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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 11 68 13

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08/17, CHG 1: 08/18

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SECTION 11 68 13

PLAYGROUND EQUIPMENT
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NOTE: This guide specification covers the requirements for furnishing and installing manufactured playground equipment in children's outdoor play areas.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
****

PART 1 GENERAL

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NOTE: Designer should require materials, products and innovative construction methods, and techniques which are environmentally sensitive, take advantage of recycling and conserve natural resources.
****

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in

this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.
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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN FOREST FOUNDATION (AFF)

ATFS STANDARDS	(2015) American Tree Farm System Standards of Sustainability 2015-2020

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A135/A135M	(2021) Standard Specification for Electric-Resistance-Welded Steel Pipe
ASTM A153/A153M	(2023) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A500/A500M	(2021a) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A513/A513M	(2020a) Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM B26/B26M	(2018; E 2018) Standard Specification for Aluminum-Alloy Sand Castings
ASTM B108/B108M	(2019) Standard Specification for Aluminum-Alloy Permanent Mold Castings
ASTM B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B179	(2017) Standard Specification for Aluminum Alloys in Ingot and Molten Forms for Castings from All Casting Processes

ASTM B221	(2021) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2021) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM D173/D173M	(2003; R 2011; E 2012) Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing
ASTM D822	(2013; R 2018) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
ASTM D1248	(2016) Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM D2454	(2014) Determining the Effect of Overbaking on Organic Coatings
ASTM D2794	(1993; R 2019) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D3359	(2017) Standard Test Methods for Rating Adhesion by Tape Test
ASTM D3363	(2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test
ASTM D6112	(2013) Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
ASTM F1487	(2021) Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
ASTM F2373	(2011) Standard Consumer Safety Performance Specification for Public Use Play Equipment for Children 6 Months through 23 Months

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

CPSC Pub No 325	(2015) Public Playground Safety Handbook

CSA GROUP (CSA)

CSA Z809-08	(R2013) Sustainable Forest Management

FOREST STEWARDSHIP COUNCIL (FSC)

FSC STD 01 001	(2015) Principles and Criteria for Forest Stewardship

PROGRAMME FOR ENDORSEMENT OF FOREST CERTIFICATION (PEFC)

PEFC ST 2002:2013	(2015) PEFC International Standard Chain of Custody of Forest Based Products Requirements

SUSTAINABLE FOREST INITIATIVE (SFI)

SFI 2015-2019	(2015) Standards, Rules for Label Use, Procedures and Guidance

1.2 DEFINITIONS

1.2.1 Age-Appropriate

A term that describes equipment scale to include platform height, fall height and maximum equipment height, that allows safe and successful use by children of a specific chronological age; mental and physical ability; and anthropometric measurement. Maximum equipment height and complexity will not exceed a child's ability in that age group.

1.2.2 Composite Structure

Also "Composite Play Structure; Linked Structure". Two or more play events attached, directly adjacent or functionally linked, to create one integral unit that provides more than one play activity.

1.2.3 Designated Play Surface

Any elevated surface for standing, walking, sitting, or climbing; or a flat surface a minimum 50 mm 2 inches wide having up to a maximum 30 degree angle from horizontal. In some play events the platform surface will be the same as the designated play surface. However, the terms should not be interchanged as they do not define the same point of measurement in accordance with ASTM F1487.

1.2.4 Guardrail

A device around an elevated surface that prevents inadvertent falls from the elevated surface.

1.2.5 Maximum Equipment Height

The highest point on the equipment (i.e., roof ridge, top of support pole).

1.2.6 Play Event

A piece of manufactured playground equipment that supports one or more play activities.

1.2.7 Protective Barrier

An enclosing device around an elevated surface that prevents both inadvertent and deliberate attempts to pass through the device.

1.2.8 Protective Surfacing

Material to be used within the use zone that meets the fall attenuation requirements of Section 32 18 16.13 PLAYGROUND PROTECTIVE SURFACING.

1.2.9 Suspended Hazard

Cable, wire, rope or similar devices suspended up to a maximum2100 mm 7 feet high between play events; or installed up to a maximum 45 degree angle from the ground to the play event.

1.2.10 Tot

A child under 4 years of age in the pre-toddler and toddler age group.

1.2.11 Use Zone

The area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

1.3 SYSTEM DESCRIPTION

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NOTE: Drawings will indicate the perimeters of the play event use zone defining fall height, platform height and maximum equipment height; spot elevations and details as required to install protective surfacing to meet child safety requirements.

Accessibility: Drawings will indicate spot elevations; dimensions; ramp slope and rise; transfer platform height and transfer space; transfer step and height; and maneuvering space as required to install play events to meet child accessibility requirements.

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1.3.1 Child Safety

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NOTE: Specify playground equipment in accordance with ASTM F1487.

Playground Areas Other Than Child Development Centers (CDC): Inactive UFC 3-210-04, Children's Outdoor Play Areas, provides guidance for the age groups defined in paragraph AGE GROUPS concerning design of outdoor play areas for children. Exercise caution when using this UFC as some of the code information may be outdated. Coordinate safety aspects with CPSC Pub No 325. UFC 3-210-04 describes the differences between unsupervised play areas such as family housing areas and supervised play areas such as child development centers. Site selection and analysis; user needs analysis; play area committee; age group criteria; play activities; play area relationships; child safety requirements; playground equipment; protective surfacing; and exterior plant materials are discussed in terms for designing a playground layout.

