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IPP Finishings 2.1

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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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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:

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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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246 1. Introduction

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

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

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

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

271 **2. Terminology**

272 **2.1 Conformance Terminology**

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

278 **2.2 Protocol Role Terminology**

279 This document defines the following protocol roles in order to specify unambiguous
280 conformance requirements:

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

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

286 **2.3 Printing Terminology**

287 Normative definitions and semantics of printing terms are imported from the Printer MIB v2
288 [RFC3805], Printer Finishings MIB [RFC3806], and Internet Printing Protocol/1.1: Model and
289 Semantics [RFC8011].

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

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

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

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

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

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

303 each of the 50 printed copies of the document constitutes a "set". If the pages were
304 uncollated, then 50 copies of each of the individual pages within the document would
305 represent each "set".

306 **2.4 Acronyms and Organizations**

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

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

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

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

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

313 **3. Requirements**

314 **3.1 Rationale for IPP Finishings**

315 Existing specifications define the following:

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

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

- 328 1. Defines Job Template attributes and values needed to clearly express finishing
329 intent; and
- 330 2. Defines Printer Description attributes and values needed to allow a Client to
331 determine the type and extent of finishing options supported by the Printer as well
332 as preview the results of finishing processes for the User.

333 **3.2 Use Cases**

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

336 **3.2.1 Band**

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

339 **3.2.2 Bind**

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

343 3.2.3 Booklet Maker

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

347 3.2.4 Coat

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

351 3.2.5 Cover

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

355 3.2.6 Edge Stitch

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

359 3.2.7 Fold

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

363 3.2.8 Jog Offset

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

367 3.2.9 Laminate

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

371 3.2.10 Punch

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

375 3.2.11 Saddle Stitch

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

379 3.2.12 Staple

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

383 3.2.13 Trim

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

387 3.2.14 Wrap

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

390 3.2.15 Multiple Finishing Options

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

395 3.2.16 Finishing of Multiple Copies

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

400 3.2.17 Finishing Supplies

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

404 **3.3 Exceptions**

405 **3.3.1 Unsupported Media**

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

408 **3.3.2 Unsupported Combinations of Finishing Options**

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

412 **3.3.3 Finishing with Finisher Fidelity Restrictions**

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

419 **3.4 Out of Scope**

420 The following are out of scope for this specification:

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

426 **3.5 Design Requirements**

427 The design requirements for this specification are:

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

- 437 5. Update the definition of the "finishing-template" member attribute for all of the
438 standard finishing options supported by modern Printers; and
439 6. Register all attributes and values with IANA and the PWG.
440

441 **4. Overview of Finishing**

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

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

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

464 The following subsections describe each of the finishing processes supported by this
465 specification.

466 **4.1 Bale (or Band) and Wrap**

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

469 **4.2 Bind**

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

472 **4.3 Booklet Making**

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

476 **4.4 Coat and Laminate**

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

480 **4.5 Cover**

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

483 **4.6 Fold**

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

486 **4.7 Jog**

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

489 **4.8 Punch**

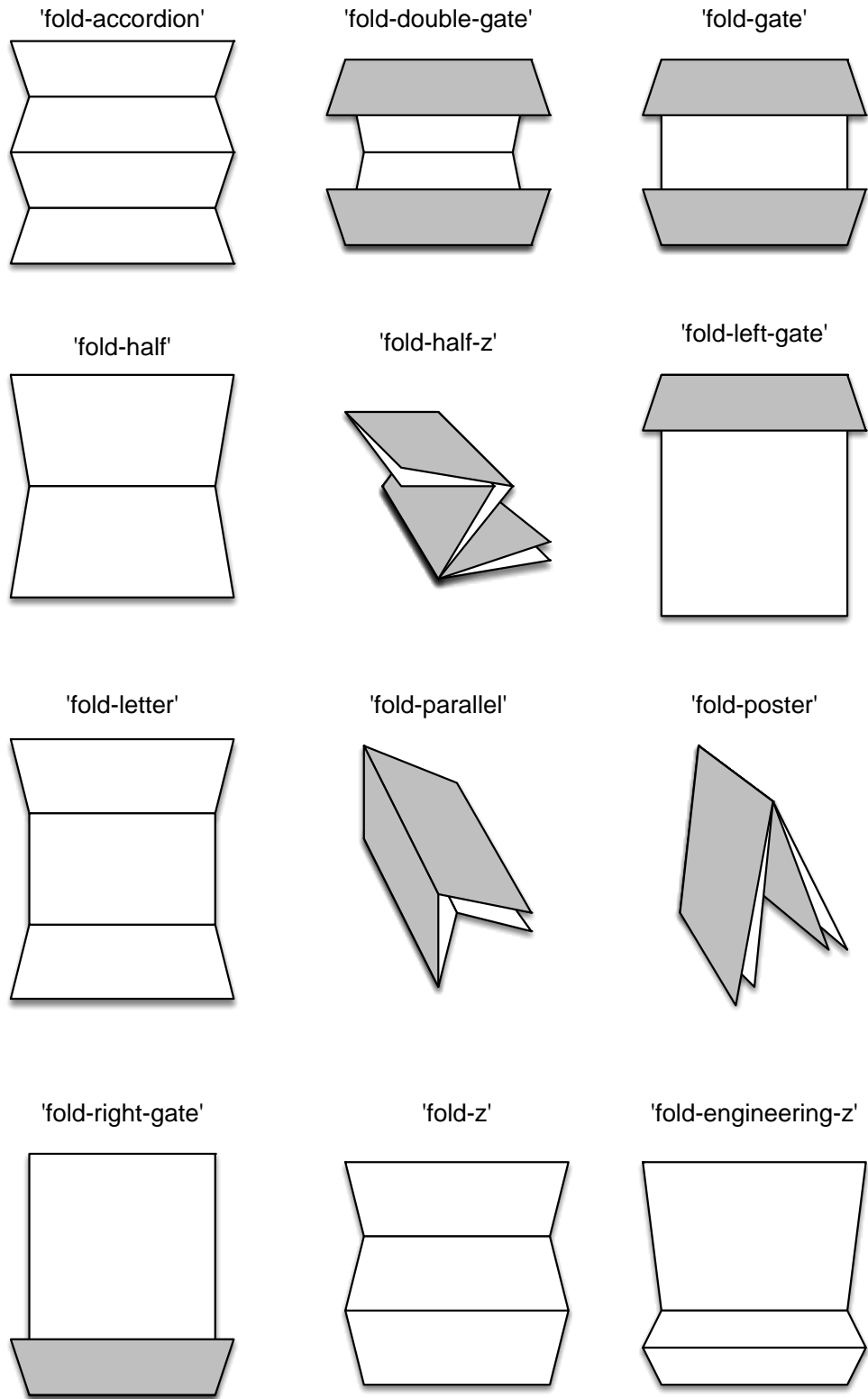
490 A punch finisher creates holes in the hardcopy Set by drilling or punching with a die. The
491 number and location of holes varies and is not well standardized [PUNCH].

492 **4.9 Staple, Edge Stitch, and Saddle Stitch**

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

497 **4.10 Trim (Cut, Perforate, or Score)**

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



500

501

Figure 1 - Standard Folds

502 **5. Job Template Attributes**

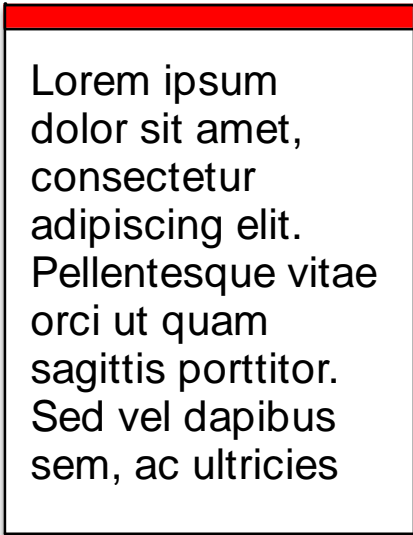
503 **5.1 finishings (1setOf type2 enum)**

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

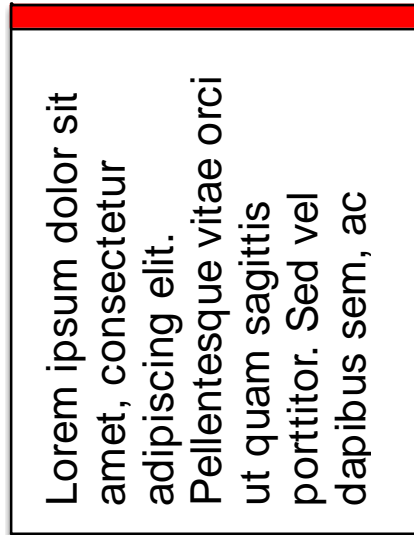
507 The order of values supplied in the "finishings" attribute is not significant. Printers MUST
508 NOT require Clients to supply values in a particular order. If the Client supplies a value of
509 'none' along with any other combination of values, it is the same as if only that other
510 combination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

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

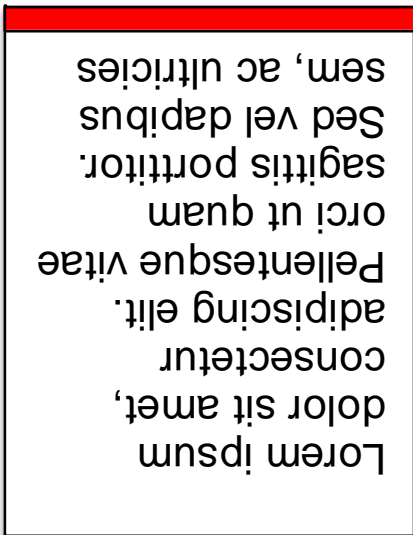
525 Note: The effect of this attribute on Jobs with multiple copies and Documents is controlled
526 by the "multiple-document-handling" Job Template attribute (section 4.2.4 [RFC8011]) and
527 the relationship of this attribute and the other attributes that control Document processing is
528 described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



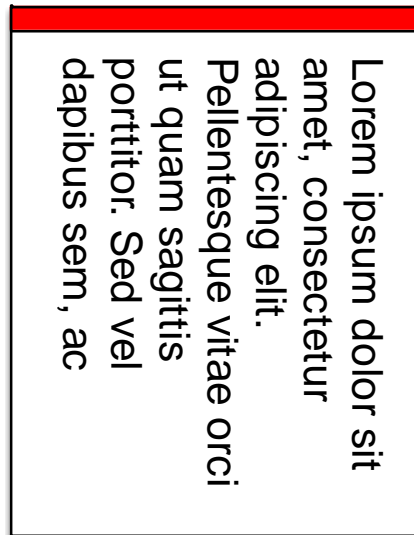
portrait



landscape



reverse-landscape



reverse-landscape

Leading Edge of Sheet

529

530

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

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

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

531

532

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

533 5.1.1 RFC 2911 “finishings” Values

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

536 ‘none’ (3): Perform no finishing

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

539 ‘punch’ (5): This value indicates that holes are required in the finished hardcopy
540 output. The exact number and placement of the holes are implementation and/or
541 site-defined. The punch specification MAY be satisfied (in a site- and
542 implementation-specific manner) either by drilling/punching, or by substituting pre-
543 drilled media.

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

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

549 ‘saddle-stitch’ (8): Bind the Set(s) with two or more staples (wire stitches) along the
550 middle fold. The exact number and placement of the staples and the middle fold are
551 implementation and/or site-defined.

552 ‘edge-stitch’ (9): Bind the Set(s) with two or more staples (wire stitches) along one
553 edge. The exact number and placement of the staples are implementation and/or
554 site-defined.

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

556 ‘staple-bottom-left’ (21): Bind the Set(s) with one or more staples in the bottom left
557 corner.

558 ‘staple-top-right’ (22): Bind the Set(s) with one or more staples in the top right
559 corner.

560 ‘staple-bottom-right’ (23): Bind the Set(s) with one or more staples in the bottom
561 right corner.

562 ‘edge-stitch-left’ (24): Bind the Set(s) with two or more staples (wire stitches) along
563 the left edge. The exact number and placement of the staples are implementation
564 and/or site-defined.

- 565 'edge-stitch-top' (25): Bind the Set(s) with two or more staples (wire stitches) along
566 the top edge. The exact number and placement of the staples are implementation
567 and/or site-defined.
- 568 'edge-stitch-right' (26): Bind the Set(s) with two or more staples (wire stitches)
569 along the right edge. The exact number and placement of the staples are
570 implementation and/or site-defined.
- 571 'edge-stitch-bottom' (27): Bind the Set(s) with two or more staples (wire stitches)
572 along the bottom edge. The exact number and placement of the staples are
573 implementation and/or site-defined.
- 574 'staple-dual-left' (28): Bind the Set(s) with two staples (wire stitches) along the left
575 edge assuming a portrait document (see section 6).
- 576 'staple-dual-top' (29): Bind the Set(s) with two staples (wire stitches) along the top
577 edge assuming a portrait document (see section 6).
- 578 'staple-dual-right' (30): Bind the Set(s) with two staples (wire stitches) along the
579 right edge assuming a portrait document (see section 6).
- 580 'staple-dual-bottom' (31): Bind the Set(s) with two staples (wire stitches) along the
581 bottom edge assuming a portrait document (see section 6).

