SECTION 116623 - GYMNASIUM EQUIPMENT

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Basketball equipment.

Volleyball equipment.

Badminton equipment.

Exercise equipment.

Safety pads.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

If floor-insert sleeves are cast in concrete, retain applicable option in first subparagraph below. If floor-insert sleeves are grouted in place, retain "oversized recessed voids" option.

Section 033000 "Cast-in-Place Concrete" for **[installation of floor-insert sleeves] [oversized recessed voids]** to be cast in concrete slabs and footings.

Section 096466 "Wood Athletic Flooring" for game lines and markers.

Section 096566 "Resilient Athletic Flooring" for game lines and markers.

Section 096766 "Fluid-Applied Athletic Flooring" for game lines and markers.

Section 116653 "Gymnasium Dividers" for gymnasium divider curtain systems.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. BWF: Badminton World Federation.
				2. FIBA: Federation Internationale de Basketball (The International Basketball Federation).
				3. FIVB: Federation Internationale de Volleyball (The International Volleyball Federation).
				4. NBA: National Basketball Association.
				5. NCAA: The National Collegiate Athletic Association.
				6. NFHS: National Federation of State High School Associations.
				7. WNBA: Women's National Basketball Association.
			1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.
			1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include assembly, disassembly, and storage instructions for removable equipment.

Retain "Motors" subparagraph below for electric operation.

Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.

* + - * 1. Sustainable Design Submittals:

"Product Data" subparagraph below applies to LEED 2009 NC, CI, and CS Credit IEQ 4.4.

Product Data: For composite wood products, indicating that product contains no urea formaldehyde.

"Laboratory Test Reports" subparagraph below applies to LEED 2009 for Schools.

Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

* + - * 1. Shop Drawings: For gymnasium equipment.

Include plans, elevations, sections, and attachment details.

Include details of field assembly for removable equipment, connections, installation, mountings, floor inserts, and operational clearances.

Include transport and storage accessories for removable equipment.

Include diagrams for power, signal, and control wiring.

Retain "Samples" paragraph below for single-stage Samples, with a subordinate list if applicable. Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs for two-stage Samples.

* + - * 1. Samples for Initial Selection: For each type of gymnasium equipment.
				2. Samples for Verification: For the following products:

Basketball Net: Full size.

**[Volleyball] [Badminton]** Net: Minimum 12-inch length by full height, including one edge and net accessories.

**[Volleyball] [Badminton]** Floor Insert: Full-size unit.

**[Volleyball] [Badminton]** Post Standard: Full-size unit**[ with net tensioner]**.

Pad Fabric: Wall padding minimum 3 inches square, with specified treatments applied. Mark face of material.

* + - 1. INFORMATIONAL SUBMITTALS

Retain "Coordination Drawings" paragraph below for situations where limited space necessitates maximum utilization for efficient installation of different components or if coordination is required for installation of products and materials by separate installers. Coordinate paragraph with other Sections specifying products listed below. Preparation of coordination drawings requires the participation of each trade involved in installations within the limited space.

* + - * 1. Coordination Drawings: Court layout plans, reflected ceiling plans, and other details, drawn to scale, and coordinated with ceiling-suspended gymnasium equipment, floor inserts, game lines, and markers applied to finished flooring, and coordinated with each other, using input from installers of the items involved:

Structural members to which overhead-supported gymnasium equipment will be attached.

Suspended ceiling components, if any.

Items supported from building structure above the courts, including the following:

Luminaires.

Air outlets and inlets.

Speakers.

Sprinklers.

Smoke detectors.

Acoustical treatments or panels.

Access panels.

**<Insert item>**.

Retain "Setting Drawings" paragraph below if required for items cast in concrete; revise to suit Project.

* + - * 1. Setting Drawings: For embedded items and cutouts required in other work.
				2. Qualification Data: For Installer.

Retain "Product Certificates" paragraph below to require submittal of product certificates from manufacturers.

* + - * 1. Product Certificates: For each type of gymnasium equipment.

Retain "Field quality-control reports" paragraph below if Contractor is responsible for field quality-control testing and inspecting.

* + - * 1. Field quality-control reports.
				2. Sample Warranty: For special warranty.
			1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For gymnasium equipment to include in operation and maintenance manuals.
			2. QUALITY ASSURANCE

Consider retaining "Installer Qualifications" paragraph below for extensive, complex installations; for custom-engineered equipment; for electrical operation of equipment; and for installations requiring floor inserts. If retaining either option, verify availability with manufacturers.

* + - * 1. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
			1. FIELD CONDITIONS
				1. Field Measurements: Verify position and elevation of floor inserts and layout for gymnasium equipment.
			2. WARRANTY

Available warranties vary with manufacturer, equipment type, and component; insert additional subparagraphs for warranties and periods to suit Project.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of gymnasium equipment that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Basketball backboard failures, including glass breakage.

Faulty operation of basketball backstops.

Verify available warranties and warranty periods for units and components.

Warranty Period: Five years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. PERFORMANCE REQUIREMENTS

Retain this article if seismic design of basketball backstops and anchors is required for Project. Revise to indicate specific loads determined by Project's structural engineer, or refer to loads indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings and components subject to earthquake motions. Coordinate requirements with Project's structural engineer.

