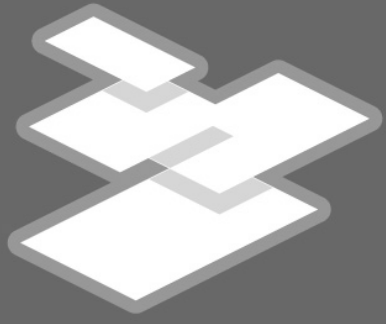
invent

hp LaserJet printer family



print media guide

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Overview

Introduction

HP LaserJet printers quickly and quietly produce documents with excellent print quality. A variety of print media, including paper, envelopes, labels, and overhead transparencies can be used in your HP LaserJet printer. However, to ensure consistent performance and long-term reliability, the print media must be designed for use with laser printers. There are many choices of high-quality print media available to laser printer users.

This guide provides useful guidelines for selecting and using print media that will give you the best performance with most HP LaserJet printers. It also contains information to help troubleshoot HP LaserJet printer problems that may be caused by poor-quality print media.

Note This document does not support HP LaserJet 2686A, HP LaserJet Plus, HP LaserJet 500, or HP LaserJet 2000 printers. See the user guide for each printer for information about print media specifications.

Note When HP LaserJet printers are discussed in this guide, the information pertains to both HP Monochrome LaserJet printers and HP Color LaserJet printers unless otherwise noted.

How HP LaserJet printers work

HP LaserJet printers use laser and electrophotographic technologies. To print a page in a laser printer, the print media must be picked from the input tray one sheet at a time and transported through the paper path. While passing through the paper path, a scanning laser beam writes an electrostatic image onto a rotating photosensitive drum. As this image passes the developing station, a dry, powdery toner is attracted to the imaged areas. In an HP Color LaserJet printer, this process is repeated for each of the four toner colors.

The developed image then advances to the transfer station where the drum contacts the paper or other print media and the toner image is electrostatically transferred onto the paper. After transfer, the print media passes through the fuser where heat is applied and the toner fuses (melts) onto the print media. The print media is then delivered to the output bin, ready for use.

To summarize, to create the printed image the print media must be transported through the printer, charged electrostatically, and heated. This is why print media properties such as electrical resistivity, caliper, finish, moisture content, and stiffness can affect the print quality and media-handling performance of your HP LaserJet printer.

Alternate sources of information

The media manufacturer and vendor can provide you with information about the suitability of print media for an HP LaserJet printer.

If you have tried the suggestions outlined in this document and in your user guide and you still need assistance, call the dealer from whom you purchased your printer. You can also obtain support through the worldwide network of HP Sales and Service Offices. (See the sales and service listings located in any HP LaserJet printer user guide.)

Visit HP's website at http://www.hp.com to find out more about your HP printer and HP print media.

General Information

Guidelines for purchasing and using print media

HP LaserJet printers are designed to be flexible in the types of print media they can use. However, it is advisable to use good quality media, and specifically, HP paper that is designed to work with your HP LaserJet printers (see "Purchasing HP print media"). This section is designed to help you select media that works best with your HP LaserJet printer.

Note

Properties of print media are subject to change. Hewlett-Packard has no control over such changes. The customer assumes all responsibility for the quality and performance of media. Although testing media helps to characterize its performance, long-term satisfaction requires process quality control by the manufacturer and proper handling and storage by the customer.

Types of print media to avoid

The following characteristics can affect the performance of your HP LaserJet printer unless the paper or other print media you are using is specifically designed to work with your HP LaserJet printer.

- Print media that is very rough, highly textured, or heavily embossed.
- Print media with multipart forms.
- Print media that offsets or discolors.
- Print media that is damaged, curled, wrinkled, or irregularly shaped.
- Paper that is extremely shiny or glossy.
- Paper, labels, envelopes, media coatings, dyes, or inks that produce undesirable emissions or melt when exposed to a fusing temperature of 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).
- Overhead tranparency material that produces undesirable emissions or melt when exposed to a fusing temperature of 205° C (401° F) for 0.1 second (0.4 second for HP Color LaserJet printers).
- Envelopes that have an open flap with the adhesive exposed so that closing the flap seals the envelope.
- Envelopes with clasps, snaps, tie strings, windows, or synthetic materials. These materials can severely damage the printer.
- Envelopes that are not square, straight, or constructed correctly (see "Envelope construction").
- Envelopes with a basis weight less than 60 g/m^2 (16 lb) or greater than 105 g/m^2 (28 lb).
- Envelopes with baggy construction or folds that are not sharply creased.

