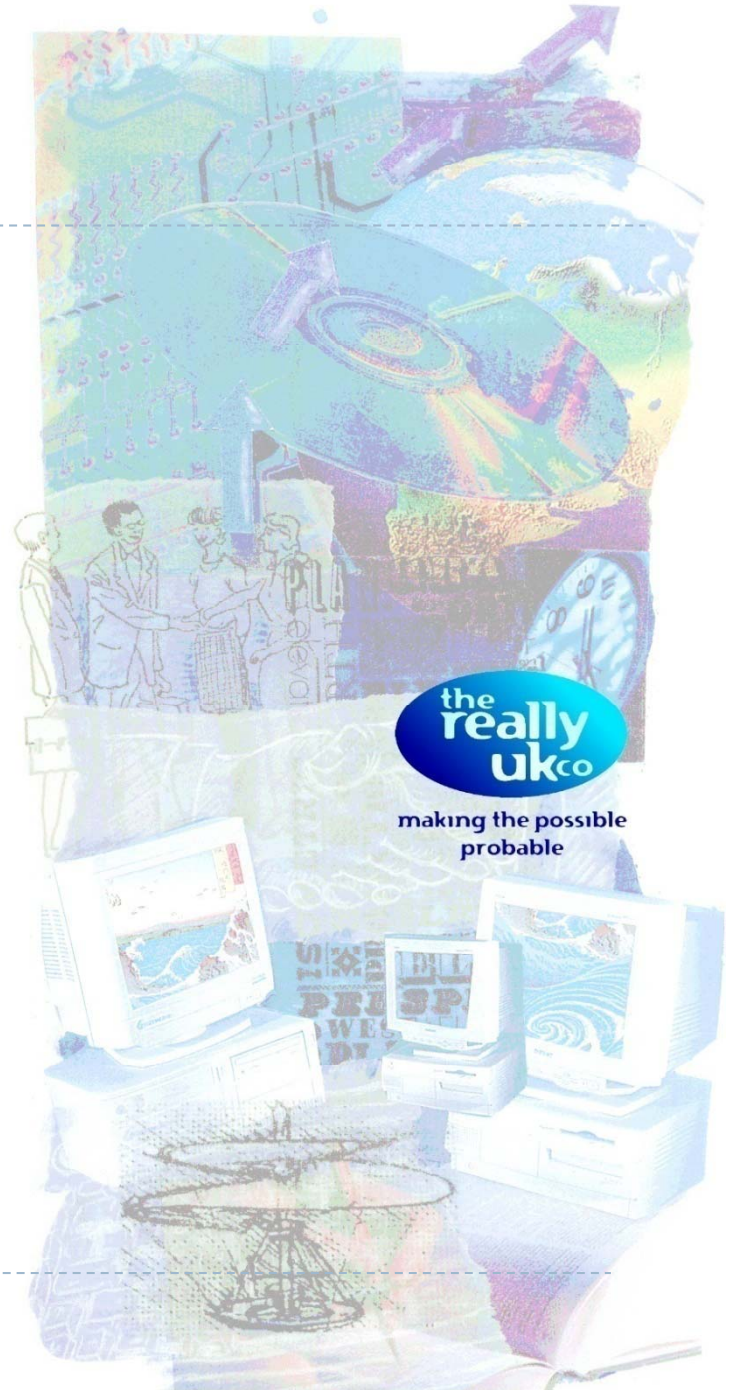
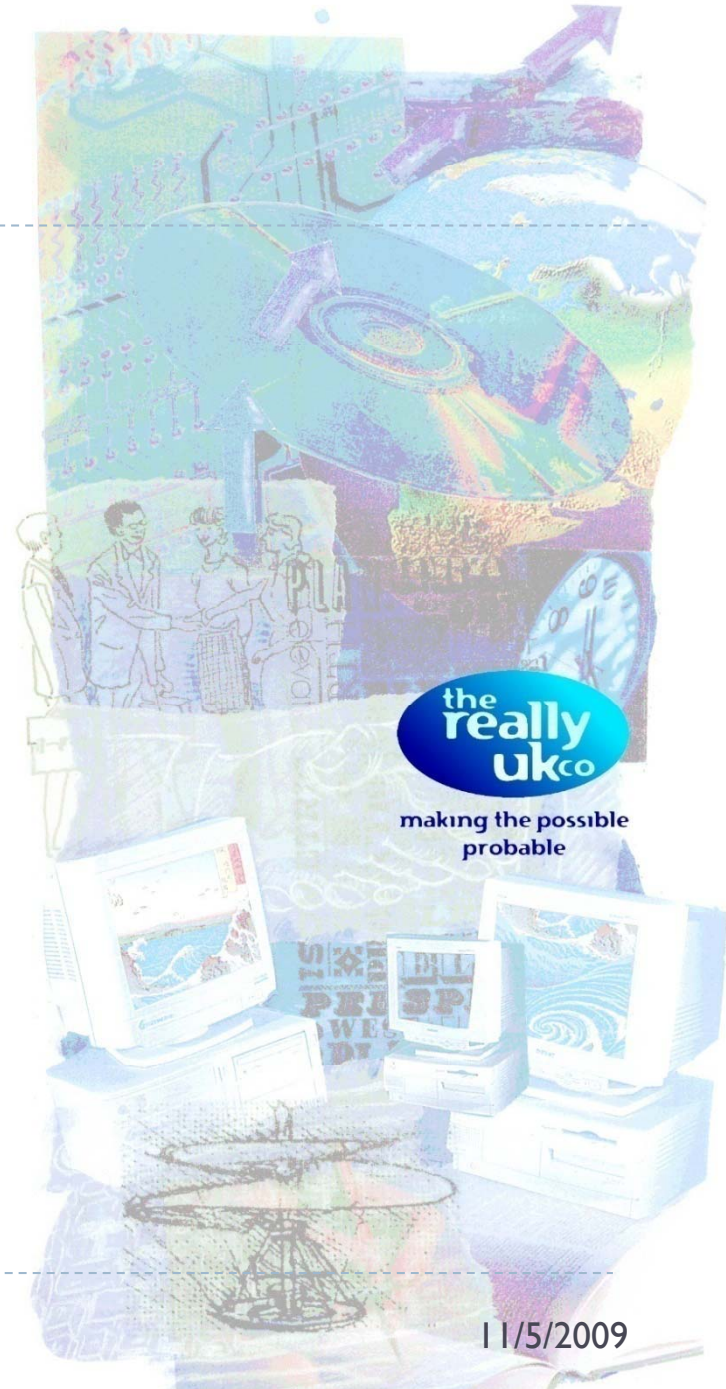

