Illinois State University
Facilities Standards

Effective:	February 20, 2025				Based on CSI 49 Division Format
ISU	**A/E**	**Section**	**Title**	**Heading**	**Description**	**Products**
Division 0 - PROCUREMENT AND CONTRACTING REQUIREMENTS						
■		**00 00 00**		General	Division 0 Sections shall be provided by Illinois State University (ISU) for inclusion in all Project Manuals. Exceptions and clarifications are indicated below.	
	■			Codes	Align with the Town of Normal current codes at time of contract. In addition, meet the current *NFPA 101 Life Safety Code*, *Illinois Accessibility Code*, *ICC A117.1*, *2010 ADA Standards for Accessible Design*, *Illinois Energy Conservation Code*, and OSHA requirements.	
	■			Setbacks	Align with Town of Normal setback requirements.	
	■		**A/E Submittal**		Prior to the Preconstruction Meeting, A/E shall submit a list of required project submittals to ISU FPDC.	
	■	**00 00 01**	**Project**	Project Cover	Project name, ISU project number, building number and other general information. In addition, locate in the bottom, right corner below the title block, two repeated line items: "ISU BUILDING #*XXX*" and " ISU PROJECT #*XXXXXX*", filled out correctly.	
	■			All Drawing Sheets	In addition to the sheet title block/border, locate in the bottom, right corner below the title block, two repeated line items: "ISU BUILDING #XXX" and " ISU PROJECT #XXXXXX", filled out correctly.	
	■		**Out For Bid Set**		ISU requires 1 digital set and 1 hard copy set of the Out for Bid Documents to be submitted to ISU FPDC.	
	■		**Construction Set**		ISU requires 1 digital set and 1 hard copy set of the Construction Documents, which incorporates all Addendums, ASI, & CO at time of submission, to be submitted to ISU FPDC.	
	■		**3rd Party Testing**		A/E shall submit a list of all the testing that requires the Owner to hire a separate testing agency. This list shall be submitted with the Owner's review set, prior to being issued for bids. This list shall be separate from the Project Manual.	
	■	**00 00 02**	**Table of Contents**	Table of Contents	List of Project Manual components.	
	■	**00 01 07**	**Seals Page**	Seals Page	Professional seals and signatures by design professionals for each discipline.	
	■	**00 01 15**	**Drawings**	List of Drawing Sheets	For project manual, provide complete list of drawings in contract set with drawing no., description, and date.	
	■			Sheet Index	For drawings, on cover sheet, provide complete list of drawings with drawing number and description. In addition, include actual, digital, sequential page numbers for each drawing sheet.	
■		**00 11 00**	**Procurement**	Bid Form	Provided by Illinois State University	
■		**00 43 00**	**Labor Requirements**	Terms for On Campus Labor	Provided by Illinois State University	
■		**00 61 00**	**Performance Bond**	Performance Bond Letter	Provided by Illinois State University	
■		**00 52 00**	**Agreement**	Construction Agreement	Provided by Illinois State University	
■		**00 62 00**	**Certificate of Insurance**	Certificate of Insurance Form	Requirements provided by Illinois State University	
Division 1 - GENERAL REQUIREMENTS						
	■	**01 00 00**	**General Requirements**	General	Division 1 Sections to be provided by A/E and shall support/coordinate with Division 0 Sections.	
	■			Coordination	Any work within the public streets shall be coordinated with the Town of Normal, IL Dept. of Transportation, and ISU.	
	■			Stored Materials Certificates, Insurance	All references for stored material certificates or insurance shall also indicate that the Owner shall be listed as additionally insured (not only the A/E and their consultants).	
	■			Project Phases	A/E to provide recommendation & coordination when multiple phases and/or substantial completion dates are required.	

ISU	A/E	Section	Title	Heading	Description	Products
		01 00 00	**General Requirements Continued**	Contractor ID Badges	Contractor Identification tags/badges are required for all workers who will be working on-site (not needed for deliveries). ID Badges must be worn at all times while on-site. 1) The ISU Project Manager shall issue the Contractor ID form. The Project Coordinator shall compile and return the completed forms to the ISU Project Manager, who then forwards the forms to the Redbird Card Office. The Redbird Card office shall notify the Contractor listed that photos can occur. 2) The Redbird Card Office is located on the 1st floor of the Bone Student Center. Hours of operation are 8:30 am – 5 pm, Monday – Friday (Fall/Spring). 3) A government issued photo ID is required to receive the Contractor ID badge. 4) Payment ($5 per ID) for the Contractor ID badges shall be before or at time of issue. Badges are issued at time of photo. Checks should be made out to "Illinois State University". Credit cards are not accepted. Note, there are no refunds for overpayment.	
				Background Checks	Background checks are required for all work in Thomas Metcalf School, Rachel Cooper, Fairchild Hall, University High School, and the Residence Halls.	
				Utility Interruptions Notifications	ISU must be notified not less than 72 hours in advance of all proposed utility interruptions. Obtain ISU Project Manager's written permission before proceeding with utility interruptions.	
		01 12 00	**Multiple Contract Summary**	For Multiple Prime Contracts	Indicate the Project Coordinator for Multiple Contracts (typically the General Contractor). In addition, clearly indicate responsibilities of each Prime Contractor and the Project Coordinator including responsibilities for coordination, temporary facilities, and controls.	
		01 12 03	**Responsibility Matrix**		Provide a responsibility matrix that indicates who supplies and who installs. Matrix can be located on the drawings or in the Project Manual under its own Section.	
		01 50 00	**Temporary Facilities and Controls**	Construction Dust	Contractors shall prevent and/or control transient dust from construction and renovation work areas from migrating into adjacent public areas and HVAC systems.	
				Heating	Contractor shall provide filters with MERV of 13 at each return-air grille within area of work and remove at end of construction.	
				Electricity and Water	Upon approval, Contractor may utilize water and electric power from existing services for construction purposes providing the service facilities are cleaned and maintained in a condition acceptable to ISU.	
				Temporary Toilets	For new buildings and additions, the Contractor shall provide and maintain sanitation facilities for workmen and remove on completion of Work. For small renovations, existing toilets may be utilized upon approval of ISU FPDC.	
				Security Barriers	The Contractor shall provide security barriers. Owner must have emergency access to the building and site at all times. Post "No Trespassing" signs every 30' max. and at corners of security enclosure.	
				ISU Building Keys	ISU building key requests (if needed) are through the ISU Project Manager. Allow one week minimum for the approval process. Key pick up and return are at the Admistrative Building #1, 715 W Raab Rd., between 7:30 am – 5 pm, Monday – Friday. Only the key holder can sign for their key(s). A government issued photo ID and key deposit are required. Key deposits are based on quantity and type of key(s) requested.	
				Construction Work Hours	Construction Work Hours are typically 7:00 am – 5:00 pm, Monday – Friday, unless other arrangements are made with the ISU Project Manager.	
				Parking Permits	Each Prime Contractor shall have one (1) complimentary parking permit. Additional parking permits may be purchased directly from ISU Office of Parking and Transportation, 709 N. Main St., between 7:30 am – 5 pm, Monday – Friday.	
		01 56 39	**Tree Protection**		At the beginning of design, a mandatory site walk-through with the ISU Project Manager, ISU Grounds, and the design consultant shall take place to clarify and discuss site limitations, expectations of tree protection, and concerns regarding all plant materials. ISU Grounds shall aid in determining the construction staging and plant protection requirements.	
				Tree Damage Penalties	Damage to campus woody plants shall include any of the "prohibited practices" as determined by Illinois State University arborist. Arborist shall evaluate damage and establish fines up to 100% of the value regardless of the current disposition of the plant.	
					Replacement for value or shrubs, vines, and perennials shall be assessed at three times the current market cost of plant material.	

ISU	A/E	Section	Title	Heading	Description	Products
		01 56 39	**Tree Protection Continued**	Alt. Tree Protection Measures	Shall refer to any *pre-arranged* Campus Facilities - approved variation to working within the protected zone. Alternatives will allow for flexibility of requirements where approved specific measures can be implemented in lieu of the standard protection specifications. Measures may include thinning and root pruning; fertilization, aeration, boring, hand excavation, care and supervision by the campus arborist. Alternatives would be based on the specific requirements of the plant species in question as determined by the campus arborist.	
				Tree Removal	The campus arborist will perform a tree risk assessment per the guidelines of Tree Campus Higher Education (TCHE). Once this is done, ISU remove the tree and collect a cross section of the trunk so record can be made of the age and other conditions. ISU will also remove the identification tag and attach it to the cross section.	
				Maximum Tree Size	New trees should not exceed a 2.5" caliber at the time of installation.	
		01 78 23	Operation and Maintenance Data		ISU requires 1 digital set of the O&M Manuals to be submitted to ISU FPDC.	
		01 78 39	Project Record Documents		ISU requires 1 digital set and 1 hard copy set of the Project Record Documents to be submitted to ISU FPDC.	
Division 2 - EXISTING CONDITIONS						
		02 06 30	**Schedules for Subsurface Investigations**		Include test boring logs and subsurface exploration results as applicable.	
		02 43 00	**Manhole / Vault Adjustment**		Contractor must adjust the existing manholes / vaults as required to be flush with the finish grade.	
		02 82 11	**Asbestos Survey and Abatement**		Provided under separate contract as part of same ISU project.	
					Consult with ISU EHS for all projects involving disturbance or removal of hazardous materials and/or presumed asbestos containing materials (PACM) or asbestos containing material (ACM).	
Division 3 - CONCRETE						
		03 30 00	**Concrete**	Compression Strength	4,000 psi in 14 days, modulus of rupture = 570 lbs., conform with ASTM C 94	
				Curbs and Gutters Reinforcing	Reinforcing materials shall be fiber reinforcement of polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116 Type III.	1. Fibermesh, Fibermesh Co. Div. Synthetic Inc. Inc. 2. Forta CR, Forta Corp. 3. Grace Fibers, W.R. Grace & Co.
				Concrete Aggregate - Exterior	IDOT CM-11 Class A Crushed Limestone conforming to ASTM C 33, One-inch max	
				Portland Cement	Conform to ASTM C 150	
				Isolation Joints	Comply with ASTM 4819, Type II, closed cell polyethylene w/ pre-scored tear away strip, 1/2" thick minimum	1. W.R. Meadows 2. Nomaco (formerly Isoflex)
				Sealants - Exterior	non-sag, fast filming, single part silicone	1. Dow Corning 2. Sika 3. Pecora
				Concrete Reinforcing	Avoid steel reinforcement in exterior non-structural slabs-on-grade when possible. Use virgin homopolymer Polypropylene multifilament fiver, 83-96 ksi tensile strength, 3/4" length, white in color, rate of 1 pound per cubic yard of concrete, conform to ASTM C-1116.	
				Water Reducing Agents	Type A, compliance with ASTM C494	
				Cement Factor	56.5 to 7.05 cwt / cy	
				Air Content	5% to 8%	
				Slump	Slump shall be (2) two to (4) four inches.	
				Sheet Vapor Barrier	Conform to ASTM E 1745, Class A with 15 mil. thickness.	
				Temperature at Placement	Shall be between 40 and 90 degrees Fahrenheit when placed.	
				Water to Cement Ratio	0.32 - 0.42	
				Use of Calcium Chloride	Prohibited	
				Use of Fly Ash	Pozzolans, including, but not limited to fly ash and slag, are prohibited from use in concrete.	
				Adding Water on Site	Strictly prohibited	

ISU	A/E	Section	Title	Heading	Description	Products
	[redacted]	**03 39 00**	**Curing Materials**		Polyethylene Film shall conform to ASTM D. Liquid Membrane Curing Compounds shall conform to ASTM C 1315.	1. W.R. Grace – Horn Clear Seal 2. Sonneborn – Kure-N-Seal 3. Toch Brothers – Acri-Seal "S"
	[redacted]			Concrete - Wet Cure	For concrete that will receive a topical treatment such as a coating, densification, or a polish, it should be wet cured for a minimum of 7 days in lieu of topically applied curing compounds	
	[redacted]			Concrete - Curing Compound Application Method	Curing compounds, sealers, densifiers, water repellents, coatings, must be applied with a pneumatic, constant pressure sprayer at the application rate prescribed by the material specifications (hand pump type sprayers are not allowed). If the application rate is not listed in the specifications, the manufacturer's recommended application rates will apply	
	[redacted]			Concrete - Curing Compound Application Temperature Restrictions	Curing compounds, sealers, sealants, densifiers, water repellents, coatings, or any other materials that are topically applied must have a substrate temperature (not ambient air temperature) for which the materials are being applied to, at or above 40 degrees Fahrenheit for the duration that the manufacturer considers the timeframe for the materials to cure. All surface preparation provisions and application requirements are to comply with the material manufacturer's recommendations.	
Division 4 - MASONRY						
	[redacted]	**04 21 00**	**Masonry**	Face Brick	Modular Face Brick: 2-l/4" x 3-5/8" x 7-5/8", to compliment existing / surrounding buildings. Utility Face Brick: 3-5/8" x 3-5/8" x 11- 5/8", to compliment existing / surrounding buildings	
	[redacted]			Weeps	Provide full head weeps. No rope weeps allowed. For masonry cavity walls, install at top and bottom of masonry wall.	
	[redacted]	**04 22 00**	**Concrete Masonry Units**		Size: Manufacturer's standard units with nominal face dimension long x 8" high (15-5/8" x 7-5/8" actual), unless otherwise allowed in writing.	
	[redacted]	**04 43 00**	**Stone**	Stone Facing	Stone shall generally match the color and texture of that used in existing buildings on campus. Precast concrete may be an acceptable alternate to stone.	
Division 5 - METALS						
	[redacted]	**05 10 00**	**Structural Steel**		Structural steel shall conform to AISC "Specifications for Design, Fabrication, and Erection of Structural Steel Buildings."	
	[redacted]	**05 40 00**	**Framing Steel**		All light gauge steel framing shall conform to "Specifications for Design of Cold Formed Steel Structural Members."	
	[redacted]	**05 51 00**	**Metal Fabrications - Stairs**		Where treads are to be steel, they shall have a non-slip surface. Where pan type treads to receive terrazzo or other fill materials (such as concrete) are used, provide slip-resistant nosing's and/or abrasive surface.	
	[redacted]	**05 58 19**	**Metal Fabrications - HVAC**		Provide bird screens mounted on the exterior face of louvers to prevent bird nesting.	
Division 6 - WOOD, PLASTICS, AND COMPOSITES						
	[redacted]	**06 10 00**	**Rough Carpentry**	Treated Wood	Provide for pressurized preservative treatment for wood in contact with concrete for roof blocking and where moisture may occur. Design to avoid contact with roofing asphalt or tar.	
	[redacted]			Backing Panels	Backing panels for equipment shall be 3/4" minimum thickness.	
	[redacted]			Wood Below Grade	There shall be no wood products buried below grade or encapsulated in concrete. Exceptions to this requirement must be approved by ISU FPDC.	
	[redacted]			Mechanical Fasteners	All mechanical fasteners used in exterior applications must be stainless steel.	
	[redacted]	**06 41 23**	**Interior Architectural Woodwork**	Veneers	Mill work shall conform to Architectural Woodwork Institute (AWI) "Quality Standards." Finish hardwood veneers shall be specified by species and cut and matching of grain.	
	[redacted]			Solid Surface	If sinks or lavatories are located in solid surface countertops, then the sinks or lavs shall be integrated solid surface.	

ISU	A/E	Section	Title	Heading	Description	Products
		06 20 00	**Finish Carpentry**	General	Plywood is preferred to particle board in most areas.	
		06 41 93	**Cabinet Hardware**		Hinges to be concealed and adjustable. Prefer euro-style.	
Division 7 - THERMAL AND MOISTURE PROTECTION						
		07 00 00	**Roofing**	Roofing Recycling	Contractor shall endeavor to recycle that roofing material which is suitable for recycling during re-roofing projects. Contractors shall utilize the practices or services of companies that provide such.	
				Warranties	For low-sloped roofs, Contractor shall provide a one (1) year warranty plus 30-year (minimum), no dollar limit (NDL), labor and material, total system manufacturer's warranty. The warranty shall cover all elements of the project and stipulate that the contractor will be on the job within twenty-four (24) hours to make repairs to reported leaks. Wind Uplift Load Capacity shall be 90 psf minimum for buildings with 1 - 5 stories and the highest uplift rating possible for buildings with 6+ stories. For shingle roofs, Manufacturer shall provide a minimum 40-year warranty plus 10-year (minimum) algae discoloration resistance warranty and a 130 mph (minimum) wind resistance warranty.	
				Existing Roof Tie-Ins	Any modification to an existing roof system, including tie-ins, shall be performed by a qualified roofing contractor. Coordinate with roof manufacturer(s). Roofing contractor to provide documentation that the existing warranty is maintained.	
				Roof Protection	For roofs that remain where adjacent demolition has potential to damage them: At minimum, the roof protection requirement should include tarps being placed directly over the membrane, add an inch minimum of rigid insulation, and cover with a plywood / OSB type material that is sufficiently ballasted to prevent it from being blown off the roof in wind events. Any and all debris shall be contained within the confines of said roof protection and cleaned up daily to prevent the debris from being blown off of the roof protection. Every effort must be made to keep the debris from entering all roof drains.	
		07 00 00	**Insulation**	Exterior Insulation	Indicate the R-value of insulation on drawings (details, wall sections, etc.). Only referencing specification is not adaquate; list the R-value.	
		07 22 00	**Roof Insulation**		Polyisocyanurate foam insulation board with glass mat facer laminated to both sides of board. Insulation boards shall have a minimum density of 25 psi for the first layer (bottom) complying with ASTM C1289-01, Type II, Class 1, Grade 3 and 25 psi complying with ASTM C1289, Type II, Class 1, Grade 3 for the second layer (top). Provide a 1/2" thick thermal board consisting of either a pre-primed glass mat faced gypsum or non-primed fiber reinforced gypsum panel board over top layer of insulation.	Roof insulation shall be manufactured or approved by the membrane roofing system manufacturer as a suitable substrate for the membrane roofing and included in the total systems warranty.
		07 31 13	**Asphalt Shingles**		Architectural fiberglass, laminated strip shingle (5 tab) with mineral surface, self-sealing, algae-resistant, and Class A fire-resistance rating.	1. CertainTeed, Landmark - 40 2. IKO, Cambridge - 40 3. Owens Corning, Oakridge - 40 4. GAF, Timberline UHDZ - 40 5. Owens Corning, TruDefinition Duration Flex - 40
		07 53 23	**EPDM Membrane**		EPDM single ply membrane, fully adhered, 90-mil, non-reinforced, UL Class A rated roofing system. This is the ISU preferred roofing system for new, low-slope roofs (less than 3/12 slope).	1. Carlisle SynTec, Sure-Seal 2. Firestone Products, Rubbergard 3. Johns Manville, EPDM NR 4. Versico, VersiGard
		07 54 23	**TPO Membrane**		For buildings with existing TPO roof systems (or written exception by ISU FPDC), TPO is allowed to be utilized. Otherwise, low-sloped roofs shall be 90 mil. EPDM. TPO single ply thermoplastic membrane, fully adhered, 60-mil, internally fabric- or scrim-reinforced, UL Class A rated roofing system.	1. Carlisle SynTech, Sure-Weld 2. Firestone Products, UltraPly TPO 3. Johns Manville, JM TPO 4. Versico, VersiWeld

