



# Microfilm: Disaster Solution or Simmering Disaster?

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# Where is the Disaster?

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- This is a picture show about the microfilm all of you have in one or more forms.
- The disaster is in the vault and in our heads.
  - Ignorance – we're losing our micrographics memory.
  - In hind sight, some microforms were chosen based on ignorance and short term planning.
  - Neglect – we haven't done what we're supposed to do.



# Microfilm Basics

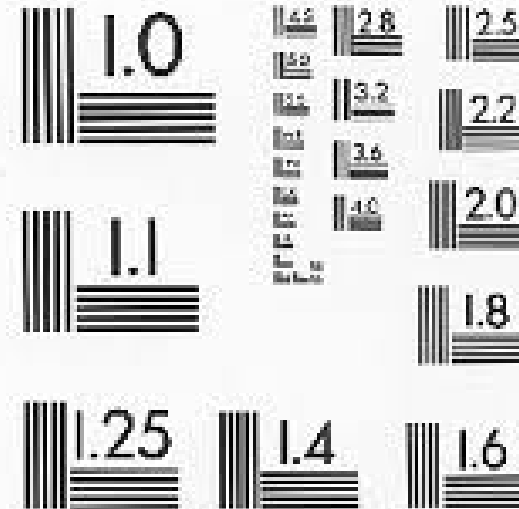
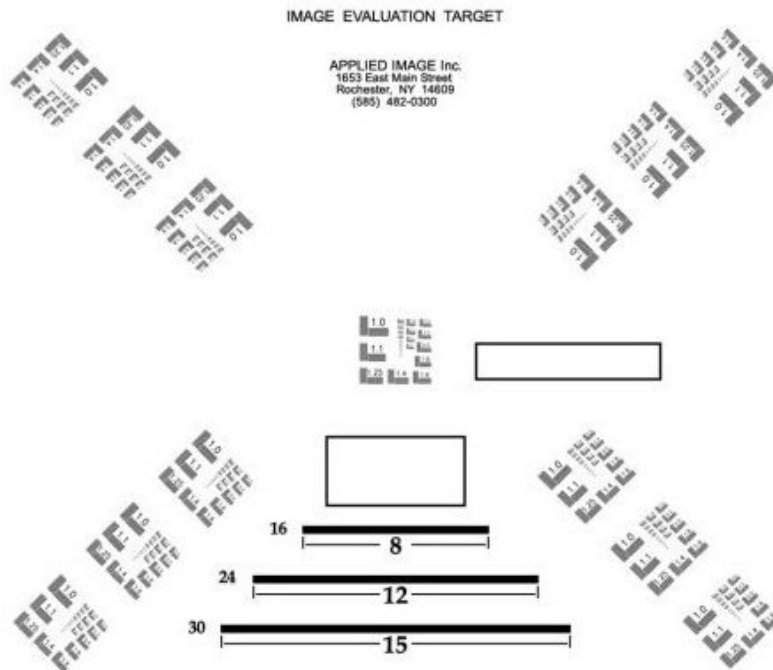
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- A Brief History
  - “Microphotography” invented in 1839
  - Suggested for document preservation in 1851
  - First used commercially in the 1920s
  - Patented in 1925
  - Purchased by Kodak in 1928

# Microfilm Cameras



# Microfilm Resolution Target

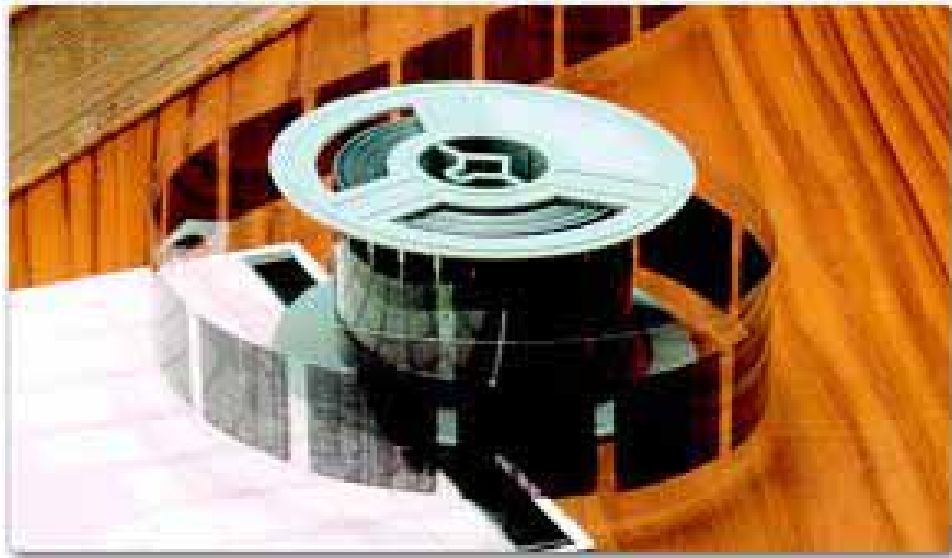


The page reduction ratio X the lowest number where you can see distinct separation = resolution in lines/mm.