582 5.1.2 PWG 5100.1-2001 “finishings” Values

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

- 585 'fold' (10): Fold the hardcopy output. The exact number and orientations of the
586 folds is implementation and/or site-defined.
- 587 'trim' (11): Trim the hardcopy output on one or more edges. The exact number of
588 edges and the amount to be trimmed is implementation and/or site-defined.
- 589 'bale' (12): Bale the Set(s). The type of baling is implementation and/or site-
590 defined.
- 591 'booklet-maker' (13): Deliver the Set(s) to the signature booklet maker. This value
592 is a short cut for specifying a Job that is to be folded, trimmed and then saddle-
593 stitched.
- 594 'jog-offset' (14): Shift each Set from the previous one by a small amount which is
595 device dependent. This value has no effect on the “job-sheet”. This value
596 SHOULD NOT have an effect if each Set of the Job consists of one sheet.
- 597 'bind-left' (50): Bind the Set(s) along the left edge; the type of the binding is
598 implementation and/or site-defined.

599 'bind-top' (51): Bind the Set(s) along the top edge; the type of the binding is
600 implementation and/or site-defined.

601 'bind-right' (52): Bind the Set(s) along the right edge; the type of the binding
602 implementation and/or is site-defined.

603 'bind-bottom' (53): Bind the Set(s) along the bottom edge; the type of the binding is
604 implementation and/or site-defined.

605 **5.1.3 PWG 5100.1-2014 “finishings” Values**

606 The IPP Finishings 2.0 specification [PWG5100.1-2014] defines the following “finishings”
607 enum values:

608 'coat' (15): Apply a protective liquid or powdered coating to each sheet in an
609 implementation and/or site-defined manner.

610 'lamine' (16): Apply a protective (solid) material to each sheet in an
611 implementation and/or site-defined manner.

612 'staple-triple-left' (32): Bind the Set(s) with three staples (wire stitches) along the left
613 edge assuming a portrait document (see section 6).

614 'staple-triple-top' (33): Bind the Set(s) with three staples (wire stitches) along the top
615 edge assuming a portrait document (see section 6).

616 'staple-triple-right' (34): Bind the Set(s) with three staples (wire stitches) along the
617 right edge assuming a portrait document (see section 6).

618 'staple-triple-bottom' (35): Bind the Set(s) with three staples (wire stitches) along the
619 top edge assuming a portrait document (see section 6).

620 'punch-top-left' (70): Punch a single hole in the top left of the hardcopy output.

621 'punch-bottom-left' (71): Punch a single hole in the bottom left of the hardcopy
622 output.

623 'punch-top-right' (72): Punch a single hole in the top right of the hardcopy output.

624 'punch-bottom-right' (73): Punch a single hole in the bottom right of the hardcopy
625 output.

626 'punch-dual-left' (74): Punch two holes on the left side of the hardcopy output.

627 'punch-dual-top' (75): Punch two holes at the top of the hardcopy output.

628 'punch-dual-right' (76): Punch two holes on the right side of the hardcopy output.

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

656 **5.1.4 PWG 5100.1-2017 “finishings” Values**

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

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

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

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

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

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

684 **5.1.5 PWG 5100.13 “finishings” Values**

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

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

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

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

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

691 **5.2 finishings-col (no-value | 1setOf collection)**

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

697 Clients MUST NOT specify both the "finishings" and "finishings-col" attributes in a Job
 698 Creation request. Printers MUST reject Job Creation requests containing both the
 699 "finishings" and "finishings-col" attributes with the 'client-error-conflicting-attributes' status
 700 code.

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

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

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

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

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

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

712 **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)

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

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

716 **5.2.1 finishing-template (type2 keyword | name(MAX))**

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

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

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

736 For vendor attribute extensions, implementors SHOULD use keywords with a suitable
737 distinguishing prefix such as 'smiNNN-' where NNN is an SMI Private Enterprise Number
738 (PEN) [IANA-PEN]. For example, if the company Example Corp. had obtained the SMI PEN
739 32473, then a vendor attribute 'foo' would be 'smi32473-foo'.

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

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

747 **5.2.2 baling (collection)**

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

751 **5.2.2.1 baling-type (type2 keyword | name(MAX))**

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

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

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

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

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

759 **5.2.2.2 baling-when (type2 keyword)**

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

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

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

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

768 **5.2.3 binding (collection)**

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

772 **5.2.3.1 binding-reference-edge (type1 keyword)**

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

777 **5.2.3.2 binding-type (type2 keyword | name(MAX))**

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

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

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

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

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

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

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

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

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

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

798 **5.2.4 coating (collection)**

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

804 **5.2.4.1 coating-sides (type1 keyword)**

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

807 5.2.4.2 coating-type (type2 keyword | name(MAX))

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

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

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

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

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

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

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

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

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

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

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

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

826 5.2.5 covering (collection)

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

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

833 5.2.5.1 covering-name (type2 keyword | name(MAX))

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

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

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

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

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

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

844 **5.2.6 folding (1setOf collection)**

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

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

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

852 **5.2.6.1 folding-direction (type1 keyword)**

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

857 **5.2.6.2 folding-offset (integer(0:MAX))**

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

862 **5.2.6.3 folding-reference-edge (type1 keyword)**

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

867 **5.2.6.4 “folding” Examples**

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

```
870     finishings-col-database=  
871     {  
872         finishing-template='fold-accordion'  
873         media-size-name="iso_a4_210x297mm"  
874         folding=  
875         {  
876             folding-direction='inward'  
877             folding-location=7425  
878             folding-reference-edge='top'  
879         },  
880         {  
881             folding-direction='inward'  
882             folding-location=22275  
883             folding-reference-edge='top'  
884         },  
885         {  
886             folding-direction='outward'  
887             folding-location=14850  
888             folding-reference-edge='top'  
889         }  
890     },  
891     {  
892         finishing-template='fold-double-gate'  
893         media-size-name="iso_a4_210x297mm"  
894         folding=  
895         {  
896             folding-direction='inward'  
897             folding-offset=7425  
898             folding-reference-edge='top'  
899         },  
900         {  
901             folding-direction='inward'  
902             folding-offset=22275  
903             folding-reference-edge='top'  
904         },  
905         {  
906             folding-direction='inward'  
907             folding-offset=14850  
908             folding-reference-edge='top'  
909         }  
910     },  
911     {  
912         finishing-template='fold-engineering-z'  
913         media-size-name="iso_a4_210x297mm"  
914         folding=  
915         {  
916             folding-direction='inward'  
917             folding-offset=11593  
918             folding-reference-edge='top'  
919         },  
920         {  
921             folding-direction='outward'  
922             folding-offset=20646  
923             folding-reference-edge='top'  
924         }  
925     },
```

```
926     {
927         finishing-template='fold-gate'
928         media-size-name="iso_a4_210x297mm"
929         folding=
930         {
931             folding-direction='inward'
932             folding-offset=7425
933             folding-reference-edge='top'
934         },
935         {
936             folding-direction='inward'
937             folding-offset=22275
938             folding-reference-edge='top'
939         }
940     },
941     {
942         finishing-template='fold-half'
943         media-size-name="iso_a4_210x297mm"
944         folding=
945         {
946             folding-direction='inward'
947             folding-offset=14850
948             folding-reference-edge='top'
949         }
950     },
951     {
952         finishing-template='fold-half-z'
953         media-size-name="iso_a4_210x297mm"
954         folding=
955         {
956             folding-direction='inward'
957             folding-offset=10500
958             folding-reference-edge='left'
959         },
960         {
961             folding-direction='inward'
962             folding-offset=9900
963             folding-reference-edge='top'
964         },
965         {
966             folding-direction='outward'
967             folding-offset=19800
968             folding-reference-edge='top'
969         }
970     },
971     {
972         finishing-template='fold-left-gate'
973         media-size-name="iso_a4_210x297mm"
974         folding=
975         {
976             folding-direction='inward'
977             folding-offset=7425
978             folding-reference-edge='top'
979         }
980     },
981     {
982         finishing-template='fold-letter'
983         media-size-name="iso_a4_210x297mm"
984         folding=
985         {
986             folding-direction='inward'
987             folding-offset=9900
```

```
988         folding-reference-edge='top'
989     },
990     {
991         folding-direction='inward'
992         folding-offset=19800
993         folding-reference-edge='top'
994     }
995 },
996 {
997     finishing-template='fold-parallel'
998     media-size-name="iso_a4_210x297mm"
999     folding=
1000     {
1001         folding-direction='inward'
1002         folding-offset=14850
1003         folding-reference-edge='top'
1004     },
1005     {
1006         folding-direction='inward'
1007         folding-offset=7425
1008         folding-reference-edge='top'
1009     }
1010 },
1011 {
1012     finishing-template='fold-poster'
1013     media-size-name="iso_a4_210x297mm"
1014     folding=
1015     {
1016         folding-direction='inward'
1017         folding-offset=10500
1018         folding-reference-edge='left'
1019     },
1020     {
1021         folding-direction='outward'
1022         folding-offset=14850
1023         folding-reference-edge='top'
1024     }
1025 },
1026 {
1027     finishing-template='fold-right-gate'
1028     media-size-name="iso_a4_210x297mm"
1029     folding=
1030     {
1031         folding-direction='inward'
1032         folding-offset=22275
1033         folding-reference-edge='top'
1034     }
1035 },
1036 {
1037     finishing-template='fold-z'
1038     media-size-name="iso_a4_210x297mm"
1039     folding=
1040     {
1041         folding-direction='inward'
1042         folding-offset=9900
1043         folding-reference-edge='top'
1044     },
1045     {
1046         folding-direction='outward'
1047         folding-offset=19800
1048         folding-reference-edge='top'
1049     }

```

1050 }
1051

1052 **5.2.7 imposition-template (type2 keyword | name(MAX))**

1053 The "imposition-template" member attribute specifies the default imposition template used
1054 for the specified finishing process. The "imposition-template" member attribute is only
1055 allowed in "finishings-col" collections in the "finishings-col-database" (section 6.9) and
1056 "finishings-col-ready" (section 6.11) Printer description attributes. For example, when
1057 applying a 'booklet-maker' finishing process a Printer could automatically apply a 'signature'
1058 imposition template when processing input pages.

1059 **5.2.8 laminating (collection)**

1060 The "laminating" member attribute specifies which material to apply to the hardcopy output.
1061 Printers with a laminating finisher MUST support this member attribute and all "laminating-
1062 xxx" member attributes if they support the "finishings-col" attribute.

1063 **5.2.8.1 laminating-sides (type2 keyword)**

1064 The "laminating-sides" member attribute specifies which sides of the sheets are laminated:
1065 'front', 'back', or 'both', If not specified, an implementation or site defined default value is
1066 used.

1067 **5.2.8.2 laminating-type (type2 keyword | name(MAX))**

1068 The "laminating-type" member attribute specifies the type of material to laminate with. The
1069 following values are defined by this specification:

1070 'archival': each sheet is laminated to preserve the output for an extended period of
1071 time, e.g., a UV protectant.

1072 'glossy': each sheet is laminated to produce a glossy surface.

1073 'high-gloss': each sheet is laminated to produce a high-gloss surface.

1074 'matte': each sheet is laminated to produce a matte surface.

1075 'semi-gloss': each sheet is laminated to produce a semi-gloss surface.

1076 'translucent': each sheet is laminated to produce a translucent surface.

1077 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-
1078 IPP].

1079 **5.2.9 media-sheets-supported (rangeOfInteger(1:MAX))**

1080 The "media-sheets-supported" member attribute specifies the minimum and maximum
1081 number of sheets supported for that set of finishing values. This attribute is related to the

1082 "job-media-sheets-supported" attribute [RFC8011] in that the value of "media-sheets-
1083 supported" MUST be within the range of "job-media-sheets-supported". The "media-sheets-
1084 supported" member attribute is only allowed in "finishings-col" collections in the "finishings-
1085 col-database" (section 6.9) and "finishings-col-ready" (section 6.11) Printer description
1086 attributes. As an example, if a Printer implementing the 'fold-half' finishing template has a
1087 minimum of 1 sheet and a maximum of 5 sheets, the Printer's "media-sheets-supported"
1088 attribute specifies this limit with a value of '1-5'.

1089 **5.2.10 media-size (collection)**

1090 The "media-size" member attribute specifies the applicable media size dimensions for the
1091 specified finishing values and is only provided in "finishings-col-database" (section 6.9) and
1092 "finishings-col-ready" (section 6.11) Printer attribute values. For example, a Printer can list
1093 the supported "punching-locations" values for ISO A4 and US Letter media sizes.

1094 The "x-dimension (integer(0:MAX))" and "y-dimension (integer(0:MAX))" member attributes
1095 provide the dimensions of the media.

1096 **5.2.11 media-size-name (type2 keyword)**

1097 The "media-size-name" member attribute specifies the applicable media size for the
1098 specified finishing values and is only provided in "finishings-col-database" (section 6.9) and
1099 "finishings-col-ready" (section 6.11) Printer attribute values. For example, a Printer can list
1100 the supported "punching-locations" values for ISO A4 and US Letter media sizes.

