

### **ADDENDUM NO. M01**

The following changes to the tender documents are effective immediately and will form part of the contract documents:

#### **1.1 REQUEST FOR EQUALS**

Reference: Mechanical Drawings and Specifications

- .1 The following products have been reviewed and have been accepted as equal. The contractor and supplier shall ensure that all requirements of the specifications. The contractor and supplier shall be responsible for any additional costs that may arise from using these products.
  - .1 Nailor Fire Dampers, Fire stop Flaps, and Combination Fire/Smoke Dampers shall be accepted as equal.
  - .2 ABB Variable Frequency Drives shall be accepted as equal.
  - .3 Alumavent Motorized Dampers shall be accepted as equal.
  - .4 California Dynamics Vibration Isolators shall be accepted as equal.
  - .5 Nailor Grilles, Registers, and Diffusers shall be accepted as equal.
  - .6 Revise “McQuay” in Custom Air Handling Unit Specifications to “Daikin”.

#### **1.2 CORRECTION TO FAN SCHEDULE**

Reference: Mechanical Drawings Schedule

- .1 Revise Fan Schedule column for “EXT ST PR” to read “TOTAL STATIC PRESSURE”. Values indicated for fans in this column are total static pressure.

#### **1.3 DUCTWORK AND DUCT LINERSPECIFICATION SECTION**

Reference: Mechanical Specifications

- .1 Refer to attached ductwork and duct liner specifications.

- Part 1            General
- 1.1            SUMMARY
- 1.2            REFERENCES
  - .1            American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
    - .1            ASHRAE Handbook – Fundamentals.
  - .2            American Society for Testing and Materials International (ASTM)
    - .1            ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
    - .2            ASTM A924/A924M, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - .3            Canadian Standards Association (CSA International)
    - .1            CAN/ULC-S109M, Standard for Flame Tests of Flame-Resistant Fabrics and Films.
  - .4            Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
    - .1            HVAC Duct Construction Standards - Metal and Flexible.
    - .2            HVAC Air Duct Leakage Test Manual.
- 1.3            SHOP DRAWINGS AND PRODUCT DATA
  - .1            Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4            CLOSEOUT SUBMITTALS
  - .1            Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- Part 2            Products
- 2.1            GALVANIZED STEEL
  - .1            Lock forming quality: to ASTM A653/A653M, G90/Z275 zinc coating, with tolerances to ASTM A924/A924M.
  - .2            Thickness, fabrication and reinforcement: to SMACNA HVAC Duct Construction Standards.
  - .3            Joints: to SMACNA HVAC Duct Construction Standards.

2.2 PRESSURE CLASSIFICATION

- .1 Pressure Class: medium pressure

2.3 DUCTWORK

- .1 Construction - round and oval.

- .1 Ducts: factory fabricated, spiral wound, with matching fittings and specials to SMACNA HVAC Duct Construction Standards.
- .2 Transverse joints up to 900 mm: slip type with tape and sealants.
- .3 Transverse joints over 900 mm: Vanstone flanges.

- .2 Construction - rectangular:

- .1 Ducts: factory fabricated to SMACNA HVAC Duct Construction Standards.
- .2 Transverse joints: to SMACNA HVAC Duct Construction Standards.

2.4 FITTINGS

- .1 Fabrication: to SMACNA HVAC Duct Construction Standards.

- .2 Radiused elbows:

- .1 Rectangular: smooth radius. Centreline radius: 1.5 times width of duct.
- .2 Round and oval: smooth radius or five-piece (for 90 degrees) and three-piece (for 45 degrees). Centreline radius: 1.5 times duct diameter.

- .3 Mitred elbows:

- .1 To 750 mm duct height in plane of turn: with single-thickness turning vanes.
- .2 Over 750 mm duct height in plane of turn: with double-thickness turning vanes.

- .4 Branches:

- .1 Rectangular main and branch: connection with 45 degree entry.
- .2 Round main and branch: conical connection.
- .3 Provide volume control damper in branch duct near connection to main duct.

