although non-loadbearing, walls must withstand wind loads and seismic (out-of-plane) forces as per Dubai Building Code (DBC). Anchorage to the main structure must be detailed.
- Fire Resistance: Materials must be non-combustible. Fire rating must be proven via calculation or testing for applications that require fire-rated elements as required by UAE FLSC and DCD.
- Thermal Performance: U-values must comply with Dubai Building Code and Al Sa'fat (Dubai Green Building System). Solid printed concrete often requires insulation (cavity fill or external) to meet these targets.
- Durability: Resistance to carbonation, chloride ingress, and sulfates. DCL certification of the mix addresses these durability parameters.

3DCP LAYERS



ILLUSTRATIVE APPLICATIONS






REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat – Dubai Green Building Evaluation System
3. Dubai Municipality 3DCP Guideline (First Edition, June 2024)
4. Decree No. (24) of 2021 Regulating the Use of Three-dimensional Printing in Construction Works in the Emirate of Dubai
5. Dubai Central Laboratory: Specific Rules for Certification of 3D Printing Materials
6. ISO/ASTM 5239:2023, Additive manufacturing for construction – Qualification Principles – Structural and infrastructure elements

7. ICC-ES AC509, Acceptance Criteria for 3D Automated Construction Technology for 3D Concrete Printed Walls

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

INSULATED CONCRETE FORMS (ICF)

Building System Category:	Site Construction Methods & Technologies
Sub-Category:	Cast-in-Place Concrete Systems

Building System Name: **Insulated Concrete Forms (ICF)**

Description:

Insulated Concrete Form (ICF) is a composite building system that utilizes lightweight, high-density foam insulation as the permanent formwork for cast-in-place reinforced concrete walls. Unlike traditional "removable" shuttering systems (plywood or steel) that are stripped away after the concrete cures, the ICF panels remain in place for the life of the building, serving a dual function: first as the shutter for the fresh concrete, and subsequently as the primary thermal and acoustic insulation for the building envelope.

The fundamental mechanism of the system relies on two parallel face panels, typically manufactured from EPS or XPS. These panels are interconnected by high-strength engineered ties (webs). The forms are dry-stacked as interlocking modular units. The forms are dry-stacked on site with horizontal steel reinforcement to the full wall height or floor height. Vertical steel reinforcement is threaded through the hollow core, and the forms are braced with a specialized alignment system. Ready-mixed concrete is then pumped into the cavity. As the concrete cures, it bonds with the foam insulation and the web flanges, creating a monolithic, composite wall assembly that is structurally robust, airtight, and thermally unbroken.

ICF systems are commonly used for load-bearing and non-load-bearing walls (above and below grade) and can also form lintels/beams when detailed by the engineer and supported by the product/system limitations. Many proprietary ICF systems are recognized through code evaluation pathways (e.g., ICC-ES evaluation reports) which define permitted uses, installation requirements, and required finishes.



Insulating Concrete Form (ICF) Construction: Foundation to Completion

WHO CAN APPLY

Applications/requests to use ICF as a building system should be submitted by one (or more) of the following stakeholders:

- System owner / manufacturer (or the regional agent) responsible for the product, its technical literature, and its compliance evidence. International manufacturers must typically appoint a local representative or have a registered branch in Dubai.
- Local supplier / installer formally authorized by the system owner/manufacturer, responsible for installation method statements, QA/QC, and competency evidence.

WHERE IT CAN BE USED

ICF is generally applicable to building wall applications, including (subject to engineering design and approvals):

- Above-grade exterior walls (loadbearing or non-loadbearing).

- Interior structural walls /shear walls where reinforced concrete walls are part of the lateral load-resisting system.
- Below-grade / basement walls and retaining-type walls when waterproofing, drainage, durability, and detailing are properly addressed for the site conditions.

ICF may be used in residential villas and townhouses, low-rise commercial and institutional buildings (office blocks, community centers, schools), and industrial and services facilities (warehouses, cold storage facilities, labor accommodation).

ADVANTAGES

1. Superior Thermal Performance (Energy Efficiency), Airtightness and Indoor Environmental Quality

- Continuous Insulation: Unlike blockwork, which introduces thermal bridges at every mortar joint and concrete column, ICF provides a continuous layer of insulation. Wall thickness, insulation thickness and insulation density vary between proprietary systems. The U-value achieved shall be calculated for the proposed build-up and shall comply with the Dubai Building Code and Al Sa'fat.
- Thermal Mass Effect: The "sandwich" configuration places the heavy concrete mass inside the insulation envelope. This protects the concrete from direct solar gain. The mass dampens interior temperature swings and can shift the peak cooling load, which may reduce installed cooling capacity. Any reduction is project-specific and shall be demonstrated by energy modelling for the project.
- Air Tightness: The solid concrete core acts as a perfect air barrier, preventing the infiltration of hot, humid air which is a primary source of latent cooling load in the UAE.
- Mold Resistance and Indoor Health: ICF wall assemblies can reduce the risk of mold growth because the concrete core and insulation materials do not generally provide an organic food source for mold. In addition, the airtight envelope helps limit moisture-laden air infiltration, thereby reducing the likelihood of condensation within the wall

assembly. These features can contribute to improved indoor environmental quality and occupant well-being, subject to proper detailing, moisture control, ventilation, and maintenance of internal finishes.

2. Construction Efficiency and Speed
   - Integrated Processes: ICF combines five construction steps into one: (1) Structural framing, (2) Wall insulation, (3) Air barrier, (4) Vapor retarder, and (5) Furring for finishes.
   - Speed: ICF can shorten superstructure programs relative to conventional formed construction by combining framing, insulation, air barrier, vapour control and furring into a single operation. Program benefit is project-specific. The forms are lightweight, reducing crane dependency and allowing for rapid manual stacking.
   - Labor Optimization: The system requires a smaller workforce compared to carpenters and steel fixers needed for traditional shuttering. Reducing on-site manpower density is often a safety and logistical goal.
3. Durability and Service Life
   - Corrosion Resistance: In Dubai's saline coastal environment, reinforcing steel is prone to corrosion. ICF protects the concrete from chloride ingress, significantly extending the service life of the building structure.

4. Acoustic Comfort
   - Sound Attenuation: The combination of foam, concrete, and foam effectively dampens sound transmission. The rating achieved depends on wall thickness, finishes, junction detailing and penetrations, and shall be demonstrated for the specific assembly against the requirements of the Dubai Building Code and Al Sa'fat.

LIMITATIONS & SPECIAL CONDITIONS

1. Mandatory Compliance Framework

- Dubai Building Code (DBC) is the minimum mandatory benchmark for building design; structural requirements should align with ASCE 7-16 (loading) and ACI 318-19 (concrete) per DBC framework.
- Fire/life safety compliance must align with UAE Fire & Life Safety Code along with Dubai Civil Defence requirements.

2. Height Limitations
   - Dubai Municipality treats standard ICF approvals as applicable to low-rise buildings. Heights beyond G+1 are assessed on a project-specific basis and may require additional structural substantiation and testing.
3. Fire Safety Requirements (Strict DCD Compliance)

   The use of expanded polystyrene (EPS) requires rigorous fire safety measures.
   - Thermal Barrier (Interior): The EPS foam on the interior face must never be left exposed. It must be covered by a thermal barrier, typically a minimum of 12.7mm (1/2 inch) fire-rated Type X gypsum board, mechanically fastened to the embedded webs, and/or render systems approved by DCD.
   - External Cladding: The exterior foam must be protected by a non-combustible finish approved by Dubai Civil Defence. This typically includes traditional 25mm cement render reinforced with mesh, EIFS (DCD and DM approved), stone or tile cladding (mechanically anchored to concrete core), render system, etc.
   - Fire Stops: Continuous fire stopping is required at floor lines and around openings to prevent fire from traveling vertically behind the cladding or within any gaps.
4. Modifications
   - ICF walls are solid reinforced concrete. Post-construction modifications (e.g., cutting new door openings or moving windows) are significantly more difficult and expensive than with blockwork or drywall.
5. Insulation Material Compliance
   - The thermal insulation materials (e.g. EPS/XPS) incorporated into the ICF system must meet Al Sa'fat requirements and shall be certified by Dubai Central Laboratory.

6. System Scope and Proprietary Controls

- Only ICF systems with a defined, traceable product identity (system owner/manufacturer, product data, installation requirements, and compliance evidence) should be accepted for use.
- Substitutions of key system elements (ICF units, ties/webs, connectors, proprietary accessories) should be controlled and justified through the system owner's documented approvals and compatibility evidence.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
ICF Units (Blocks/Panels)	Pre-molded foam blocks/panels assembled to form wall geometry, typically EPS or XPS. Density is typically in the range of 22-29 kg/m^3. Insulation material shall be certified by DCL.
Ties/Webs/Spacers	Plastic/metal/foam connectors maintain form spacing during concrete pour and remain in place after curing.
Reinforcement	Vertical and horizontal rebars placed within the concrete core as specified by structural design. Rebars shall be certified by DCL.
Concrete Core	Ready-mixed concrete with a minimum compressive strength of 35 MPa (cube) for loadbearing walls. Mix design, workability and maximum aggregate size shall be selected to achieve full consolidation within the form cavity and around reinforcement and web spacings and shall not exceed the maximum aggregate size declared for the ICF system by the system owner. Shall comply with Dubai Building Code Part F and referenced codes/standards.
Temporary Bracing /Alignment System	Adjustable steel bracing system to plumb walls and support scaffolding during concrete pour; typically, part of the installation method.
Finishes	Interior (e.g. gypsum boards) and exterior finishes (plaster/cladding systems) are required to protect foam and meet performance requirements.

Waterproofing / Drainage (*where applicable*)	Below-grade applications require waterproofing and drainage design appropriate for the exposure and site conditions; detailing must be consistent with the building's envelope moisture control intent.

PERFORMANCE CONSIDERATIONS

1. Thermal Compliance (Al Sa'fat)

- The ICF wall and overall building envelope shall be designed, specified, and documented to comply with Al Sa'fat requirements for the targeted rating level, including minimum envelope performance requirements for non-glazed elements.
- The design shall address thermal bridging by eliminating or insulating thermal bridges at structural junctions, openings, and penetrations, in line with Al Sa'fat provisions.

2. Fire Resistance Ratings

- The required fire-resistance rating for ICF walls shall be achieved for the relevant building occupancy and fire strategy and shall be demonstrated for the complete wall assembly (including concrete core, reinforcement, finishes/linings, joints, and penetrations).
- Fire-resistance compliance shall satisfy Dubai Civil Defence listing/acceptance requirements.

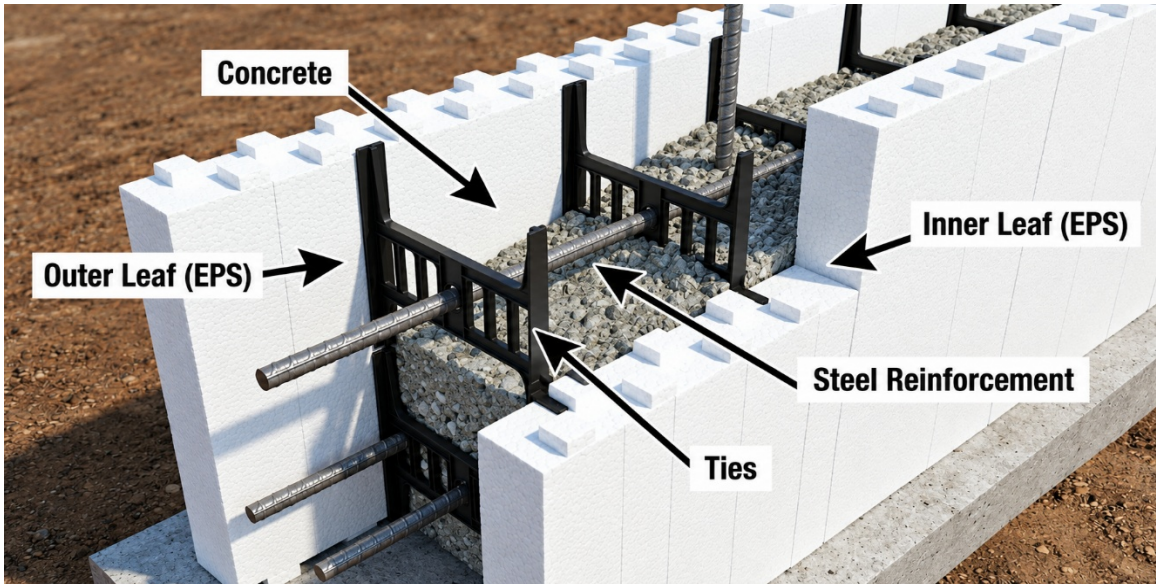
3. Structural Load Capacity

- ICF structural walls shall be designed and detailed as reinforced concrete elements in accordance with the Dubai Building Code (DBC) and its referenced international standards (including adopted wind and seismic loading basis and reinforced concrete design provisions).
- The structural design shall demonstrate adequacies for all applicable load actions (including gravity, wind, and seismic effects, as relevant to the project), and shall include project-specific detailing for reinforcement, openings connections, and robustness requirements.

4. MEP Integration and Maintainability

- System design and method statements shall ensure controlled penetrations and embedment's without compromising reinforcement or concrete core integrity. It shall ensure maintainability of access

CROSS-SECTION



strategies for concealed services consistent with good practice and authority expectations.

ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

1. Maintenance and Repair
   - Durability: ICF buildings require minimal structural maintenance due to the protection of the concrete.
   - Renovation: Future renovations involving wall penetrations (e.g., new vents) require core drilling tools. The building owner should be provided with an "As-Built" manual indicating the location of webs (for hanging heavy items) and the nature of the wall assembly.
2. Sustainability
   - Recycled Content: Many ICF webs are made from 100% recycled polypropylene, contributing to "Recycled Content" credits.
   - Construction Waste: The modular nature of the blocks significantly reduces construction waste compared to plywood formwork, which is often discarded after a few uses.
3. Competency and Installation Control: Crews shall be trained and competent in ICF installation, and the installation method shall include defined inspection and hold points (as applicable) to verify wall alignment/bracing, reinforcement placement, openings and embedment's, and penetration locations prior to concrete placement.
4. Building System Approval Pathway: The ICF product/system proposed for use in Dubai projects shall be treated as a building system and shall be submitted through the applicable Dubai Municipality Building System Approval pathway, supported by system documentation, installation

requirements, limitations, and performance evidence (international evaluation reports may be used as supporting evidence but shall not be treated as automatic acceptance).

5. Pilot Project: Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.
6. Product Compliance Pathway: The ICF system selected for use shall have a clearly defined compliance basis and documented permitted-use scope; where available, formal evaluation reports (e.g., ICC-ES) shall be provided to define installation requirements, limitations, and required finishes, and the evaluation scope shall be demonstrably aligned with the intended building application.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat – Dubai Green Building Evaluation System
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. Dubai Central Laboratory Certification Schemes
5. ICC-ES AC353: Acceptance Criteria for Stay-in-place, Foam Plastic Insulating Concrete Form (ICF) Systems
6. ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
7. ASTM E2634: Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems.
8. ACI 318: Building Code Requirements for Structural Concrete

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

3D Panel Construction System

(Loadbearing & Non-Loadbearing Applications)

Building System Category:	Site Construction Methods and Technologies
Sub-Category:	3D Panel Construction System

Building System Name:	3D Panel Construction System
Description:	The 3D Panel Construction System, also referred to 3D Wire Panel System, EPS Core Panel System, or Structural Concrete Insulated Panel (SCIP) System, consists of factory-made expanded polystyrene (EPS) insulation core sandwiched between two welded wire mesh layers. The mesh layers are connected through the EPS insulation core by diagonal steel truss wires/connectors forming a three-dimensional welded-wire reinforcement system. Once the panels are erected, aligned, connected, and temporarily supported on site, shotcrete, or concrete facing is applied to both sides of the panel to form a reinforced composite wall, floor, or roof element, as applicable to the approved system. The completed element may be designed as loadbearing or non-loadbearing, subject to structural design, system limitations, fire performance, durability requirements, and authority approval.



WHO CAN APPLY

Applications/requests to use 3D Panel Construction as a building system should be submitted by one (or more) of the following stakeholders:

- System owner / manufacturer (or the regional agent) responsible for the proprietary SCIP product, technical literature, and compliance evidence. International manufacturers must typically appoint a local representative or have a registered branch in Dubai.
- Local supplier / installer formally authorized by the system owner/manufacturer, responsible for installation method statements, QA/QC, and competency evidence.

WHERE IT CAN BE USED

1. By Building Element / Function
    - External walls (envelope): as load-bearing structural walls or non-load-bearing infill walls, depending on the structural scheme and design.
    - Internal walls & partitions: load-bearing and non-load-bearing partitions, shafts/cores (where designed accordingly), and compartmentation walls when part of a tested/approved fire-rated assembly.
    - Floors & roofs: as composite floor/roof panels with shotcrete/concrete facing, per the system evaluation/design tables and details.
2. By Occupancy (Building Use)

In principle, these systems are evaluated as concrete wall/floor/roof assemblies (with protected foam core), so they can be applicable across many buildings uses when the required fire rating, structural capacity, and detailing are demonstrated.

Common practical occupancies include:

- Residential: villas and townhouses; low-rise apartments (subject to authority acceptance and code height/area limits).
- Commercial / Business: offices and mixed-use developments (often as infill/envelope on a primary RC/steel frame).
- Education / Community / Light industrial: feasible where the assembly satisfies fire-resistance and robustness needs (project-by-project engineering).

ADVANTAGES

- Speed & reduced site labor – panels are light and prefabricated; site work focuses on alignment, fixing, and shotcrete / concrete facing application.
- Lightweight before shotcrete / concrete facing – easier handling and potentially less heavy equipment (project-dependent).
- High thermal insulation – the EPS core contributes to reduced heat transfer through the envelope.
- Sound insulation and fire-safety – benefits when properly detailed and fully encased with concrete/shotcrete.
- Lower energy – Suppliers often promote lower operational energy demand due to insulation (claims vary by project).

LIMITATIONS & SPECIAL CONDITIONS

1. Code compliance is mandatory – the system must be designed and detailed as a structural concrete/shotcrete assembly in accordance with the Dubai Building Code (DBC). The minimum concrete grade shall be 35 MPa (cube strength) for structural loadbearing elements.
2. Shotcrete execution is a critical risk item – shotcrete application should conform to recognized shotcrete documents (e.g., ACI 506.2 with

guidance in ACI 506R) including material control, application, curing, and acceptance testing.