1101 The values are PWG media size names [PWG5101.1].

1102 **5.2.12 punching (collection)**

1103 The "punching" member attribute specifies the locations of holes to make in the hardcopy
1104 output. Printers with a hole punching/drilling finisher MUST support this member attribute
1105 and all "punching-xxx" member attributes if they support the "finishings-col" attribute.

1106 The diameter of the hole made by the punch is indicated by the "punching-hole-diameter-
1107 configured" Printer description attribute (section 6.22).

1108 A Client that chooses to request custom punching using the "punching" collection attribute
1109 MUST specify the "punching-locations", the "punching-offset", and the "punching-reference-
1110 edge" member attributes. If the Client supplies a malformed request by not supplying all
1111 three member attributes, the Printer MUST (depending on implementation) either reject the
1112 request and return the 'client-error-bad-request' (see [RFC8011] section 13.1.4.1) or default
1113 the omitted member attributes, independent of the value of the "ipp-attribute-fidelity" attribute
1114 [RFC8011] supplied by the Client.

1115 **5.2.12.1 punching-locations (1setOf integer(0:MAX))**

1116 The "punching-locations" member attribute specifies the locations to be punched or drilled
1117 along the reference edge. Each value in the 1setOf MUST be in order of increasing distance.

1118 If the "punching-reference-edge" is either 'top' or 'bottom', then each value in the "punching-
1119 locations" represents an offset in hundredths of millimeters (1/2540th of an inch) from the
1120 left edge toward the center of the medium. If the "punching-reference-edge" is either 'left' or
1121 'right', then each value in the "punching-locations" represents an offset in hundredths of
1122 millimeters (1/2540th of an inch) from the bottom edge toward the center of the medium.

1123 The default value can be derived from the "finishing-template" value or, if a default value
1124 cannot be determined from that value, using an implementation or site defined value.

1125 **5.2.12.2 punching-offset (integer(0:MAX))**

1126 The "punching-offset" member attribute specifies the distance from the center of the hole to
1127 the reference edge (specified by the "punching-reference-edge" member attribute)
1128 measured in hundredths of millimeters (1/2540th of an inch). The default value can be
1129 derived from the "finishing-template" value or, if a default value cannot be determined from
1130 that value, using an implementation or site defined value.

1131 **5.2.12.3 punching-reference-edge (type1 keyword)**

1132 The "punching-reference-edge" member attribute specifies which edge of the sheets will be
1133 punched or drilled: 'bottom', 'left', 'right', or 'top'. The default value can be derived from the
1134 "finishing-template" value or, if a default value cannot be determined from that value, using
1135 an implementation or site defined value.

1136 **5.2.13 stitching (collection)**

1137 The "stitching" member attribute (originally defined in section 3.2.2 of [PWG5100.3])
1138 specifies the locations of stitches or staples that are used to bind the hardcopy output.
1139 Printers with a stapler and/or stitching finisher MUST support this member attribute and all
1140 "stitching-xxx" member attributes if they support the "finishings-col" attribute.

1141 A Client that chooses to request custom stitching using the "stitching" collection attribute
1142 MUST specify the "stitching-reference-edge", the "stitching-offset", and the "stitching-
1143 locations" member attributes. If the Client supplies a malformed request by not supplying all
1144 three member attributes, the Printer MUST (depending on implementation) either reject the
1145 request and return the 'client-error-bad-request' (see [RFC8011] section 13.1.4.1) or default
1146 the omitted member attributes, independent of the value of the "ipp-attribute-fidelity" attribute
1147 [RFC8011] supplied by the Client.

1148 **5.2.13.1 stitching-angle (integer(0:359))**

1149 The "stitching-angle" member attribute specifies the staple or stitch's angle of rotation in a
1150 counter-clockwise direction around the center of the staple, measured in degrees. A staple
1151 or stitch rotated to 0° (zero degrees) shall be parallel to the top edge of the page. The
1152 range of allowable values is 0 (0°) to 359 (359°).

1153 5.2.13.2 stitching-locations (1setOf integer(0:MAX))

1154 Each value of "stitching-locations" specifies an absolute offset along the Finishing Reference
1155 Edge at which a stitch MUST occur. Each value in the 1setOf MUST be in order of increasing
1156 distance.

1157 If the "stitching-reference-edge" is either 'top' or 'bottom', then each value in the "stitching-
1158 locations" represents an offset in hundredths of millimeters from the left edge along the
1159 Finishing Reference Edge toward the center of the medium. If the "stitching-reference-edge"
1160 is either 'left' or 'right', then each value in the "stitching-locations" represents an offset in
1161 hundredths of millimeters from the bottom edge along the Finishing Reference Edge toward
1162 the center of the medium.

1163 The unit of measure for the "stitching-locations" member attribute is one hundredth of a
1164 millimeter. This unit is equivalent to 1/2540th of an inch resolution.

1165 5.2.13.3 stitching-method (type2 keyword)

1166 The "stitching-method" member attribute specifies the type of stitching to use. The following
1167 values are defined by this specification:

1168 'auto': Automatically choose a stitching type based on the Set being finished.

1169 'crimp': Crimp the Set together.

1170 'wire': Use wire staples.

1171 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-
1172 IPP].

1173 5.2.13.4 stitching-offset (integer(0:MAX))

1174 The "stitching-offset" member attribute specifies the perpendicular distance of the staples
1175 from the Finishing Reference Edge. Since the "stitching-offset" member attribute is positive
1176 or zero, the offset is always in the direction that is both away from the Finishing Reference
1177 Edge and toward the center of the media sheet.

1178 The unit of measure for the "stitching-offset" member attribute is one hundredth of a
1179 millimeter. This unit is equivalent to 1/2540th of an inch resolution.

1180 If the Client specifies a "stitching-offset" then the Printer MUST produce a stitch (or stitches)
1181 along a line that is the specified number of hundredths of millimeters specified by the
1182 "stitching-offset" attribute away from the "stitching-reference-edge".

1183 5.2.13.5 stitching-reference-edge (type1 keyword)

1184 The "stitching-reference-edge" member attribute specifies the Finishing Reference Edge of
1185 the output media relative to which the stapling or stitching MUST be applied. The individual
1186 staples or stitches are situated along a line or axis parallel to the Finishing Reference Edge.

1187 A Printer MUST support this member attribute and at least the 'left' value.

1188 Note: The 'left' value works with 'portrait' and 'landscape' Documents since 'landscape'
1189 Documents are rotated anti-clock-wise 90 degrees, i.e., plus 90 degrees, with respect to
1190 'portrait' Documents. The left edge becomes the top edge when the human reader orients
1191 the landscape Document for reading.

1192 5.2.14 trimming (1setOf collection)

1193 The "trimming" member attribute specifies the locations of cuts to make in the hardcopy
1194 output. Printers with a trimming/cutting/perforation/scoring finisher MUST support this
1195 member attribute and all "trimming-xxx" member attributes if they support the "finishings-col"
1196 attribute.

1197 5.2.14.1 trimming-offset (1setOf integer(0:MAX))

1198 The "trimming-offset" member attribute specifies where the cut, perforation, or score is
1199 made. The value is the distance from the Finishing Reference Edge specified by the
1200 "trimming-reference-edge" member attribute toward the center of the medium in hundredths
1201 of millimeters (1/2540th of an inch). The default value is generally derived from the "finishing-
1202 template" value and output media.

1203 5.2.14.2 trimming-reference-edge (type1 keyword)

1204 The "trimming-reference-edge" member attribute specifies which edge is used as the basis
1205 of the cut, perforation, or score: 'bottom', 'left', 'right', or 'top'. Cuts, perforations, and scores
1206 are placed parallel to the reference edge at the offset specified by the "trimming-offset"
1207 member attribute. The default value is generally derived from the "finishing-template" value
1208 and output media.

1209 5.2.14.3 trimming-type (type2 keyword | name(MAX))

1210 The "trimming-type" member attribute specifies the type of trim that is to be performed. The
1211 default value is implementation and/or site defined. The following values are defined by this
1212 specification:

1213 'draw-line': Marks a cut line on the media where it could be cut by an operator

1214 'full': Cuts the hardcopy output the full length parallel to the reference edge.

1215 'partial': Partially cuts the hardcopy output along the length parallel to the reference
1216 edge.

1217 'perforate': Perforates the hardcopy output the full length parallel to the reference
1218 edge.

1219 'score': Scores the hardcopy output the full length parallel to the reference edge.

1220 'tab': Cuts the hardcopy output along the length parallel to the reference edge
1221 leaving a hanging tab.

1222 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-
1223 IPP].

1224 **5.2.14.4 trimming-when (type2 keyword)**

1225 The "trimming-when" member attribute specified when trimming is performed. The default
1226 value could be derived from the "finishing-template" value or, if a default value cannot be
1227 determined from that value, using an implementation or site defined value. The following
1228 values are defined by this specification:

1229 'after-documents': Trimming occurs after each Document.

1230 'after-job': Trimming occurs only after the entire Job is printed.

1231 'after-sets': Trimming occurs after each Set (the typical default).

1232 'after-sheets': Trimming occurs after each sheet.

1233 Additional keyword values can be registered in the IANA IPP Registry of Keywords [IANA-
1234 IPP].

1235 **5.3 job-pages-per-set (integer(1:MAX))**

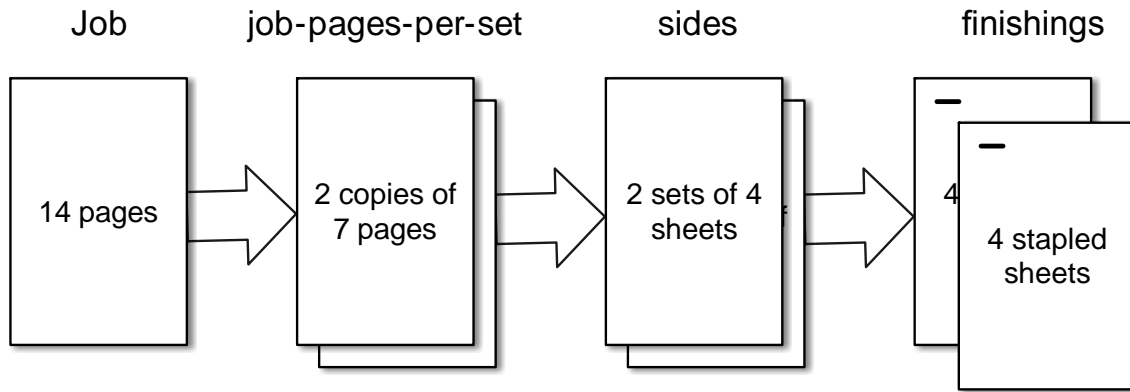
1236 The RECOMMENDED "job-pages-per-set" Job Template attribute specifies the number of
1237 input pages that constitute a set for finishing processes. It is used when the Client generates
1238 the copies in the Document content because the Printer does not support the "copies"
1239 attribute [RFC8011] for the given Document format. If the Client includes the "job-pages-per-
1240 set" Job Template attribute in a Job Creation request:

1241 • The Client SHOULD NOT include the "copies" Job Template attribute, or if included
1242 MUST use the value 1; and

1243 • The Printer MUST ignore the value of the "copies-default" Printer Description
1244 attribute.

1245 The value of "job-pages-per-set" MUST be evenly divisible with the number of Input Pages
1246 since it is being used to demarcate the length of a single copy or Set. See the sections on
1247 the "multiple-document-handling" Job Template attribute [RFC8011] for more information on
1248 using this attribute with multiple Document Jobs.

1249 For example, if a Client submits a 14 page PWG Raster Format [PWG5102.4] Document for
 1250 printing that contains two copies of four duplex pages each, the Client might specify a "job-
 1251 pages-per-set" Job Template attribute with a value of 7, a "sides" attribute with a value of
 1252 'two-sided-long-edge', and a "finishings" attribute with a value of 4 (staple) to have the Printer
 1253 staple two Sets of four sheets. Figure 4 shows a graphical representation of this example.



1254

1255 **Figure 4 - Handling of "job-pages-per-set" Job Template Attribute**

1256 **6. Printer Description Attributes**

1257 **6.1 baling-type-supported (1setOf (type2 keyword | name(MAX)))**

1258 The "baling-type-supported" Printer attribute lists the supported values for the "baling-type"
 1259 (section 5.2.2.1) member attribute.

1260 **6.2 baling-when-supported (1setOf type2 keyword)**

1261 The "baling-when-supported" Printer attribute lists the supported values for the "baling-
 1262 when" (section 5.2.2.2) member attribute.

1263 **6.3 binding-reference-edge-supported (1setOf type1 keyword)**

1264 The "binding-reference-edge-supported" Printer attribute lists the supported values for the
 1265 "binding-reference-edge" (section 5.2.3.1) member attribute.

1266 **6.4 binding-type-supported (1setOf type2 keyword)**

1267 The "binding-type-supported" Printer attribute lists the supported values for the "binding-
 1268 type" (section 5.2.3.2) member attribute.

1269 6.5 coating-sides-supported (1setOf type1 keyword)

1270 The "coating-sides-supported" Printer attribute lists the supported values for the "coating-
1271 sides" (section 5.2.4.1) member attribute.

