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ICC Meeting

Paper classification

Leeds, 15/06/2006

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R&D

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Graphic Standard ISO12647-2

and coated papers specifications

Agenda

1. Situation
2. Methodology
3. Results
    1. Paper types 1&2
    2. Paper type 3

1. Situation

Feedback from printers:

- The standard is useful and presents on the long term clear advantages in terms of:
  - process standardisation and improvement
  - quality stability
  - cost reduction, increased efficiency

- However, the practical implementation can be difficult because of:
  - Spectrophotometer measurement
  - Forecast of tone value increase per paper sort
  - Paper shade
    - difficult to sort papers by type
    - large tolerance windows in a* and b* values
    - many papers cannot be sorted into a type (high brightness, LWC, reels matt/silk…)

1. Situation

Paper specification ISO 12647-2

Table 1 — CIELAB coordinates, gloss, ISO brightness and tolerances for typical paper types

Item	Characteristic					
	L^*[a] 1	a^*[a] 1	b^*[a] 1	Gloss[b] %	ISO brightness[c] %	Mass-per-area[d] g/m²
Paper type						
1: gloss-coated, wood-free	93 (95)	0 (0)	–3 (–2)	65	89	115
2: matte-coated, wood-free	92 (94)	0 (0)	–3 (–2)	38	89	115
3: gloss-coated, web	87 (92)	–1 (0))	3 (5)	55	70	70
4: uncoated, white	92 (95)	0 (0)	–3 (–2)	6	93	115
5: uncoated, slightly yellowish	88 (90)	0 (0)	6 (9)	6	73	115
Tolerance	± 3	± 2	± 2	± 5	—	—
Reference paper[e]	94,8	–0,9	2,7	70 to 80	78	150

Source: ISO 12647-2:2004(E)

2. Methodology

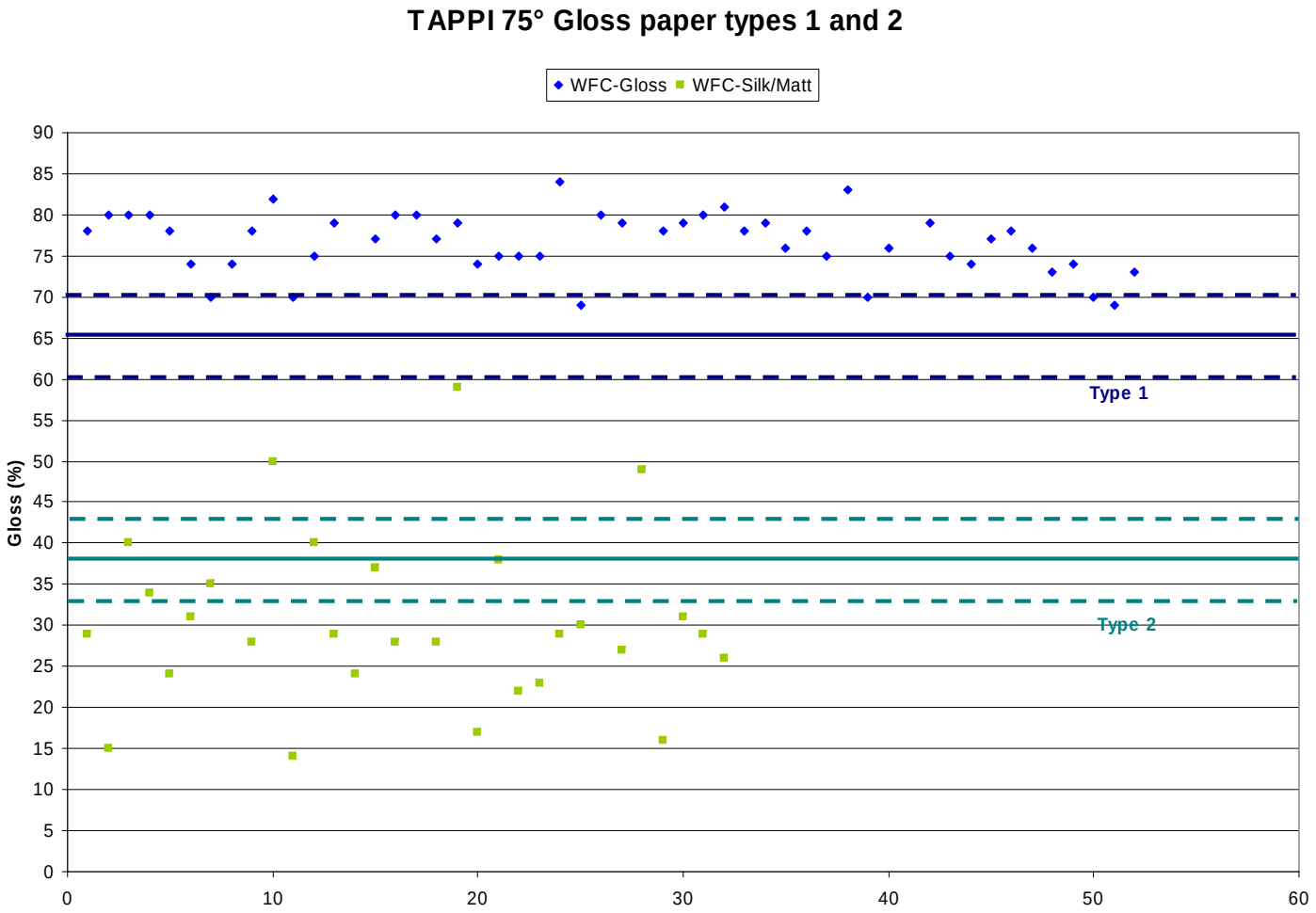
• Papers corresponding to types 1, 2 and 3 have been selected from the market with common grammages.