* + - * 1. Seismic Performance: Basketball backstops and anchors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
				2. Revise articles below to suit Project. These include paragraphs that are examples of gymnasium equipment and are not intended to be all inclusive. Indicate individual equipment or assembled system dimensions and elevations on Drawings. Use these example paragraphs as guides for developing paragraphs for other types of gymnasium equipment.
			1. BASKETBALL EQUIPMENT
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AALCO Manufacturing.

Jaypro Sports, LLC.

Porter Athletic Equipment Company.

Approved equivalent.

* + - * 1. Source Limitations: Obtain from single source from single manufacturer.
				2. Protruding fasteners or exposed bolt heads on front face of backboards are not permitted.
				3. Connections: Manufacturer's standard connections or connections recommended in writing by manufacturer.

Retain one of or both "Overhead-Supported(, Wall-Braced) Backstops" and "Wall-Mounted Backstops" paragraphs below; revise to suit Project. If required, revise paragraph title to indicate whether backstop is for main-court or cross-court backboard.

* + - * 1. Overhead-Supported**[, Wall-Braced]** Backstops:

Retain one of or both "Stationary Type" and "Folding Type" subparagraphs below, and indicate locations on Drawings. Overhead-supported, wall-braced backstops are stationary type; overhead-supported backstops may be stationary or folding type.

Stationary Type: Manufacturer's standard assembly.

Folding Type: Manufacturer's standard assembly for **[forward-folding, front-braced] [forward-folding, rear-braced] [backward-folding] [side-folding]** backstop, with hardware and fittings to permit folding.

Framing: Steel pipe, tubing, and shapes designed to minimize vibration during play.

Retain "Center-Mast Frame" or "Dual-Mast Frame" subparagraph below. Welded frames are more rigid and generally preferred; welded and bolted frames may be required for long-span systems supported by high ceiling/roof structure.

Center-Mast Frame: **[Welded] [Welded and bolted or clamped]** with side sway bracing.

Dual-Mast Frame: **[Welded] [Welded and bolted or clamped]** with cross bracing.

Finish: Manufacturer's standard **[primer for field finishing] [polyester powder-coat finish]**.

Consider retaining "Goal Height Adjuster" subparagraph below for locations, such as elementary schools. If electrically operated unit has other type of control, insert requirements.

Goal Height Adjuster: Adjustable from 8 to 10 feet to top of ring with gear-drive mechanism, locking in any position within adjustment range, with visible height scale attached to side of framing.

Operation:

Retain one of two subparagraphs below.

Manual operation with detachable crank handle.

Electrical: Electric operation with integral gear-drive motor, with limit switches preset to goal heights and the following:

Retain control options in subparagraphs below to suit Project.

Key switch control.

One detachable electric control device(s).

Wireless remote control.

* + - * 1. Wall-Mounted Backstops: Complete assembly extending from wall, including support framing to building structure, bracing, cables, support chains, pulleys, fittings, hardware, pipe anchors, equipment pads, and fasteners.

Retain "Stationary Type" or "Folding Type" subparagraph below.

Stationary Type: Manufacturer's standard assembly for stationary backstop.

Folding Type: Manufacturer's standard assembly for **[upward] [side]**-folding backstop.

Framing: Steel pipe, tubing, and shapes designed to minimize vibration during play.

Finish: Manufacturer's standard polyester powder-coat finish.

Extension: **[6 inches] [12 inches] [18 inches] [24 to 48 inches] [48 to 120 inches] [As indicated on Drawings]**.

Consider retaining "Goal Height Adjuster" subparagraph below for locations, such as elementary schools. If electrically operated unit has other type of control, insert requirements.

Goal Height Adjuster: Adjustable from 8 to 10 feet to top of ring with gear-drive mechanism, locking in any position within adjustment range, with visible height scale attached to side of framing.

Operation:

Retain "Manual" or "Electrical" subparagraph below.

Manual: Manual operation with detachable crank handle.

Electrical: Electric operation with integral gear-drive motor, with limit switches preset to goal heights, and **[one] <Insert number>** detachable electric control device(s).

Retain "Backstop Safety Device" paragraph below for wall-mounted and overhead-supported folding backstops relying on cable and chain support. Safety devices are commonly used for backstops over bleacher areas.

* + - * 1. Backstop Safety Device: Designed to limit free fall if support cable, chains, pulleys, fittings, winch, or related components fail; with mechanical automatic reset; 6000-lb load capacity; one per folding backstop.

Retain "Retractor Device" subparagraph below for forward-folding, rear-braced backstops.

Retractor Device: Manufacturer's standard device designed to retract both support and safety cables, chains, and straps away from play of the basketball when backstop is in playing position; one per folding backstop.

Retain "Winch" paragraph below for folding backstop; delete for electric operator or for stationary backstops.

* + - * 1. Winch: Hoist consisting of heavy-duty, fully enclosed worm-gear; brake; cable drum; cable; and fittings, for mounting on **[wall with equipment-mounting board]**; designed to move and hold backboard in any raised or lowered position.

Retain one of or both "Operation" and "Portable Winch Operator" subparagraphs below for manual operator. Delete both if backstop electric operator does not require a manual operator. Retain second subparagraph if both crank and portable electrical devices are required.

Operation: Manual winch with detachable hand crank.

Portable Winch Operator: One portable electric motor-drive device(s), including adaptor to fit crank mechanism.