1272 6.6 coating-type-supported (1setOf (type2 keyword | name(MAX)))

1273 The "coating-type-supported" Printer attribute lists the supported values for the "coating-
1274 type" (section 5.2.4.2) member attribute.

1275 6.7 covering-name-supported (1setOf (type2 keyword | name(MAX)))

1276 The "covering-name-supported" Printer attribute lists the supported values for the "covering-
1277 name" (section 5.2.5.1) member attribute.

1278 6.8 finishing-template-supported (1setOf (name(MAX) | type2 keyword))

1279 The "finishing-template-supported" Printer attribute lists the supported values for the
1280 "finishing-template" (section 5.2.1) member. Except for 'none', Printers MUST list all
1281 "finishings-supported" keyword value equivalents in the list of "finishing-template-supported"
1282 values.

1283 6.9 finishings-col-database (1setOf collection)

1284 The RECOMMENDED "finishings-col-database" Printer attribute lists the "finishings-col"
1285 member attributes corresponding to each "finishings-supported" value. Unlike the "media-
1286 col-database" Printer attribute [PWG5100.11], the "finishings-col-database" attribute does
1287 not provide a definitive list of the combinations of valid finishing processes. Instead, it lists
1288 the basic finishing processes separately as well as vendor or site defined preset
1289 combinations, each identified by a corresponding "finishing-template" name or keyword.

1290 For example, a Printer that supports the 'booklet-maker', 'punch-triple-left' and 'staple-top-
1291 left' values for "finishings-template" and "finishings-supported" might report the following for
1292 "finishings-col-database":

```
1293     finishings-col-database=
1294     {
1295         finishing-template='booklet-maker'
1296         imposition-template='signature'
1297         media-size-name='na_tabloid_11x17in'
1298         media-sheets-supported=1-5
1299         folding=
1300         {
1301             folding-direction='inward'
1302             folding-offset=21590
1303             folding-reference-edge='top'
1304         }
```

```

1305     stitching=
1306     {
1307         stitching-locations=9313,18626
1308         stitching-offset=21590
1309         stitching-reference-edge='top'
1310     }
1311 },
1312 {
1313     finishing-template='booklet-maker'
1314     imposition-template='signature'
1315     media-sheets-supported=1-8
1316     media-size=
1317     {
1318         x-dimension=29700
1319         y-dimension=42000
1320     }
1321     folding=
1322     {
1323         folding-direction='inward'
1324         folding-offset=21000
1325         folding-reference-edge='top'
1326     }
1327     stitching=
1328     {
1329         stitching-locations=9900,19800
1330         stitching-offset=21000
1331         stitching-reference-edge='top'
1332     }
1333 },
1334 {
1335     finishing-template='punch-triple-left'
1336     media-sheets-supported=1-100
1337     media-size-name='na_letter_8.5x11in'
1338     punching=
1339     {
1340         punching-locations=5715,16510,27305
1341         punching-offset=1300
1342         punching-reference-edge='left'
1343     }
1344 },
1345 {
1346     finishing-template='staple-top-left'
1347     media-sheets-supported=1-150
1348     stitching=
1349     {
1350         stitching-locations=635
1351         stitching-offset=635
1352         stitching-reference-edge='left'
1353     }
1354 }

```

1355 Note that the Printer SHOULD specify each of these separately to limit the size of the value
1356 for "finishings-col-database". While it is possible to create "finishings-col" collections that
1357 each represent one of the combinatorial permutations from combining the discrete "finishing-
1358 template" definitions (e.g. "staple-top-left_punch-triple-left"), that greatly and unnecessarily

1359 expands the size of "finishings-col-database" and "finishings-col-ready" (section 6.11). A
1360 Client creates the "finishings-col" for a Job by itself combining the settings contained within
1361 multiple "finishings-col" collections from "finishings-col-ready" or "finishings-col-database",
1362 after resolving any constraints, as discussed later in this section.

1363 Printers SHOULD report "finishings-col-database" values for each "finishings-supported"
1364 value other than 'none' (which is equivalent to a no-value for "finishings-col"), and MAY
1365 report multiple instances with the same "finishing-template" value but different "media-size"
1366 or "media-size-name" values. This allows a Client to easily discover which finishing
1367 processes are supported for a given media size, and to preview the results of each finishing
1368 process for the User. This attribute can also provide Printer and site-defined "presets" for
1369 compound finishing processes.

1370 The same values SHOULD be returned in the "finishings-col-ready" Printer attribute (section
1371 6.11) for each finisher Subunit that is available.

1372 There can be situations where a setting within a particular "finishings-col" collection is not
1373 compatible with some other selected Job Template attribute, such as a particular media type,
1374 media orientation, etc. These situations are described by the Printer using the IPP "job-
1375 constraints-supported" and "job-resolvers-supported" Printer Description attributes
1376 [PWG5100.13]. For example:

```
1377     job-constraints-supported={  
1378         resolver-name=A  
1379         finishings-col={  
1380             finishing-template='staple-top-left','staple-bottom-right'  
1381         }  
1382         finishings=20,23  
1383         media-col={  
1384             media-source-properties={  
1385                 media-source-feed-direction='long-edge-first'  
1386             }  
1387         }  
1388     }  
1389  
1390     job-resolvers-supported={  
1391         resolver-name=A  
1392         media-col={  
1393             media-source-properties={  
1394                 media-source-feed-direction='short-edge-first'  
1395             }  
1396         },  
1397         {  
1398             media-source='manual'  
1399         }  
1400     }
```

1401 Notice that in "job-constraints-supported" the value for "finishing-template" contains multiple
1402 values.

1403 6.10 finishings-col-default (1setOf collection | no-value)

1404 The "finishings-col-default" Printer attribute provides the default "finishings-col" (section 5.2)
1405 Job Template attribute value. Each collection value MUST contain the "finishing-template"
1406 member attribute and SHOULD contain all finishing process member attributes that are not
1407 affected by media size. For example, if the default is to staple output in the top left corner
1408 then the collection value SHOULD contain the "stitching" member attribute because the
1409 location of the staple does not depend on the media size. However, if the default is to punch
1410 three holes along the left edge of the media, the collection value SHOULD contain the
1411 "punching-reference-edge" and "punching-offset" member attributes but SHOULD NOT
1412 contain the "punching-locations" member attribute since the value of that member attribute
1413 depends upon the media size.

1414 The "finishings-col-default" Printer attribute MUST report the same finishing processes as
1415 the "finishings-default" [RFC8011] Printer attribute. If "finishings-default" has the value
1416 'none', then "finishings-col-default" MUST have the 'no-value' out-of-band value.

1417 6.11 finishings-col-ready (1setOf collection)

1418 The RECOMMENDED "finishings-col-ready" Printer attribute lists the "finishings-col"
1419 member attributes corresponding to each "finishing-template" value for Subunits that are
1420 available and media that is loaded. The values are always the same as, or a subset of, the
1421 "finishings-col-database" Printer attribute (section 6.9).

1422 6.12 folding-direction-supported (1setOf type1 keyword)

1423 The "folding-direction-supported" Printer attribute lists the supported values for the "folding-
1424 direction" (section 5.2.6.1) member attribute.

**1425 6.13 folding-offset-supported (1setOf (integer(0:MAX) |
1426 rangeOfInteger(0:MAX)))**

1427 The "folding-offset-supported" Printer attribute lists the supported values for the "folding-
1428 offset" (section 5.2.6.2) member attribute.

1429 6.14 folding-reference-edge-supported (1setOf type1 keyword)

1430 The "folding-reference-edge-supported" Printer attribute lists the supported values for the
1431 "folding-reference-edge" (section 5.2.6.3) member attribute.

1432 6.15 laminating-sides-supported (1setOf type1 keyword)

1433 The "laminating-sides-supported" Printer attribute lists the supported values for the
1434 "laminating-sides" (section 5.2.8.1) member attribute.

1435 **6.16 laminating-type-supported (1setOf (type2 keyword | name(MAX)))**

1436 The "laminating-type-supported" Printer attribute lists the supported values for the
1437 "laminating-type" (section 5.2.8.2) member attribute.

1438 **6.17 job-pages-per-set-supported (boolean)**

1439 The "job-pages-per-set-supported" Printer Attribute specifies whether the "job-pages-per-
1440 set" Job Template attribute (section 5.3) is supported. This attribute MUST be supported if
1441 the "job-pages-per-set" attribute is supported.

1442 **6.18 printer-finisher (1setOf octetString(MAX))**

1443 The "printer-finisher" Printer Description attribute provides current finisher details mapped
1444 from the SNMP finDeviceTable defined in IETF Finishing MIB [RFC3806]. This attribute
1445 MUST be supported if the Printer implements the IETF Finishing MIB [RFC3806].

1446 The Printer MUST support this attribute if it supports the "printer-finisher-description"
1447 attribute (section 6.18.3). If supported, this attribute MUST have the same cardinality
1448 (contain the same number of values) as the "printer-finisher-description" attribute. The ith
1449 value in the "printer-finisher" attribute corresponds to the ith value in the "printer-finisher-
1450 description" attribute.

1451 As with finDeviceTable, Printers MUST only list those finishers that are currently attached.

1452 **6.18.1 Keywords for printer-finisher**

1453 Table 2 defines the IPP datatypes and keywords for encoding "printer-finisher" from all of
1454 the machine-readable (non-localized) columnar objects in finDeviceTable or
1455 finDeviceAttributeTable [RFC3806].

1456 **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	FinisherMaxCapacity	REQUIRED
finDeviceCurrentCapacity	Integer	capacity	FinisherCurrentCapacity	REQUIRED
finDevicePresentOnOff	String	presentonoff	FinisherPresentOnOff	OPTIONAL
finDeviceAssociatedMediaPaths	---	---	FinisherAssociatedMediaPaths	---
finDeviceAssociatedOutputs	---	---	FinisherAssociatedOutputs	---
finDeviceStatus	Integer	status	SubunitStates	OPTIONAL

1457 Notes:

- 1458 1. finDeviceIndex is OPTIONAL in "printer-finisher", because correlation with the
 1459 original MIB order is considered unimportant. If "printer-finisher-supplies" is
 1460 implemented, then finDeviceIndex is REQUIRED.

1461 6.18.2 Encoding of printer-finisher

1462 Values of "printer-finisher" MUST be encoded using a visible subset of the US-ASCII
 1463 character set [RFC20]. Control codes (0x00 to 0x1F and 0x7F) MUST NOT be used. The
 1464 ABNF [STD68] [FIN-ABNF] in Figure 5 defines the standard encoding in "printer-finisher"
 1465 for all the machine-readable (non-localized) columnar objects in finDeviceTable
 1466 [RFC3806].

1467 Figure 5 - ABNF for "printer-finisher" Values

```

1468 printer-finisher = 1*finisher-required *finisher-optional
1469 ; set of finisher elements encoded into one value
1470 finisher-required = finisher-req ";"
1471 finisher-req = finisher-type / finisher-unit /
1472 ; finisher-max-capacity /
1473 ; finisher-capacity
1474 finisher-optional = finisher-opt ";"
1475 finisher-opt = finisher-index / finisher-presentonoff /
1476 ; finisher-status / finisher-ext
1477
1478 finisher-type = "type" "=" 1*ALPHA
1479 ; enumerated value as an alpha string (e.g.,
1480 ; 'stitcher') of finDeviceType in [RFC3806] mapped
1481 ; indirectly from the *label* in FinDeviceTypeTC
1482
1483 finisher-unit = "unit" "=" 1*ALPHA
1484 ; enumerated value as an alpha string (e.g., 'other') of
1485 ; finDeviceCapacityUnit in [RFC3806] mapped indirectly from
1486 ; the *label* in PrtCapacityUnitTC in [RFC3805]
1487
1488 finisher-max-capacity = "maxcapacity" "=" 1*[DIGIT / "-"]
1489 ; integer value as a numeric string mapped directly from
1490 ; finDeviceMaxCapacity in [RFC3806]
1491
1492 finisher-capacity = "capacity" "=" 1*[DIGIT / "-"]
1493 ; integer value as a numeric string mapped directly from
1494 ; finDeviceCurrentCapacity in [RFC3806]
1495
1496 finisher-index = "index" "=" 1*DIGIT
1497 ; integer value as a numeric string mapped directly from
1498 ; finDeviceIndex in [RFC3806]
1499
1500 finisher-presentonoff = "presentonoff" "=" 1*ALPHA
1501 ; string value as an alpha string mapped directly from
1502 ; PresentOnOff in [RFC3805]
1503
1504 finisher-status = "status" "=" 1*DIGIT
1505 ; integer value as a numeric string mapped directly from
1506 ; finDeviceStatus in [RFC3806]
1507

```

```
1508     finisher-ext      = finisher-extname "=" finisher-extvalue
1509     finisher-extname  = 1*[ALPHA / DIGIT / "-"]
1510     finisher-extvalue = 1*[ALPHA / DIGIT / "-" / "." / ","]
1511     ; extension point for other MIB values not mapped
```

1512 6.18.3 Example of printer-finisher

1513 The following example shows a "printer-finisher" attribute where its value is a set of two
1514 octetString strings encoding the machine-readable (non-localized) columnar objects from
1515 the Finisher MIB [RFC3806] finDeviceTable, presented using a PAPI [PAPI] encoding. Each
1516 string is wrapped in double-quotes (") for readability.

```
1517 printer-finisher="type=stitcher;unit=sheets;maxcapacity=500;capacity=100;",
1518                 "type=puncher;unit=sheets;maxcapacity=100;capacity=20;"
```

1519 6.19 printer-finisher-description (1setOf text(MAX))

1520 The "printer-finisher-description" READ-ONLY Printer Status attribute provides current
1521 supply descriptions mapped from the SNMP finDeviceDescription object in the
1522 finDeviceTable defined in IETF Finishing MIB [RFC3806]. This attribute MUST be supported
1523 if the Printer implements the IETF Finishing MIB [RFC3806].

