SECTION 02881 - PLAYGROUND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Related Sections include the following:

1. Division 3 Section “Cast-In-Place Concrete” for concrete footings.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements and installation details.

B. Samples for Verification: For each type of exposed finish required, prepared on samples not less than 6-inch-long linear components and 4-inch-square sheet components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Playworld Systems, obtained through Fry & Associates, Inc., 101 E. 15th Ave., N. Kansas City, MO 64116, phone (816) 221-4825, or approved equal.

2.2 5-INCH OUTSIDE DIAMETER SUPPORT POST

A. Materials:

1. Shall be 5-inch outside diameter, 11-gauge galvanized steel tubing. (See Tubing Specifications.)
2. Tubing shall have a zinc-rich paint interior coating.
3. Minimum tensile strength shall be 55,000 psi.
4. Minimum yield strength shall be 50,000 psi.
5. Surface-mount post shall have a predrilled 3/8" x 10" (0.95 cm x 25.4 cm) hot-rolled square steel base plate.

6. Finished with a baked-on polyester powder coating. (See Finish Specifications.)

B. Specification Reference: Posts shall comply with ASTM Specifications: A-315, A-500, and A-513.

C. Additional Information:

1. Support posts shall carry a factory-applied marker to indicate the level of protective surfacing material to be maintained. (See Protective Surfacing Specifications.)
2. Support post shall have a factory-installed cap. (See Pipe Cap Specifications.)

D. Support Post Finish:

1. Prior to surface treatment, all support posts shall be cleaned with a three-step process, which includes a rust-inhibiting, iron phosphate wash.
2. All support posts shall be finished with an application of PrismCoat™. (See Finishes Specifications.)

a. Color: Platinum.

2.3 DOUBLE-BANDED CLAMP

A. Materials:

1. Shall be die-cast of high-strength 380 aluminum alloy.
2. Ultimate tensile strength shall be 47 ksi.
3. Die-casting operation shall be quality sampled every hour.
4. Clamps shall be provided as hinged assemblies to facilitate structure assembly.
5. Unique S-lap design eliminates all string entanglement points at connection.
6. Single-bolt fastening system with built-in threads to eliminate T-nuts and simplify installation.
7. Clamps are permanently fastened to the support post with a drive rivet to eliminate disassembly and slippage.
8. Double-banded design provides the highest clamping pressure around the entire clamp.
9. Finished with a shot blast and a PrismCoat™ finish. (See Finish Specifications.)

a. Color: Platinum.

B. Additional Information:

1. All attachment castings shall be provided as hinged assemblies to facilitate structure assembly.
2. All load bearing castings shall be fastened to the support post with a drive rivet to eliminate slippage.

2.4 DECKING

A. Materials:

1. Deck shall be an all-welded assembly fabricated of 12-gauge, hot-rolled, pickled and oiled flat steel and 1/4" x 3" hot-rolled, pickled and oiled flat steel for a back support.
2. Deck surface and sides shall be die-formed from a single sheet of 12-gauge, hot-rolled, pickled and oiled flat steel.
3. Deck surface shall have 11/32-inch diameter perforated holes.
4. Entire deck weldment shall have a deep grey PlayArmour™ coating of 80 to 100 mils.

    a. PlayArmour™ coating shall have a salt bath cure.
    b. PlayArmour™ Punch Test: 80 pounds minimum. (See Finish Specifications.)

B. Additional Information:

1. A square PlayArmour™ coated deck shall have a minimum of 2,258 square inches (14568.6 square centimeters) of surface area.
2. A triangular PlayArmour™ coated deck shall have a minimum of 970 square inches (6258.4 square centimeters) of surface area.
3. A half-hexagonal PlayArmour™ coated deck shall have a minimum of 2,931 square inches (18910.8 square centimeters) of surface area.
4. A hexagonal PlayArmour™ coated deck shall have a minimum of 5,884 square inches (37963.7 square centimeters) of surface area.
5. A long PlayArmour™ coated deck shall have a minimum of 4,516 square inches (29137.2 square centimeters) of surface area.
6. PlayArmour™ coated deck shall be supported by deck hangers and secured with 1/2"-13 x 2-3/4" bolts and 1/2" locknuts.
7. Approach step shall be supported by a 2-3/8-inch outside diameter, 12-gauge galvanized steel tubing support leg.