Testing small amounts of print media

If you are planning a large purchase of print media, first print a small quantity in your printing environment. Subject the print media to the temperature, humidity, and printing applications in which the print media will be used. Hewlett-Packard recommends that you ask your print media vendor for a guarantee that its print media will perform satisfactorily in your HP LaserJet printer and that the vendor will assume responsibility for the replacement of any print media that does not print acceptably.

Note HP recommends testing print media before purchasing large quantities.

Paper

“Plain paper” is a misnomer. All papers are designed and manufactured for a specific use. Papers designed for the electrophotographic process used by laser printer and copy machines are usually called laser, photocopy, or xerographic grade papers. High quality laser and photocopy papers are usually made from 100% chemical wood pulp and are characterized by a smooth surface, controlled electrical properties, heat stability, and cleanliness. These characteristics ensure good image transfer, fusing without excessive curl, and reliable printer operation.

Use conventional white photocopy paper for most printing. The paper should be high quality and free of the following:

- cuts
- tears
- grease spots
- loose particles
- dust
- wrinkles voids
- curled or bent edges

Some print jobs require a paper with a more prestigious look or feel. Bond papers generally have a watermark and often use cotton fiber. These papers tend to have a rougher surface, and their properties might not be controlled like those of photocopier papers. Your HP LaserJet printer will print black satisfactorily on many of these bond papers. Using this type of paper with an HP Color LaserJet printer can degrade color print quality. However, paper manufacturers are now making laser-grade bond papers, which have properties optimized for laser printing.

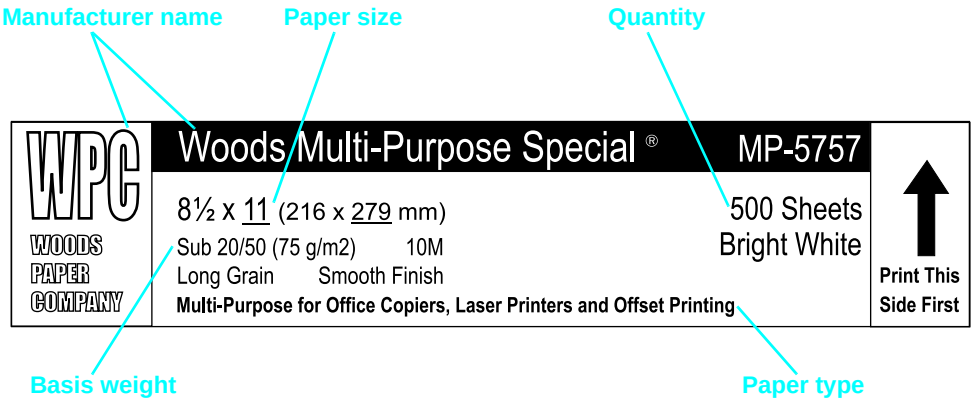
Note Paper can meet the general specifications listed in "Print media specifications" and still not print satisfactorily because of the printing environment or other variables over which HP has no control.

This section contains the following two topics:

- "Reading a ream label"
- "Paper types"

Reading a ream label

A ream label is placed on the outside of the paper wrapping. The ream label usually indicates basis weight, size, number of sheets, grain direction, and grade. The printing surface of the paper might be indicated by an arrow on the ream label, although some manufacturers do not specify a print side. Paper should be loaded into the printer so that the surface indicated by the arrow will be the printing surface. The printing surface might be facing up or down in the input tray, depending on the printer model and the paper-feeding source.



Paper types

This section describes the following paper types:

- Recycled paper
- Archival paper
- Colored paper
- Coated paper
- Specialty or converted paper
- Preprinted forms and letterhead
- Embossed and debossed paper

Recycled paper

Recycled paper is a combination of unused fibers and pre- and post-consumer waste paper. Printed waste paper is usually washed to remove most of the inks and other contaminants. A recycled sheet of paper might contain dark specks or appear gray or dirty. Choose recycled paper that meets the same specifications as standard paper (see "Print media specifications") and that has an appearance suitable for your needs. HP recommends that recycled paper contain no more than 5% groundwood.