CONSUMABLES
and
TOTAL COST OF OWNERSHIP
(TCO)



Substrates - Policy

- ▶ Paper
 - ▶ It is wise for Universities and Local Authorities to operate a paper policy
 - ▶ to provide advice on when it is appropriate to use recycled paper for records and when it would be most inappropriate to do so and
 - ▶ when it would be most inappropriate to do so.
 - ▶ The majority of University and Local Authority records are printed on paper.
 - ▶ Many records have to be kept permanently
 - ▶ a significant number are able to be destroyed once they are no longer required for administrative or legal purposes.
 - ▶ The most important factor in determining whether or not to use recycled paper is the intended life-span and function of the record which is being created.
 - ▶ If records are required to be kept for less than ten years then recycled paper is appropriate.
 - ▶ If records are required to be kept for more than ten years, permanent paper is the only alternative.



Legislation and procedure

- ▶ Legislative Requirements
 - ▶ There are likely to be legislative requirements for archiving public records to which the Universities and Local Authorities must adhere.
- ▶ Procedure
 - ▶ It is wise to have a procedure to guide users towards the most appropriate type of papers.
 - ▶ It is important to identify copiers, printers and MFDs where recycled paper may be used.



Definitions - I

▶ Definitions

▶ Permanent Paper

- ▶ formulated to have chemical and physical properties which will enable it to remain in a useable state for a long period.
- ▶ Made from chemically bleached wood pulp, cotton, linen or other comparably stable non- wood pulp or a mixture of these.
- ▶ Alkaline
- ▶ Does not disintegrate over time if kept in “archive conditions”.



