

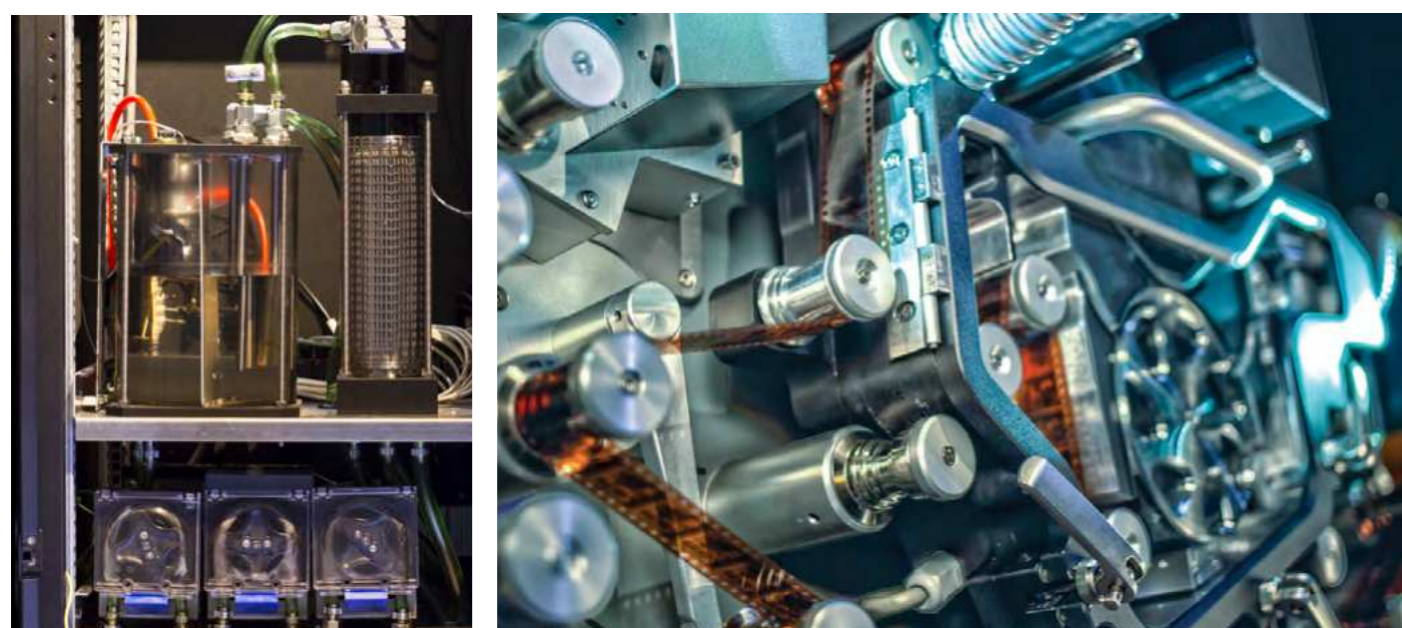
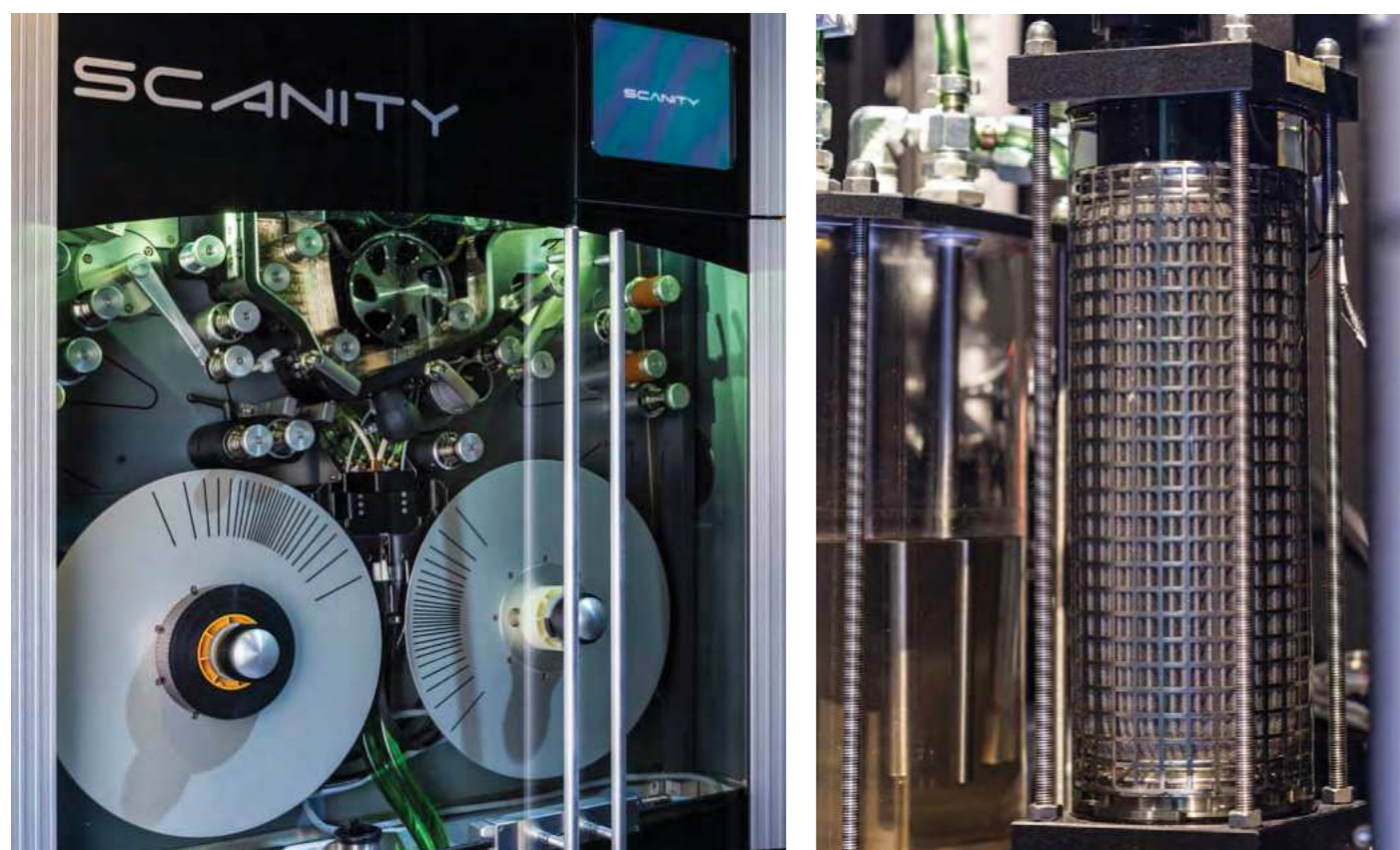