2.5 PLAYARMOUR™ PANELS

A. Materials:

1. Vertical wall panel surface and sides shall be die-formed from a single sheet of 12-gauge, hot-rolled, pickled and oiled flat steel.
2. Vertical wall panels shall be an all-welded assembly, fabricated of 14-gauge, hot rolled, pickled and oiled flat steel, and 1/4" x 3" hot-rolled, pickled and oiled flat steel for back support.
3. Vertical wall panels shall be coated with PlayArmour™.
4. PlayArmour™ protective coating shall be a tough industrial coating having superior weather- and vandal-resistant properties.

B. Additional Information:

1. Vertical wall panels shall have perforated holes for visibility.

2. PlayArmour™ shall be non-toxic and fungus resistant.
3. PlayArmour ™ shall conform to high-quality standards for vertical applications.
4. PlayArmour ™ shall completely surround and seal the steel vertical barrier and be applied to a thickness of 80 to 100 mils.
5. PlayArmour™ shall be cured in a salt bath.
6. PlayArmour™ shall meet punch test 80 pounds minimum.
7. PlayArmour™ shall have a semi-gloss finish.

2.6 PLAYARMOUR™ CRAWL TUBES

A. Materials:

1. Crawl tube vertical wall panel surface and tube sections shall be die-formed from a single sheet of 14-gauge, hot-rolled, pickled and oiled flat steel.
2. Crawl tube vertical wall panels and tube sections shall be an all-welded assembly, fabricated of 14-gauge, hot rolled, pickled and oiled flat steel, and 1/4" x 3" hot-rolled, pickled and oiled flat steel for back support.
3. Crawl tube vertical wall panels shall be coated with PlayArmour™.
4. Crawl tube shall be fabricated in two pieces for ease of assembly and shall be coated with PlayArmour™.
5. Crawl tube vertical wall panels shall be ready to accept clip art icons.
6. PlayArmour™ protective coating shall be a tough industrial coating having superior weather- and vandal-resistant properties.

B. Additional Information:

1. Crawl tube vertical wall panels and tube sections shall have perforated holes for visibility.
2. PlayArmour™ shall be non-toxic and fungus resistant.
3. PlayArmour ™ shall conform to high-quality standards for vertical applications.
4. PlayArmour ™ shall completely surround and seal the steel vertical barrier and tube sections and be applied to a thickness of 80 to 100 mils.
5. PlayArmour™ shall be cured in a salt bath.
6. PlayArmour™ shall meet punch test 80 pounds minimum.
7. PlayArmour™ shall have a semi-gloss finish.

2.7 PLAYARMOUR™ ROOF

A. Materials:

1. Roof panels shall be die-formed from a single sheet of 14-gauge, hot rolled, pickled and oiled flat steel.
2. Roof panels shall be an all-welded assembly, fabricated of 14-gauge, hot rolled, pickled and oiled flat steel, and 1/4" x 3" hot rolled, pickled and oiled flat steel for back support.
3. Roof panels shall be fabricated in four pieces for ease of assembly and shall be coated with PlayArmour™.
4. Roof panels shall be ready to accept clip art icons.

5. Roof support struts shall be fabricated of 1/4-inch hot-rolled, flat steel.
6. Roof support struts shall be manufactured using computerized technology for the highest quality and consistency.
7. After fabrication and welding, roof support strut edges shall be eased to remove all sharp edges.
8. Roof support struts shall be zinc dichromate plated before being coated with PrismCoat™ finish for added weather resistance.

    a. Color: Ruby.

