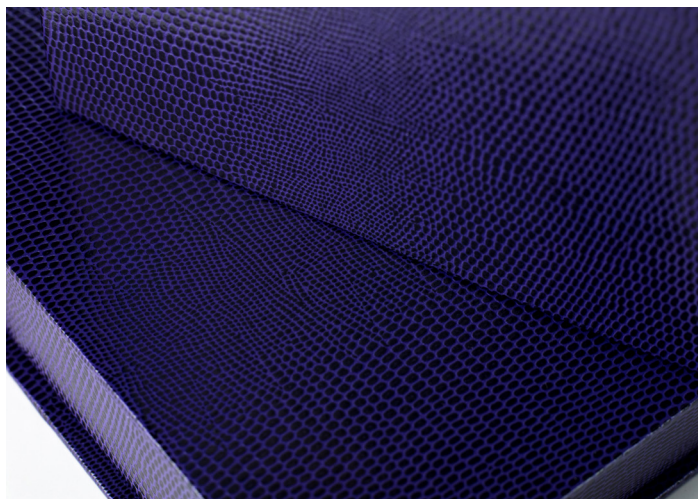


DURABILITY OF NEENAH COVER MATERIALS AGAINST COMMERCIAL DISINFECTANTS

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Testing of several Neenah Cover Materials against a variety of commercially available cleaners indicated that the PELLAQ® brand of cover material holds up very well against most types of disinfectants when following the manufacturers' disinfectant directions.

The majority of tested Neenah Cover Materials hold up well to various disinfectants. However, printed versions and soft-touch versions of cover materials have fewer appropriate options for surface cleaning. Results from testing are shown in Table 1.0. It is noteworthy that only the surfaces of the cover products were tested – no finishing treatments, such as foil stamping or printing, were evaluated. No claims of antimicrobial efficacy are made as a part of this paper.

BACKGROUND

The COVID-19 pandemic of 2020 has increased awareness of viral and bacterial disease spreading on surfaces and driven a desire to combat it across many business sectors. In the United States, disinfectants, biocides, and viricides are commonly used to kill or deactivate pathogens on various product surfaces. These chemicals are often referred to as 'antimicrobials' and must be registered with the EPA and with the FDA when companies claim a health benefit or intend for the product to come in contact with human beings.

There is a desire to be able to clean, sanitize or disinfect different surfaces found in and around homes, restaurants, schools or other businesses. Neenah accordingly tested its cover materials.

Neenah has undertaken testing of our Cover Materials to provide guidance on the durability of our products after disinfecting procedures using commercially available, EPA registered surface cleaners. A variety of well known brands and private label branded cleaning/disinfecting products were tested against individual sheets of Neenah Cover Materials. This is not an endorsement or recommendation of any specific cleaning product.

The directions provided on the label of each disinfectant were followed in the testing including any use of PPE and the amount of time the cleaning chemical/agent needed to remain on the surface. Unless the disinfectant was contained within its own wiper, a clean, white, 100% cotton rag was used for each test. Spray-on cleaners were sprayed directly on the cover material, or the rag was soaked in the solution, wrung out to eliminate most drips while still leaving a wet surface behind. All sheets were wiped to sufficiently cover the sample and leave a visually evenly

wet surface behind. Each sheet was tested ten times, at least ten minutes apart unless failure was evident prior to that time. An obviously visible residual indication of the treatment or any other change in color, gloss level, surface feel or formation of the cover material after treatment with the disinfectant was considered a failure, generating the “not recommended” rating.

Each test sheet was 8.5” X 11”. It is expected that Neenah’s cover materials will behave the same or better when treated with disinfectant when used as intended and mounted to another material, i.e. in the production of books, portfolios, menus, etc.

The results are shown in Table 1.0. These results apply only to the surface of the Neenah products and our formulations for those surfaces. Inferences to the performance of other cover materials or against any decorating techniques applied to Neenah Cover Materials should not be made.

TABLE 1.0 Durability of Neenah Branded Products Summarized Against Commercially Available Surface Disinfectants
Cleaning Recommendation – Follow manufacturer’s directions for disinfecting.

