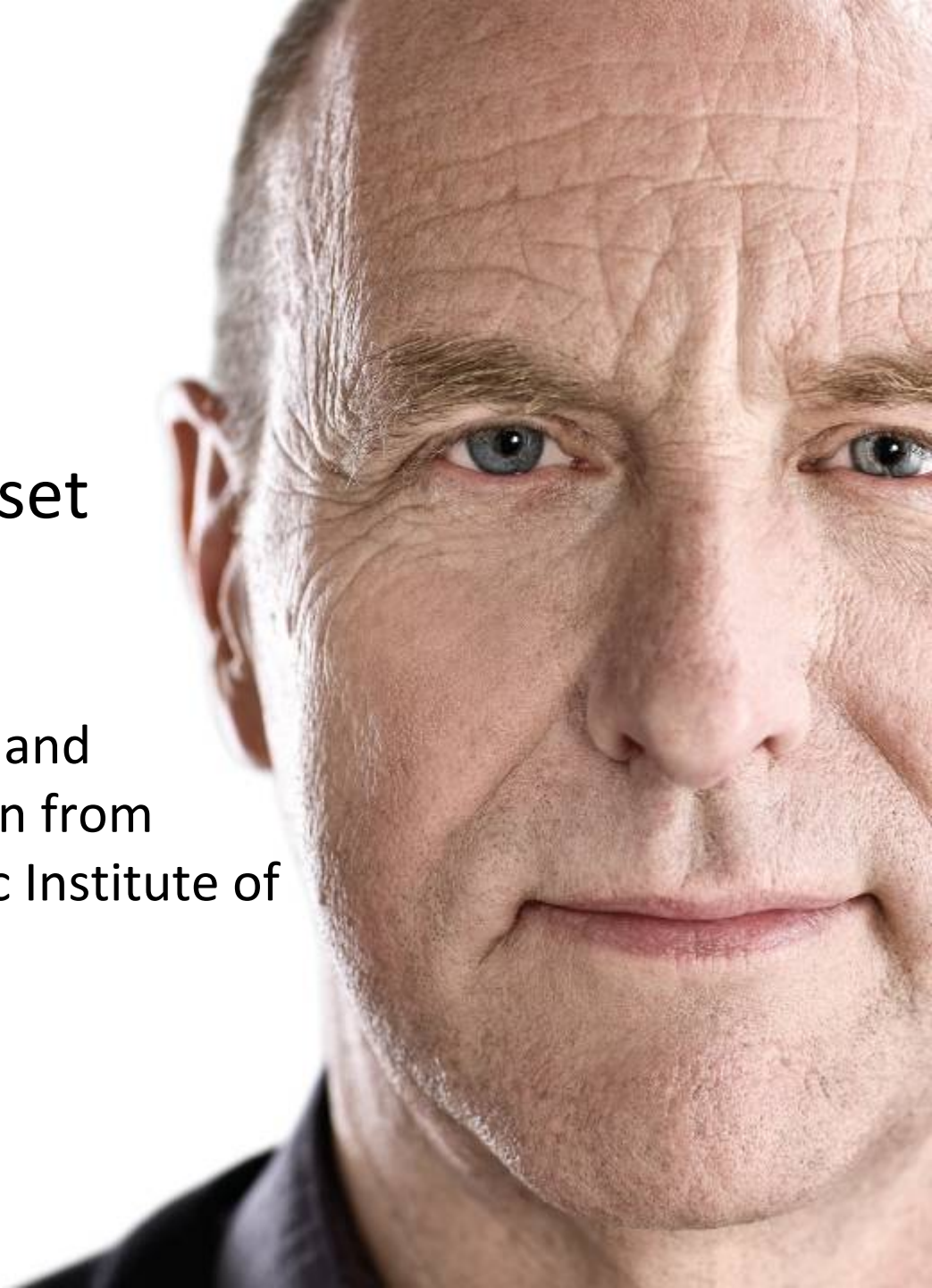


Who cares?

Total Ink Drying in Offset Printing

Excerpts from 'Responsibility and Performance' – a presentation from StoraEnso for the Lithographic Institute of Australia (LIA).



Total Ink Drying in Offset Printing

who cares?



main factors;

- Ink
- Paper
- Print room
- Water / fount solution
- Printing Machine
- Blankets
- Job

why?

Who cares?

INK

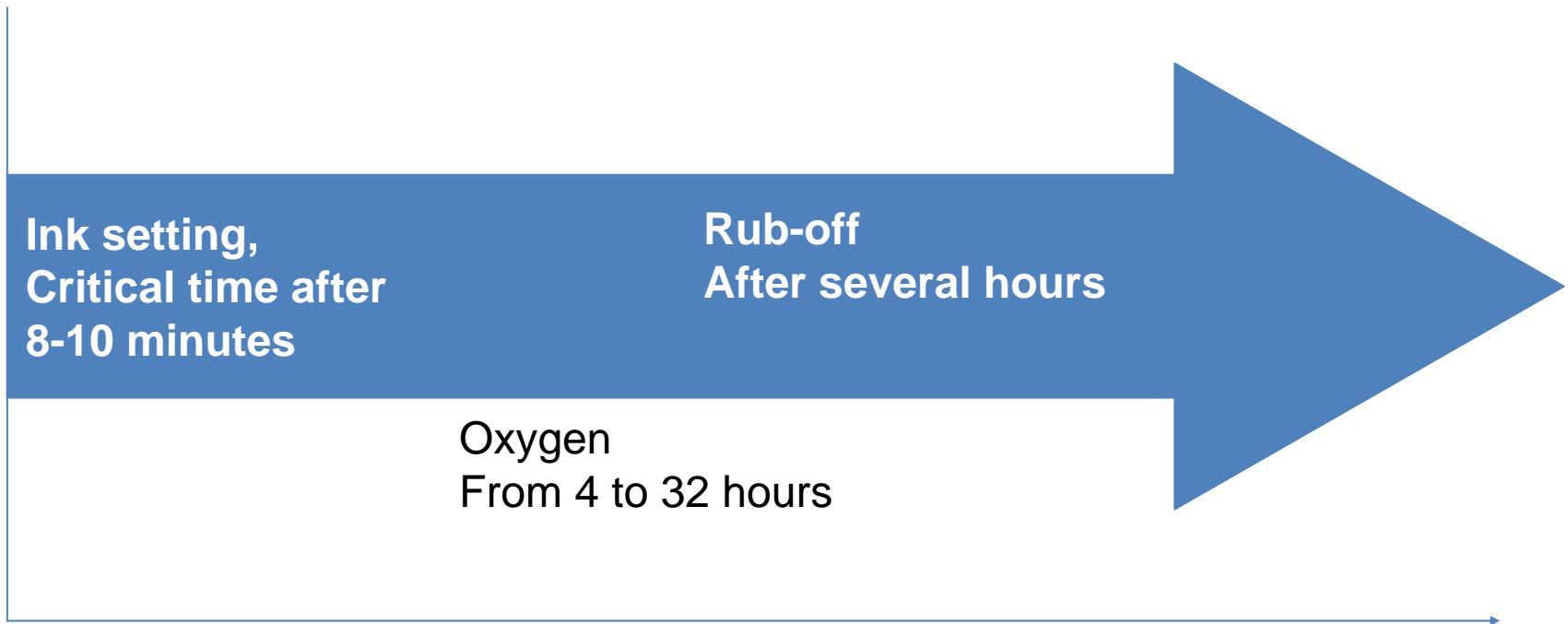
MediaPrint.



