

This is a very Important pre-note prior to reading the following summary:

The NRC were supplied with a standard size flood barrier (31.5") and at the stage of testing were not aware that XeroFlood could and still can be manufactured in all different heights.

Performance of XeroFlood Flood Barriers in Comparison to Competitors

This report evaluates the effectiveness of temporary flood retrofit measures, focusing on residential opening barriers, through two phases of testing conducted by the National Research Council of Canada (NRC). Funded by Architecture Sans Frontières Québec (ASFQ) and Canada Mortgage and Housing Corporation (CMHC), the study aimed to assess Canadian building standards and the performance of proprietary and traditional flood barriers under realistic flood conditions, including hydrostatic pressure, wave action, and debris impacts. A key focus was the proprietary XeroFlood barriers, which were compared to traditional measures (e.g., sandbags, plywood) and other commercial systems.

XeroFlood Performance Highlights

1. Leakage Rates Under Hydrostatic and Wave Conditions

- **XeroFlood Full-Sized Cushion:** Demonstrated superior performance, with negligible leakage rates under static water depths. It outperformed sandbags and plywood, which exceeded ANSI 2510 thresholds by orders of magnitude.
- **XeroFlood Regular Cushion:** Performed well at lower water depths but experienced leakage due to wave overlapping at higher depths, particularly under irregular wave conditions (see pre-note). Despite this, it maintained better sealing than traditional barriers.

2. Comparison to Competitors

- **Traditional Measures:** Sandbags and plywood consistently failed to meet ANSI 2510 standards. Sandbags leaked heavily through gaps between bags and the foundation, while plywood exhibited linear leakage increases with water depth.
- **Proprietary Barriers:**
 - **DamEasy:** Failed catastrophically under wave action, detaching from the opening despite low leakage initially.
 - **Stormmeister Flood-Resistant Door:** Leaked through its seal and failed under debris impacts (140 J energy, below ANSI's 600 J threshold).
 - **RS Stepanek and Aqualock:** Showed moderate performance but struggled with installation challenges and minor leakage (e.g., Aqualock's 0.0039 m³/m/h leakage due to seal saturation).

3. Resilience to Dynamic Loads

- XeroFlood barriers resisted displacement better than competitors. However, the regular cushion's partial coverage (0.90 m height) allowed overlapping during high waves, **highlighting the importance of barrier height relative to water levels** (see pre-note).

Ease of Installation

XeroFlood barriers scored highly in usability, requiring minimal time, labor, or expertise. Installation involved non-skid tape on the Blueskin membrane surface, following straightforward manufacturer guidelines. In contrast:

- **Sandbags** scored poorly due to labor-intensive setup.
 - **Aqualock Window Protector** and **Stormmeister Log-Type Barrier** required complex installations, including mechanical fasteners and adhesives.
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Key Findings and Recommendations

1. XeroFlood Advantages:

- Effective sealing under static and moderate wave conditions.
- User-friendly installation compared to rigid or semi-permanent systems.
- Reusable and adaptable to multiple opening sizes.

2. Limitations:

- Partial-coverage barriers (e.g., XeroFlood Regular Cushion) risk overlapping in high-wave scenarios (see pre-note).
- Performance discrepancies vs. ANSI 2510 certifications suggest installation surface (e.g. Blueskin membrane vs. concrete) and user expertise influence results.

3. Recommendations:

- Develop Canadian-specific testing protocols to account for regional conditions (e.g., ice, salinity).
 - Improve barrier design for wave overlapping (see pre-note)
 - Prioritize public education on proper installation to minimize leakage from user error.
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Conclusion

XeroFlood barriers emerged as a leading solution for residential flood protection, balancing ease of use with reliable performance. While traditional measures like sandbags and plywood proved inadequate, even proprietary systems faced challenges under extreme conditions. The study underscores the need for standardized, context-specific testing and highlights XeroFlood's potential as a benchmark for future flood mitigation strategies.