ISU	A/E	Section	Title	Heading	Description	Products
		07 60 00	**Flashing**	Locations	Provide flashings at any roof penetrations and protrusions, including all roof drains, floor drains, scuppers, roof hatches, dormers, mechanical / electrical penetrations, etc. Provide flashings for all openings in exterior walls. Provide flashings and sleeves, 2" above floor, for all openings in laboratory and kitchen floors. Provide flashing below all shower pans.	
		07 62 00	**Metal Flashing**		Metal roof flashings, where required, shall be prefinished steel, aluminum, or copper. All metal flashings shall be designed for thermal expansion with weather tight joints.	
		07 65 23	**Rubber Sheet Flashing**		Provide 60-mil EPDM / TPO base flashing system as manufactured by the respective roofing system manufacturer. Utilize EPDM / TPO flashing material to the greatest extent as allowed by the system manufacturer.	
		07 72 46	**Roof Pads**		Roof pads should be used around all roof top mechanical equipment and along pedestrian traffic paths. Use same roof pad as roof manufacturer.	1. Carlisle SynTech 2. Firestone Products 3. Johns Manville 4. Versico
		07 84 13 / 07 84 43	**Firestopping**		In concealed locations and in mechanical, electrical locations, firestopping caulks, sealants, and fluid applied should be a contrasting color to the surface in which they are applied. Unacceptable colors are white, gray, tan, off white, etc. Prefer fire-rated color to be red. Exceptions are in non-concealed locations, where the contrasting color (red) would be disruptive to the aesthetics.	1. 3M Fire Protection Products 2. Hilti, Inc 3. Specified Technologies, Inc. 4. Tremco, Inc.
				Labeling	Appropriate firestop identification labels shall be provided for penetration or joint firestop systems.	
		07 92 13	**Sealants**	General	Sealants shall be project, substrate, movement, and performance specific. Use at all joints one-inch wide or less wherever movement may occur on interior or exterior, at construction and expansion joints, masonry to masonry, concrete building construction joints, metal door and window frames to masonry, metal to metal and sheet metal to masonry.	
				Warranties	Grade level sealants should have a five (5) year material warranty and a two (2) year installation / labor warranty. Building sealants should carry a manufacturer's twenty (20) year material warranty and a two (2) installation / labor warranty.	
				Interior	Interior sealants shall be single part silicone for non-painted applications. Single part urethane for all painted surfaces.	1. Master Builders Solutions (Sonolastic) 2. Sika Corporation 3. Tremco Corporation 4. The Dow Chemical Co. 5. Pecora Corporation 6. W.R. Meadows, Inc.
				Exterior	For exterior concrete and masonry, utilize a non-sag (NS) one part, fast filiming silicone sealant.	1. Master Builders Solutions (Sonolastic) 2. Sika Corporation 3. Tremco Corporation 4. The Dow Chemical Co. 5. Pecora Corporation 6. W.R. Meadows, Inc.
				Concrete Pavement Non-Expansion Applications	Provide concrete joint sealant for all pavement joints per IDOT standards. Provide tooled concrete control joints and seal with a Type 2 Hot Applied Asphalt sealant. Where Hot Applied asphalt sealants are not applicable, such as expansion joints, use a non-sag one part silicone sealant with a backer material per the sealant manufacturer's requirements.	1. Master Builders Solutions (Sonolastic) 2. Sika Corporation 3. Tremco Corporation 4. The Dow Chemical Co. 5. Pecora Corporation 6. W.R. Meadows, Inc.

ISU	A/E	Section	Title	Heading	Description	Products
Division 8 - OPENINGS						
		08 11 13	**Doors and Frames**	Entry Doors	Aluminum.	1. Kawneer 2. EFCO 3. YKK AP 4. US Aluminum; a brand of C.R. Laurence
				Exterior Doors	All exterior door locations shall include conduit for future and current installation of electronic access. Conduit from exterior doors for future use shall extend to the nearest drop-ceiling location. Avoid hard ceilings when possible.	
				H.M. Doors & Frames	All metal frames shall be 16 gauge, reinforced for all hardware and shall receive field coat of asphaltic paint on all interior surfaces prior to installation. All metal doors shall be 16 gauge, insulated, reinforced and prepared for finish hardware. Grout-filled hollow metal frames shall be bituminous back-coated.	1. Ceco 2. Steelcraft 3. Curries 4. Republic.
				Egress Only Doors	Any egress only door with no exterior handle shall have a glazed lite or sidelight. This will ensure that both the fire department and police have access in the event of an emergency.	
		08 31 16	**Access Panels**	General	Access panels for electrical, plumbing and heating plant shall be a minimum of 24" x 24" opening and fire rated where needed.	
				HVAC Equipment Access	Access doors, when required, shall never be smaller than 16"x16" unless limited by equipment dimensions or duct size.	
				Penetrations	Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier or smoke barrier shall be protected by a firestop system or device. Such a system shall be tested and approved in accordance with ASTM E 814, Standard Test Method for Fire Tests of Through Penetration Fire Stops, or ANSI /UL 1479, Standard for Fire Tests of Through-Penetration Firestops.	
		08 71 00	**Door Hardware**	Knox Boxes	A knox box is required for all ISU Buildings. Consult with ISU EHS and ISU FPDC to determine the location and configuration of the box. ISU EHS shall supply knox box for contractor to install.	
				Hinges	Heavy duty hinges. Preference for butt hinges over continuous or pivot hinges (except at toilet partitions).	1. Hager 2. Stanley 3. McKinney; an Assa Abloy Group
				Continuous Hinges	Do not use without special ISU permission.	1. Hager 2. Ives 3. National Guard Products
				Electrified Hinges	All electronic access doors require electrified hinges containing 12 conductors for each door. Each end shall terminate at a plug to plug into another piece of hardware. See "Exhibit FS-8.1: ISU Electronic Access Guidelines" and its attached reference drawings for additional information and clarifications.	1. McKinney 2. Hager 3. Stanley
				Mortise Lockset	Lever style to be curved return. Extra heavy duty. Locate ONLY in student living spaces. Also, locate in single user restrooms and dreesing rooms; see door lock function for additional product information.	1. Best, 40H Mortise Series, Lever 14 2. Yale 8800 Series, Lever PB 3. Corbin Russwin, ML2000 Series, Lever Princeton
				Cylindrical Lockset	Lever style to be curved return. Cylindrical locksets to be used in all areas except for student living spaces.	1. Best, 9K Series, Lever 14D 2. Corbin Russwin, CL3500 Series, Lever Princeton 3. Oak, 1CL Series, Lever C
				Electrified Locks	When electronic access is required, electrified locks shall be either cylindrical or mortise locks pending each door's specific parameters. See "Exhibit FS-8.1: Electronic Access Guidelines" and its attached reference drawings for additional information and clarifications. Electrified locks must include a "request for exit" notification to the access control system and be a storeroom lock function.	1. Sargent 2. Corbin Russwin 3. BEST

ISU	A/E	Section	Title	Heading	Description	Products
		08 71 00	**Door Hardware Continued**	Classroom and Office Door Lock Function	All classroom and office doors shall have cylindrical locksets with Entrance Function (F109); keyed from the outside, providing pushbutton lock function and passage function from the inside of room. Typical finish is 626, polished chrome plated. Notify ISU if existing building's finish is different to determine correct finish. Lockset must be compatible with a small format interchangeable core (SFIC). Any existing mortise lock door for classroom or office security shall be adapted to cylindrical lock as indicated above.	1. Best, 9K37AB14D-STK 2. Oak, 1CL3-EN-1-C2-A 3. Corbin Russwin, CL3551 PZD CTSD7
				Lab Door Lock Function	Lab locking functions may vary. Each lab shall be determined based on functional needs.	
				Conference Room Door Lock Function	Primarily, conference rooms shall have Passage Function (F75). Occasionally, entrance locks (F109) may be required.	
				Storage Room Door Lock Function	Storage room lock function (Entrance [F109], Classroom [F84], Storage [F86] or Electronic Access) will vary depending on how it needs to be accessed. Coordinate with ISU FPDC.	
				Single User Restroom / Dressing Room Door Lock Function	Single user restrooms or single user dressing rooms shall have mortise lockset with deadbolt "occupied" or "locked" indicator. Lock function shall be Dormitory/Entrance (F13). Deadbolt actuation by outside key or inside thumbturn. Thrown deadbolt displays "occupied" or "locked" message on both sides. Inside lever retracts deadbolt and latch simultaneously. See requirements for ISU cores.	1. Best, 40H Mortise Series, Lever 14, VIN/VIT 2. Yale 8800 Series, Lever PB, V11 3. Corbin Russwin, ML2000 Series, Lever Princeton, V11
				Multi-User Restroom Lock Function	Provide push/pulls. No locks. No hands free operation except for ADA operator where required.	
				Janitor Door Lock Function	Janitor doors shall have cylindrical locksets with Entrance Function (F109); keyed from the outside, providing pushbutton lock function and passage function from the inside of room.	
				Mechanical / Electrical Room Door Lock Function	Mechanical and electrical doors shall have locksets with Storage Function (F86); always locked with keyed access from the outside and passage function from inside.	
				Telecom / Data Room Lock Function	Primarily telecom / data room doors shall have locksets with Storage Function (F86); always locked with keyed access from the outside and passage function from inside. However, if the electronic panel is within the telecom / data room, then the door shall have electronic access.	
				Roof Access Door Lock Function	For 2+ story roof, exterior doors that access the roof shall be always locked with keyed access from the inside and always unlocked from roof so that noone can be trapped on the roof. One story roof applications, shall be determined for each application. Coordinate with ISU FPDC.	
				Roof Hatch Lock Function	Provide hasp with padlock keyed to ISU Masterkey system.	
				Cores	Contractor shall supply one uncombinated core and two uncut keys per lock. Specific keyway shall be specified by ISU FM Carpenter Foreman. Cores shall be small format, 7-pin, interchangeable cores (SFIC) and installed by ISU FM Carpenters.	BRAND ONLY Best, CORMAX™ Patented 7-pin
				Exit devices	Shall be rim set with removable mullions in center for double doors; integrate with locks. Typical lever style to be curved return. Provide keyed dogging (with Best Core) if panic hardware can be dogged down.	1. Von Duprin, 33 / 99 Series, Lever 17 / Sparta 2. Corbin-Russwin, ED4000 Series, Lever Pablo 117 3. Sargent Manufacturing Co.; an Assa Abloy Group, 80 Series
				Removable Mullions	Removable mullions to be keyed with Best Core.	
				ADA Operators on Interior Doors	If an ADA operator is required on an interior door, provide two boxes, one for the ADA button and one for either the electronic access or for a keyed switch. Clarification, latch retraction must be provided for all doors with an ADA operator. Doors with both an ADA operator and electronic access must be hard wired.	
				ADA Operators on Multi-User Restroom Doors	Provide ADA Operators on all 1st floor male and female restrooms only (or basement / 2nd floor if no 1st floor male and female restrooms). Note, restroom doors with a latch and/or a lock cannot have an ADA operator.	
				Closers	Meet ADA requirements.	1. LCN (4040XP Series) 2. Norton Door Controls (7500 Series) 3. Sargent Manufacturing Co. (351 Series)
				Overhead Stops and Holders		1. Rixson or Sargent; an Assa Abloy Group 2. Dorma USA, Inc; 900 Series 3. Glynn-Johnson, an Allegion brand

ISU	A/E	Section	Title	Heading	Description	Products
		08 71 00	**Door Hardware Continued**	Door Pulls, Push Plates, Kick Plates, Door Stops, Flush Bolts, Coordinator and Brackets		1. Rockwood 2. Ives 3. Architectural Builders Hardware 4. Hager Co.
				Thresholds		1. Pemko 2. National Guard Products 3. Reese Enterprises 4. Hager Co.
				Gasketing		1. Pemko 2. National Guard Products 3. Reese Enterprises 4. Hager Co.
				Electric Strikes		1. HES; an Assa Abloy Group 2. Von Duprin 3. Rofu 4. Trine
				Power Supply	Power supply shall furnish regulated 24 VDC at not less than 4 amps and shall be UL class 2 listed. Power supply shall provide 8 separate outputs to divide the load. Outputs shall consist of a PTC circuit breaker or "wet" relay, and 1 LED to indicate status (voltage/no voltage). Outputs shall be controlled by either: physical switch or remote contact closure. Power supply shall be designed to charge optional sealed lead acid batteries in addition to operating the DC load. Power supply shall be provided with two 7.2 Ah 12V sealed lead acid batteries with the power supply enclosure large enough to accommodate the batteries.	1. Von Duprin 2. Honeywell 3. Securitron 4. Altronix
				Rain Drip Caps		1. Pemko 2. National Guard Products 3. Hager Co.
		08 74 13	**Electronic Access Systems**		Coordinate with ISU FM. See "Exhibit FS-8.1: Electronic Access Guidelines."	BRAND ONLY Hirsch - Identiv
		08 78 00	**Electronic Strikes**		All exterior door locations shall include conduit for future installation of electronic security system. Conduit from exterior doors shall extend to the nearest drop-ceiling location. Avoid hard ceilings when possible.	1. Von Duprin 2. Hess 3. Rofu 4. Trine
		08 81 00	**Glazing**		For safety reasons, ISU prefers glazing to be tempered whenever possible, even if the code doesn't require it.	
				Fire-Rated Glass	No wire glass. Provide fire-rated glazing where required.	
				Clear Float Glass		1. Viracon 2. A.G.C. Glass North America 3. Vitro Architectural Glass (formerly P.P.G. Industries, Inc.) 4. Pilkington North America 5. Old Castle Building Envelope
				Tempered Safety Glass	¼" thick tempered clear float safety glass meeting requirements of Safety Standard for Architectural Glazing Materials; 42 CFR 1428; 16 CFR Part 201	1. Viracon 2. A.G.C. Glass North America 3. Vitro Architectural Glass (formerly P.P.G. Industries, Inc.) 4. Pilkington North America 5. Old Castle Building Envelope
				Insulated Glass Units (IG)	Airspace shall be ½" minimum with Argon gas filled. Low-e coating shall be on the #2 surface. Must meet the energy code requirements. Tinting must be from manufacturer's standard colors unless matching existing. All IG units shall be removable and replaceable with removable stops. Warranty shall be 5 years minimum. Meet energy requirements.	
				Size Restriction	Maximum single piece of glass size shall not exceed 4'x8'. Exceptions require written approval from ISU FPDC.	
		08 83 13	**Mirrors**		In restrooms, individual mirrors will be used above each lavatory to allow for soap dispensers to be wall mounted between.	

ISU	A/E	Section	Title	Heading	Description	Products
	[redacted]	**08 91 00**	**Louvers**	Intake and Exhaust	Minimum 4" deep extruded aluminum drainable blade. Extended sill. Kynar 70, 2 coat finish, birdscreen (insect where required). Seal perimeter. Insulated blank-off panel to min. 1" thick sandwich panel. Maintain velocity under manufacturer's water penetration velocity rating on intakes.	1. Ruskin 2. Greenheck 3. Airolite
Division 9 - FINISHES						
	[redacted]	**09 21 16**	**Gypsum Board**	Normal use	VHI Abuse-Resistant Gypsum Board shall be used to Finished Floor + 8' in corridors, classrooms, and public high traffic areas. Provide cement board behind ceramic tile in lieu of gypsum board.	
	[redacted]			Heavy use	Abuse and Water Resistant Gypsum Board to be used in areas where moisture may be an issue.	
	[redacted]			Level 5 Finish Locations	Provide a level 5 finish on any wall that shall receive graphics, wall covering, and/or any wall designed to have wall wash lighting.	
	[redacted]	**09 30 13**	**Quarry Tile**		Provide at heavy duty traffic areas, including toilet rooms.	
	[redacted]			Grout	Dark grout is preferred. Provide urethane grout. Seal porous surfaces prior to grouting.	
	[redacted]			Slip Resistance	The slip resistance requirements for floor tile installation are those recommended by the Americans with Disabilities Act, "Accessibility Guidelines for Buildings" (ADAAG). The static coefficients of friction (COF) recommended are 0.6 for level floors and 0.8 for ramped surfaces.	
	[redacted]	**09 30 16**	**Ceramic Tile**		For toilet room floors and walls.	
	[redacted]			Grout	Dark grout is preferred. Provide urethane grout. Seal porous surfaces prior to grouting.	
	[redacted]			Slip Resistance	The slip resistance requirements for floor tile installation are those recommended by the Americans with Disabilities Act, "Accessibility Guidelines for Buildings" (ADAAG). The static coefficients of friction (COF) recommended are 0.6 for level floors and 0.8 for ramped surfaces.	
	[redacted]	**09 53 00**	**Ceilings**	Acoustical Ceiling Assembly	Acoustical ceilings shall consist of tegular panels with a minimum size of 2'x2'x5/8" thick. Prefer that tiles be installed with no less than one-half tile width at perimeters. Spline ceilings are prohibited.	Classrooms and Offices: 1. Armstrong Ultima 2. CertainTeed Symphony M 3. USG Mars
	[redacted]			Kitchen / Clean Room Locations	In kitchen and clean room locations, tiles shall be non-tegular, smooth vinyl or mylar-faced.	Kitchen / Clean Room Spaces: 1. Armstrong Clean Room VL 2. CertainTeed Vinylshield A 3. USG Clean Room Clima Plus Class 100 Panels
	[redacted]			Ceiling Grid	In new buildings, provide grid with hook-end cross tees. (No longer want stab tee grid). In existing buildings, match existing ceiling grid type when it is aesthetically different type than preferred grid.	Grid System: 1. Rockfon, Chicago Metallic 200 Snap Grid. 2. Armstrong, Prelude ML. 3. Or approved equal.
	[redacted]			Wood Ceiling Assembly	Allowed with written ISU FPDC approval. Design access points into ceiling for maintenance.	
	[redacted]	**09 65 13**	**Resilient Base**	Rubber Base	Rubber, 1/8 thick, coved base, 4" high is typical. Obtain special permission for other heights. Site formed inside & outside corners. Special conditions require written approval by ISU FPDC.	1. Johnsonite / Tarkett 2. Roppe 3. Flexco
	[redacted]	**09 65 16**	**Resilient Sheet Flooring**		Sheet vinyl is only recommended for labs, food service, or other areas where floor moisture is a major problem. It is not recommended for corridors or other public spaces.	1.Armstrong 2. Mohawk 3. Tarkett
	[redacted]	**09 65 19**	**Resilient Tile Flooring**		This should be a vinyl composition tile (VCT), solit vinyl tile (SVT) or luxury vinyl tile (LVT). This flooring type is not allowed for interlocking or floating flooring applications.	1. Armstrong 2. Tarkett 3. Interface / Nora 4. Shaw 5. Patcraft