Child Development Centers (CDC): The CDC outdoor play area requirements are defined in the DA Standard Design Package for Child Development Centers and TI 800-01 Design Criteria, Appendix G, Child Development Centers. The CDC accommodate the age groups as defined in paragraph AGE GROUPS. UFC 4-740-14 discusses inspection frequency and preventative maintenance requirements to assist with selection of playground equipment.

Use Zones (Clear Area or Fall Zones): Play event use zone perimeters are measured in accordance with the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS and paragraph FALL HEIGHT.

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Provide play events that meet the child safety performance requirements described in CPSC Pub No 325 and ASTM F1487. The requirements include the following: Head and neck entrapment; sharp points, edges, and protrusions; entanglement; pinch, crush, and shear points; suspended hazards; play event access and egress points; play event use zone perimeter; and design criteria. Since ASTM F1487 criteria is defined for the minimum user through the maximum user (2 through 12 years of age), the requirements for the infant or pre-toddler age group are not prescribed. This specification and Section 32 18 16.13 PLAYGROUND PROTECTIVE SURFACING establish the requirements for the infant and pre-toddler age groups.

1.3.2 Child Accessibility

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NOTE: Facilities will be accessible in accordance with TI 800-01 and 36 CFR 1191, Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities. Ensure that elevated play events will reasonably accommodate a user with mobility impairments. One access and egress point for a furnished play event must meet accessibility. Some play events will need to be installed higher to accommodate the transfer system. The maximum equipment height should be reduced to lower the cost of the transfer system. Ensure all children are accommodated on the playground in a 'play for all' socialization skill development environment. When children with disabilities are allowed to choose play events, they are more eager to learn the skills necessary to participate.

****

The accessibility requirement in accordance with ASTM F1487 includes the following: When the play event use zone consists of a protective surfacing rated as inaccessible, provide at least one accessible route from the use zone perimeter to the play event. When there is more than one of the same play activity provided, only one must meet accessibility requirements (i.e., one swing seat or one spring rocking play event). When the access and egress points are not the same for a play event, provide an accessible route to both. The accessible route must access all accessible play events and elements. The protective surfacing performance requirements must be in accordance with Section 32 18 16.13 PLAYGROUND PROTECTIVE SURFACING.

1.3.3 Age Groups

Play areas are designed to provide challenging play activities by age group. Design playground equipment to be age appropriate for the age group designated to use it. There is no anthropometric or fall attenuation significance to the discrepancy for the school-age age group between paragraph CHILD DEVELOPMENT CENTERS (CDC) and paragraph PLAYGROUND AREAS OTHER THAN CDC as described below. The Army age groups are defined as follows:

1.3.3.1 Child Development Centers (CDC)

The age groups accommodated by the CDC program range from 6 weeks through 8 years of age defined as the following: infant age group (6 weeks through 12 months); pre-toddler age group (12 through 24 months); toddler age group (2 through 3 years of age); pre-school age group (3 through 5 years of age); and school-age age group (5 through 8 years of age).

1.3.3.2 Playground Areas Other Than CDC

The age groups accommodated at these areas range from less than 12 months through 12 years of age defined as the following: infant age group (less than 12 months); pre-toddler age group (12 through 24 months); composite toddler/pre-school age group (2 through 5 years of age); school-age age group (5 through 9 years of age); and pre-teen age group (9 through 12 years of age). A multi-age playground consists of the following age groups: infant, pre-toddler, and composite toddler/pre-school age groups.

1.3.4 Equipment Identification

Identify playground equipment with attached and durable label stating the age-group that the equipment is designed to accommodate. Provide permanent WARNING labels and manufacturer's identification labels, ASTM F1487. Submit a list to include part numbers of furnished play event and equipment materials and components.

1.4 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office

(Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Configuration

Shop Drawings

Fall Height

Finished Grade and Underground Utilities

SD-03 Product Data

Equipment

Equipment Identification

Delivery, Storage and Handling

Manufacturer Qualification

Wood

Spare Parts

Materials

[Recycled content for steel components; S]

[Recycled content for stainless steel components; S]

[Recycled content for aluminum components; S]

[Recycled Content for plastic molded as deck material; S]

[Recycled Content for plastic molded as rails; S]

[Recycled Content for Plastic Molded as roof planks or pickets; S]

SD-04 Samples

Color

SD-06 Test Reports

Wood Finishes

SD-07 Certificates

Materials

Manufacturer Qualification

Installer Qualification

Manufacturer's Representative

Wood Treatment

Substitution

Play Event Modification

Child Safety and Accessibility Evaluation

[Certified sustainably harvested wood components; S]

SD-10 Operation and Maintenance Data

Maintenance Instructions

SD-11 Closeout Submittals

Maintenance Instructions

[1.5 CERTIFICATIONS

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NOTE: Use certified sustainably harvested wood wheresuitable for application and cost effective. Sustainably Harvested Wood is a product which comes from a third-party Forestry Certification Program and thus carries certain characteristics: 1) Protection of biodiversity, species at risk and wildlife habitat, sustainable harvest levels, protection of water quality, and prompt regeneration (e.g., replanting and reforestation); 2) Third-party certification audits performed by accredited certification bodies; 3) Publicly available certification audit summaries; 4) Multi-stakeholder involvement in a standards development process; 5) Complaints and appeals process.