Retain "Backstop Electric Operator" paragraph below if electric operation is required for lifting or retracting and lowering backstop.

* + - * 1. Backstop Electric Operator: Provide operating machine of size and capacity recommended in writing by manufacturer for equipment specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, and remote controls. Coordinate wiring requirements and electrical characteristics with building electrical system.

Electrical Components, Devices, and Accessories: Listed and labeled according to NFPA 70, by a qualified testing agency, and marked for intended location and application.

Operator Type: Cable drum with grooved drum and cable tension device to automatically take up cable slack and retain cable in grooves.

Operator Mounting: On wall with equipment-mounting board.

Retain "Motor Electrical Characteristics" subparagraph below if characteristics are not indicated on Drawings; revise to suit Project.

Motor Electrical Characteristics:

Horsepower: **[1/2] [3/4] [1]** hp.

Voltage: 115 V ac, single phase, 60 hertz.

Revise "Remote-Control Station(s)" subparagraph below if a toggle-type switch is required. Insert requirements for multiple control stations if required.

Remote-Control Station(s): NEMA ICS 6, Type 1 enclosure for **[surface] [recessed or flush]** mounting and momentary-contact, three-position, switch-operated control with up, down, and off functions.

Group Key Switch Control Stations: One switch per **[each backstop] [two backstops]**.

Keys: Provide **[one key] [two keys] [one set of dual keys] [two sets of dual keys] [dual keys, one key for up and one for down]** per station.

Switches, Ganged: Single faceplate with multiple switch cutouts **[for two switches operating four backstops] [for three switches operating six backstops] [for four switches operating eight backstops] [for five switches operating 10 backstops] [for six switches operating 12 backstops] [as indicated on Drawings]**.

Retain "Control Station Enclosure" subparagraph below for a secure enclosure for control station.

Control Station Enclosure: Provide prime-painted metal enclosure with **[integrally formed padlock hasps] [key access, with two sets of keys per enclosure]**.

Retain "Radio Controls" subparagraph below if required.

Radio Controls: One per backstop winch and two portable multiple-channel transmitters for operating **[two] [four] [up to nine]** backstops individually with up and down functions.

Limit Switches: Adjustable switches at each backstop, interlocked with motor controls and set to automatically stop backstop at fully retracted and fully lowered positions.

* + - * 1. Basketball Backboards:

Shape and Size:

Retain first option in "Rectangular" subparagraph below for size recommended by the NCAA, NBA, and WNBA for new installations. 48-inch-high backboards may be used if replacement backboard must match other equipment. Also, retain first option below for the FIBA that is within the range allowed by the FIBA.

Rectangular, **[72 by 42 inches] [72 by 48 inches]** width by height.

Retain first subparagraph below only for recreational (noncompetition) play.

Fan-shaped, 54-inch maximum width by [35-inch] [39-inch] maximum height.

Backboard Material: Provide with predrilled holes or preset inserts for mounting goals, and as follows:

Retain "Fiberglass," "Glass," "Steel," or "Hardwood or Particleboard" subparagraph below; revise to suit Project. Insert another subparagraph to further describe backboard.

Fiberglass: Minimum 1-1/2-inch- thick, composite backboard consisting of minimum two 3/16-inch- thick, molded-fiberglass panels laminated together over faces and edges encapsulating a 3/4-inch honeycomb core, reinforced at goal and backboard mountings, or a wood panel product core; with threaded inserts or embedded anchors for mounting backboard corners to support framing at standard mounting centers.

Do not use glass in correctional facilities.

Glass: Minimum 1/2-inch- thick, transparent tempered glass according to ASTM C1048 Kind FT (fully tempered) and with impact-testing requirements in 16 CFR 1201 Category II or ANSI Z97.1 Class A for safety glazing. Provide glass and framing system manufactured according to FIBA Level 1 or Level 2 requirement that glass does not split off if broken.

Frame: Provide glass with impact-absorbing resilient rubber or PVC gasket around perimeter in a fully welded, brushed-natural-finish, extruded-aluminum frame, with steel subframe, reinforcement, bracing, and mounting slots for mounting backboard frame to backstop.

Retain "Standard Mount" or "Direct Mount" subparagraph below. Consult manufacturers for recommendations, and coordinate subparagraph retained with backboard design; delete both subparagraphs if this is Contractor's option. Typically, glass backboards suited for center-mast mounting are designed for universal mounting, so they can comply with both mounting conditions.

Standard Mount: Provide steel corner reinforcement with mounting slots for mounting backboard frame to backstop at standard mounting centers.**[ Provide center-strut frame reinforcement.]**

Direct Mount: Designed for mounting backboard frame to center mast of backstop, to maximize stress relief on backboard frame and glass.

Consider retaining "Rim-Restraining Device" subparagraph below; revise to suit Project. Rim-restraining devices prevent goals from falling if glass breaks in glass backboards, and they are required by the NCAA and the NFHS. Rim-restraining devices are not needed for designs that mount directly and independently to center mast of backstop. Consult manufacturers for recommendations.

Rim-Restraining Device: According to NCAA and NFHS rules and designed to ensure that basket remains attached if glass backboard breaks.

Steel: Single-piece, steel face sheet, minimum 0.1046-inch nominal thickness, with 1-1/2-inch- deep, roll-edged perimeter flange and with steel-reinforced, welded frame welded to back side of backboard; with mounting slots for mounting backboard frame to backstop at standard mounting centers.