ISU	A/E	Section	Title	Heading	Description	Products
		09 66 00	**Terrazzo**	Terrazzo Flooring	Floors where heavy traffic is anticipated (lobbies/student corridors and stairs), the preferred finish is terrazzo. Patch existing terrazzo with the use of transition strips between the existing and new installation. Terrazzo used in public areas shall have a non-slip aggregate or finish.	
		09 68 00	**Carpet**	Carpet Tile	Solution dyed. Tufted, woven, textured loop construction. 1/10 min. gauge/stitch.	1. Interface 2. J&J 3. Mannington 4. Mohawk 5. Patcraft 6. Shaw
				Broad Loom Carpet	Allowed by written ISU FPDC approval.	
				Warranty	10 year minimum carpet tile. 25 year broad loom.	
		09 72 16	**Wall Covering**	Vinyl Wall Covering	Vinyl or fabric wall coverings are not recommended; however, commercial grade wall coverings may be used in special areas with prior approval. Type II required. No wall coverings shall be used on exterior walls.	
		09 90 00	**Paint**	Colors	See "Exhibit FS-9.1: Paint Colors" for ISU standard paint colors.	
				General	All VOC products shall conform to the Federal guidelines for VOC paints. Prefer water-based paints for interiors.	
				Brick	Do not paint brick walls.	
				Primers	Primers should be acceptable to paint manufacturer. Prefer waterborne primers for both exterior and interior paint.	1. Sherwin Williams Extreme Bond 2. Prairie Point Bulldog 3 3. Zinsser Bulls Eye 1-2-3 4. PPG Paints 5. Benjamin Moore
				Walls / Ceiling	Eggshell latex enamel is the standard for all walls. Low lustre white or flat is the standard for ceilings. Hallways and other public access areas shall have eggshell for walls. Restrooms shall have low lustre/satin or equal latex enamel finish on walls and ceilings.	1. Sherwin Williams ProMar 200 2. PPG Paints Speedhide 3. Benjamin Moore Ultra Spec 500
					Provide higher durability paint for corridors and high traffic spaces.	1. Sherwin Williams 2. PPG Paints 3. Benjamin Moore
				Steel Doors	New steel door and door frames shall be factory primed. Finish shall be three coats minimum so that metal does not show through. Tops and bottoms must be sealed. Finish shall be semi-gloss. In some circumstances DTM or latex epoxy can be used on metal doors and frames.	1. Sherwin Williams Pro Industrial Urethane 2. PPG Paint Breakthrough 3. Benjamin Moore Command
				Existing Steel Doors and Frames	Existing steel doors and frames shall be sanded completely, removing or dulling existing paint. Featheredge all nicks and imperfections and wash with ammonia water. Finish with one coat primer and two-three coats paint so that metal does not show through. Finish shall be semi-gloss.	1. Sherwin Williams Pro Industrial Urethane 2. PPG Paint Breakthrough 3. Benjamin Moore Command
				Mechanical and Electrical Floors	In mechanical and electrical room, provide a provide 3-coat floor system. Floor system shall be water based epoxy floor coating with slip-resistant additive. Color shall match Sherwin Williams Heavy Duty Floor Coatings color Haze Gray.	Paint plus Slip-Resistant Additive: 1. Sherwin-Williams Armorseal 8100 WB plus H&C Sharkgrip. 2. PPG Aquapon WB EP plus PPG 888 Anti-Skid Additive (aluminum oxide). 3. Benjamin Moore Corotech High Performance Waterborne Amine Epoxy V440 plus Anti-Slip Aggregate V630 (silica sand).

ISU	A/E	Section	Title	Heading	Description	Products
		09 93 23	**Interior Staining and Finishing**	Wood Doors	Wood doors shall first be stained, followed by a sanding sealer and two coats of satin or gloss poly-urethane varnish. Avoid high gloss varnishes. Tops and bottoms must be sealed.	Varnish: 1. M.L. Campbell Wood Song - Magnalac 2. Sherwin Williams KEM Aqua 3. Minwax Highbuild Stains: 1. M.L. Campbell Wood Song 2. Sherwin Williams Sherwood Wiping Stain 3. Minwax Wood Finish
		09 96 43	**Fire Retardant Coatings**	Electrical / Telephone Backboard	Paint with one coat #200 primer, one coat 20 /20 fire retardant, one coat 40 /40 fire retardant	
		09 97 00	**Special Coatings (Color)**	Piping	In mechanical, electrical, custodial, and other concealed spaces, all piping shall be color coded (sticker/label) and/or painted according to the following schedule:	
					Air - Dark Green	
					Chilled Water - Black	
					Condensate - Brown	
					Domestic Cold Water - Green	
					Domestic Hot Water - Light Blue	
					Gas - Yellow	
					High Pressure Steam - Red	
					Medium Pressure Steam - Purple	
					Low Pressure Steam - Orange	
					Hot Water - Heating - Blue	
					Steam Exchange - Pink	
					Tower Water and Drains - Gray	
					Soft Water - White	
Division 10 - SPECIALTIES						
		10 11 00	**Marker Boards**		Provide 4' high marker boards, mounting height to be 36" aff. Prefer glass marker boards. Marker boards should be installed to allow maximum usage while projector screens are in a lowered position. Ceramic steel marker boards with lifetime warranty shall be allowed when required/used for projection.	
		10 14 23	**Signage**	Interior Signage	Interior graphics should assist first time users. There should be clarity so that spaces are easy to use and understand and visitors feel welcome. Coordinate with new campus sign standards. Meet with ISU FPDC to review ISU signage requirements and standards. Obtain ISU FPDC written approval for signage. See "Exhibit FS-10.1: Sign Standards".	1. Kroy 2. Innerface 3. Takeform 4. ASI
				Exterior Signage	Install exterior sign near primary entrance or pathway in permanent fashion as directed by ISU. Meet with ISU FPDC to review ISU signage requirements and standards. Obtain ISU FPDC written approval for signage. See "Exhibit FS-10.1: Sign Standards".	
		10 21 13.19	**Phenolic Toilet Compartments; Dark Core**		Phenolic toilet compartments with dark cores are preferred material for use on campus. Floor mount with overhead bracing. Provide appropriate structural reinforcement as needed. Partitions doors should provide zero sightlines around door and pilasters. 72" tall panels. Vandal-resistant fasteners. Occupancy indicator latch. Urinal screen preference is wall mounted when size allows. Exceptions require written approval by ISU FPDC.	1. ASI-Accurate Partitions Corp. 2. Scranton Products 3. Partition Systems International 4. Bradley Corporation
				For New Buildings	Provide privacy toilet compartments in new buildings and additions. Provide 72" tall panels mounted 9" a.f.f. Meet ADA requirements including toe clearances for non-standard height panels. Coordinate electrical and mechanical requirements for each stall.	
		10 28 13	**Toilet Accessories**	Mirrors	Contractor supplied and installed. ISU prefers 24"x36" individual mirrors in lieu of one large mirror.	1. American Specialties, Inc. 2. Bobrick Washroom Equipment, Inc. 3. Bradley Corporation

ISU	A/E	Section	Title	Heading	Description	Products
				Grab Bars	Contractor supplied and installed. Stainless Steel. Meet ADA requirements.	
		10 28 13	**Toilet Accessories Continued**	Coat Hooks	Contractor supplied and installed. Located one hook in every all gender restroom and toilet stall. Provide two hooks for each individual shower. Exception, for open group showers, provide one hook per shower head.	1. American Specialties, Inc. 2. Bobrick Washroom Equipment, Inc. 3. Bradley Corporation 4. Toilet Compartment's Standard Coat Hook (at toilet compartments only)
				Hand Dryers	Hand dryers shall be contractor supplied and installed. Provide high-speed, warm-air dryers, with HEPA filtration system. Provide both electric hand dryer(s) and paper towel dispenser(s) in all restrooms.	1. World Dryer VERDEdri 2. Excel Xlerator 3. Bradley Aerix+ High Speed
				Toilet Paper Dispensers	ISU FM supplied, contractor installed.	
				Paper Towel Dispensers	ISU FM supplied, contractor installed. Provide both electric hand dryer(s) and paper towel dispenser(s) in all restrooms. Size restrooms to accommodate roll type dispensers so that dispensers don't interfere with lav. access and use.	
				Soap Dispensers	ISU FM supplied, contractor installed.	
				Menstrual Product Dispenser	ISU FM supplied, contractor installed. Locate menstrual product dispensers in all 1st floor male, female, and "All Gender" restrooms (or basement / 2nd floor if no 1st floor restroom). Offered at no cost (free).	
				Menstrual Product Disposal	Contractor supplied and installed. Located a menstrual product disposal by each toilet in all restrooms that have a menstrual product dispenser and in all "Women" restrooms. Disposals shall be stainless steel with removable and reusable container.	1. American Specialties, Inc. 2. Bobrick Washroom Equipment, Inc. 3. Bradley Corporation
				Underlav Shields and Guards	Contractor supplied and installed. Underlav shields shall allow service access and be removable as a single unit. In restrooms, for individual wall-hung china lavs., provide single-piece heavy duty piping shield. Coordinate so that the correct manufacturer's pre-cut model, that conforms to the actual wall-hung china lav., is provided.	
				Diaper Changing Station	Contractor supplied and installed. Locate a diaper changing station in one 1st floor male and female or one "All Gender" restroom (or basement / 2nd floor if no 1st floor restroom).	1. American Specialties, Inc. 2. Koala Bear Kare 3. Rubbermaid Commercial Products
				Restroom Waste Disposal	Accommodate (1) 12x24 ISU provided, free standing half moon waste receptacle for 1-5 lavs and (2) waste receptacles for 6+ lavs.	
				Shower Accessories	In showers, contractor shall supply and install soap dishes, towel hooks, grab bars (at ADA showers), and fold-down shower seats (at ADA showers). Contractor shall supply and install shower shelf or ledge for shampoo and conditioner. If the design does not include a shower door, contractor shall supply & install a shower curtain, hooks, and curtain support/bar.	
				Custodial Accessories at Utility Sinks and at Mop Sinks	Elevated utility sinks shall have an ISU FM supplied, contractor installed soap dispenser and paper towel dispenser. Floor mop sinks shall have a contractor provided mop and broom holder and utility shelf. Floor mop sinks preferred over elevated sinks in janitor closets.	
		10 28 19	**Showers**	Flashing	Provide flashing below all shower pans.	
		10 43 00	**Emergency Aid Specialities**	AED Manufacturer and Model	Zoll AED is the approved AED for ISU buildings. Any other AED must be approved by ISU EHS.	BRAND ONLY 1. Zoll AED
				Cabinets and Installation	In public circulation spaces where wall depth allows, coordinate type of AED cabinet (fully recessed, semi-recessed cabinets or surface mount) with ISU EHS. Consult with ISU EHS and ISU FPDC for quantities and exact locations. Install AED 3-D wall sign that is installed to meet ADA requirements. All AED equipment, cabinets and signage are supplied by ISU EHS and installed by contractor.	BRAND ONLY 1. Zoll Semi-recessed Wall Cabinet Part# 8000-001257 2. Zoll Fully Recessed Wall Cabinet Part# 8000-0012583 3. Zoll Standard Surface Wall Cabinet Part# 8000-001256
		10 44 13	**Fire Extinguisher Cabinets**		In circulation spaces where wall depth allows, provide recessed or semi-recessed cabinets. Provide brackets in lieu of cabinets in mechanical, electrical, and custodial rooms. Provide red, vertical lettering "FIRE EXTINGUISHER" on F.E. cabinets. In addition, provide a flag sign at each recessed and semi-recessed F.E. cabinet.	1. JL Industries 2. Larsen's Manufacturing 3. Alta

ISU	A/E	Section	Title	Heading	Description	Products
		10 44 16	**Portable Fire Extinguishers**		Contractor shall supply and install fire extinguishers of type "ABC", "K", or "D" according to the space usage and the latest NFPA 10 standard for Portable Fire Extinguishers. "ABC" type extinguishers shall be UL rating: 4-A: 60-B:C. Construction shall include steel shell, brass valve, and stainless steel handles.	1. Amerex 2. Ansul 3. Badger
Division 11 - EQUIPMENT						
		11 00 00	**Portable Waste Collection**	Trash Cans	Accommodate 12x24 space for free standing, half moon waste receptacles that are provided by ISU. Locations include classrooms, conference rooms, kitchens, labs, restrooms, etc.	
				Waste Collection Stations	Accommodate 18x36 space for ISU provided, free standing, waste receptacles including landfill and recycling station. In addition, provide space for ISU provided, free standing, compost station, where appropriate. Locate stations in the building corridors (no longer in classrooms).	
		11 21 23.13	**Vending Machines**		When required, coordinate with ISU FM and ISU FPDC to determine number, sizes, and rough-ins. ISU FM shall provide actual machine. Project shall provide connections.	
		11 53 13	**Laboratory Equipment**	Fume Hoods	Exhausting of all fumes shall be arranged to avoid fresh air intakes of all systems. Power exhaust with nozzles as required. Exhaust design shall include a review of the existing or planned building HVAC system. For new exhaust equipment or exhaust system changes, balancing of existing HVAC equipment will be included to avoid creating negative air pressure in the exhausted areas. New HVAC equipment will be included in the project if required to maintain an acceptable air flow balance.	
		11 81 29	**Fall Protection**	Fall Protection Systems	See "Exhibit DG-5: Safety Guidelines."	1. Guardian Fall Protection 2. Miller Fall Protection 3. 3M-DBI/Sala
Division 12 - FURNISHINGS						
		12 00 00	**Furnishings**	Warranty	Furnishings to have a minimum 10 year warranty. Exceptions require written approval by ISU FPDC.	
		12 24 13	**Roll-Down Blinds**	Roller Shades	Type III - Roller Shades, 1% Openness for Classrooms or 5% Openness for Offices, with valance and sealed pocket hem bar.	1. ALTA 2. Hunter Douglas 3. Draper 4. Mechoshade
				Black Out Shades	Type IV - Black Out Blinds with full perimeter seals. Confirm whether blinds are manual or electric.	1. Hunter Douglas 2. Draper 3. Mechoshade
		12 30 00	**Casework**		Exposed casework vertical surfaces shall be HPL, stained wood veneer, or solid surface. Countertop surfaces shall be HPL, solid surface, or quartz. Melamine or Low Pressure Laminate (LPL) on exposed (exterior) surfaces are not acceptable.	
		12 56 33	**Classroom Furniture**		Tables may be fixed or movable depending on how power or data connections are to be handled. Tablet arm chairs are also commonly used to maximize seating. Furniture type should be confirmed before room dimensions are finalized. See www.iphec.org/vendors for preferred vendors.	www.iphec.org/vendors
		12 59 00	**Systems Furniture**	General	Furnishings are generally procured and installed by ISU, but must be accommodated within the design by the architect.	www.iphec.org/vendors
				Power and Data Connections	Clearly describe and detail the method of delivering power and data to panel systems. Systems furniture workstations shall use wall power for occupant use where available. Power infeeds and in-panel power shall be used when wall power is not available or conveniently located. Powered computer tables shall be coordinated with building power sources for infeed locations. Prefer no partitions parallel along walls.	

ISU	A/E	Section	Title	Heading	Description	Products
Division 13 - SPECIAL CONSTRUCTION						
		13 26 00	**Custodial Requirements**	Custodial Closets	Provide hot and cold water service with hose attachment fixture. Provide enough power to accommodate charging of custodial tools and equipment.	
		13 49 00	**Radiation Protection**	X-Rays and Lasers	Machines or devices that produce x-rays or laser radiation must be reviewed by the ISU EHS Radiation Safety Officer prior to procurement.	
				Radiofrequency and Microwave Antennas	ISU EHS must be notified of the proposed installation of any device(s) that generate non-ionizing radiation exposures such as radiofrequency and microwave antennas to include their location, frequency range, power density, and other pertinent information. Exposure controls including shielding, distance and time limitations, signage requirements, etc. must be communicated to ISU EHS for implementation and dissemination to affected employees.	
Division 14 - CONVEYING EQUIPMENT						
		14 20 00	**Elevators**	General	Any controls that are proprietary in nature, where the manufacturer does not provide training to any other vendor or where full documentation of the wiring, logic and other system information can not be provided to the owner by company policy shall be expressly prohibited in the specifications	
				Features / Types	Design and selection of geared traction, gearless traction, plunger hydraulic, or holeless hydraulic elevators shall be determined by both anticipated usage and analysis of circulation patterns within the building as well as comparison of estimated equipment costs. The passenger elevator capacity shall be a minimum of 3,500 pounds and the speed of travel shall be determined by the elevator analysis studies. At a minimum, the platform size(s) shall meet ADA accessibility requirements and shall provide the capability of carrying a medical stretcher. If the outcome of the elevator analysis determines that a building requires two or more elevators, at least one of the additional elevators shall be designed as a "service" elevator with a minimum 4,000 pound capacity capable of carrying passengers as well as freight on occasion. As specified by the manufacturer, the temperature and humidity control requirements within both the elevator machine room and hoistway shall be made clear to all parties concerned during the elevatoring analysis and design phases of the project. As required by code, elevators shall be equipped with line-powered emergency phones according to current ADA requirements and shall be capable of operating over both University digital phone and VoIP systems.	
				Emergency Communications	Provide code required elevator emergency communications systems (camera, screen, yes and no buttons, and phone) for the deaf, hard of hearing, and speech impaired.	BRAND ONLY Rath Communications by Avire Global
				Parking Deck Elevator Type	ISU prefers outdoor rated traction elevators in lieu of hydraulic elevators in outdoor parking decks only.	
				Signs	Provide code required elevator signs. In addition, for multiple elevators, provide car designation signs in addition to floor designation signs on elevator door jambs. Car designations should be alphabetical since floor designations are numerical.	
				Warranty	As per manufacturer's warranty requirements, the Contractor shall provide monthly maintenance service for a period of 12 months, commencing on the date of the signing of substantial completion. Service shall consist of once a month examinations at approximately 30 day intervals, with notice to the Owner prior to each examination, and repair/replace defective parts at that time. The contractor will provide the University with specific details of what service work will not be covered under the terms of the manufacturer's warranty and what the contractor's standard hourly rate and overtime rate will be during the 24-month warranty period.	
				Service Calls	The Contractor shall respond to all call backs during the warranty period 24 hours per day, seven (7) days a week, including all Holidays, within two hours time of being notified of the call at no additional cost to the University. Contractor will respond to entrapment calls within 30 minutes.	

