

PERSONALIZED PRINT



MARKUP LANGUAGE

PODi

PPML GA Version 3.0

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Graphic Arts Conformance Specification

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PODi the Digital Printing Initiative

Approval of a PODi standard requires acceptance by the members of PODi.

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PODi welcomes feedback on this specification, and offers the following services to support widespread adoption of the specification:

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Developer Support web site

Software and hardware developers interested in supporting PPML are invited to register for the PPML Developers discussion group.

To participate in the PPML initiative, send an email to ppmlinfo@podi.org.

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Foreword

PODi: the Digital Printing Initiative developed this Graphic Arts Conformance Specification to enable interoperability among PPML Producers and Consumers in the Graphic Arts marketplace.

This specification is a conformance statement defining a conformance subset of PPML. Readers are directed to the PPML Functional specification for the definition of the syntax and semantics of PPML.

PODi does not guarantee the suitability of any of PPML or any of the conformance subsets for any specific purpose.

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Introduction

The Personalized Print Markup Language (PPML) Graphic Arts Conformance Specification Version 3.0 is built upon the current PPML 3.0 Specification. This Graphic Arts conformance subset defines additional requirements for GA conforming PPML Consumers and Producers to enhance interoperability. Therefore, understanding this specification requires familiarity with and understanding of the PPML Functional specification.

This conformance subset requires that:

- digital assets referenced by or included in PPML datasets are limited to the following common graphic arts formats: PostScript, PDF, TIFF, and JPEG, and Consumers are required to support these formats.
- PPML datasets do not contain the **IMPOSITION**, and **PRINT_LAYOUT** elements
- Consumers interpret device dependent colors in digital assets in accordance with either the sRGB or SWOP specification to allow existing digital assets to be reproduced consistently
- PPML datasets do not reference multipage PostScript files
- PPML datasets refer to external files via relative paths or URIs' using the "file:" scheme.

This conformance subset distinguishes two levels: level 1 for blind exchange of PPML datasets and level 2 for controlled exchange.

Graphic Arts Conformance Subset

1 Scope

This specification is a conformance statement for a PPML conformance subset for the Graphic Arts industry.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including amendments) applies.

Adobe Systems Incorporated. *Encapsulated PostScript File Format Specification; Technical Note 5002* (Version 3.0). 1 May 1992.

Adobe Systems Incorporated. *PDF Reference* (Sixth Edition). 2007. Addison-Wesley Professional.

Adobe Systems Incorporated. *Postscript Language Reference Manual* (Third Edition). February 1999. Addison-Wesley Professional.

Adobe Systems Incorporated. *TIFF Revision 6.0* (Second Edition). June, 1992.

ICC Version 4.2.0.0: *ICC Profile Format Specification, version 4.2.0.0*. October 2004.
<http://www.color.org/ICC1V42.pdf>

IETF (Internet Engineering Task Force). *RFC 2396: Uniform Resource Identifiers (URI): Generic Syntax*. T. Berners-Lee, R. Fielding, L. Masinter. 1998. <http://www.ietf.org/rfc/rfc2396.txt>

International Electrotechnical Commission. *Multimedia systems and equipment - Colour measurement and management - Part 2-1: Colour management - Default RGB colour space -sRGB*. October, 1999.
http://webstore.iec.ch/item/IEC_61966-2-1

ISO/IEC IS 10918 (JPEG).

JPEG File Interchange Format, Version 1.02, September 1992 <http://www.w3.org/Graphics/JPEG/jfif3.pdf>

Print on Demand Initiative. *Personalized Print Markup Language specification*. Version 2.2 February 2006.

Specifications Web Offset Publications (SWOP). (10th Edition.) <http://www.swop.org>

2.1 Other References

ANSI CGATS.20-2002, *Graphic Technology – Variable printing data exchange using PPML and PDF (PPML/VDX)*, American National Standards Institute, available from NPES The Association for Suppliers of Printing, Publishing and Converting Technologies, <http://www.npes.org/standards/workroom.html>

EXIF specification: Standard of Japan Electronics and Information Technology Industries Association, JEITA CP-3451 "Exchangeable image file format for digital still cameras: Exif Version 2.2", April 2002, <http://www.exif.org/Exif-2.2.pdf>

3 Terms, symbols, notations, and abbreviations

Refer to Section 4 in the *PPML Functional Specification*.

4 Conformance

4.1 Requirements

The PPML/GA conformance subset comprises conforming PPML 3.0 datasets that shall:

- have a **CONFORMANCE** element whose *Subset* attribute has a value of "GA";
- only contain references to PDF 1.6, PostScript Level 3, TIFF 6.0, JPEG and JFIF content data;
- reference PostScript level 3 content data using the mimetype "application/postscript";
- reference PDF content data using the mimetype "application/pdf";
- reference TIFF content data using the mimetype "image/tiff";
- reference JPEG content data using the mimetype "image/jpeg";
- reference JFIF content data using the mimetype "image/jpeg";
- only refer to or include supplemental source data in PostScript format.