Hardwood or Particleboard: Minimum 1-1/2-inch- thick backboard consisting of minimum 1/32-inch- thick, phenolic-resin-impregnated cellulose and paper laminate over front and back sides of 1-1/2-inch hardwood or particleboard core; with painted edges and corners and with threaded inserts or slotted brackets for mounting backboard corners to backstop at standard mounting centers.

Retain first "Target Area and Border Markings" subparagraph below for tempered glass backboard.

Target Area and Border Markings: Permanently etched in white color, marked in manufacturer's standard pattern and stripe width.

Retain "Target Area and Border Markings" subparagraph below for opaque backboards. Third option below is for international play.

Target Area and Border Markings: Marked in orange, with manufacturer's standard pattern and stripe width.

Retain "Finish" subparagraph below for opaque backboard.

Finish: Manufacturer's standard factory-applied, white background.

* + - * 1. Goal-Mounting Assembly: Compatible with goal, backboard, and backstop; with manufacturer's standard hole pattern for goal attachment.

Retain "Glass Backboard Goal-Mounting Assembly" or "Direct Mount" subparagraph below; revise to suit Project.

Glass Backboard Goal-Mounting Assembly: Goal support framing and reinforcement designed to transmit load from goal to backstop and to minimize stresses on glass backboard.

Direct Mount: Designed for mounting goal directly and independently to center mast of backstop, so that no force is transmitted by ring directly to backboard, and rigidity and stability of goal are maximized.

* + - * 1. Basketball Goals: Basket ring complete with flanges, braces, attachment plate, and evenly spaced loops welded around underside of ring.

Generally, retain "Single-Rim Basket Ring Competition Goal" subparagraph below for competition play according to a sport rule book, and delete "Double-Rim Basket Ring" subparagraph below. Double-rim basket rings are sometimes specified for locations where only noncompetition play is anticipated and heavy-duty use or abuse is expected.

Single-Rim Basket Ring Competition Goal: Materials, dimensions, and fabrication **[complying with referenced standard rules] [per manufacturer's standard design]**.

Double-Rim Basket Ring: Fabricated with two rims, **[each consisting of a 5/8-inch- diameter] [consisting of one 1/2-inch- diameter and one 5/8-inch- diameter] [manufacturer's standard-diameter]** steel rod welded into 18-inch ID rings.

Type:

Retain "Fixed" or "Movable" subparagraph below. If retaining "Double-Rim Basket Ring" subparagraph above, typically retain first subparagraph below.

Movable: Pressure-release design with manufacturer's standard breakaway mechanism and rebound characteristics identical to those of fixed, nonmovable ring.

Retain first option in "Pressure-Release Characteristics" subparagraph below for ring according to FIBA rules; retain second option below for ring according to NFHS rules.

Pressure-Release Characteristics: Positive-lock movable breakaway design, with manufacturer's standard mechanism, including preset pressure release, set to release between 181- and 231-lb load, and automatic reset. Provide movable ring with rebound characteristics identical to those of fixed, nonmovable ring.

Tube tie option in "Net Attachment" subparagraph below complies with FIBA requirements.

Net Attachment: No-tie loops for attaching net to ring without tying.

Finish: Manufacturer's standard finish.

* + - * 1. Basketball Nets: 12-loop-mesh net, between 15 and 18 inches long, sized to fit ring diameter, and as follows:

Cord: Made from white nylon.

Retain "Backboard Safety Pads" paragraph below for rectangular backboards, according to standard rules.

* + - * 1. Backboard Safety Pads: Designed for backboard thickness and extending continuously along bottom and up sides of backboard and over backstop according to manufacturer's standard design.

Attachment: Peel-and-stick tape or Adhesive.

Color: **[Black] [Gray] [Manufacturer's standard color] [As selected by Director’s Representative from manufacturer's full range]**.

* + - 1. VOLLEYBALL EQUIPMENT
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AALCO Manufacturing.

Jaypro Sports, LLC.

Porter Athletic Equipment Company.

Approved equivalent.

* + - * 1. Source Limitations: Obtain from single source from single manufacturer.

Revise "Floor Insert" paragraph below to include diameter for floor plate if critical for Project. Specifying a diameter may reduce availability.

* + - * 1. Floor Insert: **[Solid-brass] [Chrome-finished steel]** floor plate and steel pipe sleeve, concealed by floor plate, with capped bottom end, sized with ID to fit post standards, minimum length required, to securely anchor pipe sleeve in structural floor; with anchors designed for securing floor insert to floor substrate indicated; one per post standard.

Retain one of four subparagraphs below.

Flush Floor Plate: **[Self-locking,] [Lockable,] [Manufacturer's standard]** hinged access cover, designed to be flush with adjacent flooring. Provide two tool(s) for unlocking access covers.

Recessed Floor Plate: **[Self-locking,] [Lockable,] [Manufacturer's standard]** hinged access cover, recessed to accept finish flooring matching, and designed to be level with adjacent flooring. Provide Insert number tool(s) for unlocking access covers.

Floating Wood Floor, Floor Plate: Lockable swivel access cover, designed for use with floating wood floors and to be flush with adjacent flooring. Provide two tool(s) for unlocking access covers.