ISU	A/E	Section	Title	Heading	Description	Products
		14 20 00	**Elevators Continued**	Maintenance Program	As required by code, the contractor shall provide a detailed Maintenance Control Program (MCP) and follow-up with record keeping outlining what and when the entire elevator system and all components are to be examined, lubricated, adjusted, repaired, replaced, tested on a monthly basis including the required test of the fire service recall function. The contractor shall maintain the elevator machine rooms, hoistways and pits in a clean and safe condition and notify the University of any conditions requiring attention. All manuals, shop drawings, wiring and single line diagrams, and diagnostic tools and equipment necessary to set up, adjust or troubleshoot the system shall be provided to the University for each elevator installed. It is anticipated that any new installation (or renovated existing installation) at the University will be capable of providing at least 25 years of dependable service to the University before any major renovation is necessary again assuming that a quality full maintenance program remains in effect throughout the entire life of the equipment. Maintainability requirements shall include the ability to procure all proper replacement parts as well as any required troubleshooting or diagnostic tools necessary for maintenance or repair work to be completed by qualified, licensed and industry trained elevator mechanics.	
		14 21 00	**Traction Elevators**			1. Schindler 2. Otis 3. TK Elevators (Thyssenkrupp) 4. Kone
		14 24 00	**Hydraulic Elevators**			1. Schindler 2. Otis 3. TK Elevators (Thyssenkrupp) 4. Schumacher 5. Phoenix Modular
				Hydraulic Jacks		1. CEMCO 2. ESCO 3. EECO 4. DL Martin
				Hydraulic Valve		1. Maxton 2. ESCO 3. Elevator Equipment Corp. 4. Bucher Hydraulics
		14 26 00	**Restricted Access**		Any designated restricted access floor call buttons shall be key-operated switches compatible with Best patented cores.	
		14 27 13	**Finishes**		All car ceilings proposed and selected by owner shall be suspended aluminum frames with either translucent or opaque panels with energy-efficient LED light fixtures and shall meet all applicable codes. All car flooring materials proposed and selected by owner shall designed for high-traffic and installed with epoxy-based adhesives.	
		14 28 16	**Elevator Controls**			1. G.A.L 2. Motion Control 3. Smartrise 4. Elevator Controls Corp.
Division 21 - FIRE SUPPRESSION						
		21 00 00	**Fire Suppression**	General	Mechanically grooved piping systems are allowed. Polybutylene may be used when in conformance with the Illinois State Fire Prevention and Building Code.	
				Specialized Fire Protection Systems	Where a specialty hazard requires a specialized fire protection system (such as a FM 200 clean agent system for data rooms), the design shall be coordinated through and approved by ISU EHS.	
				Alarm Valve Signage	Provide signage, as required by NFPA 13. Signage shall include location of the design area or areas, size (area) of or number of sprinklers in the design area, discharge densities over the design area or areas, required flow and residual pressure demand at the base of the riser, occupancy classification, and installing contractor. Signage shall be on weatherproof metal.	

ISU	A/E	Section	Title	Heading	Description	Products
	■	**21 11 16**	**Hydrants**		Hydrants with 5" or 5¼" valves. Hydrants shall be ordered with threads that match Town of Normal construction standards. Hydrants shall have two 2½" national standard thread hose connection and one 4" national standard thread 6" pumper connection.	
	■	**21 11 19**	**Fire Department Connections**	General	Fire Department Connection (FDC) locations shall be determined in consultation with EHS and the local fire department. FDC connections shall have a single white strobe mounted above the connection. FDC connections will also be configured with approved Stortz connector. FDC connections must be provided with code compliant signage and caps.	
	■	**21 12 00**	**Standpipe Station Cabinets**		Specify a 2½" national standard thread. The local fire department will use this for their hoses.	
	■	**21 23 00**	**Fixed Wet Chemical Extinguishing Systems (Restaurant Systems)**		Provide fixed wet chemical extinguishing systems (restaurant systems) according to the latest NFPA17A and NFPA 96.	
	■	**21 30 00**	**Fire Pumps**	Electrical Service	The fire pump electric service shall be connected ahead of the building main secondary circuit breaker using either a tap off the switchgear line side bus or a tap directly off of the transformer secondary bushings. A line side tap is not required if the fire pump has emergency power backup.	
	■			Emergency Generator Service	If the building has an emergency generator, the generator shall be connected to the fire pump via a transfer switch in the fire pump controller. The generator shall start upon loss of voltage at the fire pump transfer switch. If the building has a double-ended secondary system, the fire pump controller shall be connected ahead of both main breakers using the above methods and a transfer switch in the fire pump controller. If an emergency generator is used to provide backup power for the pump, connection to one of the normal sources and the emergency generator is sufficient.	
Division 22 - PLUMBING						
	■	**22 00 00**	**Plumbing**	General	All work shall conform to the *Illinois Plumbing Code* (77 Illinois Admin. Code, Part 890), the Town of Normal regulations concerning water and sewer services and plumbing (*Town of Normal Municipal Code* , Chapters 7 and 12), regulations of the Bloomington and Normal Water Reclamation District, the Illinois EPA and other lawful governing bodies as well as these guidelines specific to ISU.	
	■			Penetrations	Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier or smoke barrier shall be protected by a firestop system or device. Such a system shall be tested and approved in accordance with ASTM E 814, Standard Test Method for Fire Tests of Through Penetration Fire Stops, or ANSI /UL 1479, Standard for Fire Tests of Through-Penetration Firestops.	
	■	**22 05 13**	**Motor Requirements for Plumbing Equipment**	Motors	Any 3 phase motor shall be dual voltage. Motors below 1/2 HP shall be 120/1/60. Motors 1/2 HP and above shall be 208/3/60, 230/3/60, or 480/3/60 volt systems. Motors shall be of the high efficiency, high power factor type for minimum life cycle costs. Motors 2 HP and above shall be of cast iron end bell construction.	1. GE 2. Toshiba 3. Reliance 4. Marathon 5. Baldor
	■			Motor Starters		1. SquareD 2. AB 3. Cutler-Hammer 4. GE 5. Toshiba

ISU	A/E	Section	Title	Heading	Description	Products
		22 05 23	**Valves**	General	Unless otherwise noted, all valves for shut-off service shall be gate, globe or ball valves. **No butterfly valves** of any size in any location are allowed. Bypass valves to be globe. For domestic water systems, use ball valves up to 4"; larger size piping requires gate valves, except for main water shut off by water meter use 6" ball valves. All valves 2" and smaller shall be of solder, female iron pipe thread or mechanically pressed type. All values over 2" shall be flanged.	
				Valves, Ball	Body: Bronze, cast iron, stainless steel Body Style: Full Port Trim: 316 Stainless Steel Ball and Stem Seat: Reinforced Teflon (RTFE), 15% glass filled double seal Seat Working P/T Rating: 200 psig @ 250°F Minimum Body Working P/T Rating: 200 psig @300°F Minimum WOG Rating: 200 psig Minimum Saturate Steam Rating: 125 psig Minimum	1. Milwaukee 2. Stockham 3. Nebco 4. Sharpe 5. Apollo 6. American 4000 series
				Balancing Valves, Water		1. Armstrong 2. B&G 3. Wheatley
				Check Valves	2" and under – swing check, screwed end. 2. 2½ " and over – non slam type globe styled lift check, tilting disc or wafer body non-slam type lift check. Double disc or bi-folding disc type valves are not acceptable.	
				Gauge Valves	Provide needle valves for shut-off on all pressure gauges at the gauge and separate ½" ball valves for the various taps to the gauge on a manifold gauge.	
				Control Valves	Control shall be DDC controlled, not pneumatic. Retrofits may incorporate DDC actuators on existing valves.	1. Belimo 2. Siemens 3. Johnson Controls.
				Mixing Valves	Shall be constructed to be easily maintained and resistant to harsh water conditions. Must be lead free and constructed of brass or stainless steel. Mixing valves shall have shut off valves in addition to the manufacturer supplied stops in the mixing valve assembly.	1. Leonard 2. Bradley 3. Powers 4. Cash Acme
					Whole and partial building hot water system must be tempered with the use of electronic mixing valve.	1. Metropolitan 2. Armstrong 3. Leonard
					Point of use mixers for lavatories, sinks, and emergency eyewash must be automatically controlled by thermostatic means.	1. Watts 2. Leonard 3. Taco
				Water Valves, Underground		BRAND ONLY Clow C405 (Town of Normal Std.)
		22 05 29	**Plumbing Drains & Supports**			1. Wade 2. Zurn 3. Josam
		22 05 76	**Cleanouts**		All clean outs shall require a recessed full size removable threaded plug. They shall be same size as the pipe or as required for testing and access. Cleanouts shall consist of proper drainage fitting at main and terminated with ferrule and brass screw plug. Interior cleanouts located in the floor shall be adjustable type with a finish compatible with the type of floor surface: cleanouts in walls shall have a chrome cover plate or be behind an access door. Exterior cleanouts shall have a heavy duty frame, cover, and interior brass plug with lead seal. Exterior cleanouts shall be set in concrete at least 4" thick and 24" square. Locate cleanouts per plumbing code. Anytime a horizontal drain line for a urinal, lav, or sink runs into a tee, double wye, or cross, a cleanout should be placed in the vertical vent, a minimum of 1" above the flood stage of the fixture.	1. Josam 2. Smith 3. Wade 4. Zurn
		22 06 10	**Plumbing Schedule**	Fittings and Joints	Steel 2" and below - Threaded, cast iron (except gas, use malleable iron)	
					Steel above 2" - Welded	
					Copper, refrigerant (45%minimum, cadmium free) - Wrought, silver solder	
					Copper, plumbing, and compressed air - Wrought, silver solder	

ISU	A/E	Section	Title	Heading	Description	Products
		22 06 10	**Plumbing Schedule Continued**		Ductile over 12" - Mechanical, slip joints	
					Cast Iron - Above grade, bell and spigot, w/ neoprene gasket or no-hub neoprene gasket and stainless steel clamp. Below grade, bell and spigot w/ neoprene gasket.	
		22 07 00	**Plumbing Insulation**	Plumbing Equipment	Fittings, Valves and Specialties shall be insulated with factory molded fittings of the same thickness as adjoining pipe. Flexible, custom formed and removable jackets for heating valves or specialties are acceptable.	1. Armstrong 2. CertainTeed 3. Dow 4. Owens-Corning 5. Imcoa 6. Childers 7. Rubatex
		22 11 13	**Facility Distribution**	Underground Water Service	Water Valves, Underground	BRAND ONLY Clow C405 (Town of Normal Std.)
		22 11 16	**Domestic Water**		Domestic Water / Polypropylene, Ductile Iron, HDPE with SDR 11, Copper	1. Enfield 2. Fuseal 3.
					Domestic Water / Type L hard copper all sizes	
					Buried Domestic Water / Class 52 ductile iron	
		22 11 19	**Domestic Water Specialties**	Air Gap Fittings	Shall be made to provide a fixed gap between drains which is open to atmosphere.	1. Josam 2. Smith 3. Wade 4. Zurn
				Back Flow Preventers	Locate vented backflow preventers where relief discharge spillage is not a hazard or problem; otherwise, pipe discharge to a drain.	1. Wilkins 2. Watts 3. FEBCO
				Water Hammer Arrestors		1. Watts 2. PPP Industries 3. Sioux Chief
				Strainers	All strainer elements shall be stainless steel, with No. 20 mesh screen. Domestic water service strainers shall be entirely non-ferrous.	1. Sarco 2. Illinois 3. Zurn 4. Dunham Bush 5. Mueller
				Vacuum Breakers	All hose bibs and other fittings with hose connections shall be complete with vacuum breakers.	
				Sillcocks	Shall be non-freeze integral vacuum breaker type. Each sillcock shall have its own isolation valve inside the building. Provide at least one sillcock on each side of the building	1. Woodford 2. Zurn 3. Wade
		22 11 23	**Pumps, Water (Hot and Cold)**	General		1. Aurora 2. Bell & Gossett 3. Gould 4. Grunfous 5. Metropolitan Pump
				Hot Water Recirculating Pump	Pumps shall be pipe mounted with all bronze casting and impeller, rated for 125 psig. Control scheme shall depend on particular application.	1. Bell and Gossett 2. Grunfous 3. Taco
				Domestic Water Booster Pump	Shall preferably be factory packaged duplex (minimum) pump system with all components fully frame mounted, piped, painted and wired and tested at the factory. Suction and discharge headers will be of stainless steel construction. Complete control package shall be provided, including alarms, and connected to the building automation system. Some applications will require variable frequency drives, selected to match pump characteristics. Provide a compression or buffer tank of at least thirty gallon capacity, or as deemed suitable by the pump manufacturer. Mount at the top of the building to minimize excessive pump cycling.	1. Metropolitan 2. Armstrong 3. Canariis

ISU	A/E	Section	Title	Heading	Description	Products
		22 13 19	**Grease Interceptors**		Grease traps shall be made from composite material.	1. Zurn 2. Ashland 3. Endura
		22 13 29	**Sewage Ejectors**	General	Sewage ejector assemblies shall consist of centrifugal volute casings, bronze impellers, long split steel pump shafts, thrust bearings, metal guide bearings, flexible couplings, float switches with copper floats, low speed motors (1750 rpm, or less), and float guide pipes. Duplex pumps shall be provided with separate electrical feeds and separate disconnects to allow servicing and repairs without interrupting pump operations. A high water float switch and alarm bell shall be furnished with each installation. The high water float switch shall send an alarm signal to the nearest BAS panel. Include alternators as part of controls. Pump controllers shall be installed above-grade.	1. Aurora 2. Hydromatic 3. Weil 4. Zoeller
		22 14 26 13	**Roof Drains**		Shall be cast iron body with flashing clamping ring and cast iron removable beehive strainer and sediment cup. Outlet to match type of pipe.	1. Josam 2. Smith 3. Wade 4. Zurn
		22 14 26 16	**Floor Drains**		Shall be cast iron body with cover and finish to match area in which it is being installed. Use ductile iron covers in heavy equipment use area and nickel bronze in finished areas. Floor drains in trash rooms serving kitchens shall have hanging basket type sediment bucket. Floor drains in mechanical rooms may require a heavy duty adjustable 13" square top to accept multiple equipment drains.	1. Josam 2. Smith 3. Wade 4. Zurn
		22 14 26 19	**Trench Drains**		Shall be modular precast polymer concrete, cast iron, or polyester fiberglass trench sections with presloped 4" wide radiuses interior waterways, knockouts, endcaps, cast iron frame and slotted ductile iron grate, extra heavy duty rated, stainless steel grate holdowns.	1. Aco 2. Neenah 3. Josam 4. Zurn
		22 14 29	**Sump Pumps**	General	Sump pump assemblies shall consist of centrifugal volute casings, bronze impellers, long split steel pump shafts, thrust bearings, metal guide bearings, flexible couplings, float switches with copper floats, low speed motors (1750 rpm, or less), and float guide pipes. Duplex pumps shall be provided with separate electrical feeds and separate disconnects to allow servicing and repairs without interrupting pump operations. A high water float switch and alarm bell shall be furnished with each installation. The high water float switch shall send an alarm signal to the nearest BAS panel. Include alternators as part of controls. If sump pump requires pump controllers, controllers shall be installed above-grade near the pit.	1. Aurora 2. Hydromatic 3. Weil 4. Zoeller
		22 15 13	**Compressed Air Piping**		Compressed air service and control 3/8” and below copper tubing Fire rated polyethylene tubing in and above control panels, all other hard drawn copper	
					Compressed air ½” / Type L hard copper	
		22 33 13	**Point of Use Electric Water Heater**		These may be considered for special circumstances. Where approved, each installation shall meet applicable plumbing and electrical codes for this jurisdiction and shall be a complete system. Installation shall include a tank with an insulated steel jacket, temperature and relief valve, drain valve, wall bracket, replaceable heating element, adjustable thermostat control, energy cut-off, on-off switch, cord with grounded plug.	1. State 2. AO Smith 3. American
		22 34 36	**High-Efficiency Commercial Gas Fired Water Heater**		These may be considered for special circumstances. Where approved, each heater shall be specified as a complete system including valves, gauges, controls, etc. Attention shall be given to ease of maintenance and accessibility to critical components.	1. Aerco 2. AO Smith 3. American

ISU	A/E	Section	Title	Heading	Description	Products
		22 35 13	**Instantaneous Steam Water Heater**		These are preferred and shall have a steam control element not exceeding six feet per second. All materials in contact with domestic water shall be non ferrous, type L copper, or stainless steel. Design shall allow the entire heat exchanger to be partially or completely dismantled without removing either the potable water connectors or the heating connectors. Vertical steam bundles that connect to bottom or originate/terminate from the bottom of the tank are prohibited. Each module shall have a separate individually operated electric steam valve. Water heater shall be specified as a complete system, including circulating pump (other than building return), temperature and pressure relief valves, steam and condensate strainers, inverted bucket traps, pressure gauges, water thermometers, insulated steel jacket, isolation ball valves, control package, etc.	1. Aerco 2. AO Smith 3. Cemline 4. Thrush
		22 42 13	**Water Closets and Urinals**	Water Closet Seats		1. Church 2. Bemis 3. American Standard
				Water Closet Plumbing Flush Valves - Sensors	Battery operated sensor. Exceptions require ISU FPDC and ISU FM written approval.	1. Zurn E-Z Flush (ZERK-CPM) 2. Sloan EBV-146A-C 3. Sloan EBV-500A
				Non Gravity Stool, Wall Mounted		1. Kohler 2. American Standard 3. Mansfield
				Non Gravity Stool, Floor Mounted		1. Kohler 2. American Standard 3. Mansfield
				Tank Type Stool		1. Kohler 2. American Standard 3. Mansfield
				Fixture Carriers (Required for All Wall Mounted Fixtures)	Carriers shall be adjustable, floor mounted, foot type.	1. Zurn 2. Josam 3. Wade 4. Smith
				Urinals		1. Kohler 2. American Standard 3. Mansfield
				Plumbing Flush Valves - Sensor	Battery operated sensor. Exceptions require ISU FPDC and ISU FM written approval. Sensor shall be side mount and installed on approved flush valve.	1. Sloan Side Mount (EBV-500-A) 2. Zurn E-Z Flush Side Mount (ZERK-CPM) 3. Sloan EBV-146-A-C
		22 42 16	**Lavatories**		Lavatories/Sinks located In solid surface countertops shall be integral. Prefer solid surface countertop with integral lavatories in multi-stall restrooms. Prefer porcelain lavatories in single user restrooms.	1. Kohler 2. Geber 3. Mansfield
		22 42 23	**Showers**	Showerheads		1. Sloan #AC-11-B-3 2. Kohler 3. Moen
				Shower Mixing Valves	Shall be pressure balanced to avoid scalding with changes in water system pressures. Adjustable temperature stop shall be set no higher than 110 degrees F. Shower valves which have diverters to change flow from fixed head to hand held shall be of a type that cannot shut off the flow of water to both heads at the same time	1. Symmons 2. Leonard 3. Delta 4. Zurn
		22 42 36	**Mop Basins**		Shall be precast terrazzo or molded stone, min. 24" x 24" x 6" with stainless steel edge protectors, 3" drain, wall mounted hot and cold mixing faucet with vacuum breaker and 3/4" hose connection (no aerator). Backsplash of at least 18" tall shall be installed on the walls surrounding mop sinks. Floor mop sinks are preferred over elevated utility sinks.	1. Fiat 2. Mustee 3. Stern-Williams
		22 42 39	**Commercial Faucets and Trim**	Lavatory Faucets - Sensor	Battery operated sensor. Exceptions require ISU FPDC and ISU FM written approval. Must be commercial grade.	1. Chicago Faucet 2. Zurn (Z6918-XL) 3.

