



The Printer Working Group

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## IPP Finishings 2.1

Status: Stable

Abstract: This document defines new "finishings" and "finishings-col" Job Template attribute values to specify additional finishing intent, including the placement of finishings with respect to the corners and edges of portrait and landscape documents.

This document is a PWG Candidate Standard. For a definition of a "PWG Candidate Standard", see: <http://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf>

This document is available electronically at:

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54 vendors of printer related software will benefit from the interoperability provided by voluntary  
55 conformance to these standards.

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67

**68 About the Internet Printing Protocol Workgroup**

69 The Internet Printing Protocol (IPP) workgroup has developed a modern, full-featured  
70 network printing protocol, which is now the industry standard. IPP allows a print client to  
71 query a printer for its supported capabilities, features, and parameters to allow the selection  
72 of an appropriate printer for each print job. IPP also provides Job information prior to, during,  
73 and at the end of Job processing.

74 For additional information regarding IPP visit:

75 <http://www.pwg.org/ipp/>

76 Implementers of this specification are encouraged to join the IPP mailing list in order to  
77 participate in any discussions of the specification. Suggested additions, changes, or  
78 clarification to this specification, should be sent to the IPP mailing list for consideration.  
79

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## 252 1. Introduction

253 The Internet Printing Protocol/1.1: Model and Semantics [RFC8011] and Internet Printing  
254 Protocol (IPP): Production Printing Attributes - Set 1 [PWG5100.3] specifications define the  
255 basic attributes and values needed to support advanced finishing processes on printed  
256 output. This specification, which was originally titled 'IPP: "finishings" attribute values  
257 extension', defines additional values and member attributes needed to support the full  
258 breadth of finishing options available in modern Printers. It also revisits the original  
259 definitions of the "finishings" and "finishings-col" attributes in order to provide a holistic view  
260 of the various finishing processes that some Printers support.

261 The "finishings" Job Template attribute [RFC8011] allows Clients to specify simple intent -  
262 staple, fold, trim, etc. This specification extends the original values to include positional  
263 characteristics, e.g., staple top-left, as well as common variations, e.g., Z fold.

264 The "finishings-col" Job Template attribute [PWG5100.3] allows Clients to specify detailed  
265 intent - staple at the following coordinates, fold at the following positions and directions, trim  
266 at the following positions and cut types, etc. This specification extends the original "finishing-  
267 template" member attribute to include standard names and adds member attributes for each  
268 type of finishing.

269 The coordinate system scheme used in this specification agrees with the Finisher MIB  
270 [RFC3806], which in turn follows the ISO DPA [ISO10175] approach of using a coordinate  
271 system as if the document were portrait. The approach for coordinate system being relative  
272 to the intended reading direction depends on the device being able to understand the  
273 orientation embedded in the PDL, which is too problematic for many PDLs. The approach  
274 for the coordinate system of being relative to the media feed direction is too dependent on  
275 the way the device is configured, i.e., pulling short edge first vs. long edge first, and can vary  
276 between different output bins in the same device.

277 **2. Terminology**278 **2.1 Conformance Terminology**

279 Capitalized terms, such as MUST, MUST NOT, RECOMMENDED, REQUIRED, SHOULD,  
 280 SHOULD NOT, MAY, and OPTIONAL, have special meaning relating to conformance as  
 281 defined in Key words for use in RFCs to Indicate Requirement Levels [RFC2119]. The term  
 282 CONDITIONALLY REQUIRED is additionally defined for a conformance requirement that  
 283 applies to a particular capability or feature.

284 **2.2 Protocol Role Terminology**

285 This document defines the following protocol roles in order to specify unambiguous  
 286 conformance requirements:

287 *Client*: Initiator of outgoing IPP session requests and sender of outgoing IPP operation  
 288 requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] User Agent).

289 *Printer*: Listener for incoming IPP session requests and receiver of incoming IPP operation  
 290 requests (Hypertext Transfer Protocol -- HTTP/1.1 [RFC7230] Server) that represents one  
 291 or more Physical Devices or a Logical Device.

292 **2.3 Printing Terminology**

293 Normative definitions and semantics of printing terms are imported from the Printer MIB v2  
 294 [RFC3805], Printer Finishings MIB [RFC3806], [and](#) Internet Printing Protocol/1.1: Model and  
 295 Semantics [RFC8011].

296 *Document*: An object created and managed by a Printer that contains the description,  
 297 processing, and status information. A Document object can have attached data and is bound  
 298 to a single Job.

299 *Job*: An object created and managed by a Printer that contains description, processing, and  
 300 status information. The Job also contains zero or more Document objects.

301 *Finishing Location*: The distance along the Finishing Reference Edge as measured from the  
 302 bottom or left of the media sheet.

303 *Finishing Offset*: The distance from the Finishing Reference Edge.

304 *Finishing Reference Edge*: The edge or side of the media sheets that is used for finishing  
 305 processes. For example, when staples are placed along the left side of a set of sheets, the  
 306 Finishing Reference Edge is 'left'.

307 *Set*: A logical boundary between the delivered media sheets of a printed job. For example,  
 308 in the case of a ten-page single document with collated pages and a request for 50 copies,

Deleted: , and IPP: Job Progress Attributes [RFC3381]

310 each of the 50 printed copies of the document constitutes a "set". If the pages were  
311 uncollated, then 50 copies of each of the individual pages within the document would  
312 represent each "set".

Deleted: [RFC3381]

313 **2.4 Acronyms and Organizations**

314 *CIP4*: The International Cooperation for the Integration of Processes in Prepress, Press, and  
315 Postpress Organization, <http://www.cip4.org/>

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316 *IANA*: Internet Assigned Numbers Authority, <http://www.iana.org/>

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317 *IETF*: Internet Engineering Task Force, <http://www.ietf.org/>

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318 *ISO*: International Organization for Standardization, <http://www.iso.org/>

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319 *PWG*: IEEE ISTO Printer Working Group, <http://www.pwg.org/>

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## 321 **3. Requirements**

### 322 **3.1 Rationale for IPP Finishings**

323 Existing specifications define the following:

- 324 1. The Internet Printing Protocol/1.1: Model and Semantics [RFC8011] defines the  
325 "finishings" Job Template attribute and basic values.
- 326 2. The Internet Printing Protocol (IPP): Production Printing Attributes - Set 1  
327 [PWG5100.3] defines the "finishings-col" Job Template attribute for stapling.
- 328 3. IPP Finishings 2.0 [PWG5100.1-2014] defined additional Printer Description  
329 attributes that allow a Client to determine the type and extent of finishing options  
330 supported by the printer, allowing the User to select choices with higher fidelity  
331 and allowing the Client to accurately present a preview to the User of the  
332 selected finishing processes. It also defines Job Template attributes and values  
333 that allow the Client to express finishing intent clearly.

334 In order to allow Clients to use and clearly specify finishing intent, this IPP Finishings 2.1  
335 specification:

- 336 1. Defines Job Template attributes and values needed to clearly express finishing  
337 intent; and
- 338 2. Defines Printer Description attributes and values needed to allow a Client to  
339 determine the type and extent of finishing options supported by the Printer as well  
340 as preview the results of finishing processes for the User.

### 341 **3.2 Use Cases**

342 The following use cases are derived in part from the list of finishing processes defined in  
343 section 2.2 of [RFC3806].

#### 344 **3.2.1 Band**

345 Jane needs to ship ten copies of a fifty-page report. Using software on her Client device,  
346 she specifies a finishing intent that will band wrap each copy and submits the print request.

#### 347 **3.2.2 Bind**

348 Jane is self-publishing a book on lawn ornaments. Using software on her Client device, she  
349 specifies a finishing intent that will bind the long edge of each book and submits the print  
350 request.

**351 3.2.3 Booklet Maker**

352 Jane is producing an orientation guide for new students. Using software on her Client device,  
353 she specifies a finishing intent that will impose the pages from her Document onto folded  
354 sheets and submits the print request.

**355 3.2.4 Coat**

356 Jane needs to protect a digital photographic print from sunlight. Using software on her Client  
357 device, she specifies a finishing intent that coats the media sheet with an archival UV  
358 protectant and submits the print request.

**359 3.2.5 Cover**

360 Jane needs to print an investor report for an upcoming meeting with the preprinted company  
361 report cover. Using software on her Client device, she specifies a finishing intent that will  
362 add the report cover to each Set and submits the print request.

**363 3.2.6 Edge Stitch**

364 Jane wants to print a multi-page checklist. Using software on her Client device, she specifies  
365 a finishing intent that will stitch the tops of the pages in the output and submits the print  
366 request.

**367 3.2.7 Fold**

368 Jane has a set of attendee cards she wants to print. Using software on her Client device,  
369 she specifies a finishing intent that will fold the cardstock in half after printing and submits  
370 the print request.

**371 3.2.8 Jog Offset**

372 Jane is printing several copies of a report and would like each copy separated. Using  
373 software on her Client device, she specifies a finishing intent that will offset each Set in the  
374 output bin and submits the print request.

**375 3.2.9 Laminate**

376 Jane is printing operating procedure checklists that will be used many times. Using software  
377 on her Client device, she specifies a finishing intent that will laminate each checklist and  
378 submits the print request.

**379 3.2.10 Punch**

380 Jane is printing invoices that will be placed in a 3-ring binder. Using software on her Client  
381 device, she specifies a finishing intent that will punch three holes along the left side of each  
382 sheet and submits the print request.

**383 3.2.11 Saddle Stitch**

384 Jane is printing a short informational booklet. Using software on her Client device, she  
385 specifies a finishing intent that will place two staples along the midline of each Set and  
386 submits the print request.

**387 3.2.12 Staple**

388 Jane is printing an accounts-receivable report. Using software on her Client device, she  
389 specifies a finishing intent that will place a single staple at the top left corner of each Set and  
390 submits the print request.

**391 3.2.13 Trim**

392 Jane is printing a large photograph on her roll-fed printer. Using software on her Client  
393 device, she specifies a finishing intent that will cut the roll at the end of the printed  
394 photograph and submits the print request.

**395 3.2.14 Wrap**

396 Jane is printing documentation for a software product. Using software on her Client device,  
397 she specifies a finishing intent that will shrink-wrap each Set and submits the print request.

**398 3.2.15 Multiple Finishing Options**

399 Jane is printing an eight-page brochure booklet. Using software on her Client device, she  
400 specifies finishing intent to first impose the pages from her Document onto sheets, then  
401 staple the sheets along the midline, fold the sheets along the midline, and finally shrink-wrap  
402 each booklet. She then submits the print request.

**403 3.2.16 Finishing of Multiple Copies**

404 Jane is printing a seven-page report to a Printer that only supports a raster format. Using  
405 software on her Client device, she specifies a copy count of 10 and finishing intent to staple  
406 each Set. She then submits the print request. Her Client device generates and submits 70  
407 pages of raster data to the Printer.

**408 3.2.17 Finishing Supplies**

409 Jane is printing an accounts-receivable report. Using software on her Client device, she  
410 specifies a finishing intent that will place a single staple at the top left corner of each Set.  
411 She is notified that the number of staples in the Printer is low.

### 412 3.3 Exceptions

#### 413 3.3.1 Unsupported Media

414 After submitting the orientation guide for printing (section 3.2.3), the Printer returns an error  
415 indicating that the requested media cannot be used with the booklet maker.

#### 416 3.3.2 Unsupported Combinations of Finishing Options

417 After submitting an eight page brochure booklet for printing (section 3.2.15), the Printer  
418 returns an error indicating that the requested finishing intent cannot be combined as  
419 requested.

#### 420 3.3.3 Finishing with Finisher Fidelity Restrictions

421 Jane is printing an eight-page brochure booklet. Using software on her Client device, she  
422 specifies finishing intent to impose the pages from her Document onto sheets, fold and staple  
423 the sheets along the midline, and shrink-wrap each produced copy of the booklet. The Client  
424 looks up finisher restrictions for the Printer's media and orientation, and presents an accurate  
425 print preview. Jane submits the print request, and the output accurately matches the preview  
426 and her expectations.

### 427 3.4 Out of Scope

428 The following are out of scope for this specification:

- 429 1. Explicitly specifying the order of finishing processes, i.e., processing instructions  
430 instead of intent;
- 431 2. Support for folds not parallel to a Finishing Reference Edge;
- 432 3. Support for cuts not parallel to a Finishing Reference Edge; and
- 433 4. Support for cuts that do not extend the full width or length of the media

### 434 3.5 Design Requirements

435 The design requirements for this specification are:

- 436 1. Follow the naming conventions defined in the IPP/1.1 Model and Semantics  
437 [RFC8011], including keyword value (lowercase) and hyphenation requirements;
- 438 2. Optimize compatibility with existing IETF and PWG IPP operations when making  
439 design decisions in defining new operations and attributes;
- 440 3. Define values for the "finishings" Job Template attribute to support the full range  
441 of finishing options supported by modern Printers;
- 442 4. Define Printer Description and member attributes for the "finishings-col" Job  
443 Template attribute to support the full range of finishing options supported by  
444 modern Printers;



- 445 5. Update the definition of the "finishing-template" member attribute for all of the  
446 standard finishing options supported by modern Printers; and  
447 6. Register all attributes and values with IANA and the PWG.  
448

## 449 **4. Overview of Finishing**

450 The finishing processes supported by Printers are identified in the Printer Finishing MIB  
451 [RFC3806]. IPP finishing is any post-processing of the hardcopy output performed by any of  
452 the Subunits of the Printer. Common finishing processes include baling, binding, booklet  
453 making, coating, covering, folding, jogging, laminating, punching, stapling, stitching,  
454 trimming, and wrapping. As in [RFC3806], all IPP finishing processes are specified with  
455 respect to portrait media orientation. The "multiple-document-handling" Job Template  
456 attribute [RFC8011] defines how multiple copies and Documents are combined into sets for  
457 finishing.

458 A key concept with IPP finishing processes is that the "finishings" and "finishings-col" Job  
459 Template attributes define the Client's intent and not the processing order of finishing  
460 processes. That is, a Client can specify the intent that a Document be covered and bound  
461 or bound and covered and get the intended output – the Printer is responsible for determining  
462 the correct processing order for a sequence of finishing values.

463 The original finishing support in IPP/1.1: Model and Semantics [RFC8011] only allows a  
464 Printer to list and a Client to specify simple finishing intent using the "finishings" attribute -  
465 staple, fold, punch, and so forth. The IPP Production Printing Extensions, Set 1  
466 [PWG5100.3] provided the first definition of the "finishings-col" Job Template attribute to  
467 provide explicit intent for the number and location of staples. This specification expands the  
468 "finishings-col" attribute so that it is possible to specify explicit intent for all finishing  
469 processes. In addition, the "finishings-col-database" and "finishings-col-ready" Printer  
470 Description attributes allow the Client to discover which "finishings-col" values are supported  
471 and to provide an accurate preview of those values.

472 The following subsections describe each of the finishing processes supported by this  
473 specification.

### 474 **4.1 Bale (or Band) and Wrap**

475 Bale finishers bundle hardcopy output with string or straps. Wrap finishings completely  
476 enclose the output, such as with a shrink-wrap material.

### 477 **4.2 Bind**

478 Bind finishers join hardcopy output along one edge. Binding can be performed by gluing the  
479 edge, joining using plastic or wire loops, padded, or taped.

**480 4.3 Booklet Making**

481 Booklet making combines a half fold with signature imposition, placing and ordering input  
482 pages so that the resulting output can be read as a booklet. Booklet making is often  
483 combined with a saddle stitch to hold the hardcopy output together.

**484 4.4 Coat and Laminate**

485 Coating finishers apply a liquid or powdered material to the surface of the hardcopy output,  
486 e.g., a clear UV light and weather resistant paint over a sign, while laminator finishers  
487 combine a solid material with the hardcopy output using heat and/or adhesives.

**488 4.5 Cover**

489 Cover finishers place cover media over the hardcopy output, either as two separate sheets  
490 or a single sheet that covers the binding edge.

**491 4.6 Fold**

492 A fold finisher places folds in hardcopy output at certain positions and directions. Figure 1  
493 shows common fold styles that are supported by this specification.

**494 4.7 Jog**

495 A jog finisher offsets the stack of sheets for each Set by a fixed distance so that each Set  
496 can be retrieved separately.

