SECTION 15010

MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: This Section outlines the general design requirements for mechanical systems at ANC (Ted Stevens Anchorage International Airport). Refer to other Division 15 sections for additional requirements including standards for material and construction quality.

B. Index of Mechanical Requirements:

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15075	Mechanical Identification
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15945	Controls Testing and Acceptance
15990	Testing, Adjusting, and Balancing

1.2 REFERENCES

A. Codes: Design all work in strict accordance with all applicable national, state and local codes; including, but not limited to the latest legally enacted editions of the following specifically noted requirements and local amendments thereto:

1. International Building Code (IBC).
2. International Mechanical Code (IMC).
3. Uniform Plumbing Code (UPC).
4. International Fire Code (IFC).
5. NFPA 70 - 1999, National Electric Code (NEC).
6. ANSI A117.1 - 1998 Accessible and Useable Buildings and Facilities

1.3 GENERAL REQUIREMENTS

A. Mechanical systems shall be designed under supervision of and stamped by a Mechanical Engineer licensed to practice in the State of Alaska.

B. A Mechanical Contractor licensed by the State of Alaska shall install the Tenant's mechanical systems. Unlicensed installation by tenant employees is specifically forbidden.

C. Drawings shall be prepared in AutoCAD format.

D. Submittals are required during design phase to show that the proposed mechanical systems are compatible with existing systems, and that the installation will meet the requirements of these standards. Refer to SUBMITTALS for specific design phase submittal requirements.

E. Submittals are required during construction phase to

1. Verify that systems designed by the construction contractor based on performance specifications are compatible with existing systems, and meet the requirements of these standards. These include sprinkler and controls shop drawings.
2. O&M Data. These include O&M manuals, Controls drawings and data files, Testing and Balancing reports, etc. Refer to technical sections. Tenant information shall be prepared to be a separate “Appendix” to existing O&M information.
3. Record Drawings as described in RECORD DRAWINGS.

F. Construction phase submittals shall be reviewed and approved by Tenant's Engineer prior to submission to ANC.

G. MOA building permits shall be obtained by the Tenant or their contractor and submitted to ANC prior to the start of construction.

1.4 PROJECT CONDITIONS

A. Coordinate with ANC to determine what existing building services are available at each tenant area.

B. Mechanical services available for initial tenant build-out areas in C-Concourse are shown on construction drawings for this area. Refer to Concourse C - Phase 2 - Building Completion drawings, AKSAS 54475 for additional information. Coordinate with ANC to obtain copies of these drawings. Drawings and Specifications may not reflect as-built conditions, and it shall

be the responsibility of the Tenant and the Tenant's Engineer to verify current documents to determine actual conditions that will be encountered during construction.

C. Fire Protection Systems

1. Provide sprinkler protection to the tenant spaces. All areas of the terminals are presently sprinklered. Under the basic construction in C-Concourse, upright heads suitable for protecting exposed structure have been installed in unfinished spaces. Revisions of the sprinkler system to suit the tenant improvement shall be done by the Tenant as part of Tenant build-out.

2. New sprinkler zones required by Tenant (as deemed necessary by the Fire Marshall) shall be provided to the space at Tenant expense.

3. Submit and obtain approval of sprinkler shop drawings prior to installation. Refer to Section 15300 for more information regarding sprinkler systems.

D. Plumbing Systems

1. General

a. All plumbing drawings must be submitted to the ANC for review and approval prior to construction.

b. Submit a plumbing fixture schedule with fixture connection sizes and fixture unit demands.

c. Water heaters are generally not required for most non food producing Tenants because the ANC has a central water heating system. Maximum water temperature is 140 degrees F. Provide tempering valves as necessary for hand sinks and showers.

d. Cold water, hot water, and hot water circulation water mains are located near each tenant are for use by the Tenant. The central water heating facility is adequately sized for normal office type hot water usage such as break room sinks, restrooms, and other ordinary uses. It is also sized for anticipated food service needs by the food service concession. It is not sized for large process loads such as vehicle washing systems.