Type 1 & 2: coated sheets
Type 3: coated reels

• The following measurements have been carried out:

Measurement	Norm	Specific
Paper gloss	ISO 8254-1:2003	Tappi 75°
Paper shade	ISO 12647-1:2004	D50, 2° observer, 0/45° geometry, black backing
Brightness	ISO 2470:1999	Paper backing

3.1. Paper types 1&2 – Paper gloss



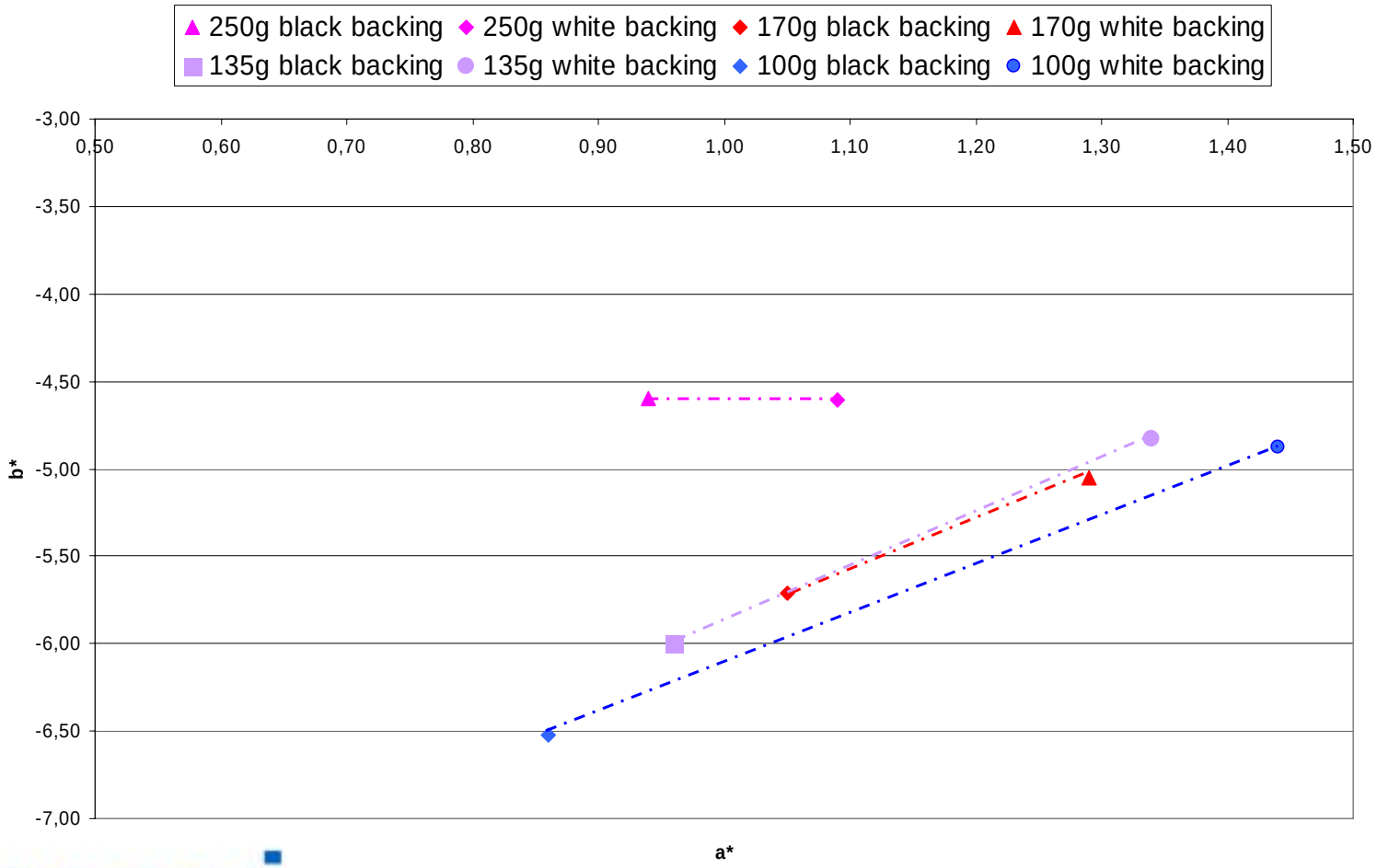
Actually 3 groups:

- Gloss
- Silk/dull
- Matt

Gloss level is part of the specificity of the printed object and varies therefore a lot.