Total ink drying - Ink-setting & Rub-off

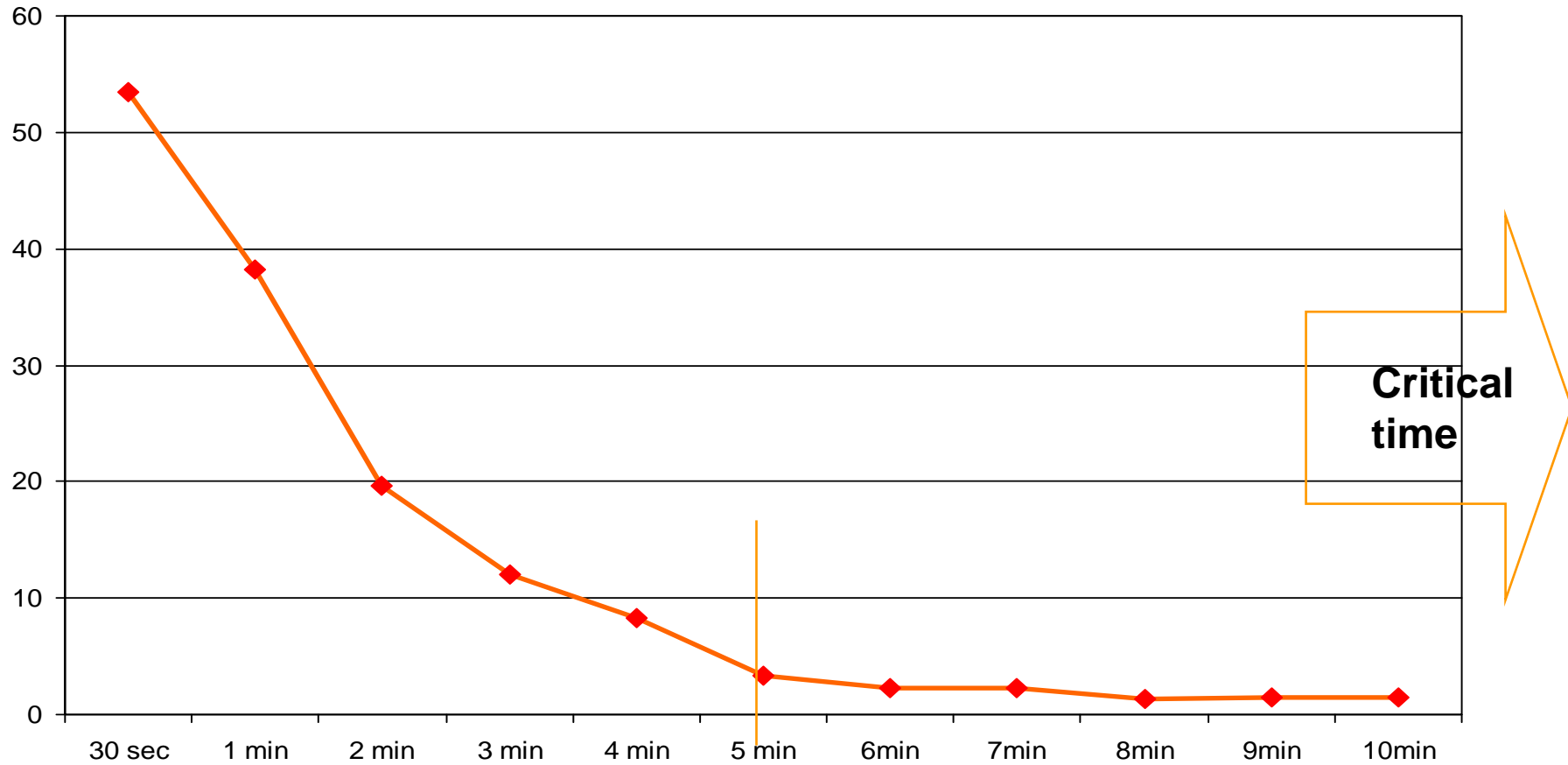
Who cares?