B. Additional Information: Roof panels shall have perforated holes for visibility.

2.8 STAINLESS-STEEL SLIDES

A. Materials:

1. Shall be formed from one piece of 16-gauge T304 stainless steel with a continuous 1-1/2-inch outside diameter stainless-steel tube welded to the side channels for support.
2. All welding of slide shall be continuous TIG (Tungsten Inert Gas) welded for consistently high-quality welds, due to the gas shield of the process. All welds shall have discoloration completely removed.
3. Slide shall be mounted to a slide barrier which is an all-welded assembly fabricated of 12-gauge, hot-rolled, pickled and oiled flat steel coated with 80 to 100 mils of PlayArmour™. (See Finish Specifications.)

B. Additional Information:

1. The slide barrier is designed to channel the user into a sitting position to enter the slide.
2. Stainless slide shall have the following features:

    a. A minimum side rail height of 8-3/4 inches (22.2 cm).
    b. A minimum bedway width of 17 inches (43.2 cm).
    c. A minimum of 16 inches (40.6 cm) for a deceleration area (runout) at the end of each slide.

2.9 ONE-PIECE ALUMINUM SPIRAL SLIDES

A. Materials:

1. Slide shall be one-piece construction, eliminating potential gaps, sharp points and edges, and mechanical segmented connections.
2. The slide shall be constructed of 0.125-inch-thick Type 3003H14 aluminum having a minimum tensile strength of 22,000 psi and a minimum yield strength of 21,000 psi.
3. The support mast shall be of 5.563-inch outside diameter x 0.258-inch wall aluminum pipe.
4. The solid aluminum chute shall be 0.125-inch thick and reinforced using 1-1/16-inch outside diameter edge railing.

5. Deep bedway design features center-pull concentric action to keep user from inadvertently falling out. Side wall features a continuous, one-piece construction with rolled outer edge eliminating trim strips and sharp edges.
6. Approach area canopy shall have ¼-inch diameter perforated holes to aid in the supervision of children at the slide entrance.
7. Approach area canopy shall be fully welded steel construction fabricated of 14-gauge to resist deformation and abuse.
8. Canopy tubing shall be fabricated from Schedule 40 galvanized steel tubing.
9. Slide bedway canopy shall be coated with a powder coated finish for improved wearability.
10. Floor of approach area shall be reinforced with a steel diamond pattern scuff shield for long-term traffic wear.

B. Specification Reference: Aluminum slide shall comply with ASTM Specifications B-209 and QQ-A-250/2.

C. Additional Information:

1. Spiral slides shall feature:

a. Approach area canopy allowing full view of users at slide entry.
b. A one-piece bedway design to assist installation and eliminate dangerous segmented connections.

2.10 PIPE WALL BARRIER - CENTERLINE

A. Materials:

1. Shall be an all-welded assembly fabricated of 1-1/16-inch outside diameter, 14-gauge galvanized steel tubing and 5/32-inch galvanized steel mounting plate.
2. Shall be finished with a baked-on polyester powder coating or PrismCoat™ finish. (See Finish Specifications.)

B. Specification Reference: Centerline pipe wall barrier shall comply with ASTM Specifications A-135, A-500, A-513, F-1487.

C. Additional Information: The centerline pipe wall barrier shall have gaps no larger than 3 inches (7.6 cm) or smaller than 9 inches (22.9 cm).

2.11 STEEL TUBING COMPONENTS

A. Materials:

1. Shall be fabricated of high-carbon, Grade 1015 steel alloy.
2. RS-20 galvanized steel tubing is 43 percent stronger (gauge for gauge) than Schedule 40 A-53 galvanized pipe. The comparison is based upon minimum yield strength and minimum tensile strength calculations.

3. The RS-20 galvanized steel tubing is also at least 31 percent lighter (outside diameter for outside diameter) than galvanized steel pipe while still being superior in strength.
4. The average minimum yield strength shall be 50,000 psi, with a minimum tensile strength of 55,000 psi.
5. The RS-20 galvanized steel tubing shall also have a FDA-approved inside diameter protective coating.

