

1. Thick Media Scanning

Some wide format scanners are marketed with the capacity to scan **thick media**. “Normal” scanners are designed with a maximum media thickness of 2-3mm, in order to scan all kinds of paper based and other media that fits in this range. The “thick media” scanners claim to be able to handle 12; 15 or even 20mm thick media.

This White Paper addresses some of the issues thick media sheet feed scanners pose to the user. At the end of this paper you will find a table of pros and cons to help decide what you really need.

1.1. What kind of documents is thicker than 2mm?

The typical documents thicker than 2mm are posters or maps mounted on foam boards. In some countries it is common with engineering drawings or maps mounted on aluminum sheets or plywood. However: Users who actually need to scan **thick media** are very rare. Most users who buy thick media scanners buy them as a “good to have” feature – “Who knows when I will need to scan something thick, I’d better buy a scanner that can scan everything.” Very few actually ever use this feature.

1.2. What are the technical challenges?

1.2.1. Thick media lifting off the scan glass

Scanning thick media has a number of technical challenges. Foam boards are of course heavier than paper. Aluminum and plywood is even heavier than the foam boards. Rigid media like these stick straight out of the scanner instead of the way a paper hangs down. The “feed tray”, a “table” in the front of the scanner, is not very deep so the board sticks out. Feeding the board into your scanner, you need to support it with your hand during the whole scan as it glides into the scanner. Supporting it with the hand has to be very precise. If you hold the rear end of the board a little too high or not tight enough, the board will lift off the scan glass.

When the original lifts off the scan glass, even very little, the quality of the scanned image is ruined.

- Focus is gone so the scanned image is blurry.
- Ambient light leaking in ruins the normal illumination (the light the scanner shines on the image) so colors and gamma in the scanned image will be wrong.
- Stitching becomes an issue when the document is no longer touching the scan glass. You will see vertical lines throughout your scanned image at each of the stitch points. One vendor recently introduced a CCD scanner with 6 cameras, which results in 5 vertical stitching lines.

Thus the scan operator has to be very cautious when supporting the feed of the rigid document at exactly the right height so that the rear end of the document is neither higher nor lower than the scan glass during scanning. As the document comes out of the scanner on the backside, the same applies. If the document is not supported by a person receiving it on the backside, the weight of the document outside of the scanner will lift the remaining portion off the scan glass. To avoid this you need two operators to handle thick media scanning.

1.2.2. Scratches on scan glass

Most thick media scanners have the cameras in the body of the scanner, below the scanned document so the document slides face down across the scan glass. Scanners with this design commonly suffer from dirt or scratches in the scan glass.

If the scan glass is scratched or dirty there will be streaks and lines vertically throughout every image. Dirt can be removed by cleaning but if the glass is scratched, the only way to get rid of the vertical streaks is to replace the scan glass. Scan glass plates are normally expensive and excluded from warranty.

Thick media is generally heavier than paper so the risk for scratches in the scan glass is greater than with normal paper. Thus scanning thick media in a sheet fed scanner can turn out to be unexpectedly expensive with the cost for glass replacement and downtime waiting for replacement glass. If possible, use a flatbed scanner or a planetary scanner instead.

Image Access WideTEK scanners have their cameras in the lid so the document travels UNDER the cameras. The scan glass is recessed so the document does not touch the glass. Users of other brands are plagued by frequent cleaning and replacement of glass because of scratches but users of WideTEK scanners from Image Access are free of these problems.

1.2.3. Maintaining correct speed

A rigid document is heavier than the papers the scanners are designed to scan. Will the motor and drive rollers be able to feed the rigid document at the correct speed, at the same speed as it feeds a paper?

The resolution across the scanner depends on the camera's resolution, the resolution in the transport direction depends on the speed with which the document is moving across the scan glass. If, for instance the scan resolution is set to 600dpi, the cameras will capture lines with the thickness of one 600th of an inch (1,6mil / 42µm) – VERY thin lines. It is easy to understand that even the smallest variation in the speed with which the document is fed will cause visible image distortions.

If the movement of the document is not precisely and exactly the same as the scanner expects, for instance if the drive rollers slip a little while struggling to pull the heavy rigid document, or if the operator supporting the document pushes a little too hard, or not exactly hard enough to counter the weight of the document; the speed will be different than what the scanner "expects". The result will be variations in the resolution in the transport direction which are visible in the scanned image.

CONCLUSION # 1: It is virtually impossible to get a good quality scan when scanning thick, rigid media. Thus claiming that a scanner can scan a document thickness of 12; 15 or 20mm is questionable.

Such a claim should be followed by a disclaimer that although the scanner might be able to transport such thick media with the help of one or two human operators, it is almost impossible to get a good quality scan.

CONCLUSION # 2: If you need to scan thick media use a flatbed scanner or a planetary scanner. A sheet-fed scanner is not capable of performing a good scan on this kind of media.

Someone might object that flatbed or planetary scanners are too small for their originals. Consider

scanning the original in pieces. The partial scans can be stitched together using stitching software, for instance the “Perfect Stitch” software sold by Image Access.

2. Scanning Regular Documents in Thick Media Scanners

A thick media scanner is designed differently than a regular scanner. Drive rollers and pressure rollers or pressure plates will have different types of suspension to compensate for the challenges described above. Sometimes rollers have a thick soft cushion layer to handle media of different thickness. The result of these designs is that the scanner will be less precise when driving documents through the scanner. Also regular paper will be handled less precisely by a thick media scanner.

Thus the trade-off for handling thick media is loss of accuracy, not just with thick media but also with regular documents. Geometric accuracy is particularly important when scanning maps since scans of maps often go into GIS systems, where it is of paramount importance that the scans are geometrically accurate.

CONCLUSION # 3: *If you need accuracy do not buy a thick media scanner.*

3. Summary

Feature	WideTEK 36/44/48-600	Thick Media Scanner
Maximum media thickness	3mm	15-20mm
Scan glass position	Scan glass at the top	Scan glass at the bottom
Scanning Position	Face up	Face down
Scan glass replacement interval	Very long, also included in extended warranty	Short replacement interval, expensive to replace.
Accuracy	Very good	Limited, thick and regular media
Price	Low, even PC is included.	High due to extra mechanics necessary.

CONCLUSION # 4: *Buy a WideTEK flatbed or a BookTEK overhead scanner and scan thick media up to 150mm regardless of weight, stiffness or surface properties.*

Image Access is the only manufacturer who can deliver large format flatbed scanners up to A2, overhead scanners up to A1 and wide format sheet feed scanners up to 48”.