1524 This attribute MUST be supported if the "printer-finisher" (section 6.18) Printer attribute is
1525 supported. If supported, this attribute MUST have the same cardinality (contain the same
1526 number of values) as the "printer-finisher" attribute. The i^{th} value in the "printer-finisher-
1527 description" attribute corresponds to the i^{th} value in the "printer-finisher" attribute.

1528 6.19.1 Encoding of printer-finisher-description

1529 Values of the "printer-finisher-description" attribute MUST be mapped from the
1530 corresponding human-readable (localized) values of finDeviceDescription, exactly as
1531 follows:

- 1532 1. Each value of finDeviceDescription MUST be converted from the character set
1533 [RFC3808] specified by prtGeneralCurrentLocalization and
1534 prtLocalizationCharacterSet into the charset specified by "charset-configured" and
1535 then copied into a text value of "printer-finisher-description"; and
- 1536 2. Each value of "printer-finisher-description" MUST be tagged with the natural
1537 language [RFC5646] specified by prtGeneralCurrentLocalization,
1538 prtLocalizationLanguage, and prtLocalizationCountry unless the natural language
1539 matches the default language used in the response.

1540 6.19.2 Example of printer-finisher-description

1541 The first example shows two instances of the human-readable (localized) columnar object
1542 finDeviceDescription in the finDeviceTable encoded into corresponding values of "printer-
1543 finisher-description", presented using a PAPI [PAPI] encoding:

1544 printer-finisher-description="Stapler S/N:EXAMPLE-12345", "Hole Punch
 1545 S/N:EXAMPLE-67890"

1546 The second example shows the same values, but also demonstrates tagging with a natural
 1547 language identifier, presented using a PAPI [PAPI] encoding:

1548 printer-finisher-description="Hefter SN:BEISPIEL-12345" (de), "Lochstanze
 1549 S/N:BEISPIEL-67890" (de)

1550 **6.20 printer-finisher-supplies (1setOf octetString(MAX))**

1551 The "printer-finisher-supplies" Printer Description attribute describes the finishing unit's
 1552 supplies, mapped from the SNMP finSupplyTable defined in IETF Finishing MIB [RFC3806].
 1553 Although some supplies could be described by the "printer-supply" attribute [PWG5100.13]
 1554 this attribute supports the full fidelity of the finSupplyTable, which is more descriptive. This
 1555 attribute MUST be supported if the Printer implements the IETF Finishing MIB [RFC3806]
 1556 finSupplyTable.

1557 This attribute MUST be supported if the "printer-finisher-supplies-description" (section 6.21)
 1558 Printer attribute is supported. If supported, this attribute MUST have the same cardinality
 1559 (contain the same number of values) as the "printer-finisher-supplies-description" attribute.
 1560 The ith value in the "printer-finisher-supplies" attribute corresponds to the ith value in the
 1561 "printer-finisher-supplies-description" attribute.

1562 **6.20.1 Keywords for printer-finisher-supplies**

1563 Table 3 defines the IPP datatypes and keywords for encoding "printer-finisher-supplies" from
 1564 all of the machine-readable (non-localized) columnar objects in finSupplyTable [RFC3806].

1565 **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	---

1566 Notes:

- 1567 1. finSupplyIndex is OPTIONAL in "printer-finisher-supplies", because correlation
- 1568 with the original MIB order is considered unimportant
- 1569 2. finSupplyDeviceIndex is REQUIRED in "printer-finisher-supplies" because a
- 1570 connection between the supply and the finisher is needed if User / Operator
- 1571 engagement is required for resolving a supply level condition.

1572 **6.20.2 Encoding of printer-finisher-supplies**

1573 Values of "printer-finisher-supplies" MUST be encoded using a visible subset of the US-
 1574 ASCII character set [RFC20]. Control codes (0x00 to 0x1F and 0x7F) MUST NOT be used.
 1575 The ABNF [STD68] [FIN-ABNF] in Figure 5 defines the standard encoding in "printer-
 1576 finisher-supplies" for all the machine-readable (non-localized) columnar objects in
 1577 finSupplyTable [RFC3806].

1578 **Figure 6 - ABNF for "printer-finisher-supplies" Values**

```

1579 finisher-supply = 1*supply-required *supply-optional
1580 ; set of finisher supply elements encoded into one value
1581 supply-required = supply-req ";"
1582 supply-req = supply-class / supply-type / supply-description /
1583             supply-unit / supply-max / supply-current-level /
1584             supply-color
1585
1586 supply-optional = supply-opt ";"
1587 supply-opt = supply-index / supply-device-index / supply-ext
1588
1589 supply-class = "class" "=" 1*ALPHA
1590 ; enumerated value as an alpha string (e.g., 'supplyThatIsConsumed')
1591 ; of prtMarkerSuppliesClass in [RFC3805] mapped indirectly from
1592 ; the *label* in PrtMarkerSuppliesClassTC in [RFC3805]
1593
1594 supply-type = "type" "=" 1*ALPHA
1595 ; enumerated value as an alpha string (e.g., 'staples') of
1596 ; prtMarkerSuppliesType in [RFC3805] mapped indirectly from
1597 ; the *label* in PrtMarkerSuppliesTypeTC in [RFC3805]
1598
1599 supply-unit = "unit" "=" 1*ALPHA
1600 ; enumerated value as an alpha string (e.g., 'items' or 'percent')
1601 ; of finSupplyUnit in [RFC3806] mapped indirectly from the *label*
1602 ; in PrtMarkerSuppliesSupplyUnitTC in [RFC3805]
1603
1604 supply-max = "max" "=" 1*[DIGIT / "-"]
1605 ; integer value as a numeric string mapped directly from
1606 ; finSupplyMaxCapacity in [RFC3806]
1607
1608 supply-current-level = "level" "=" 1*[DIGIT / "-"]
1609 ; integer value as a numeric string mapped directly from
1610 ; finSupplyCurrentLevel in [RFC3806]
1611
1612 supply-color = "color" "=" 1*ALPHA
1613 ; enumerated value as an alpha string (e.g., 'silver') of
1614 ; finSupplyColorName in [RFC3806] mapped indirectly from the color
1615 ; names from PWG Media Standardized Names 2.0 [PWG5101.1]
1616
1617 supply-index = "index" "=" 1*DIGIT
1618 ; integer value as a numeric string mapped directly from
1619 ; finSupplyIndex in [RFC3806]
1620
1621 supply-device-index = "deviceIndex" "=" 1*ALPHA
1622 ; string value as an alpha string mapped directly from

```

```
1623         ; finSupplyDeviceIndex in [RFC3806]
1624
1625     supply-ext      = supply-extname "=" supply-extvalue
1626     supply-extname  = 1*[ALPHA / DIGIT / "-"]
1627     supply-extvalue = 1*[ALPHA / DIGIT / "-" / "." / ","]
1628         ; extension point for other MIB values not mapped
```

1629 **6.20.3 Example of printer-finisher-supplies**

1630 The following is an example of "printer-finisher-supplies", which contains one supply,
1631 presented using a PAPI [PAPI] encoding:

```
1632 printer-finisher-
1633 supplies="class=supplyThatIsConsumed;type=staples;unit=items;max=500;level=100;c
1634 olor=silver;"
```

1635 **6.21 printer-finisher-supplies-description (1setOf text(MAX))**

1636 The "printer-finisher-supplies-description" READ-ONLY Printer Status attribute provides
1637 current supply descriptions mapped from the SNMP finSupplyDescription object in the
1638 finSupplyEntry sequences in the finSupplyTable defined in IETF Finishing MIB [RFC3806].
1639 This attribute MUST be supported if the Printer implements the IETF Finishing MIB
1640 [RFC3806] finSupplyTable.

1641 This attribute MUST be supported if the "printer-finisher-supplies" (section 6.18) Printer
1642 attribute is supported. If supported, this attribute MUST have the same cardinality (contain
1643 the same number of values) as the "printer-finisher-supplies" attribute. The i^{th} value in the
1644 "printer-finisher-supplies-description" attribute corresponds to the i^{th} value in the "printer-
1645 finisher-supplies" attribute.

1646 **6.21.1 Encoding of printer-finisher-supplies-description**

1647 Values of the "printer-finisher-supplies-description" attribute MUST be mapped from the
1648 corresponding human-readable (localized) values of finSupplyDescription, exactly as
1649 follows:

- 1650 1. Each value of finSupplyDescription MUST be converted from the character set
1651 [RFC3808] specified by prtGeneralCurrentLocalization and
1652 prtLocalizationCharacterSet into the charset specified by "charset-configured" and
1653 then copied into a text value of "printer-finisher-supplies-description"; and
- 1654 2. Each value of "printer-finisher-supplies-description" MUST be tagged with the
1655 natural language [RFC5646] specified by prtGeneralCurrentLocalization,
1656 prtLocalizationLanguage, and prtLocalizationCountry unless the natural language
1657 matches the default language used in the response.

1658 **6.21.2 Example of printer-finisher-supplies-description**

1659 The first example shows two instances of the human-readable (localized) columnar object
1660 finSupplyDescription in the finSupplyTable encoded into corresponding values of "printer-
1661 finisher-supplies-description", presented using a PAPI [PAPI] encoding:

```
1662 printer-finisher-supplies-description="Staples", "Staples"
```

1663 The second example shows the same values, but also demonstrates tagging with a natural
1664 language identifier, presented using a PAPI [PAPI] encoding:

```
1665 printer-finisher-supplies-description="Heftklammern" (de), "Heftklammern" (de)
```

1666 **6.22 punching-hole-diameter-configured (integer(0:MAX))**

1667 The "punching-hole-diameter-configured" member attribute specifies the diameter of the
1668 punched hole, measured in hundredths of millimeters (1/2540th of an inch). If this attribute
1669 is not provided by the Printer, the value is assumed to be 790 (7.9mm or 5/16in.) for media
1670 sizes whose dimensions are measured in inches, or 650 (6.5mm) for media sizes whose
1671 dimensions are measured in millimeters.

1672 **6.23 punching-locations-supported (1setOf (integer(0:MAX) | 1673 rangeOfInteger(0:MAX)))**

1674 The "punching-locations-supported" Printer attribute lists the supported values for the
1675 "punching-locations" (section 5.2.12.1) member attribute.

1676 **6.24 punching-offset-supported (1setOf (integer(0:MAX) | 1677 rangeOfInteger(0:MAX)))**

1678 The "punching-offset-supported" Printer attribute lists the supported values for the
1679 "punching-offset" (section 5.2.12.2) member attribute.

1680 **6.25 punching-reference-edge-supported (1setOf type1 keyword)**

1681 The "punching-reference-edge-supported" Printer attribute lists the supported values for the
1682 "punching-reference-edge" (section 5.2.12.3) member attribute.

1683 **6.26 stitching-angle-supported (1setOf (integer(0:359) | 1684 rangeOfInteger(0:359)))**

1685 The "stitching-angle-supported" Printer attribute lists the supported values for the "stitching-
1686 angle" (section 5.2.13.1) member attribute.

1687 **6.27 stitching-locations-supported (1setOf (integer(0:MAX) |**
1688 **rangeOfInteger(0:MAX)))**

1689 The "stitching-locations-supported" Printer attribute lists the supported values for the
1690 "stitching-locations" (section 5.2.13.1) member attribute.

1691 **6.28 stitching-method-supported (1setOf type2 keyword)**

1692 The "stitching-method-supported" Printer attribute lists the supported values for the
1693 "stitching-method" (section 5.2.13.3) member attribute.

1694 **6.29 stitching-offset-supported (1setOf (integer(0:MAX) |**
1695 **rangeOfInteger(0:MAX)))**

1696 The "stitching-offset-supported" Printer attribute lists the supported values for the "stitching-
1697 offset" (section 5.2.13.3) member attribute.

1698 **6.30 stitching-reference-edge-supported (1setOf type1 keyword)**

1699 The "stitching-reference-edge-supported" Printer attribute lists the supported values for the
1700 "stitching-reference-edge" (section 5.2.13.5) member attribute.

1701 **6.31 trimming-offset-supported (1setOf (integer(0:MAX) |**
1702 **rangeOfInteger(0:MAX)))**

1703 The "trimming-offset-supported" Printer attribute lists the supported values for the "trimming-
1704 offset" (section 5.2.14.1) member attribute.