3. Concrete facing shall be properly controlled – where concrete facings are formed using poured concrete and formwork, execution shall conform to recognized reinforced concrete construction standards and practices, including material control, formwork stability, concrete placement and compaction, curing, dimensional control, cover verification, and acceptance testing.
4. Minimum shotcrete / concrete facing cover/thickness must be respected – a condition in 3D panel approvals is ≥ 50mm shotcrete / concrete facing cover over the welded wire reinforcement (with stated tolerances) for loadbearing and external walls, and ≥ 30mm for non-loadbearing internal partitions unless the approved design/rated assembly requires more.
5. Special inspection/QC may be required – approvals often require special inspection for poured concrete/shotcrete works (as applicable) to confirm compliance with specified materials, placement, and thickness.
6. Fire performance is assembly-specific – where a fire rating is required, it must be based on a tested assembly approved and certified by Dubai Civil Defence (DCD).
7. Modifications are controlled – cutting mesh/truss wires, enlarging openings, or creating large chases/penetrations can compromise composite action; modifications should be engineer-approved and detailed (local strengthening, added reinforcement, etc.).
8. Material Conformity – EPS and welded wire mesh shall have a valid product conformity certificate issued by the Dubai Central Laboratory (DCL). Shotcrete/concrete may only be supplied by DM approved and registered ready-mix concrete manufacturer.
9. Thermal & Acoustic Performance – Must adhere to DBC and Al Sa'fat Green Building Regulations.
10. Pilot Project – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.

KEY COMPONENTS & TECHNICAL DETAILS

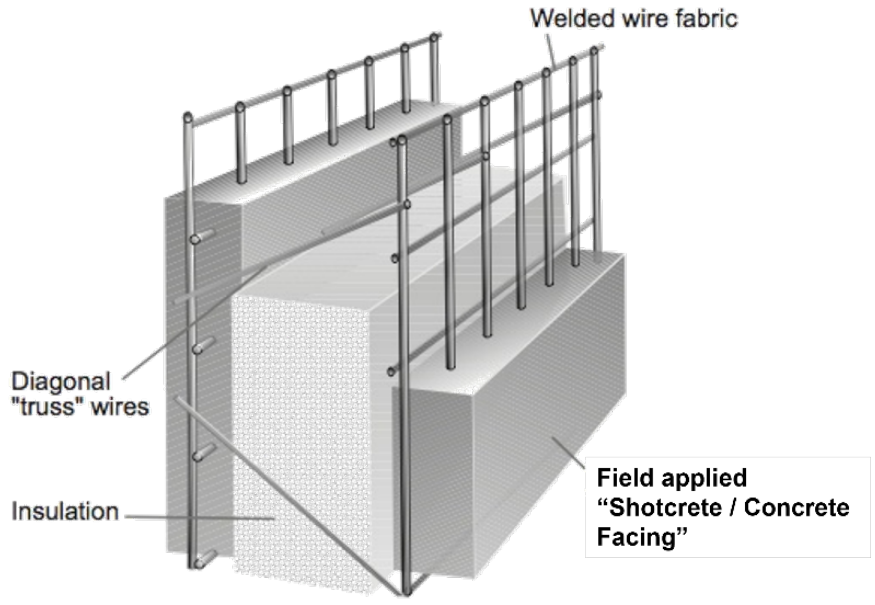
Component	Description
EPS Core	Rigid cellular polystyrene board; commonly specified to ASTM C578 (type and density per design and DM/DCD approvals).
Welded Wire Mesh (2 layers)	Provide reinforcement and anchorage for shotcrete / concrete skins; welded wire reinforcement is typically specified to standards such as ASTM A1064/A1064M (or equivalent). Welded wire mesh shall be certified by DCL.
Diagonal Truss Wires / Connectors	Galvanized truss wires/connectors that tie the two meshes through the EPS to create 3D truss action. They maintain spacing, and transfer shear between skins.
Shotcrete / Concrete Skins	Applied to both faces the specified thickness; approvals commonly reference ACI 506R (guide) and ACI 506.2 (specification) for shotcrete applications. Shall meet the requirements of DBC.
Connections & Detailing	Project-specific starter bars/dowels into reinforced concrete foundations or frames, mesh lapping, edge stiffening around openings, and embedded plates/anchors where loads or fixtures occur.

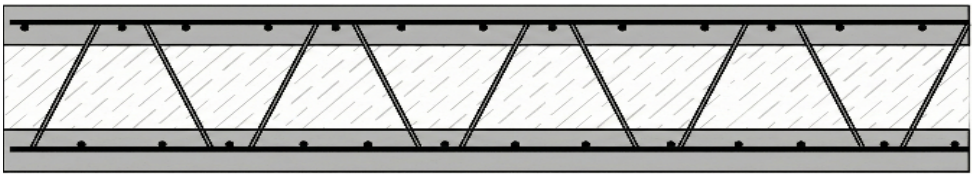
PERFORMANCE CONSIDERATIONS

- Structural capacity & serviceability – depends on shotcrete / concrete thickness, reinforcement, panel spans, openings, and connections; approvals require formal structural design/analysis and compliance with applicable building code provisions.
- Thermal performance – governed mainly by EPS type/density/thickness and thermal bridging at ribs, joints, and embeds. U-value calculations must comply with Dubai Building Code and Al Sa'fat requirements for external walls and energy efficiency regulations.

- Fire resistance – can achieve rated assemblies when tested and detailed and when foam plastic is properly protected/compartmented. Fire-rated assemblies shall be approved and listed by DCD.
- Acoustic performance – typically improved by the composite mass + insulated core; many system manuals cite good sound insulation when properly constructed. STC shall comply with Dubai Building Code and Al Sa'fat requirements.
- Moisture & durability – EPS itself is generally noted as moisture-resistant/inert in system guidance; durability in coastal/industrial environments depends strongly on galvanization/coating of wires and adequate concrete cover quality.
- Quality control / inspection – special inspection is often required for shotcrete placement in code-based approvals.

CROSS-SECTION





ILLUSTRATIVE APPLICATIONS







ADDITIONAL NOTES / USEFUL INFORMATION

- QA/QC essentials – The quality control process shall include verification of panel alignment and plumbness, mesh continuity and lap lengths, embed and opening locations, shotcrete thickness, curing regime, and proper treatment of rebound areas, voids, and defective patches. The use of a temporary bracing system is highly recommended to maintain panel alignment, stability, and plumbness prior to and during shotcrete application.
- Coordination for MEP – plan penetrations/chases early to avoid excessive cutting of meshes/truss wires; any modifications should be engineer-approved.
- Maintenance & Repair: Periodic inspections are required for surface cracks, joint sealing, and waterproofing protection. Repairs must use approved materials to maintain compliance.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC- 2021 Edition)
2. Al Sa'fat Green Building Regulations (where applicable)
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. Dubai Central Laboratory Certification Schemes
5. ACI 506R – Guide to Shotcrete
6. ACI 506.2 – Specification for Shotcrete
7. ASTM C578 – EPS Insulation Specification
8. ASTM A1064/A1064M – Welded Wire Reinforcement for Concrete

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

POST-TENSIONED CONCRETE SYSTEMS

(Post-Tensioned Flat Slabs Systems)

Building System Category:	Structural Systems & Assemblies
Sub-Category:	Site Construction Methods & Technologies

Building System Name:	Post-Tensioned Concrete Systems (*Flat Slabs Systems*)
Description:	A post-tensioned (PT) slab is a cast-in-place concrete floor system in which high-strength steel tendons are stressed after the concrete has gained sufficient strength, then grouted to provide bond and corrosion protection. The prestressing force introduces beneficial compressive stresses that enables longer spans, reduced slab thickness/self-weight, and improved crack and deflection control when properly designed, installed, and inspected in accordance with the governing codes and specifications.





WHO CAN APPLY

Applications for approval of bonded PT system may be submitted by specialist PT contractors that can demonstrate competence, local readiness, and traceable linkage to the system owner/manufacturer.

- The PT contractor must be Dubai-based and holds a commercial license issued by Dubai Department of Economy and Tourism (DET) with the following activity "Prestressed Concrete Contracting".
- The contractor must register with the Consultants & Contractors Qualification Section of Building Permits Department at Dubai Municipality.
- The local company should have an established relationship (attested contract) with the PT system owner ("mother company"), including technical/logistical support expectations and exclusivity arrangements.
- The mother company should have demonstrated capability in executing PT works and ownership/manufacture of key kit PT components (anchorage).

WHERE IT CAN BE USED

Bonded PT concrete slabs may be considered for building projects such as:

- Residential, commercial, hospitality, institutional buildings (typical floor framing).
- Long-span slabs, podium slabs, parking slabs (where building structural design demonstrates compliance with Dubai Building Code and relevant design codes).

Not in scope of this guide: infrastructure/bridge PT applications.

ADVANTAGES

Typical advantages of bonded PT slabs in buildings include:

- Longer spans and reduced number of columns, enabling more flexible architectural layouts.
- Reduced slab thickness and self-weight (project-dependent) compared to conventional reinforced concrete slabs, potentially reducing overall foundation demands.
- Improved serviceability performance through active crack control and reduced long-term deflection when properly designed for sustained loads, shrinkage and temperature.
- Reduced reinforcement congestion and improved concrete placement quality when coordinated with detailing.
- Potentially faster floor cycle times through optimized formwork/rebar installation and early stressing (subject to concrete strength gain and QA controls).

LIMITATIONS & SPECIAL CONDITIONS

1. Scope Limitation
   - Bonded PT tendons (grouted ducts). Unbonded PT is outside this guide's scope and not accepted for Dubai buildings under this specific approval pathway.
2. System Requirements

- Structural design shall comply with the Dubai Building Code and applicable PT provisions and shall be prepared/verified by qualified structural engineers.
- Only Dubai Central Laboratory (DCL) certified strands with nominal tensile strength 1860 MPa shall be used.
- Only the anchorage assembly (anchor head/block, wedges, bearing/stressing plate) supplied and approved by the mother company shall be used.
- Metal ducts – galvanized steel, flat or corrugated, with minimum wall thickness 0.4mm.
- Grouting – grout must be cementitious; grout shall achieve a minimum 28-day compressive strength is not less than the specified strength of concrete.

3. Pilot Project Requirements

- The PT slab system requires a pre-approved pilot project, where a maximum of 3 pilot projects may be executed simultaneously. Final approval may be issued upon successful completion of one pilot project.
- Dubai Municipality may, at the discretion of the approving committee, waive the pilot project requirement where the PT contractor demonstrates more than five years of experience in the UAE and has completed at least 20 projects using the same post-tensioning system, with a combined post-tensioned area of not less than 1,000,000 m^2. The applicant shall provide full details of all completed projects, together with recommendation letters from the consultants of at least three projects selected by Dubai Municipality.

4. Quality-Critical Nature of Bonded PT

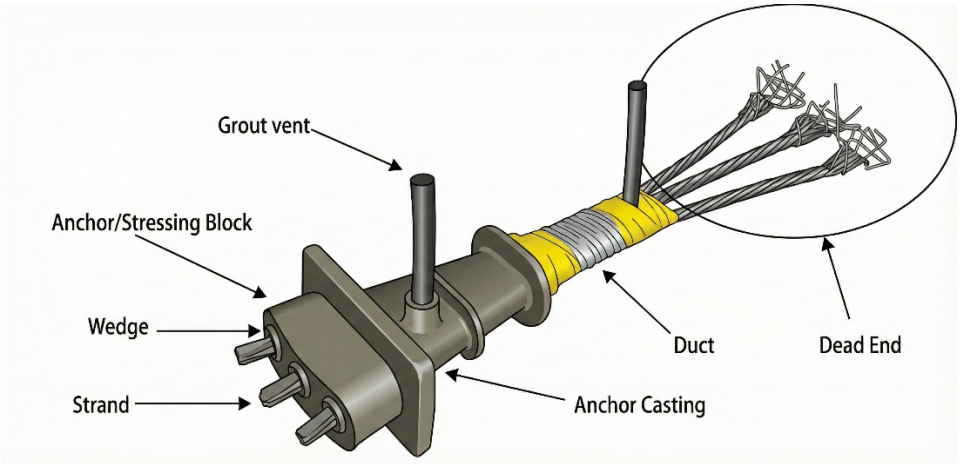
Bonded PT performance depends strongly on:

- Correct tendon placement and restraint detailing,
- Controlled stressing sequence and measurement discipline,
- Proper grouting execution (mixing, injection, venting, continuity verification),
- Robust supervision and inspection records.
- Calibrated equipment and competent crews.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Prestressing steel strand	High-strength, low-relaxation 7-wire strand specified under ASTM A416/A416M or BS 5896 (tensile strength of 1860 MPa).
Anchorages (PT Kit)	Anchorage assemblies (anchor head / block, wedges, bearing / stressing plate) transferring tendon force to concrete. System-specific (static load, load transfer, fatigue) performance must be verified. Anchorage components shall conform to the recognized standards/specifications with traceable mill certificates and test reports.
Ducts (Sheathing)	Galvanized metal ducts (flat/corrugated) enclosing strands (minimum thickness 0.4mm)
Grout	Cementitious grout for complete filling of ducts, bond development, and corrosion protection.
Stressing Equipment	Hydraulic jacks/pumps/gauges with calibration control. Stressing equipment shall be calibrated by an EIAC-accredited calibration laboratory at defined intervals.
Venting/Grouting Hardware	Vents, inlets/outlets, caps and accessories to enable complete grouting and verification.

PT KIT COMPONENTS



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Bonded system quality is grouting quality – Emphasis shall be placed on grout materials, mixing/pumping controls, venting, and site records demonstrating filling and stable grout performance.
- Future Modifications – Openings/coring in PT slabs require controlled procedures and engineer's approval to prevent tendon damage and loss of capacity.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. ACI 318-19 Building Code Requirements for Structural Concrete
3. ASTM A416/416M – Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete
4. BS 5896 – High tensile steel wire and strand for the prestressing of concrete. Specification

5. Dubai Central Laboratory Certification Schemes

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

Voided Slab System
(Void Formers)

Building System Category:	Structural Systems & Assemblies
Sub-Category:	Site Construction Methods & Technologies

Building System Name: **Voided Slab System (*Void Formers*)**





WHO CAN APPLY

Description:	The Voided Slab System is an advanced reinforced concrete floor system designed to reduce self-weight while maintaining structural integrity. It incorporates proprietary hollow plastic void formers (manufactured from High-Density Polyethylene (HDPE) or Polypropylene (PP)) placed within the slab to displace concrete in structurally redundant zones. The system minimizes concrete usage, enhances span capacity, and improves material efficiency without compromising load-bearing capacity. Common typologies include spherical/ellipsoidal voids and box void formers.

Applications/requests to use voided slabs as a building system should be submitted by one (or more) of the following stakeholders:

- System owner / manufacturer (or the regional agent) responsible for the proprietary void formers product, technical literature, and compliance evidence. International manufacturers must typically appoint a local representative or have a registered branch in Dubai.
- Local supplier / installer formally authorized by the system owner/manufacturer, responsible for installation method statements, QA/QC, and competency evidence.

WHERE IT CAN BE USED

The system is approved for use in cast-in-place reinforced concrete structures where weight reduction and span optimization are critical.

- Long-Span & Flat Soffit: Ideal for office buildings, hospitals, and educational institutions requiring flexible, column-free layouts with long spans. Moreover, it reduces the need for drop beams, maximizing clear-floor-to-ceiling heights.
- High-Rise Buildings: Significantly reduces total building dead load which reduces seismic base shear.

- Parking Structures & Podiums: Suitable for parking decks with high load-bearing requirements. The reduced self-weight allows for wider column grids, improving parking efficiency and vehicle maneuverability.

Notable use boundaries are usually governed by column punching zones, openings/penetrations, high shear lines, and detailing feasibility.

ADVANTAGES

- Reduced self-weight & concrete volume – removing concrete from the neutral zone lowers dead load and may enable longer spans, reduced column loads, and potentially smaller foundations.
- Flat soffit (no downstand beams in many layouts) – simplifies architectural coordination and can reduce MEP clashes compared with deep beam systems.
- Potential sustainability benefits – lower concrete volume can reduce embodied impacts; some void formers are produced from recycled plastics (system dependent).
- Construction logistics (system dependent) – modular cages can shift work off-site to controlled conditions (depends on the selected system).

LIMITATIONS & SPECIAL CONDITIONS

1. Shear and punching shear – voids reduce shear capacity and require solid zones around columns/walls and sometimes shear reinforcement. The extent of these zones is determined by shear perimeter checks.
2. Reduced shear resistance – The shear resistance of a voided region is lower than that of a solid slab of the same depth. Design shall apply a reduction factor appropriate to the proprietary system's void geometry and spacing, substantiated by the system owner's test evidence, and shall provide solid strips or shear reinforcement where demand exceeds the reduced capacity.
3. Complex analysis and detailing – designers often rely on FE modelling plus vendor rules for void layout, edge strips, openings, and construction stages.

4. Void placement restrictions – voids are typically omitted near columns/edges/openings.
5. Construction QA/QC is critical – risks include voids floating or shifting, inadequate consolidation around cages, damaged voids, incorrect cover, and poor interface preparation in hybrid solutions.
6. Pilot project – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Void Formers	Typically, polypropylene / HDPE / recycled plastics elements (spheres / ellipsoids / boxes) arranged in a grid; geometry and spacing are system-specific.
Reinforcement	Void formers are typically held by spacers, clips, and/or prefabricated reinforcement modules to maintain position during pouring and vibration; relocation from approved plans is usually controlled by the structural engineer.
Solid Zones / Strips	Voids are omitted near columns, walls, slab edges, openings, and high shear lines to preserve punching and shear capacity
Shear Reinforcement	Studs/links/rails (project-specific) where punching/shear demands exceed capacity.
Concrete Placement	Cast-in-place concrete. Recommended to be placed in two layers to prevent floating of voids.

PERFORMANCE CONSIDERATIONS

- Punching shear at columns – usually checked per the governing concrete code (e.g., DBC/ACI approach) with special attention to the transition between solid and voided regions.
- Shear in voided regions – apply system-specific reductions and provide solid strips or shear reinforcement when demand exceeds capacity.
- Serviceability – deflection, cracking, and vibration require explicit checks (often FE-based), especially for longer spans and lighter floors.

- Fire resistance – Fire performance shall be demonstrated for the voided configuration. The reduced concrete section and the behavior of the plastic void formers under fire exposure shall both be taken into account, supported by test evidence or a system-specific assessment.
- Openings & penetrations – must be coordinated early; cutting/core drilling without a void map can reduce capacity or hit voids/rebar.
- Durability & robustness – Ensure adequate cover, compaction, and detailing continuity.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- System selection – "voided slab" is not one product; performance and constructability depend heavily on the proprietary system's void geometry, fixing method, and detailing rules. Use the supplier's latest technical manuals as controlling documents alongside the design code
- QA/QC checklist items typically include – void layout and solid zones verification, fixing to reinforcement (anti-float), confirm voids are not damaged, cover blocks/chairs, pour sequence, compaction/vibration approach, and as-built void maps for future coring.
- Independent technical substantiation is required – combine (a) the Dubai Building Code and the concrete design standards it references, (b) verification of design parameters, and (c) system-specific technical manuals and test evidence.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC – 2021 Edition)

2. ACI 318-19 Building Code Requirements for Structural Concrete
3. Dubai Central Laboratory Certification Schemes

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

LGSF Structural Panelized Systems

Building System Category:	Structural Panelized System
Sub-Category:	Steel Structure

Building System Name: LGSF Structural Panelized Systems



Description:

A Light-Gauge Steel Frame (LGSF) Structural Panelized System is a 2D (panelized) / 3D modular structural system where load-bearing wall panels and floor panels are fabricated off-site (or in a controlled on-site yard) and assembled onsite / offsite to form the building's gravity and lateral force-resisting system. The primary structure is cold-formed steel (CFS) framing designed per recognized CFS standards, with wall panels incorporating lightweight concrete infill (with polystyrene beads) and optional internal/external boards and EIFS, while floor panels use steel deck + concrete composite slab with screed and finishes.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the modular system's design basis, production controls, and site installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the modular system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the modules on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of steel structures issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

- Low to mid-rise buildings where CFS panelized structural walls and diaphragms are feasible and code-compliant (gravity + lateral).
- Residential / hospitality / commercial / institutional projects subject to Dubai Building Code (DBC) compliance, Civil Defence requirements, and authority acceptance of the specific assembly details and fire strategy.