**497 4.8 Punch**

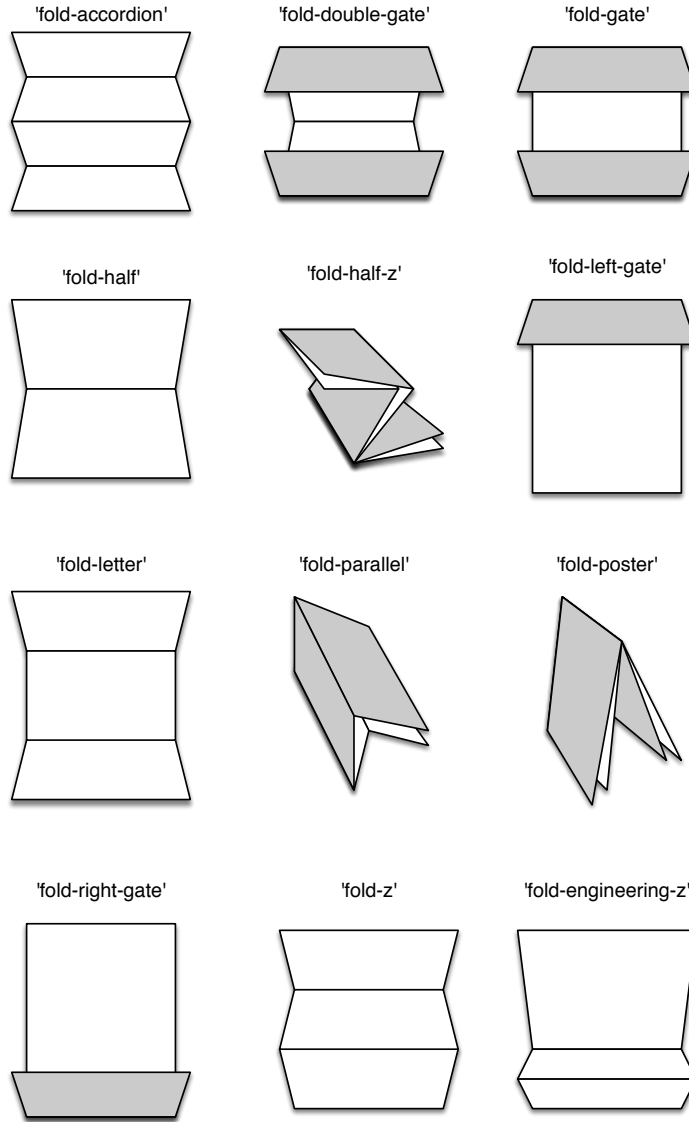
498 A punch finisher creates holes in the hardcopy Set by drilling or punching with a die. The  
499 number and location of holes varies and is not well standardized [PUNCH].

**500 4.9 Staple, Edge Stitch, and Saddle Stitch**

501 Staple and stitch finishers bind Sets of hardcopy output using 'U' shaped pieces of metal  
502 wire ("staples"). Staples are placed in a corner, along an edge, or along the middle fold (for  
503 saddle stitching). IPP uses the keyword 'edge-stitch' when multiple staples are used along  
504 an edge and 'saddle-stitch' when multiple staples are placed along the middle fold.

**505 4.10 Trim (Cut, Perforate, or Score)**

506 Trim finishers cut, perforate, or score hardcopy output along a straight line - most only  
507 support trimming along lines parallel or perpendicular to the feed direction.



508

509

**Figure 1 - Standard Folds**

## 510 5. Job Template Attributes

### 511 5.1 finishings (1setOf type2 enum)

512 The "finishings" Job Template attribute [RFC8011] identifies the finishing processes that the  
513 Printer uses for each copy of each printed Document in the Job. Printers that support any of  
514 the finishing processes listed in section 4 of this specification MUST support this attribute.

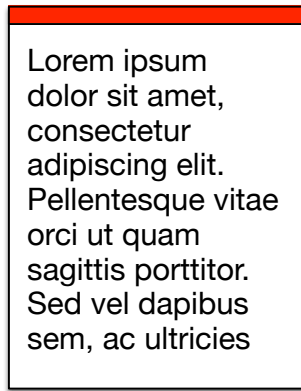
515 The order of values supplied in the "finishings" attribute is not significant. Printers MUST  
516 NOT require Clients to supply values in a particular order. If the Client supplies a value of  
517 'none' along with any other combination of values, it is the same as if only that other  
518 combination of values had been supplied, i.e., the 'none' value has no effect.

519 The positional values are specified with respect to the Document as if the Document were a  
520 portrait Document. If the Document is actually a landscape or a reverse-landscape  
521 Document, the Client supplies the appropriate transformed value. For example, to position  
522 a staple in the upper left hand corner of a landscape Document when held for reading, the  
523 Client supplies the 'staple-bottom-left' value since landscape is defined as an anti-clockwise  
524 rotation from portrait. On the other hand, to position a staple in the upper left hand corner of  
525 a reverse-landscape Document when held for reading, the Client supplies the 'staple-top-  
526 right' value since reverse-landscape is defined as a clockwise rotation from portrait. Figure  
527 2 shows how content is placed on sheets for each "orientation-requested" value where "feed-  
528 orientation" is 'short-edge-first'. Figure 3 shows how content is placed on sheets for each  
529 "orientation-requested" value where "feed-orientation" is 'long-edge-first'. If the Printer  
530 supports "media-col-ready" and / or "media-col-database", the Client could discover the  
531 media feed orientation and direction by checking the values of the "media-source-feed-  
532 orientation" and "media-source-feed-direction" sub-member attributes of "media-col".

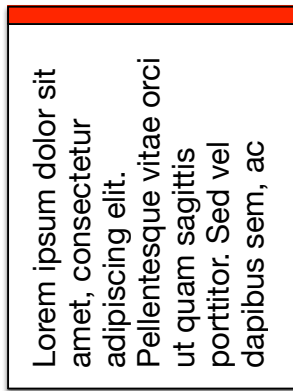
533 Note: The effect of this attribute on Jobs with multiple copies and Documents is controlled  
534 by the "multiple-document-handling" Job Template attribute (section 4.2.4 [RFC8011]) and  
535 the relationship of this attribute and the other attributes that control Document processing is  
536 described in section 15.3 [\[RFC8011\]](#).

Field Code Changed

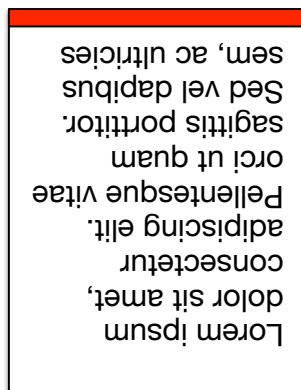
Deleted: [RFC2911]



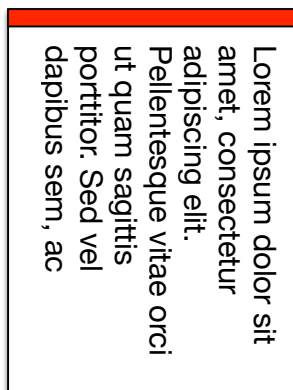
portrait



landscape



reverse-landscape



reverse-landscape

**Leading Edge of Sheet**

538

539

Figure 2 - Effect of "orientation-requested" on Output with Short Edge First Feed

Lorem ipsum  
dolor sit amet,  
consectetur  
adipiscing elit.  
Pellentesque vitae  
orci ut quam  
sagittis porttitor.  
Sed vel dapibus  
sem, ac ultricies

portrait

Lorem ipsum dolor sit  
amet, consectetur  
adipiscing elit.  
Pellentesque vitae orci  
ut quam sagittis  
porttitor. Sed vel  
dapibus sem. ac

landscape

sem, ac ultricies  
Sed vel dapibus  
sagittis porttitor.  
orci ut quam  
Pellentesque vitae  
adipiscing elit.  
consectetur  
dolor sit amet,  
Lorem ipsum

reverse-portrait

Lorem ipsum dolor sit  
amet, consectetur  
adipiscing elit.  
Pellentesque vitae orci  
ut quam sagittis  
porttitor. Sed vel  
dapibus sem. ac

reverse-landscape

**Leading Edge of Sheet**

540

541

Figure 3 - Effect of "orientation-requested" on Output with Long Edge First Feed

**542 5.1.1 RFC 2911 “finishings” Values**

543 The Internet Printing Protocol/1.1: Model and Semantics [RFC8011] defines the following  
544 standard enum values:

545 'none' (3): Perform no finishing

546 'staple' (4): Bind the Set(s) with one or more staples. The exact number,  
547 placement, and orientation of the staples are implementation and/or site-defined.

548 'punch' (5): This value indicates that holes are required in the finished hardcopy  
549 output. The exact number and placement of the holes are implementation and/or  
550 site-defined. The punch specification MAY be satisfied (in a site- and  
551 implementation-specific manner) either by drilling/punching, or by substituting pre-  
552 drilled media.

553 'cover' (6): This value is specified when it is desired to select a non-printed (or pre-  
554 printed) cover for each Set. This does not supplant the specification of a printed  
555 cover (on cover stock medium) by the Document itself.

556 'bind' (7): This value indicates that a binding is to be applied to the Set; the type  
557 and placement of the binding are implementation and/or site-defined.

558 'saddle-stitch' (8): Bind the Set(s) with two or more staples (wire stitches) along the  
559 middle fold. The exact number and placement of the staples and the middle fold are  
560 implementation and/or site-defined.

561 'edge-stitch' (9): Bind the Set(s) with two or more staples (wire stitches) along one  
562 edge. The exact number and placement of the staples are implementation and/or  
563 site-defined.

564 'staple-top-left' (20): Bind the Set(s) with one or more staples in the top left corner.

565 'staple-bottom-left' (21): Bind the Set(s) with one or more staples in the bottom left  
566 corner.

567 'staple-top-right' (22): Bind the Set(s) with one or more staples in the top right  
568 corner.

569 'staple-bottom-right' (23): Bind the Set(s) with one or more staples in the bottom  
570 right corner.

571 'edge-stitch-left' (24): Bind the Set(s) with two or more staples (wire stitches) along  
572 the left edge. The exact number and placement of the staples are implementation  
573 and/or site-defined.

574 'edge-stitch-top' (25): Bind the Set(s) with two or more staples (wire stitches) along  
575 the top edge. The exact number and placement of the staples are implementation  
576 and/or site-defined.

577 'edge-stitch-right' (26): Bind the Set(s) with two or more staples (wire stitches)  
578 along the right edge. The exact number and placement of the staples are  
579 implementation and/or site-defined.

580 'edge-stitch-bottom' (27): Bind the Set(s) with two or more staples (wire stitches)  
581 along the bottom edge. The exact number and placement of the staples are  
582 implementation and/or site-defined.

583 'staple-dual-left' (28): Bind the Set(s) with two staples (wire stitches) along the left  
584 edge assuming a portrait document (see section 6).

585 'staple-dual-top' (29): Bind the Set(s) with two staples (wire stitches) along the top  
586 edge assuming a portrait document (see section 6).

587 'staple-dual-right' (30): Bind the Set(s) with two staples (wire stitches) along the  
588 right edge assuming a portrait document (see section 6).

589 'staple-dual-bottom' (31): Bind the Set(s) with two staples (wire stitches) along the  
590 bottom edge assuming a portrait document (see section 6).

#### 591 **5.1.2 PWG 5100.1-2001 “finishings” Values**

592 The IPP “finishings” attribute values extension [PWG5100.1-2001] defines the following  
593 “finishings” enum values:

594 'fold' (10): Fold the hardcopy output. The exact number and orientations of the  
595 folds is implementation and/or site-defined.

596 'trim' (11): Trim the hardcopy output on one or more edges. The exact number of  
597 edges and the amount to be trimmed is implementation and/or site-defined.

598 'bale' (12): Bale the Set(s). The type of baling is implementation and/or site-  
599 defined.

600 'booklet-maker' (13): Deliver the Set(s) to the signature booklet maker. This value  
601 is a short cut for specifying a Job that is to be folded, trimmed and then saddle-  
602 stitched.

603 'jog-offset' (14): Shift each Set from the previous one by a small amount which is  
604 device dependent. This value has no effect on the “job-sheet”. This value  
605 SHOULD NOT have an effect if each Set of the Job consists of one sheet.

606 'bind-left' (50): Bind the Set(s) along the left edge; the type of the binding is  
607 implementation and/or site-defined.



- 608 'bind-top' (51): Bind the Set(s) along the top edge; the type of the binding is  
609 implementation and/or site-defined.
- 610 'bind-right' (52): Bind the Set(s) along the right edge; the type of the binding  
611 implementation and/or is site-defined.
- 612 'bind-bottom' (53): Bind the Set(s) along the bottom edge; the type of the binding is  
613 implementation and/or site-defined.
- 614 **5.1.3 PWG 5100.1-2014 “finishings” Values**
- 615 The IPP Finishings 2.0 specification [PWG5100.1-2014] defines the following “finishings”  
616 enum values:
- 617 'coat' (15): Apply a protective liquid or powdered coating to each sheet in an  
618 implementation and/or site-defined manner.
- 619 'lamine' (16): Apply a protective (solid) material to each sheet in an  
620 implementation and/or site-defined manner.
- 621 'staple-triple-left' (32): Bind the Set(s) with three staples (wire stitches) along the left  
622 edge assuming a portrait document (see section 6).
- 623 'staple-triple-top' (33): Bind the Set(s) with three staples (wire stitches) along the top  
624 edge assuming a portrait document (see section 6).
- 625 'staple-triple-right' (34): Bind the Set(s) with three staples (wire stitches) along the  
626 right edge assuming a portrait document (see section 6).
- 627 'staple-triple-bottom' (35): Bind the Set(s) with three staples (wire stitches) along the  
628 top edge assuming a portrait document (see section 6).
- 629 'punch-top-left' (70): Punch a single hole in the top left of the hardcopy output.
- 630 'punch-bottom-left' (71): Punch a single hole in the bottom left of the hardcopy  
631 output.
- 632 'punch-top-right' (72): Punch a single hole in the top right of the hardcopy output.
- 633 'punch-bottom-right' (73): Punch a single hole in the bottom right of the hardcopy  
634 output.
- 635 'punch-dual-left' (74): Punch two holes on the left side of the hardcopy output.
- 636 'punch-dual-top' (75): Punch two holes at the top of the hardcopy output.
- 637 'punch-dual-right' (76): Punch two holes on the right side of the hardcopy output.

- 638 'punch-dual-bottom' (77): Punch two holes at the bottom of the hardcopy output.
- 639 'punch-triple-left' (78): Punch three holes on the left side of the hardcopy output.
- 640 'punch-triple-top' (79): Punch three holes at the top of the hardcopy output.
- 641 'punch-triple-right' (80): Punch three holes on the right side of the hardcopy output.
- 642 'punch-triple-bottom' (81): Punch three holes at the bottom of the hardcopy output.
- 643 'punch-quad-left' (82): Punch four holes on the left side of the hardcopy output.
- 644 'punch-quad-top' (83): Punch four holes at the top of the hardcopy output.
- 645 'punch-quad-right' (84): Punch four holes on the right side of the hardcopy output.
- 646 'punch-quad-bottom' (85): Punch four holes at the bottom of the hardcopy output.
- 647 'fold-accordion' (90): Accordion-fold the hardcopy output vertically into four sections.
- 648 'fold-double-gate' (91): Fold the top and bottom quarters of the hardcopy output  
649 towards the midline, then fold in half vertically.
- 650 'fold-gate' (92): Fold the top and bottom quarters of the hardcopy output towards the  
651 midline.
- 652 'fold-half' (93): Fold the hardcopy output in half vertically.
- 653 'fold-half-z' (94): Fold the hardcopy output in half horizontally, then Z-fold the paper  
654 vertically into three sections.
- 655 'fold-left-gate' (95): Fold the top quarter of the hardcopy output towards the midline.
- 656 'fold-letter' (96): Fold the hardcopy output into three sections vertically; sometimes  
657 also known as a C fold.
- 658 'fold-parallel' (97): Fold the hardcopy output in half vertically two times, yielding four  
659 sections.
- 660 'fold-poster' (98): Fold the hardcopy output in half horizontally and vertically;  
661 sometimes also called a cross fold.
- 662 'fold-right-gate' (99): Fold the bottom quarter of the hardcopy output towards the  
663 midline.
- 664 'fold-z' (100): Fold the hardcopy output vertically into three sections, forming a Z.

**665 5.1.4 PWG 5100.1-2017 “finishings” Values**

666 This specification defines the following “finishings” enum values:

667 'fold-engineering-z' (101): Fold the hardcopy output vertically into three sections,  
668 forming a Z but leaving room for binding, punching, or stapling along the top edge

669 'punch-multiple-left' (86): Drill or punch more than four holes along the reference  
670 edge. For 1-4 holes, the individual explicit value ('punch-top-left', 'punch-dual-left',  
671 'punch-triple-left' and 'punch-quad-left') SHOULD be used instead. The number and  
672 location of holes can be advertised by the Printer in the "finishings-col-database"  
673 and "finishings-col-ready" Printer Description attributes in the "punching" member  
674 attribute.

675 'punch-multiple-top' (87): Drill or punch more than four holes along the reference  
676 edge. For 1-4 holes, the individual explicit value ('punch-top-top', 'punch-dual-top',  
677 'punch-triple-top' and 'punch-quad-top') SHOULD be used instead. The number and  
678 location of holes can be advertised by the Printer in the "finishings-col-database"  
679 and "finishings-col-ready" Printer Description attributes in the "punching" member  
680 attribute.

681 'punch-multiple-right' (88): Drill or punch more than four holes along the reference  
682 edge. For 1-4 holes, the individual explicit value ('punch-top-right', 'punch-dual-  
683 right', 'punch-triple-right' and 'punch-quad-right') SHOULD be used instead. The  
684 number and location of holes can be advertised by the Printer in the "finishings-col-  
685 database" and "finishings-col-ready" Printer Description attributes in the "punching"  
686 member attribute.

687 'punch-multiple-bottom' (89): Drill or punch more than four holes along the reference  
688 edge. For 1-4 holes, the individual explicit value ('punch-top-bottom', 'punch-dual-  
689 bottom', 'punch-triple-bottom' and 'punch-quad-bottom') SHOULD be used instead.  
690 The number and location of holes can be advertised by the Printer in the "finishings-  
691 col-database" and "finishings-col-ready" Printer Description attributes in the  
692 "punching" member attribute.