BRAND	CHEMICALS														
	Cleaners with Disinfecting Claims													Cleaners	
	Lactic Acid	Chloroxylenol (chloro-dimethylphenol)	Alkyl dimethyl benzyl ammonium chloride					Sodium Hypochlorite		Copper ion	Ethanol			Lauryl Sulfate Surfactants	Ethoxylated Alcohol & Methylchloroisothiazolinone
	Warm Soapy Water with Palmolive Antibacterial Dish Soap	Warm Soapy Water with Kroger brand Antibacterial Dish Soap	Non-bleach disinfectant Solution 1 (Nu-Foam)	Lysol Disinfectant Aerosol	Non-bleach disinfectant solution 2 (Lysol multipurpose Cleaner)	Non-bleach disinfectant Wiper 2 (Clorox)	Non-bleach disinfectant Wiper 3 (Private Brand)	Bleach diluted to manufacturer’s recommendation (Clorox)	Multipurpose cleaner plus bleach (Clorox)	Copper based Wiper (Seventh Generation)	Ketel One	Dial Hand Sanitizer	Grove Collaborative Hand Sanitizer	Warm, soapy water (Dawn)	Simple Green Industrial Cleaner/Degreaser
KIVAR® Series 1	✓	✓	✓	✗	✓	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓
SKIVERTEX® Series 1	✓	✓	✓	✗	✓	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓
SUMMIT™ Series 1	✓	✓	✓	✗	✓	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓
PELLAQ®	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓
Soft Touch Grades	✓	✓	Not tested	Not tested	r	Not tested	r	Not tested	Not tested	Not tested	✗	✗	✗	✓	Not tested
Series 2 or 3	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	Not tested

Use soft cloth or wiper when cleaning or disinfecting the cover materials
r - Surface of material showed cleaner residue when dry
Always test first in an inconspicuous place then test on any foil stamping or print decoration.

CONCLUSION

Many Neenah branded cover materials, including but not limited to KIVAR®, SKIVERTEX®, SUMMIT™, TOUCHÉ® and PELLAQ® hold up well when cleaned with warm, soapy water. Based on chemistry, Neenah advises that such treatments on the following brands should return similar results: MONTELENA®, HYFLEX®, LEXOTONE® and CORVON®. Conversely, alcohol based disinfectants and in general, aerosolized disinfectants should not be utilized on any Neenah Cover Materials brand.

While the PELLAQ® branded products withstood the disinfecting protocol for most cleaners, Neenah does not recommend using abrasive cleaners on any of our cover materials. Chlorine based cleaners may remove any printed pattern on a material. The non-chlorine, copper or quaternary ammonium based products (alkyl dimethyl benzyl ammonium chloride) did not compromise the surface of Neenah Cover Materials as long as they were not applied by an aerosol spray.

The EPA registered cleaners utilized in this study were chosen due to their disinfecting claims and current availability. These cleaners represent several common types of disinfecting agents. Active ingredients in cleaners could be compared with the respective cleaners in this study with the expectation of similar results. However, all disinfecting agents should be thoroughly tested before broad usage on Neenah Cover Materials.

We recommend that any specific cleaning agent be tested in an inconspicuous location on a finished product. This will determine the product's reaction to that cleaner at that concentration. Care should be taken to understand how your cleaner might impact any decorating techniques, such as printing, foil stamping, or other finishing touches. Neenah will send no-charge samples of a similar material for testing if requested. Please contact your Neenah Business Partner or Neenah Customer Service with questions or to request sample material.