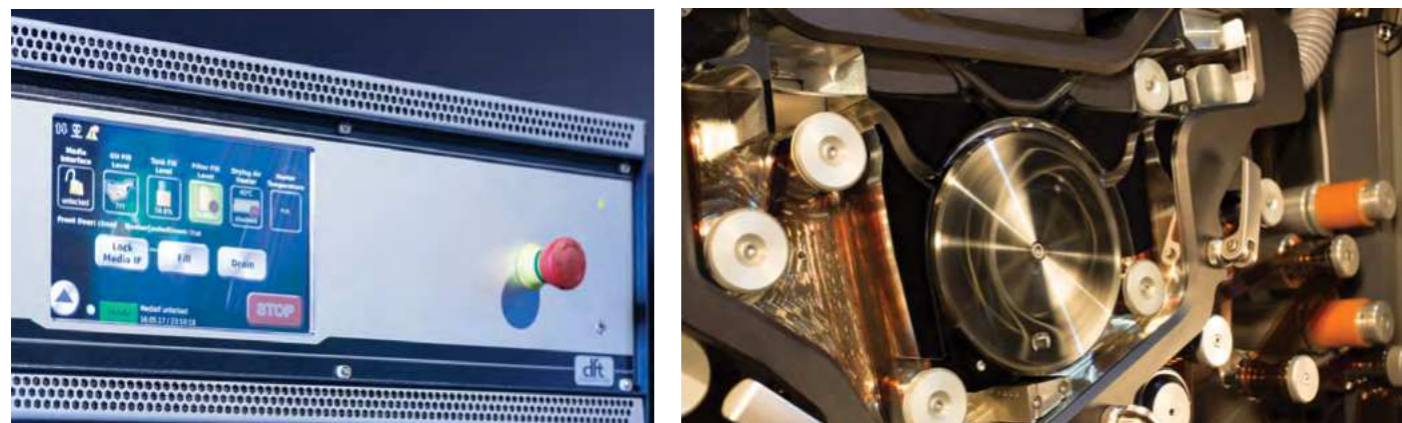
digital film technology