**693 5.1.5 PWG 5100.13 “finishings” Values**

694 The IPP Job and Printer Extensions - Set 3 (JPS3) [PWG5100.13] defines the following  
695 standard enum values:

696 'trim-after-pages' (60): Trim output after each page.

697 'trim-after-documents' (61): Trim output after each Document.

698 'trim-after-copies' (62): Trim output after each Set.

699 'trim-after-job' (63): Trim output after Job.

700 **5.2 finishings-col (no-value | 1setOf collection)**

701 The "finishings-col" Job Template attribute (originally defined in section 3.2 of [PWG5100.3])  
 702 augments the "finishings" Job Template attribute (section 5.1) and allows the Client to  
 703 specify detailed finishing instructions that cannot be specified using the simple enumerated  
 704 values of the "finishings" attribute. Printers that support any of the finishing processes listed  
 705 in section 4 SHOULD support this attribute and MUST support the "finishings" attribute.

706 Clients MUST NOT specify both the "finishings" and "finishings-col" attributes in a Job  
 707 Creation request. Printers MUST reject Job Creation requests containing both the  
 708 "finishings" and "finishings-col" attributes with the 'client-error-conflicting-attributes' status  
 709 code.

710 The "finishings-col" member attributes are listed in Table 1. The order of values supplied in  
 711 the "finishings-col" attribute is not significant. Supported values are provided in the "xxx-  
 712 supported" Printer Description attributes defined in section 6. Printers MUST NOT require  
 713 Clients to supply values in a particular order. If the Client does not want any finishings  
 714 applied it sends the 'no-value' out-of-band value.

715 The "xxx-reference-edge" member attributes are single valued, e.g., top-left is not allowed.  
 716 The standard keyword values are:

717 'bottom': The bottom edge coincides with the x-axis of the coordinate system.

718 'top': The top edge is opposite and parallel to the bottom edge.

719 'left': The left edge coincides with the y-axis of the coordinate system.

720 'right': The right edge is opposite and parallel to the left edge.

721 **Table 1 - "finishings-col" Member Attributes**

Member Attribute	Client Support	Printer Support
finishing-template (type2 keyword   name(MAX))	MUST	MUST
baling (collection)	MAY	MUST (note 1)
binding (collection)	MAY	MUST (note 1)
coating (collection)	MAY	MUST (note 1)
covering (collection)	MAY	MUST (note 1)
folding (1setOf collection)	MAY	MUST (note 1)
imposition-template (type2 keyword   name(MAX))	MAY	MAY (note 2)
laminating (collection)	MAY	MUST (note 1)
media-sheets-supported (rangeOfInteger(1:MAX))	MAY	MAY (note 2)
media-size (collection)	MAY	MAY (note 2)
media-size-name (type2 keyword)	MAY	MAY (note 2)
punching (collection)	MAY	MUST (note 1)
stitching (collection)	MAY	MUST (note 1)
trimming (1setOf collection)	MAY	MUST (note 1)

722 Note 1: MUST be supported when the corresponding finishing option is supported.

723 Note 2: Only returned in the "finishings-col-database" and "finishings-col-ready"  
724 attributes.

### 725 5.2.1 finishing-template (type2 keyword | name(MAX))

726 The REQUIRED "finishing-template" member attribute (originally defined in section 3.2.1 of  
727 [PWG5100.3]) specifies the particular finishing process using either one of the standard  
728 IANA-registered "finishing-template" keywords (many of which have matching "finishings"  
729 enum equivalents) or an implementation or site defined name. Specifying only the "finishing-  
730 template" member attribute with no other member attributes results in the default values for  
731 those member attributes.

732 Keywords can be extended by appending a qualifying label to the existing keyword,  
733 separated by an underscore. For example, 'punch-quad-left\_trio-binder', where 'punch-  
734 quad-left' is the IANA registered type2 keyword, and 'trio-binder' is the qualifying label. This  
735 allows a more specific localized user visible string to be presented (retrieved from the string  
736 catalog at the URI from the "printer-strings-uri" Printer Description attribute. These qualifying  
737 labels also allows variants' specific values for locations or offsets to be characterized  
738 precisely, while limiting the need to register a number of new keywords for obscure and/or  
739 locale-specific variations.

740 In addition to the registered keywords corresponding to the registered "finishings" enum  
741 value labels, this specification also defines keywords for each JDF @FoldCatalog [JDF1.5],  
742 value of the form 'jdf-fN-N'. For example, the JDF @FoldCatalog value 'F8-6' (a triple fold  
743 instruction similar to 'fold-parallel') would be specified using a "finishing-template" value of  
744 'jdf-f8-6'.

745 For vendor attribute extensions, implementors SHOULD use keywords with a suitable  
746 distinguishing prefix such as 'smiNNN-' where NNN is an SMI Private Enterprise Number  
747 (PEN) ~~[IANA-PEN]~~. For example, if the company Example Corp. had obtained the SMI PEN  
748 32473, then a vendor attribute 'foo' would be 'smi32473-foo'.

749 Note: Prior versions of this document recommended using a reversed domain name (e.g.,  
750 'com.example-foo'). Domain names have proven problematic due to the length of some  
751 domain names, parallel use of country-specific domain names (e.g., 'example.co.jp-foo'),  
752 and changes in ownership of domain names.

753 Localized strings for "finishing-template" values unique to the Printer SHOULD be made  
754 available by the Printer using the language-specific strings file at the URI referenced by the  
755 "printer-strings-uri" Printer Description attribute [PWG5100.13].

Deleted: [JDF1.5]

Deleted: [IANA-PEN]

**758 5.2.2 baling (collection)**

759 The "baling" member attribute specifies which baling to apply to the hardcopy output.  
760 Printers with a baling finisher MUST support this member attribute and all "baling-xxx"  
761 member attributes if they support the "finishings-col" attribute.

**762 5.2.2.1 baling-type (type2 keyword | name(MAX))**

763 The "baling-type" member attribute specifies the type of baling to apply. The following values  
764 are defined by this specification:

765 'band': each Set is baled with a paper or plastic band.

766 'shrink-wrap': each Set is shrink-wrapped in plastic.

767 'wrap': each Set is wrapped in paper.

768 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
769 IPP].

**770 5.2.2.2 baling-when (type2 keyword)**

771 The "baling-when" member attribute specified when baling is performed. The default value  
772 can be derived from the "finishing-template" value or, if a default value cannot be determined  
773 from that value, using an implementation or site defined value. The following values are  
774 defined by this specification:

775 'after-sets': Baling occurs after each Set (the typical default).

776 'after-job': Baling occurs only after the entire Job is printed.

777 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
778 IPP].

**779 5.2.3 binding (collection)**

780 The "binding" member attribute specifies the location and type of binding to apply to the  
781 hardcopy output. Printers with a binding finisher MUST support this member attribute and  
782 all "binding-xxx" member attributes if they support the "finishings-col" attribute.

**783 5.2.3.1 binding-reference-edge (type1 keyword)**

784 The "binding-reference-edge" member attribute specifies which edge ('bottom', 'left', 'right',  
785 or 'top') is bound. If not specified, the default value is either derived from the "finishing-  
786 template" keyword value ('bind-bottom', 'bind-left', 'bind-right', 'bind-top') or, if no edge is  
787 specified, is an implementation or site defined value.

**788 5.2.3.2 binding-type (type2 keyword | name(MAX))**

789 The "binding-type" member attribute specifies the type of binding to apply. If not specified,  
790 an implementation or site defined value is used. The following keyword values are defined  
791 by this specification:

792 'adhesive': sheets are bound using glue or adhesive.

793 'comb': sheets are bound by placing small rectangular holes along the binding edge  
794 and using a tube-shaped plastic binding strip with comb like fingers that fit through  
795 the holes.

796 'flat': sheets are bound so that they can lay flat when the hardcopy output is opened.  
797 The specific method of producing such a binding is implementation defined.

798 'padding': sheets are bound by applying a non-penetrating adhesive to the edge of  
799 the stack of sheets so that the sheets can be easily peeled off one at a time.

800 'perfect': sheets are bound by roughing the binding edge and applying an adhesive.

801 'spiral': sheets are bound by placing small round holes along the binding edge and  
802 winding plastic or metal wire through the holes in a spiral pattern.

803 'tape': sheets are bound by placing tape along the binding edge, overlapping the top  
804 and bottom sheets of the stack.

805 'velo': sheets are bound by placing small holes along the binding edge and joining  
806 the sheets using plastic strips with pins that extend through those holes.

807 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
808 IPP].

**809 5.2.4 coating (collection)**

810 The "coating" member attribute specifies which coating to apply to the hardcopy output.  
811 Typically, the coating is applied to the entire page, although some Printers MAY only coat  
812 those areas that have been marked on. Printers with a coating finisher MUST support this  
813 member attribute and all "coating-xxx" member attributes if they support the "finishings-col"  
814 attribute.

**815 5.2.4.1 coating-sides (type1 keyword)**

816 The "coating-sides" member attribute specifies which sides of the sheets are coated: 'front',  
817 'back', or 'both', If not specified, an implementation or site defined default value is used.

**818 5.2.4.2 coating-type (type2 keyword | name(MAX))**

819 The "coating-type" member attribute specifies the type of coating to apply. The following  
820 values are defined by this specification:

821 'archival': each sheet is coated to preserve the output for an extended period of  
822 time, e.g., a UV protectant.

823 'archival-glossy': each sheet is coated to produce a glossy surface that preserves  
824 the output for an extended period of time, e.g., a UV protectant.

825 'archival-matte': each sheet is coated to produce a matte surface that preserves the  
826 output for an extended period of time, e.g., a UV protectant.

827 'archival-semi-gloss': each sheet is coated to produce a semi-gloss surface that  
828 preserves the output for an extended period of time, e.g., a UV protectant.

829 'glossy': each sheet is coated to produce a glossy surface.

830 'high-gloss': each sheet is coated to produce a high-gloss surface.

831 'matte': each sheet is coated to produce a matte surface.

832 'semi-gloss': each sheet is coated to produce a semi-gloss surface.

833 'silicone': each sheet is coated to produce a water resistant surface.

834 'translucent': each sheet is coated to produce a translucent surface.

835 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
836 IPP].

**837 5.2.5 covering (collection)**

838 The "covering" member attribute specifies which cover to apply over the hardcopy output.  
839 Printers with a cover finisher MUST support this member attribute and all "covering-xxx"  
840 member attributes if they support the "finishings-col" attribute.

841 Note: Unlike the "cover-back" and "cover-front" Job Template attributes [PWG5100.3],  
842 finishing covers are applied over any binding, edge stitching, or staples and do not contain  
843 print-stream pages.

**844 5.2.5.1 covering-name (type2 keyword | name(MAX))**

845 The "covering-name" member attribute specifies which cover to apply. The default is  
846 implementation or site defined. The name typically represents a pre-printed, pre-cut, or  
847 generic cover that is available to the Printer. Clients MUST query the value of the "covering-



848 name-supported" (section 6.7) Printer attribute for the list of supported values. The following  
849 values are defined by this specification:

850 'plain': a plain (blank) cover is applied.

851 'pre-cut': a pre-cut cover is applied.

852 'pre-printed': a pre-printed cover is applied.

853 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
854 IPP].

### 855 **5.2.6 folding (1setOf collection)**

856 The "folding" member attribute specifies the location and direction of folds to apply to the  
857 hardcopy output. Printers with a folding finisher **MUST** support this member attribute and all  
858 "folding-xxx" member attributes if they support the "finishings-col" attribute.

859 Note: The order of "folding" values is significant and is part of the fold intent. Printers **MAY**  
860 re-order "folding" values so long as the final result matches the specified intent.

861 Note: This specification only defines folds parallel to the reference edge. Diagonal folds are  
862 explicitly not supported.

#### 863 **5.2.6.1 folding-direction (type1 keyword)**

864 The "folding-direction" member attribute specifies whether the sheets are pushed outward  
865 ('outward') or pulled inward ('inward') for the current fold. The default value can be derived  
866 from the "finishing-template" value or, if a default value cannot be determined from that  
867 value, using an implementation or site defined value.

#### 868 **5.2.6.2 folding-offset (integer(0:MAX))**

869 The "folding-offset" member attribute specifies where the fold is made. The value is the  
870 distance from the reference edge specified by the "folding-reference-edge" member attribute  
871 toward the center of the medium in hundredths of millimeters (1/2540th of an inch). The  
872 default value is generally derived from the "finishing-template" value and output media.

#### 873 **5.2.6.3 folding-reference-edge (type1 keyword)**

874 The "folding-reference-edge" member attribute specifies which edge is used as the basis  
875 of the fold instructions: 'bottom', 'left', 'right', or 'top'. Folds are placed parallel to the  
876 reference edge at the offset specified by the "folding-location" member attribute. The  
877 default value is generally derived from the "finishing-template" value and output media.

878 **5.2.6.4 “folding” Examples**

879 The following example shows a “finishings-col-database” expressing the definitions of  
 880 “folding” values for the standard folds in Figure 1 applied to A4 media sheets.

```

881     finishing-col-database=
882     {
883         finishing-template='fold-accordion'
884         media-size-name="iso_a4_210x297mm"
885         folding=
886         {
887             folding-direction='inward'
888             folding-location=7425
889             folding-reference-edge='top'
890         },
891         {
892             folding-direction='inward'
893             folding-location=22275
894             folding-reference-edge='top'
895         },
896         {
897             folding-direction='outward'
898             folding-location=14850
899             folding-reference-edge='top'
900         }
901     },
902     {
903         finishing-template='fold-double-gate'
904         media-size-name="iso_a4_210x297mm"
905         folding=
906         {
907             folding-direction='inward'
908             folding-offset=7425
909             folding-reference-edge='top'
910         },
911         {
912             folding-direction='inward'
913             folding-offset=22275
914             folding-reference-edge='top'
915         },
916         {
917             folding-direction='inward'
918             folding-offset=14850
919             folding-reference-edge='top'
920         }
921     },
922     {
923         finishing-template='fold-engineering-z'
924         media-size-name="iso_a4_210x297mm"
925         folding=
926         {
927             folding-direction='inward'
928             folding-offset=11593
929             folding-reference-edge='top'
930         },
931         {
932             folding-direction='outward'
933             folding-offset=20646
934             folding-reference-edge='top'
935         }
936     },
  
```

```
937 {
938   finishing-template='fold-gate'
939   media-size-name="iso_a4_210x297mm"
940   folding=
941   {
942     folding-direction='inward'
943     folding-offset=7425
944     folding-reference-edge='top'
945   },
946   {
947     folding-direction='inward'
948     folding-offset=22275
949     folding-reference-edge='top'
950   }
951 },
952 {
953   finishing-template='fold-half'
954   media-size-name="iso_a4_210x297mm"
955   folding=
956   {
957     folding-direction='inward'
958     folding-offset=14850
959     folding-reference-edge='top'
960   }
961 },
962 {
963   finishing-template='fold-half-z'
964   media-size-name="iso_a4_210x297mm"
965   folding=
966   {
967     folding-direction='inward'
968     folding-offset=10500
969     folding-reference-edge='left'
970   },
971   {
972     folding-direction='inward'
973     folding-offset=9900
974     folding-reference-edge='top'
975   },
976   {
977     folding-direction='outward'
978     folding-offset=19800
979     folding-reference-edge='top'
980   }
981 },
982 {
983   finishing-template='fold-left-gate'
984   media-size-name="iso_a4_210x297mm"
985   folding=
986   {
987     folding-direction='inward'
988     folding-offset=7425
989     folding-reference-edge='top'
990   }
991 },
992 {
993   finishing-template='fold-letter'
994   media-size-name="iso_a4_210x297mm"
995   folding=
996   {
997     folding-direction='inward'
998     folding-offset=9900
```

```
999         folding-reference-edge='top'
1000     },
1001     {
1002         folding-direction='inward'
1003         folding-offset=19800
1004         folding-reference-edge='top'
1005     }
1006 },
1007 {
1008     finishing-template='fold-parallel'
1009     media-size-name="iso_a4_210x297mm"
1010     folding=
1011     {
1012         folding-direction='inward'
1013         folding-offset=14850
1014         folding-reference-edge='top'
1015     },
1016     {
1017         folding-direction='inward'
1018         folding-offset=7425
1019         folding-reference-edge='top'
1020     }
1021 },
1022 {
1023     finishing-template='fold-poster'
1024     media-size-name="iso_a4_210x297mm"
1025     folding=
1026     {
1027         folding-direction='inward'
1028         folding-offset=10500
1029         folding-reference-edge='left'
1030     },
1031     {
1032         folding-direction='outward'
1033         folding-offset=14850
1034         folding-reference-edge='top'
1035     }
1036 },
1037 {
1038     finishing-template='fold-right-gate'
1039     media-size-name="iso_a4_210x297mm"
1040     folding=
1041     {
1042         folding-direction='inward'
1043         folding-offset=22275
1044         folding-reference-edge='top'
1045     }
1046 },
1047 {
1048     finishing-template='fold-z'
1049     media-size-name="iso_a4_210x297mm"
1050     folding=
1051     {
1052         folding-direction='inward'
1053         folding-offset=9900
1054         folding-reference-edge='top'
1055     },
1056     {
1057         folding-direction='outward'
1058         folding-offset=19800
1059         folding-reference-edge='top'
1060     }