2.12 STEERING WHEEL

A. Materials:

1. Steering wheel shall be one-piece, plasma-arc cut and stamped in 12-gauge H.R.P.O. steel. Wheel shall be coated with 80 to 100 mils of PlayArmour™. (See Finish Specifications.)
2. Steering wheel shall not contain aluminum.
3. PlayArmour™ shall be trim die-cut to recess hardware.
4. Rotational axis shall be stainless-steel machined fastener with no less than 2 inches of rotational surface contact for durability, and shall be secured with a tamperproof head.
5. Shall have a factory-installed Oilite bronze bearing for long life and easy operation.
6. Mounting fixture shall be dual 3/16-inch zinc-plated steel plates with powder-coated finish. Mounting plates shall be secured with tri-groove, tamperproof hardware.

B. Additional Information:

1. Steering wheel shall be 12-1/8-inch (30.5 cm) diameter with an offset hub.
2. Steering wheel shall be stamped as a solid unit to prevent injury between spokes, and shall feature a 1/2-inch stamped return for safety contact edge.
3. Steering wheel may be attached to vertical PlayArmour™ Panels.

2.13 HARDWARE

A. Specification Reference:

1. All required hardware for assembly of the structure shall be included.
2. All fasteners shall be 18-8 grade stainless steel (300 series).
3. All spring pins are stainless steel.
4. All drive rivets are aluminum.
5. All exposed fasteners shall be tamper-resistant. They shall only be attached or removed using special tools not commercially available.
6. A minimum of two tamper-resistant tools shall accompany each structure for assembly and maintenance.

2.14 CITYSCAPES™ THEME ICONS

A. Panel:

1. Panel icons shall be fabricated of 3/16-inch hot-rolled, flat steel. Icons shall incorporate the use of 3/8-inch threaded stud-weld connectors for panel attachment.
2. Icon shapes shall be manufactured using computerized technology for the highest quality and consistency.
3. After fabrication and welding, icon edges shall be eased to remove all sharp edges.
4. Icons shall be zinc dichromate plated before being coated with polyester powder coat or PrismCoat™ for added weather resistance.
5. Each icon shall be attached to its associated panel by using a vandal-resistant, tri-groove, die-cast nut with a thread-locking adhesive.

B. Roof and Post:

1. Roof and post icons shall be fabricated of 1/4inch hot-rolled, flat steel.
2. Roof icons shall incorporate the use of 3/8-inch threaded stud-weld connectors for roof attachment.
3. Post icons shall incorporate an area below the icon design with 3/8-inch holes for post cap attachment.
4. Icon shapes shall be manufactured using computerized technology for the highest quality and consistency.
5. After fabrication and welding, icon edges shall be eased to remove all sharp edges.
6. Icons shall be zinc dichromate plated before being coated with polyester powder coat or PrismCoat™ for added weather resistance.
7. Each icon shall be attached to its associated roof panel by using a vandal-resistant, tri-groove, die-cast nut with a thread-locking adhesive.
8. Each icon shall be attached to its associated Post cap by using stainless-steel hardware.

2.15 FINISHES

A. PlayArmour™:

1. PlayArmour™ protective coating shall be a tough, industrial coating having superior weather- and vandal-resistant properties.
2. PlayArmour™ shall be non-toxic and fungus resistant.
3. PlayArmour ™ shall conform to high-quality standards for vertical applications.
4. PlayArmour ™ shall completely surround and seal the steel and be applied to a thickness of 80 to 100 mils.
5. PlayArmour™ shall be cured in a salt bath.
6. PlayArmour™ shall meet punch test 80 pounds minimum.
7. PlayArmour™ shall have a semi-gloss finish.