From seconds to several days



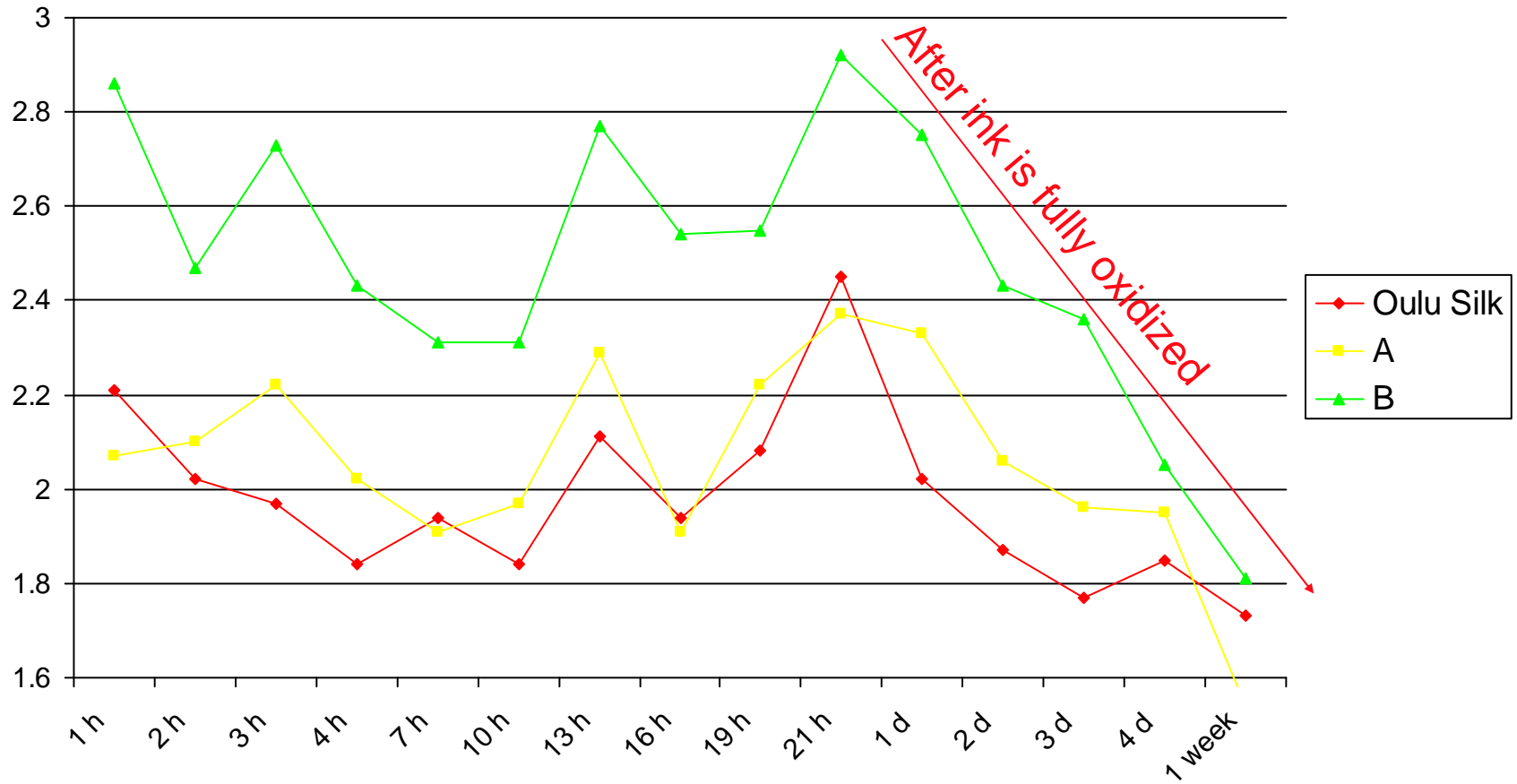
Set-Off, 115 gsm gloss

who cares?



"Sweat back" – rub-off

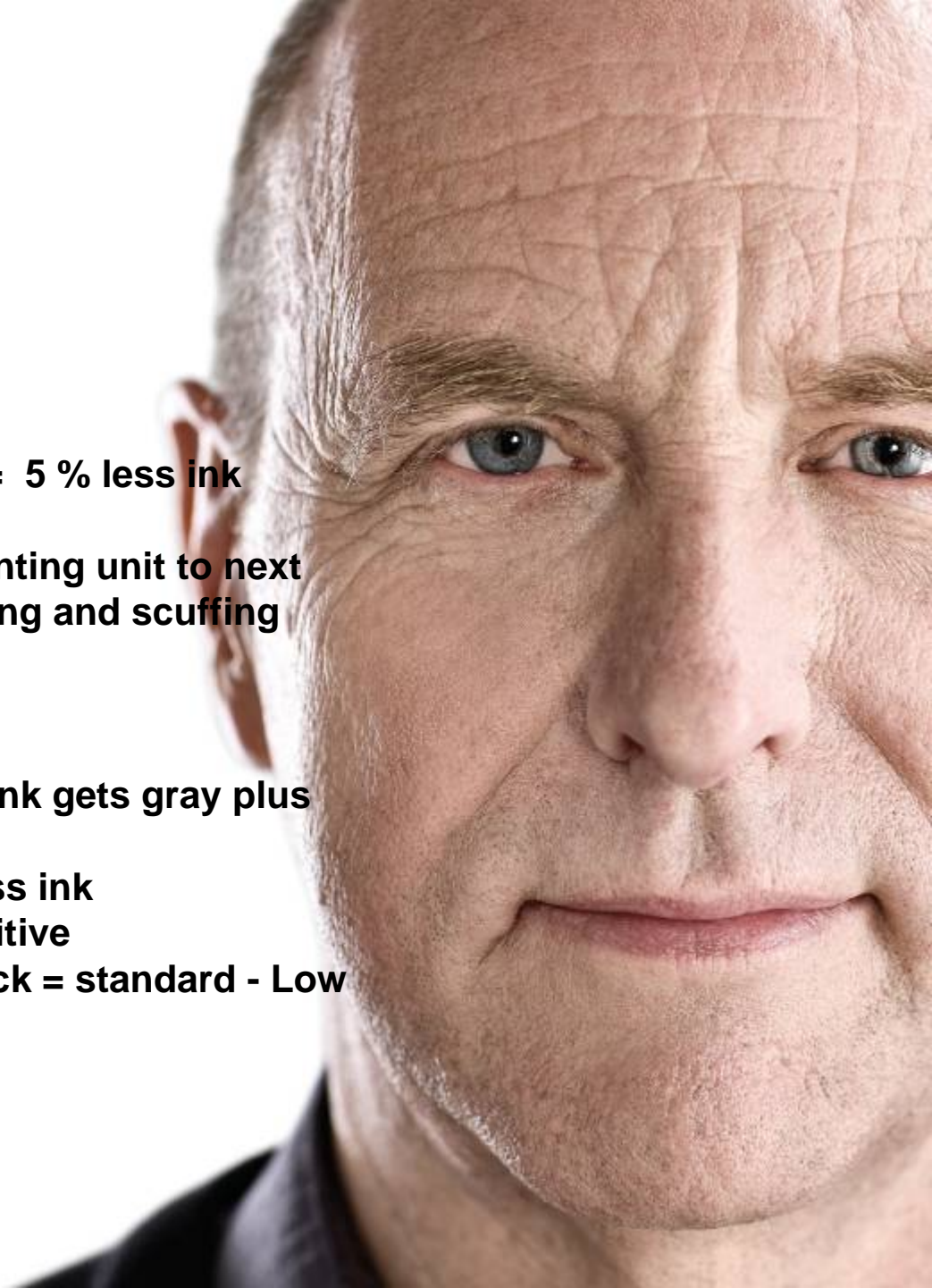
Who cares?



Who cares?

Generally inks

- 1 Celsius degree more temperature = 5 % less ink tackiness
- Increasing ink drying speed from printing unit to next
- To make glossy inks creates ink drying and scuffing problems
- Magenta ink is very water sensitive
- Yellow is very temperature sensitive
- Metal inks, pH at least 6 - otherwise ink gets gray plus there can be ink drying problem
- Silver ink, if ink is scuffing away - less ink
- UV inks are very emulsification sensitive
- High tack = summer inks - normal tack = standard - Low tack = winter inks