Designer must verify suitability, availability within the region, cost effectiveness and adequate competition before specifying these sustainably harvested wood certifications - if these conditions are verified for the project locale, include the following section. For projects pursuing LEED, delete certifications other than FSC; for all other projects allow the entire list of third party certifications.
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1.5.1 Certified Sustainably Harvested Wood

Provide wood certified as sustainably harvested by FSC STD 01 001[, ATFS STANDARDS, CSA Z809-08, SFI 2015-2019, or other third party program certified by PEFC ST 2002:2013]. Provide a letter of Certification of Sustainably Harvested Wood signed by the wood supplier. Identify certifying organization and their third party program name and indicate compliance with chain-of-custody program requirements. Submit sustainable wood certification data; identify each certified product on a line item basis. Submit copies of invoices bearing certification numbers.

]1.6 QUALITY ASSURANCE

1.6.1 Manufacturer Qualification

Play events and equipment similar to those furnished must have been installed in a minimum 10 sites and been in successful service for a minimum 5 year calendar period. The manufacturer must provide a Certificate of Insurance AA rated for a minimum one million dollars covering both product and general liability. Submit name of the owner or user; service or preventive maintenance provider; date of the installation; point of contact and telephone number; and address for 10 sites.

1.6.2 Installer Qualification

The installer must be certified by the manufacturer for training and experience installing the play events and equipment. Submit the installer's company name and address, and training and experience certification.

1.6.3 Manufacturer's Representative

The manufacturer's certified playground safety inspector or the manufacturer's designated certified playground safety representative must supervise the installation and adjustment of the play events and equipment to verify the installation meets the requirements of the manufacturer, this specification, and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. Submit the individual's name, company name and address, and playground safety training certificate.

1.6.4 Technical Representative

1.6.4.1 Child Development Centers (CDC)

The technical representative for outdoor play areas at CDC is the installation Child Development Services (CDS) Coordinator. Base the

design of the CDC outdoor play area on the developmental play program for the age groups accommodated at the CDC. The play area is designed to support the CDC program and to provide a stage set for creative play. Developmental activities are selected which promote the intellectual, social, emotional and physical growth of the children. The developmental play program is developed by the MACOM CDS Director, installation CDS Coordinator and CDC Director. They are responsible for the developmental play program and the selection of play events to meet that program.

1.6.4.2 Playground Areas Other Than CDC

The technical representative for outdoor play areas on sites other than CDCs must be the Director of Public Works or designated representative. Base the design of these outdoor play areas on the play program and the age groups to be accommodated as determined by the play area committee.

1.6.5 Prohibited Equipment

Equipment that does not meet the Army's developmental play program requirements and are prohibited on outdoor play areas include the following: chain balance beams; rotating equipment, such as merry-go-rounds, log rolls, whirls and may poles; fulcrum seesaws (teeter totters); spring rocking equipment intended for standing; animal figure swings; rope swings; multiple occupancy swings; swinging exercise and trapeze bars; swinging platforms; tire climbers; swinging dual exercise rings; roller slides; trampolines; swinging gates or doors; and new or used vehicle tires. Also play houses or enclosures made of horizontal posts or bars with space between them; wood components treated with creosote, pentachlorophenol, and tributyl tin oxide; and wood components coated with a finish containing pesticide.

1.6.6 Shop Drawings

When the use zone perimeter and play event configuration conflict with the requirements and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, submit scale drawings defining the revised use zone perimeters and play event layout and corrective measures to include the following: Adjustment to the play event with the use zone perimeter; use zone perimeter overlaps; hard surface area and pathway widths; structures; exterior plant material and planters; walls and fences; and bare or painted metal platform and slide bed orientation to the direct sun.

1.7 DELIVERY, STORAGE, AND HANDLING

Submit a delivery schedule and manufacturer's name at least 10 calendar days prior to the first day of delivery. Inspect playground equipment, upon arrival at the job site, for meeting age-appropriate requirements for the age-group that the equipment is designated to accommodate, and specified quality in accordance with paragraphs MATERIALS and CONFIGURATION. Equipment must be delivered, handled, and stored in accordance with the manufacturer's recommendations. Remove from the job site prohibited or unacceptable equipment. The storage area must be as designated. Store the materials in a dry, covered area until installed.

1.8 WARRANTY

Furnished play events and equipment must have a minimum 1 year calendar period warranty.

1.9 MAINTENANCE

Submit [two] [_____] bound copies of the manufacturer's operation and maintenance manuals containing the Maintenance Instructions and describing the recommended preventive maintenance, inspection frequency and techniques, periodic adjustments, lubricants, and cleaning requirements. Furnish play event and equipment spare parts provided by the manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS

Provide materials which are the standard products of a manufacturer regularly engaged in the manufacture of play event products. Submit results of assembled play event structural integrity tests; vertical load tests; and the maximum number of users that can be on the play event. Prior to the delivery of materials, submit certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates must include composition and tests to which the material has been subjected.

2.1.1 Metal

Metal components must have factory-drilled holes and be corrosion resistant. The components must be free of excess weld and spatter. Metallic materials must conform to Section 08 31 00 ACCESS DOORS AND PANELS. Components with extra holes not filled by hardware or covered by components must be rejected.