Archival paper

Paper used for archiving must meet the same specifications as standard paper; however, the pH should be no less than 7.0. Some archival demands are more stringent than others, requiring a specific degree of alkalinity and chemical stability. Toner is chemically stable and should last as long as the paper does. Toner can be degraded by petroleum-based solvents or plasticizers, such as those found in vinyl folders.

Avoid folding archival documents across printed areas or handling archival documents roughly. Discuss archival requirements with your paper supplier.

Colored paper

You can use colored paper in your HP LaserJet printer as long as the paper meets the same specifications as standard paper (see "Print media specifications").

The HP Color LaserJet printers are optimal when printing on white paper. You also can use an HP Color LaserJet printer to print on colored paper that meets all the specifications listed in this guide. However, colored paper can change the appearance of the printed colors. This is because HP Color LaserJet printers create colors by printing a pattern of dots, overlaying and varying their spacing to produce various colors. When these colors are printed on colored media, the shade or color of the media will vary the shades of your printed colors. Because the printer cannot sense what color paper

you are using, it cannot adjust the output colors for colored paper. To manually adjust the output colors, see the service manual for your printer.

Coated paper

Clay or other pigment-coated papers must be specifically designed for laser printers. The electrical properties must be controlled and the surface designed not to blister during fusing, and the coating must not flake or shed particles that can contaminate the printer.

Some chemically coated papers such as carbonless paper can cause swelling of rollers, damage to the paper path, or buildup on the fuser, and can produce undesirable emissions. These papers can result in unsatisfactory performance and poor reliability, and their use is not recommended.

Specialty or converted paper

Paper that undergoes converting processes before being used in your laser printer must be properly designed and manufactured to ensure acceptable performance. Converting processes include preprinting, engraving, die-cutting, perforating, folding, gluing, embossing, and debossing. These processes use many different inks, materials, tools, and techniques and it is recommend that you make sure your converter or supplier knows that the media will be used in a laser printer. Ask for a guarantee of acceptable performance.

Media that have perforations or cutouts can be printed successfully on your HP LaserJet printer. However, these media must be properly designed and manufactured to avoid feed or contamination problems.

Cutout: The area where material has been removed by punching or die-cutting. Cutouts can interact with paper path sensors or can result in contamination from toner if printing is too close to a cutout location.

Perforations: A series of holes or slits made in media to provide a controlled tear for separating one portion of the sheet from another. It is recommended that micro-perfs be used, as they provide better strength and reduce nesting, debris, and dusting.

The following guidelines should be considered when working with a knowledgeable vendor in developing media that will have perforations or die-cuts:

- Punch cutouts and perforations from the side to be printed so that edge trimmings will not scratch the photosensitive drum.
- Round all corners of a cutout to prevent snagging or, in the case of labels, peeling.
- Ensure that die-cutting of labels does not penetrate the liner sheet.
- Ensure that cutouts are not made at a position where paper path sensors are located.
- Do not print closer than 10 mm (0.394 in) to a cutout edge or perforation to avoid toner contamination.
- All cuts should be clean (no burrs) with no edge rollover to prevent nesting, poor feeding, or contamination.
- Orient perforations in the direction of paper feeding to minimize tenting or feeding problems from reduced stiffness.
- Do not run perforations closer than 2 mm (0.0788 in) from the paper edge or 25 mm (0.985 in) from the leading edge, or jamming and feeding problems can result.

Preprinted forms and letterhead

To avoid multiple-feed and jamming problems when using preprinted forms, embossed paper, and letterhead paper, observe the following guidelines:

- Avoid using low-temperature inks (the kind used with some types of thermography).
- Use forms and letterhead paper printed by offset lithography or engraving.
- Print forms with heat-resistant inks that will not melt, vaporize, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers). Typically, oxidation-set or oil-based inks meet this requirement.
- When the form is preprinted, be careful not to change the moisture content of the paper, and do not use materials that change the paper's electrical or handling properties. Seal the forms in moisture-proof wrap to prevent moisture changes during storage.
- Avoid processing preprinted forms with a finish or coating.
- Avoid using heavily embossed or raised-letterhead papers.
- Avoid papers with heavily textured surfaces.
- Avoid using offset powders or other materials to prevent printed forms from sticking together.

Embossed and debossed paper

Avoid heavily embossed or debossed papers because multiple sheet feeding can occur from nesting. Do not print closer than 15 mm (0.591 in) from the embossment to prevent poor print quality and fusing (toner adhesion). The fuser can tend to iron flat the embossed or debossed images.