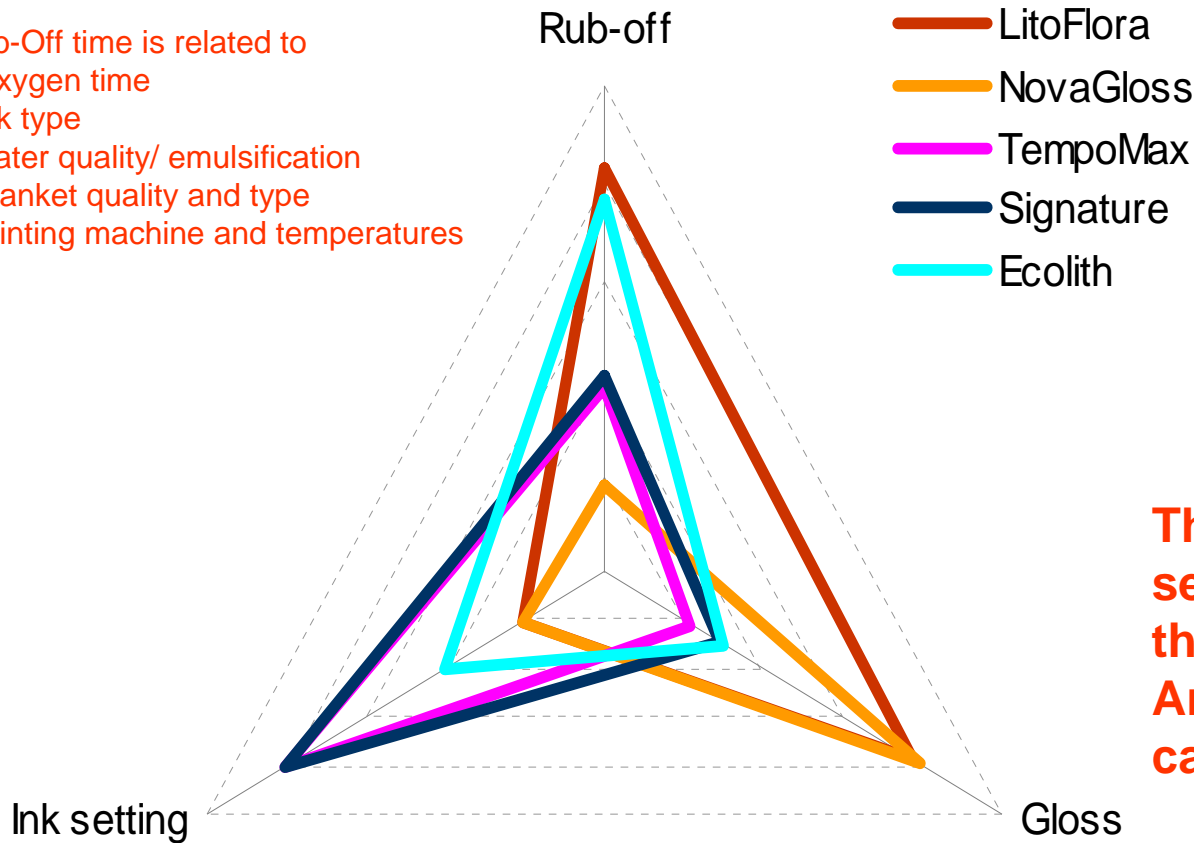


Who cares?

Example - Printing ink is a compromise

Rub-Off time is related to

- Oxygen time
- ink type
- water quality/ emulsification
- Blanket quality and type
- printing machine and temperatures

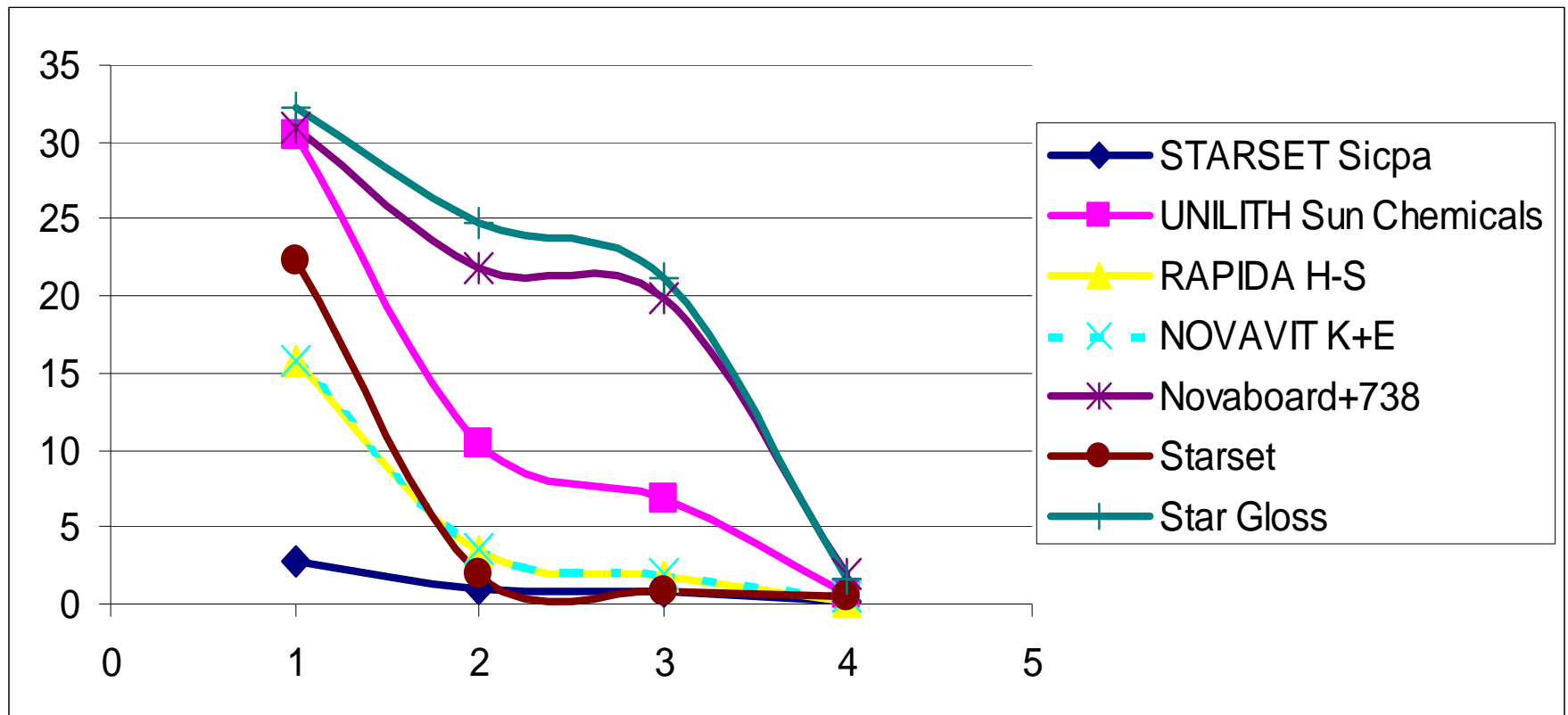


The faster the ink setting here, the worse is that Rub-Off And back-trap mottling can be the risk

In this corner we are talking about seconds and there is time of few minutes, max 10