2.1.1.1 Steel

****

NOTE: Use materials with recycled content where appropriate for use. Designer must verify suitability, availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements. A resource that can be used to identify products with recycled content is the "Comprehensive Procurement Guidelines (CPG)" page within the EPA's website at http://www.epa.gov. Other products with recycled content are also acceptable when meeting all requirements of this specification.

Research shows the product is available among US national manufacturers above the minimum recycled content stated.

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Steel components must comply with ASTM A135/A135M, ASTM A500/A500M, or ASTM A513/A513M. Minimum tensile strength must be 310 Mpa 45,000 psi. Minimum yield point must be 225 Mpa 33,000 psi. Provide steel components with pre-consumer recycled content of 40 percent minimum. [Provide data identifying percentage of recycled content for steel components.] Provide stainless steel components with recycled content of 60 percent minimum. Provide data identifying percentage of recycled content for stainless steel components.

2.1.1.2 Aluminum

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NOTE: Use materials with recycled content where appropriate for use. Designer must verify suitability, availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements. A resource that can be used to identify products with recycled content is the "Comprehensive Procurement Guidelines (CPG)" page within the EPA's website at http://www.epa.gov. Other products with recycled content are also acceptable when meeting all requirements of this specification.

Research shows the product is available among US national manufacturers above the minimum recycled content stated.

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Extruded aluminum components must be type 6061-T6, 6062-T6, or 6063-T6, and must conform to ASTM B221M ASTM B221. Minimum tensile strength of extruded aluminum components must be 270 Mpa 39,000 psi, and the minimum yield must be 250 Mpa 36,500 psi. Cast aluminum alloy must conform to ASTM B179, ASTM B26/B26M, and ASTM B108/B108M. Provide aluminum components with recycled content of 40 percent minimum. Provide data identifying percentage of recycled content for aluminum components.

2.1.1.3 Chain

Chain must be a minimum size 4/0 and must be corrosion resistant zinc plated. Polyvinyl chloride coating must be as specified.

2.1.1.4 Rope Cable

Rope cable must be composed of strands of steel cable with a polypropylene or Dacron synthetic covering that is UV stabilized. Cable ends must be capped to prevent fraying.

2.1.1.5 Hardware

Hardware must be corrosion resistant and consist of the following: aluminum, stainless steel, brass, zinc plated steel, zinc-chromate plated steel, or galvanized steel, ASTM A153/A153M. When secured, the hardware must require a tool to prevent unauthorized loosening and removal.

2.1.1.6 Rails, Loops, and Hand bars

Rails, loops, and hand bars must consist of corrosion resistant aluminum, powder-coated steel or galvanized steel. Polyvinyl chloride coating, if provided, must be as specified.

2.1.1.7 Anchors

Anchors must be in accordance with manufacturer's recommendations.

2.1.2 Wood

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NOTE: Use certified sustainably harvested wood where suitable for application and cost effective. Designer must verify suitability, availability within the region, cost effectiveness, and adequate competition before specifying this certification.

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Wood components must be exterior premium grade and free of knots. Wood components must have factory-drilled holes. Components with extra holes not filled by hardware or covered by other components will be rejected. [Provide certified sustainably harvested wood components.]

2.1.2.1 Wood Treatment

Treat wood components that are not naturally rot and insect resistant, by using standard treatment procedures. Any wood placed up to a maximum 150 mm 6 inches above, or any portion below the top elevation of the protective surfacing, must be treated after fabrication. Creosote, pentachlorophenol, and tributyl tin oxide are prohibited according to ASTM F1487. Submit wood treatment chemical content, toxicity level, and life-cycle durability. Submit certifications of wood treatment materials and processes.

2.1.2.2 Plywood

Provide plywood that is a minimum 19 mm 3/4 inch thick exterior premium grade, and adhered with a waterproof glue that will not separate under conditions of prolonged freezing temperatures, extreme heat, or excessive moisture. Face layers must be smooth, fine and tightly grained, free of knots, patches, or surface irregularities. Exposed surface must consist of a material with high paint adhesion and retention characteristics. Edges must be sanded smooth and eased to a minimum 3 mm 1/8 inch radius. Fill voids at edges with epoxy prior to sanding.

2.1.3 Plastic Components

2.1.3.1 Panels

Plastic panels must be molded of ultraviolet (UV) and color stabilized polyethylene or nylon with a minimum 5 mm 3/16 inch thickness, ASTM F1487. Edges must be a minimum 5 mm 3/16 inch radius.

2.1.3.2 Window

Plastic windows must be flat or molded into a bubble shape, consisting of clear polycarbonate plastic a minimum 5 mm 3/16 inch thick before forming in accordance with ASTM D1248. Material must be shatterproof and resistant to crazing, cracking, or fogging.

2.1.4 Plastic Components

Construct or manufacture material with a maximum 6 mm 1/4 inch deflection or creep in any member, ASTM D6112. Submit results of individual component and assembled unit structural integrity test; creep tolerance; deflection tolerance; and vertical load test results.

2.1.4.1 High Density Polyethylene

****

NOTE: Ensure manufacturers supply quality plastic products made from post-consumer recycled high density polyethylene that is equal to the performance of metal or wood by providing tight performance standards. High density polyethylene can be manufactured using post-consumer recycled plastic resins from products such as milk containers. Recommend products using high density polyethylene.