B. PrismCoat ™:

1. PrismCoat™ is a prismatic surface treatment incorporating light refraction characteristics.
2. PrismCoat™ particulates shall be thermo-set and not wear off.
3. PrismCoat ™ shall have ultraviolet light inhibitors to resist weathering.
4. PrismCoat ™ shall be lead-free for a non-toxic finish.
5. PrismCoat™ shall be applied to surfaces of single or double curvature.

6. PrismCoat's™ hues shall be visible from any vantage point.
7. PrismCoat™ shall have excellent flexibility and mechanical strength, as well as superior edge coverage.
8. PrismCoat™ shall comply with the following ASTM Specifications:

    a. B-117 (Salt-Spray Resistance Test).
    b. D-2794 (Impact Resistance Test).
    c. D-1734 (Mandrel Flexibility Test).
    d. D-2247 (Humidity Resistance Test).
    e. D-822 (Weatherability Test).
    f. D-3363 (Pencil Hardness Test).
    g. D-3359-B (Crosshatch Adhesion Test).
    h. D-2454 (Overbake Resistance Test).

9. Prior to surface treatment, all components and support posts shall be cleaned with a three-step process, which includes a rust-inhibiting, iron phosphate wash.
10. After PrismCoat™ has been applied, it shall be cured at temperatures between 375 and 400 degrees F.
11. PrismCoat™ shall have an average thickness of 4 mils.

C. Powder Coating:

1. The polyester powder shall comply with the following ASTM Specifications:

    a. B-117 (Salt-Spray Resistance Test).
    b. D-2794 (Impact Resistance Test).
    c. D-1734 (Mandrel Flexibility Test).
    d. D-2247 (Humidity Resistance Test).
    e. D-822 (Weatherability Test).
    f. D-3363 (Pencil Hardness Test).
    g. D-3359-B (Crosshatch Adhesion Test).
    h. D-2454 (Overbake Resistance Test).

2. Prior to surface treatment, all metal shall be cleaned with a three-step process, which includes a rust-inhibiting, iron phosphate wash.
3. After powder coating has been applied, it shall be cured at temperatures between 375 and 400 degrees F.
4. Powder coating shall have an average thickness of 4 mils.
5. Epoxy or hybrid paints are not acceptable.

2.16 PLASTIC COMPONENTS - CITYSCAPES™ OPTION

A. Compounded, Rotationally Molded Plastic:

1. Shall be rotationally molded from color-compounded, first-quality, linear low-density polyethylene.

a. Dry-blended or molded-in resins are not acceptable.

2. Shall be ultraviolet (UV) stabilized to UV-8 and have anti-static additives.
3. Compounded, rotationally molded plastic shall comply with ASTM Specifications:

a. D-1238 (Melt Index).
b. D-1505 (Material Density).
c. D-638 (Tensile Strength).
d. D-648 (Heat Distortion Temperature).
e. D-790 (Flexural Modulus).
f. D-1693 (Environmental Stress Crack Resistance).
g. D-2565 (Ultraviolet).

B. Sheet Plastic Panels:

1. Shall be fabricated from colored marine grade, 3/4-inch high-density polyethylene and machined. All edges shall be free of burrs or sharp edges and points.
2. Shall be ultraviolet (UV) stabilized.
3. Shall meet FDA requirements.
4. Shall comply with ASTM Specifications:

a. D-1238 (Melt Index).
b. D-1505 (Material Density).
c. D-638 (Tensile Strength).
d. D-648 (Heat Distortion Temperature).
e. D-790 (Flexural Modulus).
f. D-1693 and D-2561 (Environmental Stress Crack Resistance).
g. D-2240 (Hardness).
h. D-1822 (Tensile Impact).
i. D-746 (Brittleness).
j. D-1525 (Softening Point).

PART 3 - EXECUTION

3.1 INSTALLATION INSTRUCTIONS

A. Explicit installation instructions shall be provided, which will include a detailed top view and footing drawings plus written instructions to assure proper installation of the structure.

B. Maintenance guidelines and inspection checklists shall also be provided.

END OF SECTION 02881