

Case 18/2022

Issue: Use of Reynolds R-CAST[®] monolithic acrylic panel

Recommendation: To accept the use of proprietary Reynolds R-CAST[®] monolithic acrylic panel for construction of the side walls of an indoor swimming pool and two outdoor swimming pools with the following conditions: -

- (a) Maximum long-term 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 while maximum short-term (with wind loads) permissible tensile and flexural stress of the acrylic panel adopted as 6.04N/mm^2 (875psi) with a factor of safety 10.26 and 16.06 respectively.
- (b) Deflection limit of the cantilevered acrylic panel adopted as $L/30$ of the span.
- (c) 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.
- (d) 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.
- (e) Proper maintenance of the acrylic panel throughout its 50 years design life with a maintenance manual compiled by the RSE. Maintenance inspections will be conducted by a qualified person at interval of 1.5 years at the first 10 years of the design life and at time interval of 1 year after the first 10 years of the design life. To ensure the owner of the outdoor and indoor swimming pools aware of the maintenance requirements of the acrylic panels and follow the maintenance requirements as specified in the maintenance manual properly, AP & RSE undertakes to ensure the maintenance manual of acrylic panel will form part of the maintenance manuals as attached to the deed of mutual covenant.

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 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 (the Manual) to the satisfactory of the Buildings Department. The 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 1.5mm on either face of the panel.

Reference should be made to the Mandatory Appendix V of ASME PVHO-2-2019 – 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.