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Mold components of ultraviolet (UV) and color stabilized polyethylene consisting of a minimum 75 percent plastic profile of high-density polyethylene, low-density polyethylene, and polypropylene raw material. The material must be non-toxic, have no discernible contaminates such as paper, foil, or wood, and contain a maximum 3 percent air voids. The material must be free of splinters, chips, peels, buckling, and cracks and be resistant to deformation from solar heat gain. Material must have factory-drilled holes. Components with extra holes not filled by hardware or covered by other components will be rejected. The material must not be painted.

2.1.4.2 Panel

Panels must be a minimum 6 mm 1/4 inch thick; exposed edges must be smoothed, rounded, and free of burrs and points; and the material must be shatterproof and resistant to fading, cracking, or fogging.

2.1.4.3 Structural Component

Recycled plastic materials will not be used as load bearing structural members: framing, beams, columns or posts.

2.1.4.4 Recycled Plastic Molded As Deck Material

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NOTE: Recycled plastic molded as lumber and wood-polymer lumber are susceptible to both creep and deflection; therefore, it cannot be used for a load bearing structural members (framing, beams, columns or posts) of playground equipment. To overcome creep and deflection, the deck product is increased in volume of material and dimension.

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NOTE: Use materials with recycled content where appropriate for use. Designer must verify suitability, availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements. A resource that can be used to identify products with recycled content is the "Comprehensive Procurement Guidelines (CPG)" page within the EPA's website at

http://www.epa.gov. Other products with recycled content are also acceptable when meeting all requirements of this specification.

Research shows the product is available among US national manufacturers above the minimum recycled content stated.

****

For deck or platform construction, the span of the structural support members must be a maximum 300 mm 12 inches on center and recycled plastic decking must connect to a minimum three joists. Material used for decking must have a non-slip texture surface. The assembly must deflect a maximum 1/360 of the span of the frame when exposed to a uniform live load of 585 N/m 40 lbs/ft. The product must meet the structural integrity test requirements, ASTM F1487 and ASTM D6112. Recycled plastic deck material must contain a minimum 95 percent of recycled content. Provide data identifying percentage of recycled content for plastic molded as deck material.

2.1.4.5 Recycled Plastic Molded as Rails

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NOTE: Use materials with recycled content where appropriate for use. Designer must verify suitability, availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements. A resource that can be used to identify products with recycled content is the "Comprehensive Procurement Guidelines (CPG)" page within the EPA's website at http://www.epa.gov. Other products with recycled content are also acceptable when meeting all requirements of this specification.

Research shows the product is available among US national manufacturers above the minimum recycled content stated.

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Recycled plastic rails must contain a minimum 95 percent of recycled content. Provide data identifying percentage of recycled content for plastic molded as rails.

2.1.4.6 Recycled Plastic Molded as Roof Planks or Pickets

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NOTE: Use materials with recycled content where appropriate for use. Designer must verify suitability, availability within the region, cost effectiveness and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements. A resource that can be used to identify products with recycled content is the "Comprehensive Procurement Guidelines (CPG)" page within the EPA's website at http://www.epa.gov. Other products with recycled

content are also acceptable when meeting all requirements of this specification.

Research shows the product is available among US national manufacturers above the minimum recycled content stated.

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Recycled plastic must contain a minimum 95 percent of recycled content. Provide data identifying percentage of recycled content for plastic molded as roof planks or pickets.

2.1.5 Coatings

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NOTE: Regional climatic conditions must be considered when selecting playground equipment. Regions that are extremely hot have considerations for equipment selection that are different from regions with freezing conditions. Contact burn injury or contact skin freezing are serious safety concerns. The coatings of the play equipment become extremely important to avoiding these conditions.

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2.1.5.1 Galvanized

Metal components must be hot-dipped in zinc after fabrication according to ASTM A123/A123M. Remove tailings and sharp protrusions formed as a result of the hot-dip process; edges must be burnished.

2.1.5.2 Polyester Powder

Powder-coated surfaces must receive electrostatic zinc coating prior to painting. Powder coating must be electrostatically applied and must be oven cured. Polyester powder must be in accordance with the following: ASTM D3359 for adhesion; ASTM D173/D173M for flexibility; ASTM D3363 for hardness; ASTM D2794 for impact; ASTM D2454 for overbake resistance; ASTM B117 for salt spray resistance; and ASTM D822 for weatherability.

2.1.5.3 Polyvinyl Chloride (PVC)

Prime PVC coating with a clear acrylic thermosetting solution. The primed parts must be preheated prior to dipping. The liquid polyvinyl chloride must be UV stabilized and mold-resistant. The coated parts must be cured. The coating must be a minimum 2 mm 0.08 inch thick within a plus or minus 0.5 mm 0.020 inch tolerance. The coating must have an 85 durometer hardness, ASTM D3363. The finish must be slip-resistant.

2.1.5.4 Concrete

Provide concrete conforming to [_____].

2.1.5.5 Precast Concrete

Provide precast concrete material conforming to Section 03 45 00 PRECAST ARCHITECTURAL CONCRETE.

2.1.5.6 Cast-In Place Concrete

Provide cast-in-place concrete material in conformance with Section 03 30 00 CAST-IN-PLACE CONCRETE.