ISU	A/E	Section	Title	Heading	Description	Products
		22 42 39	**Commercial Faucets and Trim Continued**	Commercial Kitchen Faucets	Must be commercial grade.	1. Chicago Faucet 2. T&S Brass 3. Elkay
				Breakroom / Kitchenette	Must be commercial grade.	1. Chicago Faucet 2. Kohler 3. Delta
		22 45 00	**Safety Showers and Eyewash Stations**		Shall provide 60-100 degree F tempered water or hot and cold water supply with point of use mixing valve in compliance with ANSI Z358.1-2014 and IL Department of Public Health. Drains shall be beneath the showers.	1. Bradley 2. Chicago 3. Speakman 4. Guardian
				Locations	Locate where required to be code compliant in addition to being located adjacent to the exit doorway of every laboratory, near each chemical treatment or mixing station in mechanical spaces, where corrosive chemicals are stored and handled, and near battery charging stations.	
		22 47 13	**Water Coolers and Bottle Fillers**		Shall be mounted on backing boards with top and bottom portions anchored to the wall per manufacturers instructions. All installation shall be in compliance with ADA requirements. Be capable of producing eight gallons per minute at 50 degrees F. Prefer stainless steel finishes. Provide a bottle filler on one unit in each grouping; preferably the ADA drinking fountain, unless ISU requires additional bottle fillers.	1. Elkay 2. Halsey Taylor 3. Oasis
		22 63 13	**Laboratory Gas Piping**		Natural Gas, above grade / Black Schedule 40	
		22 66 53	**Laboratory Waste Piping**		Acid waste: Glass only when approved, polypropylene, PVDF or PP.	
		22 67 13	**Laboratory Water Piping**		Quality Water, RO or DI: PVDF, PVC Schedule 80, or Stainless Steel	
Division 23 - HEATING, VENTILATING, AIR CONDITIONING (HVAC)						
		23 00 00	**Heating, Ventilating, and Air-Conditioning**	General	New construction and major remodeling projects shall comply with the most recent edition of the International Energy Conservation Code (IECC) for commercial buildings. Heating and cooling system loads for the purpose of sizing systems and equipment shall be determined in accordance with procedures described in the ASHRAE Handbook - Fundamentals. Outdoor design conditions shall be selected from the latest edition of ASHRAE Handbook - Fundamentals, or from data obtained from the National Climate Center, or similar recognized weather source. Ventilation systems shall be designed to provide outdoor air ventilation rates in accordance with ANSI/ASHRAE Standard 62.	
				Static Pressure	High estimated static pressures for fans and head pressures for pumps cause larger than necessary fans, pumps, and motors which waste energy and unnecessarily increase size of electrical service. Calculate realistic static pressures without double safety factors.	
				Equipment Access	Install all piping, ductwork, conduit and accessories to permit access to equipment for maintenance, service, and replacement.	
				Restrooms	Restroom ventilation to have supply air and 100% exhaust to outdoors.	
		23 01 00	**Operation and Maintenance of HVAC Systems**	Systems	Generally, offices and classrooms shall be conditioned by variable air volume systems and hot water reheat coils with 100% economizer capability. Laboratories, animal rooms, and other areas requiring high ventilation rates shall include reheat as necessary and shall be 100% exhausted and supplied with make-up air. Plate to plate heat exchangers are acceptable. All systems shall have individual temperature control with cooling and heating controlled in sequence with deadband. Provide night setback with manual override when appropriate.	
					Perimeter zones shall be heated by hot water radiation. All systems shall have individual room temperature control with cooling and heating controlled in sequence with a deadband. Perimeter heat should be last on and first off.	
		23 05 00	**Common Work Results for HVAC**	General	Steam system pressure ratings: The steam system is a constant (normal) pressure system of 115 psig. The system has central safety valves set at 138 psig. All pressures are measured at the tie point to the existing distribution main.	

ISU	A/E	Section	Title	Heading	Description	Products
		23 05 00	**Common Work Results for HVAC Continued**		The consultant shall design around the following parameters: Low pressure is 25 psig or less; high pressure is above 30 psig. Heating loads: The 115 psig steam is reduced to working pressure steam ranging from 25 psig to 18 psig depending on the building system design. In some cases the steam is further reduced to a lower pressure, as low as 5 psi. Process loads: All process loads, such as domestic water heaters, sterilization equipment, etc., shall be designed to meet rated load with 15-20 psig of steam pressure reduced at the building. Control for such equipment shall be designed to handle the pressure variation from 0 to 60 psig, and shell tube tests of 125 psig min. PRV and control valve drops must be accounted for. For domestic hot water converters, the consultant is advised that the winter cold water temperature is 40 degrees F and 70 degrees F in the summer.	
		23 05 13	**Common Motor Requirements for HVAC Equipment**	Motors	Most buildings on campus are 208/3/60 or 480/3/60 guarantee motors to meet appropriate supply. Motors < 1/2 hp can be 120v/1ph. Motors > 1/2 hp shall be 3ph (if applicable) and premium efficiency. Motors shall meet current energy codes.	
					Motors below 1/2 HP shall be 120/1/60. Motors 1/2 HP and above shall be 208/3/60, 230/3/60, or 480/3/60 volt systems. Motors shall be of the high efficiency, high power factor type for minimum life cycle costs. Guaranteed minimum motor efficiencies, based upon IEEE tested method 112-b, shall be listed for each motor on the project.	
					For equipment expected to run more than 12 hours per day or more than 3,000 hours per year, use "premium efficiency" motors, per NEMA standard.	
				Clearances	Provide sufficient access and clearance for working space around all motors and motor controls for safe operation and maintenace of equipment.	
				Variable Frequency Drives	Drive enclosure shall be equipped with 120v cooling fans. Unit shall be designed to perform in environmental conditions 100 degrees Fahrenheit and 90% RH, ambient, without any loss of performance. Each drive shall include auto/off/manual switch: Manual local speed control, adjustable current limit, acceleration and deceleration rates; remote start/stop for automatic control. Fast acting, semi conductor fusing shall be included with drive.	1. Toshiba 2. ABB 3. Yaskawa 4. Square D 5. Siemens
				Motor Starters		1. SquareD 2. AB 3. Cutler-Hammer 4. GE 5. Toshiba 6. Siemens
		23 05 16	**Expansion Fittings and Loops for HVAC Piping**	High Pressure Steam	Externally pressured, bellows type	1. Hyspan 3500 2. Spirax Sarco 3. Flexicraft
				Hot Water Service	Stainless steel, bellows type	1. Flexonics 2. Adsco 3. Hyspan 4. Mason Industries
				Finned Tube Expansion Compensation	Stainless bellows with shroud	1. Flexonics 2. Adsco 3. Tube Turn
		23 05 17	**Seals for HVAC piping**	Gaskets	All gaskets shall be Teflon or spiral wound metal. Paper gaskets are not allowed.	
		23 05 19	**Metering**		Each building shall have a chilled water, steam (or condensate), make-up water, and electric meter. Meters shall be connected to the Apogee Siemens Desigo campus automation system for remote monitoring. Provide proper range of meter dependent on the buildings usage. Steam meters shall be capable of a minimum of 50:1 turndown and must be designed for a minimum of 350 degree F operating temperature and 150 psi working pressure.	
		23 05 19	**Gauges and Thermometers**	Pressure Gauges	Pressure gauges shall be stainless steel case, non-repairable, silicone filled with 3-1/2" diameter case. Gauges shall have 3% accuracy over the appropriate range of 0-30 psi, 0-100, or 0-160. Shall be suitable for operation at 160 degrees Fahrenheit and include a shut-off cock.	1. Taylor 2. Trerice 3. Weiss

ISU	A/E	Section	Title	Heading	Description	Products
		23 05 19	**Gauges and Thermometers Continued**	Thermometers	Minimum 7" adjustable angle, brass stem, liquid-in glass, steel stem with 1% accuracy. Choose appropriate temperature range based on application.	1. Taylor 2. Trerice 3. Weiss
		23 05 23	**General Duty Valves**	Location	All valves must be easily accessible by ladder or platform. If the valve cannot be easily assessed, consult with ISU FPDC and ISU EHS to discuss alternate plans for accessibility.	
				Temperature Control Valves	Provide automatic control valve and actuator appropriate for system and with the proper flow range. Provide control valve on supply side of piping. Coordinate proper control voltage.	1. Belimo 2. Siemens 3. Keystone 4. Bray
				Triple Duty Valves	Triple duty valves are not allowed.	
				Valves, Ball	Ball valves may only be used on piping 3" and under. 125 psi saturated steam, 600 psi WOG, full port, screwed or soldered ends, stainless steel ball and stem, Teflon seats and seals. Provide handle extensions on piping with insulation greater than 1" thickness.	1. Milwaukee 2. Stockham 3. Apollo
				Valves, Gate	All gate valves shall be raised face	1. Milwaukee 2. Stockham 3. Apollo
				Valves, Butterfly	Butterfly valves shall be used on piping 3" and larger. Fully lugged ductile or cast iron ends; bronze, aluminum/bronze or EPDM coated ductile iron disc; EPDM seat; locking handle or gear operator; stainless steel stem	1. Milwaukee 2. Stockham 3. Apollo
				Balance Valves	Balance valves shall be located on the return side of piping and have calibrated positions. Petes plugs shall be provided on the inlet and outlet of valve body. Ball valves may NOT be used in this application.	1. B&G 2. HCI 3. Armstrong
				Strainers	Strainers shall have blow down ball valve with capped threaded hose end. Clean all strainers on project turn over.	1. Watts 2. Zurn 3. NIBCO
				Air Vents and Drains	Provide proper air vents at high points and drains at low points. Provide ball valve with threaded hose thread.	
		23 05 33	**Heat Trace**		Trace all piping in areas exposed to freezing. Coordinate voltage/amp draw and termination with EC	
		23 05 48	**Vibration Isolators**		Properly isolate all equipment, duct and piping in noise sensitive areas. Equipment containing compressors shall be isolated. Provide engineered submittal drawings of proposed system	1. Mason 2. Vibration Eliminators 3. Flexonics 4. Kinetics
		23 05 53	**Identification HVAC piping and Equipment**		Identify all equipment, piping and duct with easily readable self-adhesive labeling with a minimum 1" high letters. Provide flow direction arrows. Provide equipment insulation on equipment for temperatures below 60 degrees F and above 110 degrees F with fiberglass or closed cell foam and provide jacketing as required. See "Exhibit FS-23.1: Mechanical Insulation Schedule."	1. Brady 2. Seton 3. Brimar
		23 05 93	**Testing, Adjusting, and Balancing**	General	Test, balance, and adjust all water and air systems within 10% of design	
		23 07 13	**Duct Insulation**	General	All supply air, return air and all fresh air duct`s and plenums, and plenums or ducts handling a mixture of fresh air and return air shall be insulated. Fresh air inlet ducts or plenums from intake louvers to unit housings shall be insulated. Insulate all ducts in equipment rooms as well as all air conditioning fans and housings. Duct heating coils, dampers, etc., shall be considered part of the duct system and shall also be insulated. Housings containing filters, coils, and similar equipment shall be insulated. Insulation shall not interfere with access for routine maintenance. See "Exhibit FS-23.1: Mechanical Insulation Schedule."	1. Mansville 2. CertainTeed 3. Knauf
				Waterproof Insulation	Waterproofing jackets for ducts exposed to roof-top conditions shall be a rigid aluminum jacket formed around the insulated duct.	
		23 07 16	**HVAC Equipment Insulation**	General	Provide equipment insulation on equipment for temperatures below 60 degrees F and above 110 degrees F with fiberglass or closed cell foam and provide jacketing as required. See "Exhibit FS-23.1: Mechanical Insulation Schedule."	1. Mansville 2. CertainTeed 3. Knauf

ISU	A/E	Section	Title	Heading	Description	Products
		23 07 19	**HVAC Piping Insulation**	General	Insulate all steam, steam condensate, chilled water supply/return, hot water supply/return piping. Provide blocking and appropriate oversized hangers. See "Exhibit FS-23.1: ISU Mechanical Insulation Schedule."	1. Mansville 2. CertainTeed 3. Knauf
				Valves and Fittings	Provide fitted, removable insulating jacket on steam, steam condensate and hot water supply/return on valves larger that 4".	1. Advanced Thermal Corporation 2. Thermaxx 3. Unitherm
		23 08 00	**Commissioning**	General	Commission HVAC system to meet design intent and schedule. Commissioning to be done by independent third party.	
		23 09 13 23	**Sensors and Transmitters**	Thermometers	All thermowells shall be stainless steel for steam service and brass for water service	
				Air Flow Measurement	Provide duct mounted air flow measuring stations with local readout and tie into existing BMS.	1. Air Monitor 2. Ebtron 3. Greenheck
		23 09 23	**Direct Digital Controls**	General	All new buildings shall have Direct Digital Controls (DDC) temperature controls and shall connect to our central Building Management System (BMS). Additions to an existing building shall match current control system. Coordinate all systems with ISU Building Automation Department. See "Exhibit FS-23.3: Building Automation System Standards"	1. Schneider Electric 2. Siemens 3. Delta
		23 11 23	**Facility Gas Piping**		< 2" psi be schedule 40 indoor and outdoor; >2" psi to be schedule 40 . All gas pipe labels shall be color coded yellow. Note, label piping where the design requires the gas piping to be painted a different color. Vent all regulators to outdoors.	
		23 11 26	**Facility LP Gas Piping**		< 2" psi be schedule 40 indoor and outdoor; >2" psi to be schedule 40. All gas pipe labels shall be color coded yellow. Note, label piping where the design requires the gas piping to be painted a different color. Vent all regulators to outdoors.	
		23 21 00	**Hydronic Piping**	Hot Water Supply/Return	<2" can be Type L soldered copper, >2" can be threaded, welded schedule 40.	
				Chilled Water and Condenser Water and Similar Systems	<2" can be Type L soldered copper, >2" can be threaded, welded schedule 40. HDPE piping with SDR 11 may be used in chilled water distribution.	
		23 21 16	**Hydronic Specialties**	Pressure Reducing Valve System	Provide self-powered PRV systems.	1. Bell & Gosset 2. Watts 3. Zurn
				Balancing Valves, Water	Provide balance valves on return side of terminal devices.	1. Armstrong 2. B&G 3. Anderson
				Strainers	All wye strainers shall have valves and caps.	1. Armstrong 2. Mueller 3. Watts
				Triple Duty Valves	Triple duty valves are not allowed. Provide individual valves.	
				Expansion Tanks	Expansion tanks shall be diaphragm type and precharged to meet design. Install air separators at high points in system and vent to atmosphere or drain.	1. Amtrol 2. Wessels 3. B&G
				Air Separators	Air separators shall have a peaked air removal efficiency of 98.5%	1. Spirotherm 2. Amtrol 3. B&G
		23 21 23	**Hydronic Pumps**		The building chiller water pump head shall be selected without future safety factor and as low as practical. Providing extra capacity (flow) is acceptable. The building pump head is only necessary for piping, accessories, coils, and process heat exchangers within the building loop. The design shall be a primary loop from the central chillers and each building served shall be via secondary loops. The loop may be somewhat oversized with a variable speed drive for each pump. All pumps shall have mechanical seals with carbon and ceramic seats. Provide stainless braided flanged flex connectors on discharge and inlets, and suction diffusers on base mounted pumps. Minimize use of suction diffusers. Rubber type is not allowed.	1. B&G 2. Aurora 3. Superior 4. Armstrong