- .5 Transitions:

- .1 Diverging: 10 degrees maximum angle each side; 20 degrees maximum included angle for symmetrical fittings.
- .2 Converging: 22.5 degrees maximum angle each side; 45 degrees maximum included angle for symmetrical fittings.

- .6 Offsets:

- .1 Full radiused or mitred elbows: as specified above.

- .7 Obstruction deflectors: maintain full cross-sectional area of duct.

.1 Maximum included angles: as for transitions.

2.5 SEAL CLASSIFICATION

.1 Seal class:

Systems	Pressure Class (Pa)	Seal class
AHU-9 Supply fan – discharge	+500	B
AH-13 Exhaust fan – suction	-500	B

.2 Seal Classification:

.1 Class B: longitudinal seams, transverse joints and connections made airtight with sealant and tape or combination thereof.

2.6 SEALANT

.1 Sealant: oil resistant, water-based, polymer type flame resistant duct sealant.

.2 Flame spread rating shall not exceed 25 and smoke developed classification shall not exceed 50.

.3 Operational temperature range of minus 32 degree C to plus 93 degree C. Application temperature range of plus 4 degree C to plus 43 degree C.

2.7 REINFORCING TAPE

.1 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm wide.

.2 Meets the flame-resistance requirements of CAN/ULC-S109M.

2.8 HANGERS AND SUPPORTS

.1 Hangers and Supports:

.1 Hanger configuration, design, and construction: to SMACNA HVAC Duct Construction Standards.

.2 Strap hangers: Maximum rectangular duct size supported by strap hanger: 500 mm on longest side.

.1 Straps of same material as duct but next sheet metal thickness heavier than duct.

.2 Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

.3 Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

- .3 Band hangers: of same material as duct but next sheet metal thickness heavier than duct.
  - .1 Maximum round or oval duct size supported by strap hanger: 500mm diameter.
- .4 Trapeze hangers and Riser Supports: ducts over 500 mm diameter or longest side, to SMACNA HVAC Duct Construction Standards.
  - .1 Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  - .2 Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
  - .3 Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.
- .5 Hangers: galvanized steel angle with galvanized steel rods to SMACNA HVAC Duct Construction Standards.
- .6 Upper hanger attachments:
  - .1 For concrete: manufactured concrete inserts.
  - .2 For steel joist: manufactured joist clamps.
  - .3 For steel beams: manufactured beam clamps.
- .7 Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

### Part 3 Execution

#### 3.1 GENERAL

- .1 Do work in accordance with SMACNA HVAC Duct Construction Standards unless directed otherwise by Engineer.
- .2 First class workmanship is required for fabrication and installation. Submit samples and/or detailed shop drawings of different types of fittings, joints, supports, sealants, etc, when requested by the Engineer.
- .3 Locate ductwork approximately as shown on drawings unless otherwise prevented by jobsite conditions. Carefully coordinate duct layouts with other services, particularly where exposed in occupied spaces. Conceal all ductwork unless otherwise directed and approved by the Engineer. Report all layout deviations to the Engineer for approval prior to installation.
- .4 Construct ducts in accordance with the dimensions shown on the drawings. Alter the duct dimensions, while maintaining the equivalent round duct diameter, where necessitated by jobsite conditions. Equivalent duct dimensions to be determined using ASHRAE Handbook duct design procedures.
- .5 Duct dimension shown on drawings are inside dimensions. If ducts are internally lined or insulated, increase duct size such that clear dimensions after application of lining/insulation are equal to those shown on drawings.