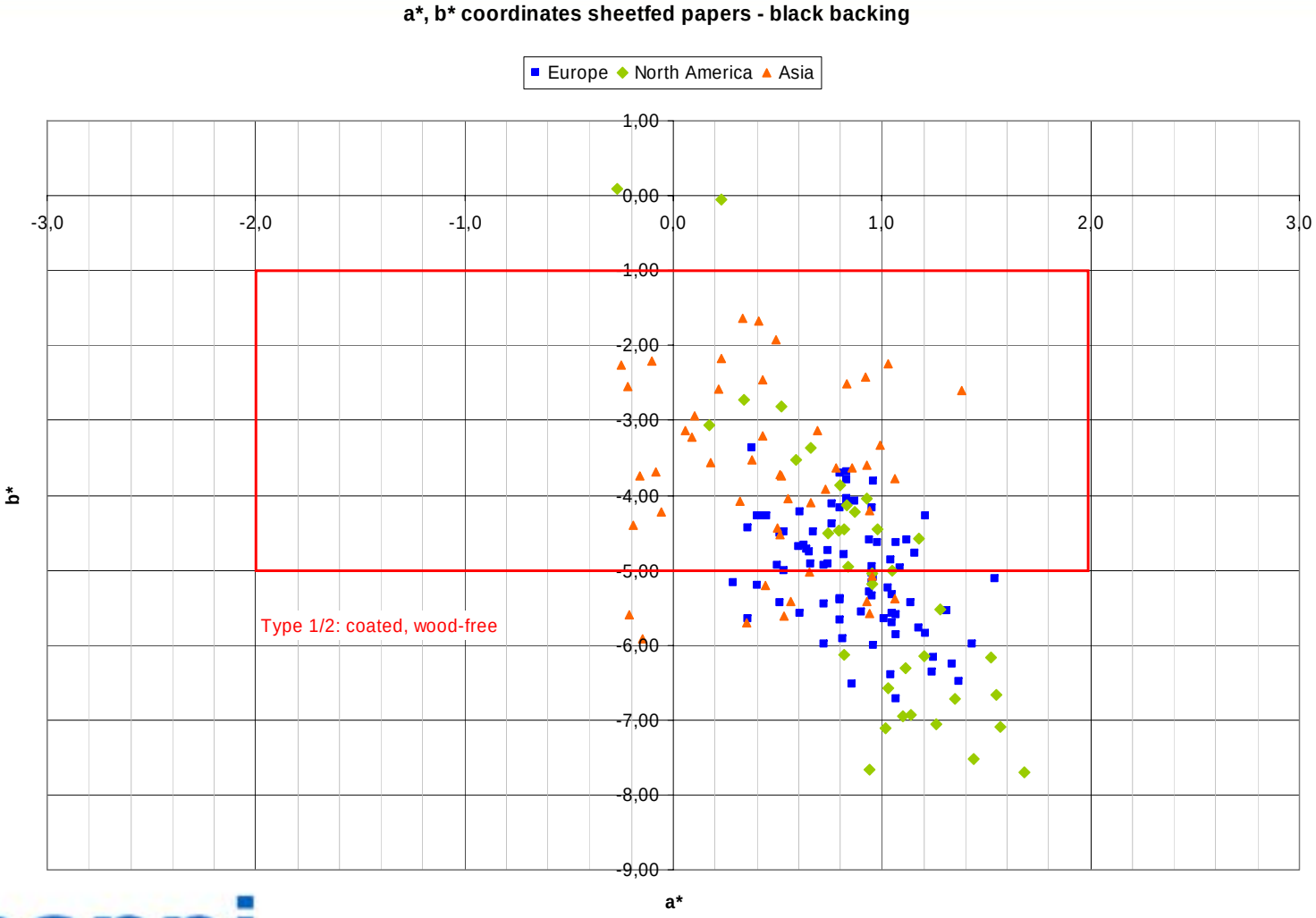
3.1. Paper types 1&2 – Paper shade (1)

a*, b* coordinates influence of backing



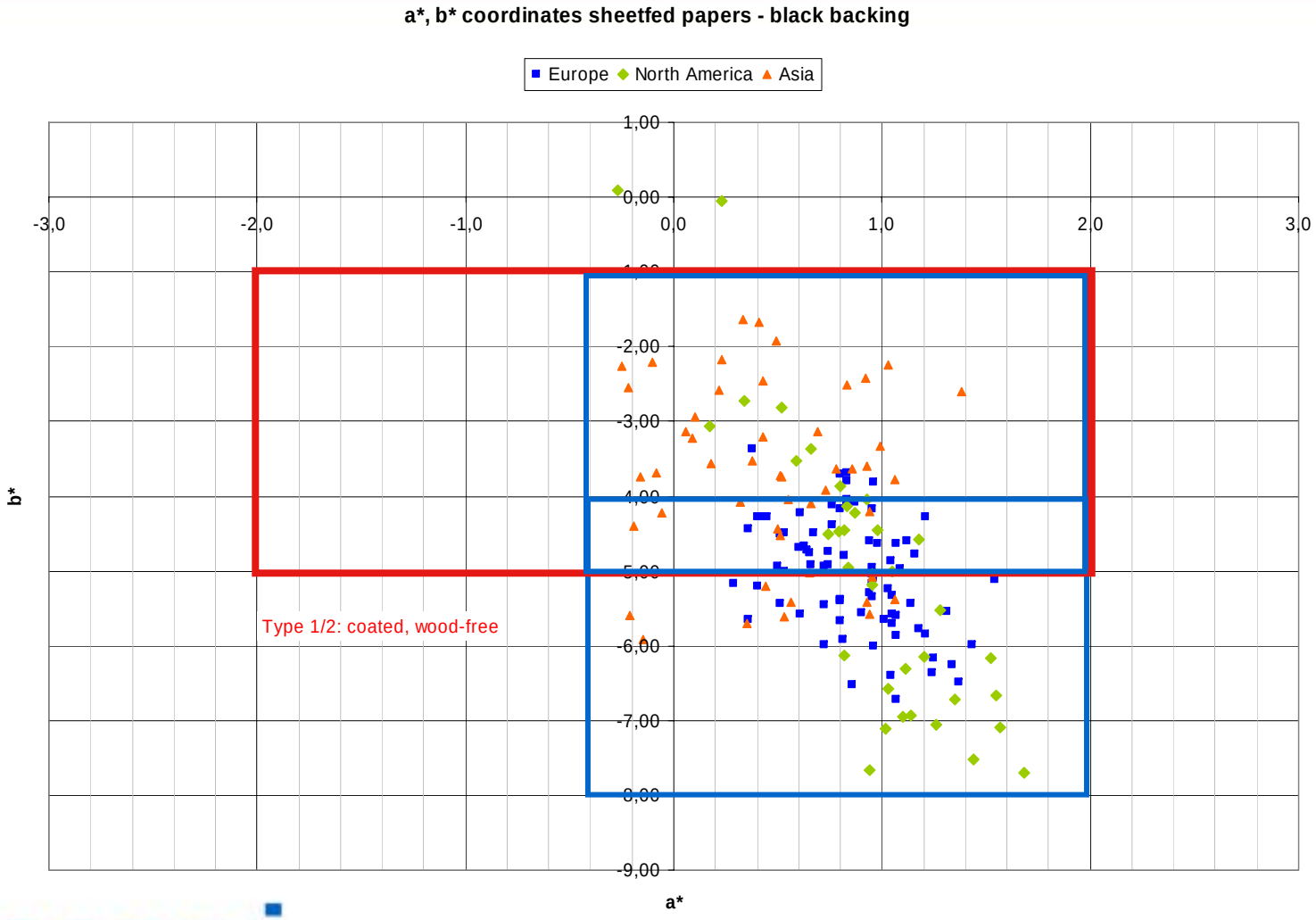
Larger influence of black backing on low grammages related to opacity.