ISU	A/E	Section	Title	Heading	Description	Products
		23 21 23	**Hydronic Pumps Continued**		All pumps shall have 1750 RPM motors. Three-phase motors shall run off of a VFD.	
					All pumps shall have valved pressure gauges on suction and discharge outlets.	
					All base mounted pumps shall be on minimum 3 1/2" thick concrete house keeping pad.	
					All inline pumps shall be supported independently of piping.	
					See "Exhibit FS-23.2: Mechanical Details."	
		23 22 13	**Steam and Condensate Heating Piping**	HPS	<2" can be schedule 80 threaded, >2" can be schedule 80 welded	
				MPS, LPS	<2" can be schedule 40 threaded, >2" can be schedule 40 welded	
				MPC, LPC	<2" can be schedule 80 threaded, >2" can be schedule 80 welded	
				Pumped Condensate	<2" can be schedule 80 threaded, >2" can be schedule 80 welded	
		23 22 16	**Steam and Condensate Heating Piping Specialties**	Steam Traps - General	Allow sufficient room for the entire trap assembly. No short nipples shall be allowed. Total trap assembly from dirt leg to end of check valve shall not be less than five feet, nor more than seven. Incorporate a test tee and valve downstream of trap.	
				Float and Thermostatic (F&T) Traps	Coils and unit heaters	1. Sarco, FT 2. Armstrong, A 3. Hoffman, H
				Thermostatic Traps	Finned-tube heating.	1. Sarco, FT1 2. MEPCO 3. Illinois Mechanical
				Bucket Traps	End of line steam mains and heat exhangers.	1. Sarco, B1H 2. Armstrong, 811 3. TLV, SS3N
				Strainers	All traps and blow-offs shall have strainers. All strainers shall have valves and caps on the cleaning port.	1. Sarco, B 2. Armstrong, B1 3. Mueller
				Pressure Reducing Valve System	The consultant is instructed to use self-powered PRV systems.	1. Sprirax/Sarco, 25P 2. Armstrong 3. Spence
		23 22 23	**Steam Condensate Pumps**		Pressure powered pumps shall be of non-cavitating design powered by steam regulated to 60 psig and designed for condensate up to 350 degrees F. C. Operation shall be controlled by a float operated, snap-acting mechanism, with no external seals or packing. Flow direction shall be controlled by two stainless steel spring check valves. G. Provide mechanical alternator to start first one pump and then the other and arranged to automatically start the second pump if the rate of condensate return exceeds the capacity of the first pump.	1. Sarco (Model PPC) 2. Spirax 3. Armstrong 4. Weil
		23 23 00	**Refrigerant Piping**		Hard brazed ACR copper preferred, soft copper line sets can be used where appropriate. Purge all systems with nitrogen while brazing.	
		23 25 13	**HVAC Water Treatment Closed System**		All newly installed closed systems shall be chemically cleaned before being placed into service. Such cleaning shall be witnessed by the system designer, or his representative, and a representative of ISU.	
					For all projects, engineer shall specify that chemicals supplied must match ISU's current, competitively-bid supplier. Further, the specifications shall require the contractor to confirm the chemical supplier with ISU before any chemicals are introduced into any system.	
					Provide for automatic control of both chemical feed and bleed-off, based on make-up water flow and conductivity levels. A safety pressure switch shall disable chemical feed when condenser water flow stops. Controls shall be compatible with and connected to the existing Apogee/Johnson BAS panel.	
					Corrosion coupon rack shall be provided with four 1" FPT openings for the mounting of corrosion coupons and shall include continuous flow regulation.	
				Chemical Pumps	Provide positive displacement pumps with proper metering devices.	1. LMI 2. Pulsatron 3. Neptune

ISU	A/E	Section	Title	Heading	Description	Products
		23 25 16	**HVAC Water Treatment Open System**	General	For all projects, engineer shall specify that chemicals supplied must match ISU's current, competitively-bid supplier. Further, the specifications shall require the contractor to confirm the chemical supplier with ISU before any chemicals are introduced into any system.	
					Provide for automatic control of both chemical feed and bleed-off, based on make-up water flow and conductivity levels. A safety pressure switch shall disable chemical feed when condenser water flow stops. Controls shall be compatible with and connected to the existing Apogee/Johnson BAS panel.	
					Corrosion coupon rack shall be provided with four 1" FPT openings for the mounting of corrosion coupons and shall include continuous flow regulation.	
				Chemical Pumps	Provide positive displacement pumps with proper metering devices.	1. LMI 2. Pulsatron 3. Neptune
		23 31 13	**Metal Ducts**	HVAC Ductwork, Fabricated Grease Duct	Ductmate or Formed on Flange Acceptable, Fabricate to SMACNA Standards based on static pressure, Seal all duct work to Class per SMACNA A pressure rating, Leak test per SMACNA for any thing over 3".	
				Supply Ductwork Upstream of VAV Boxes	4" sp rating, G-90 galvanized, Use only gasketed spiral for round	
				Supply Ductwork Downstream of VAV Boxes	2" sp rating, G-90 galvanized	
				Exhaust Ductwork	2" sp rating, G-90 galvanized	
				Return Ductwork	2" sp rating, G-90 galvanized	
				Grease Duct	Grease duct must be minimum 18 ga fully welded water tight, with clean outs installed per code	
				Dishwasher Duct	2" sp rating, aluminum or stainless steel. Seal watertight	
		23 31 16	**Non-Metal Ducts**	Buried Ductwork	FRP pipe and joints, slope towards drain. Follow manufacturer's installation instructions	1. Spunstrand 2. FRP Solutions (Monoxivent) 3. Perry Industries
				Lab Fume Ductwork	PVC solvent weld or fully welded 304 16 ga stainless steel	
		23 33 30	**Air Duct Accessories**	Duct Silencers	Provide fiber-free packed duct silencers in locations where mechanical noise from air or equipment could be present.	1. IAC 2. Price 3. Ruskin
				Fire Dampers	Preferred minimum 12" factory sleeve, Dynamic curtain, 165 degree fusible link. Install per manufacturer's instructions. Ensure fire damper has safe access via access door, platform, lift, and/or ladder. Provide access door for inspection.	1. Ruskin 2. Greenheck 3. Arrow
				Fire/Smoke Dampers	Minimum 12" factory sleeve. Provide proper rating and actuator for application. Ensure fire/smoke damper has safe access via access door, platform, lift, and/or ladder. Provide access door for inspection. Provide 165F electric resettable link. Dampers shall tie into fire alarm system.	1. Ruskin 2. Greenheck 3. Arrow
				Access Doors	Install at points for visual inspection and allowance for cleaning. Hinged preferred, 10"x10" minimum size	
				Volume Dampers	Single blade damper for ducts < 12" wide, multiblade for > 12" wide. Provide stand-off bracket for externally insulated ductwork. Install HETO's at all branch ductwork (less MP and HP).	
				Control Dampers	Control dampers shall have all aluminum frame and blades, be ultra low leakage, opposed blade with blade seals jamb seals. Provide jackshafting. Actuators by temperature controls. Provide insulated blades on outdoor air dampers.	1. Arrow 2. Tamco 3. Greenheck
		23 33 46	**Flexible Duct**	Flexible Duct	Flexible duct shall be insulated per current code depending on use. Use double nylon zip ties or work-drive clamps on each end. Do not exceed 5'-0" length.	1. Thermaflex 2. MKE 3. Atco
		23 34 16	**Fans**	Axial Fans	Provide axial fans with proper wall housing, high quality BDD or MOD, discharge hood or louver, local disconnect switch, motor side guard. Direct drive preferred.	1. Greenheck 2. Cook 3. Carnes
				Powered Ventilators	Provide powered ventilators with high quality BDD or MOD, proper roof curb, local disconnect switch. Provide 20 ga. minimum, 304 stainless steel drip pan under non-ducted fans.	1. Greenheck 2. Cook 3. Carnes

ISU	A/E	Section	Title	Heading	Description	Products
		23 34 16	**Fans Continued**	Grease/Kitchen Fans	Provide upblast or centrifugal powered ventilators UL listed for grease. Provide proper roof curb and curb extension required by code. Locate away from fresh air intakes per code. Provide grease cup.	1. Captive Aire 2. Cook 3. Greenheck
				Fan Walls	Provide the proper amount of fan in an array that will allow N+1 capacity. Provide factory starter, wiring harness, VFD package and LCD user interface. Provide factory bulkheads as required for application. Provide tight sealing backdraft damper at each fan.	1. Greenheck 2. Cook 3. Carnes
				Centrifugal Blowers	Provide proper oriented blower with backwards incline blades, scroll drain, motor guard and local disconnect. Provide proper vibration isolation.	1. Greenheck 2. Cook 3. Twin City
				Clarification	The fire alarm system shall shut down the building supply and return fans directly.	
		23 34 33	**Air Curtains/Doors**		Provide control package compatible with BAS	1. TMI 2. Mars 3. Powered Aire
		23 35 13	**Special Exhaust Systems**	Dust Control: Respirable Crystalline Silica	Equipment with integrated water delivery systems and/or dust control systems must be used when ISU occupants are conducting work activities including cutting, sawing, grinding, drilling, and crushing stone, rock, concrete, brick, block, and mortar that have the potential to produce respirable crystalline silica.	
		23 35 33	**Listed Kitchen Grease Duct**		Prefabricated grease duct for kitchen exhaust. Must meet clearances per code	1. Van Packer 2. Schebler 3. McGill AirFlow
		23 36 00	**Air Terminal Units**		1/2" min. fiber free liner. Controller and actuator field mounted by TC. Reheat coil shall be furnished integral to the box. Provide access door for coil cleaning. Box shall be hung independently of ductwork.	1. Titus 2. Price 3. Carrier 4. Nailor 5. Metalaire 6. Greenheck
		23 37 13	**Air Diffusers, Grilles, Registers**		Air devices to have NC <25. For lay-in applications, provide cone-faced supply diffusers & perforated returns/exhaust. For surface mount applications, provide double deflection supply grilles and 45 degree fixed blades on returns and exhaust grilles. Do not provide integral dampers, unless a branch damper is not possible. Provide off-white finish.	1. Titus 2. Price 3. Metalaire
		23 37 16	**Fabric Air-Distribution Devices**		Material selection, dispersion patterns and hangers shall be designed accordingly. Provide factory drawings for approval.	1. Ductsox 2. Fabric Aire 3. McGill AirFlow
		23 37 23	**HVAC Gravity Ventilators**		Gravity intakes and reliefs shall be of the penthouse style. Standard color TBD. Provide proper access for maintenance to inside of unit for cleaning. Provide a stainless steel drip pan under roof opening for non-ducted devices.	1. Cook 2. Greenheck 3. Ruskin
		23 38 13	**Commercial Kitchen Hoods**		All hoods shall be designed using the prescriptive method. Provide switches on hood face. Provide energy efficient lighting. Provide ANSUL system with appropriate cabinet. Provide smoke testing upon completion. All hoods shall have a demand fan speed control using a sensor to vary the exhaust flow rate.	1. Larkin 2. Greenheck 3. Captive Aire
		23 38 16	**Fume Hoods**	General	Supply and exhaust air systems in laboratories shall be variable volume with flow serving the greater need of fume hood make-up, cooling load, or space ventilation. Variable exhaust should be achieved by variable fan speed and will be controlled to maintain a minimum fume hood face velocity of 80 FPM and an average face velocity of 100 FPM. A variable volume supply air box will modulate to regulate supply air flow. The supply box will be equipped with a reheat coil in rooms with hoods. System shall be integrated to ISU BMS.	1. Fisher Scientific 2. VWR 3. Labconco

ISU	A/E	Section	Title	Heading	Description	Products
		23 38 16	**Fume Hoods Continued**	Fume Exhaust Fans	All fans used for fume exhaust shall be AMCA Type B spark resistant construction. Fans shall be Class 1 belted utility sets with a steel scroll sized to operate below 2,000 RPM. All components exposed to the air stream shall be coated with primer, baked enamel and baked Hersite. In-line centrifugal fans of the same material and coatings are acceptable where space precludes the use of a utility fan. Fans constructed of PVC or FRP shall be used where high concentrations of corrosives are anticipated.	1. Hartzell 2. Greenheck 3. Cook
		23 41 00	**Filters**		Provide pre-filter as MERV 8 cartridge-style (2" or 4" thick) followed by MERV 13 12" bag or cartridge-style filter. Velocity across filter back shall not exceed 500 ft/min.	1. AAF 2. Farr 3. Cambridge
		23 51 23	**Gas Vents**		Provide double-wall galvanized B-Vent as recommended by equipment manufacturer. Double-wall AL 29 - 4C to be used for pressurized stacks.	1. Van Packer 2. Metal Fab 3. DuraVent
		23 52 00	**Pressure Relief Devices**		Safety Valves: ASME safety valves are the strongly preferred approach to protection of the low pressure system. Relief shall be set at 20 psig above the steam delivery pressure. The University recognizes the architectural considerations of such a system. Building floor plans and mechanical room layouts shall be adjusted to allow the use of a safety valve and vent stack to the roof. Safety valves will, however, eliminate the tripping of the steam system during periods of rapid load or inlet pressure swings. They also provide a visible means of detecting a malfunctioning PRV system. Steam outages caused by trip valves cannot be tolerated.	
		23 54 16	**Gas Fired Furnaces**		Gas fired furnace must meet current energy codes at a minimum. Provide matching evaporator and condensing unit if applicable.	1. Trane 2. Lennox 3. York 4. American Standard
		23 55 13	**Gas Fired Heaters**		Gas fired duct heaters must meet current energy codes at a minimum. If using 100% outside air, stainless steel heat exchangers must be used. Provide factory modulating control valve.	1. Trane 2. Lennox 3. York
		23 55 23	**Gas Fire Radiant Heaters**		Provide combustion air intake and exhaust accordingly. Provide proper design for space with proper reflectors and hangers for application.	1. Re-verb-ray 2. Schwank 3. Space-ray
		23 57 16	**Heat Exchangers**	General	All heat exchangers shall have a pressure rating to meet the current buildings requirements with a minimum of 150 psi. Inlet steam pressure shall be based on available steam pressure.	
				Shell and Tube	Provide a 2 pass minimum, copper U-tube configuration. See "Exhibit FS-23.1: Mechanical Insulation Schedule".	1. Bell and Gossett 2. Trush 3. Armstrong
				Plate to Plate	Provide 304 or 316 stainless steel plates pre-assembled from the factory. Provide flanged or threaded inlets and outlets. Provide capability for breakdown for cleaning.	1. Sondex 2. Tranter 3. Alfa Laval 4. Bell & Gosset
		23 62 00	**Packaged Compressor and Condensing Units**		Provide multiple-stage compressors that meet the current energy code. Provide hail guards, frame enclosures, phase and brown-out protection. Provide factory refrigeration specialties for field install.	1. Trane 2. Daikin 3. Carrier 4. AAON
		23 64 00	**Packaged Water Chillers**		Provide centrifugal-type water cooled chillers with integration to BMS. Chillers shall be designed around 100% water. Consult owner for specific information	1. Trane 2. Daikin 3. Carrier

ISU	A/E	Section	Title	Heading	Description	Products
		23 65 13	**Cooling Towers**	General	Provide cross-flow type cooling towers with stainless steel casings, structural supports, top and bottom basins, and covers. Provide hot-dipped galvanized exterior platforms , ladders, and handrails per OSHA standards for accessibility. Provide proper vibration isolation. Fans shall be shaft-driven with motor out of the air stream. Provide standard fan guard.	1. Marley 2. Baltimore Air Coil 3. Evapco
		23 72 00	**Energy Recovery**	Water to Air	Shall be of the glycol coil type system. Provide proper pumps, coil materials for specific systems.	
				Air to Air	Provide plate-to-plate systems. Heat wheels are not allowed. Provide preheat to prevent frosting when applicable.	1. Semco 2. HeatEx 3. Renew Aire
		23 73 13	**Indoor Central Station Air Handling Unit**		Provide double-walled insulated panels to meet current energy code, stainless steel or aluminum floors in all sections, thermal breaks at shipping splits, stainless drain pans, and pre-filters (MERV 8) and filters (MERV 13). Air flows greater than 2500 cfm shall be provided with a fan wall with VFD and controller with LCD readout compatible with BAS. See coil and damper specifications elsewhere.	1. Trane 2. Daikin 3. Innovent 4. Carrier
		23 74 13	**Outdoor Central Station Air Handling Units**		Provide double-walled insulated panels to meet current energy code, stainless steel or aluminum floors in all sections, thermal breaks at shipping splits, stainless drain pans, and pre-filters (MERV 8) and filters (MERV 13). Provide fan wall with speed controller with LCD readout compatible with BAS. See coil specifications elsewhere	1. Trane 2. Daikin 3. Innovent
		23 74 33	**Dedicated Outdoor Heating And Cooling Air Units (DOAS)**		100% outside air make-up units shall be double wall construction with sloped roof per current energy codes. Burner shall be indirect fired and meet current codes. Provide stainless heat exchanger, filter banks and modulating gas valve. Provide proper access platforms and railing for maintenance.	1. Trane 2. AAON 3. Reznor
		23 81 23	**Packaged Through-Wall Terminal AC Units**		Provide factory wall sleeve, electrical terminal, and exterior wall louver for the application	1. Carrier 2. Amana 3. Friedrich
		23 81 23	**Computer Room A/C Units**		Computer room units shall be chilled water type units where chilled water is available all year or packaged systems that include a matching condenser and evaporator section. Condensing units must be capable of operation down to -20F. Provide all refrigerant specialties for field installation.	1. Liebert (Vertiv) 2. APC 3. Stulz
		23 81 26	**Split-System Air Conditioners**		Provide low ambient operating down to 0 deg F. Line sets are acceptable. VRF systems are not allowed.	1. LG 2. Panasonic 3. Mitsubishi 4. Daikin
		23 82 16	**Coils**	General	All chilled water coils in air handlers shall be sized for entering water temperature of 42 degree F. A 15 degree F. rise is the design standard. Air and water shall be piped counter-flow. Provide vent at high point and drain at low point for each coil. Each coil shall be capable of being fully drained by gravity. All coils shall have copper tubes and return bends with a minimum thickness of .035". Fin spacing of 10 FPI is preferred.	1. Trane 2. Daikin 3. RAE Coils 4. Greenheck
				Hot Water Coils	Provide proper rows for heating. Minimum 1/2" od tube. Galvanized casings. 700 fpm maximum velocity.	
				Chilled Water Coils	6 row minimum, minimum 5/8" OD tube, drainable/vented headers. Stainless steel casing. Provide individual auxiliary stainless steel drain pans. 500 fpm maximum velocity.	
				Steam Coils	Provide drainable cast iron headers.	
				Refrigerant Coils	Circuit according to application	
				Electric Resistance Coils	Provide factory casing. Provide step controllers and disconnect switch.	
		23 82 19	**Fan Coil Units**		Fan coil units shall meet the coil specification described in 23 82 16. Provide unit with proper cabinet type, discharge arrangement and color depending on application. Provide insulated stainless steel drain pan under cooling coils. Provide factory valve package as applicable.	1. Carrier 2. Trane 3. Dunham Bush