- .6 Adjust duct dimensions to suit standard control damper sizes.
  - .7 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.
  - .8 Support risers at each floor penetration. Provide neoprene pads between riser supports and the building structure. On exposed ductwork, provide galvanized angle collars to conceal the above work on both sides of the floor penetration.
  - .9 Lap all joints in the direction of air flow wherever possible.
  - .10 Provide a smooth interior surface at all seams and joints.
  - .11 Provide a straight collar, not less than 300 mm long, at the connection to each diffuser. Where this is not possible provide adjustable multi-blade type flow equalizing grid in the diffuser neck.
- 3.2 FITTINGS
- .1 Fitting geometry to be in accordance with specifications and drawing details unless otherwise directed and approved by the Engineer.
  - .2 Provide mitred elbows with turning vanes where jobsite conditions prevent installation of radiused elbows.
- 3.3 HANGERS
- .1 Strap and band hangers: install in accordance with SMACNA HVAC Duct Construction Standards.
  - .2 Angle hangers: install in accordance with SMACNA HVAC Duct Construction Standards, complete with locking nuts and washers.
  - .3 Hanger spacing: in accordance with SMACNA HVAC Duct Construction Standards.
  - .4 Do not break continuity of insulation vapour barrier with hangers or rods.
- 3.4 SEALING AND TAPING
- .1 Apply sealant to outside of joint in accordance with SMACNA HVAC Duct Construction Standards and to manufacturer's recommendations.
  - .2 Use reinforcing tape on all ducts with seal Class A; ducts with seal Class B or C and a pressure classification in excess of 500 Pa; and for larger gaps.
  - .3 Bed reinforcing tape in sealant and recoat with minimum of one coat of sealant to manufacturer's recommendations.
  - .4 Seal all joints including, but not limited to, at coils, terminal units, grilles and diffusers.

- .5 Eliminate all audible noise caused by air leakage.

### 3.5 WATERTIGHT DUCT AND DRIP PANS

- .1 Provide watertight duct for:
  - .1 Intake and relief air outlets.
    - .1 Ductwork connect from ERV unit to outdoors
  - .2 Outside air intakes.
  - .3 As directed by Engineer.
- .2 Provide watertight evaporative pan below:
  - .1 Intake and relief air outlets.
    - .1 Beneath roof hoods for ERV unit
- .3 Form bottom of horizontal duct or drip pan without longitudinal seams.
  - .1 Solder or weld joints of bottom and side sheets.
  - .2 Seal other joints with duct sealer.
- .4 Slope horizontal branch ductwork down towards hoods served.
  - .1 Slope header ducts down toward risers.
- .5 Fit base of riser with 150 mm deep drain sump and 25 mm drain, with deep seal trap and trap primer, discharging to open funnel or hub drain.
- .6 Drip pan to be 75 mm wider all around ductwork or equipment served and complete with 75 mm deep drain sump. Elevated drip pans to be provided with 25 mm drain discharging to open funnel or hub drain. Provide sufficient clearance above drip pan to facilitate access and to permit unimpeded airflow to equipment or intake above.
- .7 Provide angle iron supports under sumps and drip pans adequate to support weight when full.
- .8 Install drip pans level to maximize holding capacity.
- .9 Fill sumps and drip pans with water to demonstrate strength, level and waterproof, when requested by Engineer.

### 3.6 LEAKAGE TESTS

- .1 Conduct tests in accordance with SMACNA HVAC Duct Leakage Test Manual.
- .2 Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.

- .3 Coordinate testing requirements with the TAB contractor who will perform leakage tests. Provide temporary caps and make duct modifications required to conduct the tests.
- .4 Do leakage tests in sections.
- .5 Leakage testing shall include HVAC equipment and terminal units. Where sections include equipment and terminal units, do not perform leakage testing until final connections have been made.
- .6 Conduct trial leakage tests to demonstrate workmanship.
- .7 Do not install additional ductwork until trial tests have been passed.
- .8 Complete testing before installation of insulation or concealment Work.
- .9 Give seven days' advance notice for testing.

**END OF SECTION**

**1.4 CUSTOM PERFORATED DIFFUSER SPECIFICATIONS**

Reference: Mechanical Specifications

- .1 Refer to attached perforated diffuser specifications.
- .2 Mechanical contractor shall be responsible for construction of plenum for perforated wall diffusers. Plenum to be constructed of steel angle or stud and sheet metal. Anchor plenum structure to floor and ceiling slab.