- Podium/upper-level lightweight structures, vertical extensions, and fast-track projects benefiting from off-site panelization (provided load paths, robustness, and fire compartmentation are demonstrated).
- Typical envelope and internal partitions when the selected board/EIFS/waterproofing build-up is matched to exposure and required ratings (fire, acoustic, thermal).

ADVANTAGES

- Speed & program certainty – parallel off-site fabrication and on-site works reduces critical path time.
- High dimensional accuracy / QA – controlled roll-formed steel and factory assembly improves tolerances and repeatability.
- Lower dead load – compared to conventional RC frames, enabling smaller foundations and easier vertical extensions (project-specific).
- Integrated performance build-ups – insulation, boards, and EIFS can be configured for target thermal and moisture performance.
- Efficient composite floors – steel deck acts as permanent formwork and positive-moment reinforcement in composite slab systems.

LIMITATIONS & SPECIAL CONDITIONS

1. Authority / code acceptance is assembly-specific – approvals typically require submitted structural design basis, tested fire-rated assemblies, and material compliance with recognized specifications.
2. Combustibility risk management (polystyrene / EIFS) – EPS/XPS insulation and polymer-based EIFS must be properly encapsulated/protected and supported by compliant test evidence for surface burning and fire resistance where applicable.

3. **Corrosion durability is critical in coastal/humid environments** – specify appropriate coatings and detailing (avoid trapped moisture; isolate dissimilar metals). Base material/coating specs should align with recognized coated-steel standards.
4. **Connections govern performance** – hold-downs, anchors, diaphragm collectors, and panel-to-panel joints must be engineered for robustness, progressive collapse considerations, and construction tolerances.
5. **Wet areas / external exposure detailing** – cementitious boards, vapor control layers, drainage paths, and waterproofing must be explicit to avoid moisture damage and corrosion.

KEY COMPONENTS & TECHNICAL DETAILS

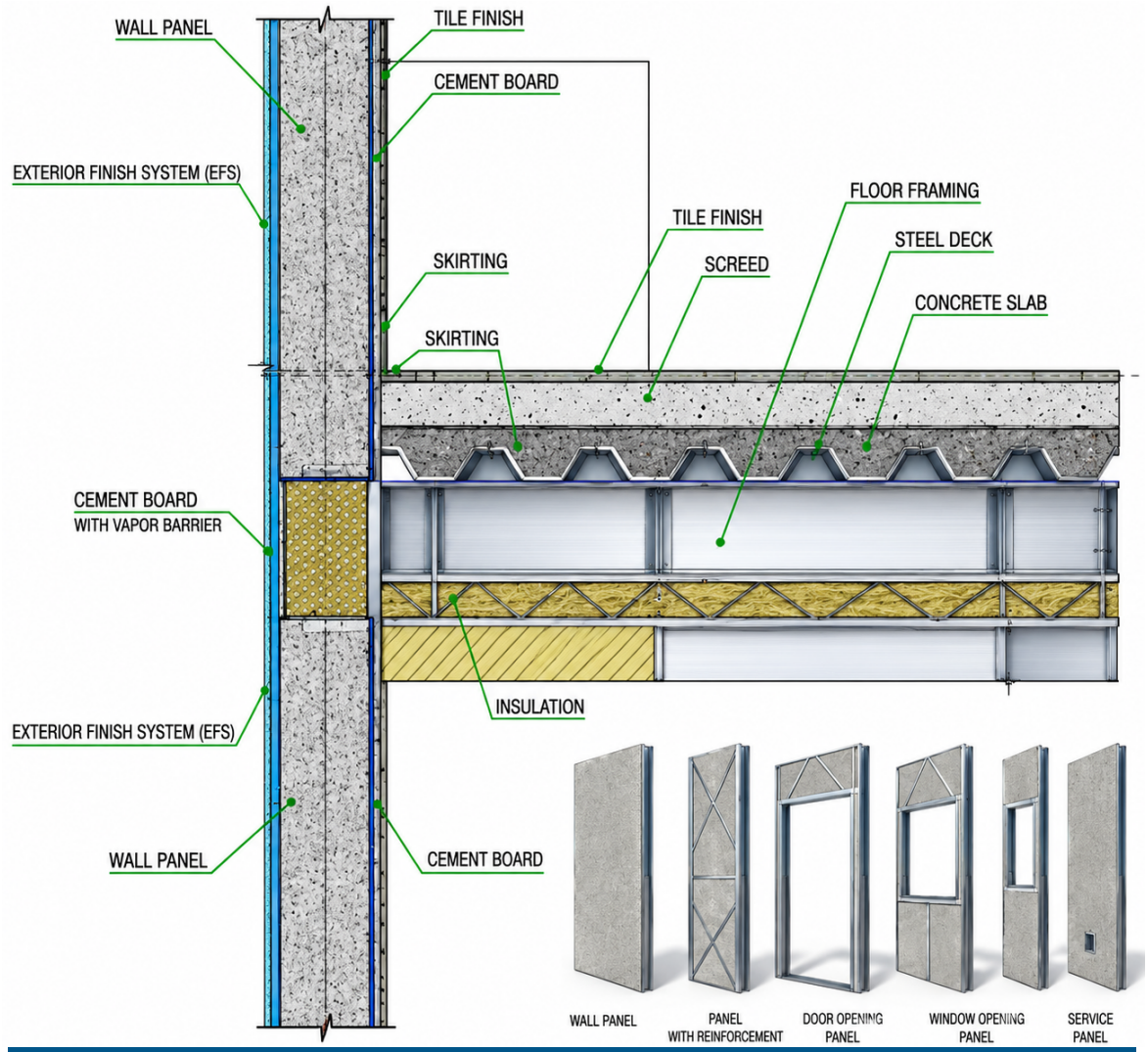
Component	Description
Wall Panels (Structural)	
CFS Framing	Galvanized cold-formed studs/tracks, built-up jambs/headers, chords, boundary elements; designed per CFS structural standards.
Steel Material Specification	Coated steel sheet suitable for framing members; project specs typically reference coated-steel framing standards.
Infill	Lightweight concrete with polystyrene beads (acts as fill/thermal mass; structural contribution must be justified if relied upon).
Sheathing	Gypsum boards for interior lining; cementitious backer/cement boards in wet areas and/or external sheathing builds.
Bracing / Lateral Elements	Strap bracing, sheathed shear walls, portal frames, or engineered braced panels (system depends on design).
Fasteners & Anchors	Self-drilling screws, bolts, powder-actuated/chemical anchors as applicable; corrosion-resistant grades, tested capacities required.
Insulation	EIFS system may be used if required.
Floor Panels (Composite)	
CFS Joist/Frame	Panel perimeter & secondary members – supports deck and distributes loads.
Steel Deck	Profiled deck acting as permanent form + composite reinforcement per SDI composite deck standard.

Concrete Slab + Screed + Floor Finish	Composite slab build-up per design and fire/acoustic targets.

PERFORMANCE CONSIDERATIONS

1. Structural (gravity + lateral) – design per CFS member and framing standards; verify load paths, diaphragms, drift, overturning, and anchorage.
2. Fire resistance – use tested fire-resistance-rated wall/floor assemblies and ensure continuity at joints/penetrations.
3. Surface burning / linings – ensure exposed interior/exterior finishes meet relevant surface burning requirements where applicable.
4. Acoustics – target STC via tested assemblies; laboratory measurement commonly per ASTM E90 (and rating calculations via related methods).
5. Thermal & condensation control – insulation selection (EPS/XPS types/grades) and vapor control layers must prevent interstitial condensation and thermal bridging.

6. Durability – corrosion protection, coating class, cut-edge protection, and moisture detailing drive service life.



CROSS-SECTION

ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- **Panelization workflow** – establish fabrication tolerances, lifting points, transport restraints, on-site sequencing, and temporary stability bracing until the full lateral system is engaged.
- **Interface coordination is key** – slab edges, façade transitions, window/door openings, MEP penetrations, and firestopping should be resolved in shop drawings before fabrication.
- **Product conformity** – key regulated materials/products may require Dubai Municipality/DCL certification where applicable under DM processes.
- **Document set typically expected** – structural calculations, panel/shop drawings, ITP/QC records, material certificates, fire/acoustic test reports, and installation method statements aligned with DBC and Civil Defence requirements.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat – Dubai Green Building System

3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. Dubai Central Laboratory Certification Schemes
5. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Members
6. AISI S240 – North American Standard for Cold-Formed Steel Structural Framing

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

Prefabricated Timber Frame Panel System
(Loadbearing / non-loadbearing)

Building System Category:	Structural Panelized Systems
Sub-Category:	Timber Structures

Building System Name:	Prefabricated Timber Frame Panel System



Description:	The Prefabricated Timber Frame Panel System is a factory-built wall and floor/roof panel method where engineered timber studs/joists are assembled with structural sheathing, thermal/acoustic insulation, and air/vapour/water-control membranes, then delivered to site for rapid erection. Panels can be open (framing + sheathing) or closed (including insulation, membranes, windows/doors, pre-installed MEP routes, and sometimes internal boards/finishes). Structurally, the system behaves as a load-bearing wall-and-diaphragm system (vertical gravity load paths + lateral load resistance via sheathing bracing, diaphragms, and hold-down/tie-down connections).

WHO CAN APPLY

Applications/requests to use Timber Frame Panel as a building system should be submitted by one (or more) of the following stakeholders:

- System owner / manufacturer (or the regional agent) responsible for the product, its technical literature, and its compliance evidence. International manufacturers must typically appoint a local representative or have a registered branch in Dubai.
- Local supplier / installer formally authorized by the system owner/manufacturer, responsible for installation method statements, QA/QC, and competency evidence.

WHERE IT CAN BE USED

Typical applications (subject to Dubai Municipality and Dubai Civil Defence acceptance for the specific project):

- Residential (low rise) – villas and townhouses.
- Industrial/support buildings – site offices, amenities blocks, light industrial ancillary buildings (where fire strategy and durability detailing are addressed).
- Hybrid structures – timber panels as infill within RC/steel primary frames, or timber superstructure over an RC podium/core (common approach to manage fire/egress and robustness constraints).

Elements within a building:

- External walls (rainscreen/cladding façade builds), internal partitions (non-loadbearing or loadbearing), floor cassettes, roof cassettes, parapets, and façade feature walls. Suitability is ultimately governed by approved building codes and the project's fire strategy/approval pathway (Civil Defence), plus material compliance (durability, safety).

ADVANTAGES

- Speed & programme certainty – high parallelization (factory production while foundations proceed), fewer wet trades, faster enclosure.
- Quality & tolerances – controlled fabrication, repeatable detailing, improved airtightness potential (when membranes and junctions are designed/installed as a system).
- Thermal efficiency – easy integration of high-performance insulation and reduced thermal bridging (with correct stud spacing, thermal breaks, and continuous layers).
- Lower embodied carbon potential – timber-based structural systems typically offer lower embodied carbon than traditional heavy structural solutions when responsibly sourced (project LCA-dependent).
- Reduced site labour & safer construction – fewer high-risk trades onsite, lighter lifts (relative to RC), and less site congestion.
- Design flexibility (panelized) – good for standardized grids while still allowing architectural variety (open/closed panels, façade options, hybrid frames).

LIMITATIONS & SPECIAL CONDITIONS

1. Fire strategy is critical – timber is combustible; compliance typically relies on rated assemblies, protected linings (e.g., gypsum), cavity barriers, firestopping of penetrations, and Dubai Civil Defence approval and fire design approach. Firestopping/penetration control must follow approved systems and project requirements.
2. Moisture & durability in Dubai climate – requires robust façade/rainscreen design, membrane continuity, condensation control, and moisture-managed interfaces at slabs/foundations; avoid trapped moisture during construction.

3. **Termite/insect risk management** – incorporate termite barriers/soil treatment strategy, treated or naturally durable timber in vulnerable locations, detailing that avoids concealed access and moisture accumulation.
4. **Acoustic performance must be engineered** – party walls/floors need tested constructions (mass–spring–mass build-ups, resilient layers, flanking control).
5. **Design coordination lock-in (especially closed panels)** – late MEP/architectural changes are disruptive; requires early BIM coordination and approved shop drawings.
6. **Connection & robustness sensitivity** – uplift/hold-downs, diaphragm chords/collectors, progressive collapse robustness, and façade anchorage must be explicitly engineered.
7. **Material compliance for Indoor Air Quality and sustainability** – interior composite wood products must avoid added urea-formaldehyde, and timber sourcing may need certified/accredited supply to satisfy Al Sa'fat Dubai green building requirements.
8. **Pilot Project** – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Structural Frame (Factory-Built)	
Studs / Joists / Plates / Headers	Kiln-dried graded timber or engineered wood (LVL/I-joists), moisture-controlled and dimensionally stable.
Sheathing for Racking / Diaphragms	OSB/plywood (or cementitious boards in specific façade/fire/moisture strategies), nailed/screwed per structural design.
Hold-downs and Anchors	Galvanized/stainless steel connectors, straps, brackets, screw fixings, anchor bolts to RC slabs/grade beams; designed for uplift, shear transfer, and overturning.
Building Physics Layers (System-based)	

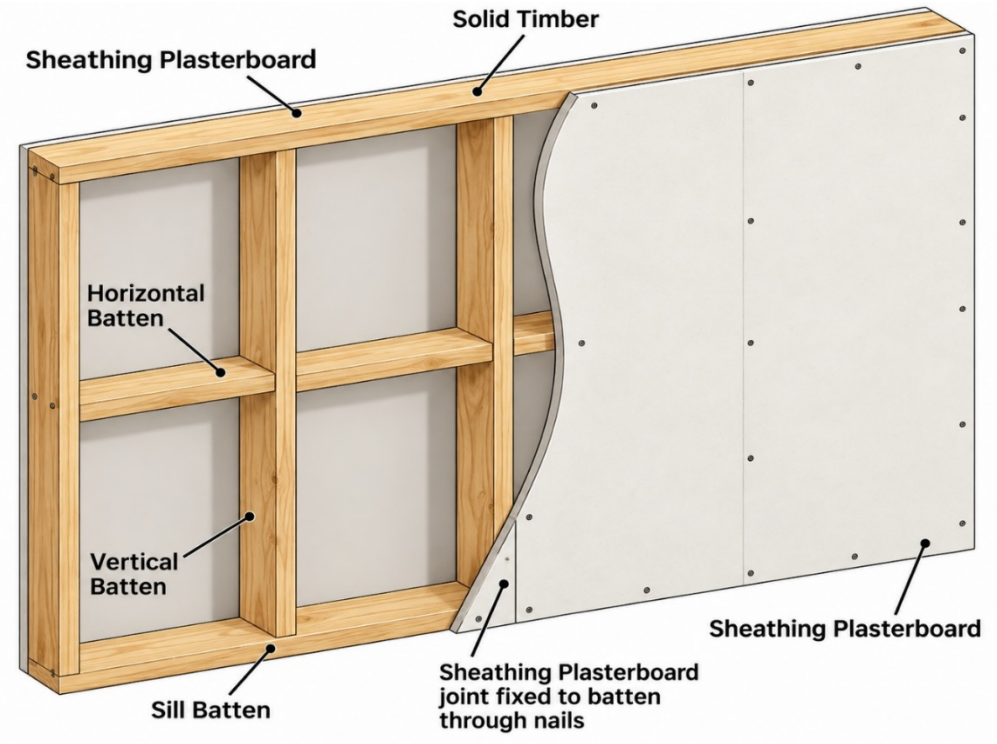
External Barriers	Weather-resistive barrier (WRB) / breather membrane (external), air barrier (continuous), and vapour control (positioned based on hygrothermal analysis for a cooling-dominated climate).
Insulation	Mineral wool / glass wool / PIR / PUR / etc. In Dubai green building requirements, insulation must meet toxicity/combustion constraints, be fire resistant per Civil Defence requirements, and be accredited/certified by Dubai Central Lab
Internal Linings	Gypsum boards (often for fire/acoustic), cement boards in wet zones as required, with robust jointing and sealant strategy.
Fire & Acoustic Detailing	Cavity barriers/fire blocking, fire-rated board layers, tested sealants and penetration systems, perimeter firestopping at slab edges and façade junctions (project-specific listings).
Panel Typologies	
Open Panels	Frame + structural sheathing (fast, flexible onsite).
Closed Panels	Add insulation + membranes + service voids; may include windows/doors and internal boards (highest speed, highest coordination demand).
Floor/Roof Cassettes	Joists + deck/sheathing + insulation zones, designed for vibration/serviceability and diaphragm action.

PERFORMANCE CONSIDERATIONS

- Structural capacity & serviceability – axial compression in studs, panel buckling restraint, racking shear of walls, diaphragm deflection, and connection slip; control floor vibration and long-span deflections for comfort. Dubai requires structural design by qualified licensed engineers and durability/safety against critical load effects.
- Fire resistance & reaction-to-fire – demonstrate required fire resistance rating of wall/floor assemblies (linings, insulation type, cavity barriers) and ensure penetrations/firestopping are listed or tested to the project requirement and accepted approved by Dubai Civil Defence (DCD). Assemblies shall be approved and listed by DCD.
- Thermal performance – U-values, thermal bridge control at studs/junctions, continuity of insulation, and detailing around openings. Shall comply with DBC and Al Sa'fat requirements.

- Airtightness – membrane continuity, taped joints, gasketed service penetrations; plan QA/QC and site testing (where specified).
- Moisture/condensation risk – hygrothermal assessment of wall build-ups (especially with exterior claddings and interior cooling), drainage/ventilation of rainscreens, and construction moisture management.
- Acoustics – airborne + impact sound targets, resilient layers, decoupled linings, and flanking control at junctions. Shall comply with DBC and Al Sa'fat requirements.
- Durability – preservative strategy for vulnerable zones, corrosion-resistant fixings in coastal/saline exposure, and maintenance access for façade systems. Termite prevention should be addressed as a defined strategy (barriers/treatments + detailing).