3.1. Paper types 1&2 – Paper shade (2)



Many papers from the market are not or not well described by the norm.

3.1. Paper types 1&2 – Paper shade (3)



No difference in shade between matt and gloss grades
but 2 shade groups as function of the b* value.

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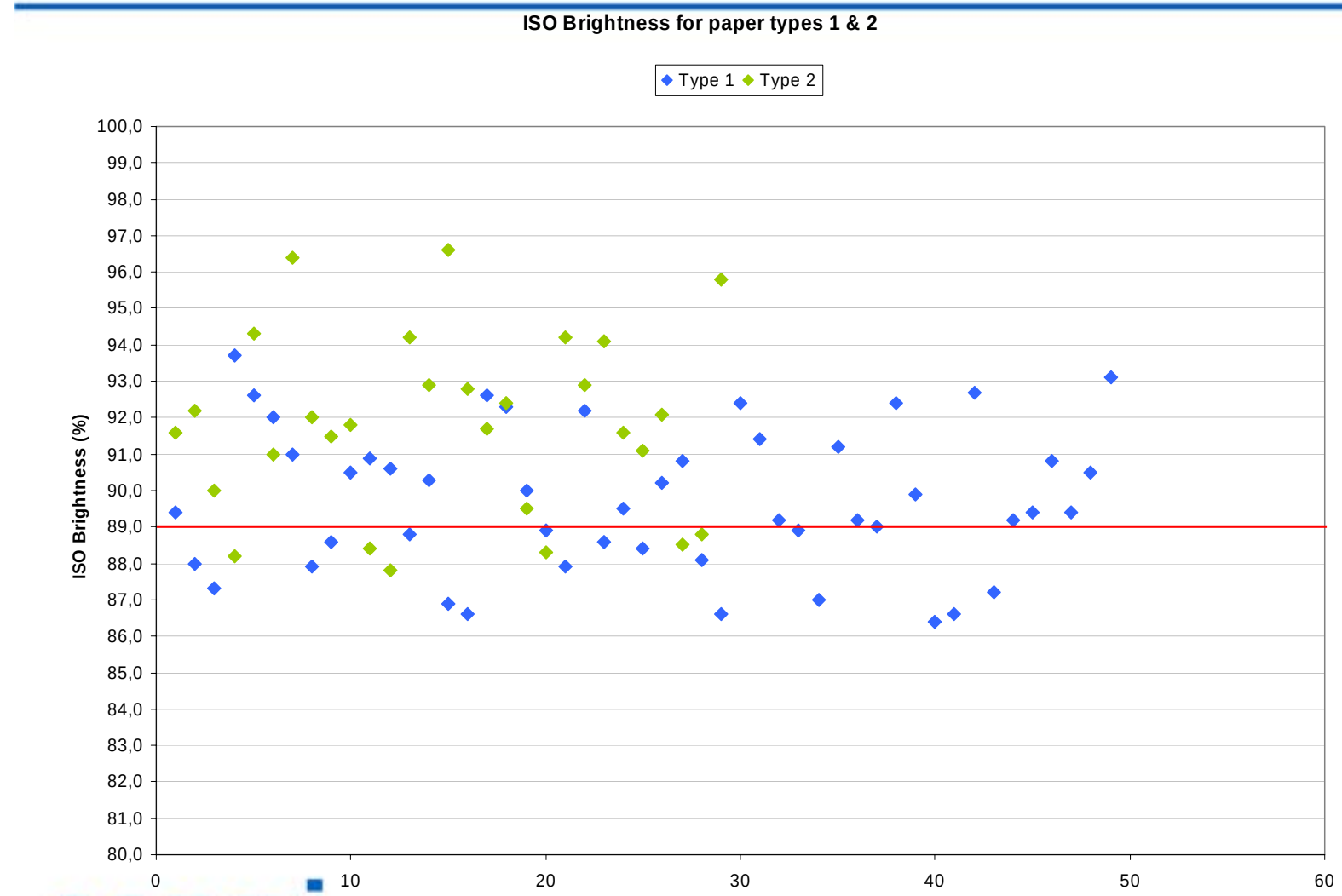
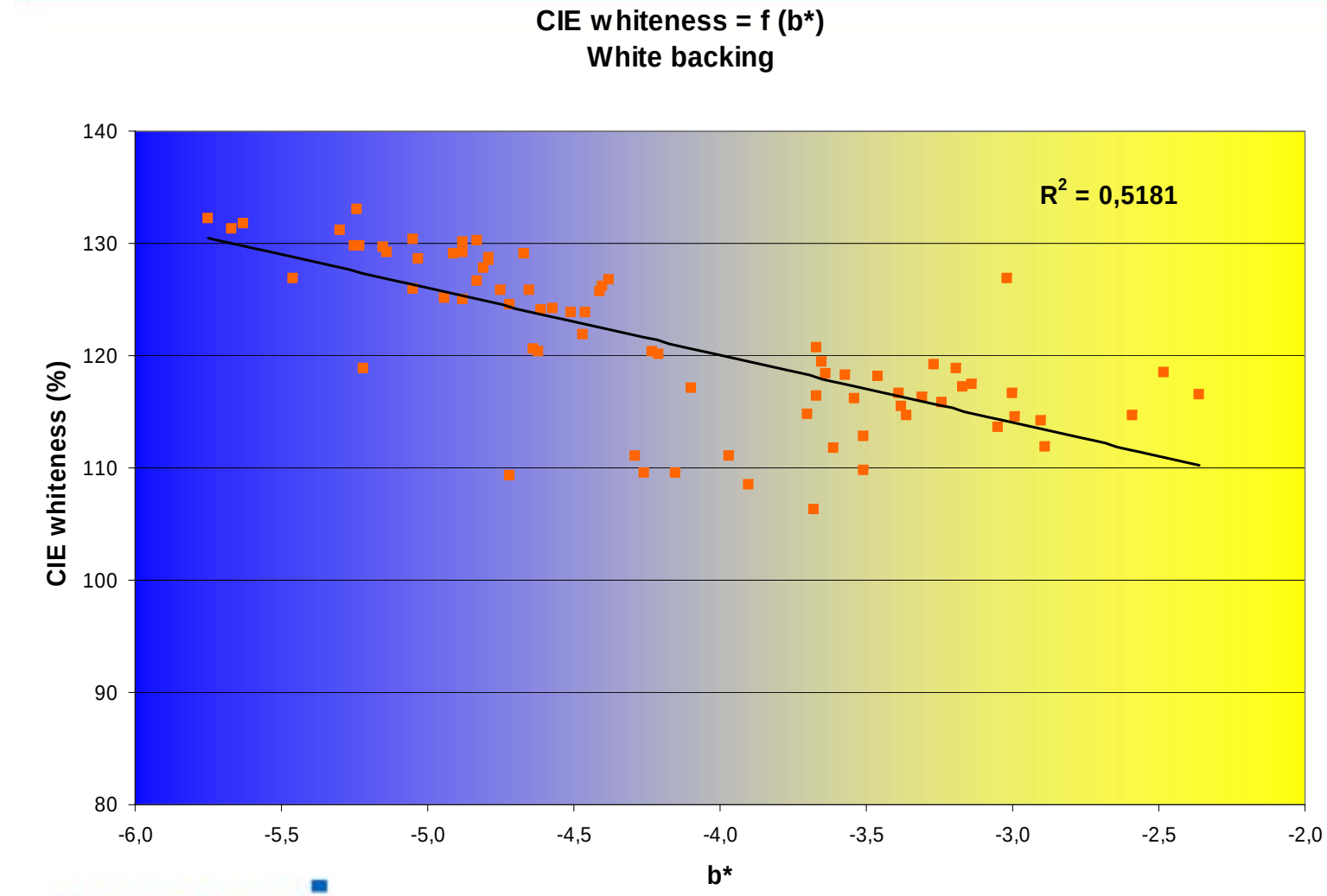
3.1. Paper types 1&2 – ISO Brightness