2.1.6 Wood Sealants

Exposed wood surfaces must have factory applied prime coat with a minimum [2] [_____] spray coats of two-component polyurethane or approved preservative that meets paragraph WOOD TREATMENT.

2.1.6.1 Paint

Paint must be factory applied to a minimum of 2 coats. Paint must comply with Section 09 90 00 PAINTS AND COATINGS. Paint must be weather resistant, and resist cracking, peeling and fading.

2.1.6.2 Sealants

Seal all applied surfaces from air; sealants containing pesticide are prohibited.

2.1.7 Color

Color must be provided [as indicated] [in accordance with Section 09 06 00 SCHEDULES FOR FINISHES] [_____]. Submit [2] [_____] color charts displaying the colors and finishes.

2.2 EQUIPMENT

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NOTE: Ensure the play events selected are age-appropriate for the age group designated to use them.

Playground Areas Other Than Child Development Centers (CDC): CPSC Pub No 325 and ASTM F1487 both describe the requirements for children from the toddler through pre-teen age group (2 through 12 years of age). Consult Inactive UFC 3-210-04, Children's Outdoor Play Areas, and ASTM F2373 for guidance concerning children in the infant through pre-toddler age groups (less than 12 months through 2 years of age). Exercise caution when using the UFC as some of the code information may be outdated. Coordinate safety aspects with CPSC Pub No 325.

Child Development Centers (CDC): The CDC program accommodates children from 6 weeks through 8 years of age. The CDC outdoor play area requirements for these age groups are defined in the DA Standard Design Package for Child Development Centers and TI 800-01 Design Criteria, Appendix G, Child Development Centers. UFC 4-740-14 Child Development Centers, discusses inspection frequency and preventative maintenance requirements may assist with the selection of playground equipment.

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Submit manufacturer's descriptive data; catalog cuts; references; and the latest edition of ASTM F1487[, ASTM F2373] and CPSC Pub No 325. Manufacturer's specifications, handling and storage requirements, installation procedures, and safety data sheets to include the following: bare or painted metal platform and slide bed orientation from the direct sun; warnings; and child safety performance standards.

2.2.1 Configuration

Provide play event configuration, platform height, fall height, and maximum equipment height [as indicated] [_____]. When the configuration varies from the play event shown, submit scale drawings defining the revised configuration to include the following: equipment layout with the use zone perimeter; designated play surface spot elevations; maximum equipment height spot elevations; platform spot elevations; protective barriers; guardrails; bare or painted metal platform and slide bed orientation; and play events in relationship to the playground layout.

2.2.2 Substitution

Substitutions will not be allowed and play events will not be selected without written approval from the technical representative. Evaluate manufacturer substitutions which increase the play event platform height or maximum equipment height. The increased height requires additional protective surfacing in accordance with paragraph FALL HEIGHT. Submit technical representative's written approval.

2.2.3 Platform Height

Platform height is used to define the age group for age appropriate play events and composite structures. To be age appropriate, the platform height must meet the finished elevations of the age groups in the following paragraphs. For some play events, platform height and paragraph FALL HEIGHT are the same.

2.2.3.1 Pre-Toddler Age Group

Platforms designed for children 12 through 24 months of age must have a finished elevation a maximum 900 mm 36 inches above the finished elevation of the protective surfacing.

2.2.3.2 Toddler Age Group

Platforms designed for children 2 through 3 years of age must have a finished elevation a maximum 1200 mm 48 inches above the finished elevation of the protective surfacing.

2.2.3.3 Pre-School Age Group

Platforms designed for children 3 through 5 years of age must have a finished elevation a maximum 1200 mm 48 inches above the finished elevation of the protective surfacing.

2.2.3.4 School-Age Age Group

Platforms designed for children 5 through 8 years of age must have a finished elevation a maximum 1800 mm 72 inches above the finished elevation of the protective surfacing.

2.2.3.5 Pre-Teen Age Group

Platforms designed for children 8 through 12 years of age must have a finished elevation a maximum 1800 mm 72 inches above the finished elevation of the protective surfacing.

2.2.4 Protective Barrier and Guardrail

Provide protective barriers and guardrails in accordance with paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. This specification establishes the protective barrier and guardrail requirements for the infant and pre-toddler age group.

2.2.4.1 Protective Barrier

The protective barrier for pre-toddler, toddler, and pre-school age groups must be provided on elevated surfaces a minimum 760 mm 30 inches above the protective surfacing. The protective barrier for school-age and pre-teen age groups must be provided on elevated surfaces a minimum 1200 mm 48 inches above the protective surfacing. The protective barrier must completely surround the elevated surface except for the access or egress route. As infants are not to be placed on an elevated surface, the protective barrier for the infant age group must be the same as the crawl wall defined in paragraph MEASURING FALL HEIGHT.

2.2.4.2 Guardrail

The guardrail for pre-toddler, toddler, and pre-school age groups must be provided on elevated surfaces a minimum 510 mm 20 inches above the protective surfacing. The guardrail for school-age and pre-teen age groups must be provided on elevated surfaces a minimum 760 mm 30 inches above the protective surfacing. The guardrail must completely surround the elevated surface except for the access or egress route. As infants are not to be placed on an elevated surface, the guardrail for the infant age group must be the same as the crawl wall defined in paragraph MEASURING FALL HEIGHT.