Definitions - 2

▶ Recycled Paper

- ▶ Contains a stated percentage of recycled fibre and is so labelled.
- ▶ It is made from recycled wood pulp and, due to the processing required, has much shorter fibres than permanent paper.
- ▶ The effect is to reduce the strength of the recycled paper and create a product which is acidic.
- ▶ The paper yellows over time and becomes brittle
- ▶ Is not adequate for records which need to be kept for the long term even under “archive conditions”.



Applications – permanent (I)

- ▶ Applications requiring Permanent Papers
 - ▶ All records which need to be kept for longer than ten years should be created on permanent paper.
 - ▶ Examples of these types of records are:
 - ▶ Records required for administrative purposes which continue beyond ten years
 - files documenting policy and procedural development in relation to ongoing functions
 - master plans/drawings of buildings owned or occupied on long-term leases.
 - ▶ High level policy records and any records likely to have continuing historical interest
 - Council, Academic Board and committee records
 - Records relating to substantial research projects
 - Certain theses, examination papers, speeches;
 - ▶ Records which are costly to collect and likely to be used in the future
 - research data;



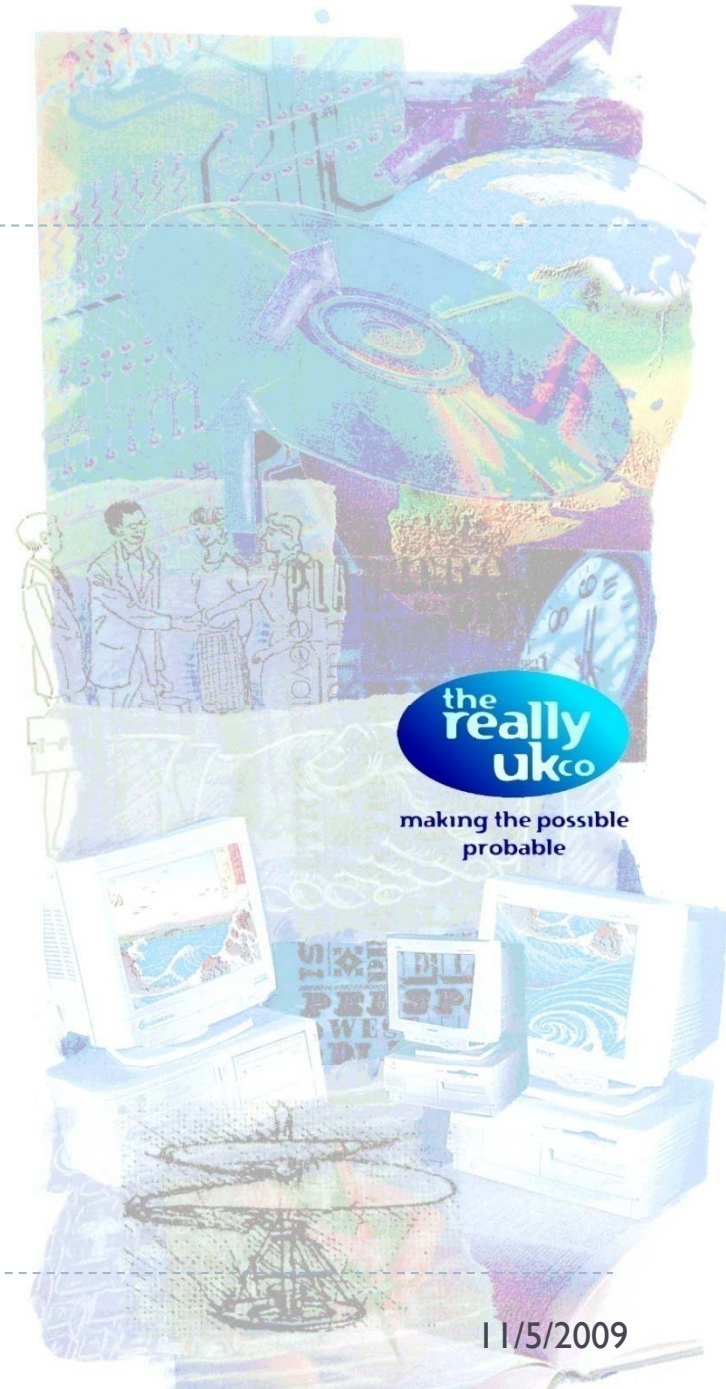
Applications – Permanent (2)

