Further development of the European gravure standard:

**PSR-V2**

*Bernhard Schmidt*,
Prepress Manager Prinovis Nuremberg,
Chairman of Gravure Working Group

Cologne, 25 June 2009

Gravure Working Group - European Color Initiative
Introduction to PSR v2

Welcome and introduction: James Siever, ERA

Moderation: Bernhard Schmidt, Prinovis Nürnberg, Chairman of ECI gravure working group

- Why a new version of PSR?
  Bernhard Schmidt (Prinovis Nürnberg), Renate Rewer (Laudert)

- Implementation in Production – Printing
  Raffaele Belligoli (Mondadori Printing), Gary McCrorie (Polestar Sheffield)

- Implementation in Production – Repro
  Johannes Haas (Meyle & Müller), Renate Rewer (Laudert), Jürgen Seitz (GMG), Stefan Spengler (impakt-medien)

- Lunch 12:30-13:30

- First customer experiences with v2 production
  Michael Farkas (IKEA), Johannes Haas (Meyle und Müller by proxy of BAUR-Versand)

- Standardisation - Moderation Dr. Claudia Jahn (Prinovis Dresden)
  Andreas Kraushaar (Fogra), Karl Michael Meinecke, (bvdm)

- Coffee 15:00-15:30

- Open discussion with panel of experts to answer questions
  all

- End of meeting 16:30
Why a new version of PSR?

Bernhard Schmidt (Prinovis Nürnberg), Renate Rewer (Laudert)

- History - Problems with v1, reasons for the new test print
- How was the revision made?
- What has changed / Naming convention for v2
- Advantages of v2 over v1
What is ‘ECI’?

- ‘ECI’ stands for ‘European Color Initiative’.
- The ECI was founded in 1996 (www.eci.org) and is a non-commercial expert group with the goal of medium-independent processing of colour data.
- It has participants from agencies, publishers, repro houses, printers and research associations.
- Within the ECI, there are several working groups with different themes, e.g. PDF standards, digital photography, colour standards, printing, etc.
Development of the European gravure standard
PSR – Process Standard Rotogravure

The Gravure Working Group was founded in the year 2000. The main goal of this working group is the creation of a “Process Standard Rotogravure” for various paper classes, and the preparation of high-quality colour profiles.

Between 2001 and 2005, gravure standards for several paper qualities were developed.

<table>
<thead>
<tr>
<th>Paper type</th>
<th>existing PSR ‘V1’</th>
<th>current: “PSR-V2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWC papers (LWC Standard)</td>
<td>LWC since July 2001</td>
<td>LWC-STD</td>
</tr>
<tr>
<td>SC papers (SC Standard)</td>
<td>SC since July 2002</td>
<td>SC-STD</td>
</tr>
<tr>
<td>LWCPlus papers (formerly called HWC)</td>
<td>HWC since end of 2005</td>
<td>LWC-Plus</td>
</tr>
<tr>
<td>MF papers (Machine Finished or News Plus)</td>
<td>MF since Oct 2003</td>
<td>V1 still valid</td>
</tr>
</tbody>
</table>

➢ The Process Standard Rotogravure (PSR) is documented in ISO 12647-4
The PSR (Process Standard Rotogravure): advantages of standardisation

- The introduction of a gravure standard into the European market has led to a great increase in quality.
- Printed products from different printers have been brought much more into line with each other.
- The complexity for prepress services and customers is significantly reduced.

➢ But there has been a lot of development, in both technology and quality, since the introduction of the first standards in 2001.
Proofing, colour management and printing have all developed enormously in the last seven years

Prepress

- Many changes and improvements in proofing, with shorter innovation cycles and innovative materials.
- Developments in software for making colour profiles.
- User experience has greatly increased.