e. Plumbing waste and venting systems are to be available for connection of fixtures.

f. The Airport has experienced extensive corrosion in the past on drain lines from food service areas, presumably from soft drink dispensers. For this reason, drains to the food service areas shall be chemically resistant.

g. ANC will not provide grease interceptors at the terminal. There is no service available in the local area to remove the grease from interceptors, and the Municipal landfill will not accept grease in the large volumes that come from interceptors. Grease traps to service individual fixtures or groups of fixtures shall be provided by the Tenant as part of the tenant build-out. Cleaning and maintenance shall be the Tenant's responsibility.

h. Drains serving areas where motor vehicles operate shall be protected by an oil/water separator system provided and maintained by Tenant.

E. Heating Systems

1. Heating mains routed through the terminal provide space heating needs. Heating medium is water; supply temperature is 190 Degrees F. Heating devices shall be designed with a maximum of 30 Degrees temperature drop of the heating water. The heating system has been designed to provide adequate water flow to maintain the building temperature at design heating conditions, including heating requirements for ordinary ventilation.

2. Distribution piping in C-Concourse has many valved and capped stub-outs to future terminal heating devices in tenant areas. Some of the stub-outs are designed for perimeter heating. Other stub-outs are designed for reheat coils associated with VAV terminal units. Refer to Concourse C - Phase 2 - Building Completion drawings for heating flow allocations to each stub-out. Flows in excess of the allocations will not be allowed.

3. Where multiple tenants draw from the same flow allocation, the flow shall be prorated between tenants.

F. Cooling Systems

1. Space cooling is available through the ventilation system in most areas of the terminal. Supply temperatures are typically 55 Degrees F for most systems. Refer to Ventilation below.

2. Supplemental cooling is available in C-Concourse at each floor from the chilled water system. The chilled water system circulates a propylene glycol solution at 42 Degrees F. during the summer months when the chillers are in operation. During the winter, the cooling towers are used as a dry cooler, with temperature controlled to 50 Degrees F. Temperatures may be higher in the spring and fall. The system is used primarily for equipment room air conditioners that use the chilled water system for cooling the air conditioner condensers. Coordinate with ANC for points of connection to existing risers located in many of the ventilation shafts.

G. Ventilation

1. C-Concourse: Conditioned air supply has been provided to each Tenant space. The air distribution system has been sized for the estimated total heating and cooling requirement of the Tenant lease space and is terminated with capped duct connections within each Tenant lease space. Refer to Concourse C - Phase 2 - Building Completion drawings for locations of outlet connections.

2. The Tenant shall furnish VAV boxes, thermostats, low velocity ductwork, diffusers, and return air grilles to suit the Tenant's need as part of the initial build-out. In subsequent remodels, existing HVAC equipment may be re-used at the Tenant's discretion.

3. The allocated capacity of each outlet is indicated on the drawings, and the VAV terminal schedule. Tenants shall work within the allocated flows.

4. Temperature of the air supplied through the VAV trunk ducts is scheduled to be delivered on the following schedule:

Outside Air Temp	Mixed Air Temp
Minus10 degrees F.	65 degrees F.
55 degrees F.	55 degrees F.

5. Where multiple tenants draw from the same flow allocation, the flow shall be prorated between tenants.

6. Additional connections to the trunk ductwork may be requested in writing during the design process.

7. Return air ducts have been extended to certain areas. Refer to the drawings for locations of these ducts.

H. Environmental (toilet) exhaust

1. The environmental exhaust exhausts for C-Concourse were designed with additional capacity to serve tenants. The designed total capacity of each system is indicated on the Concourse C - Phase 2 - Building Completion drawings.

2. The excess capacity of any environment exhuast system shall be prorated among tenants. Permission to connect to any environmental exhaust system will be dependent on the availability of capacity. Coordinate with ANC for determination of what is available. Provision of environmental exhaust beyond what is currently furnished to the tenant area is the responsibility of the Tenant.