Same conclusions as for shade:
2 groups based on high or low b* value.

3.1. Paper types 1&2 – ISO Brightness

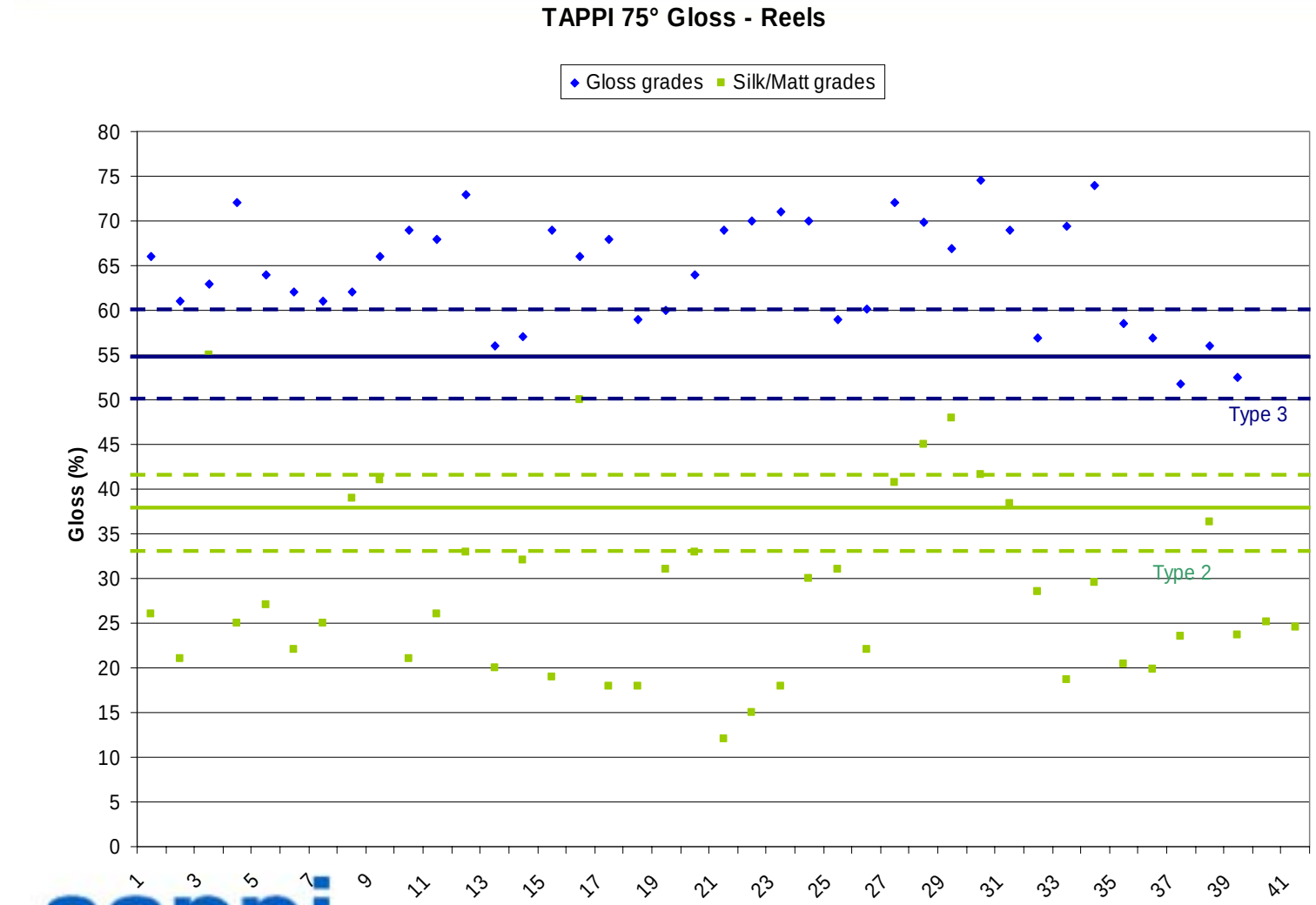


Whiteness is related to b* value:
the higher the whiteness, the lower the b* value.