- ▶ Certain documents provided by the University or Local Authority to their respective communities.
- ▶ Records which document the legal rights and obligations of the enterprise
 - ▶ contracts for projects such as buildings
 - ▶ consultancy agreements/contracts, contractor records
 - ▶ records of long service leave
 - ▶ superannuation entitlements
 - ▶ records affecting entitlements of beneficiaries
 - ▶ reports of workplace or other accidents.
- ▶ Publications required for long-term reference
 - ▶ Annual reports
 - ▶ Public submissions
 - ▶ Handbooks
 - ▶ Calendars
 - ▶ Protective packaging for records, archives and artefacts.
- ▶ Copies of records that are sent to the Library or the Governance & Corporate Services Office should be on permanent paper.



Applications – Recycled (I)

- ▶ Certain documents provided by the Recycled papers may be used for the following range of applications:
 - ▶ provided that the items are to be retained for no longer than ten years:
 - ▶ Creating records which are retained for a short time period
 - ▶ Forms
 - ▶ Throwaways
 - writing, scribble and message pads
 - internal telephone directories
 - adhesive backed note paper and "post-its"
 - Notebooks
 - paper used for drafting documents
 - transaction control or transmittal documents
 - envelopes which are not processed through high speed machinery
 - short-term or frequently updated manuals
 - non-protective packaging;



Applications – Recycled (2)

- ▶ Printing and publications
 - ▶ bulk information leaflets
 - ▶ advertising material.
- ▶ Records where the originals are on permanent paper and are retained by the originating office and information copies are on recycled paper and sent out to staff and/or the public
 - ▶ committee minutes issued to members of a committee
 - ▶ Publications
 - ▶ Ephemera
 - ▶ media releases
 - ▶ Reports
 - ▶ statistical information
 - ▶ examination papers issued to students.



Copiers and Printers

- ▶ Before using recycled paper in photocopiers or laser printers, always check with the machine's manufacturer.
- ▶ Recycled paper is not suitable for use in some machines. It may
 - ▶ degrade performance
 - ▶ increase dust
 - ▶ increase downtime due to maintenance
- ▶ Recycled paper can also cause damage to some components
 - ▶ Drums
 - ▶ Developer units
 - ▶ Fuser units
 - ▶ Clutches and platens