Scanity WetGate

Creating superb digital clones from damaged and scratched film materials

white paper





Archive film material and its imperfections >>>

Typical damage



In some cases, archive film can be scanned quite easily. However when film is damaged, special attention to the features in the choice of a film scanner should be taken. Damaged film includes warping, buckled, shrunken, weak and/or damaged splices, missing or broken perforations, notched or broken edges, and vinegar syndrome. dft's Scanity and Scanity HDR film scanners offer a feature-set that is tailored to meet the unique demands of archive scanning including smooth and gentle handling of damaged film.

Scanity addresses the needs of damaged archive film through:

Roller Gate

dft designed Scanity's roller gate to avoid friction and abrasion on the film. Only the edge of the film touches the roller as it travels gently through the film gate on the two gate rollers.

Pinless, sprocketless film transport

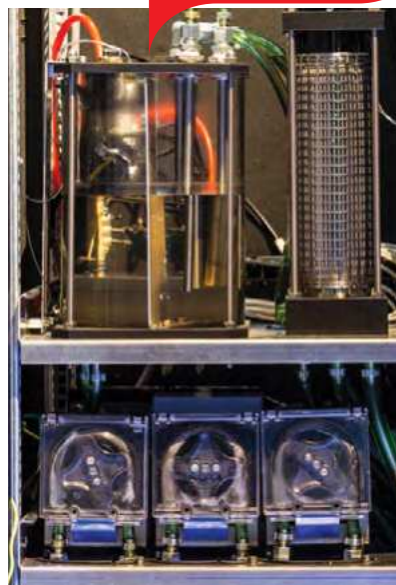
Archive film is often damaged due to careless use, aging or wear and tear that may need repair prior to scanning. Scanity can help keep the repair down to a minimum due in part to its smooth, pinless and sprocketless film transport system. Scanity's film transport handles the film with great care ensuring that no further damage occurs.

Film shrinkage measurement and display

Scanity's film shrinkage measurement feature displays the amount of how much the film has shrunk. Scanity has the ability to scan shrunken film without adjustments or modifying film gates, supporting shrinkage to >5%.

Vertical Over-Scanning

Splices on film, especially on archive film, can have wide tolerances causing the frame bar to jump in and out of the visible area of the image. A similar effect is also visible in case of unstable camera transport where the frame is not positioned well (shifting image frame by frame). By scanning more of the nominal picture height and showing small parts of the previous and next frame allows the image area to be selected in a second workflow step without losing any of the content. The advantage of using Scanity is that the scanned files increase in size as the image area becomes larger (higher and wider). Thus, the resolution per inch/pixel pitch is kept constantly high. In contrast to an optical zoom this allows users to maintain image sharpness throughout the post production process - even after cropping and repositioning. The image height is 25% larger than the original film frame, equally dispersed on the top and bottom of the frame.

Scanity WetGate
Plant

Managing Imperfections

Although digital processing speed increases year-by-year and powerful restoration algorithms have been developed, some film defects like scrubs, cinch marks, horizontal and vertical scratches are still problematic, and very often need long-lasting and expensive manual intervention, sometimes frame-by-frame repair in postproduction, thus spoiling the intrinsic speed advantage of Scanity and Scanity HDR.

To overcome these usual film surface imperfections, Scanity & Scanity HDR deploys a range of tools; the use of clever diffuse illumination and optional infra-red (IR) scanning, with realtime user adjustable

automated processing techniques all designed to minimise and or remove these undesirable imperfections. In addition, dft has developed an optional state-of-the-art WetGate technology solution for its Scanity HDR model. WetGate technology fills the film surface deficiencies with a fluid matching the refractive index of the film base, at the point of scan, and provides a near perfect quality transfer - saving time and downstream processing, thereby improving the time and cost outcome significantly.

The Scanity HDR
WetGate solution

The Scanity HDR WetGate system consists of two major components:

- Lens Gate Assembly (LGA) (available for all 16mm or 35mm films)
- Supply Unit

The WetGate can be mounted like a standard “dry” Lens Gate Assembly (LGA) and is connected to a supply unit, which includes a tank, filters and pumps to supply the fluid together with electronics to control the LGA and the

fluid stream. All components mentioned above fit in two 19”enclosures and are installed in a standard 19” electronic rack.