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Approval package (practical expectation for Dubai projects) – system description, structural basis of design, panel engineering calculations, connection schedules, fire strategy narrative + assembly evidence, façade moisture strategy, QA/QC plan, factory inspection/testing regime, and traceability (materials + treatments).
- Sustainability compliance – Dubai green building requirements include (a) a minimum certified/accredited timber volume threshold and (b) restrictions on added urea-formaldehyde in interior composite wood products, both directly relevant to Timber Frame Panel System supply chains and specifications.
- Interfaces drive risk – most defects occur at base of wall, around openings, balconies/ledgers, roof-wall junctions, and MEP penetrations; detail these early and lock them into manufacturing drawings.

- Site handling & storage – keep panels dry, ventilated, and protected from UV and wetting; control lifting points and temporary bracing to prevent racking damage.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire & Life Safety Code of Practice (UAEFLSC)
3. Al Sa'fat Green Building Regulations
4. National Design Specification (NDS, AWC)
5. International Building Code (IBC, ICC)
6. ASCE 7 – Wind and Seismic Design
7. AWPA Standards and Guidance – Timber Treatment and Termite Protection
8. FSC / PEFC Certification
9. ISO 21930 / EN 15804 – EPD Standards

Building Permits Department

Research & Building Systems Section

Building Systems Approval

Pre-Engineered Steel Building Systems (PEB)

(Structural Steel Frame & Enclosure Systems)

Building System Category:	Prefab Structural Components
Sub-Category:	Structural Steel

Building System Name:	Pre-Engineered Steel Building Systems (PEB)



Description:	PEB are factory-designed and shop-fabricated steel building "kits" supplied by a manufacturer as an integrated structural frame + secondary framing + building envelope (roof/wall panels, insulation, trims, etc.), then bolted/fastened together on site. In typical PEBs, the primary framing comprises rigid frames / rafters / columns (often built-up/tapered members), while secondary framing uses cold-formed Z/C purlins that support the roof and wall cladding. PEBs are known for their efficiency in large-span, low-rise applications such as warehouses, industrial facilities, and commercial buildings.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the modular system's design basis, production controls, and site installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the modular system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the modules on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of steel structures issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

Commonly suited to large clear-span or repetitive-bay buildings where speed and cost efficiency are priorities, such as warehouses and logistics hubs, factories/workshops, aircraft hangars, showrooms/big-box retail, sports halls, canopies, shelters, and utility/service buildings.

ADVANTAGES

- **Fast delivery & erection** – parallel off-site fabrication + on-site foundations; mostly bolted field connections.
- **Cost efficiency for long spans** – optimized built-up/tapered primary members and standardized secondary framing.
- **System integration** – manufacturer provides coordinated structural + envelope components and common detailing practices aligned to prevailing building codes.
- **Quality consistency** – controlled shop fabrication, repeatable components, and standardized inspection/specification language widely used in procurement.
- **Sustainability options** – high recycled content potential for steel and availability of industry EPDs for key metal building components.

LIMITATIONS & SPECIAL CONDITIONS

1. **Architectural complexity** – highly irregular geometry, heavy façade articulation, or tight tolerances can erode PEB's cost/schedule advantage (often better served by conventional structural steel + tailored envelope).
2. **Fire strategy implications** – fire resistance ratings, compartmentation, and construction-phase fire safety controls must be integrated early; local Civil Defence requirements typically govern.
3. **Thermal bridging / energy detailing** – metal building envelopes require careful design of insulation continuity, air leakage control, and condensation risk management to meet energy code requirements.
4. **Corrosion exposure** – marine/industrial environments may require upgraded coating systems (e.g., hot-dip galvanizing specifications and/or high-performance paint systems).
5. **Pilot project** – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.

KEY COMPONENTS & TECHNICAL DETAILS

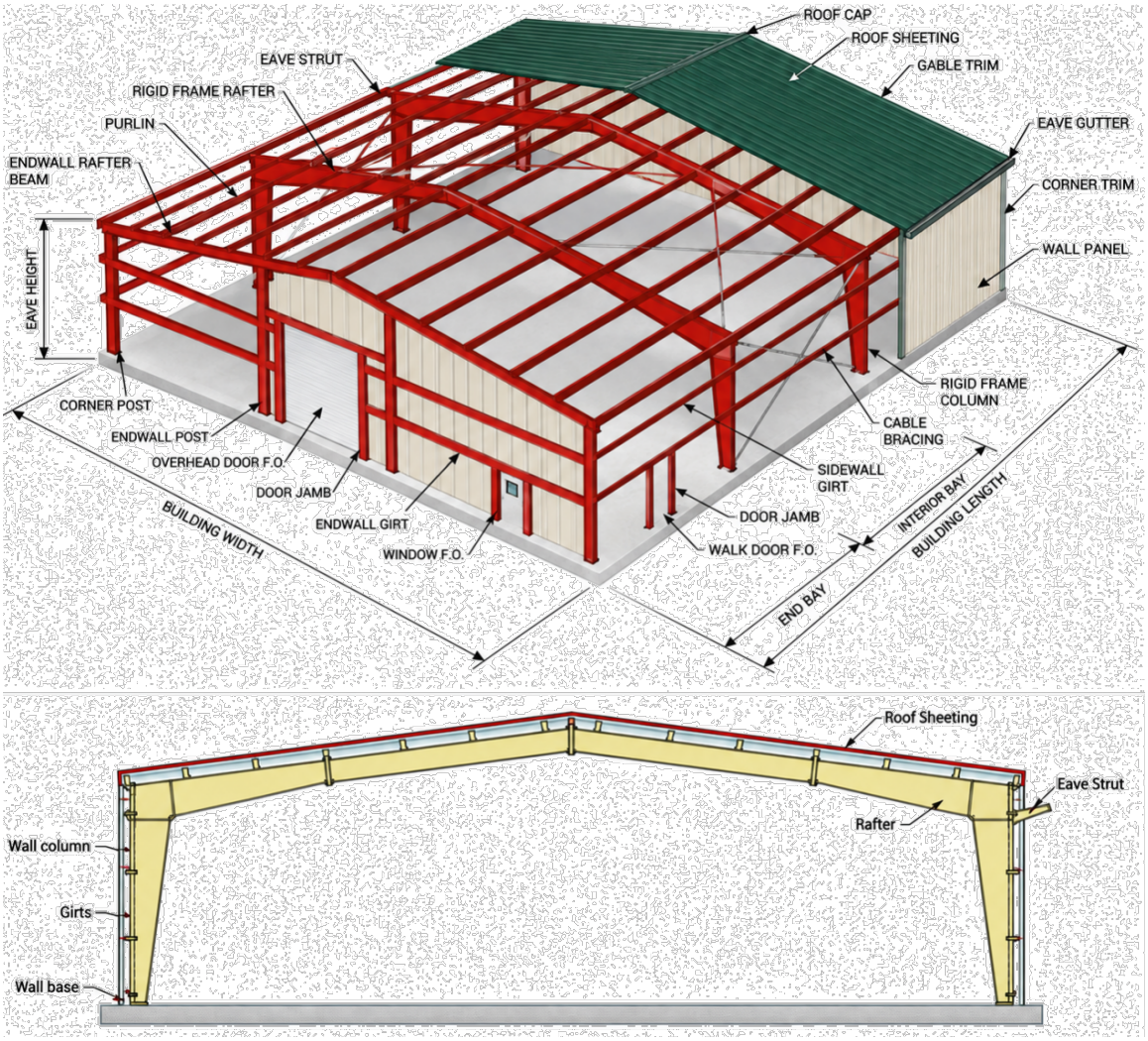
Component	Description

Primary Structural Frame	Rigid transverse frames (columns/rafters), lean-to frames, canopy beams; usually shop-welded built-up members with bolted site splices.
Secondary Framing	Cold-formed purlins, girts, struts, framed openings; provides cladding support and load transfer to primary frame.
Stability System	Rod/cable/angle bracing (roof and walls), portal frames, diaphragm action where applicable; configured to resist wind/seismic and to control drift.
Envelope	Profiled metal roof and wall panels (single-skin or insulated assemblies), flashings/trims, fasteners, sealants, gutters/downpipes, translucent panels/skylights as needed.
Interfaces	Base plates and anchor rods to foundations; movement joints/thermal expansion detailing; penetrations for MEP coordinated with structural and waterproofing strategy.

PERFORMANCE CONSIDERATIONS

- Structural safety (loads & combinations) – design loads typically follow governing building code load standards (e.g., ASCE/SEI 7 for wind, seismic and load combinations).
- Steel member design – hot-rolled/built-up steel per AISC (e.g., AISC 360), and cold-formed secondary framing per AISI S100 (or equivalent adopted standards).
- Serviceability – frame drift, purlin/girt deflection, cladding support movement limits, and vibration (if cranes/mezzanines are present) should be checked with the envelope system in mind.
- Envelope integrity – air/water tightness, wind-uplift resistance of roof/wall panels, condensation control, and thermal performance must be demonstrated for the specified assembly.
- Fire & life safety – occupancy classification, separation, and required ratings/sprinkler provisions (as applicable) must align with the UAE Fire & Life Safety Code and local authority requirements.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Material/product certification – where required under Dubai's regulatory frameworks (e.g., green building product categories), Dubai Central Laboratory certification is required.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (2021 Edition)
2. Al Sa'fat Green Building Regulations (where applicable)
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. Dubai Central Laboratory Certification Schemes
5. AISC, ASCE 7-16, ASTM Standards

Dubai Municipality

Building Permits Department

Research & Building Systems Section

Building Systems Approval

PRECAST CONCRETE BUILDING SYSTEM

(PCB)



Building System Category:	Prefab Structural Components & Panelized System
Sub-Category:	Precast Concrete Building Systems

Building System Name: **Precast Concrete Building System**

Description:

Precast Concrete Building Systems (PCB) consist of structural and architectural concrete elements that are manufactured off-site in controlled factory environments and transported to the construction site for installation and assembly. These systems are designed to achieve high quality, dimensional accuracy, structural reliability, and accelerated construction timelines when compared to conventional cast-in-place concrete construction.

Precast concrete systems typically include a wide range of building components such as foundations, columns, beams, slabs, walls, façade panels, staircases, and sandwich insulated panels. The factory-controlled production process ensures consistent material properties, improved curing conditions, reduced waste, and enhanced quality assurance.

PCB systems may be used for load-bearing and non-load-bearing applications, including low-rise, mid-rise, and high-rise buildings, subject to structural design approval and compliance with applicable local regulations.

Approval for Precast Concrete Building Systems shall be issued only for precast concrete factories located within the Emirate of Dubai, in accordance with Administrative Decision No. 316 and Dubai Municipality Circular No. 192.

WHO CAN APPLY

Manufacturers of precast concrete building systems/elements that operate a permanent prefabrication facility within the Emirate of Dubai and are seeking official Dubai Municipality (DM) approval for their products. Applicants must also hold a valid Industrial License issued by the Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

Precast concrete can be used as a total-precast solution (structure + envelope) or hybrid construction (with cast-in-place concrete/steel) and is widely applied across most building typologies.

1. Structural Superstructure – Used to form main building frame and floor systems including:

- Columns, beams
- Floor/roof units (hollowcore, solid slabs, double-tees)
- Stairs and landings

2. Lateral Stability Systems – Where engineered and code-compliant, precast may contribute to wind/seismic resistance via:
   - Precast shear walls
   - Core walls / stair-elevator cores
3. Building Envelope / Façade – Commonly used for rapid enclosure and durable finishes, such as:
   - Architectural cladding panels
   - Sandwich insulated wall panels
   - Spandrels, parapets, feature elements
4. Internal Partitions – Wall panels can be designed as non-loadbearing or loadbearing.
   - Non-loadbearing internal partitions (corridor walls, room dividers)
   - Loadbearing internal walls (where applicable to structural scheme)
   - Fire Compartment / Separation walls
   - Internal insulated partitions (specific thermal/acoustic separation).
5. Substructure and Foundations – Used where lifting access, sequencing, and joints can be accommodated:
   - Footings
   - Basement walls
   - Service pits, trenches, utility chambers
6. Boundary Walls – Perimeter / site walls
   - Plot boundary and privacy walls
   - Perimeter security walls (industrial plots, yards, substations)
   - Noise barrier / screening walls along roads
7. Typical high-fit building types – Commonly deployed in residential, hotels, schools, healthcare, industrial/logistics, and parking structures.

ADVANTAGES

- Fast Installation – Factory prefabrication accelerates on-site assembly and reduces overall construction timeline.

- High Quality and Consistency – Factory-controlled production improves dimensional accuracy, curing conditions, and overall QA/QC compared to site-cast processes.
- Reduced on-site Labor and Rework – Elements arrive reinforced and finished, minimizing temporary works and labor-intensive site activities.
- Acoustic and Thermal Comfort – Concrete's inherent mass supports acoustic separation and thermal comfort, and insulated precast panels can enhance envelope performance.
- Durability and Long Service Life – Precast provides high resistance to weathering and deterioration, supporting lower maintenance over the building lifecycle.
- Improved Site Safety – Reduced site activities (e.g., less formwork and fewer workers on-site for shorter durations) can lower exposure to construction hazards.
- Fire Resistance – Concrete is non-combustible and provides inherently high fire resistance as part of passive fire protection strategies.
- Environmental Performance – Controlled waste management in factories, and potential reuse of molds and recycling of concrete waste.
- Aesthetics and Finishing Flexibility – Precast supports a wide range of colors, textures, and architectural finishes with consistent repeatability.

LIMITATIONS & SPECIAL CONDITIONS

1. Pilot Project – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.
2. Certification Conditions – Approvals are issued only to manufacturers with production facilities located within the Emirate of Dubai. Concrete batching units at precast factories shall be certified by Dubai Central Laboratory (DCL).
3. Material Conformity – Dubai Central Laboratory certificates of product conformity are required for insulation materials, steel reinforcement, welded wire mesh, coatings, sealants, and paints.
4. Early Design and Coordination – Layouts, openings, embeds, and MEP penetrations should be confirmed early because elements are fabricated

in advance, and late changes can be costly. Precast projects also require manufacturing lead time and benefit from early supplier involvement to optimize design.

5. Transport and Lifting Constraints – Element dimensions and weights are limited by haulage regulations and crane capacity/reach. Lifting anchors, handling forces, and concrete strength at lift must be engineered to suit the erection method.
6. Site Access and Temporary Stability Requirements – Erection needs sufficient crane access, lifting zones, storage/stacking space, and a controlled erection sequence. Temporary bracing/propping may be required until the permanent structural system is fully engaged.
7. Maintenance and Modifications – Modifications must be controlled. Cutting, drilling, or making openings, especially in prestressed elements (e.g. hollowcore), requires engineer approval and structural verification. Connections/bearings should remain accessible for inspection. Fire and smoke compartmentation must be maintained; any new penetrations/joints must be reinstated using DCD approved firestop/joint system suitable for the required rating.
8. Best Economics (Repetition and Volume) – Precast is typically more efficient when there is sufficient repetition to justify molds, setup, and standardized production/erection cycles.

KEY COMPONENTS DETAILS

Precast System	Description
Structural Frame (Columns & Beams)	Precast columns and beams form the structural frame of buildings. Columns are vertical load-bearing elements, while beams span horizontally to support slabs and distribute loads to columns or walls.
Hollow Core Slabs	Hollow core slabs are prestressed, precast floor units with continuous internal voids to reduce weight and material use; widely used for building floors/roofs due to standardized production and fast installation.
Prestressed Slabs	These are factory-made slabs where high-strength steel tendons are tensioned before concrete is poured. After curing, the tension

	is released, creating a compressive force that enhances slab performance for longer spans and higher loads.
Solid Slabs	Solid slabs are flat, reinforced concrete floor units with no internal voids. They are commonly used for shorter spans, stair landings, and balconies where higher stiffness and mass are beneficial.
Solid Walls	Solid precast wall panels are typically reinforced and serve as load bearing or shear elements in structures. They offer quick installation, excellent soundproofing, and structural integrity.
Sandwich Insulated Panels (SIP)	Sandwich panels are multi-layered wall panels consisting of an insulation core (usually rigid foam or mineral wool) between two concrete layers. These panels offer structural, thermal, and sound insulation in one unit.
Stairs and Landings	Precast stair elements include treads, risers, and landings cast as a single or modular unit. They are widely used for their uniformity, safety, and speed of installation.
Boundary Walls	Boundary walls are typically configured as full-height panels or post-and-panel systems, selected based on height, wind exposure, foundation configuration, and installation access.
Connections	Connections are designed to transfer loads, restrain movement, and provide stability. Typical building connection approaches include bearing + mechanical restraint, embedded plates with welded/bolted links, and grouted interfaces where required.

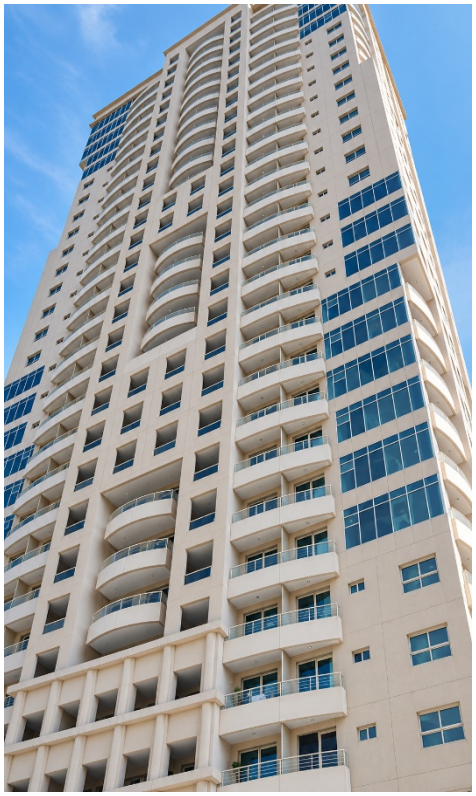
PERFORMANCE CONSIDERATIONS

- Acoustic Performance – Must meet Dubai Building Code and Al Sa'fat performance requirements. Performance depends on joint continuity, closest paths, and penetrations.
- Fire and Compartmentation – Concrete is non-combustible, and precast can support rated assemblies; however, building fire performance depends on correct firestopping of joints and penetrations.

- Durability and Maintainability – Long-term performance is often governed by joint sealants, interfaces, and periodic inspection/repair, especially for building envelopes.
- Architectural Finish / Weathering – For exposed architectural precast, consider finish selection, staining risk, drainage detailing, and visual acceptance criteria early to avoid post-installation defects.