Example - Set-off, 300 % ink Different inks for different purpose

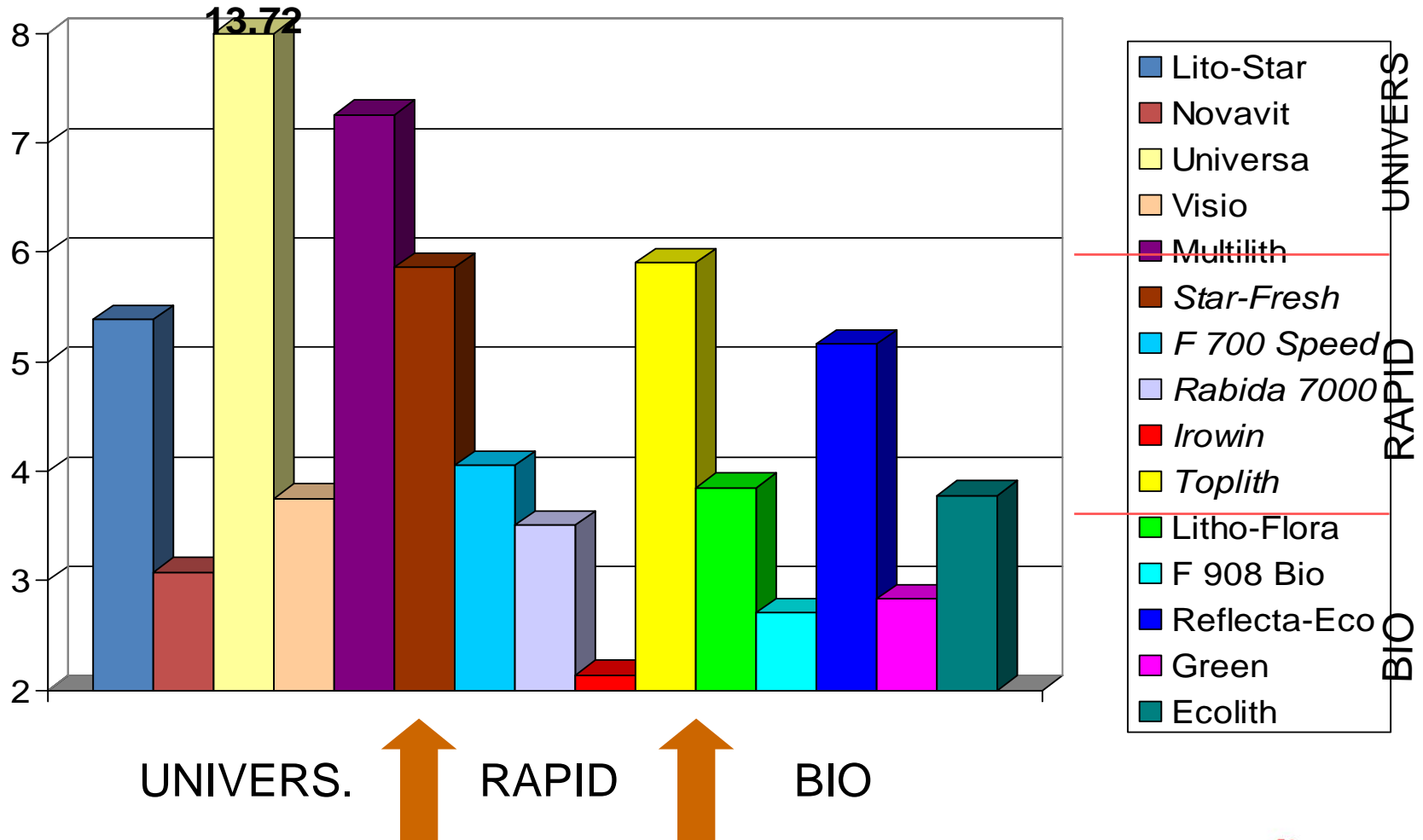
who cares?



who cares?

Set-off 400 % time 15 sec.

Same paper, different ink and INK-DRYING PROPERTIES



Who cares?

WATER
FOUNT SOLUTION

MediaPrint.



who cares?

Fount Solution

ISOPROPANOL

=> BETWEEN 0 - 10 %

MORE THAN 12 %

=> "DISSOLVE" INK PIGMENTS

WATER TEMPERATURE

=> 11 - 15 C (SHEET)

15 - 25 C (HSWO)

IF HIGHER

=> TOO MUCH FOUNT TRANSFERS

=> ALCOHOL EVAPORATE

=> EMULCIFY DIFFERENT IN

DIFFERENT UNITS

DRYING AND / OR RUB OFF PROBLEMS

who cares?

WATER / pH

WATER ph

=> BETWEEN 4,9 - 5,3 (conventional)
FROM 4,2 – 5,0 (non-alcohol)

HIGH pH

=> EMULSIFY PLENTY INTO INKS
=> DRYING PROBLEMS

LOW pH

=> SOFTEN THE PAPER COATING
=> PREVENT OXIDIZE OF INKS
=> DRYING PROBLEMS

EXAMPLES pH 5 => ink drying 4 h

pH 4,5 => ink drying 14-15 h

who cares?

Water / Hardness

HARDNESS (dH)

0 - 2,1	VERY SOFT
2,1 - 4,9	SOFT
4,9 - 9,8	“NORMAL”
9,8 - 21	HARD
21 ->	VERY HARD

BELOW 5 = FOAMING RISK

HIGHER THAN 12, THERE MIGHT BE BUILD UP PROBLEMS

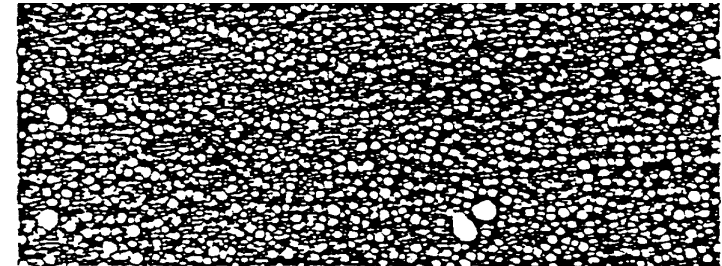
IN BOTH CASES EMULSIFIED WATER AMOUNT IS TOO HIGH.

Who cares?

Total Ink Drying in Offset Printing

Water / fount solution, the level and the quality of emulsification

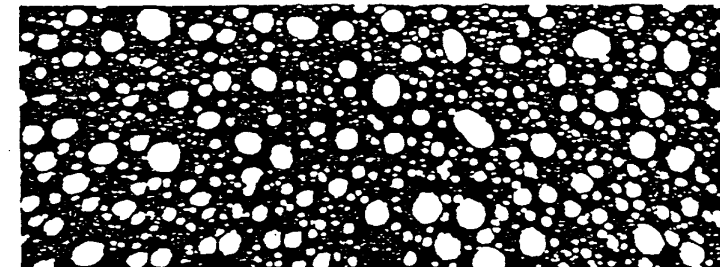
- * viscoelastic properties of inks
- * printing speed (temperature)
- * the pressure of nips (impression)
- * surface energy of fountain solution
- * temperature of waters
- * number of rollers, ink and water
- * the amount of ink and water



Offsetstabile Emulsion

Good!