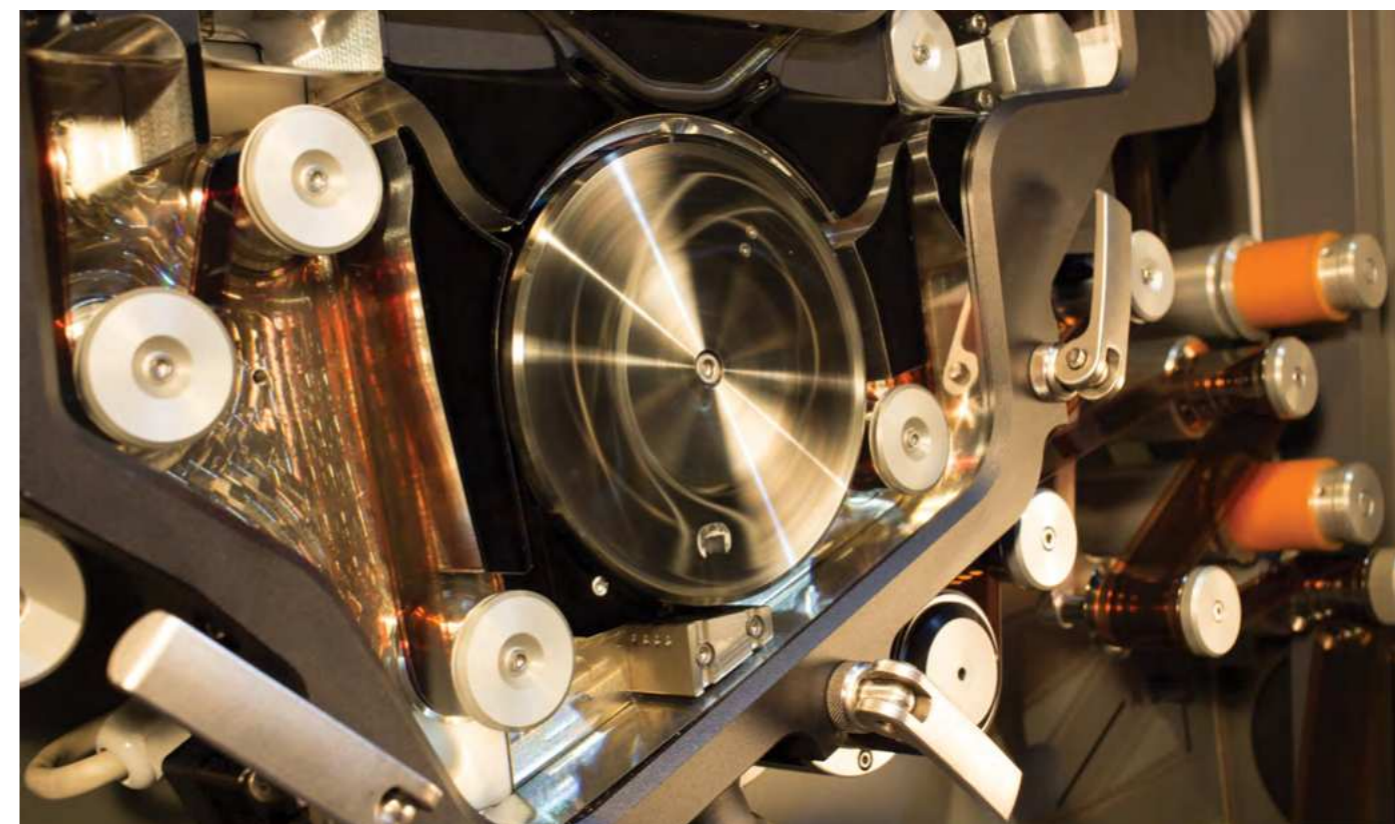
How does this
technology work?

In contrast to most concepts in the market, Scanity’s WetGate ensures that the film gently passes through a large fluid tank (aquarium), submerging the film in a liquid with the same refractive index of the film. As the film is submerged, the fluid fills in surface imperfections, such as scratches and surface damage, so that when it is scanned these surface imperfections have been minimised.