PRECAST ELEMENTS
ILLUSTRATIVE APPLICATIONS







ADDITIONAL NOTES / USEFUL INFORMATION

- Future Modifications – Structural or layout changes are more complex compared to conventional cast-in-place construction.
- Early supplier engagement is highly recommended to optimize module sizes, connections, erection sequence, and tolerances before design freeze.
- Mock-ups and visual acceptance criteria are recommended for architectural precast (color/texture consistency, patching expectation, and panel alignment).
- Quality Management is a key advantage. Precast benefits from controlled production and systematic QA/QC, which should be backed by documented inspection/testing procedures.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire & Life Safety Code of Practice (UAEFLSC)

3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System
5. ACI 318-19 Building Code Requirements for Structural Concrete

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

COLD-FORMED STEEL (CFS) BUILDING SYSTEM

Building System Category:	Prefabricated Structural Components
Sub-Category:	Structural Steel
Building System Name:	Cold-Formed Steel (CFS) Building System
Description:	Cold-Formed Steel (CFS) building systems (Light-Gauge Steel Framing) are building framing solutions made from thin steel sheet that is cold-formed at room temperature into efficient shapes (commonly C-studs, tracks, Z-sections, hat channels, joists, trusses, etc.). The system can be panelized, modular, or stick-built, and can be engineered as structural load-bearing framing (walls/floors/roofs and lateral systems) or used as nonstructural framing (e.g., partitions and linings). CFS systems are commonly used for low-rise buildings, modular construction, and infill structures, offering high strength-to-weight ratio, precision manufacturing, and compatibility with off-site fabrication and industrialized construction processes.



WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the modular system's design basis, production controls, and site installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the modular system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the modules on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of steel structures issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

1. Load-bearing structural framing – low-rise buildings (subject to engineering design, project constraints, and authority approval), including wall bearing + floor joists + roof trusses.
2. Lateral force resisting systems – sheathed shear walls, strap bracing, diaphragm action via floors/roofs, and engineered bracing schemes per applicable standards.

3. Off-site / MMC – panelized wall cassettes, volumetric modular units, bathroom pods, and rapid site assembly (with appropriate QA/QC and tolerances).
4. Infill / hybrid construction – infill walls inside RC/steel frames; façade backup framing supporting cladding systems (rainscreen, EIFS/ETICS, etc.).
5. Non-Structural applications – internal partitions, bulkheads/soffits, and furring channels for finishes/services.

ADVANTAGES

- High strength-to-weight ratio – reduced dead loads and often lighter foundations.
- Speed & buildability – repetitive framing, screw-fastened assemblies, and compatibility with off-site manufacturing. Reduced site labor.
- Dimensional accuracy & quality – roll-forming and factory QA can improve consistency and reduce rework.
- Durability & termite control – steel is not susceptible to termites/rot (performance still depends on corrosion control and moisture detailing).
- Noncombustible primary structure (steel framing), enabling robust fire strategies when paired with rated assemblies per code.
- Sustainability – steel is widely recycled; off-site approaches can reduce waste (project-specific LCA still needed for claims).

LIMITATIONS & SPECIAL CONDITIONS

1. Thermal bridging risk – continuous steel members can degrade U-values unless thermal breaks/continuous insulation are detailed correctly. Thermal bridging must be addressed through proper envelope design.
2. Fire & acoustic performance is assembly-dependent – ratings require tested/listed wall/floor/shaft assemblies, correct fasteners, correct penetrations/firestopping, and strict installation control.

3. Corrosion management is critical, especially in coastal/aggressive environments – specify coating class, protect cut edges, avoid dissimilar-metal galvanic issues, and control water ingress/condensation.
4. Stability/buckling sensitivity – thin-walled members require correct bracing/bridging, screw patterns, and connection detailing; field deviations can significantly reduce capacity.
5. Serviceability – floor vibration and deflection may govern (particularly for long spans/light floor builds); requires careful system design.
6. Dubai compliance – DBC compliance is mandatory for permitted designs, and the UAE Fire Code is a referenced baseline; authority requirements may also require DCL certified materials/products.
7. Pilot project – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Framing Members	Steel studs, tracks/runners, joists, rafters, truss chords/webs, purlins, girts, bracings formed from coated steel sheet and manufactured in accordance with approved standards. Structural vs. nonstructural should be clearly separated in design/specs.
Structural Connections	Screws, bolts, clips, and brackets tested for structural performance
Sheathing Systems	Structural sheathing (where used for shear walls/diaphragms) and lining boards (gypsum/cement boards) must match the intended structural + fire/acoustic design basis and compatible fastening schedules.
Bracing & Stability Systems	Bridging, straps, blocking, hold-downs, anchors, and diaphragm connections are required to develop the intended load path (gravity + wind + seismic where applicable).
Building Envelope Layers	Where CFS is in external walls; weather/air barriers, vapor control strategy, flashings, drained cavities (as applicable), insulation/thermal breaks, and fire stopping at cavities/edges.

PERFORMANCE CONSIDERATIONS

- Structural design basis – use the applicable AISI framework for member and system design (capacity, stability/buckling, connections, load combinations, etc.) as referenced in Dubai Building Code.
- Fire/life safety – verify required fire resistance ratings (walls, floors, shafts), cavity barriers, and protection of penetrations in line with the UAE Fire & Life Safety Code / DCD requirements, and DBC references.
- Acoustics – target STC via assembly selection (stud configuration, insulation type, resilient channels, sealing) and control flanking paths through junction details.
- Thermal & moisture – manage thermal bridges, condensation risk, and water ingress; detailing often governs performance more than member sizing.
- Durability – coating selection (and protection of cut edges/field damage) plus envelope moisture control are key to corrosion performance.



CROSS-SECTION

ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Specify by system intent – clearly state whether framing is structural (engineered load-bearing) or nonstructural (partitions/furring). Use the corresponding standards and product categories consistently.
- Application Choice – CFS systems should be selected based on building height, exposure conditions, fire strategy, and intended occupancy.
- Submittals/QA (typical best practice) – mill certificates to the specified steel sheet standard; framing member properties/markings; connection schedules; shop drawings for panelized/modular; inspection/test plans for critical connections and bracing.
- Material/product certification – where required under Dubai's regulatory frameworks (e.g., green building product categories), Dubai Central Laboratory certification is required for Al Sa'fat-linked products.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat – Dubai Green Building System
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. Dubai Central Laboratory Certification Schemes

5. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Members
6. AISI S240 – North American Standard for Cold-Formed Steel Structural Framing.

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

SPACE FRAME STRUCTURES

Building System Category:	Prefab Structural Components
Sub-Category:	Structural Steel

Building System Name:	Space Frame Structures
Description:	Space frame structures are three-dimensional, lightweight steel structural systems composed of interconnected struts and nodes, forming a rigid spatial lattice that distributes loads in multiple directions.



Unlike conventional planar frames, space frames act as a fully integrated structural system, providing high stiffness, redundancy, and efficiency, particularly suitable for large-span roofs and architecturally expressive buildings.

The system shall be designed, fabricated, and erected as a complete engineered solution, including nodes, members, connections, corrosion protection, and erection methodology.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the modular system's design basis, production controls, and site installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the modular system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the modules on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of steel structures issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

1. Large-Span Roof Structures – exhibition halls, convention centers, airports/terminals, atria, malls, mosques, transport interchanges.
2. Sports & Assembly Venues – stadium canopies, arenas, grandstands.
3. Industrial & Logistics – warehouses, aircraft hangars, factories, covered yards.
4. Architectural Features – entrance canopies, skylight grids, free-form roofs, façade/atrium space trusses.

ADVANTAGES

- Long-span efficiency – high stiffness-to-weight due to 3D triangulation and axial-force action.

- **Redundancy / multi-path load distribution** – loads can redistribute through the lattice if properly detailed.
- **Architectural freedom** – supports curved/free-form geometries and integrates well with skylights and large roof apertures.
- **Prefabrication-friendly** – repetitive members and modular nodes can speed up fabrication and erection when tolerances are controlled. (Execution quality requirements are typically managed under recognized steel execution/welding quality frameworks).

LIMITATIONS & SPECIAL CONDITIONS

1. **Connection/joint complexity is critical** – node detailing governs strength, stiffness, robustness, fatigue performance, and constructability.
2. **Tight tolerances required** – cumulative geometric tolerances can cause fit-up issues during erection; shop control and site surveying are essential.
3. **Fire protection may be demanding** – many slender members resulting in more surface area to protect; fire strategy must align with local fire/life-safety requirements.
4. **Corrosion protection and maintenance** – roofs/canopies in humid/marine environments need robust coating specifications and inspection access.
5. **Pilot project** – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.

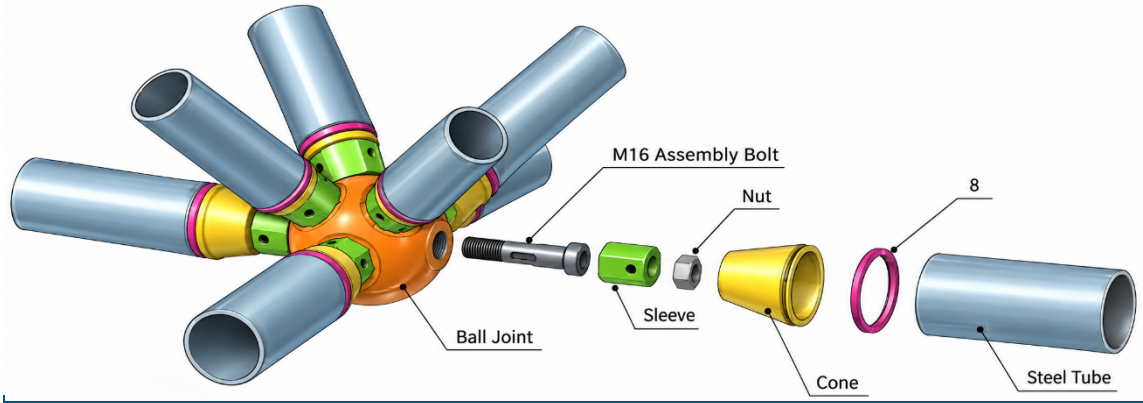
KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Struts / Members	Tubular or solid steel members designed to resist axial forces (tension/compression).
Nodes / Connectors	Precision-fabricated proprietary ball-nodes, cone-nodes, welded plate nodes, or cast/forged connectors; bolted or welded-to-member ends to form the spatial joint.
Bolts & Fasteners	High-strength bolts, sleeves, end fittings; controlled tightening/ pretension procedures per the selected standard/spec.

Support Conditions	Bearings, columns, or reinforced concrete supports transferring loads
Cladding Interface	Secondary framing for roof or façade systems
Protection Systems	Galvanization, paint systems, or duplex coatings; passive fire protection where required.

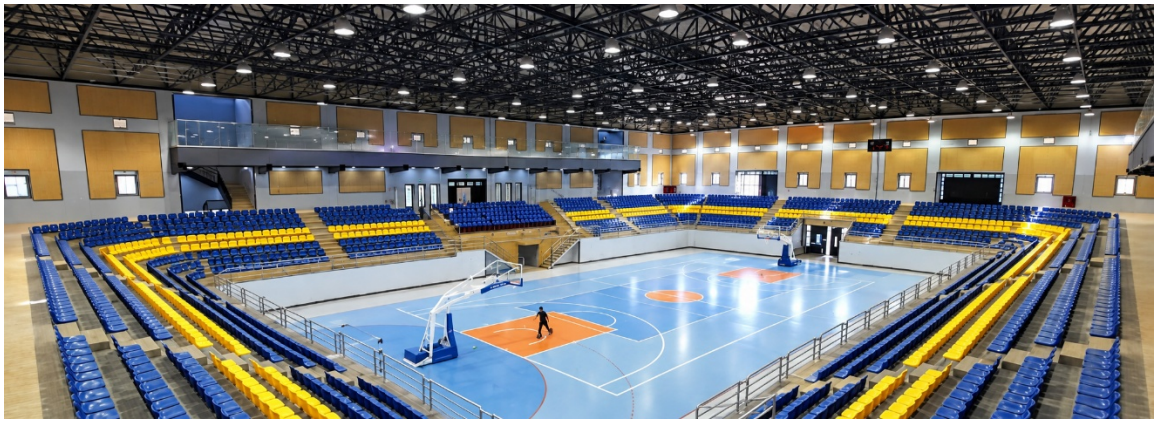
PERFORMANCE CONSIDERATIONS

- Load actions & combinations – wind uplift, seismic, roof live loads, maintenance loads, thermal actions; loading standard consistent with the Dubai Building Code.
- Serviceability – deflection limits (global and local), ponding risk on roofs, vibration/comfort criteria for long-span lightweight roofs.
- Robustness – check for alternate load paths and key element/joint capacities (space frames often rely on connection integrity).
- Stability – overall buckling modes (global and member buckling), sensitivity to imperfections, and erection-stage stability.
- Fatigue (where relevant) – canopies with dynamic loading, machinery vibration, or long-term cyclic wind effects, detail joints accordingly.
- Fire performance – fire resistance rating strategy for the roof structure and supports per UAEFLSC, DCD requirements and the Dubai Building Code.



CROSS-SECTION

ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Structural evaluation – Space frame systems shall be evaluated as complete structural packages, including nodes and erection methodology.
- Erection sequencing matters – temporary bracing and staged tightening are often needed to control geometry and internal force "lock-in."
- Drainage and waterproofing interfaces should be resolved early (space frames often create complex roof geometries and penetrations).
- Inspection & access – including catwalks or maintenance routes where needed; slender members and dense node regions can be hard to inspect without planned access.
- Documentation package (typical) – structural calculations, node/member schedules, connection design reports, fabrication drawings, welding/bolting QA/QC records, coating DFT reports, and as-built survey results.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat Green Building Regulations (where applicable)
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. AISC 360 – Specification for Structural Steel Buildings
5. ISO / ASTM standards for steel, bolts, and coatings

Dubai Municipality
Building Permits Department
Research & Building Systems Section

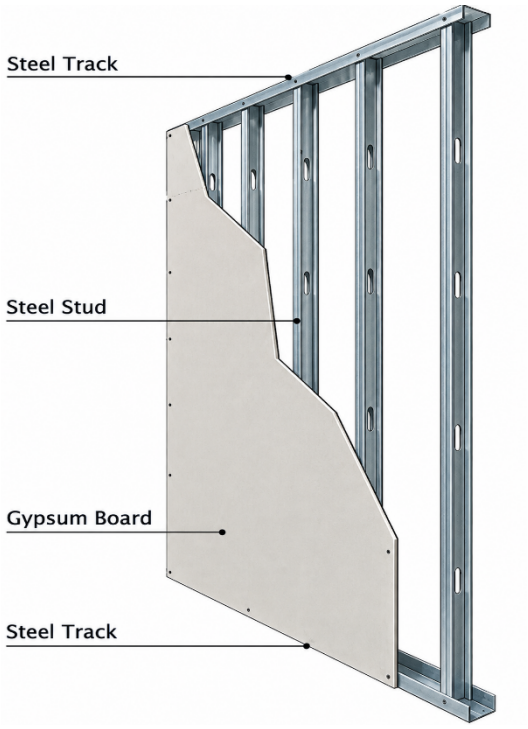
Building Systems Approval

DRYWALL PARTITIONS
(Non-loadbearing)

Building System Category:	Non-Structural Assemblies & Sub-assemblies
Sub-Category:	Walls and Partitions

Building System Name: **Drywall Partitions (Non-loadbearing)**





Description:

Drywall partition systems are non-loadbearing wall assemblies constructed from galvanized steel framing (studs, tracks) covered on both sides by gypsum boards. They may include thermal/acoustic insulation in the wall cavity, plus finishing accessories like tapes, jointing compounds, and sealants.

Drywall partitions are commonly used for internal partitions in residential, commercial, and hospitality settings offering faster installation and lighter weight compared to masonry walls. They can achieve fire-resistant and sound-rated performance if designed with the correct boards and insulation materials.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the system design basis, production controls, and installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of drywall partitions. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the system on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of cladding system activity issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

1. Internal Partitions (Within the Same Unit)
   - General internal space subdivision in most building types (residential, offices, retail, institutional, hotels), where a lightweight, fast and adaptable non-loadbearing partition is suitable.
2. Demising Walls (Between Different Units)
   - Allowed in hotels and commercial buildings (if appropriately fire-rated and acoustically rated).

- Not allowed in apartments or residential units between separate dwellings.

ADVANTAGES

- Fast, dry construction with minimal wet trades; easy to modify for tenant changes and fit-out works.
- Lightweight, non-loadbearing partitions reduce dead load and can help with construction logistics in towers.
- Integrated performance options: acoustic infill, fire-rated linings, moisture/mold-resistant boards, and impact/abuse-resistant boards can be specified to suit the space.
- Easy Finishing – Smooth surface for paint or decorative finishes
- Standardized installation practices are well-documented, supporting consistent quality when properly supervised.

LIMITATIONS & SPECIAL CONDITIONS

1. Non-Structural / Non-Loadbearing – they must not be relied upon for gravity or lateral load resistance beyond their intended service loads.
2. No Pilot Project Required – Not required for the approval of drywall partition systems.
3. Demising Wall Restrictions – Local regulations/practice do not accept drywall partitions as demising walls in residential buildings or connected villas/townhouses for security reasons, unless an acceptable security level is demonstrated.
4. Moisture Limitations – Standard gypsum boards are not suitable for persistently wet areas without appropriate moisture-resistant assemblies and detailing (board type, waterproofing, etc.).
5. Height/Deflection Sensitivity – Tall partitions require appropriate stud selection (depth/thickness), spacing, bracing, and head-of-wall deflection detailing.
6. Penetrations are critical – MEP openings can degrade fire, smoke, and acoustic performance unless protected with tested/approved systems.

7. Material Conformity – Dubai Central Laboratory certificates of product conformity are required for insulation materials, sealants and coatings.

KEY COMPONENTS & TECHNICAL DETAILS

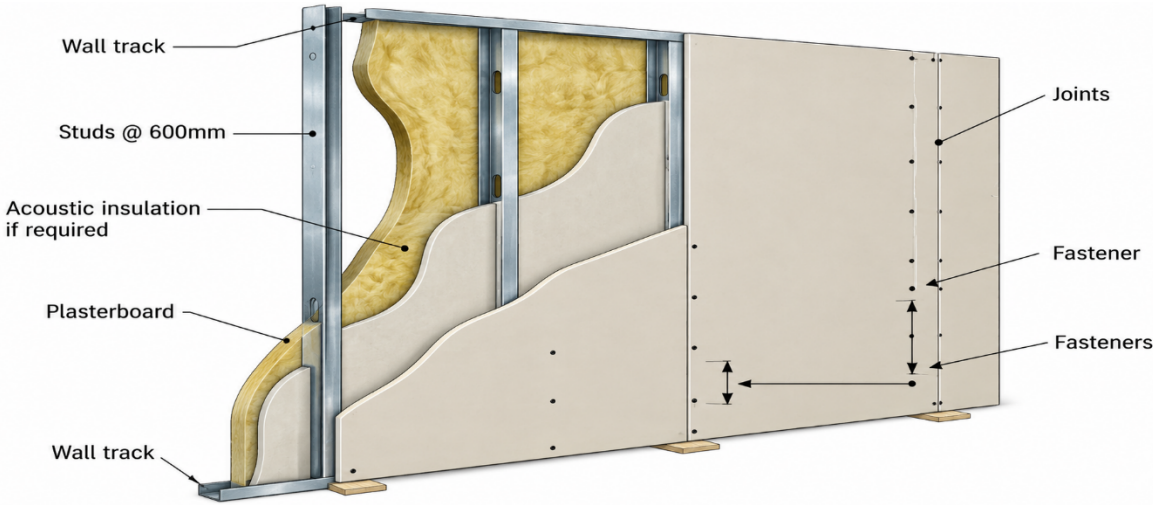
Component	Description
Steel Framing	Non-structural galvanized steel studs and tracks conforming to ASTM C645, EN 14195, or an equivalent recognized standard. Zinc coating in accordance with ASTM A653/A653M or EN 10346, of a class appropriate to the exposure and not less than grade +Z140. Installed at maximum 600 mm center-to-center.
Boards / Linings	Standard or specialized gypsum boards (fire-rated, moisture-resistant, high-impact resistant, etc.) to ASTM C1396, EN 520, EN 15283-1, ASTM C1658, ASTM C1177 or equivalent. Installed in 1–3 layers on each side depending on rating requirements.
Insulation	Optional mineral wool or glass wool for acoustic/fire performance.
Jointing & Tape	Mesh tape or paper tape over joints, finished with jointing compound. Firestop or acoustic sealant used at perimeter joints, if needed.
Fasteners	Self-tapping / Self-drilling drywall screws, typically spaced per the manufacturer's guidelines.