ISU	A/E	Section	Title	Heading	Description	Products
		23 82 29	**Fin-Tubed Radiators**		Fin-Tubed radiators elements and cabinets shall be sized for the application. Piping shall be copper and fins shall be aluminum. Provide each section with proper control valve and balance valve per application.	1. Carrier 2. Trane 3. Daikin 4. Dunham Bush
		23 82 39	**Unit Heaters**		Unit Heaters shall be the proper type for the service (hot water or steam). Axial-type fans shall be controlled by thermostatic switch. Provide control valve and balance valve/stream trap as required.	1. Carrier 2. Trane 3. Dunham Bush
		23 84 13	**Humidity Control Equipment**	Hydronic and Steam	Humidifiers shall be direct dry steam injection provided with a steam source from ISU central steam plant. Evaporative humidifiers are not acceptable. Electric steam humidifiers will only be considered for buildings without access to campus steam.	1. Armstrong 2. Dri-Steam 3. Condair
Division 25 - INTEGRATED AUTOMATION						
		25 00 00	**Integrated Automation**	General	This standard covers systems and components supplied by the controls contractor and are to be used for all new construction and renovations. See "Exhibit FS-23.3: Building Automation System Standards"	1. Schnieder Electric 2. Distech 3. Siemens
		25 13 16	**Panels**		See "Exhibit FS-23.3: Building Automation System Standards"	
		25 35 00	**Sensors and Transmitters**		See "Exhibit FS-23.3: Building Automation System Standards"	
		25 35 19	**Control Valves**		See "Exhibit FS-23.3: Building Automation Standards"	
		25 30 00	**Integrated Automation Instrumentation and Terminal Devices**	General	Actuators shall be electric versus pneumatic in all new installations.	1. Siemens 2. Belimo 3. Johnson Controls 4. Trane
		25 91 00	**Integrated Automation Control Sequences**	General	See "Exhibit FS-23.3: Building Automation System Standards"	
Division 26 - ELECTRICAL						
		26 00 00	**Electrical**	General	System designer/specifier shall pay particular attention to life cycle cost, energy efficiency, accessibility, and ease of maintenance, when designing and specifying electrical work.	
				Exterior Doors	All exterior door locations shall include conduit for future installation of electronic security system. Conduit should extend from exterior doors to nearest accessible ceiling. Use tracer wire above all direct buried non-metallic raceway to controller location.	
				Penetrations	Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier or smoke barrier shall be protected by a firestop system or device. Such a system shall be tested and approved in accordance with ASTM E 814, Standard Test Method for Fire Tests of Through Penetration Fire Stops, or ANSI /UL 1479, Standard for Fire Tests of Through-Penetration Firestops.	
				Panel Access	For equipment operating at 600 volts, nominal or less to ground, electrical panels must have a minimum of 3'-0" of clearance directly in front of the panel and a minimum clearance width of 2'-6" or the width of the equipment, whichever is greater.	
				GFCI Protection	GFCI protection shall be installed for 125-volt to 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to the ground. GFCI receptacles shall be placed in restrooms, garages, crawl spaces, basements, laundry rooms, and any area where a water source is present.	
		26 05 33	**Raceways and Boxes**	General	Threadless connectors and couplings shall not be used. Aluminum conduit of any kind shall not be used. Aluminum surface raceways shall not be used without written ISU FM approval. Armored Cable (AC) – “Core Clad” shall not be used.	

ISU	A/E	Section	Title	Heading	Description	Products
		26 05 43	**Duct Banks**	Duct Banks	Concrete, min. 5" pvc ducts w/ at least one spare, include pull strings. Min. 48" radius at bends.	
				Manholes	The minimum size is: 8' Long x 6' Wide x 7'. High Reinforcing bars shall be located on the opposite wall and one foot below the horizontal projection of the lowest duct for each ductbank entering the manhole. Pulling irons shall be located on the opposite wall and one foot below the horizontal projection of the lowest ductbank entering the manhole. The manhole shall have a concrete floor sloping toward an effective gravity drain located 18" up the side of a 30" deep sump. The sump must be 18" on a side and have a cast iron grate with 1/2" holes. There shall be no downhill ductbank building entrances without a manhole before the building to prevent flooding in the building.	
		26 10 00	**Medium-Voltage Distribution**	General	Conductors shall be annealed copper, 98% conductivity.	
					Minimum size conductor for general wiring shall be #12, stranded.	
					All building conductors #2 and larger shall be THW or THHN.	
					Conductors smaller than #2 shall be THHN.	
					XHHW shall be used in wet locations for all sizes.	
					Conductors for building feeder and branch circuits shall be insulated for 600 volts.	
					Conductors for signal circuits operating at less than 50 volts shall be insulated for 300 volts.	
		26 20 00	**Low-Voltage Electrical Power Conductors and Cables**	Splices	Wires #8 and smaller: Pre-insulated solderless connectors	1. Dossert 2. T&B 3. Burndy
					Wires #6 through #4/0: Compression or split bolt type connectors	1. Dossert 2. T&B 3. Burndy
					Wires larger than #4/0: Compression or split bolt type connectors with minimum 2 pressure points per conductor.	1. Dossert 2. T&B 3. Burndy
		26 20 00	**Service and Distribution**	General	Buildings with gross areas exceeding 40,000 square feet, or design loads exceeding 500 KW, shall be considered for dual secondary voltages (480/277, 208/120). The Consultant shall justify the selection and implementation of a dual system.	
		26 23 00	**Main Secondary Switchgear**		Switchgear shall be dead front, fully enclosed with front and rear accessibility provided.	1. General Electric 2. Square D 3. Siemens
		26 24 00	**Panels**	High Voltage Panels (480/277):	Any panel serving central or mainframe type computer loads, or UPS system(s) totaling over 50 KVA rating shall be fed with the neutral sized a minimum of 200% of the phase conductor ampacity.	
				Low Voltage Panels (208/120):	Any panel serving central or mainframe type computer loads, or UPS system(s) totaling over 50 KVA rating shall be fed with the neutral sized a minimum of 150% of the phase conductor ampacity.	
				Motor Circuits	All motors shall contain thermal trip units through controls for motor protection.	
				Panel Boards	Provide for approximately 40% spare spaces in every panelboard. All panelboards shall be three-phase, 4-wire.	1. General Electric 2. Square D 3. Cutler-Hammer
				Arc Flash Study	The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace. All documentation associated with this Study shall be provided to ISU EHS, ISU FM, and ISU FPDC. This Study is required for all new additions, buildings, and renovations that include new switchgear, new electrical panels, and/or new hazardous equipment.	
				Arc Flash	A/E shall have the contractor label the outside of each electrical panel with an arc flash code that the A/E determines. This code will inform maintenance what level of safety equipment should be worn when working on each panel.	

ISU	A/E	Section	Title	Heading	Description	Products
		26 27 13	**Metering**		Metering shall be on the secondary side of the building transformer bank. Metering shall consist of a voltmeter with phase selector switch, ammeter with phase selector switch, and KWH-demand meter. All meters shall be switchboard type, socket mount. Sockets shall have integral shorting bars for current transformer circuits to simplify meter removal for calibration. Meters shall be capable of being read remotely through connection to the existing Apogee building automation system.	BRAND ONLY Electrical sub-metering shall be done with Siemens Digital Energy Monitors (DEM) only.
		26 27 26	**Wiring Devices**	General	All devices, light switches, and convenience receptacles shall be specification grade and shall be 20 amp minimum. Confirm with ISU FPDC for electrical device color(s).	
				Occupancy Sensors	All offices, laboratories, conference rooms, copier rooms, classrooms, and restrooms, shall have occupancy sensors installed to reduce energy consumption during unoccupied times. Restrooms shall have sufficient sensors properly positioned for lights to remain on while restroom is occupied.	1. Sensor Switch 2. Hubbell 3. Infracon
		26 29 23	**Variable Frequency Drives**		Alarms and control signals must communicate on a two-wire Floor Level Network (FLN), or a LAN, with the existing Apogee/Johnson system to allow remote sensing and control from a central location. For air handlers with constant volume fans, a soft start unit may be provided in place of a VFD.	1. Toshiba 2. ABB 3. Yaskawa 4. Square D 5. Siemens
		26 33 53	**Un-Interrupted Power Supply**	Battery Back Up	ISU Technology Solutions/ION will install and provision all UPS units once it has been delivered to the location(s) and all electrical power has been installed and tested. All UPSs must come with a network card for remote access and monitoring.	BRANDS ONLY 1. Schneider Electric APC SMT2200RM2U 2. Schneider Electric APC SYH4K6RMT-P1 3. Vertiv GXT5.
		26 51 13	**Interior Lighting**	General	System designer/specifier shall pay particular attention to energy efficiency, accessibility, and ease of maintenance.	
					At least one lighting panel shall be provided per floor. All electric conduits shall originate on the same floor as room serviced.	
					All lighting shall be LED.	
		26 53 00	**Exit Signs**		Exit lighting shall be LED with red lettering.	
		26 56 00	**Exterior Lighting**	General	LED lamps only are acceptable. Pole-mounted lights shall be identified with black and yellow numbers at 8 feet above finished grade facing walk or roadway. Pole identification numbers will be provided by Facilities Management. Quazite J-Box shall be placed adjacent to pole. Size shall be 12" x 12", or larger.	
		26 56 16	**Vehicular Lighting Fixtures**		Fixtures - DSX1 LED, 60C, 1000, 50K Pole - 5" sq tube, 0.188 wall thickness, rated for 100mph wind	1. Lithonia 2. Hubbell 3. Cooper
		26 56 33	**Pedestrian Light Fixtures**		The traditional "Illinois State" fixture shall be used for areas of pedestrian traffic only. The fixtures are low (12-15'), and relatively close spacing (approximately 80') is required for safety, rhythm, and scale.	BRAND ONLY Pole: Sternberg 6600 Morristown, 10', FP4, Black Post Top: Sternberg A75LED Columbia, 5P-4L-40T5-MDL02-A Black
Division 27 - COMMUNICATIONS						
		27 05 53	**Identification of Systems**	Labeling	The University has adapted a unique labeling standard. Jack numbers for telephone/data combination outlets are derived from the position of the new telephone wire on the 66 blocks in the closet. Data only wiring requires an individual 'C#' label for each jack and wire. The data wire "C#'s must be provided by the ISU Technology Solutions/ION Structured Wiring division.	a. Bldg#-Room#-Floor#-Closet#-Jack#

ISU	A/E	Section	Title	Heading	Description	Products
		27 05 53	**Identification of Systems Continued**			b. Building # = The Universities official building number, usually three digits.
						c. Room # - Room number where outlet is installed.
						d. Floor # - Is the floor that the terminal closet is located on.
						e. Closet # - Designates which closet on the floor that the outlet is served from.
						f. Jack # - The individual outlet number used to identify the wire on both ends
		27 10 00	**Structured Cabling**	Telephone Risers	All copper telephone riser cables must be type ARRM 24 gauge, have industry standard color coding, have 25 pair groups in 100 pair bundles, and meet the specifications outlined by the NEC and the EIA/TIA. ISU Technology Solutions/ION uses the following formula to determine sizing of riser cables in administrative or academic buildings. Number of telephone outlets times two plus 30 percent. Each telephone outlet has one dedicated path back to the nearest NODE site. Installations that have been designated as "Voice Over IP" (VOIP) installations will only require a 25 pair riser cable per closet. Sizing the cable as described above will not be required.	THESE PRODUCTS ARE EXAMPLES OF THE EQUIPMENT AND DEVICES TO INCORPORATE INTO THE STRUCTURED CABLING SYSTEM. THE DESIGNER SHALL SUBMIT PRODUCT LITERATURE FOR APPROVAL.
				Data Risers	All data riser cables must be hybrid fiber optic cables. Each IDF closet will have a homerun 12/12 fiber optic riser cable to the BDF to serve the data electronics. The contractor will supply, place, terminate, and test the fiber optic riser cables. The contractor will supply and install 19" data racks (usually two) in the data closets.	1. Corning FDC-003 Combination distribution box for 24 fibers with splice trays. One per IDF. 2. Corning FDC-CM-12-58 12 strand single mode pigtail module. Two required per cable. 3. Corning 024X81-331XX-24 12MM/12SM hybrid fiber optic cable. Length (no splices) from the BDF to IDF determined by contractor. Homeruns from each IDF to BDF are required. 4. (24) Corning MM ST light guides, part# FDC-CP1P-15. 5. (4) Corning MM ST connectors, part# 95-100-01R.
				Penetrations	Seal all penetrations for sound separation and/or fire-rating. Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier or smoke barrier shall be protected by a firestop system or device. Such a system shall be tested and approved in accordance with ASTM E 814, Standard Test Method for Fire Tests of Through Penetration Fire Stops, or ANSI /UL 1479, Standard for Fire Tests of Through-Penetration Firestops.	
		27 11 13	**Data Entrance Cable**		The data entrance cable will consist of a continuous, unspliced, hybrid fiber bundle that is installed by the contractor from the building entrance termination point to a data switching center to be determined by ISU Technology Solutions/ION. This fiber bundle shall be contained in a black outer sheath and shall be a loose tube fiber design with a non-conductive center core.	1. Corning ALTOS Gel Free fiber hybrid bundle. 2. Exterior splice cases in manholes or tunnels must be stainless steel Preformed Line Products (PLP) brand. 3. Termination of the entrance cable at the BDF will be on 100 pair Emerson/Reliable brand RELTEC R366AA100D protectors.

ISU	A/E	Section	Title	Heading	Description	Products
		27 11 16	**Data Closets**	Closet Requirements	Traditional telephone service is powered remotely from the telephone switching center. VOIP telephone service is powered locally from the IDF/BDF closets. It is recommended that an EM generator be designed into new construction and major renovations plans so that telephone and data services are not lost during a power outage. In situations when a generator cannot be installed, sufficient power must be provided in the IDF/BDF closets to support UPS devices.	
				Closet Terminations	At the IDF/BDF or data cabinet all conductors of each station wire will be terminated. Telephone station wiring will be terminated on standard 66M1-50 split 50 mini 66 blocks. 89B-mounting brackets for each block are also required.	Product approval required.
				Closet Wiring		Product approval required.
		27 13 00	**Optical Fiber Backbone**	General	See notes on building entrance above. Buffer tube color and fiber color to be provided by ISU Technology Solutions/ION. THE CAMPUS IS CURRENTLY UTILIZING, BUT NOT LIMITED TO, THE PRODUCTS NOTED.	Multimode - Corning (FDC-CP1P-15) FDC panel-preloaded with 6 ST multimode adapters (CAI). Corning (95-100-01R) ST connectors UV, glass in ceramic, 125um, multimode 3.0mm jkt.
						Single mode – Building Entrance/Main Tel-Data Room. Corning (FDM12P12-3C-RH000) 12 port, single mode, LC Ultra PC connector module with 900um, single mode, 3-meter MIC pigtails contained in one sheath. Terminating 48SM will require eight (8) modules.
						Single mode – Riser Tel-Data Room(s): Corning (FDM12P12-3C-RH000) 12 port, single mode, SC Ultra PC connector module with 900um, single mode, 3-meter MIC pigtails contained in one sheath. Terminating 12SM will require two (2) modules Corning (2806031-01) fusion splice protection sleeve heat shrinks for splice tray. Corning (M67-048) 12 fiber splice tray TR/HSF. Will require one tray for each 12 strand tube of single mode optical fiber.
						FDC-72 Box - Corning (FDC-CMH-072) 72-F capacity FDC fiber distribution center. All fiber at the main tel/data entrance room will terminate in FDC-72 housings.
						FDC-003 Box - Corning (FDC-003) 24-F capacity FDC fiber combination box with splice trays. All fiber in the tel/data riser rooms will terminate in a FDC-003 housing.
						Splice Box - Corning (FDC-SMH-5) 24-tray capacity FDC fiber splice module housing. Required in the main entrance tel/data room only.

ISU	A/E	Section	Title	Heading	Description	Products
		27 15 01	**Horizontal Station Wiring**	Voice/Data Wiring, Network/VoIP Telephone/Wireless, and Battery Backup Equipment	The data station cable shall be: a blue, plenum rated, UL listed as Type CMP meeting NEC Section 800: The data cable must exceed Category 6 Performance and have guaranteed swept test parameters through 400Mz. Data cable must also guarantee the following: Guaranteed Min PSACR @ 250MHz 11.2dB; Guaranteed PSNEXT headroom of 7 dB over TIA 1-250MHz, guaranteed Min. of 41.10 dB at 350MHz; Guaranteed IL headroom of 2.2% over TIA 1-250MHz, and guaranteed Max. of 42.01 dB at 400MHz; Use of an X central member. All terminations must comply with manufacturer's specifications. Belden 3613 cat6 wire. Cat6 cable is attached and it is the 3613 D15U1000 Blue.	BRAND ONLY Belden
				UPS Battery Back Up	**See Section 26 33 53.** ISU Technology Solutions/ION will install and provision all UPS units once it has been delivered to the location(s) and all electrical power has been installed and tested.	
		27 15 43	**Station Jacks**		Station jacks and faceplates are to be provided by the contractor and installed in metal single or double gang outlet boxes. All outlet components are white colored.	BRAND ONLY Belden/CDT RevConnect Jack CAT6+ UTP white, T568 A/B and face plates RVUCOEW.
						Cat6 cable is attached and it is the 3613 D15U1000 Blue.
						If a patch pane is needed in the network closet then a COMMSCOPE (FORMERLY TE CONN) 6653 1 677-48, 48-PORT PANEL KRONE-MOD 8W8P T568A/B CAT6 IP5, C6T SILK SCREEN BLACK 2U is used. 2. Belden RevConnect 48-port patch panel, 2U Cat6+, loaded, black. 3. Belden RevConnect 24-port patch panel, 2U Cat6+, loaded, black. 4. 24/48-port patch panel 1/2 U 10GX, loaded, black.
		27 21 00	**Network Equipment**		ISU Technology Solutions/ION staff will install and provision all network equipment once it has been delivered and all wiring closet field termination work has been completed and tested.	BRAND ONLY Cisco Chassis
		27 21 33	**Wireless Equipment**	Equipment	ISU Technology Solutions/ION staff will install and provision all wireless equipment once it has been delivered and all wiring closet field termination work has been completed and tested. AP 500 series 600 series.	BRAND ONLY Aruba Networks Wireless Equipment
		27 31 23	**VoIP Telephone Equipment**		ISU Technology Solutions/ION staff will supply, install, and provision all VoIP telephone equipment after all wiring closet field termination work has been completed and tested. Cisco Systems shall be 7811 for classrooms, 7841 for desktops, 8841 for desktops, 8851 for contact center, and Polycom 7000 for conference phones.	BRAND ONLY Cisco Unified Communications Systems
		27 35 20	**Emergency Telephone**	Telephone Kiosk	Telephone kiosk with bronze finish. 84"H x 16 ½" dia. Lighted "EMERGENCY" panel to be included. Panel to be blue with white letters. Will be supplied by ISU and installed by contractor.	BRAND ONLY 1. Kiosk - Industries Jaro, Inc., Model J070 2. Emergency Telephone - GAI-Tronics Model 293 AL-001 3. Strobe - GAI-Tronics Model 530FB
		27 40 00	**Audio-Video Communications**	General	Coordinate with ISU Learning Spaces and Audio/Visual Technologies (ISU LSAVT) for complete requirements.	