* + - * 1. Post Standards: Removable, fixed-height paired volleyball post standards and a center post standard for multicourt play, as indicated on Drawings, designed for easy removal from permanently placed floor inserts.

Retain "combined steel and extruded-aluminum" option in "Materials" subparagraph below only for adjustable-height, telescopic-type post standards. Post standards for volleyball are made from steel or extruded-aluminum pipe or tubing, or a combination of movable steel bottom sections and aluminum top sections.

Materials: Manufacturer's standard metal pipe or tubing, with nonmarking plastic or rubber end cap or floor bumper to protect permanent flooring.

Nominal Pipe or Tubing Diameter: 3-inch OD at base.

Finish: Manufacturer's standard factory-applied, polyester powder-coat finish or plated metal finish.

Retain "Net Height Adjuster" subparagraph below for fixed post standards.

Net Height Adjuster: Manufacturer's standard mechanism for height adjustment, complete with fittings; designed for positioning net at heights indicated.

Net Heights: **[Between sitting volleyball net height and boys'/men's volleyball net height, 36 and 95-5/8 inches] [Between tennis net height and boys'/men's volleyball net height, 42 and 95-5/8 inches] [For ages 12 and under net height and boys'/men's volleyball net height, 84 and 95-5/8 inches]** or more.

Coordinate option retained in "Height Markers" subparagraph below with referenced standard rules above as applicable.

Height Markers: Clearly marked at regulation play heights for **[elementary school] [girls/women] [boys/men] [sitting volleyball] [tennis]**.

* + - * 1. Net: 32 feet long; **[one per pair of paired post standards] [two per every center post standard]**; and as follows:

Retain "Width and Polyester Mesh " or "Width and Nylon Mesh" subparagraph below, or insert another. These example subparagraphs represent the extremes in a range of commonly available nets. Less-expensive net in first subparagraph below is suitable for use where noncompetitive play may be common; net in second subparagraph below is suitable for competitive play.

Width and Polyester Mesh: 36 inches with 4-1/2-inch- square mesh made of black polyester string.

Hem Band Edges: White, 2-inch- wide top binding; black, 1-inch- wide bottom and side bindings; tie offs at top and bottom of each side end of net; and 1/4-inch- diameter rope, at least 42 feet long, threaded through top hem of binding.

Dowels: Minimum 1/2-inch- diameter fiberglass or 1-inch- diameter wood. Provide two dowels per net threaded through each side hem sleeve for straightening net side edges.

* + - * 1. Net-Tensioning System: Designed to adjust and hold tension of net. Fully enclosed, nonslip, manufacturer's standard-type winch with cable length and fittings for connecting to net lines, positive-release mechanism, and removable handle. Provide end post with post top pulley. Provide opposing post with welded-steel loops, hooks, pins, or other devices for net attachment and post top grooved line guide.

Delete "Bottom Net Lock Tightener" paragraph below if winch-tensioning the bottom line. Net-tensioning winches are typically used most effectively with nets having cable top lines. Net lock tighteners are typically used for tightening bottom lines.

* + - * 1. Post Standard Transporter: Manufacturer's standard wheeled unit designed for transporting a single post.
				2. Wall Storage Rack: Manufacturer's standard unit designed for mounting on walls and for storing post standards in vertical position, with retaining arms, fittings for padlock, and mounting hardware; number of units as required to provide storage for specified equipment.
				3. Storage Cart: Manufacturer's standard wheeled unit designed for transporting and storing volleyball equipment and passing through 36-inch- wide door openings. Fabricate welded-steel tubing units with heavy-duty casters, including no fewer than two swivel casters. Fabricate wheels from materials that do not damage or mark floors; number of units as required to provide transport and storage for specified equipment.
			1. BADMINTON EQUIPMENT
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AALCO Manufacturing.

Jaypro Sports, LLC.

Porter Athletic Equipment Company.

Approved equivalent.

* + - * 1. Source Limitations: Obtain from single source from single manufacturer.

Retain "Standard Rules" paragraph below for competition-quality system. Consider deleting if less rigorously designed recreational system suits Project.

* + - * 1. Standard Rules: Provide equipment according to the requirements of BWF's "Laws of Badminton."

Retain "Floor Insert" or "Floor-Insert Adaptor" paragraph below. If retaining second paragraph, adaptor must fit smaller badminton post standards and larger floor-insert sleeve.

* + - * 1. Floor Insert: Solid-brass floor plate with hinged access cover and steel pipe sleeve with capped bottom end; sized with ID to fit post standards, minimum length required to securely anchor pipe in structural floor; one per post standard.
				2. Floor-Insert Adaptor: Pipe sleeve adaptor to convert volleyball floor-insert sleeve to fit badminton post standard; one per badminton post standard.
				3. Post Standards: Paired badminton post standards**[ and a center post standard for multicourt play]**, designed for easy removal from permanently placed floor inserts.

Material: Steel pipe or tubing, with plastic or rubber end cap or nonmarking floor bumper to protect permanent flooring.

First option in "Nominal Pipe or Tubing Diameter" subparagraph below may be designed for combination volleyball and badminton play by some manufacturers. Some manufacturers offer square-tube post standards. Revise subparagraph if square-tube post standard suits Project.

Nominal Pipe or Tubing Diameter: 1-1/2-inch OD at base.