PERFORMANCE CONSIDERATIONS

- Fire Resistance – Where a fire rating is required, the partition must follow a tested/listed assembly (materials, layers, fasteners, jointing, insulation, and penetrations) in line with recognized fire-test evidence. Fire-rated assemblies must be approved and listed by Dubai Civil Defence.
- Acoustics – Specify target STC/ASTC/R_w/D_{nTw} based on occupancy; performance depends heavily on perimeter sealing, back-to-back boxes, plenum paths, and flanking. Must meet Dubai Building Code and Al Sa'fat performance requirements.
- Robustness / Impact Resistance – Internal partitions used as demising walls shall meet the severe duty classification of BS 5234-2.

- Serviceability & Fixings – Confirm allowances for wall-hung loads (TVs, cabinets, grab bars) using backing plates, additional studs, or proprietary supports; avoid uncontrolled site drilling that compromises performance.
- Movement & Interfaces – Provide deflection heads, control joints, and compatible sealants at slab/beam edges and façade interfaces to prevent cracking and maintain acoustic/fire seals.

SYSTEM SECTIONS



ILLUSTRATIVE APPLICATIONS







ADDITIONAL NOTES / USEFUL INFORMATION

- Design by performance target, then select a tested system – fire rating, acoustics, moisture, impact/robustness, and (where applicable) security.
- Security Upgrade Pathway (for exceptional demising approval) – typically requires a strengthened build-up (e.g., heavier studs, closer spacing, multi-layer boards, internal reinforcement/backing, protected weak points like access panels) plus credible third-party evidence (testing/engineering evaluation) acceptable to the local authority.
- QA/QC matters – most failures are workmanship-related (gaps at perimeters, poor sealing, unprotected penetrations, wrong screws/spacing, "value engineering" substitutions).
- Maintenance & Repair – Regular inspection for moisture damage near bathrooms and kitchens.

- Future Modifications – Layout changes are simpler compared to masonry but must follow updated codes and regulations and obtain the necessary permits.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire & Life Safety Code of Practice (UAEFLSC)
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System
5. BS 5234-2 – Partitions (impact resistance, durability)
6. ASTM C1396 – Gypsum Board Specifications
7. EN 520 – Gypsum plasterboards – Requirements and Test Methods
8. EN 15283-1 – Gypsum boards with fibrous reinforcement
9. ASTM C1658 – Specification for Glass Mat Gypsum Panels
10. ASTM C1177 – Specification for Glass Mat Gypsum Substrate
11. ASTM C645 – Non-Structural Cold Formed Steel

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

LGSF EXTERNAL FAÇADE SYSTEM

Building System Category:	Non-Structural Assemblies & Sub-assemblies
Sub-Category:	Façade Systems - LGSF

Building System Name: **LGSF External Façade System**

Description:

The LGSF External Façade System is a non-load-bearing cold-formed steel framed wall assembly designed for external envelope applications. The system provides a lightweight, durable, and thermally efficient façade solution that supports external finishes while transferring lateral loads safely to the primary building structure.

The system comprises galvanized cold-formed steel framing, external sheathing boards, internal gypsum plasterboards, mechanical fixings, and optional thermal and acoustic insulation. Two framing configurations are permitted, Single-Stud System, and Twin-Stud System, where internal framing is structurally separated from external framing to improve acoustic and thermal performance.

The external face of the system may be finished with either a direct render system or an EIFS / ETICS system, applied over the external sheathing board. All components of the system shall be compatible and supplied as part of an approved system configuration.



WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the system design basis, production controls, and installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the LGFS External Façade system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the system on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of cladding system activity issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

- External Walls (Cladding)
  a. Applicable to all building types (residential, commercial, institutional, hospitality, etc.) for non-load-bearing application.
  b. Suitable for use as external cladding, if approved per local code requirements for insulation, fire resistance, and weatherproofing.

ADVANTAGES

- **Energy Efficiency** – Energy-performance pathway via cavity insulation and/or continuous external insulation to support compliance with building energy codes/standards.
- **Fast Installation** – Lightweight external envelope that reduces façade dead load and simplifies handling/installation compared to masonry or concrete walling.
- **Low Maintenance** – Durable materials and protected assemblies reduce long-term maintenance requirements.
- **Design Flexibility** – to suit performance targets and site constraints; twin-stud can reduce thermal bridging and improve acoustic separation when the frames are structurally separated.
- **Multi-Finish Compatibility** – Accommodates various façade finishes, including direct render and EIFS/ETICS systems.

LIMITATIONS & SPECIAL CONDITIONS

1. **Pilot Project** – Not required for approval of the LGSF External Façade System.
2. **Non-Loadbearing Wall** – Do not assign primary gravity-load capacity; design the studs, tracks, bracing/bridging and anchors to transfer lateral actions (e.g., wind) safely into the main structure.
3. **Fire Resistance** – Fire-rating assemblies must be approved and listed by Dubai Civil Defence.
4. **Material Conformity** – Dubai Central Laboratory Certificates of product conformity are required for insulation materials.
5. **Moisture Management** – Provide a continuous WRB, controlled drainage paths (where applicable), and correctly detailed openings/penetrations to avoid concealed wetting and degradation.
6. **Corrosion Protection** – Specify galvanized steel and coating class suitable for the exposure environment (coastal/industrial).
7. **Movement/Deflection Detailing** – Provide deflection head tracks/slip details and movement joints so building drift, slab deflection and thermal movement do not crack finishes or rupture seals.

8. Material Selection – The selection of the board type, thickness, and number of layers must be based on the specific application, location, and fire rating requirements.
9. System Control – The system is approved as a complete configuration. All components shall be those specified in the approved system. Installation shall be carried out by contractors holding the applicable license and trained and authorized by the system owner for the approved system, following the approved installation method statement under the system owner's technical supervision.

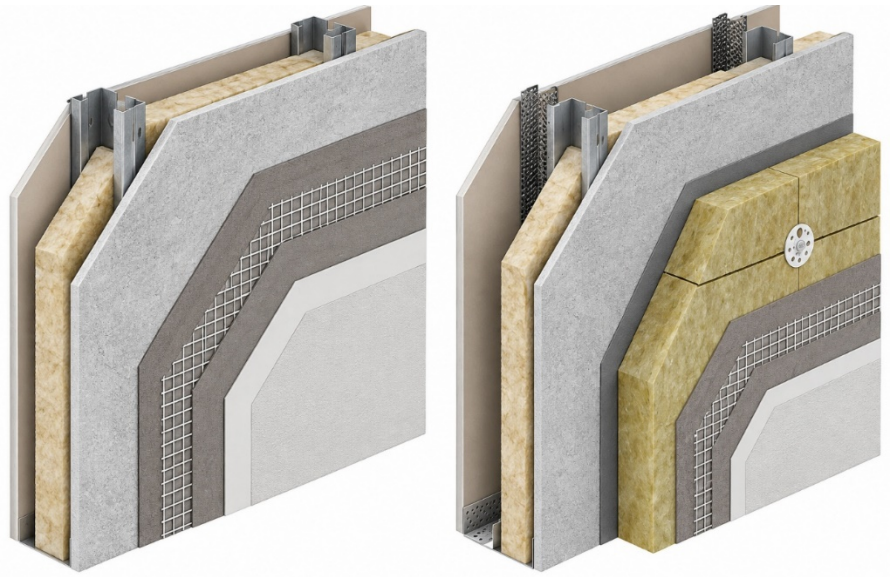
KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
External Framing System	The exterior of the façade is made from galvanized cold-formed steel, which includes a bottom track, head track, and vertical studs.
Internal Framing Systems	The internal part of the façade in twin stud systems is made from galvanized cold-formed steel, including a bottom track, head track, and vertical studs. Internal framing members may be of a lighter specification than the external framing.
Fixings	Mechanical fasteners used for steel-to-steel connections, anchorage to structure, and fixing of boards.
Thermal Insulation	Provide thermal and sound insulation typically made of polystyrene or mineral wool. It is required to be certified DCL.
Sheathing Board	Glass mat reinforced gypsum board or cement board installed on the exterior face of the framing system.
Gypsum Plasterboards	Internal lining boards fixed to the internal framing system.
Jointing Treatment	Used to seal and reinforce the joints between gypsum boards, utilizing jointing compounds, tape, and mesh.
Direct Render	An option used for the outer layer of the façade, made up of a base coat, reinforcement mesh, primer, and a finish coat.
EIFS/ETICS	Alternative external finish system applied over the sheathing board, subject to DCD approval.

PERFORMANCE CONSIDERATIONS

- Structural Performance – Determine façade design pressures and load combinations (wind, etc.) and check stud/track/connection capacities and deflections.
- Acoustic Performance – Must meet Dubai Building Code and Al Sa'fat performance requirements.
- Fire Resistance – Use wall assemblies with the required fire-resistance rating evidence (where applicable) and ensure external wall fire propagation performance is satisfied when combustible components are present. Assemblies requiring a specific fire-rating must have valid DCD approval/license.
- Thermal Performance – Address thermal bridges (studs, tracks, brackets) and demonstrate compliance using an accepted energy standard/framework. Twin-stud configurations can reduce bridging effects. Insulation configuration must meet U-value targets stipulated by DBC and Al Sa'fat regulations.
- Impact Resistance – External wall assemblies shall provide impact resistance appropriate to their exposure, with enhanced impact resistance in zones subject to pedestrian access, vehicle movement or maintenance activity.
- Weather Resistance – Proper detailing is required at joints, penetrations, and interfaces to prevent water ingress.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS



ADDITIONAL NOTES / USEFUL INFORMATION

- External Sheathing Selection – Glass-mat gypsum sheathing intended for exterior substrates is commonly specified for these systems (and should match the finish manufacturer's requirements).
- Sealant & Joint – External and internal joints must be sealed using approved fire-rated and weather resistant materials.
- Quality assurance – Require shop drawings showing stud sizing/gauges, bracing/bridging, fixing patterns, movement joints, WRB continuity, and interface details; consider a façade mock-up to validate sequencing and interfaces.
- Maintenance Access – Façade detailing should allow inspection and maintenance where required.
- Factory or System Audit – May be requested for new manufacturers, new configurations, or where supporting performance data is insufficient.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire & Life Safety Code of Practice (UAEFLSC)
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System

Dubai Municipality

Building Permits Department

Research & Building Systems Section

Building Systems Approval

LIGHTWEIGHT CONCRETE PANELS

Building System Category:	Non-Structural Assemblies & Sub-assemblies
Sub-Category:	Walls & Partitions

Building System Name: **Lightweight Concrete Panels**

Description:

The Lightweight Concrete Panel System is a non-load-bearing wall assembly designed for internal and external building applications. The panels consist of lightweight concrete core incorporating polystyrene beads and finished on both faces with cement-based boards.

The lightweight concrete provides enhanced thermal insulation and acoustic performance while significantly reducing the overall dead load compared to traditional concrete wall systems. Panels may be prefabricated in a controlled factory environment or cast in place on-site within a framing system, subject to approved installation methodology.

Panels may be detailed and installed in two common arrangements:

- Interlocking (tongue-and-groove): panel edges are profiled so a projecting "tongue" engages a matching "groove," improving alignment and continuity during installation. The system is installed using galvanized light-gauge steel, incorporating a "U" channel as the bottom track and an "L" angle as the top track, providing structural support for the wall system.
- Infill within cold-formed steel framing (CFS): panels are placed between light-gauge steel studs/rails as infill walling, where the primary structure carries gravity loads while the infill wall supports its own weight and transfers lateral actions (e.g., wind loads) through fixings and framing.

All components shall be compatible and supplied as part of an approved system configuration. Installation shall be carried out by authorized contractors under the supervision of the system owner, in compliance with local code and standards.





WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, approved suppliers, and/or specialized contractors responsible for the system design, material supply, and installation methodology.

- Manufacturers / System Owners: Must hold a valid Industrial License issued by the relevant economic department and demonstrate control over product formulation, quality assurance, and technical documentation.
- Commercial Installers / Applicators: Installation works must be carried out by contractors holding a valid Commercial License issued by Dubai Department of Economy and Tourism (DET). Applicators must be trained and certified for the proposed works.

WHERE IT CAN BE USED

Internal Partitions & External Walls

a. Suitable for all building types: residential, commercial, institutional, hospitality, and industrial.
b. Can be used as non-load-bearing interior or external walls, depending on panel thickness and specification.

ADVANTAGES

- Lightweight – Significantly lighter than conventional concrete, reducing demands on foundations and structural framing.
- Faster installation – Factory-made, panelized delivery can support faster installation and cleaner site logistics (especially when used as infill within cold-formed steel framing).
- Thermal Performance – EPS has very low thermal conductivity, and EPS-modified concretes/panels are frequently reported to lower overall thermal conductivity versus conventional materials.
- Acoustic Performance – Effective in reducing noise transmission.
- Durability – Weather-resistant with minimal maintenance.
- Design Flexibility – Available in different sizes, textures, and finishes for architectural appeal.

LIMITATIONS & SPECIAL CONDITIONS

- Non-loadbearing – Panels shall not be used as primary structural elements; gravity loads are carried by the main structure.
- Strength-Density Trade-Off – Increasing EPS content typically reduces mechanical properties; design values must be based on system test data (density, compressive/flexural strength).
- Fire Resistance – Fire strategy must be assembly-based. EPS can melt/shrink and generate dense smoke under fire exposure; fire performance must be demonstrated for the full wall assembly per accepted test methods and must be approved and listed by Dubai Civil Defence.
- Façade Detailing – External use requires proper façade detailing (water management, joint sealing, compatible membranes/flashings) and verified board suitability for exposure.
- Material Conformity – Dubai Central Laboratory Certificates of product conformity are required for insulation materials.
- System Control – The system is approved as a complete configuration. All components shall be those specified in the approved system. Installation shall be carried out by contractors holding the applicable license and

trained and authorized by the system owner for the approved system, following the approved installation method statement under the system owner's technical supervision.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Framing system	Galvanized light-gauge steel bottom tracks, top tracks, and studs (if needed).
Facings	Fiber-reinforced cement boards or silicate boards offer a strong, fire resistant, and moisture resistant surface for the panels.
Lightweight Concrete Core/Infill	Lightweight concrete blended with polystyrene beads offers thermal and acoustic insulation properties, all while ensuring a lightweight structure.
Edges/Joints	Tongue-and-groove profiles to provide mechanical interlock and alignment. Jointing tapes and compounds used to seal and strengthen the joints between cement boards, typically involving fiberglass mesh tape and a pre-mixed joint compound.
Fixings/Fasteners	Corrosion-resistant screws/anchors and connection accessories compatible with cement boards and steel framing.
Sealants	Approved sealants used at joints and interfaces to improve fire resistance, air tightness, and weather protection.

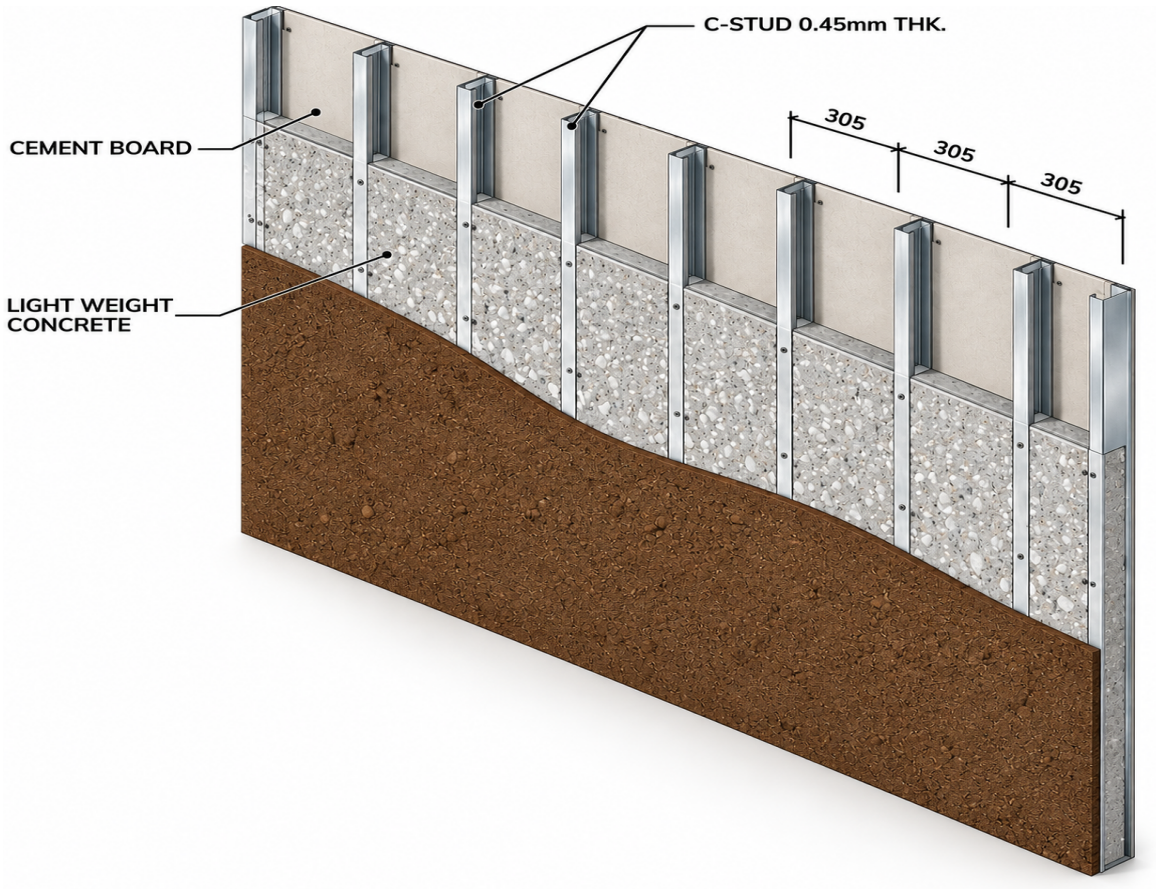
PERFORMANCE CONSIDERATIONS

- Structural (Non-Loadbearing) – Verify capacity for self-weight support, handling, transport, and out-of-plane actions (e.g., wind on external infill).
- Acoustic Performance – Assemblies shall comply with Dubai Building Code and Al Sa'fat sound insulation requirements.
- Fire Resistance – Assemblies requiring fire ratings must have valid DCD approval and certification.
- Impact Resistance – Wall assemblies shall provide impact resistance appropriate to their application.
- Thermal Performance – External wall assemblies shall meet U-value requirements stipulated by DBC and Al Sa'fat regulations. EPS inclusion can materially reduce thermal conductivity; confirm declared values for the

specific panel density/thickness and account for thermal bridging through steel studs in infill configurations.