Envelopes

CAUTION HP Color LaserJet and HP Color LaserJet 5 printers do not support envelopes. Printing envelopes can damage the printer. See the user guide that came with your printer for detailed instructions about printing envelopes.

You can print many sizes and styles of envelopes on most HP LaserJet printers by using manual feed, a multipurpose (MP) tray, an optional envelope tray, or an optional envelope feeder. Whichever input method you use, envelopes should meet all specifications discussed in this document. Your envelope vendor should provide you with a satisfactory envelope that complies with the specifications listed in "Print media specifications". However, folding inconsistencies or other process control problems can result in some envelopes feeding well and others jamming. Purchase envelopes that have the quality and consistency your printer requires.

Note Envelopes can meet the general specifications listed in "Print media specifications" and still not print satisfactorily because of the printing environment or other variables over which HP has no control.

CAUTION Envelopes containing windows, clasps, or snaps can cause severe damage to the printer. See the printer user guide before using envelopes in your HP LaserJet printer.

This section contains the following two topics:

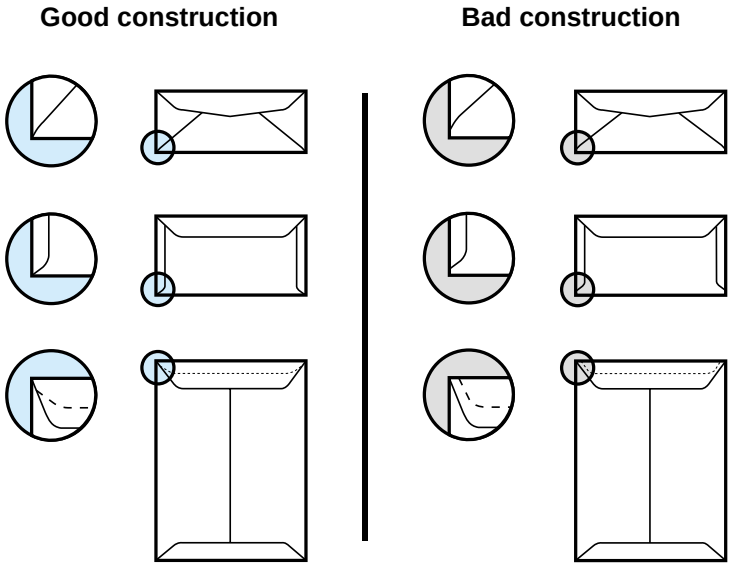
- "Envelope construction"
- "Results of envelope testing"

Envelope construction

Because of their construction, some envelopes will not feed through the printer dependably. Observe the following guidelines when purchasing and using envelopes:

- Make sure the envelope's leading edge, which enters the printer first, is straight, with a sharp, well-creased fold that has no more than two thicknesses of paper. Envelopes that exceed 90 g/m^2 (24 lb) basis weight can cause jamming.
- Avoid using flimsy envelopes with thick or curved leading edges; they will not feed reliably.
- Envelopes should lie flat and should not be wrinkled, nicked, or otherwise damaged.
- Avoid envelopes with baggy construction; they might wrinkle while going through the printer's fuser assembly.
- Make sure that the adhesive labels used on envelopes will not scorch, melt, offset, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).
- Avoid using envelopes with encapsulated adhesives that do not require moistening, but rely instead on pressure to seal them.
- Do not use envelopes with clasps, snaps, tie strings, transparent windows, holes, perforations, or cutouts.
- Do not use envelopes that have any adhesive surfaces exposed to the printer.
- Finishes such as wove or smooth are recommended to ensure good toner adhesion on envelopes.

Many envelopes will feed through your HP LaserJet printer without problems. However, some envelope constructions (as shown in the figure below) will not feed reliably. Problems can occur when the envelopes are folded more tightly than normal, causing a thick leading edge near a corner. Folding inconsistencies at the manufacturer can cause some envelopes to feed well and others to jam. Purchase envelopes with the quality and consistency that you require.



Results of envelope testing

HP tests many types of envelopes to determine which ones print acceptably in an HP LaserJet printer. Some of the test results are listed below.