Print

- The gradations have been harmonised in the highlights. All tone values print smoothly out to paper white – in some cases even 1% prints. (in the past, tone values of under 3% were simply “clipped”)

➢ Therefore we ask: is our standard still good enough, or can we improve it?
Criticisms of the existing standard (PSR_ECI_V1):

The key criticisms of the existing standard are:

- The colour gamuts of the different paper types differ widely from each other.
- The grey balance in the Proof has a colour nuance which varies in colour over the whole grey scale from white to black.
- Highlight values below 3 % are clipped, which has a disadvantageous effect on areas where the tone runs out to paper white.
- It is a colour standard which is based on an old proofing technology, and has changed with every new generation of proofers.
- The same standard looks very different on different proof systems.
- There are major differences between the ICC and the proprietary proof profiles.

➢ The ‘go-ahead’ for further development of the standard was given in April 2007 at a workshop held with printers and customers in Nuremberg.
Preparations for the new reference prints

In a series of meetings, the definitions for the new reference prints were agreed by the participating European printers:

- Primary colours and colour gamut
- Homogeneous grey balance
- Optimisation of the engraving curves
- Selection of paper types
- New colour chart (“TC-GMG-2008” with 5,376 patches = IT 8.7 + additional fields)
- Evaluation method and basic requirements for proofing systems
- Printing conditions

➤ The goal was to draw up a clear “Process Standard Rotogravure” and simultaneously achieve an excellent basis for colour-managed workflows and proofing.
Carrying out the PSR V2 reference prints on 27 May 2008 at Prinovis in Nuremberg

<table>
<thead>
<tr>
<th>Paper type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWC Standard</td>
<td>48 g/m² – “UPM Cote G” from UPM</td>
</tr>
<tr>
<td>SC Standard</td>
<td>52 g/m² – “Publipress G” from Stora Enso</td>
</tr>
<tr>
<td>LWC Plus)*</td>
<td>70 g/m² – “UPM Ultra G” from UPM</td>
</tr>
</tbody>
</table>

* The lack of a paper shade standard for LWCPlus papers in the paper industry required a compromise in the proof and profile standardisation. The ‘paper white’ definition in the profiles was set to the average of the LWCPlus papers currently offered in the market.

Afterwards, the data was evaluated, extensive proofing tests carried out, and the results tested for nine months in production.
Results
Advantages and improvements of the new standard PSR V2

Colour reproduction on the different paper types:
Print results on the different paper types (SC, LWC und LWC_Plus) are significantly closer to each other.

- SC
- LWC
- LWC Plus

➢ This simplifies the conversion between paper types. Images look much closer to each other in colour than in the old standard.
Advantages and improvements of the new standard PSR V2

Print – SC Standard has a 20% larger colour gamut

The new PSR_SC standard has a colour gamut around 20% larger than that of the old standard. The saturation nearly reaches that of the LWC standard.

➢ The new SC standard has significantly more contrast and a larger colour gamut – nearly as large as that of the LWC standard.
Advantages and improvements of the new standard PSR V2

Print – improved grey balance
- More homogeneous gradation of intensity, and less coloured than V1

Print – colour gamut rather closer to offset in green and red
- The colour gamut is moved by a Δa* of -4 on the a* axis towards green, and so approaches the offset gamut more closely in this region.
Advantages and improvements of the new standard PSR V2

Proofing

- Better agreement between the sharpness of the proof and the print with the GMG MX4 profiles – sharpness parameter recommendation for each standard.

  Copy of a proof comment line:

  `PSR_LWC_STD_Ex880_GMGsemimatte250_V2.mx4 (CAD363DC 3D Sharpness, Strength: 4)`

- ICC proofs and proofs from other proofing system suppliers are closer to each other and to the GMG “.mx4” proofer adaptations.

- More harmonic proof profiles, because there is essentially no manual editing.

- New procedures for proofer certification, through setting new tolerances and bringing in Fogra.
Advantages and improvements of the new standard PSR V2

Separation (conversion from RGB to CMYK)

- Very good separation results – good to put into a fully digital workflow, also for use as “digital fabric samples”.