3. Connection points to the environmental exhaust systems shall be at the duct risers at the ventilation shafts.

4. Existing horizontal ductwork serving ANC toilet facilities may not be used for tenant exhaust , except that minor exhaust flows may be accepted with prior ANC approval where the additional flow does not exceed the capacity fo the ductwork.

5. Penetration of the ventilation shafts with environmental ducts may require installation of fire and smoke dampers in accordance with the adopted Building Code.

I. Makeup Air

1. Design of the central ventilation system includes allowances for makeup air purposes for general environmental exhaust for toilet rooms, and for general food service areas with small cooking hoods.

2. There is no allowance for the area designated for large commercial kitchen. Separate makeup air units shall be provided as part of the tenant build-out of this area.

3. The Tenant shall provide makeup air systems for any process exhaust system.

J. HVAC Controls

1. The existing control system is LonWorks based. Refer to 15900 for specific control system design and installation requirements.

2. The Tenant shall provide compatible controls for new equipment installed by the Tenant. In general, the extent of controls work under tenant improvement is limited to installation and programming of the field devices in the tenant area. Coordination with ANC for integration of the new controls into the existing controls is required. Refer to Section 15900.

3. Refer to Section 15940 for specific requirements for Sequences of Operation, monitoring, and alarming.

1.5 SUBMITTALS

A. Professional Mechanical Engineer qualifications: Submit qualifications described in QUALITY ASSURANCE. Submit with Preliminary Design Submittal.

B. Design Phase Submittals: Submit the following as described under DESIGN PHASE REQUIREMENTS.

1. Preliminary Design Submittal: Submit prior to preparing construction documents to demonstrate compliance with these Tenant Mechanical Requirements.

2. Final Design Submittal: Submit completed construction documents for review and approval prior to any construction activity.

3. Submit copies of MOA building permits prior to any construction activity.

C. Construction Phase Submittals

1. Submit documents for all system that are designed by the Tenant's Contractor on a performance basis, including but not necessarily limited to:

a. Sprinkler shop drawings and calculations. Refer to Section 15300.

b. HVAC Control drawings, diagrams, and software. Refer to Section 15900.

2. Commissioning Certifications. Refer to Section 15945.

3. O&M Manuals approved by the Engineer - See OPERATIONS AND MAINTENANCE MANUALS.

4. Record Drawings - See RECORD DRAWINGS.

5. Testing and Balancing Reports. See Section 15990.

6. Other submittals as may be included in these requirements.

1.6 QUALITY ASSURANCE

A. Provide the services of a Professional Mechanical Engineer (the Tenant's Mechanical Engineer) currently licensed for practice in the State of Alaska to design a complete set of interrelated mechanical systems in accordance with the requirements and criteria set forth in this document. Obtain approval of the prepared plans and specifications by ANC prior to construction as noted below.

B. Prior to commencement of design, submit documentation demonstrating that the proposed Professional Mechanical Engineer meets all current licensing requirements of the State of Alaska Board of Registration for Architects, Engineers and Land Surveyors in accordance with Alaska Statutes. This applies to both personal and business licensing.

C. The Professional Mechanical Engineer shall review and approve all product submittals and shop drawings prior to installation. This review shall be before and in addition to submittal and shop drawing review by ANC.

1.7 DESIGN PHASE REQUIREMENTS

A. Preliminary and Final Submittals shall be in accordance with ANC's "Airport Tenant Criteria section on "Submission Requirements". Additional specific requirements for mechanical are noted below.

B. Preliminary Design Submittal: This submittal shall include the items noted below to confirm and document the scope of work and the type and quality of mechanical systems. The submittal shall document all proposed mechanical systems and their proposed interfaces to building systems.