Finish: Manufacturer's standard factory-applied, polyester powder-coat finish.

Net Height Setting: By preset net hooks.

* + - * 1. Net: Competition badminton net, 20 feet long and as follows; **[one per pair of paired post standards] [two per every center post standard]**:

Width and Mesh: 30 inches with 3/4-inch- square mesh made of purple, dark brown, or black nylon string.

Hem Band Edges: White, 3-inch- wide top binding; purple, dark brown, or black 3/4-inch- wide bottom and side bindings; tie offs at top, bottom, and midpoints, eliminating gap at each side end of net; and minimum 1/8-inch- diameter rope, at least 42 feet long, threaded through top hem of binding. Provide lengths of lines and linkage fittings as required to properly connect to and set up net for post-standard spacing indicated on Drawings.

* + - * 1. Wall Storage Rack: Manufacturer's standard unit designed for mounting on walls and for storing post standards in vertical position, with retaining arms, fittings for padlock, and mounting hardware; number of units as required to provide storage for specified equipment.
				2. Storage Cart: Manufacturer's standard wheeled unit designed for transporting and storing badminton equipment and passing through 36-inch- wide door openings. Fabricate welded-steel tubing units with heavy-duty casters, including no fewer than two swivel casters. Fabricate wheels from materials that do not damage or mark floors; number of units as required to provide transport and storage for specified equipment.

Insert safety pads for badminton post standards here if required.

* + - 1. EXERCISE EQUIPMENT
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Jaypro Sports, LLC.

Performance Sports Systems.

Porter Athletic Equipment Company.

Approved equivalent.

* + - * 1. Source Limitations: Obtain from single source from single manufacturer.
				2. Pull-up Bar: Wall mounted.

Retain "Fixed height" or "Adjustable Height" subparagraph below.

Fixed height.

Adjustable Height: In 6-inch increments within a range of **[18 inches] [30 inches]**.

Bar Length: Minimum **[36 inches] [40 inches] [As indicated on Drawings]**.

Bar: Minimum 1-1/16-inch- diameter, round, plated solid-steel bar.

Support Frame: Steel-angle end brackets attached to wood stringers, steel channels, or bars.

Bar Installation Height and Wall Clearance: Height as indicated on Drawings and minimum 12 inches from wall.

Retitle "Stall Bars" paragraph below to "Wall Bars," "Wall Ladder," "Swedish Bars," or another name, as is customary for Project location.

* + - * 1. Stall Bars: Wall mounted in a continuous row; each vertical section with no fewer than 16 rungs.

Size: Each section **[96 inches high by 36 inches wide] [as indicated on Drawings]**.

Side Rails: Formed-steel tube uprights minimum 1-1/2 by 5 inches with capped ends; nominal sheet thickness minimum 0.0598 inch.

Rungs: Minimum 1-3/8-inch- diameter, round rungs made from hardwood firmly fixed to side rails to prevent rotating or other movement. Provide equipment with top rung extended 6 inches beyond other rungs.

Extended Top Rail: Provide equipment with an extension arm on side rails and an additional rung extended 20 inches beyond lower rungs.

Number of Sections: **[As indicated on Drawings] <Insert number>**, complete with intermediate uprights and terminal uprights without rung holes at finished ends.

* + - * 1. Horizontal Ladder: Wall mounted, with 12 rungs.

Size: **[12 feet long by minimum 16 inches wide] [As indicated on Drawings]**.

Side Rails: Steel tubing minimum 1-1/2 by 4 inches with capped ends; tubing wall thickness minimum 0.083 inch.

Rungs: Minimum 1-5/16-inch- diameter round rungs made from hardwood firmly fixed to side rails to prevent rotating or other movement.

Support Frame: Minimum 1-5/16-inch- OD, steel pipe or tubing, with bracing.

Ladder Installation Height and Wall Clearance: Height **[as indicated on Drawings]** and 30 inches from wall.

Retitle "Vertical Arm Ladder" paragraph below to "Arm-Strengthening Bars," "Vertical Climbing Ladder," or another name as is customary for Project location.

* + - * 1. Vertical Arm Ladder: Wall mounted, with five to seven horizontal rungs for hand and foot holds.

Size: **[60 inches long by minimum 22 inches wide] [As indicated on Drawings]**.

Side Rails: Minimum 1-5/16-inch- OD, round pipe or tubing, with rails sloped 10 degrees from wall for climbing.

Rungs: Minimum 1-1/16-inch- OD, round pipe or tubing rungs firmly welded to side rails.

Ladder Installation Height: **[As indicated on Drawings]**.

Ladder Installation Method: **[Fixed to wall] [Removable]**.

* + - * 1. Pegged Board Vertical Climber: Wall-mounted board; size as indicated on Drawings; with two peg handholds per board.
				2. Climbing Rope: 1-1/2-inch- diameter rope, with top end securely clamped in fitting designed for attaching to supporting structure indicated on Drawings.

Description: **[Three-strand hemp] [Synthetic polyfiber] [Manufacturer's standard material]**.

Length: **[12 feet] [16 feet] [20 feet] [24 feet] [As required to allow 42 inches of rope to lie on floor] [As indicated on Drawings]**.

Rope Bottom End: **[Tied in a Turk's head knot] [Tied in a Turk's head knot and fitted with leather sheath] [Fitted with heat-shrink-type PVC tube and coated with PVC coating after fitting] [Manufacturer's standard]**.

