

Support Surface Materials and Design Innovation:

Preventing Fluid Ingress and Maximizing Investment Returns for Hospitals

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Frequent Damage Seen With Other Leading Manufacturers



Construction: Top cover material is eroded by harsh chemical cleansers

Result: Degraded waterproofing material allows for fluid ingress



Construction: Sewn seams create thousands of holes in cover

Result: Holes allow fluid to permeate the interior components



Construction: Fiberglass fire barrier breaks down over time and is chemically treated.

Result: No longer offers fire protection

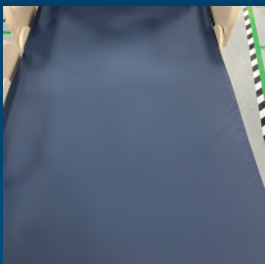


Construction: Unprotected interior components

Result: Fluid ingress and contamination of interior components, requires full replacement of the surface for patient safety

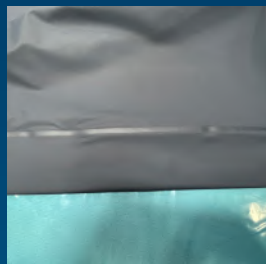


Damage Prevented with Innovative Support Surface Construction



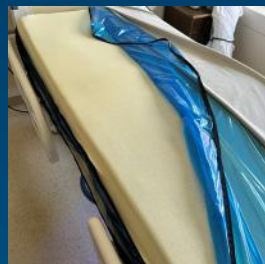
Construction: Specially formulated top cover fabric

Result: No delamination of waterproofing, maintains integrity, and no fluid ingress



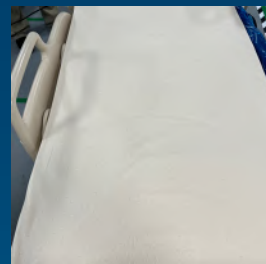
Construction: RF-welded seams permanently bond the material on a molecular level

Result: Avoiding holes to join fabric prevents fluid intrusion



Construction: Fiberglass-free fire barrier

Result: Remains intact over time ensuring adequate fire protection



Construction: Welded shield protected interior components

Result: The welded shield prevents fluid ingress to interior components if top cover would get damaged, further preventing full replacement



INTRODUCTION

Fifty percent of acute care support surfaces are compromised within 3.8 years with an increase in failure odds of 67.6% with each additional year of age.¹ Compromised surfaces have a 5.83 times greater risk for cross-contamination than that of controls.² The FDA recommends regular inspection of the top cover and internal components for fluid ingress and damage and replacing those damaged covers and surfaces to reduce the risk of infection to patients.³ Replacing surfaces is costly. Preserving their integrity prevents not only infections but also unnecessary spend. Innovative surface materials/construction was assessed to understand the impact on fluid ingress/cross-contamination and improved lifespan.

METHODS

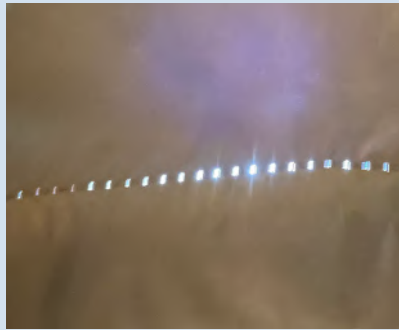
Surfaces considered patient-ready for use were thoroughly inspected to observe fluid ingress/contamination. First, the top covers were inspected for holes, tears or internal staining. Then, the top cover was removed to inspect internal components for damage and staining. With any sign of fluid ingress into internal components, the recommendation is to replace the surface to prevent cross-contamination. Surfaces from various manufacturers were inspected to understand how different constructions impacted surface longevity.

Significant Differences Between Typical and Innovative Construction

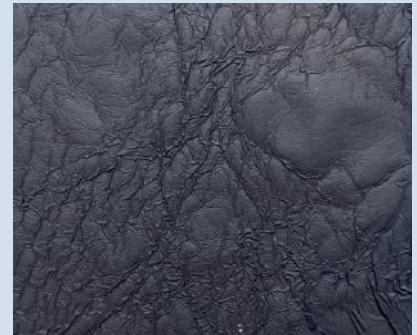
Typical Construction



Typical design allows any fluid ingress to immediately damage internal components — likely requiring full asset replacement.

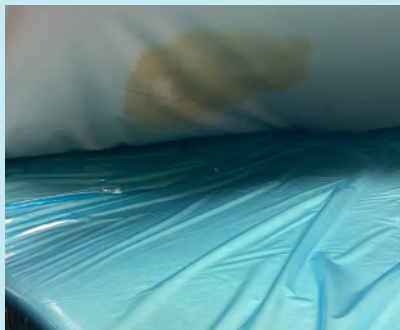


Traditional sewing methods punch thousands of holes into the fabric, creating openings for fluid ingress along every seam.