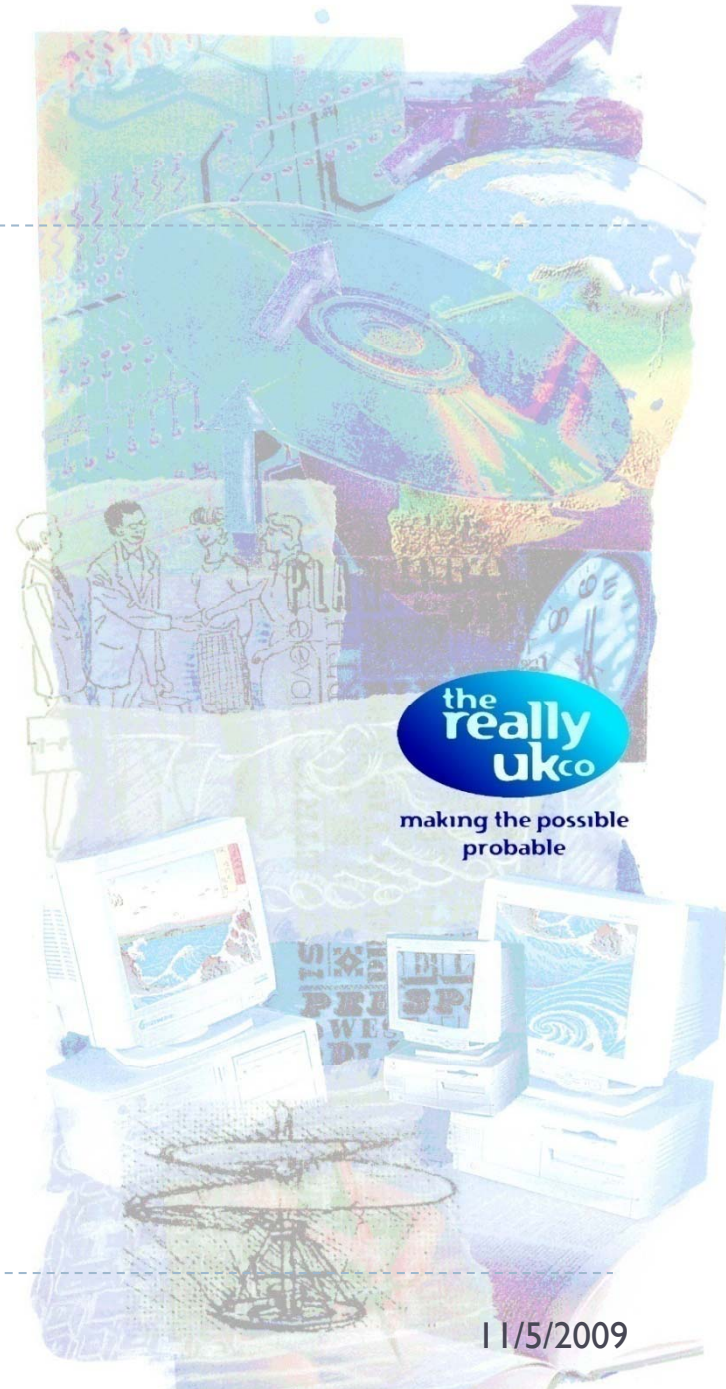
Substrates - I

- ▶ Paper for inkjet and laser applications
 - ▶ Types
 - ▶ Weight in grams per square metre (gsm)
 - Thin (80-120 gsm)
 - Medium to heavy card (160gsm -400gsm)
 - Check capability of device transport (also manufacturer's specification limits.