- Moisture/Durability – Cement/fibre-cement boards are commonly used in internal/external wall/ceiling applications; wet-area and external use still require correct waterproofing and joint detailing.
- Quality/Tolerances – Panel flatness, edge accuracy, and board integrity directly affect joint quality and finishing performance; require factory QA/QC and site acceptance checks (manufacturer documentation).

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

- Sealant & Joint – External and internal joints must be sealed using approved fire-rated and weather resistant materials.
- Maintenance – Panels require periodic inspection for corrosion, damaged coatings, or joint degradation.
- Customization – Panel finishes, perforations, and profiles can be customized to meet architectural designs.
- Environmental Impact – Use of recycled steel facings and insulation cores can enhance sustainability ratings.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire and Life Safety Code of Practice (UAEFLSC)
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System

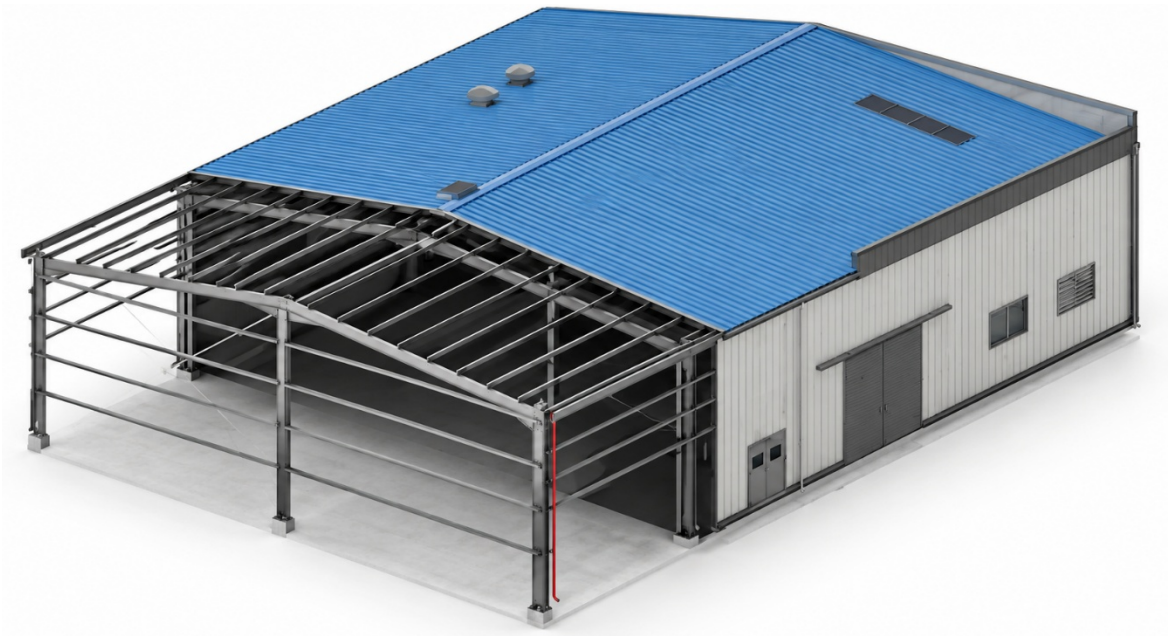
Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

METAL SANDWICH PANELS
(MSP)

Building System Category:	Non-Structural Assemblies & Sub-assemblies
Sub-Category:	Thermal Insulation Assemblies

Building System Name:	Metal Sandwich Panels
Description:	Metal Sandwich Panels (MSPs) are prefabricated composite panels with two metal facings bonded to an insulating core. The facings typically galvanized steel, aluminum, or stainless steel, provide protection, corrosion resistance, weatherproofing, and aesthetic finish, while the



core either PUR, PIR, Mineral Wool, or EPS offers thermal insulation, acoustic performance, and fire resistance.

MSPs are non-loadbearing envelope components. Their prefabricated and modular design enables rapid installation, reduced labor costs, high-quality construction, and flexibility in finishes, colors, and profiles, while ensuring fire safety, structural integrity, and long-term durability when installed according to DCD-certified assemblies.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the MSP design basis, production controls, and installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the MSP system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the MSP on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of cladding system activity issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

- Industrial / Commercial Envelopes – External wall cladding and roof cladding for warehouses, factories, logistics buildings, workshops, cold stores, sheds, and ancillary buildings—subject to the project's fire strategy and authority approvals.
- Internal Envelope Applications (where permitted) – Internal partitions, ceilings/liners, and temperature-controlled rooms (e.g., cold rooms), typically under specific fire/insurance requirements.
- Local Constraint (Dubai) – Not permitted for residential building applications per local requirements/practice. May be considered only as concealed roofing to service blocks within residential developments

(aesthetic-driven use), subject to Dubai Municipality / Civil Defence acceptance (as applicable).

ADVANTAGES

- Lightweight – Offer high strength-to-weight ratio, reducing structural load.
- Quick & Fast Installation – Large-format, prefabricated panels enable rapid enclosure and reduced site labor.
- Good Acoustic Performance – Reduce noise transmission, useful in industrial and commercial buildings.
- Excellent Thermal Comfort – Continuous insulation core delivers good U-values with fewer layers (when joints and thermal bridges are correctly detailed) reducing energy consumption for heating and cooling.
- Durability – Expand the service life of building envelope by resisting corrosion, UV rays, and harsh weather conditions.
- Low Maintenance – Easy to clean and maintain, ideal for hygienic, industrial building, and warehouse.
- Fire Resistance – Can provide up to two hours (or more) of fire rating with certified components (Reference shall be made to Dubai Civil Defence licenses).
- Aesthetic Flexibility – Available in different colors, finishes, and profiles to meet architectural designs.
- Sustainability – Panels can be recycled, and insulation improves building energy efficiency.

LIMITATIONS & SPECIAL CONDITIONS

1. Pilot Project – Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.
2. Fire Resistance - Fire performance depends on the core and full assembly. Foam cores (EPS/PUR/PIR) must meet project fire requirements, and MSP assemblies must be Dubai Civil Defence approved and listed.
3. Material Conformity – Dubai Central Laboratory Certificates of product conformity are required for insulation materials.

4. Thermal Expansion – Panels must allow for expansion and contraction due to temperature variations.
5. Durability depends on coating/specification – Marine/coastal exposure, industrial pollutants, and cut-edge corrosion require appropriate coating system, detailing, and maintenance.
6. Jointing & Penetrations are critical – Correct sealing and joint design is essential to avoid water penetration. Poor detailing at laps, corners, openings, MEP penetrations, and roof lights is the most common cause of leakage, corrosion initiation, and thermal bypass.
7. Structural Limitations – Metal sandwich panels are approved for non-loadbearing (self-supporting) applications only; they are self-supporting between supports and shall be designed for self-weight and wind pressure and suction.

KEY COMPONENTS AND TECHNICAL DETAILS

Component	Description
Metal Facings (Skins)	Profiled galvanized/pre-painted steel (or aluminum in some systems) providing weathering protection.
Insulating Core	Commonly PUR, PIR, EPS, or mineral wool, selected based on thermal target, fire strategy, acoustic need, and insurance/authority requirements. Provides thermal insulation, fire resistance, and acoustic control.
Adhesive	Binds metal skins to core material with high-strength polyurethane or epoxy adhesive. Must ensure strong bonding and long-term durability.
Connections & Joints	Commonly interlocking male/female joints (tongue-and-groove), with side-lap/overlap profiles to manage air/water tightness; roof panels typically include crown/rib profiles for drainage and stiffness.
Fixings	Self-drilling fasteners to purlins/girts with sealing washers; fixing pattern designed for wind uplift/suction and serviceability (deflection).
Coating	Surface treatments for corrosion and UV protection.
System Accessories	Flashings (ridge, eaves, corners), closures, sealants, vapor/air seals (as required), gutters/downpipes, and interface trims.

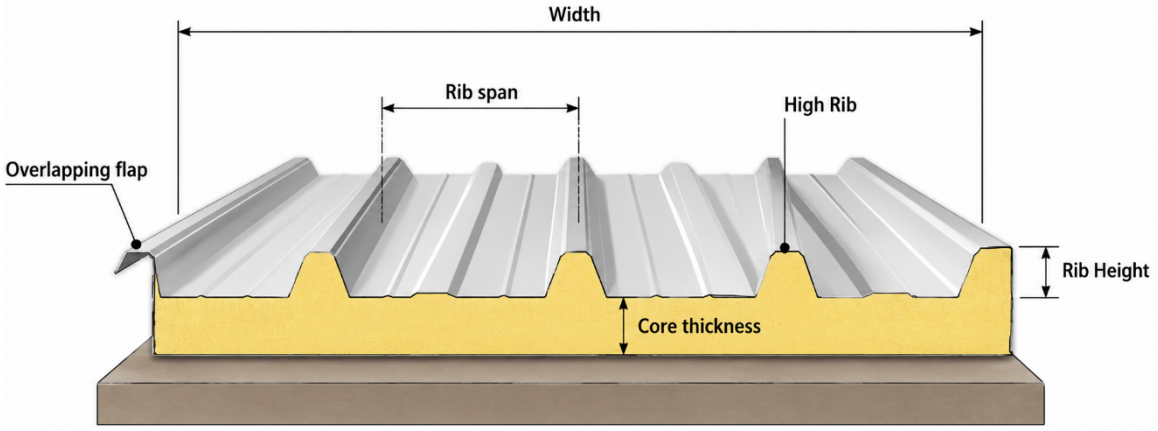
PERFORMANCE CONSIDERATIONS

- **Structural** – Verify spanning capacity, support spacing, wind uplift/suction.
- **Acoustic Performance** – Depends strongly on core type/density, joint sealing, and whether a twin-skin build-up is required for higher ratings. Must meet Dubai Building Code and Al Sa'fat performance requirements.
- **Fire Resistance** – Assemblies requiring a specific fire-rating must have valid DCD approval/license.
- **Moisture & Water Resistance** – Effective detailing, sealing, and substrate preparation required to prevent water ingress at joints, penetrations, and terminations.
- **Thermal Performance** – Continuity of insulation, thermal bridging at fasteners/steel substructure, and joint sealing govern real (in-situ) performance. Continuous insulation must meet U-value targets as per DBC and Al Sa'fat Green Building Regulations.

SYSTEM SECTIONS







ILLUSTRATIVE APPLICATIONS

ADDITIONAL NOTES / USEFUL INFORMATION

- Sealant & Joint – External and internal joints must be sealed using approved fire-rated and weather resistant materials.
- Maintenance – Panels require periodic inspection for corrosion, damaged coatings, or joint degradation.
- Customization – Panel finishes, perforations, and profiles can be customized to meet architectural designs.
- Environmental Impact – Use of recycled steel facings and insulation cores can enhance sustainability ratings.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire & Life Safety Code of Practice (UAEFLSC)
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

COMBO ROOF SYSTEM

Building System Category:	Non-Structural Assemblies & Sub-assemblies
Sub-Category:	Roofing Assemblies

Building System Name: **Combo Roof System**



Description:

The Combo Roof System is an integrated roofing assembly designed to provide long-term waterproofing and thermal insulation for concrete roof structures. The system combines high-performance insulation materials with robust waterproofing layers to enhance energy efficiency, durability, and protection against environmental exposure.

The system typically consists of spray-applied polyurethane (PU) foam or rigid PIR/PUR insulation, applied directly over the concrete roof slab, followed by liquid-applied or membrane-based waterproofing, a geotextile separation layer, protective screed, and a durable topcoat finish.

Combo Roof Systems are particularly suited for flat and low-slope roofs, where continuous insulation and seamless waterproofing are critical. When properly designed and installed, the system improves thermal comfort, reduces cooling loads, and protects the structural roof slab from moisture ingress and thermal stresses.

All system components shall be compatible and supplied by approved manufacturers. Installation shall be carried out by trained and certified applicators, ensuring compliance with Dubai Building Code, Al Sa'fat Green Building Regulations, and relevant Dubai Municipality requirements.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, approved suppliers, and/or specialized roofing and insulation contractors responsible for the system design, material supply, and installation methodology.

- Manufacturers / System Owners: Must hold a valid Industrial License issued by the relevant economic department and demonstrate control over product formulation, quality assurance, and technical documentation.
- Commercial Installers / Applicators: Installation works must be carried out by contractors holding a valid Commercial License for roofing, waterproofing, or insulation works, issued by Dubai Department of

Economy and Tourism (DET). Applicators must be trained and certified for the proposed insulation and waterproofing materials.

WHERE IT CAN BE USED

Roof Applications

- Suitable for all building types: residential, commercial, institutional, hospitality, and industrial.
- Suitable for sloped or flat roofs applications.

ADVANTAGES

- "3-in-1" Integrated Build-Up – Combines waterproofing + thermal insulation + protective/finish coat into one coordinated system, reducing trade interfaces and handover gaps.
- Lower Leak Risk – Typically relies on continuous, joint-free application and/or fully bonded insulation/waterproofing layers, which helps reduce common failure points at laps and joints.
- Energy Efficiency & Comfort – Improved roof insulation can cut heat gain and reduce cooling demand–particularly beneficial in hot climates.
- Fast-Track Installation – Marketed as a fast-curing approach with fewer discrete roof build-up operations, supporting shorter programmes.
- Reduced Roof Build-Up Complexity – Can eliminate the need for roof tiles/finishes in many applications (where an exposed/protective coating finish is acceptable), simplifying detailing and logistics.
- Durability – Protects the roof slab from thermal cycling, moisture damage, and environmental exposure.
- System Compatibility – Can be tailored to meet project-specific U-value and waterproofing requirements.

LIMITATIONS & SPECIAL CONDITIONS

1. Pilot Project – Not required for approval of Combo Roof System.
2. Material Conformity – Dubai Central Laboratory Certificates of product conformity are required for insulation materials.
3. Material Substitution – PUR/PIR insulation from alternative manufacturers may be accepted, provided the applicator is certified, and the product complies with DCL requirements.
4. Thermal Compliance – The system must meet the latest DBC and Al Sa'fat
   U-value requirements for roof assemblies.
5. Drainage & Slope – Adequate slope and detailing must be provided to prevent water ponding.

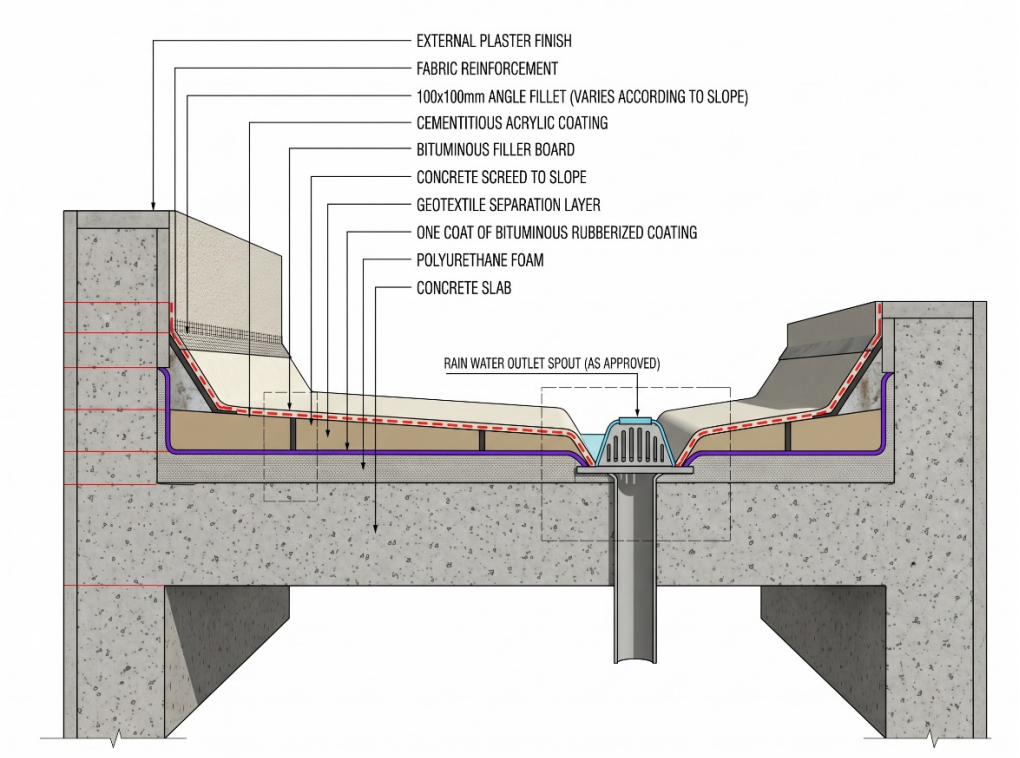
KEY COMPONENTS & TECHNICAL DETAILS

Component	Description
Roof Slab	Reinforced concrete slab
Thermal Insulation	Sprayed PUR/PIR thermal insulation, applied on-site, with the applicator holding DCL certification for this scope of work. The insulation thickness is tailored to meet the U-value requirements for the roof.
Damp-proofing	Rubberized bitumen liquid emulsion.
Waterproofing	Liquid-applied membrane or approved waterproofing system forming a continuous barrier.
Geotextile Separation	Permeable textiles of synthetic fibers used as separation layer.
Screed	Non-structural concrete is used as protection screed.
Topcoat	Acrylic-modified polymer cementitious coating. The topcoat should be DCL certified to confirm its compliance with Al Sa'fat regulations.
Joint Sealants	Polyurethane sealant used for treating joints. The sealants should hold DCL certification to guarantee compliance with Al Sa'fat requirements.