Retain one of or both "Rubber Balls" and "Tambourine" subparagraphs below to suit Project.

Rubber Balls: Securely fastened every **[12 inches] [18 inches]** along length of rope.

Tambourine: 24-inch diameter; minimum 1/2-inch- thick, painted plywood disk for restricting climbing and for exercise competition.

Safety Guard: 3/16-inch chain or 1/8-inch- diameter cable, clamp, and fittings designed for attaching guard to supporting structure indicated on Drawings.

Retain "Pipe Beam" subparagraph below if not attaching rope directly to overhead building structure.

Pipe Beam: **[Ceiling] [Wall and ceiling]** mounted; minimum 3-1/2-inch- OD steel pipe or tubing beam with minimum 2-3/8-inch- OD drop pipes, bracing, and connectors, designed for transferring load and securely attaching to supporting structure indicated on Drawings.

* + - * 1. Rope Hoist: Wall attached; consisting of #10 bell cord or 1/4-inch- diameter, synthetic polyfiber rope, snap swivel fitting, rope adjuster, rope weight, weight bag, pulley, rope cleat, clear-finished wood wall equipment pads for pulley and cleat attachment, clamps, and fasteners.
				2. Metal Finish: Manufacturer's standard factory-applied, polyester powder-coat finish.
				3. Wood Finish: Manufacturer's standard transparent or opaque-painted finish.
			1. SAFETY PADS
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AALCO Manufacturing.

Jaypro Sports, LLC.

Porter Athletic Equipment Company.

Approved equivalent.

* + - * 1. Source Limitations: Obtain from single source from single manufacturer.

Retain "Surfacing-Burning Characteristics" paragraph below if required.

* + - * 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Flame-Spread Index: 25 or less.

Smoke-Developed Index: 450 or less.

* + - * 1. Pad Coverings: Provide safety pad fabric covering that is fabricated from puncture- and tear-resistant, PVC-coated polyester or nylon-reinforced PVC fabric, minimum 14-oz./sq. yd. and treated with fungicide for mildew resistance; with surface-burning characteristics indicated.
				2. Wall Safety Pads: Padded wall wainscot panels designed to be attached in a continuous row; each panel section consisting of fill laminated to backer board, with visible surfaces fully covered by seamless fabric covering, free of sag and wrinkles and firmly attached to back of backer board.

Availability of fire-retardant-treated plywood in "Backer Board" subparagraph below varies with manufacturer.

Backer Board: Minimum 3/8-inch- thick plywood, mat formed, or composite panel.

Retain "Fill" or "Fire-Resistive Fill" subparagraph below.

Fill: Multiple-impact-resistant foam, minimum density 2-inch- thick bonded polyurethane, 6.0-lb/cu. ft. density.

Fire-resistive neoprene is a component of wall panel assemblies tested according to ASTM E84 for surface-burning characteristics.

Size: Each panel section 24 inches wide by minimum 72 inches long.

Number of Modular Panel Sections: **[As indicated on Drawings] <Insert number>**.

Installation Method: 1-inch top and bottom fabric attachment flange with exposed fasteners.

Fabric Covering Color(s): **[Match school colors] [As indicated by manufacturer's designations] [Match Director’s Representative's sample] [As selected by Director’s Representative from manufacturer's full range]** for **[one] [two]** color(s).

Retain "Graphics" subparagraph below if applicable.

Graphics: Custom graphics as indicated on Drawings.

Pads in "Corner Wall Safety Pads," "Column Safety Pads," and "Round Column Safety Pads" paragraphs below are less available than flat wall pads; verify availability with manufacturers.

* + - * 1. Corner Wall Safety Pads: Wall corner pad consisting of minimum 1-1/4-inch- thick, multiple-impact-resistant, closed-cell, polyethylene-foam filler, covered on both sides and all edges by fabric covering with backer board and manufacturer's standard anchorage to wall.

Length: Each pad matching length of wall safety pads.

Fabric Covering Color(s): Match color of wall safety pads.

Verify availability with manufacturers of standard- or custom-sized column covers in "Column Safety Pads" paragraph below.

* + - * 1. Column Safety Pads: Pads covering exposed flange of columns to height indicated, consisting of minimum 1-1/4-inch- thick, multiple-impact-resistant, closed-cell, polyethylene-foam filler, covered on both sides and all edges by fabric covering with backer board and manufacturer's standard anchorage to column.

Length: Each pad matching length of wall safety pads.

Fabric Covering Color(s): Match color of wall safety pads.

* + - * 1. Round Column Safety Pads: Wraparound pads fully covering exposed round column to height indicated, consisting of minimum 2-inch- thick, multiple-impact-resistant, bonded polyurethane-foam filler, 6.0-lb/cu. ft. density, covered on both sides and all edges by fabric covering with hook-and-loop or cord lace and grommet attachment to column.

Length: Each pad matching length of wall safety pads.

Fabric Covering Color(s): Match color of wall safety pads.

* + - * 1. Cutout Trim: Manufacturer's standard flanged cutout trim kits for fitting pads around switches, receptacles, and other obstructions.

Color: Black.

* + - 1. MATERIALS

Retain paragraphs in this article to suit Project.