2.2.5 Sand Table

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NOTE: Ensure sand tables are located where play activity will not restrict or conflict with circulation.

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The sand table with a cover must be as shown. The cover must not be attached to the table. The sand sieve size must be provided as defined in Section 32 18 16.13 PLAYGROUND PROTECTIVE SURFACING.

2.2.6 Multiple-Axis (Rotating) Swing

The swivel mechanism must contain a durable long life bearing to reduce friction and wear. A tire manufactured specifically for a multiple-axis swing must be provided and must weigh a maximum 15.8 kg 35 lb. The tire must be composed of rotationally molded, low density elastomer, and internally reinforced with a steel ring. The tire must have no openings for insects or water. The multiple-axis swing must not be confused with the multiple occupancy swing as they are not the same.

2.2.7 Single-Axis (To-Fro) Swing

2.2.7.1 General Requirements

The swing seat must be molded of high quality rubber or polyurethane with an encapsulated steel reinforcement. The swing seat must be designed to accommodate one user

2.2.7.2 Full Bucket Swing Seat

A full bucket swing seat is designed to accommodate children up to a maximum 4 years of age; the seat is used by a child with adult assistance. The swing seat must be constructed of rubber with a tempered steel insert molded inside, must be double-sided, must be enclosed by rubber both front and back, and must include a 360 degree waist enclosure and leg enclosures. Leg enclosures must be sized to avoid head or neck entrapment. Finish must be smooth and edges must be rounded. These swing seats must not be mixed with other swing seats within a bay.

2.2.8 Spring Rocking Equipment

Spring mechanisms must conform to the requirements for pinch, crush, and shear points for a maximum 54 kg 120 lb weight limit in accordance with ASTM F1487. Seats must be designed to accommodate only the intended number of users.

2.2.9 Roofs

Roofs must contain no designated play surface.

2.2.10 Sliding Poles

Sliding poles must be a maximum 48 mm 1.9 inch diameter and a continuous surface with no protruding welds or joints along the sliding area.

2.2.11 Plastic Slide

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NOTE: Plastic is the preferred slide material, and must be installed to face in any direction but north.
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The slide must be molded of UV stabilized polyethylene or nylon with minimum of 5 mm 3/16 inch wall thickness. The edge must be a minimum 5 mm 3/16 inch radius, ASTM D1248, Type II, Class A, Grade G4.

2.2.12 Play House or Enclosures

Provide the play house with a shelf at the window. The play house and enclosures will be designed to provide other than direct outside visibility from a minimum 1.5 m 5 feet to all inside corners.

PART 3 EXECUTION

3.1 SITE PREPARATION

3.1.1 Finished Grade and Underground Utilities

Submit finished grade, underground utilities, storm-drainage system and irrigation system status; and location of underground utilities and facilities. Verify that finished grades are as indicated; the smooth grading has been completed in accordance with Section 31 00 00 EARTHWORK; installation of the underground utilities through the area has been completed in accordance with Section 31 00 00 EARTHWORK; installation of the storm-drainage system through the area has been completed in accordance with Section 33 40 00 STORMWATER UTILITIES; and the installation of underground sprinklers through the area has been completed in accordance with Section 32 84 24 UNDERGROUND SPRINKLER SYSTEMS. The location of underground utilities and facilities in the area of the operation must be verified. Damage to underground utilities and facilities must be repaired at the Contractor's expense.

3.1.2 Layout

3.1.2.1 General

The layout of the entire outdoor play area must be staked before excavation begins to include the following: all play event configuration access and egress points; use zone perimeters; hard surface areas and pathway widths; exterior plant material and planters; walls and fences; and structures. Provide sufficient space between all adjacent play events and individual play events for play activities and circulation. Moving and rotating play events must be located away from circulation to prevent collisions.

3.1.2.2 Use Zone

The use zone is associated with the following terms; "Clear Area," and "Fall Zone". The use zone must be free of hard surfaces, objects or obstacles that a child could run into or fall on top of and be injured. The use zone must consist of protective surfacing in accordance with the requirements of Section 32 18 16.13 PLAYGROUND PROTECTIVE SURFACING. Use zone perimeters must not overlap hard surfaces. The use zone perimeter must meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. Use zone perimeters must not overlap except for certain play events as defined in ASTM F1487.

3.1.3 Orientation

Bare or painted metal platforms and slide beds must be oriented from the direct sun; or shaded to reduce contact burn risk. Play events that require orientation to adjacent play events or to meet visibility requirements must be properly oriented.

3.1.4 Obstructions Below Ground

When obstructions below ground affect the work, submit shop drawings showing proposed adjustments for approval.

3.2 INSTALLATION

Play events must be installed according to the manufacturer's recommendations and as shown to meet the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.2.1 Play Event Modification

Site modifications of play events affect the coverage provided in paragraph WARRANTY; therefore, play events and equipment must not be modified without the written approval of the manufacturer. Submit manufacturer's written approval.

3.2.2 Wood Finishes

Field applied or touch up of wood finishes must meet the same specifications as finishes applied at the factory. Submit wood finish chemical content and toxicity level.