APPENDIX 1

Surface Disinfectants Utilized in Testing

Cleaners with Disinfecting Claims

Lactic Acid

- Palmolive Antibacterial Dish Soap

Chloroxylenol (chlorodimethylphenol)

- Kroger (private label) Antibacterial Dish Soap

Alkyl dimethyl benzyl ammonium chloride

- Glissen Chemical Nu-Foam EPA Regulated Disinfecting Tablet Cleaner
- Lysol Disinfectant Spray
- LYSOL Multipurpose Cleaner, Lemon Breeze Scent
- Clorox® Disinfecting Wipes – Orange Fusion
- Laura Lynn (Ingles Private Label) Disinfectant Wipes, Lemon Scent

Sodium Hypochlorite

- Clorox® - Note: manufacturer's directions were not followed. Instead, a 33% more concentrated solution was prepared as indicated by the CDC <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/disinfecting-your-home.html>
- Clorox Clean-Up® Cleaner + Bleach Copper ion
- Seventh Generation Disinfecting Multi-Surface Wipes, Lemongrass Citrus

Ethanol

- Ketel One Vodka
- Dial Hand Sanitizer Antibacterial, Gel
- Grove Collaborative: Hand Sanitizer Spray w/Moisturizing Coconut Oil – Blood Orange Scent

Cleaners

Lauryl Sulfate Surfactants

- Dawn Platinum Dishwashing Liquid, Refreshing Rain

Ethoxylated Alcohol & Methylchloroisothiazolinone

- Simple Green Industrial Cleaner/Degreaser

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QUICK GUIDE TO THE USE OF COMMERCIAL DISINFECTANTS ON NEENAH COVER MATERIALS

Testing of several Neenah Cover Materials against a variety of commercially available cleaners indicated that the PELLAQ® brand of cover material holds up very well against most types of disinfectants when following the manufacturers' disinfectant directions.



		BRAND	PELLAQ®	SKIVERTEX® Series 1	SUMMIT™ Series 1	KIVAR® Series 1	CORVON®	HYFLEX®	Soft Touch Grades
CLEANERS									
Ethoxylated Alcohol & Methylchloroisothiazolinone	Simple Green Industrial Cleaner/Degreaser	✓	✓	✓	✓	✓	✓	✓	—
	Lauryl Sulfate Surfactants	✓	✓	✓	✓	✓	✓	✓	✓
CLEANERS WITH DISINFECTING CLAIMS									
Lactic Acid	Warm Soapy Water (Palmolive Antibacterial Dish Soap)	✓	✓	✓	✓	✓	✓	✓	✓
	Chloroxylenol (chlorodimethylphenol)	✓	✓	✓	✓	✓	✓	✓	✓
Alkyl dimethyl benzyl ammonium chloride	Non-bleach disinfectant Solution 1 (Nu-Foam)	✓	✓	✓	✓	✓	✓	✓	—
	Lysol Disinfectant Aerosol	✓	✗	✗	✗	✗	✗	✗	—
	Non-bleach disinfectant solution 2 (Lysol multipurpose Cleaner)	✓	✓	✓	✓	✓	✓	✓	r
	Non-bleach disinfectant Wiper 2 (Clorox)	✓	✓	✓	✓	✓	✓	✓	—
	Non-bleach disinfectant Wiper 3 (Private Brand)	✓	✓	✓	✓	✓	✓	✓	r
Sodium Hypochlorite	Bleach diluted to manufacturer's recommendation (Clorox)	✓	✓	✓	✓	✓	✓	✓	—
	Multipurpose cleaner plus bleach (Clorox)	✗	✗	✗	✗	✗	✗	✗	—
Copper ion	Copper based Wiper (Seventh Generation)	✓	✓	✓	✓	✓	✓	✓	—
Ethanol	Ketel One	✓	✗	✗	✗	✗	✗	✗	✗
	Dial Hand Sanitizer	✓	✗	✗	✗	✗	✗	✗	✗
	Grove Collaborative Hand Sanitizer	✓	✗	✗	✗	✗	✗	✗	✗

KEY
 ✓ - PASS
 ✗ - FAIL
 — - NOT TESTED
 r - CLEANER RESIDUE WHEN DRY

These results apply only to the surface of the Neenah products and our formulations for those surfaces. Inferences to the performance of other cover materials or against any decorating techniques applied to Neenah Cover Materials should not be made. Printed versions of cover materials (series 2 and series 3) have fewer appropriate options for surface cleaning. Please refer to our technical paper, "Durability of Neenah Cover Materials Against Commercial Disinfectants" for additional details.

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