

You're putting your trust on a piece of glass. Is it the right one?

This question drove research and testing by StatLab product development to better understand market needs and the decision-making process a lab undergoes when choosing which slides will hold their patient tissue during testing.

When a laboratory manager chooses a slide, they're putting their trust and their lab's reputation on that piece of glass. If tissue washes off of the slide during processing, results could be catastrophic, especially if the sample involved is a fine needle aspirate or small tissue fragment. We found that labs focus their decisions on several key factors.

Testing Performance and Adhesion

Labs often use a combination of slides for samples depending on the type of testing because many slides perform better in one application than another, but not consistently in all types of testing. Often a combination of coated and uncoated slides are utilized to ensure the best performance for each application. Many labs select a premium adhesion slide for use when IHC staining, to ensure tissue stays adhered through the harsh processing involved. Unfortunately, many slides with excellent IHC performance will have background staining when used for H&E and Special staining, and another slide must be used for those applications.

This combination of slides can create headaches when managing inventory for multiple slides and colors. In addition, the wrong slide could inadvertently be chosen—if an uncoated is used for IHC testing, tissue wash will be experienced and testing will need to be completed twice.

Utilization of one slide that provides excellent performance on all applications is desirable to eliminate risk of confusing slides and ensuring availability of the slides

Slide Printer Compatibility

When labs are utilizing an automated slide printer in their workflow, slide choice is important to ensure compatibility with the industry's most common thermal transfer printers, like the ESPO, SlideMate Pro, and PiSmart. Slides with a rough surface not optimized for printing can cause prints to appear lighter and contribute to scanning problems and delays in a busy, high-volume lab.

Availability and Cost

Finally, availability and cost contribute to slide decisions in several practical ways. In a post-COVID world, procurement departments have turned into supply chain specialists, juggling backorders between vendors to ensure the lab has what they need to run. Once validated in a lab, consistent availability helps labs run more efficiently, as well as costs that are comparable to other industry-standard multi-use slides.

	Millennia Command	SuperFrost Plus	TOMO
Dimensions	75mm X 25mm X 1mm	75mm X 25mm X 1mm	75mm X 25mm X 1mm
Corners	90 Degree Corners	90 Degree Corners	90 Degree Corners Clipped Corners
Packaging	1000 slides/Case Preloaded cartridge options for ESPO slide printer	1440 slides/Case	1000 slides/Case Preloaded cartridge options for ESPO slide printer
Color Options	White, yellow, blue, green, pink, aqua, tan, red, lilac	White, yellow, blue, green, pink, aqua, tan, gold, orange, lilac	White, yellow, blue, green, pink
Adhesion	Coated, hydrophilic	Coated, hydrophilic	Coated, hydrophilic
H&E	No background staining	No background staining	Some background staining
Special Staining	No background staining	No background staining	Some background staining
IHC	Excellent	Excellent	Excellent
Tissue Wash	No tissue wash	No tissue wash	No tissue wash
Printer Compatibility	Excellent on all thermal transfer printers	Rough surface will print, but lighter than desired	Excellent on all thermal transfer printers
Availability	No backorders	Some backorders in 2022	Some backorders in 2022

See the difference.

Introduction and Methodology

StatLab conducted a study to compare the print performance of Millennia Command Adhesive slides with Superfrost Plus (SF+) Adhesive slides on heat settings 5 to 9 on the PiSmart Slide Printer. To begin, 3 slides were tested on each heat setting to check for print consistency. 1,000 slides of each were then printed at heat settings 9 and 7. The same number of slides was printed at each heat setting.

Superfrost Plus Results

In order to achieve suitable print quality for both human readable text and barcode scannability the Superfrost Plus slides needed to be printed on heat setting 9. During test printing 1,000 Superfrost+ slides, a printer ribbon break occurred after printing 100 slides. Printing at the highest heat setting increases the risk of a ribbon breaking during printing, costing time and money. The time taken to replace the ribbon and clean the print head was significant.

There were significantly more print errors observed when printing SuperFrost+ slides compared to Millennia Command slides. Three slides printed on the SuperFrost+ slides were rated as major print errors which were unsatisfactory and unreadable by the human eye. Of these three slides two of the 2D Datamatrix barcodes were also unreadable.



Superfrost Plus starting with heat setting 5 on the left, to heat setting 9 on the right

Millennia Command Results

Millennia Command slides were found to be able to print on lower heat settings and still maintain superior print quality and barcode scannability compared to SuperFrost+. Printing at lower heat settings significantly reduces the risk and inconvenience of a ribbon break during printing. Out of 1,000 Millennia Command slides printed, no ribbon break occurred.

There were significantly fewer print errors observed when printing Millennia Command slides. No slides were rated as major print errors for the Millennia Command slides and no 2D barcodes printed on Millennia Command slides failed to scan. The printing errors observed on Millennia Command slides were rated as medium or minor and had no effect upon readability of the slide by the human eye.



Millennia Command starting with heat setting 5 on the left, to heat setting 9 on the right

Conclusion and Recommendations

The Millennia Command slides showed greater print quality across all heat settings and no errors compared to Superfrost Plus slides.

The Superfrost Plus slides only achieved suitable print quality on heat setting 9, while Millennia Command slides showed the same quality when printing on heat setting 5. Printing Superfrost plus on the highest setting caused the printer ribbon to burn and break.

While the print quality experienced no errors when printing with Millennia Command, Superfrost Plus slides were observed to have barcode scan failures and slide identification errors.

	MAJOR PRINT ERRORS Slide Identification Impaired	2D Data Matrix Barcode Scan Failures	TOTAL SLIDES WITH ERRORS
SuperFrost Plus	3	2	5
Millennia Command	0	0	0

Millennia Command slides proved to be more reliable and saved on cost and time compared to Superfrost Plus.