**Part 1 General**

**1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - .2 ASTM C916, Standard Specification for Adhesives for Duct Thermal Insulation.
  - .3 ASTM C1071, Standard specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
  - .4 ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
  - .5 ASTM G21, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- .2 National Fire Protection Association (NFPA)
  - .1 NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.
  - .2 NFPA 90B, Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
- .3 North American Insulation Manufacturers Association (NAIMA)
  - .1 NAIMA AH116, Fibrous Glass Duct Construction Standards.
- .4 Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
  - .1 SMACNA, HVAC Duct Construction Standards, Metal and Flexible.
  - .2 SMACNA IAQ Guideline for Occupied Buildings Under Construction.
- .5 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3 CLOSEOUT SUBMITTALS:**

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse as specified in Construction Waste Management Plan.

**Part 2 Products****2.1 DUCT LINER**

- .1 General:
  - .1 Mineral fibre duct liner: air surface coated with smooth matt acrylic polymer.
  - .2 Temperature limit: 121EC.
  - .3 Flame spread rating shall not exceed 25 and smoke development rating shall not exceed 50 when tested in accordance with CAN/ULC-S102.
  - .4 Water sorption: less than 3% by weight when tested in accordance with ASTM C1104.
  - .5 Fungi resistance: to ASTM C1338 and ASTM G21.
- .2 Rigid:
  - .1 Use on flat surfaces.
  - .2 25 mm thick, to ASTM C1071, Type II, fibrous glass rigid board duct liner.
  - .3 Density: 48 kg/m<sup>3</sup> minimum.
  - .4 Thermal resistance to be minimum 0.76 (m<sup>2</sup>. EC)/W for 25 mm thickness when tested in accordance with ASTM C177 or C518, at 24EC mean temperature.
  - .5 Maximum velocity on faced air side: 30 m/sec.
  - .6 Minimum NRC of 0.70 at 25 mm thickness based on Type "A" mounting to ASTM C423.
- .3 Flexible:
  - .1 Use on round or oval surfaces and where otherwise directed by Engineer.
  - .2 25 mm thick, to ASTM C1071 Type 1, fibrous glass blanket duct liner.
  - .3 Density: 24 kg/m<sup>3</sup> minimum.
  - .4 Thermal resistance to be minimum 0.74 (m<sup>2</sup>. EC)/W for 25 mm thickness when tested in accordance with ASTM C177 or C518, at 24EC mean temperature.

- .5 Maximum velocity on coated air side: 30 m/sec.
- .6 Minimum NRC of 0.65 at 25 mm thickness based on Type “A” mounting to ASTM C423.

## **2.2 ADHESIVE AND SEALANT**

- .1 Adhesive and sealant: to ASTM C916.
- .2 Flame spread rating shall not exceed 25 and smoke developed classification shall not exceed 50. Temperature range minus 29EC to plus 93EC.
- .3 Water-based fire retardant type.

## **2.3 FASTENERS**

- .1 Weld pins 2.0 mm diameter, length to suit thickness of insulation. Metal retaining clips, 32 mm square.

## **2.4 JOINT TAPE**

- .1 Poly-Vinyl treated open weave fiberglass membrane 50 mm wide.

## **2.5 SEALER**

- .1 Meet requirements of NFPA 90A.
- .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range minus 68 degrees C to plus 93 degrees C.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 GENERAL**

- .1 Do work in accordance with SMACNA HVAC Duct Construction Standards except as specified otherwise.
- .2 Line inside of ducts where indicated.
- .3 Duct dimensions, as indicated, are clear inside duct lining.