# Microforms



# Common Roll Formats



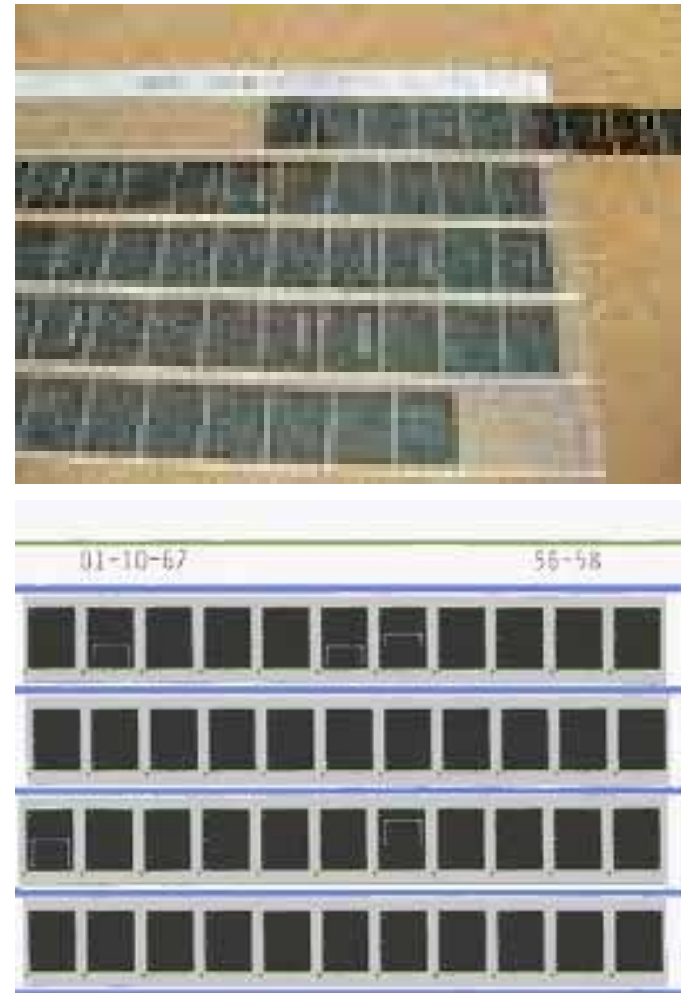
35mm on open reel



16mm on camera reel

# Microfilm Jackets

- Rollfilm cut into strips and slid into sleeves
- Not the best choice for preservation or recovery.
- Often the camera film is in the jackets