ISU	A/E	Section	Title	Heading	Description	Products
		27 40 00	**Audio-Video Communications Continued**	Room Design Considerations	Adequate space must be provided in the room floor plan for the instructor and the Instructor Station. Student seating must be a minimum distance of 1.5 times the video screen height. Student seating must be within 90 degrees horizontal of the center of the nearest display. Standard classroom designs should consider: 1. Dedicated room PC with Zoom capability 2. Bring Your Own Device capability to accommodate user devices 3. Wireless presentation capability to accommodate sharing by students 4. Document Camera to allow presentation of non-digital source material.	
		27 41 00	**Audio-Video Infrastructure**	Raceways and Boxes	A minimum conduit size of 3/4" I.D. must be used for all audio-video low voltage cabling. Prefer concealed applications, if surface mounted conduit is unavoidable, it must be Wiremold 700. Where 1" I.D. conduit is required, surface mount conduit shall be Wiremold 2400. Provide pull strings.	
				Cabling	ISU LSAVT shall supply and install cabling from Instructor Electrical Enclosure to Instructor Station/Cart. Electrical Contractor shall supply and install the infrastructure and cabling within the infrastructure. Category cabling connecting to the ISU network shall be CAT6. Category cabling transmitting video shall be shielded CAT6A. Category cabling extending USB shall be shielded CAT6A. Speaker wire for 70 volt systems shall be 18AWG/2. Speaker wire for low impedance systems shall meet individual system requirements, with a size no smaller that 18AWG/2. Audio signal cabling shall be 22AWG/1 pair shielded. Serial control cabling shall be 22AWG/1 pair shielded.	
				Instructor Station and Electrical Enclosure	ISU LSAVT shall supply and install instructor stations/carts. Alternative instructor stations require written approved by ISU LSAVT. Electrical Contractor shall supply & install 16"h x 12"w x 8"d Instructor Electrical Enclosure within 8'-0" of instructor location. Electrical Enclosure will be wall mounted with the top edge 36" AFF. Electrical Enclosure will have a solid door and be secured with a CAT102 key. Unless indicated otherwise, electrical enclosure will contain: 1. 120VAC, 15-20A duplex. 2. Multi-gang data outlet box with 1" or equivalent path to above ceiling tiles. If ceiling tiles are not utilized, full conduit paths of 3/4" will be run to specified equipment locations. Box size will vary based on system design. Provide pull strings. 3. (4) network ports. 4. 1.5" hole in bottom of box with edge protection for low voltage cabling to instructor cart. 5. 3/8" eyebolt inside enclosure to secure low voltage cabling to instructor cart.	
				Wall Mounted Displays	ISU LSAVT shall supply and install the wall mounted displays/monitors. Contractor shall install blocking and ISU LSAVT supplied mounting bracket/hardware. Each display location requires (supplied and installed by Electrical Contractor): 1. (1) 120VAC 15A duplex in a position that will be hidden by the mounted display but that will not impede with the mounting of the display. 2. (1) low voltage electrical box in a position that will be hidden by the mounted display but that will not impede with the mounting of the display. This box will have a conduit stubbed out above ceiling if a path to the Instructor Electrical Enclosure is available. Otherwise this box will require a conduit path with pull strings to the Instructor Electrical Enclosure.	
				Ceiling Mounted Projectors	ISU LSAVT shall supply projectors. Contractor shall install the supports, mounts, and infrastructure (power, conduit, cabling, etc.). Projector mounts must be attached to building structure and braced securely against swaying. Each projector location requires: 1. (1) 120VAC 15A duplex within 2' of the projector mount. 2. (1) single gang low voltage electrical box with conduit to the Instructor Electrical Enclosure if no above ceiling path is available. Individual system designs may require ISU network ports adjacent to the low voltage electrical box.	
				Projection Screens	Contractor shall supply and install projection screens including all infrastructure unless project requires ISU LSAVT to supply the projection screen and mount only. All installations by the contractor. Blocking must be installed in locations where a projection screen will be attached to a wall. Ceiling mounted screens must be attached to building structure and braced securely against swaying.	

ISU	A/E	Section	Title	Heading	Description	Products
		27 41 00	**Audio-Video Infrastructure Continued**	Equipment Racks	ISU LSAVT shall supply and install equipment racks. Electrical Contractor shall install infrastructure (blocking, conduit, boxes, CAT6, etc.). If the system design requires an equipment rack in addition to the Instructor Station, the equipment rack will require: 1. If the rack is to be attached to a wall, blocking will be required and the equipment rack will be installed by ISU FM. 2. Minimum of (1) 120VAC 15A duplex based on system requirements. 3. Multi-gang data outlet box with minimum 1" or equivalent path to above ceiling tiles. If ceiling tiles are not utilized, a conduit path of minimum 1" or equivalent will be run to the Instructor Electrical Enclosure. Provide pull strings.	
				A/V Cameras	ISU LSAVT shall supply and install cameras. Electrical Contractor shall install infrastructure (blocking, conduit, boxes, CAT6, etc.) If not located at a wall mounted display location, each camera location requires: 1. (1) 120VAC 15A duplex 2. (1) single gang low voltage electrical box with conduit to the Instructor Electrical Enclosure if no above ceiling path is available. Otherwise the conduit may stub out above ceiling. 3. (1) ISU network jack Line items #2 and #3 can share low voltage electrical box if approved by ISU FM.	
				Audio-Video Over IP (AVoIP)	ISU LSAVT supplied and installed. Any design utilizing AVoIP must be approved by ISU LSAVT and ISU AT Networking.	
		27 41 16	**Audio-Video Equipment**		Coordinate with ISU LSAVT for complete requirements.	
Division 28 - ELECTRONIC SAFETY AND SECURITY						
		28 20 00	**Video Surveillance**	Public Safety Cameras	Meet & coordinate with ISU Chief of Police, Emergency Management Director, and ISU FPDC. Provide testing and confirmation of intended functionality.	BRAND ONLY Axis
		28 31 00	**Fire Alarm System**		24 Volt DC closed circuit. All systems shall be non-coded type. Wired as a Class "A' system throughout, including initiating and audible alarm circuit, except as noted. Manufacturer shall state maximum external load and circuit resistance for each system for battery back-up operation. Provide with project submittals. The integrated fire alarm system shall be UL listed.	BRAND ONLY 1. Siemens (UHS & EMDH only) 2. Simplex (GR & all remaining buildings)
					The fire alarm system shall shut down the building supply and return fans directly.	
					Provide a single white strobe (no horn) device on the exterior. Preferred location is in the direct vicinity of the Fire Dept. Connection.	
				Programming of Fire Alarm System	Coordinate with ISU FM Electrical Foreman for requirements.	
				Fire Alarm Duct Detector	Electrical Contractor shall supply for Ventilation Contractor to install.	BRAND ONLY Simplex
				Backup Networking	Fire Alarm Systems must communicate with the Siemens Desigo Building Automation front end system on campus.	BRAND ONLY Siemens Desigo Interface
		28 31 11	**Fire Alarm Network**		The Fire Alarm Network is a fiber network that all fire alarm systems report to. It is a Simplex product. The majority of fire alarm panels on campus are Simplex. There are two “servers” one is located in the ISU electric shop 102 PPS; the other is located in NSB. ISU Police Department has a display for notification to the ISU police. ISU Heating Plant has the software on the machine in the water test room. The University is currently running the Simplex network and the Apogee fire alarm reporting in parallel. For all projects, fire alarm cable shall be run in conduit.	BRAND ONLY 1. Siemens (UHS & EMDH only) 2. Simplex (GR & all remaining buildings)
		28 31 23	**Fire Alarm Control Panel**		Dead front construction with lockable door and a minimum of 2 keys. Modular design. Provisions for 20% expansions.	
		28 31 46	**Automatic Smoke Detectors**		Provide combination smoke/heat detectors. Photoelectric, solid state type with 360-degree smoke entry and sensitive to both black and gray smoke.	
		28 31 63	**Audible Signal Appliance**		All audible devices shall be speakers	

ISU	A/E	Section	Title	Heading	Description	Products
Division 32 - EXTERIOR IMPROVEMENTS						
		32 12 16	**Asphalt Paving**	New Asphalt	Bituminous surface shall be laid on an 8" aggregate compacted base. New surfaces shall consist of a 2" base course and a 2" finish course for a total minimum of 4" of asphaltic concrete. Mill and overlays shall consist of a 2" finish course, minimum. Overlay will be done only after appropriate patching and subsurface repair has occurred. Surface parking areas shall be designed to allow for the drainage of rainwater.	
				Asphalt Resurfacing	Mill and overlays shall consist of a 2" finish course. Overlay will be done only after appropriate patching and subsurface repair has occurred.	
				Asphalt Testing	Field testing shall include field density in accordance with ASTM D 1559, thickness of new asphalt concrete in accordance with ASTM D 3549, asphalt content in accordance with ASTM D 2172, and/or aggregate gradation in accordance with ASTM C 136 and ASTM C 117.	
		32 11 00	**Aggregate Base Course**		Conform to current State of Illinois Department of Transportation Construction and Material Specifications for Polymer Modified Asphalt. For asphalt parking lots, virgin aggregate is to be used – NO RAP or RAS.	
		32 11 13	**Bituminous Surface Course**		Conform to current State of Illinois Department of Transportation Construction and Material Specifications for Polymer Modified Asphalt. Asphalt (bituminous) binders shall include asphalt emulsion Type SS-1 tack coat, class A crushed limestone course aggregate, and natural sand or stone sand fine aggregate. Slag and/or recycled asphalt products are prohibited for use in either the binder course or surface course. Polymer for hot asphalt concrete shall be Type PG-70-22-SBS.	
		32 11 26	**Bituminous Binder Course**		Conform to current State of Illinois Department of Transportation Construction and Material Specifications for Polymer Modified Asphalt.	
		32 16 23	**Concrete Sidewalks**	General	Sidewalks shall be built of 4,000 psi fiber mesh reinforced concrete. Maximum size of course aggregate shall be 1 1/2 inch. Concrete shall have a slump of between 1 1/2 and 4 inches. The concrete mixtures shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer of five to seven percent. Air content shall be determined in accordance with ASTM C 231. Compounds containing calcium chloride shall not be used. Sidewalks shall be six inches thick and reinforced with fiber mesh at all locations. See Division 3 - Concrete for additional requirements.	
				Sidewalk Pattern	Sidewalks shall have a broomed surface and square interval joints.	
				Joints	See Division 7 - Thermal and Moisture Protection, Sealants for requirements.	
		32 17 13	**Parking Bumpers**	Blocks	Where installed, provide concrete blockes with stake pockets and slots on the underside.	
		32 17 23	**Pavement Markings**	Colors	Standard parking stalls shall be striped in white paint regardless of surface type. ADA parking stalls shall be striped in yellow paint. For asphalt parking lots, provide (2) two coats of a water based acrylic based paint. For concrete parking lots, provide (2) two coats of a solvent base 100% acrylic paint.	
		32 17 26	**Tactile Warning Surfacing**		Exterior detectable warning tiles and mats with truncated domes shall be cast-iron and meet ADA requirements.	
		32 33 13	**Bicycle Racks**		Sturdy and well anchored. "Inverted U" bike rack design located in bike corrals.	
		32 33 43	**Landscape Forms**	Site Seating		1. Presidio 2. Plexus 3. Carousel

ISU	A/E	Section	Title	Heading	Description	Products
		32 91 19	**Topsoil**		Imported Topsoil shall be natural, fertile, agricultural soil typical of locality, capable of sustaining vigorous plant growth from well drained site free of flooding, not in frozen or muddy condition, not less than six percent organic matter and PH value between 5.4 and 7.0. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, coughgrass, noxious weeds and foreign matter. Use topsoil excavated from site only when it conforms to these specifications. Provide a Combination 3-1-2 fertilizer at 3# nitrogen/1000sf for areas to be sodded and a Combination 2-3-2 fertilizer at 5# nitrogen/1000 sf for areas to be seeded.	
		32 92 16	**Seed**		Contractor shall apply 15 lbs. per 1,000 square feet evenly in two intersecting directions by using a rotary or drop type spreader. Preferred blend is 33% creeping red fescue, 33% of 2 types of perennial ryegrass (Revenge, GLX, and Apple SGL), 33% of 4 types of kentucky bluegrass (BlueChip, NuBlue Plus, and Ashland).	
		32 92 23	**Sod**		Sod shall be 100% blend of improved Kentucky bluegrass varieties.	
		32 93 00	**Exterior Plants**		See "Exhibit DG-3: Landscape Design Guidelines."	
Division 33 - UTILITIES						
		33 05 26	**Utility Identification**	Tracer Wire	Tracer wire shall be used above all direct buried ductile iron piping and all non-metallic piping.	
		33 12 33	**Water Meter**		Water meters are required on building entrance service. Meter shall conform to Town of Normal requirements. Consult Facilities Management for remote readout requirements.	Neptune T10 with E2 remote reading head (to be provided by Illinois State University)
		33 71 00	**High Voltage Distribution**	General	System designer/specifier shall pay particular attention to life cycle cost, energy efficiency, accessibility, and ease of maintenance.	
				4.16 KV System and 13.8 KV System	Single copper conductor, class B, insulated, metallic/non-metallic shield, 80m black PVC jacket	
				Primary Substation Switchgear - 4.16KV	Switchgear located at the substation for radial feeders shall be pad mounted switches and shall be listed for outdoor use. Minimum ratings shall be 60,000 amps rms symmetrical short circuit current and 270 Short Circuit MVA, three phase symmetrical at rated nominal voltage.	BRAND ONLY S&C
					Switchgear access doors shall have an integral keyed lock in addition to a safety interlock. The safety interlock shall prevent opening access doors with the switch in the closed position, and closing the switch if the door is open. The interlock shall be proof against defeat.	
					Each switchgear cubicle shall be provided with watt hour-demand metering. The primary switchgear shall include phased potential transformers (including spare fuses), current transformers, voltmeters, and selector switch, ammeters, and selector switch, and kilowatt meter. Watt hour-demand meters shall be a switchboard type with socket mount. The socket mount shall have integral shorting bars for the current transformers to simplify meter removal for calibration. Watt hour meters shall have provision for pulse output, capable of communicating over a two-wire FLN link to ISU's Apogee system.	
				Unit Substation (Building) Switchgear & Transformers - 4.16 KV or 13.8 KV	Switchgear for unit substations feeders shall be pad mounted. Minimum ratings shall be 40,000 amps rms symmetrical short circuit current and 180 Short Circuit MVA, three phase symmetrical at rated nominal voltage.	BRAND ONLY S&C "Vista"
					Switchgear access doors shall have an integral keyed lock in addition to a safety interlock. The safety interlock shall prevent opening access doors with the switch in the closed position, and closing the switch if the door is open. The interlock shall be proof against defeat.	
					Automatic transfer between 4.16 KV feeders on double ended systems will not be considered. Automatic transfer in the event of a building feeder loss shall take place on the low voltage side of the building transformers.	

ISU	A/E	Section	Title	Heading	Description	Products
		33 73 00	**Unit Substation Transformers**		Indoor transformer vaults must be accessible from both inside and outside of the building. The outside entrance must be large enough to allow installation and removal of the primary switchgear, transformer, and secondary switchgear without component disassembly. No PCB contaminated (50 ppm or greater) transformers will be allowed. Transformers shall have manual tap changes, interlocked with supplying switchgear to prevent energized tap changes. Taps shall be two at 2.5% above nominal voltage, and two at 2.5% below nominal voltage. Transformers shall retain their nominal KVA ratings at all tap settings. Outdoor transformers shall be oil filled type. No indoor transformers shall contain fluid. All transformers shall be protected with surge arrestors.	
		33 75 36	**Primary Overcurrent Protection**		A separate, fused primary interrupter switch shall be used with larger transformers. A complete set of spare fuses shall be supplied.	BRAND ONLY S&C "Vista"
		33 77 00	**Pad Mounted Transformers**		Concrete pads shall be designed with a pit under the primary cable compartment to provide a minimum of 36" of exposed cable under the primary bushing.	
		33 79 19	**Grounding**		A continuous grounding system shall be provided for grounding of primary cable shields, switchgear and transformer frames and transformer secondary neutrals. The grounding system shall consist of a grid embedded in the vault floor. A bare 4/0 copper grounding conductor shall run around the perimeter of the vault, at six inches above the floor, and shall be connected to the ground grid at not less than eight foot intervals.	
		33 81 26	**Manholes**		Manholes shall have round lids. Above grade utility tunnel access shall have fixed-hinged lids. All access shall be designed so that the lids cannot fall through.	

Referenced Documents:

1. *Illinois State University Design Guidelines*
2. "Exhibit DG-1: Agreement for Services"
3. "Exhibit DG-2: Professional Services Agreement"
4. "Exhibit DG-3: Landscape Design Guidelines"
5. "Exhibit DG-4: Room Numbering Guidelines"
6. "Exhibit DG-5: Safety Guidelines"
7. "Exhibit FS-8.1: Electronic Access Guidelines"
8. "Exhibit FS-9.1: Paint Colors"
9. "Exhibit FS-10.1: Sign Standards"
10. "Exhibit FS-23.1: Mechanical Insulation Schedule"
11. "Exhibit FS-23.2: Mechanical Details"
12. "Exhibit FS-23.3: Building Automation System Standards"