3.1. Paper types 1&2 – conclusions

- Black backing has a huge influence on L*, a* and b* values, depending on grammage.
- The gloss values of glossy grades are higher than the values specified in the norm.
- The gloss values of Matt/Silk grades are lower than the values specified in the norm.
- A majority of the papers investigated are „bluer“ and „redder“ as the standard shade specifications.
- The majority of the papers investigated have a higher ISO Brightness as the one specified in the norm.
- Papers that have a higher Brightness usually have a lower b* value.

3.2. Paper type 3 – Paper gloss

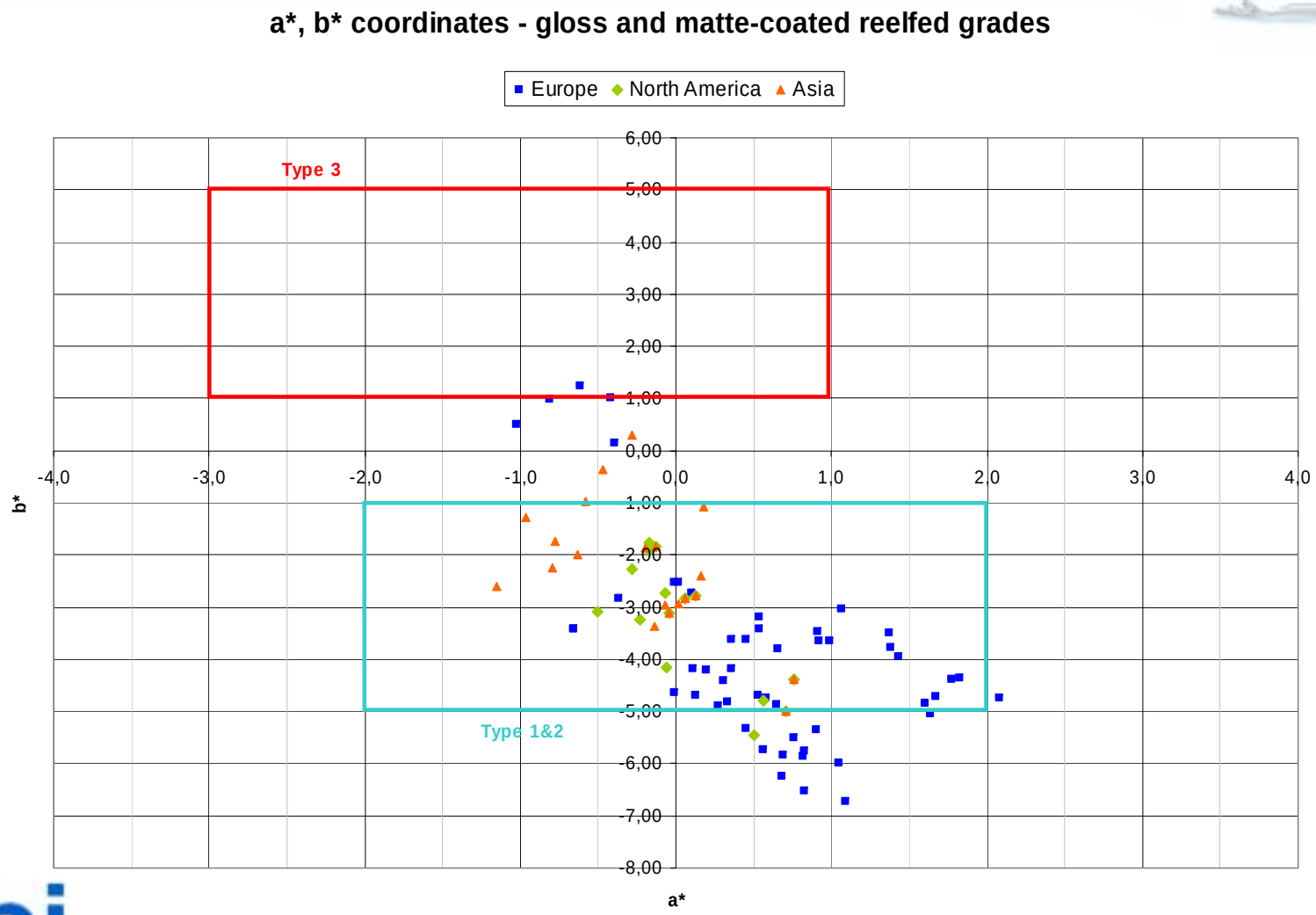


Actually 3 groups:

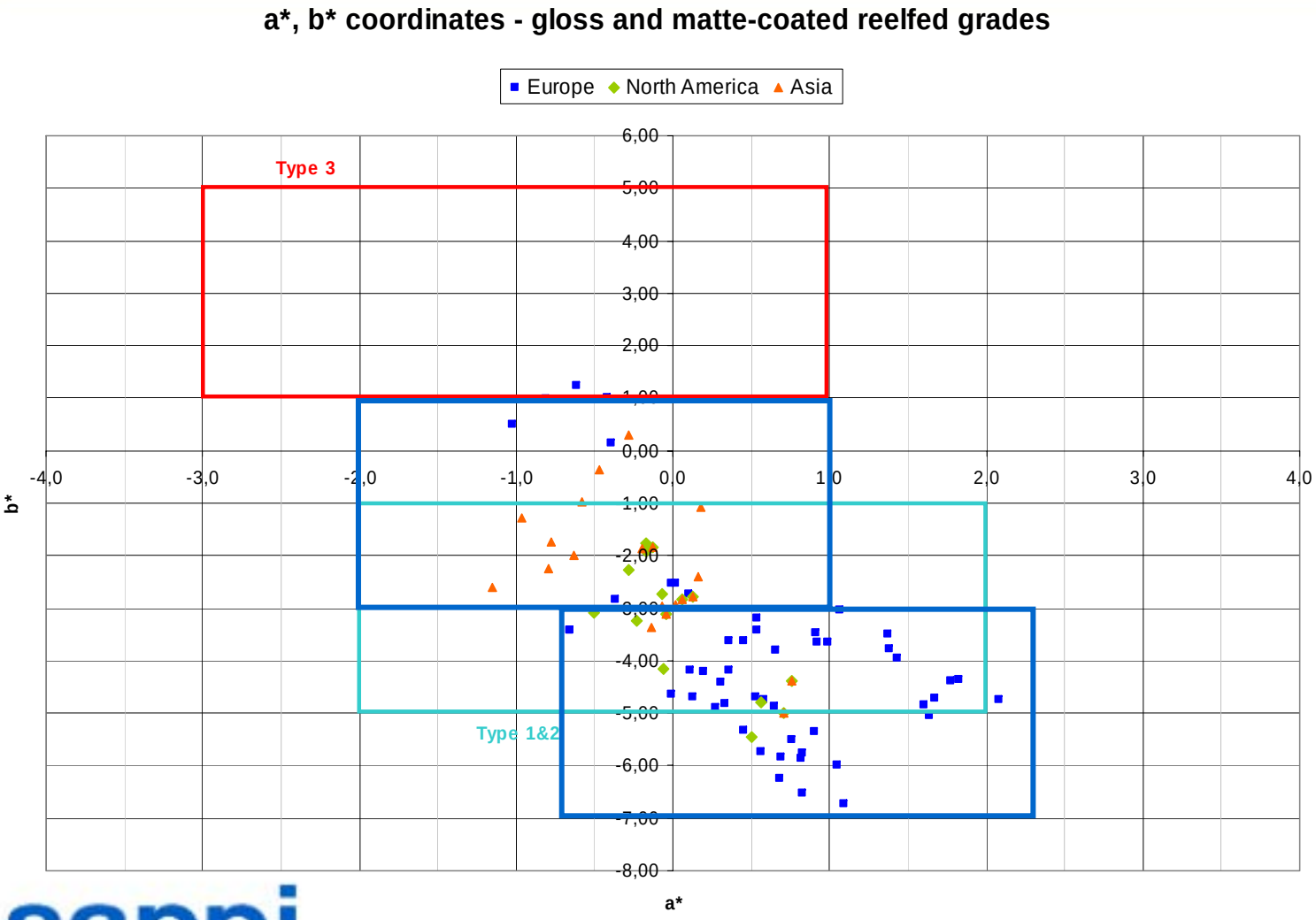
- Gloss
- Silk/dull
- Matt

Gloss level is part of the specificity of the printed object and varies therefore a lot.