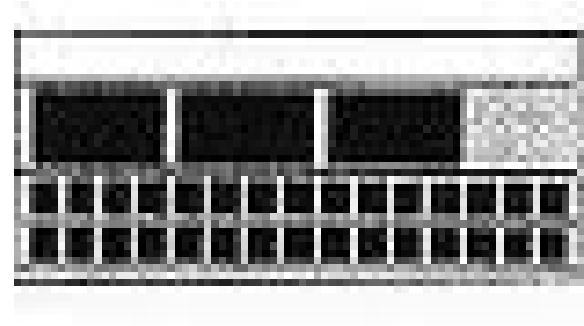
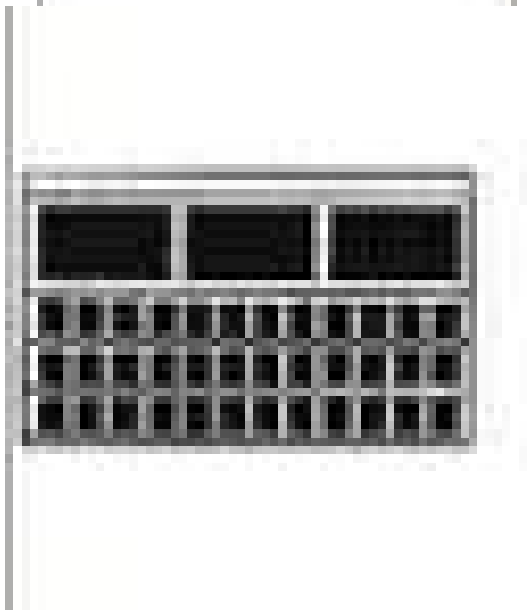
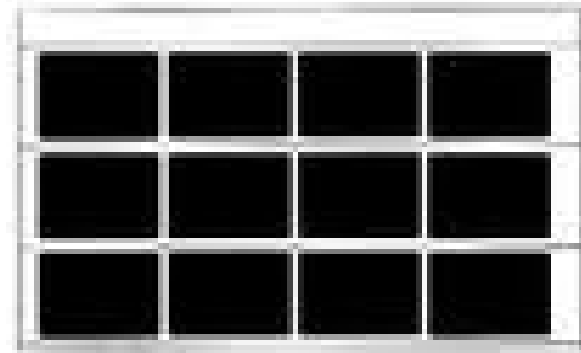
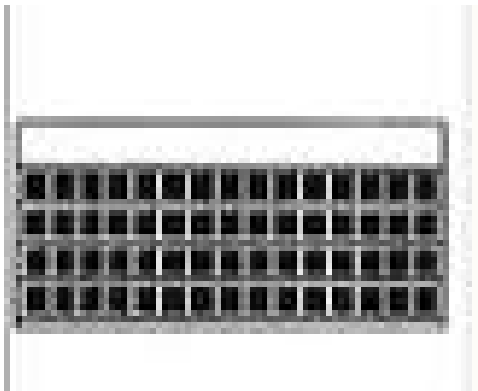