```

- 1061 }  
1062
- 1063 **5.2.7 imposition-template (type2 keyword | name(MAX))**
- 1064 The "imposition-template" member attribute specifies the default imposition template used  
1065 for the specified finishing process. The "imposition-template" member attribute is only  
1066 allowed in "finishings-col" collections in the "finishings-col-database" (section 6.9) and  
1067 "finishings-col-ready" (section 6.11) Printer description attributes. For example, when  
1068 applying a 'booklet-maker' finishing process a Printer could automatically apply a 'signature'  
1069 imposition template when processing input pages.
- 1070 **5.2.8 laminating (collection)**
- 1071 The "laminating" member attribute specifies which material to apply to the hardcopy output.  
1072 Printers with a laminating finisher MUST support this member attribute and all "laminating-  
1073 xxx" member attributes if they support the "finishings-col" attribute.
- 1074 **5.2.8.1 laminating-sides (type2 keyword)**
- 1075 The "laminating-sides" member attribute specifies which sides of the sheets are laminated:  
1076 'front', 'back', or 'both'. If not specified, an implementation or site defined default value is  
1077 used.
- 1078 **5.2.8.2 laminating-type (type2 keyword | name(MAX))**
- 1079 The "laminating-type" member attribute specifies the type of material to laminate with. The  
1080 following values are defined by this specification:
- 1081 'archival': each sheet is laminated to preserve the output for an extended period of  
1082 time, e.g., a UV protectant.
- 1083 'glossy': each sheet is laminated to produce a glossy surface.
- 1084 'high-gloss': each sheet is laminated to produce a high-gloss surface.
- 1085 'matte': each sheet is laminated to produce a matte surface.
- 1086 'semi-gloss': each sheet is laminated to produce a semi-gloss surface.
- 1087 'translucent': each sheet is laminated to produce a translucent surface.
- 1088 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
1089 IPP].
- 1090 **5.2.9 media-sheets-supported (rangeOfInteger(1:MAX))**
- 1091 The "media-sheets-supported" member attribute specifies the minimum and maximum  
1092 number of sheets supported for that set of finishing values. This attribute is related to the

1093 "job-media-sheets-supported" attribute [RFC8011] in that the value of "media-sheets-  
 1094 supported" MUST be within the range of "job-media-sheets-supported". The "media-sheets-  
 1095 supported" member attribute is only allowed in "finishings-col" collections in the "finishings-  
 1096 col-database" (section 6.9) and "finishings-col-ready" (section 6.11) Printer description  
 1097 attributes. As an example, if a Printer implementing the 'fold-half' finishing template has a  
 1098 minimum of 1 sheet and a maximum of 5 sheets, the Printer's "media-sheets-supported"  
 1099 attribute specifies this limit with a value of '1-5'.

#### 1100 **5.2.10 media-size (collection)**

1101 The "media-size" member attribute specifies the applicable media size dimensions for the  
 1102 specified finishing values and is only provided in "finishings-col-database" (section 6.9) and  
 1103 "finishings-col-ready" (section 6.11) Printer attribute values. For example, a Printer can list  
 1104 the supported "punching-locations" values for ISO A4 and US Letter media sizes.

1105 The "x-dimension (integer(0:MAX))" and "y-dimension (integer(0:MAX))" member attributes  
 1106 provide the dimensions of the media.

#### 1107 **5.2.11 media-size-name (type2 keyword)**

1108 The "media-size-name" member attribute specifies the applicable media size for the  
 1109 specified finishing values and is only provided in "finishings-col-database" (section 6.9) and  
 1110 "finishings-col-ready" (section 6.11) Printer attribute values. For example, a Printer can list  
 1111 the supported "punching-locations" values for ISO A4 and US Letter media sizes.

1112 The values are PWG media size names

1113 ~~[PWG5101.1]~~

Deleted: [PWG5101.1]

#### 1114 **5.2.12 punching (collection)**

1115 The "punching" member attribute specifies the locations of holes to make in the hardcopy  
 1116 output. Printers with a hole punching/drilling finisher MUST support this member attribute  
 1117 and all "punching-xxx" member attributes if they support the "finishings-col" attribute.

1118 The diameter of the hole made by the punch is indicated by the "punching-hole-diameter-  
 1119 configured" Printer description attribute (section 6.22).

1120 A Client that chooses to request custom punching using the "punching" collection attribute  
 1121 MUST specify the "punching-locations", the "punching-offset", and the "punching-reference-  
 1122 edge" member attributes. If the Client supplies a malformed request by not supplying all  
 1123 three member attributes, the Printer MUST (depending on implementation) either reject the  
 1124 request and return the 'client-error-bad-request' (see [RFC8011] section 13.1.4.1) or default  
 1125 the omitted member attributes, independent of the value of the "ipp-attribute-fidelity" attribute  
 1126 [RFC8011] supplied by the Client.

**1128 5.2.12.1 punching-locations (1setOf integer(0:MAX))**

1129 The "punching-locations" member attribute specifies the locations to be punched or drilled  
1130 along the reference edge. Each value in the 1setOf MUST be in order of increasing distance.

1131 If the "punching-reference-edge" is either 'top' or 'bottom', then each value in the "punching-  
1132 locations" represents an offset in hundredths of millimeters (1/2540th of an inch) from the  
1133 left edge toward the center of the medium. If the "punching-reference-edge" is either 'left' or  
1134 'right', then each value in the "punching-locations" represents an offset in hundredths of  
1135 millimeters (1/2540th of an inch) from the bottom edge toward the center of the medium.

1136 The default value can be derived from the "finishing-template" value or, if a default value  
1137 cannot be determined from that value, using an implementation or site defined value.

**1138 5.2.12.2 punching-offset (integer(0:MAX))**

1139 The "punching-offset" member attribute specifies the distance from the center of the hole to  
1140 the reference edge (specified by the "punching-reference-edge" member attribute)  
1141 measured in hundredths of millimeters (1/2540th of an inch). The default value can be  
1142 derived from the "finishing-template" value or, if a default value cannot be determined from  
1143 that value, using an implementation or site defined value.

**1144 5.2.12.3 punching-reference-edge (type1 keyword)**

1145 The "punching-reference-edge" member attribute specifies which edge of the sheets will be  
1146 punched or drilled: 'bottom', 'left', 'right', or 'top'. The default value can be derived from the  
1147 "finishing-template" value or, if a default value cannot be determined from that value, using  
1148 an implementation or site defined value.

**1149 5.2.13 stitching (collection)**

1150 The "stitching" member attribute (originally defined in section 3.2.2 of [PWG5100.3])  
1151 specifies the locations of stitches or staples that are used to bind the hardcopy output.  
1152 Printers with a stapler and/or stitching finisher MUST support this member attribute and all  
1153 "stitching-xxx" member attributes if they support the "finishings-col" attribute.

1154 A Client that chooses to request custom stitching using the "stitching" collection attribute  
1155 MUST specify the "stitching-reference-edge", the "stitching-offset", and the "stitching-  
1156 locations" member attributes. If the Client supplies a malformed request by not supplying all  
1157 three member attributes, the Printer MUST (depending on implementation) either reject the  
1158 request and return the 'client-error-bad-request' (see [RFC8011] section 13.1.4.1) or default  
1159 the omitted member attributes, independent of the value of the "ipp-attribute-fidelity" attribute  
1160 [RFC8011] supplied by the Client.

**1161 5.2.13.1 stitching-angle (integer(0:359))**

1162 The "stitching-angle" member attribute specifies the staple or stitch's angle of rotation in a  
1163 counter-clockwise direction around the center of the staple, measured in degrees. A staple

1164 or stitch rotated to 0° (zero degrees) shall be parallel to the top edge of the page. The  
1165 range of allowable values is 0 (0°) to 359 (359°).

#### 1166 **5.2.13.2 stitching-locations (1setOf integer(0:MAX))**

1167 Each value of "stitching-locations" specifies an absolute offset along the Finishing Reference  
1168 Edge at which a stitch MUST occur. Each value in the 1setOf MUST be in order of increasing  
1169 distance.

1170 If the "stitching-reference-edge" is either 'top' or 'bottom', then each value in the "stitching-  
1171 locations" represents an offset in hundredths of millimeters from the left edge along the  
1172 Finishing Reference Edge toward the center of the medium. If the "stitching-reference-edge"  
1173 is either 'left' or 'right', then each value in the "stitching-locations" represents an offset in  
1174 hundredths of millimeters from the bottom edge along the Finishing Reference Edge toward  
1175 the center of the medium.

1176 The unit of measure for the "stitching-locations" member attribute is one hundredth of a  
1177 millimeter. This unit is equivalent to 1/2540th of an inch resolution.

#### 1178 **5.2.13.3 stitching-method (type2 keyword)**

1179 The "stitching-method" member attribute specifies the type of stitching to use. The following  
1180 values are defined by this specification:

1181 'auto': Automatically choose a stitching type based on the Set being finished.

1182 'crimp': Crimp the Set together.

1183 'wire': Use wire staples.

1184 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
1185 IPP].

#### 1186 **5.2.13.4 stitching-offset (integer(0:MAX))**

1187 The "stitching-offset" member attribute specifies the perpendicular distance of the staples  
1188 from the Finishing Reference Edge. Since the "stitching-offset" member attribute is positive  
1189 or zero, the offset is always in the direction that is both away from the Finishing Reference  
1190 Edge and toward the center of the media sheet.

1191 The unit of measure for the "stitching-offset" member attribute is one hundredth of a  
1192 millimeter. This unit is equivalent to 1/2540th of an inch resolution.

1193 If the Client specifies a "stitching-offset" then the Printer MUST produce a stitch (or stitches)  
1194 along a line that is the specified number of hundredths of millimeters specified by the  
1195 "stitching-offset" attribute away from the "stitching-reference-edge".



1196 **5.2.13.5 stitching-reference-edge (type1 keyword)**

1197 The "stitching-reference-edge" member attribute specifies the Finishing Reference Edge of  
 1198 the output media relative to which the stapling or stitching MUST be applied. The individual  
 1199 staples or stitches are situated along a line or axis parallel to the Finishing Reference Edge.

1200 A Printer MUST support this member attribute and at least the 'left' value.

1201 Note: The 'left' value works with 'portrait' and 'landscape' Documents since 'landscape'  
 1202 Documents are rotated anti-clock-wise 90 degrees, i.e., plus 90 degrees, with respect to  
 1203 'portrait' Documents. The left edge becomes the top edge when the human reader orients  
 1204 the landscape Document for reading.

1205 **5.2.14 trimming (1setOf collection)**

1206 The "trimming" member attribute specifies the locations of cuts to make in the hardcopy  
 1207 output. Printers with a trimming/cutting/perforation/scoring finisher MUST support this  
 1208 member attribute and all "trimming-xxx" member attributes if they support the "finishings-col"  
 1209 attribute.

1210 **5.2.14.1 trimming-offset (1setOf integer(0:MAX))**

1211 The "trimming-offset" member attribute specifies where the cut, perforation, or score is  
 1212 made. The value is the distance from the Finishing Reference Edge specified by the  
 1213 "trimming-reference-edge" member attribute toward the center of the medium in hundredths  
 1214 of millimeters (1/2540th of an inch). The default value is generally derived from the "finishing-  
 1215 template" value and output media.

1216 **5.2.14.2 trimming-reference-edge (type1 keyword)**

1217 The "trimming-reference-edge" member attribute specifies which edge is used as the basis  
 1218 of the cut, perforation, or score: 'bottom', 'left', 'right', or 'top'. Cuts, perforations, and scores  
 1219 are placed parallel to the reference edge at the offset specified by the "trimming-offset"  
 1220 member attribute. The default value is generally derived from the "finishing-template" value  
 1221 and output media.

1222 **5.2.14.3 trimming-type (type2 keyword | name(MAX))**

1223 The "trimming-type" member attribute specifies the type of trim that is to be performed. The  
 1224 default value is implementation and/or site defined. The following values are defined by this  
 1225 specification:

1226 'draw-line': Marks a cut line on the media where it could be cut by an operator

1227 'full': Cuts the hardcopy output the full length parallel to the reference edge.

1228 'partial': Partially cuts the hardcopy output along the length parallel to the reference  
 1229 edge.

1230 'perforate': Perforates the hardcopy output the full length parallel to the reference  
1231 edge.

1232 'score': Scores the hardcopy output the full length parallel to the reference edge.

1233 'tab': Cuts the hardcopy output along the length parallel to the reference edge  
1234 leaving a hanging tab.

1235 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
1236 IPP].

#### 1237 **5.2.14.4 trimming-when (type2 keyword)**

1238 The "trimming-when" member attribute specified when trimming is performed. The default  
1239 value could be derived from the "finishing-template" value or, if a default value cannot be  
1240 determined from that value, using an implementation or site defined value. The following  
1241 values are defined by this specification:

1242 'after-documents': Trimming occurs after each Document.

1243 'after-job': Trimming occurs only after the entire Job is printed.

1244 'after-sets': Trimming occurs after each Set (the typical default).

1245 'after-sheets': Trimming occurs after each sheet.

1246 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-  
1247 IPP].

#### 1248 **5.3 job-pages-per-set (integer(1:MAX))**

1249 The RECOMMENDED "job-pages-per-set" Job Template attribute specifies the number of  
1250 input pages that constitute a set for finishing processes. It is used when the Client generates  
1251 the copies in the Document content because the Printer does not support the "copies"  
1252 attribute [RFC8011] for the given Document format. If the Client includes the "job-pages-per-  
1253 set" Job Template attribute in a Job Creation request:

- 1254 • The Client SHOULD NOT include the "copies" Job Template attribute, or if included  
1255 MUST use the value 1; and
- 1256 • The Printer MUST ignore the value of the "copies-default" Printer Description  
1257 attribute.

1258 The value of "job-pages-per-set" MUST be evenly divisible with the number of Input Pages  
1259 since it is being used to demarcate the length of a single copy or Set. See the sections on  
1260 the "multiple-document-handling" Job Template attribute [RFC8011] for more information on  
1261 using this attribute with multiple Document Jobs.

1262 For example, if a Client submits a 14 page PWG Raster Format [PWG5102.4] Document for  
 1263 printing that contains two copies of four duplex pages each, the Client might specify a "job-  
 1264 pages-per-set" Job Template attribute with a value of 7, a "sides" attribute with a value of  
 1265 'two-sided-long-edge', and a "finishings" attribute with a value of 4 (staple) to have the Printer  
 1266 staple two Sets of four sheets. Figure 4 shows a graphical representation of this example.

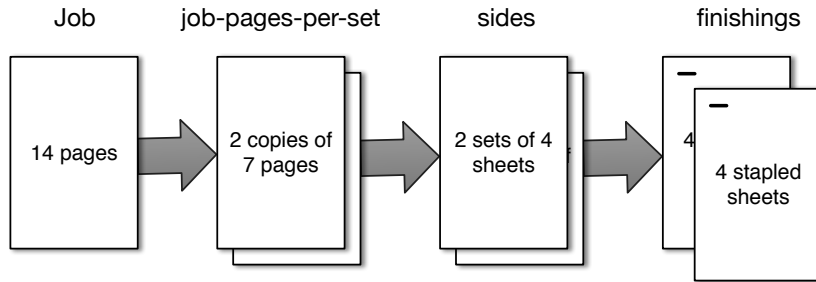


Figure 4 - Handling of "job-pages-per-set" Job Template Attribute

1267

1268

1269 **6. Printer Description Attributes**

1270 **6.1 baling-type-supported (1setOf (type2 keyword | name(MAX)))**

1271 The "baling-type-supported" Printer attribute lists the supported values for the "baling-type"  
 1272 (section 5.2.2.1) member attribute.

1273 **6.2 baling-when-supported (1setOf type2 keyword)**

1274 The "baling-when-supported" Printer attribute lists the supported values for the "baling-  
 1275 when" (section 5.2.2.2) member attribute.

1276 **6.3 binding-reference-edge-supported (1setOf type1 keyword)**

1277 The "binding-reference-edge-supported" Printer attribute lists the supported values for the  
 1278 "binding-reference-edge" (section 5.2.3.1) member attribute.

1279 **6.4 binding-type-supported (1setOf type2 keyword)**

1280 The "binding-type-supported" Printer attribute lists the supported values for the "binding-  
 1281 type" (section 5.2.3.2) member attribute.

**1282 6.5 coating-sides-supported (1setOf type1 keyword)**

1283 The "coating-sides-supported" Printer attribute lists the supported values for the "coating-  
1284 sides" (section 5.2.4.1) member attribute.

**1285 6.6 coating-type-supported (1setOf (type2 keyword | name(MAX)))**

1286 The "coating-type-supported" Printer attribute lists the supported values for the "coating-  
1287 type" (section 5.2.4.2) member attribute.

**1288 6.7 covering-name-supported (1setOf (type2 keyword | name(MAX)))**

1289 The "covering-name-supported" Printer attribute lists the supported values for the "covering-  
1290 name" (section 5.2.5.1) member attribute.

**1291 6.8 finishing-template-supported (1setOf (name(MAX) | type2 keyword))**

1292 The "finishing-template-supported" Printer attribute lists the supported values for the  
1293 "finishing-template" (section 5.2.1) member. Except for 'none', Printers MUST list all  
1294 "finishings-supported" keyword value equivalents in the list of "finishing-template-supported"  
1295 values.