1705 **6.32 trimming-reference-edge-supported (1setOf type1 keyword)**

1706 The "trimming-reference-edge-supported" Printer attribute lists the supported values for the
1707 "trimming-reference-edge" (section 5.2.14.2) member attribute.

1708 **6.33 trimming-type-supported (1setOf type2 keyword)**

1709 The "trimming-type-supported" Printer attribute lists the supported values for the "trimming-
1710 type" (section 5.2.14.3) member attribute.

1711 **6.34 trimming-when-supported (1setOf type2 keyword)**

1712 The "trimming-when-supported" Printer attribute lists the supported values for the "trimming-
1713 when" (section 5.2.14.4) member attribute.

1714

1715 **7. Conformance Requirements**

1716 This section summarizes the Conformance Requirements detailed in the definitions in this
1717 document for Clients and Printers.

1718 **7.1 Conformance Requirements for Clients**

1719 In order for a Client to claim conformance to this specification, a Client **MUST** support:

- 1720 1. The IPP Printer attributes defined in section 6;
- 1721 2. The IPP Job Template attributes defined in section 5;
- 1722 3. The internationalization considerations in section 8; and
- 1723 4. The security considerations in section 9.

1724 **7.2 Conformance Requirements for Printers**

1725 In order for a Printer to claim conformance to this specification, a Printer **MUST** support:

- 1726 1. The IPP Printer attributes for any supported finishings defined in section 6;
- 1727 2. The IPP Job Template attributes for any supported finishings defined in section
1728 5;
- 1729 3. The internationalization considerations in section 8; and
- 1730 4. The security considerations in section 9.

1731 **8. Internationalization Considerations**

1732 For interoperability and basic support for multiple languages, conforming implementations
1733 **MUST** support:

- 1734 1. The Universal Character Set (UCS) Transformation Format -- 8 bit (UTF-8)
1735 [STD63] encoding of Unicode [UNICODE] [ISO10646]; and
- 1736 2. The Unicode Format for Network Interchange [RFC5198] which requires
1737 transmission of well-formed UTF-8 strings and recommends transmission of
1738 normalized UTF-8 strings in Normalization Form C (NFC) [UAX15].

1739 Unicode NFC is defined as the result of performing Canonical Decomposition (into base
1740 characters and combining marks) followed by Canonical Composition (into canonical
1741 composed characters wherever Unicode has assigned them).

1742 **WARNING** – Performing normalization on UTF-8 strings received from IPP Clients and
1743 subsequently storing the results (e.g., in IPP Job objects) could cause false negatives in IPP
1744 Client searches and failed access (e.g., to IPP Printers with percent-encoded UTF-8 URIs
1745 now 'hidden').

1746 Implementations of this specification SHOULD conform to the following standards on
1747 processing of human-readable Unicode text strings, see:

1748 Unicode Bidirectional Algorithm [UAX9] – left-to-right, right-to-left, and vertical

1749 Unicode Line Breaking Algorithm [UAX14] – character classes and wrapping

1750 Unicode Normalization Forms [UAX15] – especially NFC for [RFC5198]

1751 Unicode Text Segmentation [UAX29] – grapheme clusters, words, sentences

1752 Unicode Identifier and Pattern Syntax [UAX31] – identifier use and normalization

1753 Unicode Character Encoding Model [UTR17] – multi-layer character model

1754 Unicode in XML and other Markup Languages [UTR20] – XML usage

1755 Unicode Character Property Model [UTR23] – character properties

1756 Unicode Conformance Model [UTR33] – Unicode conformance basis+

1757 Unicode Collation Algorithm [UTS10] – sorting

1758 Unicode Locale Data Markup Language [UTS35] – locale databases

1759 **9. Security Considerations**

1760 In addition to the security considerations described in the IPP/1.1: Model and Semantics
1761 [RFC8011], implementations MAY support different access control to various finishing
1762 features, depending on the identity of the User submitting the Job.

1763 Implementations of this specification SHOULD conform to the following standards on
1764 processing of human-readable Unicode text strings, see:

1765 Unicode Security Mechanisms [UTS39] – detecting and avoiding security attacks

1766 Unicode Security FAQ [UNISECFAQ] – common Unicode security issues

1767 **10. IANA and PWG Considerations**

1768 **10.1 Attribute Registrations**

1769 The attributes defined in this document will be published by IANA according to the
1770 procedures in IPP Model and Semantics [RFC8011] section 6.2 in the following file:

1771 <http://www.iana.org/assignments/ipp-registrations>

1772 The registry entries will contain the following information:

1773	Job Template attributes:	Reference
1774	-----	-----
1775	finishings-col (no-value 1setOf collection)	[PWG5100.1]
1776	baling (collection)	[PWG5100.1]
1777	baling-type (type2 keyword name(MAX))	[PWG5100.1]
1778	baling-when (type2 keyword)	[PWG5100.1]
1779	binding (collection)	[PWG5100.1]
1780	binding-reference-edge (type1 keyword)	[PWG5100.1]
1781	binding-type (type2 keyword name(MAX))	[PWG5100.1]
1782	coating (collection)	[PWG5100.1]
1783	coating-sides (type1 keyword)	[PWG5100.1]
1784	coating-type (type2 keyword name(MAX))	[PWG5100.1]
1785	covering (collection)	[PWG5100.1]
1786	covering-name (type2 keyword name(MAX))	[PWG5100.1]
1787	finishing-template (name(MAX) type2 keyword)	[PWG5100.1]
1788	folding (1setOf collection)	[PWG5100.1]
1789	folding-direction (type1 keyword)	[PWG5100.1]
1790	folding-offset (integer(0:MAX))	[PWG5100.1]
1791	folding-reference-edge (type1 keyword)	[PWG5100.1]
1792	imposition-template (type2 keyword name(MAX))	[PWG5100.1]
1793	laminating (collection)	[PWG5100.1]
1794	laminating-sides (type1 keyword)	[PWG5100.1]
1795	laminating-type (type2 keyword name(MAX))	[PWG5100.1]
1796	media-sheets-supported (rangeOfInteger(1:MAX))	[PWG5100.1]
1797	media-size (collection)	[PWG5100.1]
1798	media-size-name (type2 keyword)	[PWG5100.1]
1799	punching (collection)	[PWG5100.1]
1800	punching-locations (1setOf integer(0:MAX))	[PWG5100.1]
1801	punching-offset (integer(0:MAX))	[PWG5100.1]
1802	punching-reference-edge (type1 keyword)	[PWG5100.1]
1803	stitching (collection)	[PWG5100.3]
1804	stitching-angle (integer(0:359))	[PWG5100.1]
1805	stitching-method (type2 keyword)	[PWG5100.1]
1806	trimming (1setOf collection)	[PWG5100.1]
1807	trimming-offset (integer(0:MAX))	[PWG5100.1]
1808	trimming-reference-edge (type1 keyword)	[PWG5100.1]
1809	trimming-type (type2 keyword name(MAX))	[PWG5100.1]
1810	trimming-when (type2 keyword)	[PWG5100.1]
1811	job-pages-per-set (integer(1:MAX))	[PWG5100.1]
1812		
1813		
1814	Printer Description attributes:	Reference
1815	-----	-----
1816	baling-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1817	baling-when-supported (1setOf type2 keyword)	[PWG5100.1]
1818	binding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1819	binding-type-supported (1setOf type2 keyword)	[PWG5100.1]
1820	coating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1821	coating-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1822	covering-name-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1823		[PWG5100.1]
1824	finishing-template-supported (1setOf (name(MAX) type2 keyword))	[PWG5100.1]
1825		[PWG5100.1]
1826	finishings-col-database (1setOf collection)	[PWG5100.1]

1827	< member attributes are the same as finishings-col >	[PWG5100.1]
1828	folding-direction-supported (1setOf type1 keyword)	[PWG5100.1]
1829	folding-offset-supported (1setOf (integer(0:MAX) rangeOfInteger(0:MAX)))	[PWG5100.1]
1830		[PWG5100.1]
1831	folding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1832	laminating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1833	laminating-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1834		[PWG5100.1]
1835	job-pages-per-set-supported (boolean)	[PWG5100.1]
1836	printer-finisher (1setOf octetString(MAX))	[PWG5100.1]
1837	printer-finisher-description (1setOf text(MAX))	[PWG5100.1]
1838	printer-finisher-supplies (1setOf octetString(MAX))	[PWG5100.1]
1839	printer-finisher-supplies-description (1setOf text(MAX))	[PWG5100.1]
1840	punching-hole-diameter-configured (integer(0:MAX))	[PWG5100.1]
1841	punching-locations-supported (1setOf (integer(0:MAX)	
1842	rangeOfInteger(0:MAX)))	[PWG5100.1]
1843	punching-offset-supported (1setOf (integer(0:MAX)	
1844	rangeOfInteger(0:MAX)))	[PWG5100.1]
1845	punching-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1846	stitching-angle-supported (1setOf (integer(0:359)	
1847	rangeOfInteger(0:359)))	[PWG5100.1]
1848	stitching-method-supported (1setOf (type2 keyword))	[PWG5100.1]
1849	trimming-offset-supported (1setOf (integer(0:MAX)	
1850	rangeOfInteger(0:MAX)))	[PWG5100.1]
1851	trimming-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1852	trimming-type-supported (1setOf type2 keyword)	[PWG5100.1]
1853	trimming-when-supported (1setOf type2 keyword)	[PWG5100.1]

1854 **10.2 Attribute Value Registrations**

1855 The keyword attribute values defined in this document will be published by IANA according
 1856 to the procedures in the IPP Model and Semantics [RFC8011] section 6.1 in the following
 1857 file:

1858 <http://www.iana.org/assignments/ipp-registrations>

1859 The registry entries will contain the following information:

1860	Attributes (attribute syntax)	Reference
1861	Keyword Attribute Value	-----
1862	-----	
1863	baling-type (type2 keyword name(MAX))	[PWG5100.1]
1864	band	[PWG5100.1]
1865	shrink-wrap	[PWG5100.1]
1866	wrap	[PWG5100.1]
1867	baling-type-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1868	< all baling-type values >	
1869		
1870	baling-when (type2 keyword)	[PWG5100.1]
1871	after-sets	[PWG5100.1]
1872	after-job	[PWG5100.1]
1873	baling-when-supported (1setOf type2 keyword)	[PWG5100.1]
1874	< all baling-when values >	[PWG5100.1]
1875		

1876	binding-reference-edge (type1 keyword)	[PWG5100.1]
1877	bottom	[PWG5100.1]
1878	left	[PWG5100.1]
1879	right	[PWG5100.1]
1880	top	[PWG5100.1]
1881	binding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
1882	< all binding-reference-edge values >	[PWG5100.1]
1883		
1884	binding-type (type2 keyword name(MAX))	[PWG5100.1]
1885	adhesive	[PWG5100.1]
1886	comb	[PWG5100.1]
1887	flat	[PWG5100.1]
1888	padding	[PWG5100.1]
1889	perfect	[PWG5100.1]
1890	spiral	[PWG5100.1]
1891	tape	[PWG5100.1]
1892	velo	[PWG5100.1]
1893	binding-type-supported ((1setOf type2 keyword name(MAX)))	[PWG5100.1]
1894	< all binding-type values >	[PWG5100.1]
1895		
1896	coating-sides (type1 keyword)	[PWG5100.1]
1897	back	[PWG5100.1]
1898	both	[PWG5100.1]
1899	front	[PWG5100.1]
1900	coating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
1901	< all coating-sides values >	[PWG5100.1]
1902		
1903	coating-type (type2 keyword name(MAX))	[PWG5100.1]
1904	archival	[PWG5100.1]
1905	archival-glossy	[PWG5100.1]
1906	archival-matte	[PWG5100.1]
1907	archival-semi-gloss	[PWG5100.1]
1908	glossy	[PWG5100.1]
1909	high-gloss	[PWG5100.1]
1910	matte	[PWG5100.1]
1911	semi-gloss	[PWG5100.1]
1912	silicone	[PWG5100.1]
1913	translucent	[PWG5100.1]
1914	coating-type-supported ((1setOf type2 keyword name(MAX)))	[PWG5100.1]
1915	< all coating-type values >	[PWG5100.1]
1916		
1917	covering-name (type2 keyword name(MAX))	[PWG5100.1]
1918	plain	[PWG5100.1]
1919	pre-cut	[PWG5100.1]
1920	pre-printed	[PWG5100.1]
1921	covering-name-supported (1setOf (type2 keyword name(MAX)))	[PWG5100.1]
1922	< all covering-name values >	[PWG5100.1]
1923		
1924		
1925	finishing-template (name(MAX) type2 keyword)	[PWG5100.1]
1926	bale	[PWG5100.1]
1927	bind	[PWG5100.1]
1928	bind-bottom	[PWG5100.1]
1929	bind-left	[PWG5100.1]
1930	bind-right	[PWG5100.1]
1931	bind-top	[PWG5100.1]