1. Schematic Design Narrative

    a. Narrative shall include:

        1) Document basic assumptions

        2) Communicate system concepts

        3) Identify proposed system connection points for all major systems. If connection to a particular system is not required it shall be noted in narrative.

            i Fire Protection

            ii Plumbing

            iii Heating, cooling and ventilation.

            iv Exhaust systems

            v HVAC Control System

        4) Identify major product choices.

2. Calculations

    a. Mechanical load summaries. Enumeration of specific heating water, chilled water and air flows shall be indicated, and a comparison with flow allocations for the area. Flow demands shall be within the allocations, or alternate sources shall be provided.

3. Floor Plans: Submit 1/8" scale concept floor plans to demonstrate the viability of proposed design.

    a. Show major mechanical equipment and proposed connection points.

    b. Identify all equipment with a weight in excess of 300 lbs. The Tenant's structural engineer shall consider the impact of such weight. The Tenant shall provide any additional structural support where it is required to support the additional weight.

4. Outline Specifications.

C. Final Design Submittal: Submit Construction Documents, suitable for permit approval, and construction. Final design shall be based on schematic design submitted previously, unless otherwise approved by ANC. Required submittal shall include, but is not limited to:

1. Construction Plans as follows:

    a. Separate floor plans for plumbing and HVAC.

    b. Show all ductwork and piping that will be installed, and their sizes.

    c. Indicate all VAV boxes, grilles, diffuser, plumbing fixtures, heating terminal devices.

    d. Complete fixture schedules with manufacturer, model number,. Submit catalog cutsheets with product data sheets.

    e. Additional drawings and details so that when used with the specific project specifications, the proposed construction is sufficiently clear to allow permitting and successful project completion without additional drawings.

2. Specifications to describe specific project requirements, products and execution.

3. Complete mechanical calculations in accordance with recognized procedures and specified criteria. Provide step by step calculations, summaries and narratives to explain procedures and results or conclusions. In the title block of each calculation sheet include engineer's name, date, project name, topic, and page number. Provide detailed and annotated engineering calculations including, but not limited to:

    a. Load calculations for heating, cooling and ventilation equipment.

    b. Plumbing fixture calculations.

4. Upon review and approval, correct and mark the final documents (including each drawing sheet) "Released For Construction."

1.8 OPERATION AND MAINTENANCE MANUALS

A. Completed O&M Manuals approved by the Tenant's Mechanical Engineer shall be submitted to ANC upon completion of construction. The manuals shall be prepared as described in the following paragraphs.

B. Organize manual logically and include data and narrative as noted below. Bind manuals in hard-backed loose-leaf binders.

1. If more than one binder is needed, divide into multiple volumes so that all pages in each binder may rest naturally on one side of rings.

2. Provide a separate chapter for each section of the mechanical specifications with subchapters for each class of equipment or system. Provide a table of contents for each chapter, and each major item in each chapter, to indicate the page number of each. Label all pages to assure correct placement in manual. Identify each piece of equipment with its associated nameplate number.

3. Operating Sequence Narrative:

    a. Describe the procedures necessary for personnel to operate the system and equipment covered in that chapter.

    b. Describe procedures for start-up, operation, emergency operation, and shutdown of each system. If a particular sequence is required, give step-by-step instructions in order.

    c. Describe all seasonal adjustments that should be accomplished for each system.

    d. Provide the above descriptions in typewritten, simple outline, narrative form.

4. Maintenance Instructions:

    a. Provide complete information for preventive maintenance for each product,

    b. Provide instructions for minor repair or adjustments required for preventive maintenance routines, limited to repairs and adjustments that may be performed without special tools or test equipment and that require no extensive special training or skills.

    c. Provide all information of a maintenance nature covering warranty items, etc., that have not been discussed in the manufacturers' literature or the operating sequence narrative.

    d. Provide complete information data for all the spare and replacement parts for each product and system. Properly identify each part by part number and manufacturer.