**1296 6.9 finishings-col-database (1setOf collection)**

1297 The RECOMMENDED "finishings-col-database" Printer attribute lists the "finishings-col"  
1298 member attributes corresponding to each "finishings-supported" value. Unlike the "media-  
1299 col-database" Printer attribute [PWG5100.11], the "finishings-col-database" attribute does  
1300 not provide a definitive list of the combinations of valid finishing processes. Instead, it lists  
1301 the basic finishing processes separately as well as vendor or site defined preset  
1302 combinations, each identified by a corresponding "finishing-template" name or keyword.

1303 For example, a Printer that supports the 'booklet-maker', 'punch-triple-left' and 'staple-top-  
1304 left' values for "finishings-template" and "finishings-supported" might report the following for  
1305 "finishings-col-database":

```
1306     finishing-col-database=
1307     {
1308         finishing-template='booklet-maker'
1309         imposition-template='signature'
1310         media-size-name='na_tabloid_11x17in'
1311         media-sheets-supported=1-5
1312         folding=
1313         {
1314             folding-direction='inward'
1315             folding-offset=21590
1316             folding-reference-edge='top'
1317         }
1318     }
```

```

1318     stitching=
1319     {
1320         stitching-locations=9313,18626
1321         stitching-offset=21590
1322         stitching-reference-edge='top'
1323     }
1324 },
1325 {
1326     finishing-template='booklet-maker'
1327     imposition-template='signature'
1328     media-sheets-supported=1-8
1329     media-size=
1330     {
1331         x-dimension=29700
1332         y-dimension=42000
1333     }
1334     folding=
1335     {
1336         folding-direction='inward'
1337         folding-offset=21000
1338         folding-reference-edge='top'
1339     }
1340     stitching=
1341     {
1342         stitching-locations=9900,19800
1343         stitching-offset=21000
1344         stitching-reference-edge='top'
1345     }
1346 },
1347 {
1348     finishing-template='punch-triple-left'
1349     media-sheets-supported=1-100
1350     media-size-name='na_letter_8.5x11in'
1351     punching=
1352     {
1353         punching-locations=5715,16510,27305
1354         punching-offset=1300
1355         punching-reference-edge='left'
1356     }
1357 },
1358 {
1359     finishing-template='staple-top-left'
1360     media-sheets-supported=1-150
1361     stitching=
1362     {
1363         stitching-locations=635
1364         stitching-offset=635
1365         stitching-reference-edge='left'
1366     }
1367 }

```

1368 Note that the Printer SHOULD specify each of these separately to limit the size of the value  
 1369 for "finishings-col-database". While it is possible to create "finishings-col" collections that  
 1370 each represent one of the combinatorial permutations from combining the discrete "finishing-  
 1371 template" definitions (e.g. "staple-top-left\_punch-triple-left"), that greatly and unnecessarily

1372 expands the size of "finishings-col-database" and "finishings-col-ready" (section 6.11). A  
 1373 Client creates the "finishings-col" for a Job by itself combining the settings contained within  
 1374 multiple "finishings-col" collections from "finishings-col-ready" or "finishings-col-database",  
 1375 after resolving any constraints, as discussed later in this section.

1376 Printers SHOULD report "finishings-col-database" values for each "finishings-supported"  
 1377 value other than 'none' (which is equivalent to a no-value for "finishings-col"), and MAY  
 1378 report multiple instances with the same "finishing-template" value but different "media-size"  
 1379 or "media-size-name" values. This allows a Client to easily discover which finishing  
 1380 processes are supported for a given media size, and to preview the results of each finishing  
 1381 process for the User. This attribute can also provide Printer and site-defined "presets" for  
 1382 compound finishing processes.

1383 The same values SHOULD be returned in the "finishings-col-ready" Printer attribute (section  
 1384 6.11) for each finisher Subunit that is available.

1385 There can be situations where a setting within a particular "finishings-col" collection is not  
 1386 compatible with some other selected Job Template attribute, such as a particular media type,  
 1387 media orientation, etc. These situations are described by the Printer using the IPP "job-  
 1388 constraints-supported" and "job-resolvers-supported" Printer Description attributes  
 1389 [PWG5100.13]. For example:

```

1390     job-constraints-supported={
1391       resolver-name=A
1392       finishings-col={
1393         finishing-template='staple-top-left','staple-bottom-right'
1394       }
1395       finishings=20,23
1396       media-col={
1397         media-source-properties={
1398           media-source-feed-direction='long-edge-first'
1399         }
1400       }
1401     }
1402
1403     job-resolvers-supported={
1404       resolver-name=A
1405       media-col={
1406         media-source-properties={
1407           media-source-feed-direction='short-edge-first'
1408         }
1409       },
1410       {
1411         media-source='manual'
1412       }
1413     }
  
```

1414 Notice that in "job-constraints-supported" the value for "finishing-template" contains multiple  
 1415 values.

1416 **6.10 finishings-col-default (1setOf collection | no-value)**

1417 The "finishings-col-default" Printer attribute provides the default "finishings-col" (section 5.2)  
 1418 Job Template attribute value. Each collection value MUST contain the "finishing-template"  
 1419 member attribute and SHOULD contain all finishing process member attributes that are not  
 1420 affected by media size. For example, if the default is to staple output in the top left corner  
 1421 then the collection value SHOULD contain the "stitching" member attribute because the  
 1422 location of the staple does not depend on the media size. However, if the default is to punch  
 1423 three holes along the left edge of the media, the collection value SHOULD contain the  
 1424 "punching-reference-edge" and "punching-offset" member attributes but SHOULD NOT  
 1425 contain the "punching-locations" member attribute since the value of that member attribute  
 1426 depends upon the media size.

1427 The "finishings-col-default" Printer attribute MUST report the same finishing processes as  
 1428 the "finishings-default" [RFC8011] Printer attribute. If "finishings-default" has the value  
 1429 'none', then "finishings-col-default" MUST have the 'no-value' out-of-band value.

1430 **6.11 finishings-col-ready (1setOf collection)**

1431 The RECOMMENDED "finishings-col-ready" Printer attribute lists the "finishings-col"  
 1432 member attributes corresponding to each "finishing-template" value for Subunits that are  
 1433 available and media that is loaded. The values are always the same as, or a subset of, the  
 1434 "finishings-col-database" Printer attribute (section 6.9).

1435 **6.12 folding-direction-supported (1setOf type1 keyword)**

1436 The "folding-direction-supported" Printer attribute lists the supported values for the "folding-  
 1437 direction" (section [5.2.6.1](#)) member attribute.

Deleted: 5.2.5.1

1438 **6.13 folding-offset-supported (1setOf (integer(0:MAX) |  
 1439 rangeOfInteger(0:MAX)))**

1440 The "folding-offset-supported" Printer attribute lists the supported values for the "folding-  
 1441 offset" (section [5.2.6.2](#)) member attribute.

Deleted: 5.2.5.2

1442 **6.14 folding-reference-edge-supported (1setOf type1 keyword)**

1443 The "folding-reference-edge-supported" Printer attribute lists the supported values for the  
 1444 "folding-reference-edge" (section [5.2.6.3](#)) member attribute.

Deleted: 5.2.5.3

1445 **6.15 laminating-sides-supported (1setOf type1 keyword)**

1446 The "laminating-sides-supported" Printer attribute lists the supported values for the  
 1447 "laminating-sides" (section [5.2.8.1](#)) member attribute.

Deleted: 5.2.7.1

1452 **6.16 laminating-type-supported (1setOf (type2 keyword | name(MAX)))**

1453 The "laminating-type-supported" Printer attribute lists the supported values for the  
 1454 "laminating-type" (section 5.2.8.2) member attribute.

Deleted: 5.2.7.2

1455 **6.17 job-pages-per-set-supported (boolean)**

1456 The "job-pages-per-set-supported" Printer Attribute specifies whether the "job-pages-per-  
 1457 set" Job Template attribute (section 5.3) is supported. This attribute MUST be supported if  
 1458 the "job-pages-per-set" attribute is supported.

1459 **6.18 printer-finisher (1setOf octetString(MAX))**

1460 The "printer-finisher" Printer Description attribute provides current finisher details mapped  
 1461 from the SNMP finDeviceTable defined in IETF Finishing MIB [RFC3806]. This attribute  
 1462 MUST be supported if the Printer implements the IETF Finishing MIB [RFC3806].

1463 The Printer MUST support this attribute if it supports the "printer-finisher-description"  
 1464 attribute (section 6.18.3). If supported, this attribute MUST have the same cardinality  
 1465 (contain the same number of values) as the "printer-finisher-description" attribute. The i<sup>th</sup>  
 1466 value in the "printer-finisher" attribute corresponds to the i<sup>th</sup> value in the "printer-finisher-  
 1467 description" attribute.

1468 As with finDeviceTable, Printers MUST only list those finishers that are currently attached.

1469 **6.18.1 Keywords for printer-finisher**

1470 Table 2 defines the IPP datatypes and keywords for encoding "printer-finisher" from all of  
 1471 the machine-readable (non-localized) columnar objects in finDeviceTable or  
 1472 finDeviceAttributeTable [RFC3806].

1473 **Table 2 - Keywords for "printer-finisher"**

Finishing MIB Object	IPP Data Type	IPP Keyword	PWG SM Keyword	Conformance
finDeviceTable (note 1)			Finishers	
finDeviceIndex (note 1)	Integer	index	Id	OPTIONAL
finDeviceType	String	type	FinisherType	REQUIRED
finDeviceCapacityUnit	String	unit	FinisherCapacityUnit	REQUIRED
finDeviceMaxCapacity	Integer	maxcapacity	FinisherMax Capacity	REQUIRED
finDeviceCurrentCapacity	Integer	capacity	FinisherCurrent Capacity	REQUIRED
finDevicePresentOnOff	String	presentonoff	FinisherPresentOnOff	OPTIONAL
finDeviceAssociatedMediaPaths	---	---	FinisherAssociatedMediaPaths	---
finDeviceAssociatedOutputs	---	---	FinisherAssociatedOutputs	---
finDeviceStatus	Integer	status	SubunitStates	OPTIONAL

1474 Notes:



1476 1. finDeviceIndex is OPTIONAL in "printer-finisher", because correlation with the  
 1477 original MIB order is considered unimportant. If "printer-finisher-supplies" is  
 1478 implemented, then finDeviceIndex is REQUIRED.

#### 1479 6.18.2 Encoding of printer-finisher

1480 Values of "printer-finisher" MUST be encoded using a visible subset of the US-ASCII  
 1481 character set [RFC20]. Control codes (0x00 to 0x1F and 0x7F) MUST NOT be used. The  
 1482 ABNF [STD68] [FIN-ABNF] in Figure 5 defines the standard encoding in "printer-finisher"  
 1483 for all the machine-readable (non-localized) columnar objects in finDeviceTable  
 1484 [RFC3806].

1485 **Figure 5 - ABNF for "printer-finisher" Values**

```

1486 printer-finisher = 1*finisher-required *finisher-optional
1487 ; set of finisher elements encoded into one value
1488 finisher-required = finisher-req ";"
1489 finisher-req = finisher-type / finisher-unit /
1490               finisher-max-capacity /
1491               finisher-capacity
1492 finisher-optional = finisher-opt ";"
1493 finisher-opt = finisher-index / finisher-presentonoff /
1494              finisher-status / finisher-ext
1495
1496 finisher-type = "type" "=" 1*ALPHA
1497 ; enumerated value as an alpha string (e.g.,
1498 ; 'stitcher') of finDeviceType in [RFC3806] mapped
1499 ; indirectly from the *label* in FinDeviceTypeTC
1500
1501 finisher-unit = "unit" "=" 1*ALPHA
1502 ; enumerated value as an alpha string (e.g., 'other') of
1503 ; finDeviceCapacityUnit in [RFC3806] mapped indirectly from
1504 ; the *label* in PrtCapacityUnitTC in [RFC3805]
1505
1506 finisher-max-capacity = "maxcapacity" "=" 1*[DIGIT / "-"]
1507 ; integer value as a numeric string mapped directly from
1508 ; finDeviceMaxCapacity in [RFC3806]
1509
1510 finisher-capacity = "capacity" "=" 1*[DIGIT / "-"]
1511 ; integer value as a numeric string mapped directly from
1512 ; finDeviceCurrentCapacity in [RFC3806]
1513
1514 finisher-index = "index" "=" 1*DIGIT
1515 ; integer value as a numeric string mapped directly from
1516 ; finDeviceIndex in [RFC3806]
1517
1518 finisher-presentonoff = "presentonoff" "=" 1*ALPHA
1519 ; string value as an alpha string mapped directly from
1520 ; PresentOnOff in [RFC3805]
1521
1522 finisher-status = "status" "=" 1*DIGIT
1523 ; integer value as a numeric string mapped directly from
1524 ; finDeviceStatus in [RFC3806]
1525

```

```

1526     finisher-ext      = finisher-extname "=" finisher-extvalue
1527     finisher-extname  = 1*[ALPHA / DIGIT / "-"]
1528     finisher-extvalue = 1*[ALPHA / DIGIT / "-" / "." / ","]
1529     ; extension point for other MIB values not mapped

```

### 1530 6.18.3 Example of printer-finisher

1531 The following example shows a "printer-finisher" attribute where its value is a set of two  
 1532 octetString strings encoding the machine-readable (non-localized) columnar objects from  
 1533 the Finisher MIB [RFC3806] finDeviceTable, presented using a PAPI [PAPI] encoding. Each  
 1534 string is wrapped in double-quotes (") for readability.

```

1535 printer-finisher="type=stitcher;unit=sheets;maxcapacity=500;capacity=100;",
1536                 "type=puncher;unit=sheets;maxcapacity=100;capacity=20;"

```

### 1537 6.19 printer-finisher-description (1setOf text(MAX))

1538 The "printer-finisher-description" READ-ONLY Printer Status attribute provides current  
 1539 supply descriptions mapped from the SNMP finDeviceDescription object in the  
 1540 finDeviceTable defined in IETF Finishing MIB [RFC3806]. This attribute MUST be supported  
 1541 if the Printer implements the IETF Finishing MIB [RFC3806].

1542 This attribute MUST be supported if the "printer-finisher" (section 6.18) Printer attribute is  
 1543 supported. If supported, this attribute MUST have the same cardinality (contain the same  
 1544 number of values) as the "printer-finisher" attribute. The  $i^{\text{th}}$  value in the "printer-finisher-  
 1545 description" attribute corresponds to the  $i^{\text{th}}$  value in the "printer-finisher" attribute.

#### 1546 6.19.1 Encoding of printer-finisher-description

1547 Values of the "printer-finisher-description" attribute MUST be mapped from the  
 1548 corresponding human-readable (localized) values of finDeviceDescription, exactly as  
 1549 follows:

- 1550 1. Each value of finDeviceDescription MUST be converted from the character set  
 1551 [RFC3808] specified by prtGeneralCurrentLocalization and  
 1552 prtLocalizationCharacterSet into the charset specified by "charset-configured" and  
 1553 then copied into a text value of "printer-finisher-description"; and
- 1554 2. Each value of "printer-finisher-description" MUST be tagged with the natural  
 1555 language [RFC5646] specified by prtGeneralCurrentLocalization,  
 1556 prtLocalizationLanguage, and prtLocalizationCountry unless the natural language  
 1557 matches the default language used in the response.

#### 1558 6.19.2 Example of printer-finisher-description

1559 The first example shows two instances of the human-readable (localized) columnar object  
 1560 finDeviceDescription in the finDeviceTable encoded into corresponding values of "printer-  
 1561 finisher-description", presented using a PAPI [PAPI] encoding:

1562 printer-finisher-description="Stapler S/N:EXAMPLE-12345","Hole Punch  
 1563 S/N:EXAMPLE-67890"

1564 The second example shows the same values, but also demonstrates tagging with a natural  
 1565 language identifier, presented using a PAPI [PAPI] encoding:

1566 printer-finisher-description="Hefter SN:BEISPIEL-12345" (de) ,"Lochstanze  
 1567 S/N:BEISPIEL-67890" (de)

1568 **6.20 printer-finisher-supplies (1setOf octetString(MAX))**

1569 The "printer-finisher-supplies" Printer Description attribute describes the finishing unit's  
 1570 supplies, mapped from the SNMP finSupplyTable defined in IETF Finishing MIB [RFC3806].  
 1571 Although some supplies could be described by the "printer-supply" attribute [PWG5100.13]  
 1572 this attribute supports the full fidelity of the finSupplyTable, which is more descriptive. This  
 1573 attribute MUST be supported if the Printer implements the IETF Finishing MIB [RFC3806]  
 1574 finSupplyTable.

1575 This attribute MUST be supported if the "printer-finisher-supplies-description" (section 6.21)  
 1576 Printer attribute is supported. If supported, this attribute MUST have the same cardinality  
 1577 (contain the same number of values) as the "printer-finisher-supplies-description" attribute.  
 1578 The i<sup>th</sup> value in the "printer-finisher-supplies" attribute corresponds to the i<sup>th</sup> value in the  
 1579 "printer-finisher-supplies-description" attribute.