Most top cover fabrics lose their waterproofing when exposed to disinfecting chemicals — allowing for fluid ingress (*photos: 5 days in bleach*).

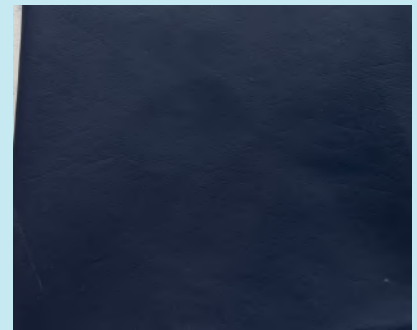
Innovative Construction



CoreShield™ liner protects the internal components from potential fluid ingress and damage — likely requiring only top cover replacement.



RF-welding avoids holes altogether, joining fabrics using radiofrequency.



Highly chemically resistant fabrics withstand harsh cleaning protocols and help maintain a waterproof covering (*photos: 10 days in bleach*).

RESULTS

Across 76 facilities, 849 surfaces with an average age of 6 years were inspected. One hundred and three (103) surfaces contained a welded-shield to prevent fluid ingress to the internal components if the top cover was damaged. None of these surfaces required full replacement. Of the remaining 743 without a welded-shield, 75% (556) sustained internal damage requiring full surface replacement.

Surfaces Requiring Full Replacement:

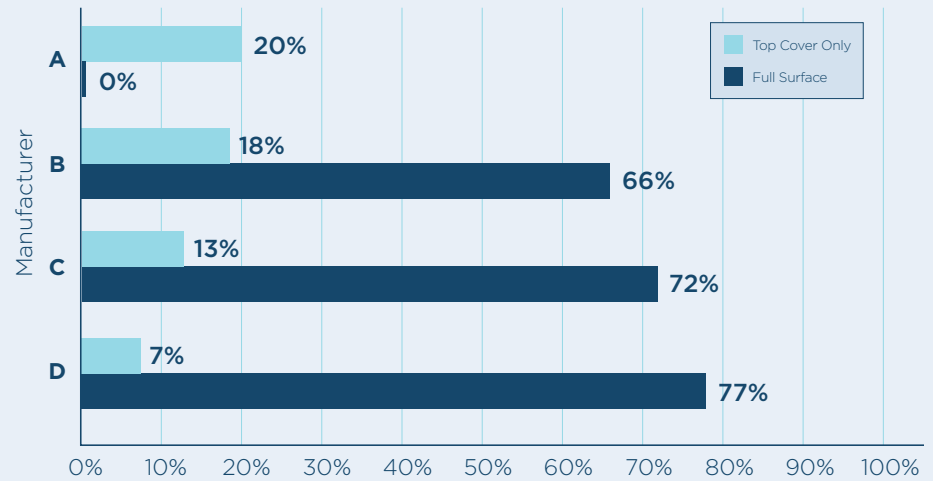
75%

Surfaces from other market leading manufacturers (B, C, D)

0%

Surfaces with innovative construction from Manufacturer A

Percentage of Replacements Required



DISCUSSION

Innovative materials and construction prevented fluid ingress and contamination of surfaces preserving longevity of costly assets. Previous studies have shown that most surfaces sustain internal damage triggering replacement in less than five years. No welded-shield surface required full replacement and only 20% had cover damage. The cost of replacing the 556 surfaces with internal damage (~\$1500 per surface) totals \$834,000. Replacing the top cover (~\$200) of 20% would save \$804,200. Surfaces with a welded-shield construction yield significant cost savings. Considering welded-shield surfaces did not require replacement, inspection of these surfaces beyond 6 years is warranted to understand total useful life.

Additional Spend Required for Patient Safety

In a 400 Bed Hospital by Year 5

Manufacturer	Surfaces Requiring Replacment	Cost
A	0%	\$0
B	66%	\$396,000
C	72%	\$432,000
D	77%	\$462,000



REFERENCES

1. Koshy, T., Manista, G., Nicholson, L., Ikpeze, T., Black, J. The state of support surface integrity in acute healthcare facilities. Poster presented at: NPIAP 2023 Annual Conference. March 17-19, 2023. San Diego, CA
2. Sivek, A., Davis, J., How Wet is Your Patient's Bed? Blood, Urine, and Microbiological Contamination of Mattresses and Mattress Covers. Patient Safety Advisory. 2018; 15(4).
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A = Agiliti Health, Inc.

*CoreShield™ by Agiliti Health, Inc.

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