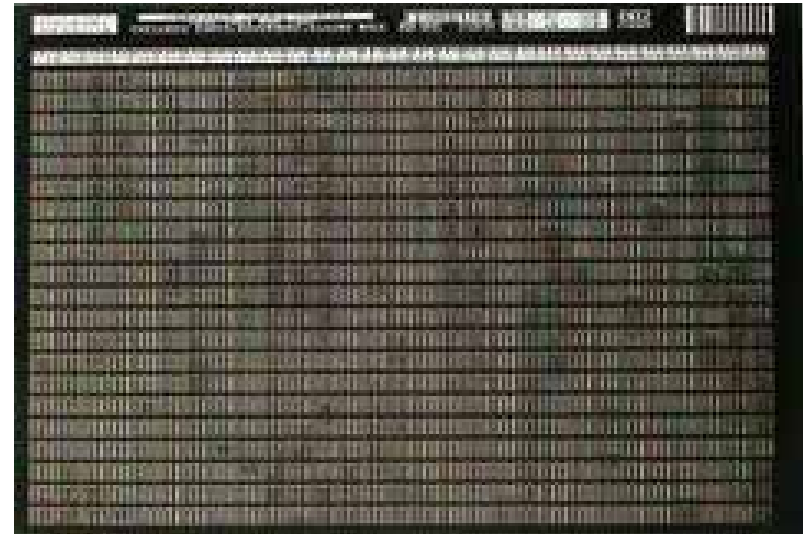


# More Jacket Formats

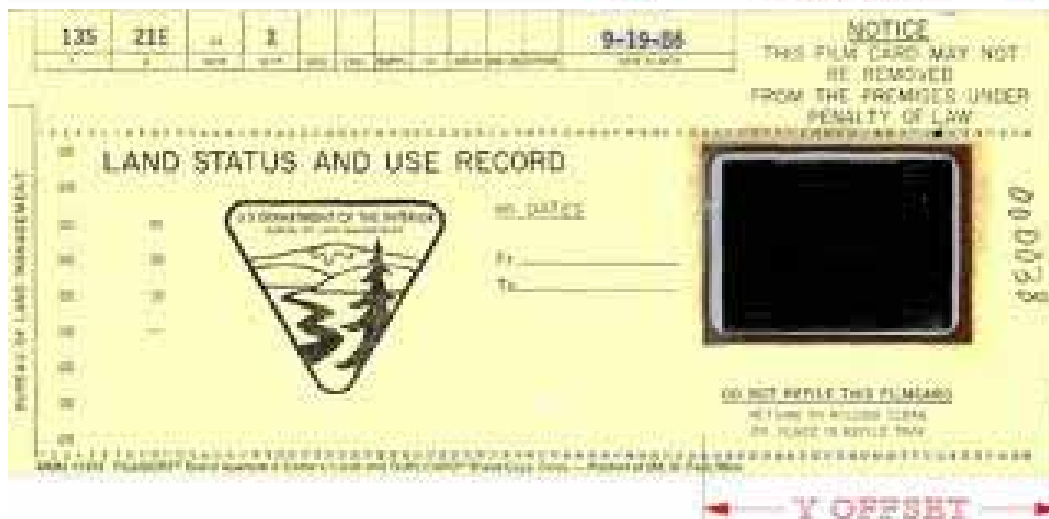
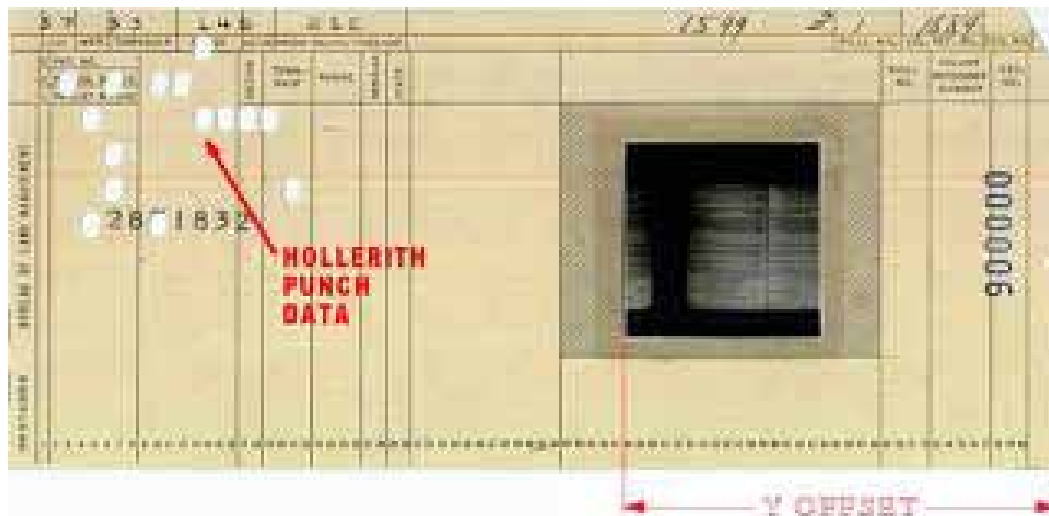
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# COM Microfiche



# Aperture Cards





# Film Generations

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- The film used in the camera is called:
  - Camera Negative
  - 1<sup>st</sup> Generation
  - Silver Original
  - Silver Master – not a definitive description
- If you can read words looking through the base side, it's an odd generation.
- If you can read looking through the emulsion, it's an even generation.
- Should not be a "mirror image".



# Film Types

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- Silver Original – Preservation – offsite
- Silver Duplicate – In-house printing master
- Diazo Duplicate – Working copy
- Direct Duplicating film makes a same polarity copy
- Print film makes a opposite polarity copy