### **3.3 DUCT LINER**

- .1 Install in accordance with manufacturer's recommendations, and as follows:

- .1 Fasten to interior sheet metal surface with 100% coverage of adhesive.
  - .1 Exposed leading edges and transverse joints to be factory coated or coated with adhesive during fabrication.
- .2 In addition to adhesive, install weld pins not less than 2 rows per surface and not more than 450 mm on centres to compress duct liner sufficiently to hold it firmly in place.
  - .1 Spacing of mechanical fasteners in accordance with NAIMA AH124, Fibrous Glass Duct Liner Standard.
- .2 All joints to be tightly butted together with no interruptions or gaps.
- .3 Seal butt joints, exposed edges, weld pin and clip penetrations and damaged areas of liner.
- .4 Replace damaged areas of liner at discretion of Engineer.
- .5 Provide metal nosing over transverse oriented liner edges facing the airstream at the discharge of fans, at any section of lined duct preceded by unlined duct and where the continuity of liner is interrupted by duct mounted devices (e.g. fire dampers, coils).
- .6 Where duct air velocities exceed 20 m/sec provide sheet metal nosing on the leading edge of duct liner at every transverse joint.
- .7 Turning vane assemblies, dampers and other devices located inside lined ductwork shall be installed using insulated “build outs” secured to the duct wall.

### 3.4 JOINTS

- .1 Seal butt joints, exposed edges, weld pin and clip penetrations and damaged areas of liner with joint tape and sealer. Install joint tape in accordance with manufacturer's written recommendations, and as follows:
  - .1 Bed tape in sealer.
  - .2 Apply 2 coats of sealer over tape.
- .2 Replace damaged areas of liner at discretion of Departmental Representative.
- .3 Protect leading and trailing edges of duct sections with sheet metal nosing having 15 mm overlap and fastened to duct.

### 3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General****1.1 REFERENCES**

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
  - .1 ASHRAE Standard 70, Method of Testing for Rating the Performance of Air Outlets and Inlets

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for diffusers, registers and grilles and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Indicate following:
    - .1 Capacity.
    - .2 Throw and terminal velocity.
    - .3 Noise criteria.
    - .4 Pressure drop.
    - .5 Neck velocity.

**1.3 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Include:
    - .1 Keys for volume control adjustment.
    - .2 Keys for air flow pattern adjustment.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan.

- .5 Packaging Waste Management: remove for reuse as specified in Construction Waste Management Plan.

## **Part 2 Products**

### **2.1 SYSTEM DESCRIPTION**

- .1 Performance Requirements:
  - .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

### **2.2 GENERAL**

- .1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.
- .2 Frames:
  - .1 Full perimeter gaskets.
  - .2 Plaster frames where set into plaster or gypsum board.
  - .3 Concealed fasteners.
- .3 Concealed manual volume control damper operators.
- .4 Colour: as per schedule.

### **2.3 MANUFACTURED UNITS**

- .1 Grilles, registers and diffusers of same generic type, products of one manufacturer.

### **2.4 CUSTOM PERFORATED DIFFUSERS**

- .1 General requirements:
  - .1 Provide custom perforated diffusers for supply air wall. Individual grilles to be no larger than 600x600, each with individual key operate opposed blade balancing damper.
  - .2 Frames:
    - .1 Full perimeter gaskets.
    - .2 Concealed fasteners.
  - .3 Concealed manual volume control damper operators.
  - .4 Colour: baked off-white epoxy enamel unless otherwise directed by the Engineer.
- .2 The one way flat faced displacement diffuser shall be constructed with an aluminum equalization baffle behind the perforated diffuser face for uniform, low velocity distribution of supply air. Both the equalization baffle and the face shall be securely retained in the diffuser frames.
- .3 The perforated front panel shall be constructed of 18-gauge perforated steel.
- .4 The diffuser front panel shall be secured to the plenum through the wall with factory provided fasteners.

- .5 Plastic nozzle arrays or any plastic components shall be unacceptable.
- .6 Field fabricated supply air plenum:
  - .1 Construct supply air plenum for support of perforated diffusers with angle iron and sheet metal.
  - .2 Coordinate all work with architectural drawings.
- .7 Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 INSTALLATION**

- .1 Install in accordance with manufacturer's instructions.
- .2 Install with screws in countersunk holes where fastenings are visible.
- .3 Bolt grilles, registers and diffusers, in place, in gymnasium and similar game rooms.
- .4 Provide concealed safety chain on each grille, register and diffuser in gymnasium and similar game rooms.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**