3.2.3 Plastic Play Events

Plastic and recycled plastic components must be connected by stainless steel hardware. The hardware must be countersunk. Recycled plastic molded as lumber or wood-polymer lumber must be installed in accordance with the manufacturer's recommendations.

3.2.4 Footings

The top elevation of play event footings will be installed at the subbase of the protective surfacing.

3.2.5 Multiple-Axis (Rotating) Swing

The multiple-axis (rotating) swing must be located away from other play events and circulation. It must not be attached to a composite structure.

3.2.6 Single-Axis (To-Fro) Swing

The single-axis (to-fro) swing must be located on the perimeter of the outdoor play area. It must not be attached to a composite structure.

3.2.7 Slide

The required exit region clear area must be provided in accordance with ASTM F1487.

3.2.8 Chain or Rope Ladder, Climber or Net Climber

A chain or rope ladder; climber; net climber; and similar components must be installed in the vertical position. Angled or arch positions are not accepted.

3.2.9 Composite Structure

The composite structure use zone perimeter must be composed of the use zone perimeters of the play events that, when joined together, comprise the composite structure.

3.2.10 Fall Height

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NOTE: To assist manufacturers in providing the required depth of protective surfacing, the fall height and the maximum equipment height dimensions and spot elevations for each play event must be shown on the drawings.

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3.2.10.1 General

The fall height is defined as the vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it. For some play events the fall height and paragraph PLATFORM HEIGHT are the same. For some play events the fall height and maximum equipment height are the same. When the furnished play event fall height varies from the play event shown, submit scale drawings defining the revised depth or type of protective surfacing to meet or exceed the requirements of Section 32 18 16.13 PLAYGROUND PROTECTIVE SURFACING must be provided.

3.2.10.2 Measuring Fall Height

EQUIPMENT	MEASURING FALL HEIGHT
Composite Structure	For a platform surrounded by protective barriers, measure from the platform finished elevation.
	For a platform surrounded by guardrails, measure from the guardrail top elevation.
Infant Crawl Area	A maximum 600 mm 24 inch height, measured from the crawl wall or barrier finished elevation.
Playhouse, Nonclimbable	Measure from the designated play surface finished elevation.
Spring Rocking Equipment	Measure from the seat top elevation.
Stationary Equipment, Climbable	Measure from the maximum equipment height finished elevation.
Stationary Equipment, Nonclimbable	Measure from the designated play surface finished elevation.
Swing	Measure from the bottom of the pivot point.

3.2.11 Signage

For playground areas other than CDC, durable permanent signage must be provided to identify the age group the equipment is designed to accommodate. Signage must be in accordance with Section 10 14 00.10 EXTERIOR SIGNAGE.

3.3 RESTORATION AND CLEAN UP

When the operation has been completed, clean up and protect the site. Existing areas that have been damaged from the operation must be restored to original condition at the Contractor's expense.

3.3.1 Clean Up

The site and play events must be cleaned of all materials associated with the operation. Play events and surfaces must be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents must be as recommended by the manufacturer. Required labeling must be undamaged and visible in accordance with paragraph EQUIPMENT IDENTIFICATION.

3.3.2 Protection

The area must be protected as required or directed by providing barricades and signage. Signage must be in accordance with Section 10 14 00.10 EXTERIOR SIGNAGE.

3.3.3 Disposal of Materials

Excess and waste material must be removed and disposed off Government property.

3.4 CHILD SAFETY AND ACCESSIBILITY EVALUATION

a. When the protective surfacing is installed the play events and protective surfacing must be thoroughly inspected and measured to verify the playground meets manufacturer's recommendations, paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, and paragraph FALL HEIGHT.

b. The play events must be age appropriate for the age group using them in accordance with paragraph PLATFORM HEIGHT. Determine 1) secure anchoring; 2) all hardware and connectors are tight; 3) all hardware and connectors require tools to loosen; 4) all hooks are closed; 5) head and neck entrapment; 6) sharp points, edges, and protrusions; 7) entanglement; 8) pinch, crush, and shear points; 9) suspended hazards; 10) all component holes are filled; and 11) recycled plastic components used as load bearing structural members.

c. Use zone distances must be measured to determine the area is free of hard surfaces, objects or obstacles. Determine exceptions to use zone overlaps occur in accordance with paragraph USE ZONE. Play event fall height must be measured and compared to critical height value for thickness of installed protective surfacing. The slide exit region must have the required clear zone. Play events and surfaces must be properly oriented. Chain, rope, net climbers or similar components must be installed in a vertical position. Swing seat clearances must be measured while occupied by a maximum user for the age group using the equipment. Warning labels and manufacturer identification labels must be visible in accordance with paragraph EQUIPMENT IDENTIFICATION.

d. Play events that do not comply must be reinstalled. Fasteners, anchors, hardware and labels that do not comply must be replaced. Ensure positive drainage for the area and the lowest elevation of protective surfacing subgrade has been provided. A written report describing the results of the evaluation must be provided.

e. Submit records of measurements and findings by the certified playground safety inspector. Submit verification stating that the installed play events and equipment meet manufacturer's recommendations and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.5 RE-INSTALLATION

When re-installation is required, accomplish the following: Re-install the product as specified. Provide new replacement materials supplied by the manufacturer. Material acquisition of replacement parts is the responsibility of the Contractor. Damage caused by the failed installation must be repaired at the Contractor's expense.

-- End of Section --