3.2. Paper type 3 – Paper shade

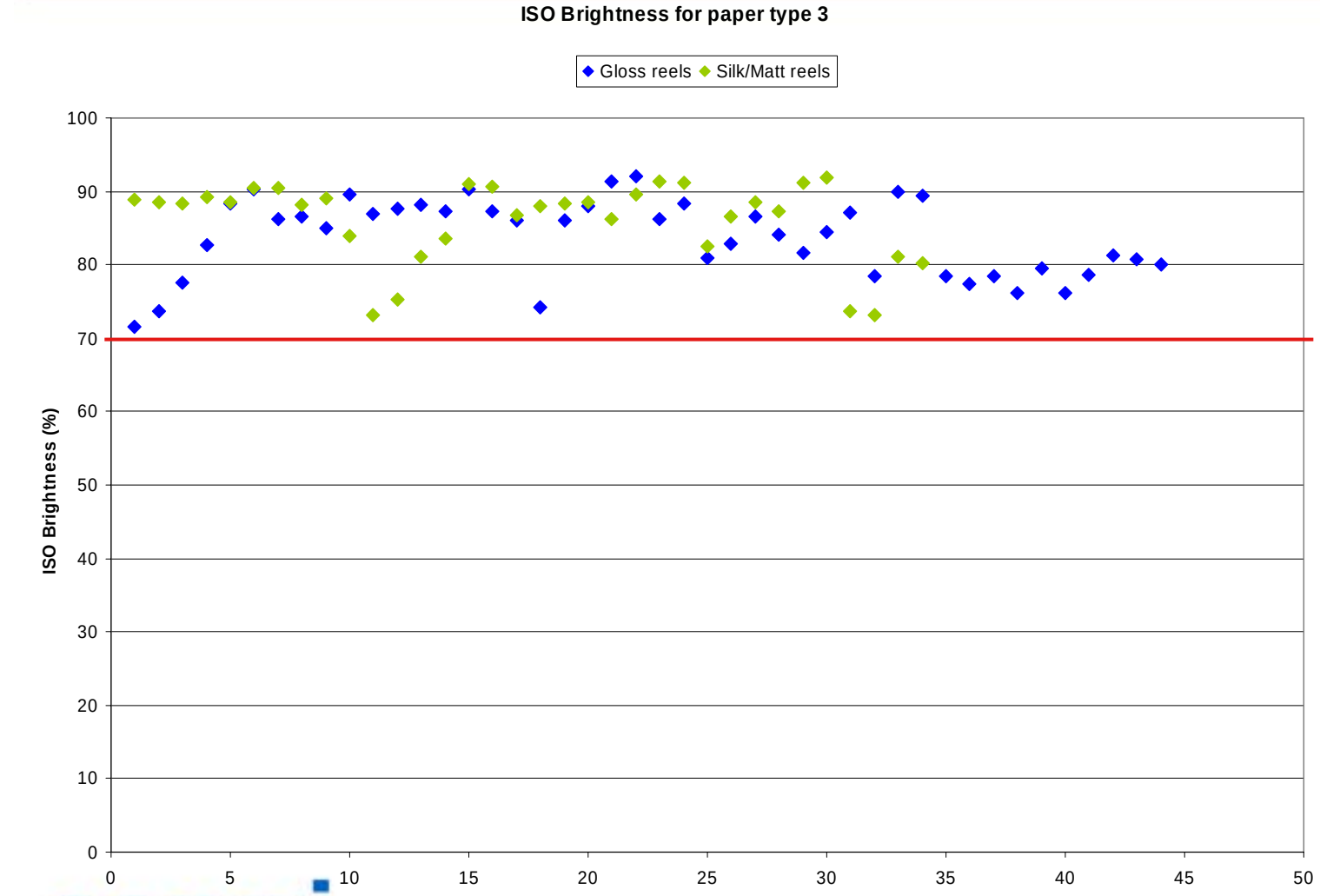


3.2. Paper type 3 – Paper shade



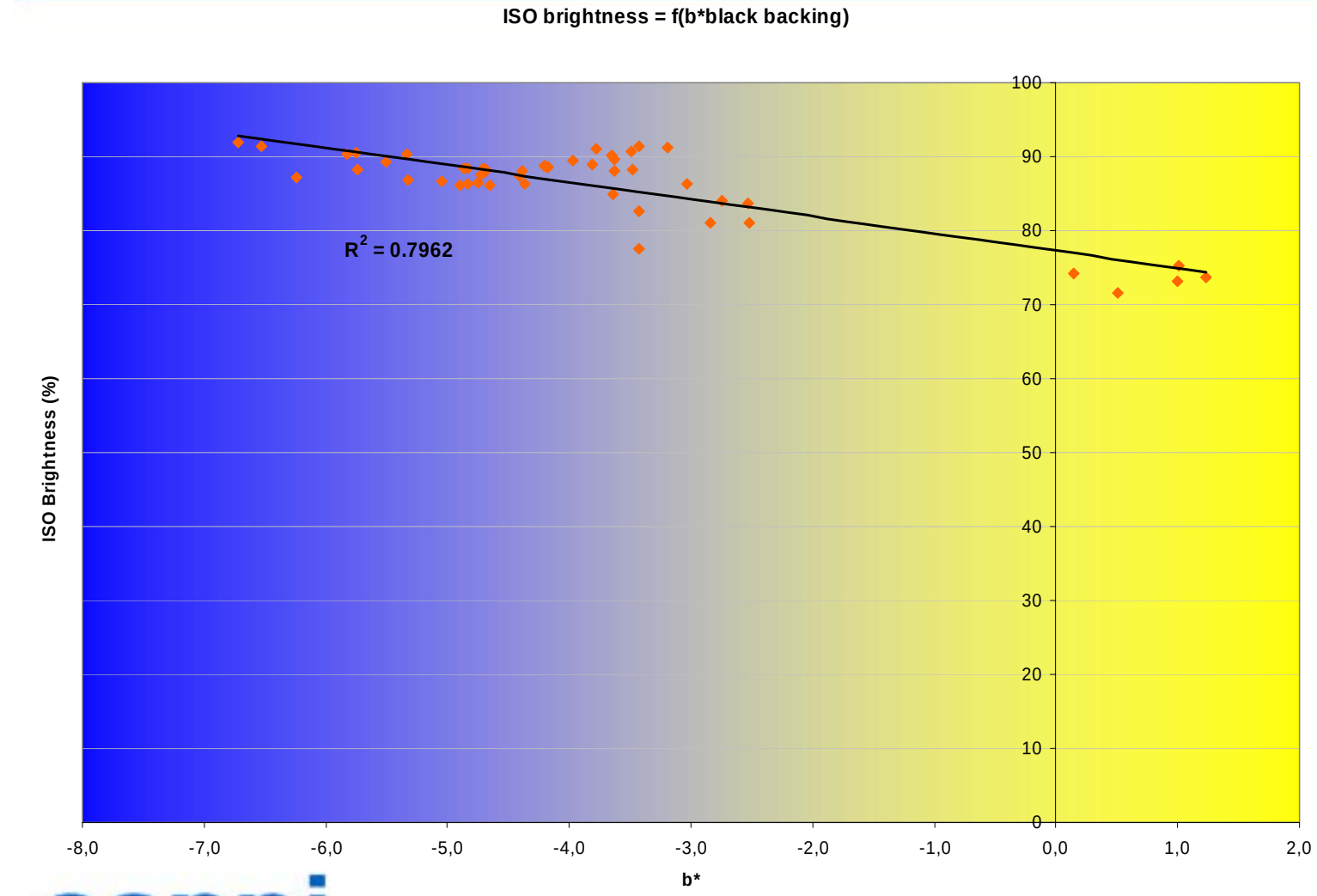
No difference in shade between matt and gloss grades
but 2 shade groups as function of the b* value.

3.2. Paper type 3 – ISO Brightness



Brightness of commercial grades usually higher than norm specification.

3.2. Paper type 3 – ISO Brightness



Brightness is related to b* value:
the higher the brightness, the lower the b* value.

3.2. Paper types 3 – conclusions

• The shades for paper type 3 specified in the norm do not correspond very well to the shades found in the market for the papers measured.

• All investigated papers have a higher ISO brightness than the one specified in the norm.

• Papers with a higher Brightness usually have a lower b* value.

4. Conclusions

- Paper shade:
    - variation in b* is much higher than variation in a* value.
    - b* values from market paper are usually low, related to market demand (high brightness, bluish shades).
- Paper gloss:
    - gloss grades have very high TAPPI 75° gloss values.
    - there is a lot of variation in the gloss values of matt/semi-matt/pearl papers.

- Paper differentiation as a function of wood content is difficult for coated grades because of effect of optical brighteners.

- Difference to be made as function of b* value or brightness.

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Thank you for your attention