- Commercial or Official envelopes (also called Business or Regular), with diagonal seams and standard gummed flaps, performed the most reliably.
- Envelopes with double-sided seam construction, which have vertical seams at both ends of the envelope instead of diagonal seams, tend to be more flimsy than diagonal-seam envelopes. Double-side seam envelopes tend to jam or wrinkle unless the edges are thin and sharply creased. However, a variety of double-sided seam envelopes have performed acceptably during testing.
- Envelopes with a peel-off adhesive strip, or with more than one flap that folds over for sealing, must use adhesives compatible with the heat and pressure of the printer's fusing process. Many varieties of this type of envelope performed satisfactorily in HP testing; however, the extra flaps and strips can result in increased jamming or wrinkling.
- Generally, feeding problems increase with envelope size. Larger envelope sizes (C5, B5) cannot have a basis weight greater than 105 g/m^2 (28 lb).
- Rougher finishes such as laid, linen, or cockle can result in poor fusing due to poor contact between the hot fusing roll and the bumpy surface.

Adhesive labels

Labels are multiple-layer media typically consisting of a face sheet (the printable surface), pressure-sensitive adhesive, and a liner (a carrier sheet coated with a release agent). Labels used in your HP LaserJet printer must be specifically designed for laser printers. If labels other than those compatible with laser printers are used, there is a significant risk of labels peeling or adhesive contamination that can severely damage your printer. All materials in laser label stock must be compatible with the heat and pressure of the fusing process, and must not melt or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).

CAUTION Not all HP Color LaserJet printers support printing on labels. Refer to your user guide to determine if your printer supports labels.

Consider the information in this section when choosing label stock.

Face sheet

The face sheet is the printable surface on a sheet of adhesive labels and can be made from different materials including paper, polyester, and vinyl. It is common for a face sheet to be die-cut so that individual shapes can be removed after printing. Polyester and vinyl labels require a topcoat to provide the proper electrical and toner adhesion properties. It is important to purchase labels from a knowledgeable converter who familiar with these processes and laser printing.

Adhesives

Different adhesives can provide removable, permanent, or semi-permanent fixturing of the face sheet onto the item being labeled. Generally, acrylic-based adhesives are preferred for laser printing because they can be applied in very thin layers to prevent oozing and contamination, and can be made compatible with the heat and pressure of fusing. Improved processes are being developed to minimize adhesive contamination such as zone coating or stripped matrix. Zone coating recesses the adhesive around the border of a die-cut, and stripped matrix prevents adhesive from oozing between the die-cut labels. The adhesive and liner must provide adequate release strength so that labels will not peel during printing.

Liner

The liner is the carrier sheet for the label material. This must provide stability for the reliable pick-up and transport of the label stock through the printer.

Recommendations

- Regularly inspect your labels after printing for any indication of label edges lifting or adhesive contamination on the print surface. If either of these problems are observed, it is recommended that you discontinue use of that box or lot number and discuss the problem with your label supplier.
- If many sheets of labels are being continuously run, periodically run several sheets of paper through the printer to clean any contamination on label stock that might have deposited.
- Run full sheets of labels. Reprinting unused portions can increase the risk of label peeling and adhesive contamination.

Overhead transparencies

Overhead transparency film must be designed specifically for use with laser printers. Photocopy transparency film might not be compatible with laser printers because of higher temperature and stiffness requirements. Color laser printers also require different film than monochrome printers for proper color reproduction and fusing needs.

Overhead transparency film is very smooth and must have a topcoat to provide the proper electrical and toner adhesion properties. A transparency that is made of poor materials or that is too thin can easily melt in the fuser and damage your printer. The thickness requirement for monochrome overhead transparency film is 0.10 to 0.11 mm (4.1 to 4.3 mils) and for color is 0.12 to 0.13 mm (4.8 to 5.2 mils).

Overhead transparency materials must be compatible with the heat and pressure of the fusing process. Materials must not discolor, offset, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.4 second for HP Color LaserJet printers). See your HP LaserJet printer user guide for detailed instructions on using overhead transparencies. See "Overhead tranparencies" in the "Print media specifications" section for more information.

See "HP LaserJet Black & White Transparency" or "HP Color LaserJet Transparency" for information about ordering HP transparencies.

Conditioning print media

After purchasing print media, you might have to prepare it for usage. Print media needs some time to stabilize in a new environment. To prepare print media, keep it in its protective packaging and store it in the environment in which it will be used. For small quantities, such as one or two reams, store the print media for one to two days. For larger quantities or if the change in the environment is large, a week or more may be needed.

