

## SECTION 10 - SPECIAL REQUIREMENTS FOR WATERSLIDES

### APPLICATION

Water Slides are amusement devices as defined in Australian Standard AS 3533 - 1997 *Amusement rides and devices*.

### 10.1 STRUCTURAL ADEQUACY

The design of waterslides, and all materials used, shall comply with structural engineering practices and requirements. Structural engineering certification shall be provided for both the design phase, prior to approval to construct and also the installation, prior to issuing the certificate of compliance.

Waterslides shall be constructed with a durable structure, and be capable of carrying loads in excess of the number of persons that would normally be in the flume. The structure shall be capable of sustaining the most adverse combination of loads.

### 10.2 FLUME (SLIDE) DESIGN AND CONSTRUCTION

#### 10.2.1 General Considerations

Waterslides shall be designed to ensure maximum safety.

All materials used for construction shall be durable, water resistant, easily cleaned and maintained.

The flume shall be designed to take into account human size, weight and movement, to ensure that the rider stays within the pre-determined design path of the flume and cannot be thrown out of the flume.

All 'user contact' surfaces shall be assembled, arranged and finished smooth to prevent bodily injury or abrasion to the riders.

Flume path design shall have a configuration to ensure that under normal use, rider speeds will be maintained within the intended design range.

The flume exit configuration shall provide the rider with a safe deceleration from the ride speed to zero velocity in the landing area.

All water should be contained within the flume and landing pool area. Where water leakage and 'splash out' from the flume and landing pool occurs, suitable drainage and protection from under structure erosion is required.

#### 10.2.2 Curves and Turns

The manufacturer shall demonstrate, or provide evidence to illustrate/certify that the angle of curves and turns has been considered with respect to public health and safety.

Sharp turns in quick succession shall be avoided, especially in conjunction with accelerator drops.

Attention shall be given to location and radius of bends and drops in areas of high speed.

Flumes shall be designed to minimise rider impact with the walls.

Curved portions of the flume shall be banked, so that riders are retained safely inside the flume under all foreseeable circumstances of operation.

All undulations, turns, drops and other configurations shall be provided with smooth transitions to minimise impacts.

### **10.2.3 Angle of Descent**

Optimal descent rates shall be in accordance with slide specifications. The manufacturer shall demonstrate, or provide evidence to illustrate/certify that the angle of descent has been considered with respect to public health and safety.

### **10.2.4 Speed**

The manufacturer shall demonstrate, or provide evidence to illustrate/certify that the slide speed has been considered with respect to public health and safety.

### **10.2.5 Tube Diameter**

The diameter of the tube shall be in accordance with the design criteria of the slide.

The manufacturer shall demonstrate, or provide evidence to illustrate/certify that the tube diameter has been considered with respect to public health and safety.

### **10.2.6 Point Of Entry**

All waterslides shall be equipped with a system to regulate entry of patrons into the flume.

Handrails/grip rails shall be designed to reduce risk to the rider, especially to hands or other body parts.

### **10.2.7 Fibreglass**

Where a flume is constructed of fibreglass, it shall be manufactured with a UV stabilised gel coat on the outer tube layer, and an acid-resistant 'sanitary grade' gel coat on the inner tube layer.

The gel coat should be an 'iso NPG' (pool grade) gel coat.

### **10.2.8 Drainage**

Adequate drainage shall be provided at the base of the structure to ensure that any spillages over the sides of the flume are quickly drained to grass areas or floor drains.

## **10.3 FLUME EXIT TO LANDING POOL**

### **10.3.1 General Design**

The flume discharge section shall be graded in such a manner so as to reduce risk to the rider on discharge into the landing pool.

The flume exit shall be designed to minimise risk of injury from riders falling back onto the flume on discharge (eg bull nosed lip, rubber compounds, covers etc).

### **10.3.2 Point of Exit**

All flume sections shall be constructed to meet the design performance criteria. The designer shall specify/certify to the approving authority that the flume exit section has been considered with respect to public health and safety.

### **10.3.3 Clearance**

The flume shall have adequate clearance from obstructions on each side to prevent rider collisions.

Multiple flumes shall have an adequate clearance between flumes.

## **10.4 LANDING POOL**

### **10.4.1 General Design**

The landing pool should be:

- Either a designated or marked-off area (that will reduce risk to the rider or pool user), or preferably, a dedicated pool for water slide use only, whilst the slide is in use.
- Clear of obstructions over the adequate stopping distance of a rider. The stopping distance is to be designated in the slide parameters.
- Free from any pool grates or drains within the landing area.

Exit points from the landing pool shall be clearly marked/labelled.

The internal surfaces of the landing pool shall be smooth, free of sharp edges and slip resistant.

Wall and floor junctions shall be rounded to a radius of 150 - 300mm.

Pool coping shall be rounded, and constructed from non-slip materials, enabling them to be used as a hand-hold by riders in the pool.

#### **10.4.2 Wall and Floor Colour**

The colour of wall and floor finishes shall be no darker than the colours listed in Appendix 1, as defined by AS 2700.

Prior to construction commencing, samples of the proposed landing pool colour/s shall be submitted to the appropriate authority for approval.

### **10.5 ACCESS LADDERS AND STAIRWAYS**

All flume access ladders and stairways shall comply with Appendix 5 of this Code.

### **10.6 WATERSLIDE OPERATION - SAFE RIDER SPEEDS**

Qualified, competent and other responsible personnel, who supervise, or have overall responsibility for a waterslides operation, shall have in place policies and procedures that demonstrate they have considered the following factors influencing rider descent speeds, when supervising, or operating waterslides to ensure their safe operation:

#### **10.6.1 The Angle of the Flume Descent**

Increased flume descent angles increase rider speeds.

#### **10.6.2 The Quantity of Water Flow on the Flume**

Increasing the water flow rate tends to slow larger and heavier riders down, but can have the opposite effect on small children of lesser body weight, thus providing a moderating effect on sliding speed.

#### **10.6.3 Body Weight**

Body weight has a direct bearing on rider speeds.

- Heavier riders tend to travel faster than lighter riders.
- This factor must be taken into account when determining time intervals between riders entering and exiting the flumes.

#### **10.6.4 The Coefficient of Friction**

The coefficient of friction between the rider and the flume varies with costume types and skin condition.

- Nylon costumes slide well, but baggy cotton shorts can increase friction, slowing the rider down.
- Skin condition has less influence; however, the application of excessive sun-tanning oils or similar preparations can decrease the coefficient of friction, increasing rider speeds.
- Children of small build with cotton tee-shirts and shorts may have difficulty in sliding, whereas a large rider of solid build and wearing copious amounts of tanning oil (and nylon costume) can expect a quick ride.