There are three main advantages to this approach.

Firstly, as the WetGate is a sealed aquarium unit, there is no need to work with complex vacuum systems that are prone to reliability issues, expensive to maintain, difficult to set-up (time consuming) and often introduce further issues such as air bubbles on the film scanning surface.

Secondly, because the WetGate has been purpose built for



Scanity HDR film deck with WetGate installed

the Scanity HDR scanner, the film can expect to receive the same gentle film handling characteristics as found in the dry scanning mode; but with the added benefit of a wetted transfer, if required. Regardless of whether you scan wet or dry, your film will be held and transferred gently and securely, without causing any further damage to the valuable film stock.

Finally, as the WetGate is an integral part of the scanning process, film is simultaneously ‘restored’ and scanned at up to real time transfer speeds, saving significant time, effort and money.

The three stage process

Pre-chamber:

Guided by a precision roller, the film reaches the fluid level from the top through a drying stage (only active if film moves in reverse direction). Two idle rollers within the fluid guide the film to make a loop to force air and dust particles off the film; this process hinders any air to enter the critical area; eliminating typically found air bubbles.

Scanning Area

Similar in many ways to Scanity HDR’s dry roller gate, the fluid

immersed film travels on two rotating supports through the scanning area avoiding any contact of the image area with the glass cylinder. The outside of the rotating glass cylinder is in contact with the fluid but specially designed seals prohibit fluid to enter the inside of the roller. To reduce pressure to the sealing and making sure that fluid will never enter critical parts inside the machine the system includes a cleverly designed leakage drain allowing some fluid to pass the sealing.

Drying Unit

Finally, the scanned film exits the fluid tank via a drying unit

Tetrachloroethylene C2Cl4	Synonym: Perchloroethylene (PERC)
CAS Number	127-18-4
Physical State	Liquid
Colour	Colourless
Odour	Ethereal
Refraction Index	1,5059
Vapour Pressure	2.5kPa at 25°C
Melting Temperature	-22°C
Boiling Temperature	121,4°C (101.3245 kPa)
Molecular weight	165.8334 g/mol
Flash Point	Non-flammable
Water solubility	150 mg/l at 25°C

Table -1

consisting of a series of air knives removing the remaining liquid. Critically as no scrapers are used, imperfect splices or other changes in film thickness as typically found on aged materials present no issue.

Operation

Mounting the WetGate LGA is as straight forward as with mounting a dry lens gate assembly for Scanity HDR models. Take the LGA, set it on the guide rails and slide it slowly towards the film deck plate until it fits properly then lock it. Connect the gate to the supply unit, start the automatic calibration process. After this has completed, open the transparent front door, lace the film around the rollers and film gate. Then close the front door - the gate is ready for operation. The fully automated system fills the gate, controls the fluid level and drying times.

Maximum real time scan speed will be achieved by using a fast drying component like (PERC). Other liquids like oilbased chemicals might limit the scanning speed depending on film dryness required by the end user.

Fluid

The WetGate system has been tested and fully qualified with the most aggressive fluids, particularly Perchloroethylene (PERC), clearly as this chemical requires special environmental handling considerations; local or regional authority permits or licenses prior to its use, this should be a predominant consideration in the hands of the end user.