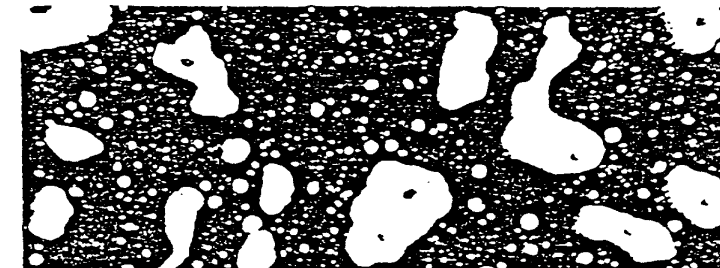
0.1 mm



Emulsion vor dem Umkippen

0.1 mm

Hard water



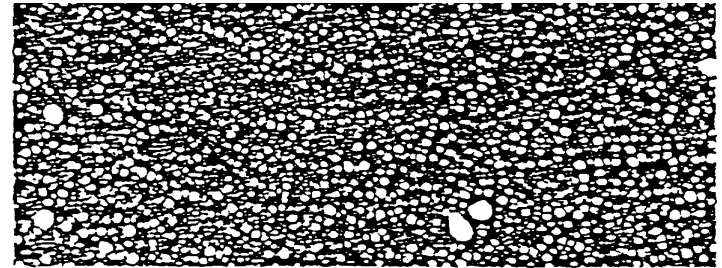
Instabile Emulsion (.Emulgieren') Very bad!

0.1 mm

Who cares?

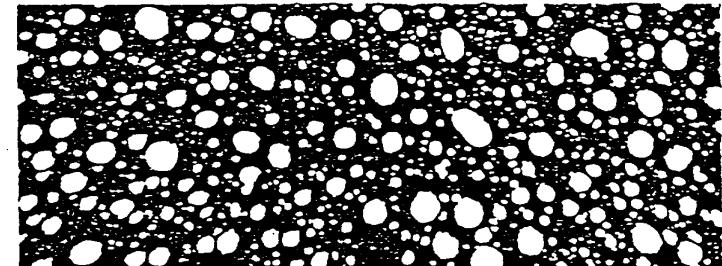
Influence of water hardness

- Ink stripping
- Mottle
- Blanket pile
- Linting
- Emulsification
- Doubling
- Dot Sharpness
- Scuff resistance
- Ink setting



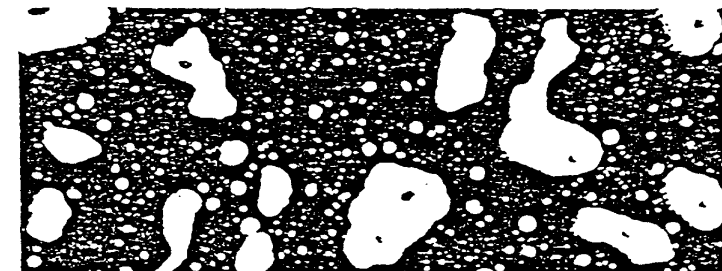
Offsetstabile Emulsion

0,1 mm



Emulsion vor dem Umkippen

0,1 mm



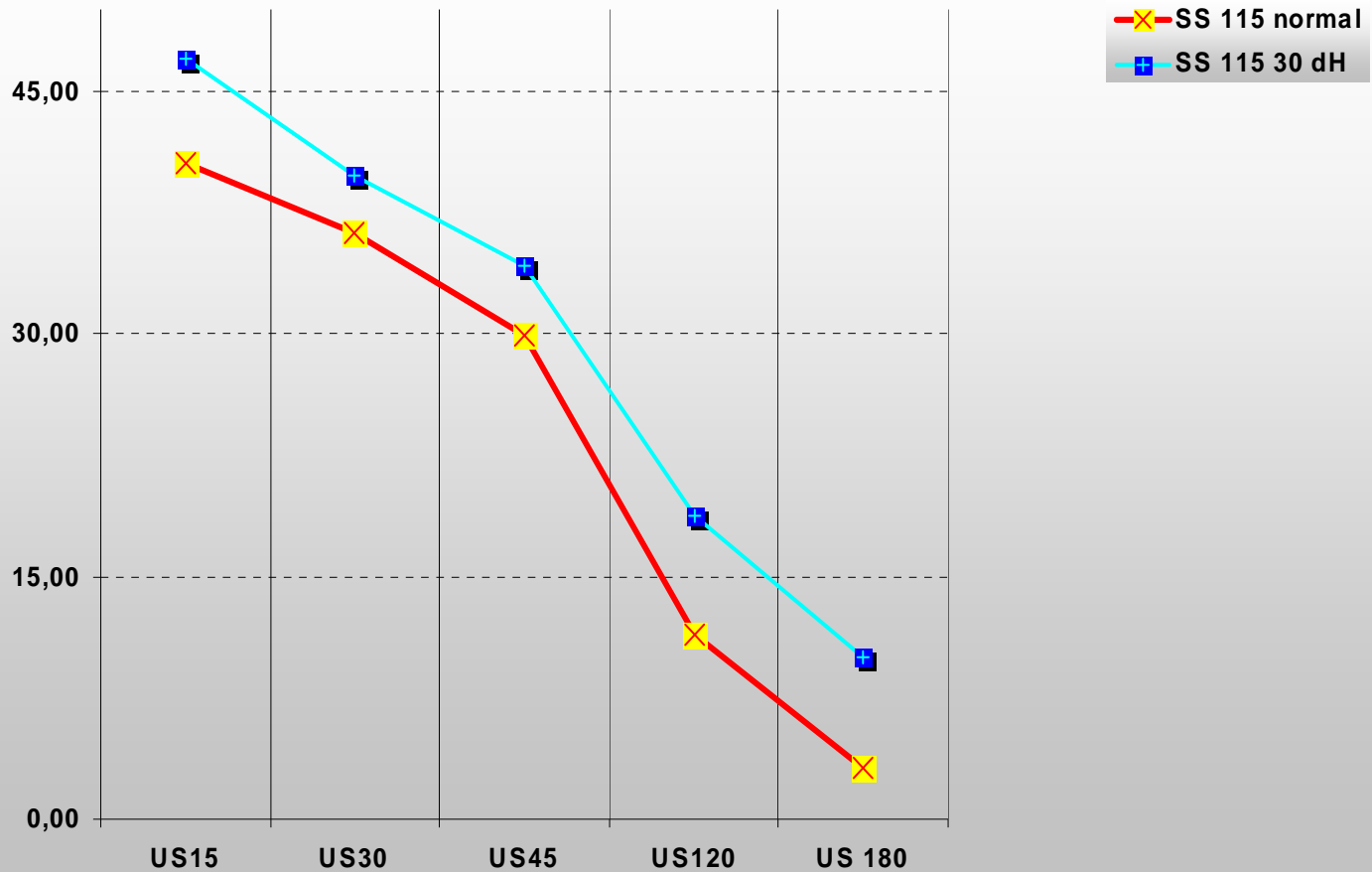
Instabile Emulsion („Emulgieren“)