1580 **6.20.1 Keywords for printer-finisher-supplies**

1581 Table 3 defines the IPP datatypes and keywords for encoding "printer-finisher-supplies" from  
 1582 all of the machine-readable (non-localized) columnar objects in finSupplyTable [RFC3806].

1583 **Table 3 - Keywords for "printer-finisher-supplies"**

Finishing MIB Object	IPP Data Type	IPP Keyword	PWG SM Keyword	Conformance
finSupplyTable (note 1)			FinisherSupplies	
finSupplyIndex (note 1)	Integer	index	Id	OPTIONAL
finSupplyDeviceIndex (note 2)	Integer	deviceIndex	Id	REQUIRED
finSupplyClass	String	class	FinisherClass	REQUIRED
finSupplyType	String	type	FinisherSupplyType	REQUIRED
finSupplyUnit	String	unit	FinisherSupplyCapacityUnit	REQUIRED
finSupplyMaxCapacity	Integer	max	FinisherSupplyMaxCapacity	REQUIRED
finSupplyCurrentLevel	Integer	level	FinisherSupplyCurrentLevel	REQUIRED
finSupplyColorName	String	color	FinisherSupplyColorName	---

1584 Notes:

- 1585 1. finSupplyIndex is OPTIONAL in "printer-finisher-supplies", because correlation
- 1586 with the original MIB order is considered unimportant
- 1587 2. finSupplyDeviceIndex is REQUIRED in "printer-finisher-supplies" because a
- 1588 connection between the supply and the finisher is needed if User / Operator
- 1589 engagement is required for resolving a supply level condition.

1590 **6.20.2 Encoding of printer-finisher-supplies**

1591 Values of "printer-finisher-supplies" MUST be encoded using a visible subset of the US-  
 1592 ASCII character set [RFC20]. Control codes (0x00 to 0x1F and 0x7F) MUST NOT be used.  
 1593 The ABNF [STD68] [FIN-ABNF] in Figure 5 defines the standard encoding in "printer-  
 1594 finisher-supplies" for all the machine-readable (non-localized) columnar objects in  
 1595 finSupplyTable [RFC3806].

1596 **Figure 6 - ABNF for "printer-finisher-supplies" Values**

```

1597 finisher-supply = 1*supply-required *supply-optional
1598 ; set of finisher supply elements encoded into one value
1599 supply-required = supply-req ";"
1600 supply-req = supply-class / supply-type / supply-description /
1601             supply-unit / supply-max / supply-current-level /
1602             supply-color
1603
1604 supply-optional = supply-opt ";"
1605 supply-opt = supply-index / supply-device-index / supply-ext
1606
1607 supply-class = "class" "=" 1*ALPHA
1608 ; enumerated value as an alpha string (e.g., 'supplyThatIsConsumed')
1609 ; of prtMarkerSuppliesClass in [RFC3805] mapped indirectly from
1610 ; the *label* in PrtMarkerSuppliesClassTC in [RFC3805]
1611
1612 supply-type = "type" "=" 1*ALPHA
1613 ; enumerated value as an alpha string (e.g., 'staples') of
1614 ; prtMarkerSuppliesType in [RFC3805] mapped indirectly from
1615 ; the *label* in PrtMarkerSuppliesTypeTC in [RFC3805]
1616
1617 supply-unit = "unit" "=" 1*ALPHA
1618 ; enumerated value as an alpha string (e.g., 'items' or 'percent')
1619 ; of finSupplyUnit in [RFC3806] mapped indirectly from the *label*
1620 ; in PrtMarkerSuppliesSupplyUnitTC in [RFC3805]
1621
1622 supply-max = "max" "=" 1*[DIGIT / "-"]
1623 ; integer value as a numeric string mapped directly from
1624 ; finSupplyMaxCapacity in [RFC3806]
1625
1626 supply-current-level = "level" "=" 1*[DIGIT / "-"]
1627 ; integer value as a numeric string mapped directly from
1628 ; finSupplyCurrentLevel in [RFC3806]
1629
1630 supply-color = "color" "=" 1*ALPHA
1631 ; enumerated value as an alpha string (e.g., 'silver') of
1632 ; finSupplyColorName in [RFC3806] mapped indirectly from the color
1633 ; names from PWG Media Standardized Names 2.0
1634 [PWG5101.1],
1635
1636 supply-index = "index" "=" 1*DIGIT
1637 ; integer value as a numeric string mapped directly from
1638 ; finSupplyIndex in [RFC3806]

```

Deleted: [PWG5101.1]

```

1640
1641     supply-device-index = "deviceIndex" "=" 1*ALPHA
1642     ; string value as an alpha string mapped directly from
1643     ; finSupplyDeviceIndex in [RFC3806]
1644
1645     supply-ext         = supply-extname "=" supply-extvalue
1646     supply-extname     = 1*[ALPHA / DIGIT / "-"]
1647     supply-extvalue    = 1*[ALPHA / DIGIT / "-" / "." / ","]
1648     ; extension point for other MIB values not mapped

```

### 1649 6.20.3 Example of printer-finisher-supplies

1650 The following is an example of "printer-finisher-supplies", which contains one supply,  
 1651 presented using a PAPI [PAPI] encoding:

```

1652 printer-finisher-
1653 supplies="class=supplyThatIsConsumed;type=staples;unit=items;max=500;level=100;c
1654 olor=silver;"

```

### 1655 6.21 printer-finisher-supplies-description (1setOf text(MAX))

1656 The "printer-finisher-supplies-description" READ-ONLY Printer Status attribute provides  
 1657 current supply descriptions mapped from the SNMP finSupplyDescription object in the  
 1658 finSupplyEntry sequences in the finSupplyTable defined in IETF Finishing MIB [RFC3806].  
 1659 This attribute MUST be supported if the Printer implements the IETF Finishing MIB  
 1660 [RFC3806] finSupplyTable.

1661 This attribute MUST be supported if the "printer-finisher-supplies" (section 6.18) Printer  
 1662 attribute is supported. If supported, this attribute MUST have the same cardinality (contain  
 1663 the same number of values) as the "printer-finisher-supplies" attribute. The  $i^{\text{th}}$  value in the  
 1664 "printer-finisher-supplies-description" attribute corresponds to the  $i^{\text{th}}$  value in the "printer-  
 1665 finisher-supplies" attribute.

#### 1666 6.21.1 Encoding of printer-finisher-supplies-description

1667 Values of the "printer-finisher-supplies-description" attribute MUST be mapped from the  
 1668 corresponding human-readable (localized) values of finSupplyDescription, exactly as  
 1669 follows:

- 1670 1. Each value of finSupplyDescription MUST be converted from the character set  
 1671 [RFC3808] specified by prtGeneralCurrentLocalization and  
 1672 prtLocalizationCharacterSet into the charset specified by "charset-configured" and  
 1673 then copied into a text value of "printer-finisher-supplies-description"; and
- 1674 2. Each value of "printer-finisher-supplies-description" MUST be tagged with the  
 1675 natural language [RFC5646] specified by prtGeneralCurrentLocalization,  
 1676 prtLocalizationLanguage, and prtLocalizationCountry unless the natural language  
 1677 matches the default language used in the response.

1678 **6.21.2 Example of printer-finisher-supplies-description**

1679 The first example shows two instances of the human-readable (localized) columnar object  
1680 finSupplyDescription in the finSupplyTable encoded into corresponding values of "printer-  
1681 finisher-supplies-description", presented using a PAPI [PAPI] encoding:

1682 `printer-finisher-supplies-description="Staples", "Staples"`

1683 The second example shows the same values, but also demonstrates tagging with a natural  
1684 language identifier, presented using a PAPI [PAPI] encoding:

1685 `printer-finisher-supplies-description="Heftklammern" (de), "Heftklammern" (de)`

1686 **6.22 punching-hole-diameter-configured (integer(0:MAX))**

1687 The "punching-hole-diameter-configured" member attribute specifies the diameter of the  
1688 punched hole, measured in hundredths of millimeters (1/2540th of an inch). If this attribute  
1689 is not provided by the Printer, the value is assumed to be 790 (7.9mm or 5/16in.) for media  
1690 sizes whose dimensions are measured in inches, or 650 (6.5mm) for media sizes whose  
1691 dimensions are measured in millimeters.

1692 **6.23 punching-locations-supported (1setOf (integer(0:MAX) |  
1693 rangeOfInteger(0:MAX)))**

1694 The "punching-locations-supported" Printer attribute lists the supported values for the  
1695 "punching-locations" (section [5.2.12.1](#)) member attribute.

Deleted: 5.2.11.1

1696 **6.24 punching-offset-supported (1setOf (integer(0:MAX) |  
1697 rangeOfInteger(0:MAX)))**

1698 The "punching-offset-supported" Printer attribute lists the supported values for the  
1699 "punching-offset" (section [5.2.12.2](#)) member attribute.

Deleted: 5.2.11.2

1700 **6.25 punching-reference-edge-supported (1setOf type1 keyword)**

1701 The "punching-reference-edge-supported" Printer attribute lists the supported values for the  
1702 "punching-reference-edge" (section [5.2.12.3](#)) member attribute.

Deleted: 5.2.11.3

1703 **6.26 stitching-angle-supported (1setOf (integer(0:359) |  
1704 rangeOfInteger(0:359)))**

1705 The "stitching-angle-supported" Printer attribute lists the supported values for the "stitching-  
1706 angle" (section [5.2.13.1](#)) member attribute.

Deleted: 5.2.12.1

1711 **6.27 stitching-locations-supported (1setOf (integer(0:MAX) |**  
 1712 **rangeOfInteger(0:MAX)))**

1713 The "stitching-locations-supported" Printer attribute lists the supported values for the  
 1714 "stitching-locations" (section [5.2.13.1](#)) member attribute.

Deleted: 5.2.12.1

1715 **6.28 stitching-method-supported (1setOf type2 keyword)**

1716 The "stitching-method-supported" Printer attribute lists the supported values for the  
 1717 "stitching-method" (section [5.2.13.3](#)) member attribute.

Deleted: 5.2.12.3

1718 **6.29 stitching-offset-supported (1setOf (integer(0:MAX) |**  
 1719 **rangeOfInteger(0:MAX)))**

1720 The "stitching-offset-supported" Printer attribute lists the supported values for the "stitching-  
 1721 offset" (section [5.2.13.3](#)) member attribute.

Deleted: 5.2.12.3

1722 **6.30 stitching-reference-edge-supported (1setOf type1 keyword)**

1723 The "stitching-reference-edge-supported" Printer attribute lists the supported values for the  
 1724 "stitching-reference-edge" (section [5.2.13.5](#)) member attribute.

Deleted: 5.2.12.5

1725 **6.31 trimming-offset-supported (1setOf (integer(0:MAX) |**  
 1726 **rangeOfInteger(0:MAX)))**

1727 The "trimming-offset-supported" Printer attribute lists the supported values for the "trimming-  
 1728 offset" (section [5.2.14.1](#)) member attribute.

Deleted: 5.2.13.1

1729 **6.32 trimming-reference-edge-supported (1setOf type1 keyword)**

1730 The "trimming-reference-edge-supported" Printer attribute lists the supported values for the  
 1731 "trimming-reference-edge" (section [5.2.14.2](#)) member attribute.

Deleted: 5.2.13.2

1732 **6.33 trimming-type-supported (1setOf type2 keyword)**

1733 The "trimming-type-supported" Printer attribute lists the supported values for the "trimming-  
 1734 type" (section [5.2.14.3](#)) member attribute.

Deleted: 5.2.13.3

1735 **6.34 trimming-when-supported (1setOf type2 keyword)**

1736 The "trimming-when-supported" Printer attribute lists the supported values for the "trimming-  
 1737 when" (section [5.2.14.4](#)) member attribute.

Deleted: 5.2.13.4

1738

1747 **7. Conformance Requirements**

1748 This section summarizes the Conformance Requirements detailed in the definitions in this  
1749 document for Clients and Printers.

1750 **7.1 Conformance Requirements for Clients**

1751 In order for a Client to claim conformance to this specification, a Client MUST support:

- 1752 1. The IPP Printer attributes defined in section 6;
- 1753 2. The IPP Job Template attributes defined in section 5;
- 1754 3. The internationalization considerations in section 8; and
- 1755 4. The security considerations in section 9.

1756 **7.2 Conformance Requirements for Printers**

1757 In order for a Printer to claim conformance to this specification, a Printer MUST support:

- 1758 1. The IPP Printer attributes for any supported finishings defined in section 6;
- 1759 2. The IPP Job Template attributes for any supported finishings defined in section  
1760 5;
- 1761 3. The internationalization considerations in section 8; and
- 1762 4. The security considerations in section 9.

1763 **8. Internationalization Considerations**

1764 ~~For interoperability and basic support for multiple languages, conforming implementations~~  
1765 ~~MUST support:~~

- 1766 1. ~~The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)~~  
1767 ~~[STD63] encoding of Unicode [UNICODE] [ISO10646]; and~~
- 1768 2. ~~The Unicode Format for Network Interchange [RFC5198] which requires~~  
1769 ~~transmission of well-formed UTF-8 strings and recommends transmission of~~  
1770 ~~normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].~~

1771 ~~Unicode NFC is defined as the result of performing Canonical Decomposition (into base~~  
1772 ~~characters and combining marks) followed by Canonical Composition (into canonical~~  
1773 ~~composed characters wherever Unicode has assigned them).~~

1774 ~~WARNING – Performing normalization on UTF-8 strings received from IPP Clients and~~  
1775 ~~subsequently storing the results (e.g., in IPP Job objects) could cause false negatives in IPP~~  
1776 ~~Client searches and failed access (e.g., to IPP Printers with percent-encoded UTF-8 URIs~~  
1777 ~~now 'hidden').~~

**Deleted:** For interoperability and basic support for multiple languages, conforming implementations MUST support( ... [4])

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1781 Implementations of this specification SHOULD conform to the following standards on  
1782 processing of human-readable Unicode text strings, see:

1783 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1784 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1785 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1786 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1787 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1788 Unicode Character Encoding Model [UTR17] – multi-layer character model

1789 Unicode in XML and other Markup Languages [UTR20] – XML usage

1790 Unicode Character Property Model [UTR23] – character properties

1791 Unicode Conformance Model [UTR33] – Unicode conformance basis+

1792 Unicode Collation Algorithm [UTS10] – sorting

1793 Unicode Locale Data Markup Language [UTS35] – locale databases

## 1794 **9. Security Considerations**

1795 In addition to the security considerations described in the IPP/1.1: Model and Semantics  
1796 [RFC8011], implementations MAY support different access control to various finishing  
1797 features, depending on the identity of the User submitting the Job.

1798 Implementations of this specification SHOULD conform to the following standards on  
1799 processing of human-readable Unicode text strings, see:

1800 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1801 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

## 1802 **10. IANA and PWG Considerations**

### 1803 **10.1 Attribute Registrations**

1804 The attributes defined in this document will be published by IANA according to the  
1805 procedures in IPP Model and Semantics [RFC8011] section 6.2 in the following file:

1806 <http://www.iana.org/assignments/ipp-registrations>

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1807 The registry entries will contain the following information:

1808	Job Template attributes:	Reference
1809	-----	-----
1810	finishings-col (no-value   lsetOf collection)	[PWG5100.1]
1811	baling (collection)	[PWG5100.1]
1812	baling-type (type2 keyword   name(MAX))	[PWG5100.1]
1813	baling-when (type2 keyword)	[PWG5100.1]
1814	binding (collection)	[PWG5100.1]
1815	binding-reference-edge (type1 keyword)	[PWG5100.1]
1816	binding-type (type2 keyword   name(MAX))	[PWG5100.1]
1817	coating (collection)	[PWG5100.1]
1818	coating-sides (type1 keyword)	[PWG5100.1]
1819	coating-type (type2 keyword   name(MAX))	[PWG5100.1]
1820	covering (collection)	[PWG5100.1]
1821	covering-name (type2 keyword   name(MAX))	[PWG5100.1]
1822	finishing-template (name(MAX)   type2 keyword)	[PWG5100.1]
1823	folding (lsetOf collection)	[PWG5100.1]
1824	folding-direction (type1 keyword)	[PWG5100.1]
1825	folding-offset (integer(0:MAX))	[PWG5100.1]
1826	folding-reference-edge (type1 keyword)	[PWG5100.1]
1827	imposition-template (type2 keyword   name(MAX))	[PWG5100.1]
1828	laminating (collection)	[PWG5100.1]
1829	laminating-sides (type1 keyword)	[PWG5100.1]
1830	laminating-type (type2 keyword   name(MAX))	[PWG5100.1]
1831	media-sheets-supported (rangeOfInteger(1:MAX))	[PWG5100.1]
1832	media-size (collection)	[PWG5100.1]
1833	media-size-name (type2 keyword)	[PWG5100.1]
1834	punching (collection)	[PWG5100.1]
1835	punching-locations (lsetOf integer(0:MAX))	[PWG5100.1]
1836	punching-offset (integer(0:MAX))	[PWG5100.1]
1837	punching-reference-edge (type1 keyword)	[PWG5100.1]
1838	stitching (collection)	[PWG5100.3]
1839	stitching-angle (integer(0:359))	[PWG5100.1]
1840	stitching-method (type2 keyword)	[PWG5100.1]
1841	trimming (lsetOf collection)	[PWG5100.1]
1842	trimming-offset (integer(0:MAX))	[PWG5100.1]
1843	trimming-reference-edge (type1 keyword)	[PWG5100.1]
1844	trimming-type (type2 keyword   name(MAX))	[PWG5100.1]
1845	trimming-when (type2 keyword)	[PWG5100.1]
1846	job-pages-per-set (integer(1:MAX))	[PWG5100.1]
1847		
1848		
1849	Printer Description attributes:	Reference
1850	-----	-----
1851	baling-type-supported (lsetOf (type2 keyword   name(MAX)))	[PWG5100.1]
1852	baling-when-supported (lsetOf type2 keyword)	[PWG5100.1]
1853	binding-reference-edge-supported (lsetOf type1 keyword)	[PWG5100.1]
1854	binding-type-supported (lsetOf type2 keyword)	[PWG5100.1]
1855	coating-sides-supported (lsetOf type1 keyword)	[PWG5100.1]
1856	coating-type-supported (lsetOf (type2 keyword   name(MAX)))	[PWG5100.1]
1857	covering-name-supported (lsetOf (type2 keyword   name(MAX)))	[PWG5100.1]
1858		[PWG5100.1]
1859	finishing-template-supported (lsetOf (name(MAX)   type2 keyword))	[PWG5100.1]
1860		[PWG5100.1]
1861	finishings-col-database (lsetOf collection)	[PWG5100.1]