Retain one or more of "Support Cable," "Support Chain and Fittings," and "General-Purpose Chain" paragraphs below to suit Project. See the Evaluations for discussion of chains used for folding, wall-mounted basketball backstops.

* + - * 1. Support Cable: 1/4-inch- diameter, 7x19 galvanized-stranded-steel wire rope with a breaking strength of 7000 lb. Provide fittings according to the wire rope manufacturer's written instructions for size, number, and installation method.
				2. Support Chain and Fittings: For chains used for overhead lifting, provide Grade 80 heat-treated alloy-steel chains, according to ASTM A391, with commercial-quality, zinc-plated steel connectors and hangars.
				3. General-Purpose Chain: For chains not used for overhead lifting, provide carbon steel chain, according to ASTM A413 (Grade 30 proof coil chain or higher grade recommended by gymnasium equipment manufacturer). Provide coating type, chain size, number, and installation method according to manufacturer's written instructions.
				4. Castings and Hangers: Malleable iron, according to ASTM A47; grade as required for structural loading.

"Composite Wood Products" paragraph below applies to LEED 2009 NC, CI, and CS Credit IEQ 4.4.

* + - * 1. Composite Wood Products: Products shall be made without urea formaldehyde.
				2. Softwood Plywood: DOC PS 1, exterior.
				3. Particleboard: ANSI A208.1.

Revise "Equipment-Mounting Board" paragraph below if a particular wood species is required for Project's equipment-mounting boards.

* + - * 1. Equipment-Mounting Board: Wood, **[transparent] [or] [neutral-color-painted]** finish; size and quantity as required to mount gymnasium equipment according to manufacturer's written instructions.
				2. Anchors, Fasteners, Fittings, and Hardware: Gymnasium equipment manufacturer's standard corrosion-resistant or noncorrodible units; concealed**[; tamperproof, vandal- and theft-resistant design]**.
				3. Grout: Nonshrink, nonmetallic, premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout, according to ASTM C1107, with minimum strength recommended in writing by gymnasium-equipment manufacturer.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for court layout, alignment of mounting substrates, installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

Verify critical dimensions.

Examine supporting structure, and subfloors below finished floor.

Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements are clearly marked. Locate reinforcements and mark locations.

* + - * 1. Proceed with installation only after unsatisfactory conditions have been corrected.
			1. INSTALLATION, GENERAL
				1. Comply with manufacturer's written installation instructions.
				2. Install gymnasium equipment after other finishing operations, including painting, have been completed unless otherwise indicated.
				3. Permanently Placed Gymnasium Equipment and Components: Install rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated; in proper relationship to adjacent construction; and aligned with court layout.

Floor-Insert Locations: Coordinate locations with application of game lines and markers, and core drill floor for inserts after game lines are applied.

Floor-Insert Elevation: Coordinate installed heights of floor inserts with installation and field finishing of finish flooring and floor-plate type.

Operating Gymnasium Equipment: Verify clearances for movable components of gymnasium equipment throughout entire range of operation and for access to operating components.

Retain "Floor-Insert Setting" paragraph below if setting floor inserts in oversized, recessed voids in concrete substrate. Revise paragraph below if using core-drilled holes or all-grout footings to set floor inserts or if floor inserts are embedded in freshly placed concrete.

* + - * 1. Floor-Insert Setting: Clean oversized, recessed voids in concrete substrate of debris. Position each sleeve, and fill void around sleeve with grout, mixed and placed according to grout manufacturer's written instructions. Protect portion of sleeve above subfloor from splatter. Verify that sleeves are set plumb, aligned, and at correct height and spacing; hold in position during placement and finishing operations until grout is sufficiently cured. Set insert so top surface of completed unit is flush with finished flooring surface.
				2. Anchoring to In-Place Construction: Use anchors and fasteners where necessary to secure built-in and permanently placed gymnasium equipment to structural support and to properly transfer load to in-place construction.

Retain "Connections" paragraph below for electrically operated gymnasium equipment.

* + - * 1. Connections: Connect electric operators to building electrical system.
				2. Removable Gymnasium-Equipment Components: Assemble in place to verify that equipment and components are complete and in proper working order. Disassemble removable gymnasium equipment after assembled configuration is approved by **[Director’s Representative]**, and store units in location indicated on Drawings.
			1. INSTALLATION OF SAFETY PADS
				1. Mount with bottom edge at 4 inches above finished floor.
				2. Cutout Trim: Limit cuts in face of padding so that cuts are securely and fully concealed behind trim-kit flange.
			2. FIELD QUALITY CONTROL

Edit number of hours to suit project size.

* + - * 1. Secure the services of a Company Field Advisor for a minimum of 8 working hours for the following:

Render advice regarding installation and final adjustment of the equipment.

Witness final equipment tests and then certify in writing that the equipment is installed in accordance with the contract documents and is operating properly.

Train Facility personnel on the operation and maintenance of the equipment (minimum of two 2 hour sessions).

* + - 1. ADJUSTING

Retain this article if movable components of gymnasium equipment are required.

* + - * 1. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly; free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range; and lubricate as recommended in writing by manufacturer.
			1. DEMONSTRATION

Generally, retain this article if specified gymnasium equipment is operable or has operable components.

* + - * 1. Engage a Company Field Advisor to train Facility’s maintenance personnel to adjust, operate, and maintain gymnasium equipment.

END OF SECTION 116623