1932	booklet-maker	[PWG5100.1]
1933	coat	[PWG5100.1]
1934	cover	[PWG5100.1]
1935	edge-stitch	[PWG5100.1]
1936	edge-stitch-bottom	[PWG5100.1]
1937	edge-stitch-left	[PWG5100.1]
1938	edge-stitch-right	[PWG5100.1]
1939	edge-stitch-top	[PWG5100.1]
1940	fold	[PWG5100.1]
1941	fold-accordion	[PWG5100.1]
1942	fold-double-gate	[PWG5100.1]
1943	fold-engineering-z	[PWG5100.1]
1944	fold-gate	[PWG5100.1]
1945	fold-half	[PWG5100.1]
1946	fold-half-z	[PWG5100.1]
1947	fold-left-gate	[PWG5100.1]
1948	fold-letter	[PWG5100.1]
1949	fold-parallel	[PWG5100.1]
1950	fold-poster	[PWG5100.1]
1951	fold-right-gate	[PWG5100.1]
1952	fold-z	[PWG5100.1]
1953	jdf-f2-1	[PWG5100.1]
1954	jdf-f4-1	[PWG5100.1]
1955	jdf-f4-2	[PWG5100.1]
1956	jdf-f6-1	[PWG5100.1]
1957	jdf-f6-2	[PWG5100.1]
1958	jdf-f6-3	[PWG5100.1]
1959	jdf-f6-4	[PWG5100.1]
1960	jdf-f6-5	[PWG5100.1]
1961	jdf-f6-6	[PWG5100.1]
1962	jdf-f6-7	[PWG5100.1]
1963	jdf-f6-8	[PWG5100.1]
1964	jdf-f8-1	[PWG5100.1]
1965	jdf-f8-2	[PWG5100.1]
1966	jdf-f8-3	[PWG5100.1]
1967	jdf-f8-4	[PWG5100.1]
1968	jdf-f8-5	[PWG5100.1]
1969	jdf-f8-6	[PWG5100.1]
1970	jdf-f8-7	[PWG5100.1]
1971	jdf-f10-1	[PWG5100.1]
1972	jdf-f10-2	[PWG5100.1]
1973	jdf-f10-3	[PWG5100.1]
1974	jdf-f12-1	[PWG5100.1]
1975	jdf-f12-2	[PWG5100.1]
1976	jdf-f12-3	[PWG5100.1]
1977	jdf-f12-4	[PWG5100.1]
1978	jdf-f12-5	[PWG5100.1]
1979	jdf-f12-6	[PWG5100.1]
1980	jdf-f12-7	[PWG5100.1]
1981	jdf-f12-8	[PWG5100.1]
1982	jdf-f12-9	[PWG5100.1]
1983	jdf-f12-10	[PWG5100.1]
1984	jdf-f12-11	[PWG5100.1]
1985	jdf-f12-12	[PWG5100.1]
1986	jdf-f12-13	[PWG5100.1]
1987	jdf-f12-14	[PWG5100.1]

1988	jdf-f14-1	[PWG5100.1]
1989	jdf-f16-1	[PWG5100.1]
1990	jdf-f16-2	[PWG5100.1]
1991	jdf-f16-3	[PWG5100.1]
1992	jdf-f16-4	[PWG5100.1]
1993	jdf-f16-5	[PWG5100.1]
1994	jdf-f16-6	[PWG5100.1]
1995	jdf-f16-7	[PWG5100.1]
1996	jdf-f16-8	[PWG5100.1]
1997	jdf-f16-9	[PWG5100.1]
1998	jdf-f16-10	[PWG5100.1]
1999	jdf-f16-11	[PWG5100.1]
2000	jdf-f16-12	[PWG5100.1]
2001	jdf-f16-13	[PWG5100.1]
2002	jdf-f16-14	[PWG5100.1]
2003	jdf-f18-1	[PWG5100.1]
2004	jdf-f18-2	[PWG5100.1]
2005	jdf-f18-3	[PWG5100.1]
2006	jdf-f18-4	[PWG5100.1]
2007	jdf-f18-5	[PWG5100.1]
2008	jdf-f18-6	[PWG5100.1]
2009	jdf-f18-7	[PWG5100.1]
2010	jdf-f18-8	[PWG5100.1]
2011	jdf-f18-9	[PWG5100.1]
2012	jdf-f20-1	[PWG5100.1]
2013	jdf-f20-2	[PWG5100.1]
2014	jdf-f24-1	[PWG5100.1]
2015	jdf-f24-2	[PWG5100.1]
2016	jdf-f24-3	[PWG5100.1]
2017	jdf-f24-4	[PWG5100.1]
2018	jdf-f24-5	[PWG5100.1]
2019	jdf-f24-6	[PWG5100.1]
2020	jdf-f24-7	[PWG5100.1]
2021	jdf-f24-8	[PWG5100.1]
2022	jdf-f24-9	[PWG5100.1]
2023	jdf-f24-10	[PWG5100.1]
2024	jdf-f24-11	[PWG5100.1]
2025	jdf-f28-1	[PWG5100.1]
2026	jdf-f32-1	[PWG5100.1]
2027	jdf-f32-2	[PWG5100.1]
2028	jdf-f32-3	[PWG5100.1]
2029	jdf-f32-4	[PWG5100.1]
2030	jdf-f32-5	[PWG5100.1]
2031	jdf-f32-6	[PWG5100.1]
2032	jdf-f32-7	[PWG5100.1]
2033	jdf-f32-8	[PWG5100.1]
2034	jdf-f32-9	[PWG5100.1]
2035	jdf-f36-1	[PWG5100.1]
2036	jdf-f36-2	[PWG5100.1]
2037	jdf-f40-1	[PWG5100.1]
2038	jdf-f48-1	[PWG5100.1]
2039	jdf-f48-2	[PWG5100.1]
2040	jdf-f64-1	[PWG5100.1]
2041	jdf-f64-2	[PWG5100.1]
2042	jog-offset	[PWG5100.1]
2043	laminare	[PWG5100.1]

2044	punch	[PWG5100.1]
2045	punch-bottom-left	[PWG5100.1]
2046	punch-bottom-right	[PWG5100.1]
2047	punch-dual-bottom	[PWG5100.1]
2048	punch-dual-left	[PWG5100.1]
2049	punch-dual-right	[PWG5100.1]
2050	punch-dual-top	[PWG5100.1]
2051	punch-multiple-bottom	[PWG5100.1]
2052	punch-multiple-left	[PWG5100.1]
2053	punch-multiple-right	[PWG5100.1]
2054	punch-multiple-top	[PWG5100.1]
2055	punch-quad-bottom	[PWG5100.1]
2056	punch-quad-left	[PWG5100.1]
2057	punch-quad-right	[PWG5100.1]
2058	punch-quad-top	[PWG5100.1]
2059	punch-top-left	[PWG5100.1]
2060	punch-top-right	[PWG5100.1]
2061	punch-triple-bottom	[PWG5100.1]
2062	punch-triple-left	[PWG5100.1]
2063	punch-triple-right	[PWG5100.1]
2064	punch-triple-top	[PWG5100.1]
2065	saddle-stitch	[PWG5100.1]
2066	staple	[PWG5100.1]
2067	staple-bottom-left	[PWG5100.1]
2068	staple-bottom-right	[PWG5100.1]
2069	staple-dual-bottom	[PWG5100.1]
2070	staple-dual-left	[PWG5100.1]
2071	staple-dual-right	[PWG5100.1]
2072	staple-dual-top	[PWG5100.1]
2073	staple-top-left	[PWG5100.1]
2074	staple-top-right	[PWG5100.1]
2075	staple-triple-bottom	[PWG5100.1]
2076	staple-triple-left	[PWG5100.1]
2077	staple-triple-right	[PWG5100.1]
2078	staple-triple-top	[PWG5100.1]
2079	trim	[PWG5100.1]
2080	trim-after-copies	[PWG5100.1]
2081	trim-after-documents	[PWG5100.1]
2082	trim-after-job	[PWG5100.1]
2083	trim-after-pages	[PWG5100.1]
2084	finishing-template-supported (1setOf (type2 keyword name (MAX))	
2085		[PWG5100.1]
2086	< any finishing-template value >	[PWG5100.1]
2087		
2088	folding-direction (type1 keyword)	[PWG5100.1]
2089	inward	[PWG5100.1]
2090	outward	[PWG5100.1]
2091	folding-direction-supported (1setOf type1 keyword)	[PWG5100.1]
2092	< all folding-direction values >	[PWG5100.1]
2093		
2094	folding-reference-edge (type1 keyword)	[PWG5100.1]
2095	bottom	[PWG5100.1]
2096	left	[PWG5100.1]
2097	right	[PWG5100.1]
2098	top	[PWG5100.1]
2099	folding-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]

2100	< all folding-reference-edge values >	[PWG5100.1]
2101		
2102	laminating-sides (type1 keyword)	[PWG5100.1]
2103	back	[PWG5100.1]
2104	both	[PWG5100.1]
2105	front	[PWG5100.1]
2106	laminating-sides-supported (1setOf type1 keyword)	[PWG5100.1]
2107	< all laminating-sides values >	[PWG5100.1]
2108		
2109	laminating-type (type2 keyword name(MAX))	[PWG5100.1]
2110	archival	[PWG5100.1]
2111	glossy	[PWG5100.1]
2112	high-gloss	[PWG5100.1]
2113	matte	[PWG5100.1]
2114	semi-gloss	[PWG5100.1]
2115	translucent	[PWG5100.1]
2116	laminating-type-supported ((1setOf type2 keyword name(MAX)))	[PWG5100.1]
2117		[PWG5100.1]
2118	< all laminating-type values >	[PWG5100.1]
2119		
2120	punching-reference-edge (type1 keyword)	[PWG5100.1]
2121	bottom	[PWG5100.1]
2122	left	[PWG5100.1]
2123	right	[PWG5100.1]
2124	top	[PWG5100.1]
2125	punching-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2126	< all punching-reference-edge values >	[PWG5100.1]
2127		
2128	stitching-method (type2 keyword)	[PWG5100.1]
2129	auto	[PWG5100.1]
2130	crimp	[PWG5100.1]
2131	wire	[PWG5100.1]
2132	stitching-method-supported (1setOf type2 keyword)	[PWG5100.1]
2133	< all stitching-method values >	[PWG5100.1]
2134		
2135	trimming-reference-edge (type1 keyword)	[PWG5100.1]
2136	bottom	[PWG5100.1]
2137	left	[PWG5100.1]
2138	right	[PWG5100.1]
2139	top	[PWG5100.1]
2140	trimming-reference-edge-supported (1setOf type1 keyword)	[PWG5100.1]
2141	< all trimming-reference-edge values >	[PWG5100.1]
2142		
2143	trimming-type (type2 keyword name(MAX))	[PWG5100.1]
2144	draw-line	[PWG5100.1]
2145	full	[PWG5100.1]
2146	partial	[PWG5100.1]
2147	perforate	[PWG5100.1]
2148	score	[PWG5100.1]
2149	tab	[PWG5100.1]
2150	trimming-type-supported (1setOf type2 keyword)	[PWG5100.1]
2151	< all trimming-type values >	[PWG5100.1]
2152		
2153	trimming-when (type2 keyword)	[PWG5100.1]
2154	after-documents	[PWG5100.1]
2155	after-job	[PWG5100.1]

2156 after-sheets [PWG5100.1]
 2157 after-sets [PWG5100.1]
 2158 trimming-when-supported (1setOf type2 keyword) [PWG5100.1]
 2159 < all trimming-when values > [PWG5100.1]

2160 **10.3 Type2 enum Attribute Value Registrations**

2161 The enumerations defined in this document will be published by IANA according to the
 2162 procedures in the IPP Model and Semantics [RFC8011] section 6.2 in the following file:

2163 <http://www.iana.org/assignments/ipp-registrations>

2164 The registry entries will contain the following information:

2165	Attributes (attribute syntax)		
2166	Enum Value	Enum Symbolic Name	Reference
2167	-----	-----	-----
2168	finishings (1setOf type2 enum)		[RFC8011]
2169	15	coat	[PWG5100.1]
2170	16	laminate	[PWG5100.1]
2171	32	staple-triple-left	[PWG5100.1]
2172	33	staple-triple-top	[PWG5100.1]
2173	34	staple-triple-right	[PWG5100.1]
2174	35	staple-triple-bottom	[PWG5100.1]
2175	70	punch-top-left	[PWG5100.1]
2176	71	punch-bottom-left	[PWG5100.1]
2177	72	punch-top-right	[PWG5100.1]
2178	73	punch-bottom-right	[PWG5100.1]
2179	74	punch-dual-left	[PWG5100.1]
2180	75	punch-dual-top	[PWG5100.1]
2181	76	punch-dual-right	[PWG5100.1]
2182	77	punch-dual-bottom	[PWG5100.1]
2183	78	punch-triple-left	[PWG5100.1]
2184	79	punch-triple-top	[PWG5100.1]
2185	80	punch-triple-right	[PWG5100.1]
2186	81	punch-triple-bottom	[PWG5100.1]
2187	82	punch-quad-left	[PWG5100.1]
2188	83	punch-quad-top	[PWG5100.1]
2189	84	punch-quad-right	[PWG5100.1]
2190	85	punch-quad-bottom	[PWG5100.1]
2191	86	punch-multiple-left	[PWG5100.1]
2192	87	punch-multiple-top	[PWG5100.1]
2193	88	punch-multiple-right	[PWG5100.1]
2194	89	punch-multiple-bottom	[PWG5100.1]
2195	90	fold-accordion	[PWG5100.1]
2196	91	fold-double-gate	[PWG5100.1]
2197	92	fold-gate	[PWG5100.1]
2198	93	fold-half	[PWG5100.1]
2199	94	fold-half-z	[PWG5100.1]
2200	95	fold-left-gate	[PWG5100.1]
2201	96	fold-letter	[PWG5100.1]
2202	97	fold-parallel	[PWG5100.1]
2203	98	fold-poster	[PWG5100.1]
2204	99	fold-right-gate	[PWG5100.1]

2205	100	fold-z	[PWG5100.1]
2206	101	fold-engineering-z	[PWG5100.1]

2207 **10.4 PWG Semantic Model Registrations**

2208 The IPP attributes and values defined in this specification and listed in the preceding
2209 sections will be added to the PWG Semantic Model XML schema using the method defined
2210 in section 21 of [PWG5108.07].