- Significantly higher patterning and contrast range than in the old standard.
Advantages and improvements of the new standard PSR V2

Summary

- Print results on different paper types (SC, LWC and LWC_Plus) are significantly closer to each other.
- Ca. 20% greater SC gamut than in the old standard. Colour saturation almost reaches the LWC standard.
- Improved grey balance.
- Gamut moved in the “green” direction and thereby brought closer to offset.
- Closer match of sharpness between proof and print.
- ICC-Proofs and proofing systems from different suppliers match each other better, and also better match the GMG “.mx4” proofer adaptations.
- More harmonic proof profiles.
- New procedures for proofer certification, through setting new tolerances and bringing in Fogra.
- Very good separation results.
- Significantly higher patterning and contrast range than in the old standard.

➢ The goals aimed for have been achieved!
Naming convention for the new profiles:

**ICC profile:**

\[ PSR\_papertype\_V2\_profilingsoftware.icc \]
\[ e.g. PSR\_LWC\_STD\_V2\_BAS.icc \]

**Proof profile:**

\[ PSR\_papertype\_proofertype\_proofsubstrate\_V2.supplierextension \]
\[ e.g. PSR\_LWC\_STD\_Ex880\_GMGsemimatte250\_V2.mx4 \]

**Important Notice:**

- There are already various profiles in the market that were intended for pre-release testing. Please delete all previous profiles that are in circulation and replace them with the current profiles:
  - ICC profiles from [www.eci.org](http://www.eci.org)
  - Proofer profiles from your proofing system supplier.
Establishment of proof tolerances and certification

- Our goal is to define proof tolerances that are as narrow as possible, and yet are realistic. Many tests and evaluations were carried out for this purpose (Proofs from GMG, CGS, EFI).
- Dr. Hoffstadt (GMG) carried out the extensive evaluations and worked out proposals for choosing tolerance values.
- Together with Fogra, new ways to set tolerances were discussed.
- The Epson x800 und x880 proofing systems were – both visually and by measurement – very close to the reference prints. This was checked with both GMG MX4 and ICC proofs.
- Future proofer certification for PSR should be taken over by Fogra.

➤ PSR proofer certification will in future only be carried out with colorimetric evaluation.
Many thanks!

I would like to officially thank all participants who have taken part in the preparation of the new standard.

Particular thanks are due to GMG, which supported us both in the scientific development of the new test chart and the extensive evaluations of the measurement data and the proofs.
Implementation in Production – Printing

Three ways to calibrate the process (ISO/TC 130 Draft 10128)
*Bernhard Schmidt, Prinovis Nürnberg*

**Experiences of printers:**

Mondadori Printing – Raffaele Belligoli

Polestar Sheffield – Gary McCrorie
Conversion to PSR V2 in print

Goal: the new standard must be printable by all the printers in Europe.

Instructions have been worked out, which will enable every printer to achieve the new PSR. These are based on the proposed ISO Technical Specification “Proposed ISO TS 10282 – Printing System Calibration”

- **Method 1** – Calibration of the tone value gradations of the primary colours of PSR V2
  Primary colours identical or very close to the PSR V2 colours – *one-channel adaptation*

- **Method 2** – Achieving the grey balance of PSR V2 –
  Prerequisites of Method 1, get as close as possible with Method 1, then deal with the remaining deviations, and do “fine tuning”, with Method 2

- **Method 3** – Device Link Transformation
  Conversion into a local print standard, e.g. when the inks are significantly different, or the deviations with Methods 1 and 2 are too great – *3-dimensional adaptation*
Conversion to PSR V2 in print

Situation of the implementation in print, and applied methods:

Polestar, UK
Gary McCrorie

Mondadori, Italy
Raffaele Belligoli
Conversion to PSR V2 in repro

Availablilty of profiles

Bernhard Schmidt, Prinovis Nürnberg

Daily production – round table discussion

- What does this mean for my database of images?
- How can I switch from V1 to V2 of the standard?
- Advert delivery – daily problems – future prospects
- Experiences to date with the new standard