5. Manufacturers' Brochures:

   a. Include manufacturers' descriptive literature covering all products used in each system, together with illustrations, wiring diagrams, exploded views and renewal parts lists.

   b. Highlight all applicable items and instructions, or mark out non-applicable items.

6. Shop Drawings: Provide a copy of all corrected, approved shop drawings for the project either with the manufacturers' brochures or properly identified in a separate subsection.

7. Valve Directory: List valve number, size, location, function and normal position for each numbered valve required by Section 15075.

1.9 OPERATING INSTRUCTIONS:

A. ANC personnel shall be instructed on the proper operation and maintenance of any mechanical systems, equipment, and controls under this contract that is special or unique to the Tenant. Operating instructions for ordinary air and heating terminal devices are not required.

B. Where instruction is required make available a qualified technician for each component of the installation for this instruction.

C. Give these operating instructions after the systems are commissioned and operational, and the Operation and Maintenance Manuals have been furnished to ANC.

D. Coordinate with ANC for time and location of instruction.

1.10 RECORD DRAWINGS

A. Maintain "record document" drawings in an up-to-date fashion in conjunction with the actual progress of installation. Accurate progress mark-ups shall be available on-site for examination by ANC or their representative at all times. The drawings shall be marked up show the dimensioned location and routing of all mechanical work that will become permanently concealed. Show routing and location of items cast in concrete or buried underground. Show routing of work in permanently concealed blind spaces within the building. Show complete routing and sizing of any significant revisions to the systems shown. The drawings shall be marked as follows:

   1. Full sized "as-built" drawings shall be neatly marked-up by the Tenant's Contractor to show actual installation conditions using the symbols, line types and abbreviations as shown in the contract document's legends and abbreviations. Red shall be used to show items to be added, green for items to be removed and blue for general clarification comments not to be drafted.

   2. All line work shall be drawn using a straight edge and all notes shall be neatly printed and legible. Leaders and sheet notes shall be used where necessary using a similar style to that shown throughout the drawings.

   3. All under slab and otherwise inaccessible pipe and other components shall be accurately dimensioned to the nearest one-inch increment.

   4. Where equipment is furnished having different dimensions than those shown, the drawings shall be modified to show the dimensions of the equipment provided.

   5. Where equipment is shown in more than one drawing location, (i.e., plan and section), revised equipment arrangement shall be shown in all drawing locations.

B. Upon completion of construction, prepare "Record drawings" with precise "as-built" conditions based upon the Contractor's mark ups.

C. After review and approval of Record Drawings by the Tenant's Engineer, submit completed drawings to ANC. Submit final approved Record Drawings both in paper copy and electronic format. File format shall be AutoCAD "DWG" or "DXF".

1.11 WARRANTY

A. Require warranties of workmanship, labor, and materials for a period of one year from the date of final acceptance, without limitation, except where longer warranty periods are required in

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 CONSTRUCTION DOCUMENTS

A. Demolition

1. Where demolition of existing systems is required, require the following:

a. Disconnection and removal of abandoned fixtures, terminal units and other products. Remove abandoned controls and associated wiring and conduit, junction boxes, etc. to source of signal and supply.

b. Removal of all abandoned piping and ductwork back to source of supply or other point as shown, and cap tight to accept normal system test pressure. Cut concealed pipes and ducts flush with walls and floors. Remove brackets, stems, hangers and other accessories. Patch and finish surfaces to match surrounding finish work.

2. Maintain access to existing mechanical and electrical installations that remain active. Modify installation or provide access panels as appropriate.

B. Accessibility of Products

1. All serviceable and/or operable products shall be accessible.

2. Provide access doors in ceilings, walls, floors, etc., for access to all serviceable or operable equipment in concealed spaces.

C. Cleaning and Repair

1. Require cleaning and repair of existing materials and equipment that remain or are to be reused or are affected by this work.

2. Require the exterior of all apparatus and equipment to be thoroughly cleaned at the completion of the work.

END OF SECTION