

June 2, 2020

Project B2004610

Mr. Ghislain Beauregard, President
Arcoplast, Inc.
106 Crafton Drive
O'Fallon, MO 63366

Re: Arcoplast Wall and Ceiling Panels Limited Structural Peer Review
National Biocontainment Laboratory
Upper Hutt, New Zealand

Dear Mr. Beauregard:

At the request of Arcoplast, Inc., O'Fallon, MO., U.S.A., Braun Intertec Corporation has prepared this third party limited structural performance peer review of the installed Arcoplast wall and ceiling panels in the National Biocontainment Laboratory (NBL), located in Upper Hutt, New Zealand. This new laboratory structure is owned and operated by the Ministry for Primary Industries in New Zealand and was substantially completed in the spring 2019. The building has some 3,400 square meters (approx. 36,600 sq. ft.) of interior floor space and the Arcoplast wall and ceiling biocontainment panels are installed throughout the many laboratory spaces in this new facility.

Overview of our Structural Peer Review of Arcoplast Panels Documents

Our technical documents review was limited to the available construction documents related to the Arcoplast wall and ceiling panels installations, data sheets, and past testing performance reports provided to us. In reviewing these product related documents, it is our understanding that the panels' installation performance must resist without assembly failure, a negative pressure of up to 3000 Pascals. (0.435 psi). The following is a summary of documents reviewed by Braun Intertec:

- Project Specification Sections 019140 – Room Leak Testing, 066200 – GFRPC Wall Panels
- Report of Mechanical Test (November 2016), St. Louis Testing Laboratory
- Structural Framing Calculations (July 2018), Redco NZ Ltd.
- Inspection and Site Visit Reports, Photos, Shop Drawings (2018 – 2019), Redco NZ Ltd., The Fletcher Construction Company Ltd.
- Sheet A-522-REV.M, Interior Details – Arcoplast System (November 2015), CCM Architects
- Arcoplast *Acryloyl EP* Panels Brochure (June 2019), Arcoplast, Inc.
- Window Panel Pressure Decay Study Report (June 2014), Technical Safety Services, Inc.
- Various website reviews on biocontainment facilities design and testing standards

In our review of the ceiling and wall panels tests performed by St. Louis Testing Labs, the test specimens were installed as a typical composite Arcoplast EP panel to standard light gauge metal stud framing, very similar to the support framing we see in the NBL structure. The Arcoplast structural adhesive provides the chemical bonding between the 12.5 mm (1/2") and ceiling 9.5 mm (3/8") biocontainment panels and the light gauge steel framing. As an assembly, these particular tests indicate that maximum loads to the ceiling and wall panels varied between some 15kPa to 30kPa to failure, far in excess of the stated goal of resisting a negative pressure of -3kPa (3000 Pascals, or 0.435 psi).

The technical specifications for the Acryloyl Engineered Polymer ceiling and wall panels, Section 066250, specifies that the Arcoplast panels are the 'Basis of Design' product. The physical properties listed in this specification requirement appear to be met or exceeded by the Arcoplast panels that were installed in the facility. In the Commissioning section of this specification, there is also the reference to the Room Leak Testing specification, Section 019140. In paragraph 3.3 for the air fan pressurization testing, a negative air pressure of -500 Pascals through the duration of the smoke pencil testing is required. The testing space acceptance criteria for the various rooms then is specified to be maintaining a negative room pressure of -200 Pascals +/- 50 Pascals for a period of at least 20 minutes.

Finally, the Common Fire Alarm Testing at the PC3 Level (March 2019) reported by Merrick Co. included a negative air pressure test that reached approximately -1300 Pascals (0.19 psi) without apparent damage to the Arcoplast ceiling and wall panels, and this negative pressure test exceeds the standard -500 Pa criteria for these biocontainment spaces, and further exceeds the minimum performance parameters in the above noted specifications.

In conclusion, our third party peer review of the Arcoplast ceiling and wall panels installed at the National Biocontainment Laboratory in Upper Hutt, New Zealand, would suggest that these biocontainment ceiling and wall panels, when constructed in conformance to the manufacturer's standards and project specifications, should perform as intended, even up to as much as -3000 Pascals negative room air pressure for the test standard of 20 minutes. This value in our opinion, appears to exceed standard requirements when compared to the project specifications criteria and in researching similar lab testing criteria.

Thank you for the opportunity to provide you this peer review of the Arcoplast panels being used at the impressive National Biocontainment Laboratory in Upper Hutt, New Zealand.

General

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in our profession. No warranty, express or implied, is made.

The information, observations, and opinions stated in this report are based upon our review of documents provided to Braun Intertec by the manufacturer or prime contractor, and are based upon our professional engineering judgment and professional practice.

To have questions answered, please call Richard McGuire at 913.647.5006.

Sincerely,

BRAUN INTERTEC CORPORATION



Richard R. McGuire, PE (USA)
Principal Engineer

Reviewed by:



Jason S. Hanlon, PE (USA)
Principal Engineer