# Film Base Types



Acetate Base



Polyester Base

# How to Tell Film Base Types – Backlighting



Acetate Base – Bad  
1980s & Prior - tears easily



Polyester Base – Good  
1980s and After  
This film tears only if nicked

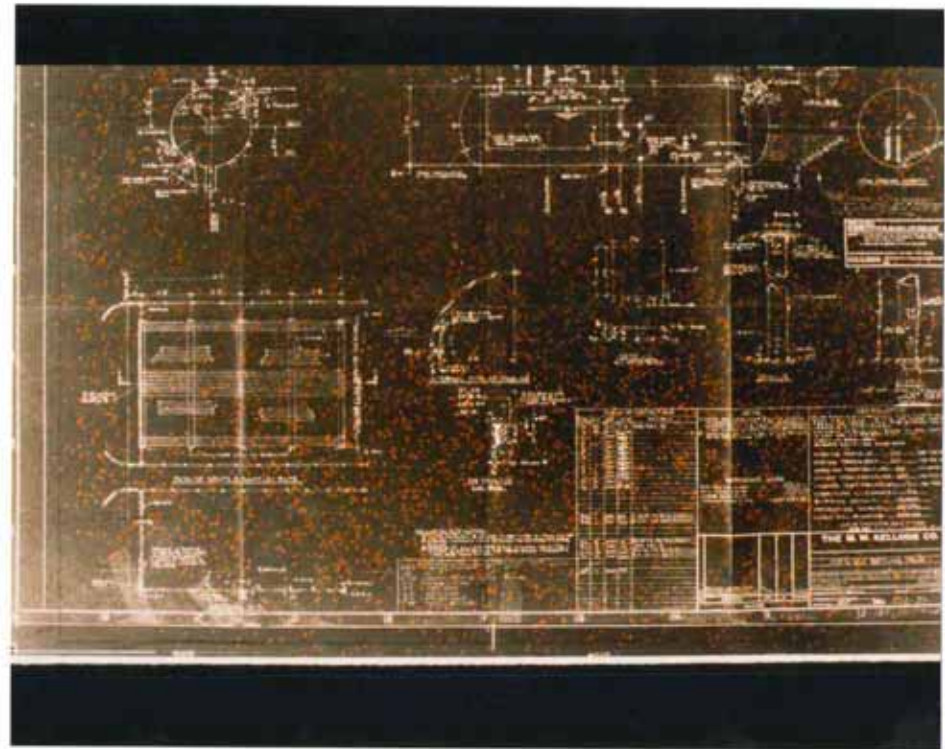
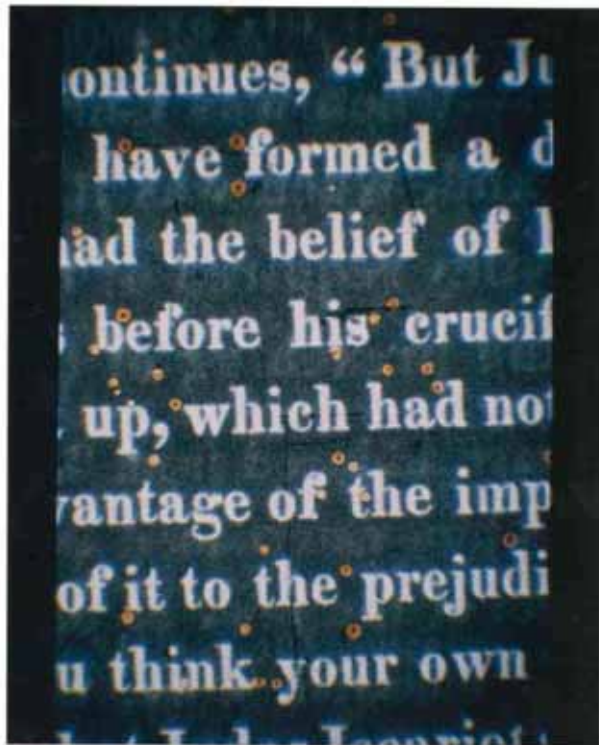
# Film Emulsion



- Silver film: shiny side is the base & dull side is the emulsion.
  - Lip test: Put the end of the film leader between your lips. The sticky side is the emulsion side. Beware of splices!
- Diazo film has an emulsion side but its hard to determine without scratching the film.



# "Cosmetic" Redox (Measles) – All Silver Film



Oxidation of the silver halide.