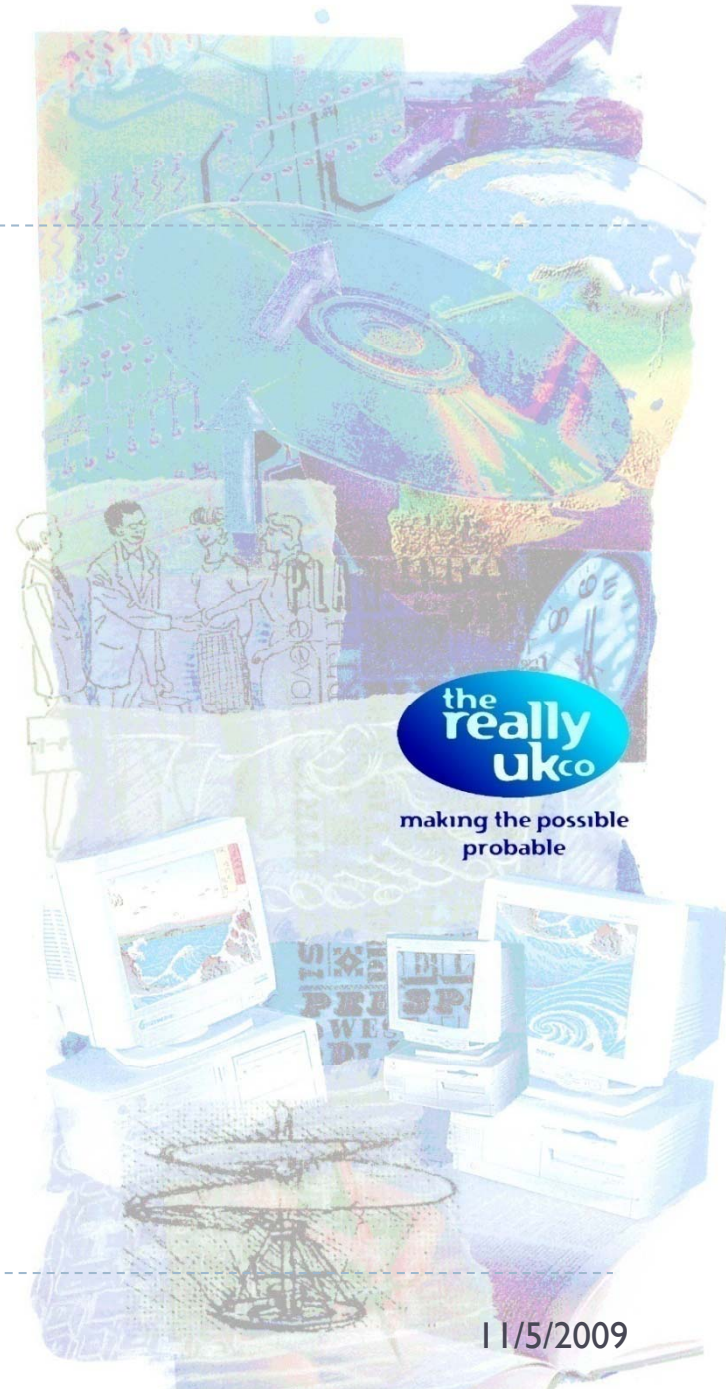
Surface characteristics

- ▶ Low quality matt (utility copy paper)
 - ▶ May include percentage of recycled materials
 - ❑ Check device capability for throughput
 - ❑ Machine dependent
 - ❑ Not suitable for archive purposes
 - ❑ 10,000 ream JIT contract price from £1.50/r
 - ▶ Medium quality matt (from £2.50/r)
 - ❑ Wood pulp low or no rag content
 - ❑ Machine independent
 - ❑ Not suitable for archive purposes
 - ▶ High quality matt (from £3.50/r)
 - ❑ High rag content
 - ❑ Suitable for archive purposes (10+ years)



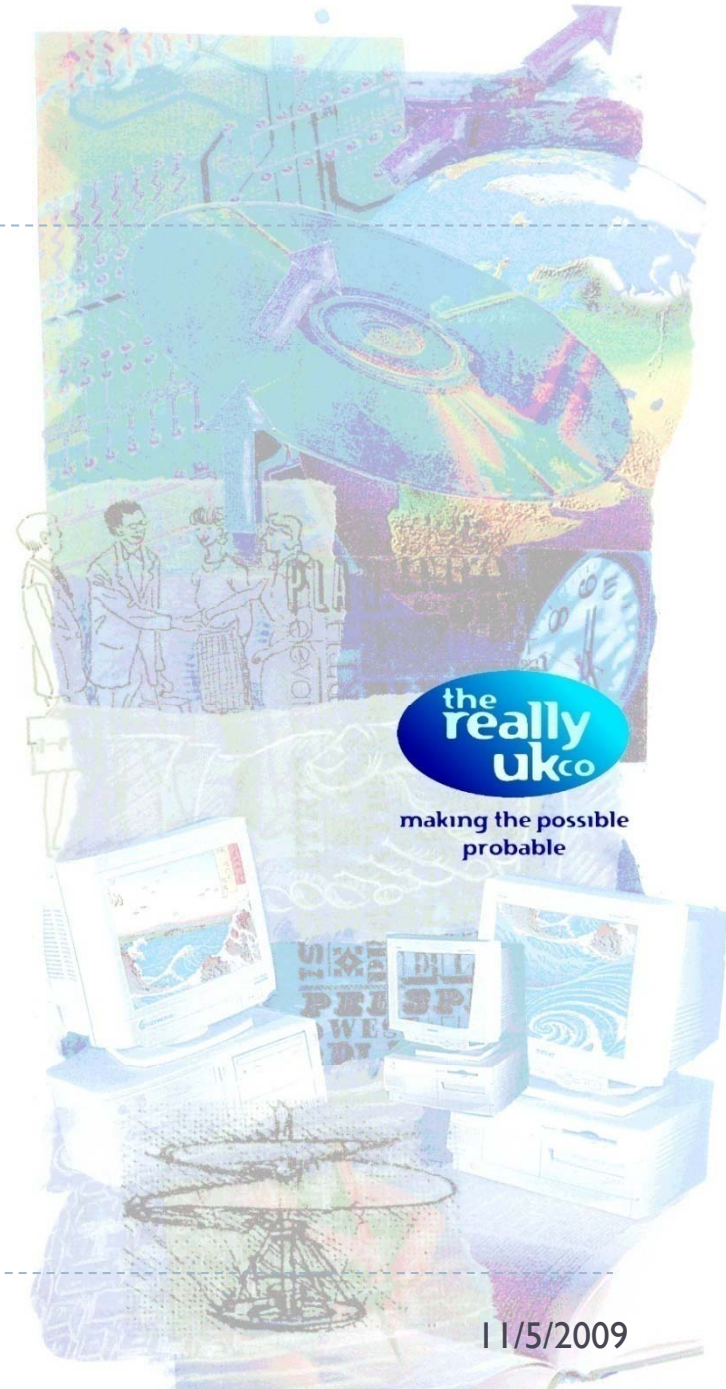
Surface characteristics (cont.)

