**Division 23 – Heating, Ventilating, and Air Conditioning**

**Section 23 37 13 – Diffusers, Registers, and Grilles**

The following specification is for a defined application. Global IFS would be pleased to assist in developing a specification for your specific need.

**PART 1 – GENERAL**

* 1. **Summary**
1. This section includes the following:
	* + 1. Power Supply Modules – controller by others

**1.02 Related Documents**

1. Section 01 30 00 – Administrative Requirements
2. Section 01 40 00 – Quality Requirements
3. Section 01 60 00 – Product Requirements
4. Section 01 74 19 – Construction/Demolition Waste Management and Disposal
5. Section 01 78 00 – Closeout Submittals
6. Section 01 79 00 – Demonstration and Training
7. Section 23 30 00 – HVAC Air Distribution
8. Section 23 32 00 – Air Plenums and Chases
	1. **Reference Standards**
9. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
10. ASHRAE Standard 55 – Thermal Environmental Conditions for Human Occupancy
11. ASHRAE Standard 62.1 – Standards for Ventilation and Indoor Air Quality
12. ASHRAE Standard 70 – Method of Testing the Performance of Air Outlets and Air Inlets
13. ASTM Standard D610 – Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
14. ASTM Standard D714 – Standard Test Method for Evaluating Degree of Blistering of Paints
15. ASTM Standard D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
16. ASTM Standard D1654 – Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
17. ASTM Standard D4752 – Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
18. ASTM Standard E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
19. NFPA Standard 70A, Article 100 – National Electrical Code
20. NFPA Standard 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems

**1.04 Administrative Requirements**

A. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

**1.05 Submittals**

1. See Section 01 30 00 – Administrative Requirements for submittal procedures.
2. Product Data:
	1. Provide data indicating configuration, general assembly, materials used in fabrication, rated capacities, and furnished specialties and accessories.
	2. Include drawings indicating size, profiles and dimensional requirements of the linear floor grilles that are based on the specific system indicated.
	3. Include catalog performance ratings that indicate air volume flow, initial pressure drops, sound performance, and throw, as tested in accordance with ASHRAE 70.
3. Shop Drawings: For each type of product indicated, include the following:

1. Equipment assemblies and indicated dimensions

2. Required clearances

3. Method of field assembly

4. Revit models

1. Coordination Drawings:
	1. Include floor plans, and other details, drawn to scale, on which the following items are shown and coordinated based on input from installers:
	2. Floor or underfloor-mounted items including:
		* 1. Floor structure (floor tiles, concrete, etc.)
			2. Floor finishing (carpet, tile, etc.)
			3. Access panels
			4. Electrical components
			5. Plumbing
			6. Networking components
			7. Terminal Units and other HVAC components
2. Operation and Maintenance Data: Include manufacturer’s descriptive literature, operating instructions, maintenance schedules and repair data, and parts lists.

**1.06 Quality Assurance**

1. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.
2. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
3. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

**1.07 Warranty**

1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Provide 12 month manufacturer warranty from date of shipment for grilles and registers.

**PART 2 – PRODUCTS**

**2.01 General**

1. Basis of Design: Global IFS Industries, Inc.

 1. Power Supply Module [PSM]

1. General Product Information:
2. Furnish and install Global IFS modular floor diffusers of the sizes and capacities indicated on the drawings or outlet schedule.
3. Unit sizes shall be selected in accordance with ASHRAE guidelines and manufacturer’s literature.
4. Manufacturers shall demonstrate that they have successfully supplied and installed underfloor HVAC products, as well as the computer modeling thereof for a minimum of ten years.
5. Manufacturers must be pre-qualified to bid based on the completion of a minimum of [xx] jobs in similar climates.
6. Manufacturers shall provide a list of completed jobs and references.
7. Underfloor Air System Controls:
	1. Air Grilles and diffusers specified for underfloor service shall incorporate the following requirements:
	2. Damper construction shall include an integral flow-modulation damper and motor (air valve) that is specifically designed for low static pressure air distribution, and throw no higher than 4.5 feet under full load in the interior zone 1.5 feet from the wall surface to achieve a Ventilation Effectiveness of 1.2 or higher in accordance with ASHRAE 62.1.
	3. Air dampers shall not include fast acting actuators that require high life cycle ratings.
	4. Flow-modulation with constant plenum air temperature shall reduce air flow and throw heights in response to lower space demands. Flow-modulation technique shall be implemented to maximize stratification, leading to energy savings and increased thermal comfort.
	5. Modulation by timed duty cycle of fully open and closed periods shall not be acceptable. This type of modulation can greatly reduce stratification, removing potential energy savings. Timed duty cycle modulation also increases the possibility of creating stagnant zones and starving buoyancy driven flow. Any use of this type of modulation shall be modified in order to demonstrate stratification to the project team prior to being considered acceptable.
	6. Plenum Rated Cables: Color-coded plug-and-play plenum rated cables with connectors shall be used between devices.
	7. Terminal block type plugs shall not be acceptable.
	8. Plug-and-Play cables shall carry both the Power Supply signal to each device and connect to a single port on the device control board.
	9. Cable types shall be limited to no more than one type and connector per device to reduce complexity in wiring and future modifications.
	10. Cables shall be stranded wire to increase flexibility in the wires, to improve ease of installation, and reduce damage during installation.
	11. Cables shall have six wires with redundant wires to provide a more robust system and protection against damage, and to allow the current for multiple devices to be controlled through a single cable. Solid wires shall not be acceptable.
	12. The Power Supply Module1 shall include a direct digital controller (DDC) and transformer to supply both Power Supply signals to air devices.

**Power Supply Module with 0-10V Controller**

1. Description:
2. Furnish and install Price model PSM, with the voltage, wiring, and configurations indicated on the plans and controllers schedule. All components shall be factory wired, calibrated and pre-tested to ensure a fully functional unit.
3. The PSM shall accept a common or unique 0-10VDC analog cooling damper, heating damper and/or electric heater input signal from any controller by others
4. Perimeter Heating and Cooling Device Control
	1. Plug and play Power and control cable between the module and the trough dampers by trough manufacturer.
	2. All trough dampers with in a control zone to daisy chain back to the PSM.
	3. Wiring of each damper back to the zone controller / power module not acceptable.
	4. DDC controller to be wired directly to the water valve.
	5. Wiring between zone controller and water valve by Controls Contractor (directly hard wired).
	6. Water valve by Controls Contractor.
5. Controls contractor to co-ordinate the installation of DDC controller in the PSM with Mechanical Contractor and the manufacturer.
6. Separate enclosure for the DDC controller should be avoided.
7. The controller shall modulate the Global IFS devices based on the 0-10VDC input analog signal through a series of plug-and-play connectors and wires provided by the manufacturer of the controlled devices.
8. The PSM shall be provided with an integral [96VA] or [50VA] transformer.
	1. For the [96VA] transformer the following connector options and max allowable devices controlled and powered are;
		1. [Three dedicated MTA connectors for up to 30 devices]
		2. [Two dedicated MTA connectors for up to 24 devices]
	2. For the [50VA] transformer the following connector options and max allowable devices controlled and powered are;
		1. [One dedicated MTA connector for up to 10 devices]
9. Maximum allowable daisy chain length is 100ft from PSM to last end device.
10. Each MTA connector allows up to two cable chains with up to 12 field devices per MTA connector.
11. All components shall be factory wired, calibrated and pretested to ensure a fully functional unit. The PSM shall be ETL listed to UL873 and CSA C22.2.
12. Enclosure: All control components shall be mounted inside a protective metal enclosure.