2211 **11. Overview of Changes**

2212 **11.1 Changes in IPP Finishings v2.1**

2213 The following changes were made for IPP Finishings v2.1:

- 2214 • Added finishing enums and templates for multiple-hole punching and an engineering Z
2215 fold.
- 2216 • Defined an extension naming convention for the "finishing-template" member attribute.
- 2217 • Added the "media-sheets-supported" member attribute for the "finishings-col-database"
2218 and "finishings-col-ready" attributes.
- 2219 • Added the "stitching-method" member attribute for the "finishings-col", "finishings-col-
2220 database", and "finishings-col-ready" attributes.
- 2221 • Added the "printer-finisher-supplies" and "printer-finisher-supplies-description"
2222 attributes.

2223 **11.2 Changes in IPP Finishings v2.0**

2224 The following changes were made for IPP Finishings v2.0:

- 2225 • Moved definition of PWG 5100.3 "finishings-col" attribute to this document and added
2226 new member attributes for all finishings processes.
- 2227 • Added finishing enums and templates for coating, lamination, triple stapling, different
2228 kinds of punching, and common folds.
- 2229 • Added the "finishings-col-database" and "job-pages-per-set" attributes.
- 2230 • Added the "media-size" and "media-size-name" member attributes for the "finishings-col-
2231 database" and "finishings-col-ready" attributes.

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2352 Richard Blanchard (Apple)
2353 Ira McDonald (High North)
2354 Rick Yardumian (Canon)

2355 **14. Change History**

2356 **14.1 February 16, 2017**

2357 Updated to resolve editorial comments received during formal vote:

- 2358 • From Mike Sweet (Apple):
- 2359 ○ Section 5.2.4.3 should be a level 3 heading (covering)
 - 2360 ○ IANA considerations are missing definitions of the following finishings-col
2361 member attributes: imposition-template, media-sheets-supported, media-size,
2362 media-size-name

- 2363 ○ IANA considerations are missing definitions of the following Printer Description
2364 attributes: printer-finisher-supplies, printer-finisher-supplies-description
- 2365 ● From Smith Kennedy (HP Inc.):
 - 2366 ○ Replace all references to RFC 2910 to instead point to RFC 8010
 - 2367 ○ Replace all references to RFC 2911 to instead point to RFC 8011
- 2368 ● From IPP WG meeting review 2017-03-02
 - 2369 ○ Removed RFC 3382 references and mention since RFC 8011 deprecates it
 - 2370 ○ Added Internationalization Considerations content from IPP3D
 - 2371 ○ Added Security Considerations content from IPP3D where appropriate
 - 2372 ○ Changed all IETF RFC links to use the general form
2373 "https://tools.ietf.org/html/rfcXXXX" rather than the traditional form
2374 "http://www.ietf.org/rfc/rfcXXXX.txt"

2375 **14.2 January 17, 2017**

2376 Updated Last Call Resolved Comments draft:

- 2377 ● SK1: Reworded first paragraph of section 5.3 to better articulate the relationship
2378 between "copies", "job-pages-per-set" and document formats.
- 2379 ● JR3: From "REJECTED" to "RESOLVED (IN SPIRIT)", and also adopted the SMI
2380 vendor extension scheme from RFC 8011 draft, which will be the new PWG norm.
2381 Also fixed references cascading from new SMI vendor extension convention.
- 2382 ● WW1: Drop "Loosely stated" from second sentence of Section 4.

2383 **14.3 January 11, 2017**

2384 Last Call Resolved Comments draft:

- 2385 ● SK1: Add to the definition of "job-pages-per-set" mention that the value for this
2386 attribute MUST match "copies" if "copies" is included in the job creation / document
2387 submission operation.
- 2388 ● SK2: Replace "media-source-feed-orientation" with "media-source-feed-direction" in
2389 the "job-constraints-supported" / "job-resolvers-supported" example on page 45
- 2390 ● JR1: Section 3.3.3 explicitly discusses ordering of options yet in 3.4 Out of Scope #1
2391 claims the opposite.

2392 14.4 November 9, 2016

2393 Minor editorial changes

2394 • Added new section 11 "Overview of Changes"

2395 • Minor rewording of a sentence to fix Word formatting weirdness that occurs when a
2396 reference is at the start of a paragraph.

2397 14.5 October 25, 2016

2398 Updated as per notes from Oct. 19, 2016 IPP WG Meeting to resolve a wide range of editorial
2399 issues. No technical updates. Possibly ready for WGLC.

2400 • Fixed ABNF / tables / examples in 6.18-6.21

2401 • Cross-referenced "job-media-sheets-supported"

2402 • Various editorial fixes

2403 14.6 October 18, 2016

2404 A variety of issues resolved following feedback and discussion in the WG meeting and on
2405 the reflector:

2406 • Added a new "media-sheets-supported" member attribute to "finishings-col" to specify
2407 the minimum and maximum number of sheets supported by the finishing template
2408 described in the "finishings-col", because this now allows it to be specified on a per-
2409 finishing-template basis.

2410 • Updated definition of "printer-finisher-supplies" to have correct ABNF and examples

2411 • Added a new "printer-finisher-supplies-description" attribute to convey the localized
2412 string label for a "printer-finisher-supplies" supply.

2413 • Add a non-normative reference to the PAPI specification.

2414 • Fixed the structure of several of the examples to use a PAPI syntactic presentation,
2415 for consistency with other recent PWG specifications and other examples within this
2416 specification

2417 • Added IANA listings for 'punch-multiple-bottom', 'punch-multiple-left', 'punch-multiple-
2418 right', and 'punch-multiple-top', for completeness.

2419 14.7 October 4, 2016

2420 Updated following discussion on IPP reflector and other discussions:

- 2421 • In section 5.3 , enhanced definition of "job-pages-per-set" to clarify that the value
2422 needs to be an exact multiple of the number of pages in all Documents in the Job,
2423 which also clarifies the expectations of how that attribute value is set in the case of a
2424 multiple document Job.
- 2425 • Modified the "job-constraints-supported" attribute example at the end of section 6.9:
 - 2426 ○ Removed mention of "media-source"='tray-2' because the input source doesn't
2427 matter.
 - 2428 ○ Added a second value to "finishings" and "finishing-template" so that the
2429 example illustrates that attributes in a constraint can have more than one value
2430 even when the attribute itself is defined to have only one value. Also called this
2431 out with an additional sentence below the example.
 - 2432 ○ Moved open curly braces to the same line as the equal sign to reduce number
2433 of lines used
- 2434 • Modified the "job-resolvers-supported" attribute example at the end of section 6.9:
 - 2435 ○ make the resolution either use "short-edge-feed" or to change the media
2436 source to 'manual' where the user might be instructed via a prompt to provide
2437 the needed media size and feed orientation.
 - 2438 ○ Moved open curly braces to the same line as the equal sign to reduce number
2439 of lines used
 - 2440 ○ Removed mention of alternate stitching angles because they don't resolve the
2441 problem

2442 14.8 September 26, 2016

2443 In the process of considering how the Printer can indicate the maximum number of sheets
2444 supported by one of its finisher units, a few additions were made.

- 2445 • Made some modifications to the "printer-finisher" definition including updates to 'Table
2446 2 - Keywords for "printer-finisher"'.
 - 2447 • Added a new "printer-finisher-supplies" attribute that conveys the finisher unit's
2448 supplies information, which is defined in "Printer Finishing MIB" [RFC3806] but has
2449 no IPP equivalent.

- 2450 • Added a comment to section 5.3 "job-pages-per-set" asking for a description of how
2451 "job-pages-per-set" would work in the case where the Job contains multiple
2452 Documents.

2453 **14.9 August 15, 2016**

2454 Updated to Stable draft status. No changes other than updating the status label and the
2455 date.

2456 **14.10 July 28, 2016**

2457 Updated to become a Prototype draft as per minutes and discussion in July 25, 2016 IPP
2458 WG meeting:

- 2459 • Fix wording in section 5.1
- 2460 • Fix formatting in section 5.2
- 2461 • Update text in 5.2.1
- 2462 • Change all double quotes around values to single quotes
- 2463 • Change all uses of the word "Job" to be capitalized
- 2464 • Reworded section 6.10 a bit, and fixed example for "job-constraints-supported" and
2465 "job-resolvers-supported"
- 2466 • Fixed formatting of subsections of 6.18 which got messed up through the amazing
2467 powers of MS Word
- 2468 • Various editorial fixes to clean up the document

2469 **14.11 July 20, 2016**

2470 Updated as per minutes from IPP Working Group meetings on May 23 and June 13, 2016
2471 and additional email dialogs on the IPP Working Group reflector:

- 2472 • Added subtype naming convention to definition of "finishing-template" to support, for
2473 instance, the Swedish "trio binding" 4-hole punch pattern without having to define a
2474 new base "finishings" enum value and "finishing-template" keyword
- 2475 • Elaborated description of "finishings-col-database" to cover several needed topics
- 2476 ○ Updated the example to include "punch-triple-left" and renamed "staple" to be
2477 "staple-top-left"

- 2478 ○ Used the example to clarify that the "finishings-col" collections each could
2479 define the details of a particular "finishing-template" keyword, and that
2480 combinatorial permutations produced by combining 2 or more keyword
2481 definitions (e.g. "staple-top-left_punch-triple-left") could not be enumerated in
2482 "finishings-col-database" or "finishings-col-ready"; a Client could be able to
2483 combine them on its own
- 2484 ○ Recommended the use of "job-constraints-supported" and "job-resolvers-
2485 supported" to define limitations between "finishings-col" collections and
2486 particular feed orientations or similar interactions between finishings attributes
2487 and other Job Template attributes (e.g.
- 2488 • Removed "feed-orientation" member attribute from "finishings-col" because this is
2489 now handled using "job-constraints-supported" and "job-resolvers-supported"
- 2490 • Updated Figure 1 and Figure 2 and added a new Figure 3 to show the orientation and
2491 leading edge with "feed-orientation" = 'long-edge-first'
- 2492 • Added a missing "fold-engineering-z" entry in section 10.2 for "finishing-template"

2493 **14.12 May 9, 2016**

- 2494 Updated as per minutes from April 2016 F2F IPP WG minutes (ippv2-f2f-minutes-
2495 20160427.pdf):
- 2496 • Moved the new use 3.2.17 to the exceptions sub-section (3.3) and reworded
- 2497 • Removed "punching-hole-diameter" as a member attribute of "punching", and
2498 replaced "punching-hole-diameter-supported" with "punching-hole-diameter-
2499 configured" since at this time there are no printers with finishers that support alternate
2500 hole diameters.
- 2501 • Changed staple rotation back to use counter-clockwise rotation, and specified
2502 horizontal as 0°
- 2503 • Cleaned up IANA registration listings to remove some that are unnecessarily
2504 redundant with 5100.3
- 2505 • Added references to 5101.1 and RFC 20

2506

2507 **14.13 April 18, 2016**

- 2508 Updated as per feedback from 2016-04-11 conference call, in preparation for April 2016
2509 F2F.

- 2510 • Updated IANA Attribute Registrations to add attribute listings new in 2.1, as well as
2511 ones in 2.0 that were missing in this section
- 2512 • Fixed text for punching and stitching to simplify descriptions of location, and
2513 stopped using the term "origin"
- 2514 • Added the "stitching-method" member attribute to "stitching", and the "stitching-
2515 method-supported" Printer Description attribute
- 2516 • Updated references to list Finishings 2.0 as an informative reference
- 2517 • Added mention of 'fold-engineering-z' in 5.2.6.4 and in 5.1.x "finishings" value
2518 listings
- 2519 • Added 'draw-line' keyword to "trimming-type"
2520

2521 **14.14 April 11, 2016**

2522 Initial revision of v2.1.

- 2523 • Added statement clarifying the location of the origin (primary point of reference) of a
2524 punch hole
- 2525 • Added "punching-hole-diameter" attribute to allow the punch hole's diameter to be
2526 specified, and corresponding "punching-hole-diameter-supported" Printer attribute
- 2527 • Added statement clarifying the location of the origin (primary point of reference) of a
2528 stitch / staple
- 2529 • Added "stitching-angle" member attribute to stitching to allow the stitch or staple's
2530 angle to be specified, and corresponding "stitching-angle-supported" Printer
2531 attribute

2532