PERFORMANCE CONSIDERATIONS

- **Acoustic Performance:** The combo roof system must meet the Dubai Building Code and Al Sa'fat performance requirements for sound insulation.
- **Impact Resistance:** Must have sufficient impact resistance to withstand foot traffic, maintenance activities, and environmental factors without damaging the insulation or waterproofing layers.
- **Waterproofing Integrity:** A Combo Roof System must provide a durable, seamless waterproof barrier beneath the insulation to prevent any water ingress and protect the building structure.
- **Thermal Insulation:** A Combo Roof System should offer effective thermal insulation above the waterproofing layer to reduce heat transfer and protect the membrane from temperature extremes.
- **Installation and Detailing:** Installation of a Combo Roof System requires skilled workmanship with careful attention to joints, penetrations, and slopes to ensure long-term performance and prevent water ponding.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS

ADDITIONAL NOTES / USEFUL INFORMATION

- Joint Treatment – All movement joints, terminations, and penetrations must be detailed using approved sealants and accessories.
- Maintenance Access – Roof design should accommodate safe access for inspection and maintenance.
- System Documentation – Approved drawings, method statements, product datasheets, and test reports must be maintained as part of the approval record.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Al Sa'fat Green Building Regulations
3. UAE Fire & Life Safety Code of Practice (UAEFLSC)
4. Dubai Central Laboratory Product Conformity Standards

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

EXTERNAL INSULATION FINISHING SYSTEM
(EIFS/ETICS)

Building System Category:	Non-Structural Assemblies
Sub-Category:	Thermal Insulation Assemblies

Building System Name: **External Insulation Finishing System**





Description:

External Insulation Finishing System (EIFS) is a multi-layered exterior wall cladding system designed to improve the thermal performance, weather resistance, and aesthetic appearance of buildings. It consists of rigid insulation boards mechanically fixed or adhesively bonded to the exterior wall substrate, providing continuous insulation that minimizes thermal bridging.

EIFS typically includes a reinforced base coat applied over the insulation board, the base coat is reinforced by embedding a fiberglass mesh to enhance impact resistance and durability. EIFS system profiles such as PVC corner bead with wing mesh are installed to further reinforce corners/windows/dis-similar surface interfaces. A primer is roller applied to the basecoat, to create a uniform bonding layer and to ensure consistent texture and color. The final decorative, textured finish coat is then typically trowel applied to the primed basecoat to protect the system from environmental exposure while offering a wide range of colors and architectural finishes.

All components of the EIFS shall be compatible and supplied by an approved manufacturer. Installation shall be carried out by trained and certified applicators to ensure proper adhesion, alignment, and performance of the system.

WHO CAN APPLY

Applications may be submitted by system owners/manufacturers, suppliers, and/or installers who are responsible for the EIFS design basis, production controls, and installation methodology.

- Manufacturers: The primary applicant is typically the manufacturer of the EIFS system. They must hold a valid Industrial License issued by the relevant economic department.
- Commercial Installers: The installation of the EIFS cladding systems on-site cannot be performed by just any contractor. The applicant must also hold, or partner with a firm holding, a Commercial License specific to the installation of EIFS cladding system activity issued by Dubai Department of Economy and Tourism (DET).

WHERE IT CAN BE USED

External Walls (Cladding)

- Applicable to all building types (residential, commercial, institutional, hospitality, etc.) for non-load-bearing applications.
- Suitable for use as external cladding, if approved per local code requirements for insulation, fire resistance, and weatherproofing.

ADVANTAGES

- Lightweight – Offer high strength-to-weight ratio, reducing structural load.
- Quick Site Installation – Speed up construction time and reduce labor costs.
- Good Acoustic Performance – Reduce noise transmission, useful in industrial and commercial buildings.
- Excellent Thermal Comfort – Reduces energy consumption for heating and cooling, and improved thermal efficiency when insulation is added.
- Durability – Expand the service life of building envelope by resisting corrosion, UV rays, and harsh weather conditions.
- Low Maintenance – Easy to clean and requires minimal maintenance
- Fire Resistance – Can provide up to two hours (or more) of fire rating with certified components and complete EIFS systems (Reference shall be made to Dubai Civil Defence licenses).
- Aesthetic Flexibility – Available in different colors, finishes, and textures to meet architectural designs.

LIMITATIONS & SPECIAL CONDITIONS

1. Pilot Project – Not required for approval of EIFS.
2. Fire Rating – Fire-rating assemblies must be approved and listed by Dubai Civil Defence.
3. Material Conformity – Dubai Central Laboratory Certificates of product conformity are required for insulation materials.
4. Height Limitations – System performance for high-rise applications may require additional wind-load resistance testing and verification.
5. Movement Accommodation – Expansion joints and interface detailing must be included to avoid cracking or water ingress.

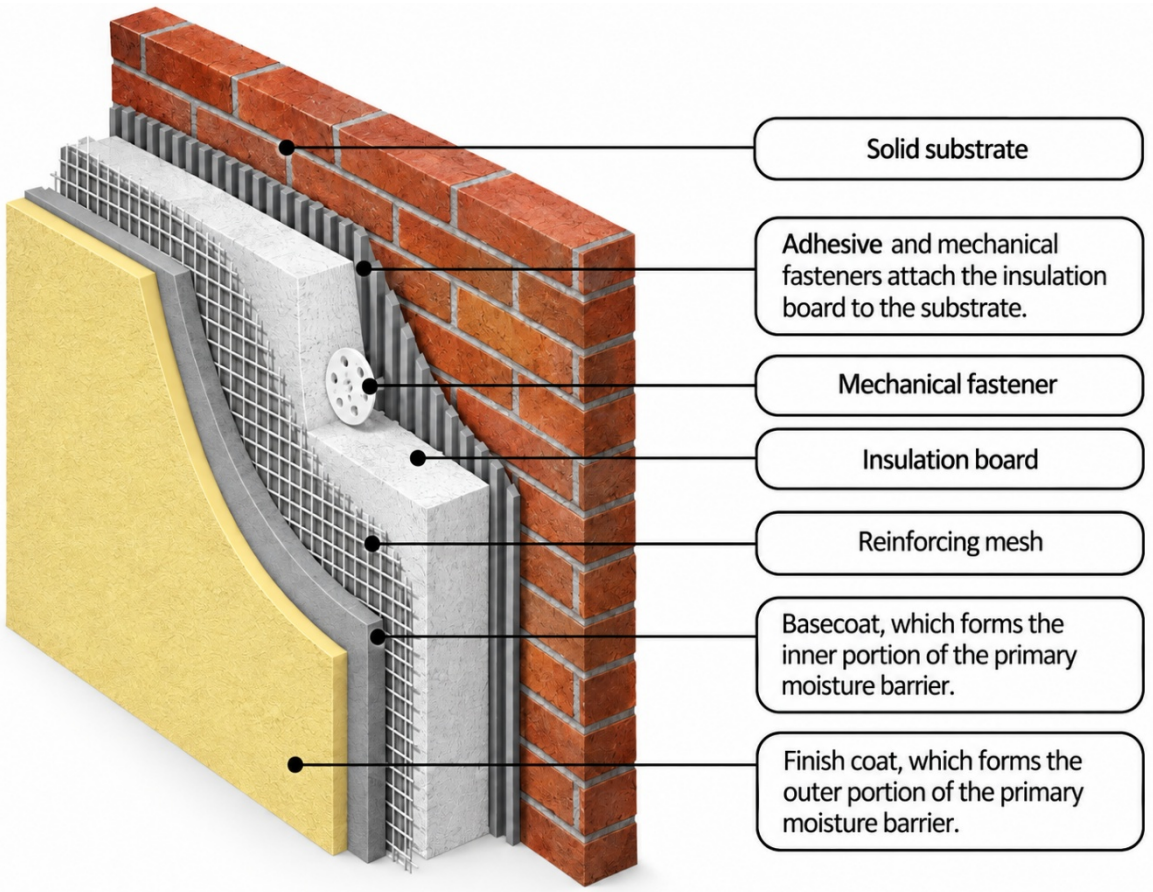
KEY COMPONENTS AND TECHNICAL DETAILS

Component	Description
Base Wall	Exterior sheathing, shell, or surface of the EIFS is applied. It must be structurally sound and compatible.
Adhesive	Used to bind insulation board to the exterior wall surface. Must ensure strong bonding and long-term durability.
Insulation Board	Provide thermal resistance typically made of polystyrene or mineral wool and is secured to the exterior wall surface.
Mechanical Fasteners	Used to fasten the insulation board to the exterior wall surface.
Base Coat	Applied over insulation to embed reinforcing mesh.
Reinforcing Mesh	Embedded in the base coat for crack resistance and impact protection.
Finish Coat	Applied on top of the primed base coat, to provide a decorative, durable, and protective outer layer.
Expansion Joints	Allow for movement of the system due to thermal expansion / contraction.

PERFORMANCE CONSIDERATIONS

- Acoustic Performance – Must meet Dubai Building Code and Al Sa'fat performance requirements.
- Fire Resistance – Assemblies requiring a specific fire-rating must have valid DCD approval/license.
- Impact Resistance – External wall assemblies shall provide impact resistance appropriate to their exposure, with enhanced impact resistance in zones subject to pedestrian access, vehicle movement or maintenance activity.
- Moisture & Water Resistance – Effective detailing, sealing, and substrate preparation required to prevent water ingress at joints, penetrations, and terminations.
- Thermal Performance – Continuous insulation must meet U-value targets as per DBC and Al Sa'fat Green Building Regulations.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

Sealants & Joints – External and internal joints must be sealed using approved fire-rated and weather resistant materials. All sealants and coatings shall be certified by Dubai Central Laboratory.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. UAE Fire Safety Code
3. Dubai Central Laboratory Certification Schemes
4. Al Sa'fat – Dubai Green Building System
5. 2021 International Building Code, Chapter 14, Section 1407 - Exterior Insulation and Finish Systems (EIFS)

Dubai Municipality
Building Permits Department
Research & Building Systems Section

Building Systems Approval

INTEGRAL WATERPROOFING SYSTEM

(Concrete Admixture – Permeability Reducing)

Building System Category:	Building and Construction Materials
Sub-Category:	Integral Waterproofing (Permeability Reducing Admixture

Building System Name:	Integral Waterproofing System
Description:	Integral waterproofing refers to chemical admixtures introduced into the concrete mix at batching to reduce water absorption and permeability. Depending on the chemistry, the admixture may act by hydrophobic pore-blocking and/or by hydrophilic crystalline reactions that

densify the cement matrix, generate pore-blocking deposits, or both, and can re-activate in the presence of moisture.

Integral waterproofing shall be specified as part of an overall watertightness strategy that includes appropriate concrete design, crack control, joint detailing, and quality assurance, with explicit consideration of exposure conditions and hydrostatic pressure.

WHO CAN APPLY

Manufacturers of integral waterproofing admixtures may apply through their local distributors/agents, and contractors specialized in integral waterproofing applications. The distributer/agent shall be qualified by the manufacturer and shall deploy certified and experienced on-site supervision.

WHERE IT CAN BE USED

1. Below-Grade Structural Concrete (Substructures)
   - Basement rafts, pile caps, retaining walls, lift pits, and other below-grade reinforced concrete elements, particularly where groundwater or wet soil conditions are expected.
2. Water-Containing Structures (Tanks/Pools/Pits)
   - Applicable for non-potable water containment and wet process pits, subject to the projects' watertightness class, joint detailing, and test requirements.
   - For potable-water contact, the admixture and the complete waterproofing system shall be certified for drinking-water contact as required by the project.
3. Supplementary Support for Exposed / Wet Areas
   - May be specified as a supplementary risk-reduction measure for podium slabs, planters, and wet areas. External membranes, surface waterproofing and detailing remain required where mandated by code and/or project specifications.

ADVANTAGES

- Provides uniform integral protection within the concrete matrix and reduces water ingress pathways associated with capillary absorption and permeability.
- Can improve durability by limiting moisture and aggressive ion ingress (e.g. chlorides), thereby supporting reinforcement of corrosion protection and service-life performance.
- Reduces reliance on post-applied membranes in certain applications and simplify detailing for complex geometries (subject to project risk assessment).
- For crystalline-type systems, exposure to moisture can promote ongoing pore blocking/crystal growth, supporting autogenous sealing of fine cracks (within design limits).

LIMITATIONS & SPECIAL CONDITIONS

1. Not a stand-alone waterproofing strategy: It shall be used with proper concrete design, crack control, curing, and joint/penetration detailing (waterstops, sealants, sleeves, etc.).
2. Pilot projects: Approval requires the successful completion of a pilot project to demonstrate feasibility, build quality, and compliance with local regulations.
3. Integral admixtures do not accommodate significant movement of joints or wide cracks: Movement joints shall be designed with dedicated joint systems, and crack widths shall be controlled by structural design and reinforcement detailing.
4. Performance depends on correct dosing, mixing, placement, and curing: Trial mixes, calibrated dosing equipment, production of QC, and traceability records are required.
5. Material conformity is required: The product shall have a valid product conformity certificate issued by Dubai Central Laboratory.

KEY COMPONENTS & TECHNICAL DETAILS

Component	Description

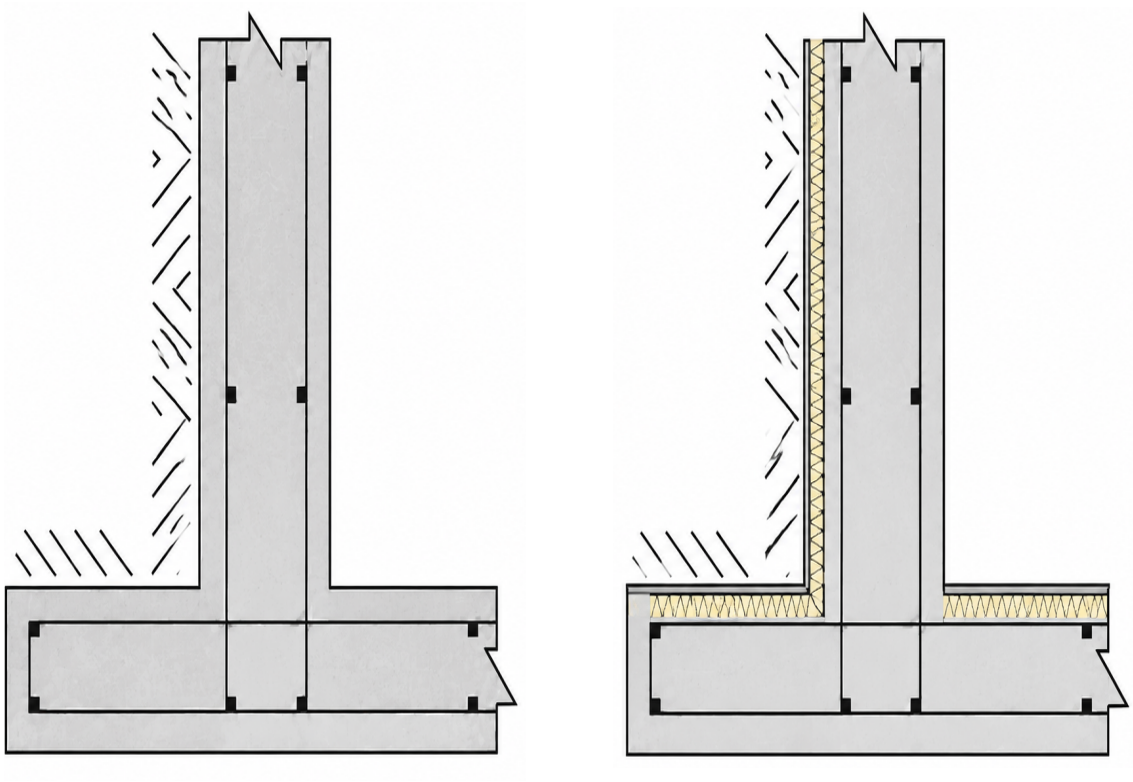
Waterproofing Admixture	Chemical admixture dosed at batching of concrete to reduce absorption/permeability. Products shall conform to EN 934-2.
Concrete Mix Design	Project mix design to achieve the required strength, durability, and low permeability. Compatibility with other admixtures shall be demonstrated by trial mixes.
Batching, Dosing & Mixing Controls	Calibrated dosing system (or documented dosing procedures by admixture supplier or representative), documented mixing sequence/time, and production records (delivery tickets, batch reports). On-site addition is not allowed.
Joint / Penetration Detailing Accessories	PVC waterstops, hydrophilic strips, swellable bars, injectable hoses, sleeves, crystalline slurry (joint treatment), and sealants as required. Joint and penetration waterproofing accessories shall be compatible with the integral admixture system, shall be specified by the system owner, and shall be installed in accordance with the system owner's method statement under its technical supervision. Integral admixture does not replace joint waterproofing systems.
Curing, Crack Control & Repair Provisions	Curing regime, temperature control, and crack control reinforcement to maintain watertightness. Where cracking/leakage occurs, approved repair methods (e.g. injection, crystalline mortar) consistent with the system shall be used.

PERFORMANCE CONSIDERATIONS

- Watertightness / Permeability: Verify using standardized testing such as depth of penetration of water under pressure (e.g. EN 12390-8) and/or capillary absorption testing, with comparative results versus a control mix and acceptance criteria aligned to the intended exposure conditions (hydrostatic / non-hydrostatic). Selection and evaluation of product shall be performed based on relevant standards and guidelines, such as ACI 212, Chapter 15.
- Durability and Structural Performance: Demonstrate that the admixture does not adversely affect strength development, setting, shrinkage, reinforcement bond, or other critical properties, and that it supports durability objectives.

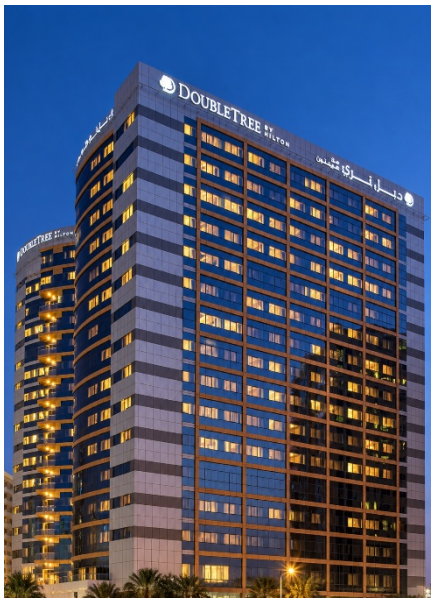
- Inspection and Project QA/QC: Include hold points for dosing/mixing verification, joint installation inspection, curing verification, and post-construction watertightness testing as specified by the design and project specifications.

CROSS-SECTION



ILLUSTRATIVE APPLICATIONS





ADDITIONAL NOTES / USEFUL INFORMATION

Integral waterproofing selection should be risk-based. Consider groundwater level, hydrostatic head, joint density, concrete cracking risk, and required watertightness class. Coordinate with the structural designer and waterproofing specialist.

REFERENCES & APPLICABLE STANDARDS

1. Dubai Building Code (DBC)
2. Dubai Central Laboratory Certification Schemes
3. EN 934-2: Admixtures for concrete, mortar and grout – Definitions and requirements (water-resisting admixtures).
4. ACI 212.3R: Report on Chemical Admixtures for Concrete (Permeability-Reducing Admixtures).
5. BS 8102: Code of practice for protection of below ground structures against water from the ground.
6. Project specifications and manufacturer installation method statements, including dosing, mixing, curing, and repair procedures.