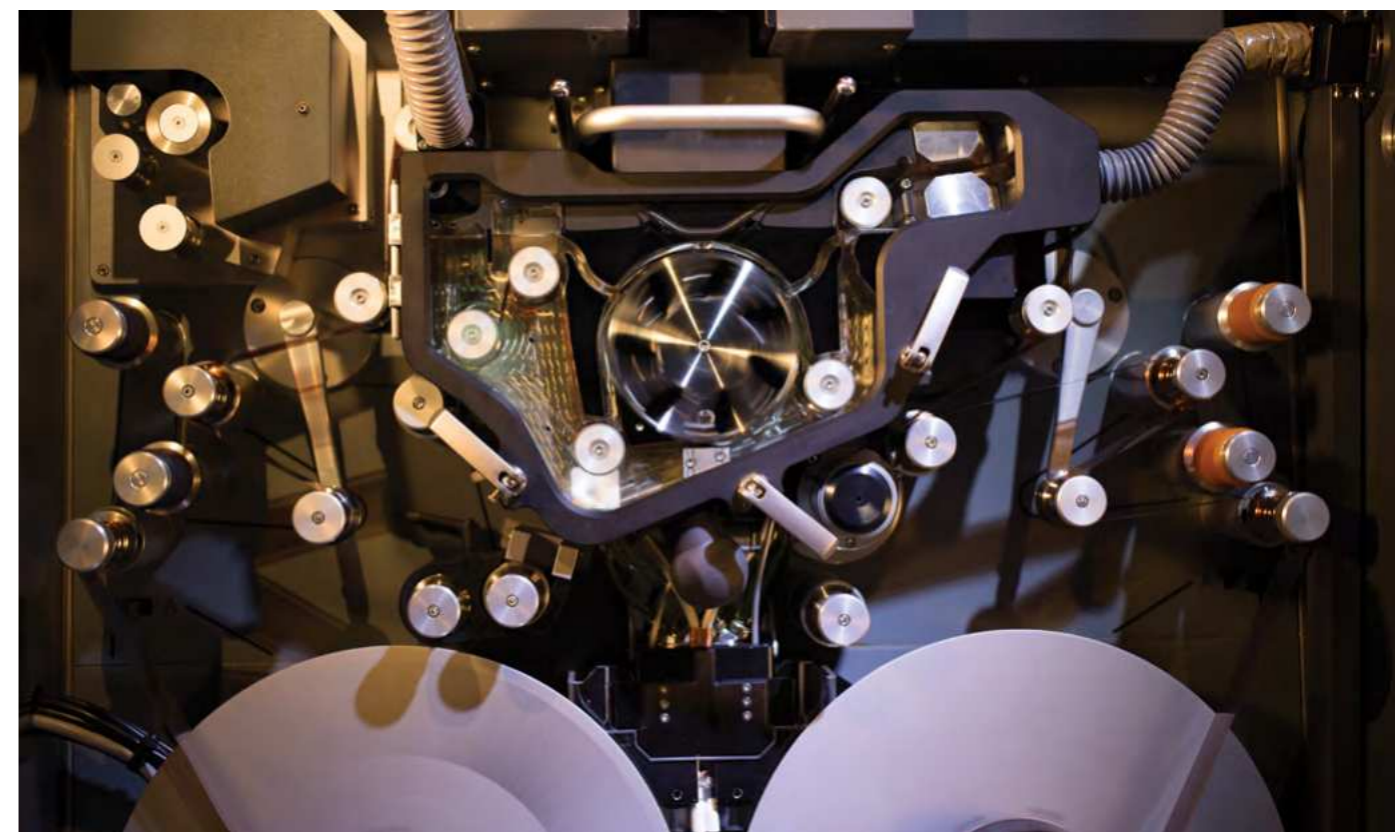
dft has designed the Scanity HDR WetGate technology to ensure it can accommodate PERC, and to facilitate a range of fluid options; these fluid alternatives will be detailed,

but in the end, it will be at the discretion of the end user and the regional licensing authorities as to which chemical can be considered. Customers can choose any fluids they want, subject to Health and Safety legislation. dft will offer support to the customer, but dft will not guarantee any specifications or be liable for poor management or the use of these fluids.

Note:- after wet scanning the film, dft highly recommends that the film is cleaned again using standard lab procedures/ methods, such as ultrasonic cleaning ,prior to storage.

Gas exhaust

dft has prepared the Scanity HDR film deck module allowing for the extraction of waste exhaust fluid vapor, in its design; including adaptors to attach waste hoses on top of as well as in the scanner. It is the customer's responsibility to draw



and filter these waste exhaust gases to the meetthe local authority or regional environmental licensing regulations.

Conclusion

Besides delivering superb and crisp pictures at very high scanning speed, faster than any other scanner in wet mode, the unique approach of the new WetGate option allows for a fast switchover between wet and dry modes simply by exchanging the lens gate assembly. The WetGate works, in contrast to infrared-based systems, on color film as well as on black and white film material. Moreover, without diminishing (keeping all) other features and benefits

of the Scanity family like safe and smooth film handling and operational flexibility.

Filling the film surface imperfections with a fluid at the point of scan is the best solution to maintain the quality and originality of film material, together with saving time and downstream processing, thereby improving the outcome significantly.

Scanity HDR, with a WetGate, is clearly the perfect solution to maintain the quality and originality of the scratched and imperfect film material.

“making sure the past has a future !”



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