4.1.1 Supplied Resource Requirements

- The execution of a PostScript ProcSet definition shall execute the `defineresource` operator for the `/ProcSet` category with a name equal to the value of the *ResourceName* attribute of the **SUPPLIED_RESOURCE** element defining the ProcSet.
- The execution of a PostScript font definition shall execute the `definefont` operator with a name equal to the value of the *ResourceName* attribute of the **SUPPLIED_RESOURCE** element defining the font or alternatively execute the `defineresource` operator for the `/Font` category with that name.
- In PostScript source data for which a Supplied Resource of type ProcSet is a required resource, execution of the `findresource` operator with a name equal to the value of the *ResourceName* attribute and category `/ProcSet` shall return the dictionary defined during the execution of that PostScript ProcSet definition.
- In PostScript source data for which a Supplied Resource of type Font is a required resource, execution of the `findresource` operator with a name equal to the value of the *ResourceName* attribute and category `/Font` shall return the dictionary defined during the execution of that PostScript font definition. This implies that execution of the `findfont` operator with that name will also return that dictionary.
- Changes to the VM due to the interpretation of a Supplied Resource of type ProcSet and subtype Prolog shall be visible to any PostScript source data that has that supplied resource as a required resource.

4.2 Exclusions

The PPML/GA conformance subset comprises conforming PPML 3.0 datasets that shall not:

- refer to or include TIFF 6.0 content data containing alpha channel data
- refer to or include TIFF 6.0 content data that contains a Compression tag with a value of 6 (JPEG compression).
- refer to or include JPEG or JFIF content data other than those with Start-of-Frame markers SF0, SF1, or SF2.
- refer to or include PostScript Level 3 content data with more than one page.
- refer to or include PostScript Level 3 content data that contains restricted operators or relies on the execution of illegal operators as defined in "Encapsulated PostScript File Format Specification Version 3.0", Adobe Technical Note #5002 and as amended by Appendix G, "Operator Usage Guidelines" of the *Postscript Language Reference Manual*.
- contain **PRINT_LAYOUT**, **IMPOSITION**, or **IMPOSITION_REF**, elements.
- not reference files with mime type "application/postscript" or "image/jpeg" using the **EXTERNAL_DATA_ARRAY** element.
- refer to or include PDF content data that refers to a font that is supplied in that PPML dataset.
- use elements or attributes marked as deprecated in the PPML Functional Specification.

NOTE Some files containing the .jpg or .jpeg extension in their name are not JPEG or JFIF files, but adhere to the EXIF file format which may not be referenced in a PPML/GA compliant dataset.

- contain a *BlendColorSpace* attribute with a value other than "CMYK"
- contain a **SOURCE** element with a *Transparency* attribute with a value of "Isolated"
- contain **MARK** elements that are not a sub-element of a **PAGE** element
- contain a **REUSABLE_OBJECT** with an *Isolated* attribute with a value of "No"
- contain **SOFTMASK** elements defined from content with an extent that does not completely encompass the extent of the content to which the soft mask is applied.

4.2.1 Supplied Resource Restrictions

- The interpretation of the supplementary source data of a supplied resource shall not:
 - leave any values on the operand stack

- leave any dictionaries on the dictionary stack
- execute the `defineuserobject`, `execuserobject` and `undefineuserobject` operators
- execute device setup and output operators or change the PostScript page size (as defined by the *PostScript Language Reference Manual*)
- execute any painting operators, path construction operators or graphics state operators (as defined by the *PostScript Language Reference Manual*)
- execute any interpreter parameter operators (as defined by the *PostScript Language Reference Manual*)
- write to the standard output file (as defined by the *PostScript Language Reference Manual*)
- create, delete or modify files in the PostScript file system
- The interpretation of the supplementary source data of a Supplied Resource other than those of type ProcSet and subtype Prolog shall not define multiple resources using the `defineresource` or `definefont` operators
- Any PostScript source data for which a Supplied Resource of type ProcSet or Font is a required resource shall not depend on any changes to the PostScript VM due to the interpretation of the supplementary source data other than the ability to retrieve the defined ProcSet or Font via the `findresource` or `findfont` operator. This restriction shall not apply to a supplied resource of type ProcSet and subtype Prolog.

NOTE A PostScript ProcSet definition shall therefore not execute the `defineresource` or `definefont` operators for any resource other than the resource indicated by the **SUPPLIED_RESOURCE** element and no changes should be made to the global VM.

- There shall be only one definition of a Supplied Resource of type ProcSet and subtype Prolog.
- A definition of a Supplied Resource of type ProcSet and subtype Prolog shall only be allowed in the PPML scope and shall be made a Required Resource in that PPML scope.
- If a Supplied Resource of type ProcSet and subtype Prolog is defined there shall be no other supplied resource definitions in the same PPML data set. Note that this requires all changes to the PostScript VM to be made in a single prolog if a prolog is being used.
- PostScript content should not alter any object in the VM defined by Supplied Resources and shall not depend on any such alterations by other PostScript content.