Renate Rewer, Laudert
Johannes Haas, Meyle+Müller
Jürgen Seitz, GMG
Stefan Spengler, impakt-medien
Availability of the new profiles

Since yesterday, the ICC profiles can be downloaded from the ECI server.
The profiles were generated by two different software suppliers:

- **Profile Tool** (formerly “Print Open”) – in the perceptive rendering intent, 5% lighter than basICColor
- **basICColor** – in the perceptive rendering intent, 5% darker than “Profile Tool”

<table>
<thead>
<tr>
<th>Paper class</th>
<th>Made with “Profile Tool” *</th>
<th>Made with “basICColor”</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWC Plus</td>
<td>PSR_LWC_PLUS_V2_PT.icc</td>
<td>PSR_LWC_PLUS_V2_BAS.icc</td>
</tr>
<tr>
<td>LWC Standard</td>
<td>PSR_LWC_STD_V2_PT.icc</td>
<td>PSR_LWC_STD_V2_BAS.icc</td>
</tr>
<tr>
<td>SC Standard</td>
<td>PSR_SC_STD_V2_PT.icc</td>
<td>PSR_SC_STD_V2_BAS.icc</td>
</tr>
<tr>
<td>SC Plus</td>
<td><em>in preparation</em></td>
<td><em>in preparation</em></td>
</tr>
</tbody>
</table>

* Profile Tool, Heidelberg

- **ICC profiles are available under [www.eci.org](http://www.eci.org)**

Recommendation: please use only original profiles
Important change:
The profile identification “HWC” in the V1 profiles has been replaced with the correct paper identification “LWC PLUS”.

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<td>PSR_LWC_PLUS_PT.icc</td>
</tr>
<tr>
<td>LWC Standard</td>
<td>PSR_LWC_STD_V2_PT.icc</td>
<td>PSR_LWC_STD_PT.icc</td>
</tr>
<tr>
<td>SC Standard</td>
<td>PSR_SC_STD_V2_PT.icc</td>
<td>PSR_SC_STD_PT.icc</td>
</tr>
<tr>
<td>SC Plus</td>
<td>in preparation</td>
<td>in preparation</td>
</tr>
</tbody>
</table>

* Profile Tool, Heidelberg

SC-Plus is in preparation – to be published ca. Sept 09

- ICC profiles are available under [www.eci.org](http://www.eci.org)
  Recommendation: please use only original profiles
Availability of special proof profiles

Special proof profiles may be downloaded from the respective proofing system supplier.
In this way, optimum support for the proofing system will also be secured.

Example: Naming of “.mx4” proof profiles (profiles for GMG proofers):

<table>
<thead>
<tr>
<th>Paper class</th>
<th>Old name “PSR V1”</th>
<th>New name “PSR V2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWC Plus</td>
<td>PSR_ECI_HWC_Proofertype_Substrate_V1.mx4</td>
<td>PSR_LWC_PLUS_Proofertype_Substrate_V2.mx4</td>
</tr>
<tr>
<td>LWC Standard</td>
<td>PSR_ECI_LWC_Proofertype_Substrate_V1.mx4</td>
<td>PSR_LWC_STD_Proofertype_Substrate_V2.mx4</td>
</tr>
<tr>
<td>SC Standard</td>
<td>PSR_ECI_SC_Proofertype_Substrate_V1.mx4</td>
<td>PSR_SC_STD_Proofertype_Substrate_V2.mx4</td>
</tr>
<tr>
<td>News plus</td>
<td>PSR_ECI_MF_V2_Proofertype_Substrate_V1.mx4</td>
<td>News Plus – for now, stay with the old standard</td>
</tr>
</tbody>
</table>

➤ Proof profiles directly from the proofing system supplier
Conversion to PSR V2 in repro

Daily production - Round Table discussion
Bon Appétit
Customers report their experiences

Status of implementation in printing, and methods used:

**IKEA**
Michael Farkas

**BAUR-Versand**
Johannes Haas from meyle+müller reports on behalf of Herr Jaeger of BAUR-Versand
Standardization

Dr. Claudia Jahn, Prinovis Dresden
Coffee break

30 minutes
# Annex: Overview of paper types

<table>
<thead>
<tr>
<th>Paper class</th>
<th>Definition</th>
<th>ISO Brightness</th>
<th>Examples</th>
<th>Proof parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N-ST</strong> News Standard</td>
<td>Standard newsprint without adaption to gravure</td>
<td>58-59</td>
<td>Holmen News</td>
<td></td>
</tr>
<tr>
<td><strong>N-P</strong> News Plus</td>
<td>Improved newsprint for gravure</td>
<td>68-76</td>
<td>Holmen Plus G68, Exopress, Flyopress</td>
<td>PSR_ECI_MF....V1.mx4</td>
</tr>
<tr>
<td><strong>DIR</strong> Directory</td>
<td>uncoated directory paper</td>
<td>56-71</td>
<td>Opalite G, Opalite 67 G, Alfa (+)</td>
<td></td>
</tr>
<tr>
<td><strong>SC-B</strong> SC-B</td>
<td>only calandered, high content of recycled fibre</td>
<td>65-69</td>
<td>UPM ECO, Envipress</td>
<td></td>
</tr>
<tr>
<td><strong>SC-STD</strong> SC Standard</td>
<td>super calandered magazine paper</td>
<td>67-68</td>
<td>UPM Max G, Publipress, GraphoGrande</td>
<td>PSR_SC_STD_........V2.mx4</td>
</tr>
<tr>
<td><strong>SC-P</strong> SC Plus</td>
<td>Optically improved SC-paper</td>
<td>72-75</td>
<td>UPM cat, M-Plus, GraphoGrande</td>
<td>PSR_SC_PLUS........V2.mx4</td>
</tr>
<tr>
<td><strong>SC-80</strong> SC 80</td>
<td>Highly opt. improved SC-paper, partly matt</td>
<td>79-82</td>
<td>UPM Lux 80, Innopress, GraphoPrestige</td>
<td></td>
</tr>
<tr>
<td><strong>LWC-B</strong> LWC B</td>
<td>Light weight coated, High content of recycled fibre, film coated</td>
<td>72</td>
<td>Ultra Mag RG</td>
<td></td>
</tr>
<tr>
<td><strong>LWC-STD</strong> LWC Standard</td>
<td>Light weight coated, &quot;catalogue&quot; brightness</td>
<td>67-72</td>
<td>UPM Cote G, Bavaria Ultra, Turnopress</td>
<td>PSR_LWC_STD.........V2.mx4</td>
</tr>
<tr>
<td><strong>LWC-STD Mag</strong> LWC Standard</td>
<td>Light weight coated, &quot;magazine&quot; brightness</td>
<td>72-76</td>
<td>Bavaria Classic, Neopress, UPM Cote G</td>
<td></td>
</tr>
<tr>
<td><strong>LWC-P</strong> LWC Plus</td>
<td>Optically improved LWC paper</td>
<td>78-87</td>
<td>UPM Cote Plus, Terrapress, UPM Ultra, My Brite</td>
<td>PSR_LWC_PLUS.........V2.mx4</td>
</tr>
<tr>
<td><strong>MWC-90</strong> MWC 90</td>
<td>Medium weight coated; double coated, very high brightness, optical brighteners</td>
<td>90-92</td>
<td>UPM Star, Novapress G</td>
<td></td>
</tr>
<tr>
<td><strong>HWC-WF</strong> HWC woodfree</td>
<td>Heavy weight coated, 2-3 times coated offset paper, optical brighteners,</td>
<td>&gt;92</td>
<td>Galerie fine, Royal Xpress, UPM Finesse</td>
<td>“House standards”</td>
</tr>
</tbody>
</table>

[Proof parameters: Examples ISO Brightness Definition Paper class coated grades uncoated grades]
Contact for further information

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Email: bernhard.schmidt@prinovis.com