1862	< member attributes are the same as finishings-col >	[PWG5100.1]
1863	folding-direction-supported (1setOf type1 keyword)	[PWG5100.1]
1864	folding-offset-supported (1setOf (integer(0:MAX)   rangeOfInteger(0:MAX)))	[PWG5100.1]
1865		[PWG5100.1]
1866	folding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1867	laminating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1868	laminating-type-supported (1setOf (type2 keyword   name(MAX)))	[PWG5100.1]
1869		[PWG5100.1]
1870	job-pages-per-set-supported (boolean)	[PWG5100.1]
1871	printer-finisher (1setOf octetString(MAX))	[PWG5100.1]
1872	printer-finisher-description (1setOf text(MAX))	[PWG5100.1]
1873	<u>printer-finisher-supplies (1setOf octetString(MAX))</u>	<u>[PWG5100.1]</u>
1874	<u>printer-finisher-supplies-description (1setOf text(MAX))</u>	<u>[PWG5100.1]</u>
1875	punching-hole-diameter-configured (integer(0:MAX))	[PWG5100.1]
1876	punching-locations-supported (1setOf (integer(0:MAX)   rangeOfInteger(0:MAX)))	[PWG5100.1]
1877		[PWG5100.1]
1878	punching-offset-supported (1setOf (integer(0:MAX)   rangeOfInteger(0:MAX)))	[PWG5100.1]
1879		[PWG5100.1]
1880	punching-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1881	stitching-angle-supported (1setOf (integer(0:359)   rangeOfInteger(0:359)))	[PWG5100.1]
1882		[PWG5100.1]
1883	stitching-method-supported (1setOf (type2 keyword))	[PWG5100.1]
1884	trimming-offset-supported (1setOf (integer(0:MAX)   rangeOfInteger(0:MAX)))	[PWG5100.1]
1885		[PWG5100.1]
1886	trimming-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1887	trimming-type-supported (1setOf type2 keyword)	[PWG5100.1]
1888	trimming-when-supported (1setOf type2 keyword)	[PWG5100.1]

1889 **10.2 Attribute Value Registrations**

1890 The keyword attribute values defined in this document will be published by IANA according  
 1891 to the procedures in the IPP Model and Semantics [RFC8011] section 6.1 in the following  
 1892 file:

1893 <http://www.iana.org/assignments/ipp-registrations>

1894 The registry entries will contain the following information:

1895	Attributes (attribute syntax)	
1896	Keyword Attribute Value	Reference
1897	-----	-----
1898	baling-type (type2 keyword   name(MAX))	[PWG5100.1]
1899	band	[PWG5100.1]
1900	shrink-wrap	[PWG5100.1]
1901	wrap	[PWG5100.1]
1902	baling-type-supported (1setOf (type2 keyword   name(MAX)))	[PWG5100.1]
1903	< all baling-type values >	
1904		
1905	baling-when (type2 keyword)	[PWG5100.1]
1906	after-sets	[PWG5100.1]
1907	after-job	[PWG5100.1]
1908	baling-when-supported (1setOf type2 keyword)	[PWG5100.1]
1909	< all baling-when values >	[PWG5100.1]
1910		

1911	binding-reference-edge (type1 keyword)	[PWG5100.1]
1912	bottom	[PWG5100.1]
1913	left	[PWG5100.1]
1914	right	[PWG5100.1]
1915	top	[PWG5100.1]
1916	binding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1917	< all binding-reference-edge values >	[PWG5100.1]
1918		
1919	binding-type (type2 keyword   name(MAX))	[PWG5100.1]
1920	adhesive	[PWG5100.1]
1921	comb	[PWG5100.1]
1922	flat	[PWG5100.1]
1923	padding	[PWG5100.1]
1924	perfect	[PWG5100.1]
1925	spiral	[PWG5100.1]
1926	tape	[PWG5100.1]
1927	velo	[PWG5100.1]
1928	binding-type-supported ((1setOf type2 keyword   name(MAX)))	[PWG5100.1]
1929	< all binding-type values >	[PWG5100.1]
1930		
1931	coating-sides (type1 keyword)	[PWG5100.1]
1932	back	[PWG5100.1]
1933	both	[PWG5100.1]
1934	front	[PWG5100.1]
1935	coating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1936	< all coating-sides values >	[PWG5100.1]
1937		
1938	coating-type (type2 keyword   name(MAX))	[PWG5100.1]
1939	archival	[PWG5100.1]
1940	archival-glossy	[PWG5100.1]
1941	archival-matte	[PWG5100.1]
1942	archival-semi-gloss	[PWG5100.1]
1943	glossy	[PWG5100.1]
1944	high-gloss	[PWG5100.1]
1945	matte	[PWG5100.1]
1946	semi-gloss	[PWG5100.1]
1947	silicone	[PWG5100.1]
1948	translucent	[PWG5100.1]
1949	coating-type-supported ((1setOf type2 keyword   name(MAX)))	[PWG5100.1]
1950	< all coating-type values >	[PWG5100.1]
1951		
1952	covering-name (type2 keyword   name(MAX))	[PWG5100.1]
1953	plain	[PWG5100.1]
1954	pre-cut	[PWG5100.1]
1955	pre-printed	[PWG5100.1]
1956	covering-name-supported (1setOf (type2 keyword   name(MAX)))	[PWG5100.1]
1957	< all covering-name values >	[PWG5100.1]
1958		
1959		
1960	finishing-template (name(MAX)   type2 keyword)	[PWG5100.1]
1961	bale	[PWG5100.1]
1962	bind	[PWG5100.1]
1963	bind-bottom	[PWG5100.1]
1964	bind-left	[PWG5100.1]
1965	bind-right	[PWG5100.1]
1966	bind-top	[PWG5100.1]

1967	booklet-maker	[PWG5100.1]
1968	coat	[PWG5100.1]
1969	cover	[PWG5100.1]
1970	edge-stitch	[PWG5100.1]
1971	edge-stitch-bottom	[PWG5100.1]
1972	edge-stitch-left	[PWG5100.1]
1973	edge-stitch-right	[PWG5100.1]
1974	edge-stitch-top	[PWG5100.1]
1975	fold	[PWG5100.1]
1976	fold-accordion	[PWG5100.1]
1977	fold-double-gate	[PWG5100.1]
1978	fold-engineering-z	[PWG5100.1]
1979	fold-gate	[PWG5100.1]
1980	fold-half	[PWG5100.1]
1981	fold-half-z	[PWG5100.1]
1982	fold-left-gate	[PWG5100.1]
1983	fold-letter	[PWG5100.1]
1984	fold-parallel	[PWG5100.1]
1985	fold-poster	[PWG5100.1]
1986	fold-right-gate	[PWG5100.1]
1987	fold-z	[PWG5100.1]
1988	jdf-f2-1	[PWG5100.1]
1989	jdf-f4-1	[PWG5100.1]
1990	jdf-f4-2	[PWG5100.1]
1991	jdf-f6-1	[PWG5100.1]
1992	jdf-f6-2	[PWG5100.1]
1993	jdf-f6-3	[PWG5100.1]
1994	jdf-f6-4	[PWG5100.1]
1995	jdf-f6-5	[PWG5100.1]
1996	jdf-f6-6	[PWG5100.1]
1997	jdf-f6-7	[PWG5100.1]
1998	jdf-f6-8	[PWG5100.1]
1999	jdf-f8-1	[PWG5100.1]
2000	jdf-f8-2	[PWG5100.1]
2001	jdf-f8-3	[PWG5100.1]
2002	jdf-f8-4	[PWG5100.1]
2003	jdf-f8-5	[PWG5100.1]
2004	jdf-f8-6	[PWG5100.1]
2005	jdf-f8-7	[PWG5100.1]
2006	jdf-f10-1	[PWG5100.1]
2007	jdf-f10-2	[PWG5100.1]
2008	jdf-f10-3	[PWG5100.1]
2009	jdf-f12-1	[PWG5100.1]
2010	jdf-f12-2	[PWG5100.1]
2011	jdf-f12-3	[PWG5100.1]
2012	jdf-f12-4	[PWG5100.1]
2013	jdf-f12-5	[PWG5100.1]
2014	jdf-f12-6	[PWG5100.1]
2015	jdf-f12-7	[PWG5100.1]
2016	jdf-f12-8	[PWG5100.1]
2017	jdf-f12-9	[PWG5100.1]
2018	jdf-f12-10	[PWG5100.1]
2019	jdf-f12-11	[PWG5100.1]
2020	jdf-f12-12	[PWG5100.1]
2021	jdf-f12-13	[PWG5100.1]
2022	jdf-f12-14	[PWG5100.1]

2023	jdf-f14-1	[PWG5100.1]
2024	jdf-f16-1	[PWG5100.1]
2025	jdf-f16-2	[PWG5100.1]
2026	jdf-f16-3	[PWG5100.1]
2027	jdf-f16-4	[PWG5100.1]
2028	jdf-f16-5	[PWG5100.1]
2029	jdf-f16-6	[PWG5100.1]
2030	jdf-f16-7	[PWG5100.1]
2031	jdf-f16-8	[PWG5100.1]
2032	jdf-f16-9	[PWG5100.1]
2033	jdf-f16-10	[PWG5100.1]
2034	jdf-f16-11	[PWG5100.1]
2035	jdf-f16-12	[PWG5100.1]
2036	jdf-f16-13	[PWG5100.1]
2037	jdf-f16-14	[PWG5100.1]
2038	jdf-f18-1	[PWG5100.1]
2039	jdf-f18-2	[PWG5100.1]
2040	jdf-f18-3	[PWG5100.1]
2041	jdf-f18-4	[PWG5100.1]
2042	jdf-f18-5	[PWG5100.1]
2043	jdf-f18-6	[PWG5100.1]
2044	jdf-f18-7	[PWG5100.1]
2045	jdf-f18-8	[PWG5100.1]
2046	jdf-f18-9	[PWG5100.1]
2047	jdf-f20-1	[PWG5100.1]
2048	jdf-f20-2	[PWG5100.1]
2049	jdf-f24-1	[PWG5100.1]
2050	jdf-f24-2	[PWG5100.1]
2051	jdf-f24-3	[PWG5100.1]
2052	jdf-f24-4	[PWG5100.1]
2053	jdf-f24-5	[PWG5100.1]
2054	jdf-f24-6	[PWG5100.1]
2055	jdf-f24-7	[PWG5100.1]
2056	jdf-f24-8	[PWG5100.1]
2057	jdf-f24-9	[PWG5100.1]
2058	jdf-f24-10	[PWG5100.1]
2059	jdf-f24-11	[PWG5100.1]
2060	jdf-f28-1	[PWG5100.1]
2061	jdf-f32-1	[PWG5100.1]
2062	jdf-f32-2	[PWG5100.1]
2063	jdf-f32-3	[PWG5100.1]
2064	jdf-f32-4	[PWG5100.1]
2065	jdf-f32-5	[PWG5100.1]
2066	jdf-f32-6	[PWG5100.1]
2067	jdf-f32-7	[PWG5100.1]
2068	jdf-f32-8	[PWG5100.1]
2069	jdf-f32-9	[PWG5100.1]
2070	jdf-f36-1	[PWG5100.1]
2071	jdf-f36-2	[PWG5100.1]
2072	jdf-f40-1	[PWG5100.1]
2073	jdf-f48-1	[PWG5100.1]
2074	jdf-f48-2	[PWG5100.1]
2075	jdf-f64-1	[PWG5100.1]
2076	jdf-f64-2	[PWG5100.1]
2077	jog-offset	[PWG5100.1]
2078	laminate	[PWG5100.1]

2079	punch	[PWG5100.1]
2080	punch-bottom-left	[PWG5100.1]
2081	punch-bottom-right	[PWG5100.1]
2082	punch-dual-bottom	[PWG5100.1]
2083	punch-dual-left	[PWG5100.1]
2084	punch-dual-right	[PWG5100.1]
2085	punch-dual-top	[PWG5100.1]
2086	punch-multiple-bottom	[PWG5100.1]
2087	punch-multiple-left	[PWG5100.1]
2088	punch-multiple-right	[PWG5100.1]
2089	punch-multiple-top	[PWG5100.1]
2090	punch-quad-bottom	[PWG5100.1]
2091	punch-quad-left	[PWG5100.1]
2092	punch-quad-right	[PWG5100.1]
2093	punch-quad-top	[PWG5100.1]
2094	punch-top-left	[PWG5100.1]
2095	punch-top-right	[PWG5100.1]
2096	punch-triple-bottom	[PWG5100.1]
2097	punch-triple-left	[PWG5100.1]
2098	punch-triple-right	[PWG5100.1]
2099	punch-triple-top	[PWG5100.1]
2100	saddle-stitch	[PWG5100.1]
2101	staple	[PWG5100.1]
2102	staple-bottom-left	[PWG5100.1]
2103	staple-bottom-right	[PWG5100.1]
2104	staple-dual-bottom	[PWG5100.1]
2105	staple-dual-left	[PWG5100.1]
2106	staple-dual-right	[PWG5100.1]
2107	staple-dual-top	[PWG5100.1]
2108	staple-top-left	[PWG5100.1]
2109	staple-top-right	[PWG5100.1]
2110	staple-triple-bottom	[PWG5100.1]
2111	staple-triple-left	[PWG5100.1]
2112	staple-triple-right	[PWG5100.1]
2113	staple-triple-top	[PWG5100.1]
2114	trim	[PWG5100.1]
2115	trim-after-copies	[PWG5100.1]
2116	trim-after-documents	[PWG5100.1]
2117	trim-after-job	[PWG5100.1]
2118	trim-after-pages	[PWG5100.1]
2119	finishing-template-supported (1setOf (type2 keyword   name (MAX) )	
2120		[PWG5100.1]
2121	< any finishing-template value >	[PWG5100.1]
2122		[PWG5100.1]
2123	folding-direction (type1 keyword)	[PWG5100.1]
2124	inward	[PWG5100.1]
2125	outward	[PWG5100.1]
2126	folding-direction-supported (1setOf type1 keyword)	[PWG5100.1]
2127	< all folding-direction values >	[PWG5100.1]
2128		
2129	folding-reference-edge (type1 keyword)	[PWG5100.1]
2130	bottom	[PWG5100.1]
2131	left	[PWG5100.1]
2132	right	[PWG5100.1]
2133	top	[PWG5100.1]
2134	folding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]

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2136	< all folding-reference-edge values >	[PWG5100.1]
2137		
2138	laminating-sides (type1 keyword)	[PWG5100.1]
2139	back	[PWG5100.1]
2140	both	[PWG5100.1]
2141	front	[PWG5100.1]
2142	laminating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
2143	< all laminating-sides values >	[PWG5100.1]
2144		
2145	laminating-type (type2 keyword   name(MAX))	[PWG5100.1]
2146	archival	[PWG5100.1]
2147	glossy	[PWG5100.1]
2148	high-gloss	[PWG5100.1]
2149	matte	[PWG5100.1]
2150	semi-gloss	[PWG5100.1]
2151	translucent	[PWG5100.1]
2152	laminating-type-supported ((1setOf type2 keyword   name(MAX)))	[PWG5100.1]
2153		[PWG5100.1]
2154	< all laminating-type values >	[PWG5100.1]
2155		
2156	punching-reference-edge (type1 keyword)	[PWG5100.1]
2157	bottom	[PWG5100.1]
2158	left	[PWG5100.1]
2159	right	[PWG5100.1]
2160	top	[PWG5100.1]
2161	punching-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2162	< all punching-reference-edge values >	[PWG5100.1]
2163		
2164	stitching-method (type2 keyword)	[PWG5100.1]
2165	auto	[PWG5100.1]
2166	crimp	[PWG5100.1]
2167	wire	[PWG5100.1]
2168	stitching-method-supported (1setOf type2 keyword)	[PWG5100.1]
2169	< all stitching-method values >	[PWG5100.1]
2170		
2171	trimming-reference-edge (type1 keyword)	[PWG5100.1]
2172	bottom	[PWG5100.1]
2173	left	[PWG5100.1]
2174	right	[PWG5100.1]
2175	top	[PWG5100.1]
2176	trimming-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2177	< all trimming-reference-edge values >	[PWG5100.1]
2178		
2179	trimming-type (type2 keyword   name(MAX))	[PWG5100.1]
2180	draw-line	[PWG5100.1]
2181	full	[PWG5100.1]
2182	partial	[PWG5100.1]
2183	perforate	[PWG5100.1]
2184	score	[PWG5100.1]
2185	tab	[PWG5100.1]
2186	trimming-type-supported (1setOf type2 keyword)	[PWG5100.1]
2187	< all trimming-type values >	[PWG5100.1]
2188		
2189	trimming-when (type2 keyword)	[PWG5100.1]
2190	after-documents	[PWG5100.1]
2191	after-job	[PWG5100.1]



```

2192         after-sheets [PWG5100.1]
2193         after-sets [PWG5100.1]
2194         trimming-when-supported (1setOf type2 keyword) [PWG5100.1]
2195         < all trimming-when values > [PWG5100.1]
    
```