- ▶ Calendered (wood pulp) £4-8/r
 - General purpose`colour work
 - Not suitable for archive purposes
- ▶ Supercalendered (wood pulp) £8-14/r
 - Needs to be copier/printer suitable
 - Not generally suitable for archive purposes
- ▶ Calendered (mixed rag/wood) £>16/r
 - Check archive suitability
- ▶ Supercalendered (mixed rag/wood)
 - Suitable for archive purposes £>20/r
- ▶ Coated (various grades) £>40/r
 - Specialist uses – e.g. colortech (Xerox)
 - Check suitability for laser
 - Not generally suitable for archive



Substrates - 2

- ▶ Tinted papers
 - ▶ Generally pigmented versions of matt
 - ▶ Low to medium quality
 - ▶ Some single sided high density coated
 - Check suitability for application
- ▶ Film
 - ▶ Clear and tinted films designed specifically for laser.
 - ▶ Coated film stock is suitable for some inkjet applications.



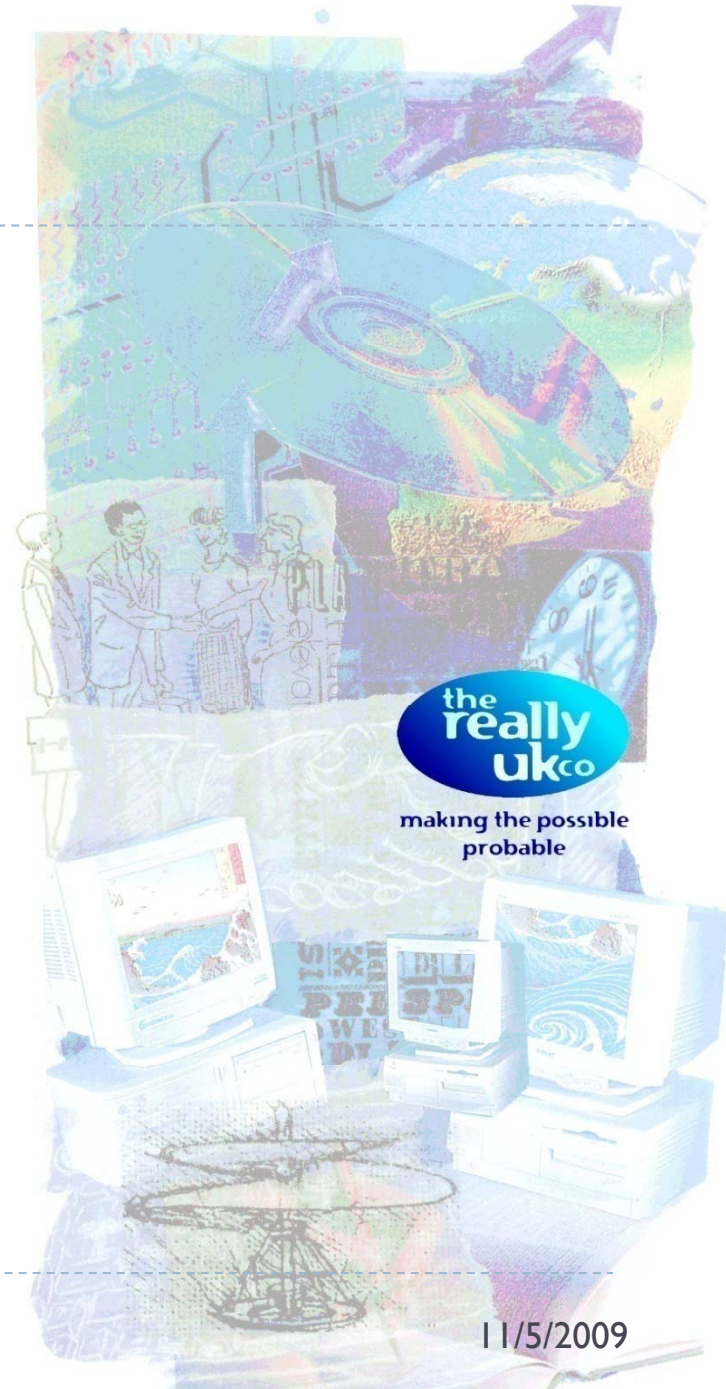
Inkjet - inks

- ▶ Dye based inks:
 - ▶ Brilliant colour
 - ▶ Wide colour range (gamut)
 - ▶ Not light fast or suitable for archive
 - ▶ Not generally water water-fast
 - ▶ Slow to penetrate substrate
 - ▶ Up to ten seconds to dry
 - ▶ Suitable for monochrome or block colour
 - ▶ Not suitable for permanent applications.
- ▶ Pigmented inks:
 - ▶ Waterproof
 - ▶ Fade resistant
 - ▶ Fast drying
 - ▶ Suitable for colour
- ▶ Remarkably expensive
- ▶ Low coverage (often well under 1000 pages especially colour @ 5%)
 - ▶ Far less when printing images



Inkjet - Integration

- ▶ Nozzles with cartridge
 - ▶ More expensive
 - ▶ Less maintenance
 - ▶ Ensures compatibility (oem)
 - ▶ Less subject to third party options
- ▶ Nozzles with machine
 - ▶ Cheaper technology
 - ▶ Subject to third party compatibles
 - ▶ Variable quality
 - ▶ Recycled can be less than half price
- ▶ Cartridge dependence
 - ▶ Independent – lower replacement cost
 - ▶ Colour combined



Inkjet –cost

- ▶ Example CANON IP4700
 - ▶ Best cost@~£28 for **compatible** valuepack. (Stinkyink)
 - ▶ [Page prints average actual yield 300 pages](#)
 - ▶ Full colour cost @ 5-10% coverage
 - ▶ Approaching 10p per page.
 - ▶ As cheap as it gets!
- ▶ Average inkjet page costs are usually much higher due to
 - ▶ Low activity