4.3 Restricted Operators

Restricted operators are allowed with the following conditions:

1. the visual appearance of an EPS file should be uniformly transformed when it is being scaled, rotated and transposed. All pieces of the EPS shall be affected similarly, i.e. each part of the EPS shall maintain it's relative position and relative size with respect to other parts of the same EPS when it is being transformed for placement onto a PPML page.
2. respect any clipping path setup before the interpretation of that PostScript content and shall not cause changes to the area outside of that initial clipping path (including erasing the current `pagedevice`)
3. not vary the visual appearance dependent on the execution of other PostScript content except for those supplied resources that are required resources for that PostScript content
4. PostScript content shall not depend on modifications to global VM by previous executions of any PostScript content other than the supplied resources that are required resources for that PostScript content. PostScript content should not make changes to global VM and shall not modify items in global VM defined by supplied resources that are required resources for that PostScript content.

The above conformance requirements imply that the following restricted operators may be used with the following conditions:

- `grestoreall`, `setgstate`, `setmatrix`: condition 1 & 2
- `setblackgeneration`, `setundercolorremoval`, `setcolorrendering`, `setscreen`, `setcolorscreen`, `settransfer`, `setcolortransfer`, `setflat`, `setsmoothness`, `sethalftone`, `setoverprint`: the use of these operators impacts device independency of the resulting output and may result in suboptimal output quality
- `false setglobal`: acceptable
- `true setglobal`: condition 3 & 4
- `setshared`: see `setglobal`
- `undefinefont`, `undefineresource`: condition 3 & 4
- `nulldevice`: can be used without problems
- `clear`, `cleardictstack`: may be used provided that the operand and dictionary stacks are restored to the state prior to execution of the PostScript content

NOTE The `clear` and `cleardictstack` support has been added to allow the EPS output of some widespread applications to be used in PPML datasets.

- The `makepattern` operator should not be executed in resource definitions as the `makepattern` operator uses the current CTM to define the pattern. Using such a pattern in PostScript content will yield different results when the PostScript content is scaled or rotated which is a violation of condition 1, above.

4.4 Level 1 GA Conformance

The level 1 PPML/GA conformance subset is a subset of the PPML/GA conformance subset that comprises conforming PPML 3.0 datasets that shall additionally:

- have a **CONFORMANCE** element whose *Subset* attribute has a value of "GA" and whose *Level* attribute has a value of "1".
- have a *ResourcesIncluded* attribute with a value of "Yes" on the PPML element.

NOTE The level 1 PPML/GA conformance subset enables a level 1 PPML/GA Producer to create PPML datasets that can be sent to any level 1 PPML/GA Consumer as those datasets can be consumed independent of resources that may or may not be available in the Consumer's environment.

4.4.1 Level 1 GA Producer Conformance

A conforming level 1 PPML/GA Producer shall be a conforming PPML Producer for the level 1 PPML/GA conformance subset.

4.4.2 Level 1 GA Consumer Conformance

A conforming level 1 PPML/GA Consumer shall:

- be a conforming PPML Consumer for the level 1 PPML/GA conformance subset
- ensure that supplied resources that have been marked as required for PostScript content data are loaded in PostScript VM before processing that content data.
- process device dependent colors in content data files as if they were specified in either sRGB or SWOP unless explicitly overridden by a job ticket associated with the PPML data file referencing those content data files. sRGB shall be used for 3 component color specifications and SWOP shall be used for 1 or 4 component color specifications.
- process spot colors in content data files such that the resulting colors closely match the results of using the specified alternate color space for that spot color.

NOTE A JDF based system could specify a remapping of device-dependent colors and has the capability of honoring the default specified by the PPML/GA specification.

4.5 Level 2 GA Conformance

The level 2 PPML/GA conformance subset is a subset of the PPML/GA conformance subset that comprises conforming PPML 3.0 datasets that shall additionally have a **CONFORMANCE** element whose *Subset* attribute has a value of "GA" and whose *Level* attribute has a value of "2".

4.5.1 Level 2 GA Producer Conformance

A conforming level 2 PPML/GA Producer shall be a conforming PPML Producer for the level 2 PPML/GA conformance subset.

4.5.2 Level 2 GA Consumer Conformance

A conforming level 2 PPML/GA Consumer shall:

- be a conforming PPML/GA level 1 Consumer
- be a conforming PPML Consumer for the level 2 PPML/GA conformance subset.

4.6 PDF Constraints

In accordance with the PDF specification, a PPML Consumer must rotate the page contents based on the value of the */Rotate* key associated with a PDF Page prior to applying any additional transformations specified in PPML. Therefore a PDF page with a portrait *MediaBox* and a */Rotate* key of 90 shall be rendered landscape in PPML if no other transformations are applied. The *Dimensions* attribute of the **SOURCE** element referring to such a PDF page shall match the width and height of that page after applying the rotation based on the */Rotate* key value.

NOTE The way PPML/GA handles the */Rotate* key differs from how PPML/VDX handles the */Rotate* key. If compatibility with both conformance subsets is required all pages should have a value of 0 for the */Rotate* key, if present, on each PDF page.

Annex A (informative) Revision history

A.1 GA December 2007

- Revision of Version 2.2.1 to add to section 4.2

A.2 GA May 2010

- [Revision for Version 3.0.](#)

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