

Case 1/2019

Issue: Use of proprietary R-CAST[®] monolithic acrylic panels for construction of side walls at an indoor waterslide

Recommendation: To accept the use of proprietary R-CAST[®] monolithic acrylic panels for construction of side walls at an indoor waterslide with the following conditions: -

- (i) Maximum permissible tensile and flexural stress of the acrylic panel adopted as 4.83N/mm^2 (700psi) with a factor of safety 12.84 and 20 respectively.
- (ii) Provision of an extra 15mm thick acrylic material to allow for the need of removal of weathered layer (7.5mm for dry-side and 7.5mm for wet-side) in future.
- (iii) Destructive tensile tests to ASTM D638, flexural tests to ASTM D790 and shear tests to ASTM D732 carried out on the acrylic samples which will be cut out from the same batch of acrylic panels, with results satisfying the acceptance criteria.
- (iv) Proper maintenance of the acrylic panels throughout its design life with a maintenance manual compiled by the RSE. To ensure the owner of the indoor waterslide aware of the maintenance requirements of the acrylic panel and follow the maintenance requirements as specified in the maintenance manual properly, RSE undertakes to ensure the maintenance requirements will form part of the maintenance manuals as attached to the owner's manual.

Decision: Having noted the background information and arguments together with the clarifications made by the RSE, members endorsed the recommendation on a case-by-case basis subject to the following additional conditions:

- (a) The RSE should ensure that the selected samples for the strength tests are representative. The sampling and testing process should be carried out or witnessed by an independent professional who should not be an employee of the supplier;
- (b) Upon completion of the works, RSE should submit the Maintenance and Inspection Manual to the satisfactory of the Buildings Department. The Maintenance and Inspection Manual should include, but not limited to, the following information:

- (i) those harmful substances that would cause severe damage to acrylic panels;
- (ii) acceptable cleaners/biocides/polishes; and
- (iii) measures to limit the maximum thickness of weathered layer of acrylic material removed within any 10 years period not exceeding 1.5 mm on either face of the panel.

Reference should be made to the Mandatory Appendix V of ASME PVHO-2-2012 – Safety Standard for Pressure Vessels for Human Occupancy: In-Service Guidelines. Approval drawings should also be included in the Manual for the owner’s reference.