 - ▶ Head cleaning cycles
 - ▶ “proof” prints
 - ▶ Printer faults
- ▶ Ten sources (reviews and comment on actual printing scenarios) suggest that the true cost per page of the average low end inkjet can be as much as 25p per A4 page across a wide variety of manufacturers
 - ▶ not counting the cost of special papers.
- ▶ A3 printing more than doubles the cost.



Laser - cost

- ▶ HP Color LaserJet CP4005 Printer
- ▶ HP Full set of toners £764 (black £140)
 - ▶ Full set of compatible toners (street) <£300 –pack of four (black £65)
- ▶ 5% Yield average 7500 pages
- ▶ HP OEM cost per colour page ~10p
 - ▶ mono 1.8p per page
- ▶ Compatible cost per colour page ~4p
 - ▶ mono .86 per page



Compatibles use

- ▶ It is possible to remanufacture used ink and toner cartridges.
 - ▶ It is also possible simply to refill them but this practice can lead to greater unreliability and adversely affect the quality of output.
- ▶ Whether recycled products are used will depend upon policy regarding equipment warranties and the maintenance terms of equipment suppliers.
- ▶ Typically, lease and click contracts will be served by the manufacturer/supplier but for desk top devices there may be issues regarding the effect of using recycled containers.
- ▶ Remanufacturing with OEM materials under OEM standards should enable cartridges to be an effective economy.
 - ▶ There are however many suppliers whose standards are not necessary to the OEM level.
 - ▶ Needs management and therefore a hidden additional cost.
 - ▶ Reduces the cost advantage especially when problems arise.



Click use

- ▶ The best way to control costs.

- ▶ However

- ▶ Contract needs to be carefully studied

- definitions of a click - A3/A4 duplexing?
 - What's included?
 - Toner, Fuser oil etc?
 - Drum, Developer, Fuser, units ?
 - What's not (usually)
 - Ancillary consumables – staples, glue sticks etc.



Total Cost of Ownership

- ▶ Purchase/Lease
- ▶ Clicks
- ▶ Power
- ▶ Consumables – substrate inks, toner and ancillaries
- ▶ Spare parts/clicks
- ▶ Faults/callouts/downtime
- ▶ Maintenance
- ▶ Training
- ▶ Lost consumables (wastage proofing and rework)
- ▶ Time/people costs
- ▶ Management