0,1 mm

Silk 115 gsm, hard/normal water

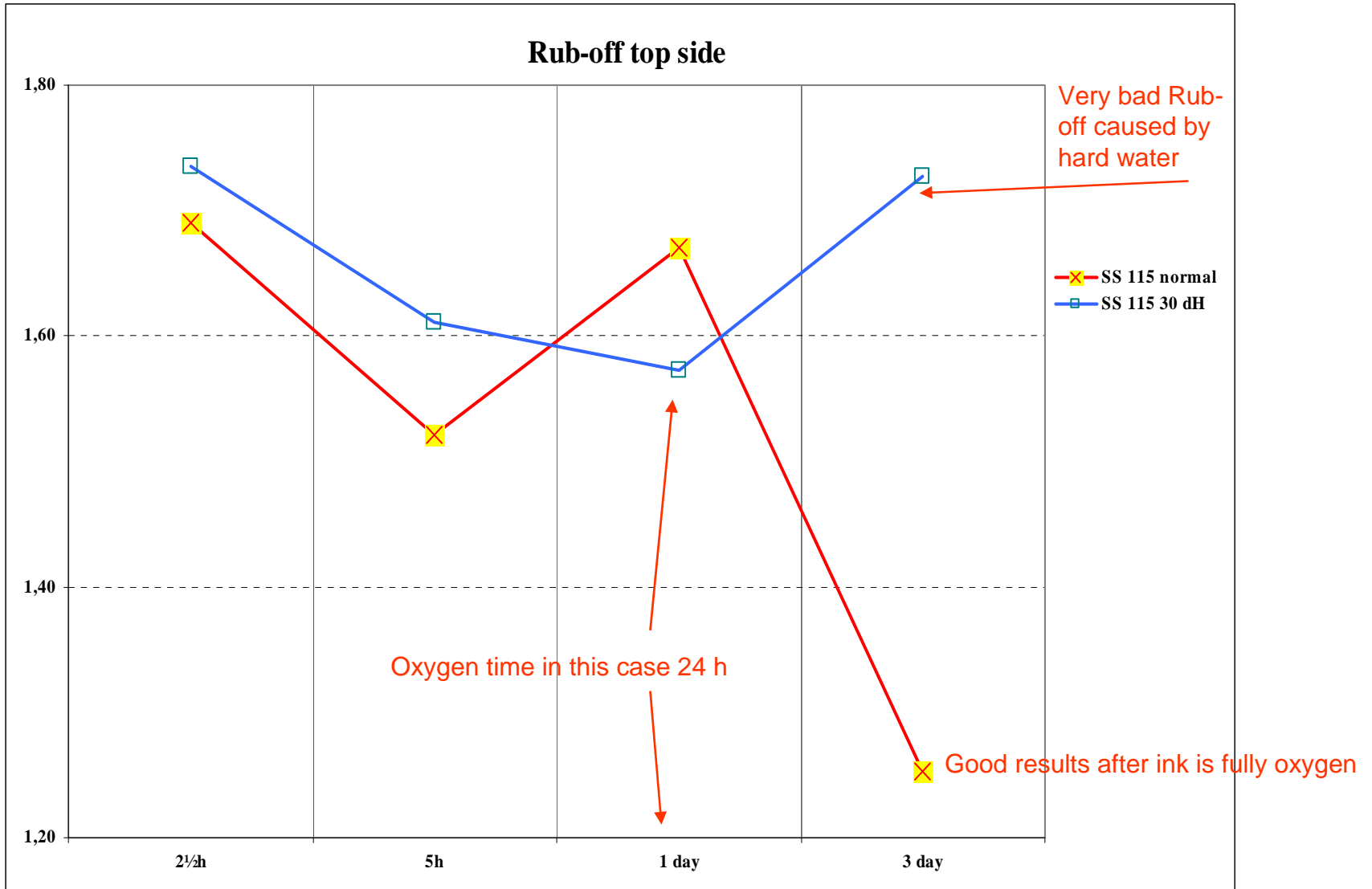
Who cares?

SET-OFF 3-Color Compact us



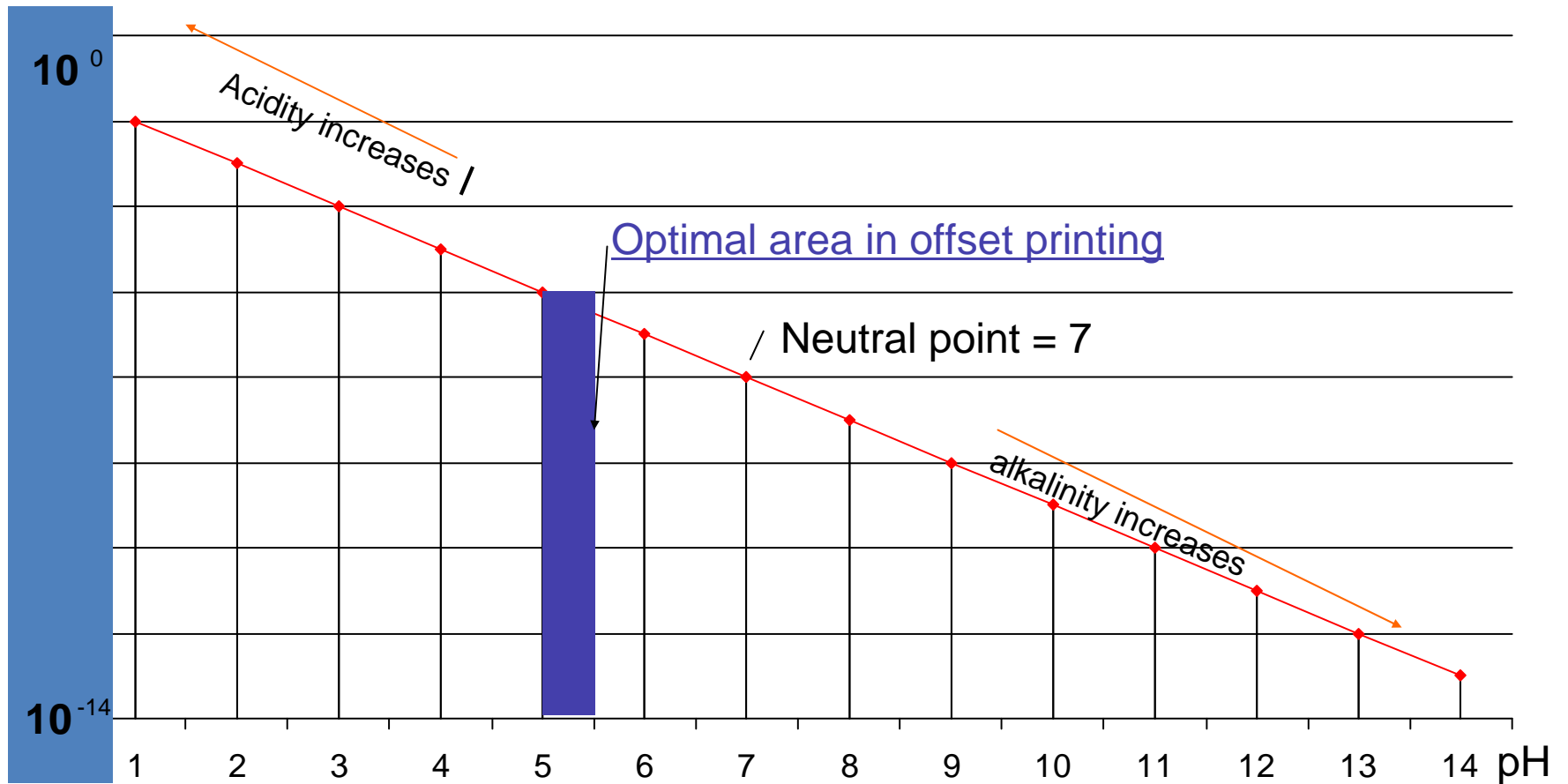
Who cares?