2196 **10.3 Type2 enum Attribute Value Registrations**

2197 The enumerations defined in this document will be published by IANA according to the  
 2198 procedures in the IPP Model and Semantics [RFC8011] section 6.2 in the following file:

2199 <http://www.iana.org/assignments/ipp-registrations>

2200 The registry entries will contain the following information:

2201	Attributes (attribute syntax)		Reference
2202	Enum Value	Enum Symbolic Name	
2203	-----	-----	-----
2204	finishings (1setOf type2 enum)		[RFC8011]
2205	15	coat	[PWG5100.1]
2206	16	laminate	[PWG5100.1]
2207	32	staple-triple-left	[PWG5100.1]
2208	33	staple-triple-top	[PWG5100.1]
2209	34	staple-triple-right	[PWG5100.1]
2210	35	staple-triple-bottom	[PWG5100.1]
2211	70	punch-top-left	[PWG5100.1]
2212	71	punch-bottom-left	[PWG5100.1]
2213	72	punch-top-right	[PWG5100.1]
2214	73	punch-bottom-right	[PWG5100.1]
2215	74	punch-dual-left	[PWG5100.1]
2216	75	punch-dual-top	[PWG5100.1]
2217	76	punch-dual-right	[PWG5100.1]
2218	77	punch-dual-bottom	[PWG5100.1]
2219	78	punch-triple-left	[PWG5100.1]
2220	79	punch-triple-top	[PWG5100.1]
2221	80	punch-triple-right	[PWG5100.1]
2222	81	punch-triple-bottom	[PWG5100.1]
2223	82	punch-quad-left	[PWG5100.1]
2224	83	punch-quad-top	[PWG5100.1]
2225	84	punch-quad-right	[PWG5100.1]
2226	85	punch-quad-bottom	[PWG5100.1]
2227	86	punch-multiple-left	[PWG5100.1]
2228	87	punch-multiple-top	[PWG5100.1]
2229	88	punch-multiple-right	[PWG5100.1]
2230	89	punch-multiple-bottom	[PWG5100.1]
2231	90	fold-accordion	[PWG5100.1]
2232	91	fold-double-gate	[PWG5100.1]
2233	92	fold-gate	[PWG5100.1]
2234	93	fold-half	[PWG5100.1]
2235	94	fold-half-z	[PWG5100.1]
2236	95	fold-left-gate	[PWG5100.1]
2237	96	fold-letter	[PWG5100.1]
2238	97	fold-parallel	[PWG5100.1]
2239	98	fold-poster	[PWG5100.1]
2240	99	fold-right-gate	[PWG5100.1]

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2242	100	fold-z	[PWG5100.1]
2243	101	fold-engineering-z	[PWG5100.1]

## 2244 10.4 PWG Semantic Model Registrations

2245 The IPP attributes and values defined in this specification and listed in the preceding  
 2246 sections will be added to the PWG Semantic Model XML schema using the method defined  
 2247 in section 21 of [\[PWG5108.07\]](#).

Deleted: [PWG5108.07]

## 2248 11. Overview of Changes

### 2249 11.1 Changes in IPP Finishings v2.1

2250 The following changes were made for IPP Finishings v2.1:

- 2251 • Added finishing enums and templates for multiple-hole punching and an engineering Z  
 2252 fold.
- 2253 • Defined an extension naming convention for the "finishing-template" member attribute.
- 2254 • Added the "media-sheets-supported" member attribute for the "finishings-col-database"  
 2255 and "finishings-col-ready" attributes.
- 2256 • Added the "stitching-method" member attribute for the "finishings-col", "finishings-col-  
 2257 database", and "finishings-col-ready" attributes.
- 2258 • Added the "printer-finisher-supplies" and "printer-finisher-supplies-description"  
 2259 attributes.

### 2260 11.2 Changes in IPP Finishings v2.0

2261 The following changes were made for IPP Finishings v2.0:

- 2262 • Moved definition of PWG 5100.3 "finishings-col" attribute to this document and added  
 2263 new member attributes for all finishings processes.
- 2264 • Added finishing enums and templates for coating, lamination, triple stapling, different  
 2265 kinds of punching, and common folds.
- 2266 • Added the "finishings-col-database" and "job-pages-per-set" attributes.
- 2267 • Added the "media-size" and "media-size-name" member attributes for the "finishings-col-  
 2268 database" and "finishings-col-ready" attributes.

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2423 **14. Change History**

2424 **14.1 February 16, 2017**

2425 Updated to resolve editorial comments received during formal vote:

- 2426 ● From Mike Sweet (Apple):
  - 2427 ○ Section 5.2.4.3 should be a level 3 heading (covering)

- 2435        o IANA considerations are missing definitions of the following finishings-col  
2436        member attributes: imposition-template, media-sheets-supported, media-size,  
2437        media-size-name
- 2438        o IANA considerations are missing definitions of the following Printer Description  
2439        attributes: printer-finisher-supplies, printer-finisher-supplies-description
- 2440        • From Smith Kennedy (HP Inc.):
- 2441            o Replace all references to RFC 2910 to instead point to RFC 8010
- 2442            o Replace all references to RFC 2911 to instead point to RFC 8011
- 2443        • From IPP WG meeting review 2017-03-02
- 2444            o Removed RFC 3382 references and mention since RFC 8011 deprecates it
- 2445            o Added Internationalization Considerations content from IPP3D
- 2446            o Added Security Considerations content from IPP3D where appropriate
- 2447            o Changed all IETF RFC links to use the general form  
2448            "https://tools.ietf.org/html/rfc/rfcXXXX" rather than the traditional form  
2449            "http://www.ietf.org/rfc/rfcXXXX.txt"

Formatted

## 2450 **14.2 January 17, 2017**

2451 Updated Last Call Resolved Comments draft:

- 2452        • SK1: Reworded first paragraph of section 5.3 to better articulate the relationship  
2453        between "copies", "job-pages-per-set" and document formats.
- 2454        • JR3: From "REJECTED" to "RESOLVED (IN SPIRIT)", and also adopted the SMI  
2455        vendor extension scheme from RFC 8011 draft, which will be the new PWG norm.  
2456        Also fixed references cascading from new SMI vendor extension convention.
- 2457        • WW1: Drop "Loosely stated" from second sentence of Section 4.

## 2458 **14.3 January 11, 2017**

2459 Last Call Resolved Comments draft:

- 2460        • SK1: Add to the definition of "job-pages-per-set" mention that the value for this  
2461        attribute MUST match "copies" if "copies" is included in the job creation / document  
2462        submission operation.

- 2463 • SK2: Replace "media-source-feed-orientation" with "media-source-feed-direction" in  
2464 the "job-constraints-supported" / "job-resolvers-supported" example on page 45

- 2465 • JR1: Section 3.3.3 explicitly discusses ordering of options yet in 3.4 Out of Scope #1  
2466 claims the opposite.

2467 **14.4 November 9, 2016**

2468 Minor editorial changes

- 2469 • Added new section 11 "Overview of Changes"

- 2470 • Minor rewording of a sentence to fix Word formatting weirdness that occurs when a  
2471 reference is at the start of a paragraph.

2472 **14.5 October 25, 2016**

2473 Updated as per notes from Oct. 19, 2016 IPP WG Meeting to resolve a wide range of editorial  
2474 issues. No technical updates. Possibly ready for WGLC.

- 2475 • Fixed ABNF / tables / examples in 6.18-6.21

- 2476 • Cross-referenced "job-media-sheets-supported"

- 2477 • Various editorial fixes

2478 **14.6 October 18, 2016**

2479 A variety of issues resolved following feedback and discussion in the WG meeting and on  
2480 the reflector:

- 2481 • Added a new "media-sheets-supported" member attribute to "finishings-col" to specify  
2482 the minimum and maximum number of sheets supported by the finishing template  
2483 described in the "finishings-col", because this now allows it to be specified on a per-  
2484 finishing-template basis.

- 2485 • Updated definition of "printer-finisher-supplies" to have correct ABNF and examples

- 2486 • Added a new "printer-finisher-supplies-description" attribute to convey the localized  
2487 string label for a "printer-finisher-supplies" supply.

- 2488 • Add a non-normative reference to the PAPI specification.

- 2489 • Fixed the structure of several of the examples to use a PAPI syntactic presentation,  
2490 for consistency with other recent PWG specifications and other examples within this  
2491 specification



- 2492 • Added IANA listings for 'punch-multiple-bottom', 'punch-multiple-left', 'punch-multiple-  
2493 right', and 'punch-multiple-top', for completeness.

2494 **14.7 October 4, 2016**

2495 Updated following discussion on IPP reflector and other discussions:

- 2496 • In section 5.3 , enhanced definition of "job-pages-per-set" to clarify that the value  
2497 needs to be an exact multiple of the number of pages in all Documents in the Job,  
2498 which also clarifies the expectations of how that attribute value is set in the case of a  
2499 multiple document Job.

- 2500 • Modified the "job-constraints-supported" attribute example at the end of section 6.9:

- 2501 ○ Removed mention of "media-source"='tray-2' because the input source doesn't  
2502 matter.

- 2503 ○ Added a second value to "finishings" and "finishing-template" so that the  
2504 example illustrates that attributes in a constraint can have more than one value  
2505 even when the attribute itself is defined to have only one value. Also called this  
2506 out with an additional sentence below the example.

- 2507 ○ Moved open curly braces to the same line as the equal sign to reduce number  
2508 of lines used

- 2509 • Modified the "job-resolvers-supported" attribute example at the end of section 6.9:

- 2510 ○ make the resolution either use "short-edge-feed" or to change the media  
2511 source to 'manual' where the user might be instructed via a prompt to provide  
2512 the needed media size and feed orientation.

- 2513 ○ Moved open curly braces to the same line as the equal sign to reduce number  
2514 of lines used

- 2515 ○ Removed mention of alternate stitching angles because they don't resolve the  
2516 problem

2517 **14.8 September 26, 2016**

2518 In the process of considering how the Printer can indicate the maximum number of sheets  
2519 supported by one of its finisher units, a few additions were made.

- 2520 • Made some modifications to the "printer-finisher" definition including updates to 'Table  
2521 2 - Keywords for "printer-finisher"'.

2522 • Added a new "printer-finisher-supplies" attribute that conveys the finisher unit's  
2523 supplies information, which is defined in "Printer Finishing MIB" [RFC3806] but has  
2524 no IPP equivalent.

2525 • Added a comment to section 5.3 "job-pages-per-set" asking for a description of how  
2526 "job-pages-per-set" would work in the case where the Job contains multiple  
2527 Documents.

#### 2528 **14.9 August 15, 2016**

2529 Updated to Stable draft status. No changes other than updating the status label and the  
2530 date.

#### 2531 **14.10 July 28, 2016**

2532 Updated to become a Prototype draft as per minutes and discussion in July 25, 2016 IPP  
2533 WG meeting:

2534 • Fix wording in section 5.1

2535 • Fix formatting in section 5.2

2536 • Update text in 5.2.1

2537 • Change all double quotes around values to single quotes

2538 • Change all uses of the word "Job" to be capitalized

2539 • Reworded section 6.10 a bit, and fixed example for "job-constraints-supported" and  
2540 "job-resolvers-supported"

2541 • Fixed formatting of subsections of 6.18 which got messed up through the amazing  
2542 powers of MS Word

2543 • Various editorial fixes to clean up the document

#### 2544 **14.11 July 20, 2016**

2545 Updated as per minutes from IPP Working Group meetings on May 23 and June 13, 2016  
2546 and additional email dialogs on the IPP Working Group reflector:

2547 • Added subtype naming convention to definition of "finishing-template" to support, for  
2548 instance, the Swedish "trio binding" 4-hole punch pattern without having to define a  
2549 new base "finishings" enum value and "finishing-template" keyword

2550 • Elaborated description of "finishings-col-database" to cover several needed topics

- 2551           ○ Updated the example to include "punch-triple-left" and renamed "staple" to be  
2552           "staple-top-left"
- 2553           ○ Used the example to clarify that the "finishings-col" collections each could  
2554           define the details of a particular "finishing-template" keyword, and that  
2555           combinatorial permutations produced by combining 2 or more keyword  
2556           definitions (e.g. "staple-top-left\_punch-triple-left") could not be enumerated in  
2557           "finishings-col-database" or "finishings-col-ready"; a Client could be able to  
2558           combine them on its own
- 2559           ○ Recommended the use of "job-constraints-supported" and "job-resolvers-  
2560           supported" to define limitations between "finishings-col" collections and  
2561           particular feed orientations or similar interactions between finishings attributes  
2562           and other Job Template attributes (e.g.
- 2563           • Removed "feed-orientation" member attribute from "finishings-col" because this is  
2564           now handled using "job-constraints-supported" and "job-resolvers-supported"
- 2565           • Updated Figure 1 and Figure 2 and added a new Figure 3 to show the orientation and  
2566           leading edge with "feed-orientation" = 'long-edge-first'
- 2567           • Added a missing "fold-engineering-z" entry in section 10.2 for "finishing-template"
- 2568           **14.12 May 9, 2016**
- 2569           Updated as per minutes from April 2016 F2F IPP WG minutes (ippv2-f2f-minutes-  
2570           20160427.pdf):
- 2571           • Moved the new use 3.2.17 to the exceptions sub-section (3.3) and reworded
- 2572           • Removed "punching-hole-diameter" as a member attribute of "punching", and  
2573           replaced "punching-hole-diameter-supported" with "punching-hole-diameter-  
2574           configured" since at this time there are no printers with finishers that support alternate  
2575           hole diameters.
- 2576           • Changed staple rotation back to use counter-clockwise rotation, and specified  
2577           horizontal as 0°
- 2578           • Cleaned up IANA registration listings to remove some that are unnecessarily  
2579           redundant with 5100.3
- 2580           • Added references to 5101.1 and RFC 20
- 2581

**2582 14.13 April 18, 2016**

2583 Updated as per feedback from 2016-04-11 conference call, in preparation for April 2016  
2584 F2F.

- 2585 • Updated IANA Attribute Registrations to add attribute listings new in 2.1, as well as  
2586 ones in 2.0 that were missing in this section
- 2587 • Fixed text for punching and stitching to simplify descriptions of location, and  
2588 stopped using the term "origin"
- 2589 • Added the "stitching-method" member attribute to "stitching", and the "stitching-  
2590 method-supported" Printer Description attribute
- 2591 • Updated references to list Finishings 2.0 as an informative reference
- 2592 • Added mention of 'fold-engineering-z' in 5.2.6.4 and in 5.1.x "finishings" value  
2593 listings
- 2594 • Added 'draw-line' keyword to "trimming-type"  
2595

**2596 14.14 April 11, 2016**

2597 Initial revision of v2.1.

- 2598 • Added statement clarifying the location of the origin (primary point of reference) of a  
2599 punch hole
- 2600 • Added "punching-hole-diameter" attribute to allow the punch hole's diameter to be  
2601 specified, and corresponding "punching-hole-diameter-supported" Printer attribute
- 2602 • Added statement clarifying the location of the origin (primary point of reference) of a  
2603 stitch / staple
- 2604 • Added "stitching-angle" member attribute to stitching to allow the stitch or staple's  
2605 angle to be specified, and corresponding "stitching-angle-supported" Printer  
2606 attribute
- 2607

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For interoperability and basic support for multiple languages, conforming implementations MUST support:

- The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8) [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- The Unicode Format for Network Interchange [RFC5198] which requires transmission of well-formed UTF-8 strings and recommends transmission of normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

Unicode NFC is defined as the result of performing Canonical Decomposition (into base characters and combining marks) followed by Canonical Composition (into canonical composed characters wherever Unicode has assigned them).

WARNING – Performing normalization on UTF-8 strings received from IPP Clients and subsequently storing the results (e.g., in IPP Job objects) could cause false negatives in IPP Client searches and failed access (e.g., to IPP Printers with percent-encoded UTF-8 URIs now 'hidden').

<b>Page 68: [5] Deleted</b>	<b>Smith Kennedy</b>	<b>2/23/17 1:04:00 PM</b>
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[RFC3382] R. deBry, R. Herriot, T. Hastings, K. Ocke, P. Zehler, "Internet Printing Protocol (IPP): The 'collection' attribute syntax", RFC 3382, September 2002,