# Oxidant Sources & Other No Nos

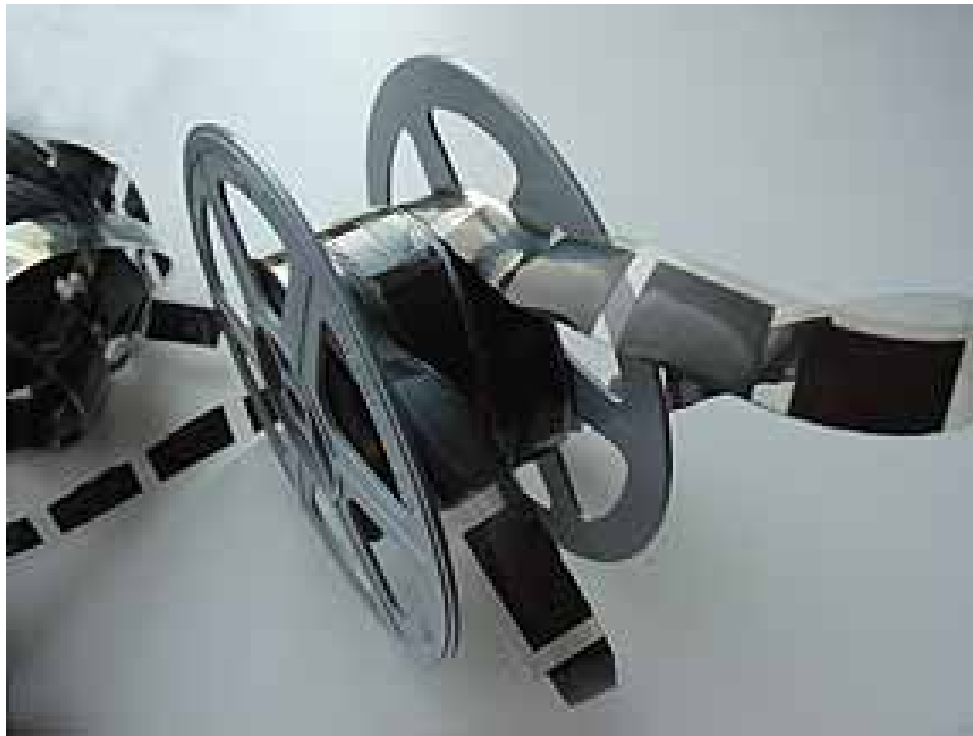


# Polysulfide Film Treatment



- Protects the silver from oxidation.
- Can be done during or after processing in a processor with an extra tank to accommodate the toner.

# Vinegar Syndrome – Acetate Film



# Microfilm Splicers



Prestoseal - Acetate  
Pre 1980s film



Metric – Polyester  
Post 1980s film

# Tape Splicers – Sometimes A Necessary Evil



Guillotine Tape Splicer



Optically Clear Mylar  
Tape 1/8" – 1" widths

# Microfilm Inspection



This....



Not this....



# Microfilm Recorders



Kodak Archive Writer



Source: Fujifilm

Fuji AR1000

**PRIA Best Practice!**

# Optical Media Oxidation



CD Rot

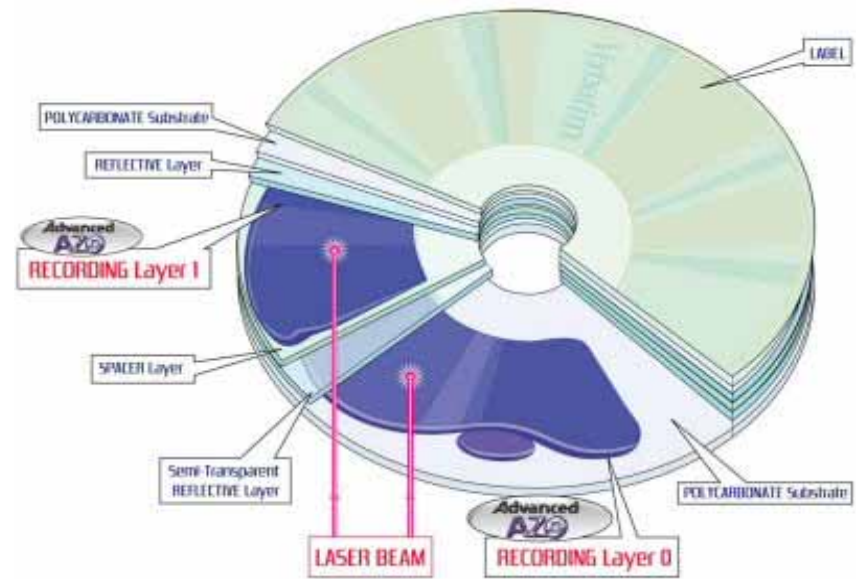


DVD Rot

# Optical Media Oxidation



Blu-Ray Disc Rot



Media Layers

# MAM-A Transfer Media





# The Future of Electronic Preservation

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- CAS – Content Addressable Storage
  - WORM – Write Once Read Many
  - Self Auditing – Secure Hash Algorithm version 2, 512 bit
  - Self Repairing – Reed Solomon error correction
  - Automatic email error notification



# References

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- Film boxes must meet ISO 18902:2007
  - Photographic activity test – ISO 14523:1999
  - [www.centuryboxes.com](http://www.centuryboxes.com)
- Silver microfilm
  - Environmental storage conditions – ISO 18911:2010
- Polysulfide toning of microfilm
  - Testing method – ISO 18915:2000
- CDs & DVDs
  - Environmental storage conditions – ISO 18925:2002
  - [www.mam-a.com](http://www.mam-a.com)
- PRIA Archival Backup & Disaster Recovery Workgroup
  - [www.pria.us/i4a/pages/index.cfm?pageid=3308](http://www.pria.us/i4a/pages/index.cfm?pageid=3308)
- Vinegar Syndrome detection strips
  - <https://www.imagepermanenceinstitute.org/imaging/ad-strips>