Silk 115 gsm, hard/normal water



pH (pondus hydrogenii)

who cares?



Who cares?

Generally found solution

- * High pH = high water emulsification
- * Low pH = pick up Calcium Carbonate, washing paper surface
- * pH 5 = ink drying 4 hour - pH 4,5 ink drying 14 - 15 hour
- * Low pH (close to 5) = better dot gain and shade contrast
- * water absorption is faster than oil and ink absorption



Who cares?

PAPER

MediaPrint.



who cares?

Multicoated paper surface 1000 x



who cares?

Total Ink Drying in Offset Printing

- **The type of Paper**

- Uncoated - Multicoated
- Matt – Gloss

Basic role = more coating, faster setting + controlled absorption

- **Print room + paper RH/temperature**

- How good, based on recommendations
- how close to each others

Basic role = room temperature paper and wrapping on as long as possible

Fillers & Pigments of MediaPrint

who cares?

- Filler
 - CaCO_3 (Danish chalk)
 - Part of the material is recycled
 - Coarse pigments
- Pigments
 - 100% CaCO_3 (pure **MARBLE**)
 - **Natural whiteness**
 - Basically coarser pigments for pre coating and finer pigments for top coating



Who cares?

Ink Rub & Scuffing

Run minimum amount and avoid Coarse Grained Powder, spray powder acts as an abrasive.

Overall Varnishing, spot varnishing or varnishing of the unprinted areas in contact with other printed surfaces

Keep Handling of printed stock to a minimum

Do folding straight away OR wait 2 days before folding

Minimum pH 5,0 of the fountain solution

Arrange the Layout so that print faces print and not plain paper

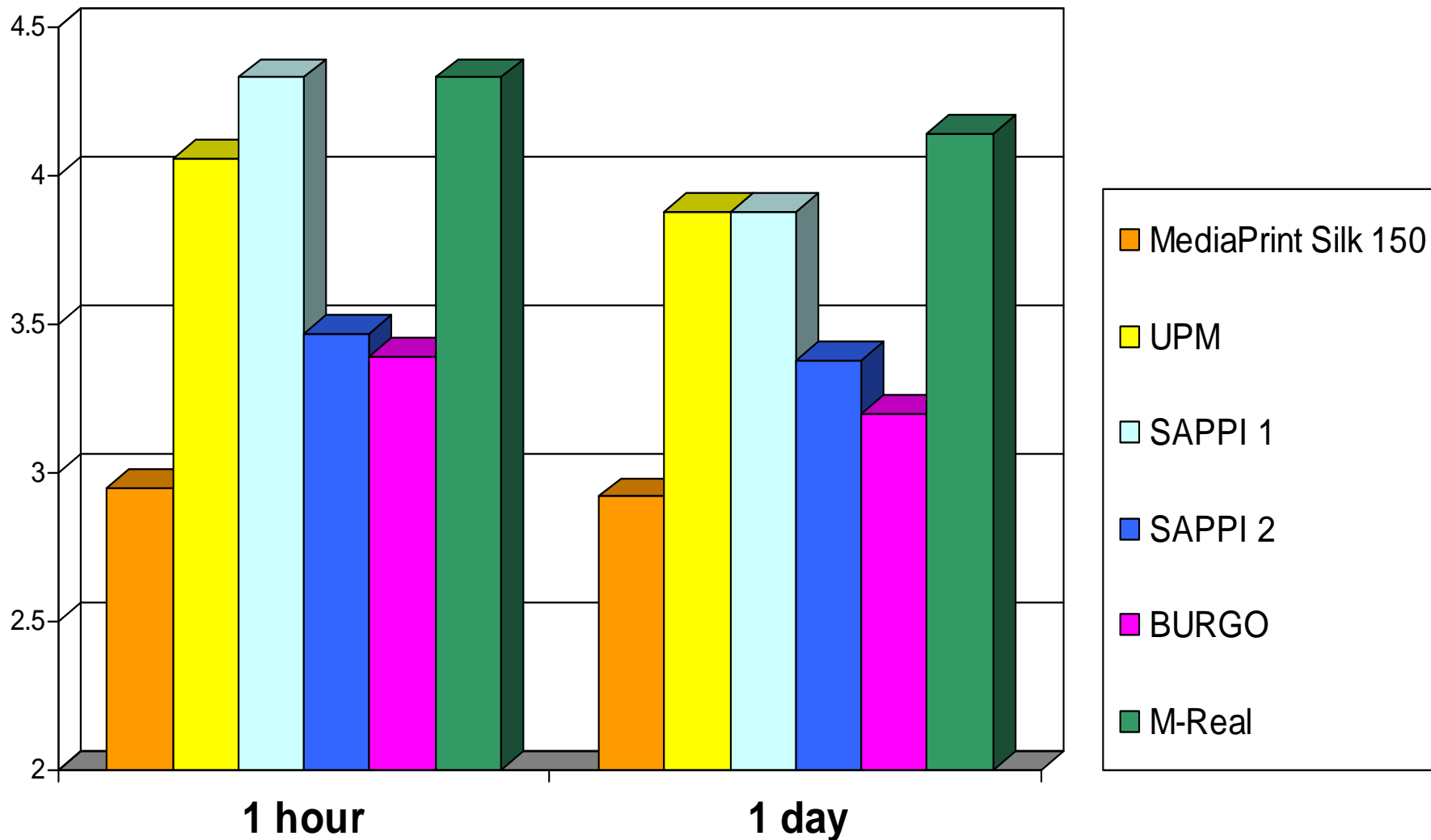
If possible avoid Reflex Blue

Avoid illustrations which Bleed off the edge

Rub-Off silk, 400 % image

who cares?

smaller the better



Tips (UV-varnish)

Basically three methods for UV-varnish.

-Normal offset printing machine 5-6 units, printing normal offset inks, after that is primer unit and then UV-varnish with blanket followed by UV dryer.

These machines normally have also cylinders tempered.

-Printing UV separately in the screen-printing machine. Machines do not have temperature control and therefore printing speed and temperature changes in varnishing unit are causing viscosity changes which lead to absorption changes and problems.

-Printing UV in HSWO on-line, no primer – but on the other hand, machines are tempered causing very seldom problems.

- Using primer before UV varnishing allows you to use wide range different papers.