If print media is not properly prepared, the edges in the ream can become wavy or the sheets can curl soon after opening the package.

Opening and loading paper

Follow this suggested process when opening and loading paper:

1. Place the ream of paper on a flat surface with the seam side up.
2. Read the ream label located on the outside of the paper wrapping and note the direction of the arrow that indicates the preferred print side (if there is one). See "Reading a ream label".
3. Open the paper wrapping and inspect for any damage to the sheets such as bent corners, wrinkles, nicked edges, or glue contamination. Discard any damaged sheets.
4. Handle the stack of paper as little as possible before loading it as a single stack. (Fanning the paper or separating the paper into several stacks creates air pockets between sheets that may cause multi-feeds.)

Printing on both sides of the paper

Two-sided printing, also known as duplex printing can be either an automatic or a manual process.

Note The print quality for color duplex printing has been optimized for 90 g/m^2 (24 lb) and heavier paper.

Automatic duplexing

Automatic duplexing requires an HP LaserJet printer designed especially for duplex printing. For example, when duplexing on the Color LaserJet 8500 printer, 90 g/m^2 to 105 g/m^2 (24 lb to 28 lb) media is recommended. Adhesive labels, envelopes, and overhead tranparencies cannot be duplexed.

Manual duplexing

Manual duplex printing, in which sheets that already have been printed are refed into the printer, requires both operator and software intervention. (See the software application user guide for more information.) Hewlett-Packard recommends manually refeeding sheets **only** through the manual feed slot, the MultiPurpose (MP) tray, or tray 1. **Do not** refeed sheets from the paper cassette trays. Using the paper cassette trays can cause jams, misfeeds, and print-quality problems.

Preparing laser-printed mailings

Laser printing technology is being used by more and more postal customers to prepare their mailings. Laser printers produce high-quality images; offer advantages in speed, flexibility, and size; and are the printers of choice for smaller companies and in-home businesses.

Unlike offset printers, in which the ink is absorbed into the paper, laser printers use heat to fuse a plastic toner to the surface of the paper. Because of this difference, Hewlett-Packard recommends that our customers use the following guidelines to produce quality laser-printed products for mailings:

1 Ensure that the manufacturer's recommended toner is used for the laser printer. Many aftermarket toners do not comply with the manufacturer's original specifications. Hewlett-Packard cannot predict or guarantee the performance of non-HP consumables in HP products.

2 Paper selection is critical. Several manufacturers have papers that are specifically formulated for their printers. Good laser printer papers have the following properties:

- Basis weight of 24 lb (90 g/m^2)
- Thickness from 4 mils to 4.7 mils (0.004 in to 0.0047 in)
- Smoothness from 100 to 150 Sheffield

In our testing and in the United States Postal Service (USPS) testing, the new HP LaserJet Paper has been found to be one of the best of the commodity-grade papers available. The only comparably performing papers we tested were specialty papers not usually suited to standard business use.

3 Avoid preparing laser-printed sheets as folded self-mailers. The laser-printed sheets should be mailed in envelopes. The envelopes should have an edge or end seam and a minimum basis weight of 24 lb (90 g/m^2).

4 Pre-bar code and presort all envelopes. Meter the envelopes or use precanceled stamps. (In addition to helping in the overall performance of the laser-printed document, bar coding and presorting can offer advantageous postal charges. Please contact your USPS business office to find out more about this.)

5 Avoid text-on-text contact. This can be avoided by printing single-sided, and then folding the document with the fold to the outside. Text will contact only the inside of the envelope or the back side of the printed sheets. If text-on-text contact cannot be avoided, use a thin insert such as onion skin to separate the printed sheets.

6 Ensure that all mailpieces placed in a tray and presented at the retail window or Bulk Mail Acceptance Unit (BMAU). *Avoid placing laser-printed mail into collection boxes or chutes*.

Purchasing HP print media

In the United States you can purchase HP Paper and Tranparencies through HP's website at http://www.hp.com/ljsupplies/ or contact your local reseller. To order outside of the U.S., please contact your local sales office.

This section lists the current HP papers and tranparencies available:

- HP LaserJet Black & White Transparency
- HP Color LaserJet Transparency
- HP LaserJet Soft Gloss Paper
- HP Premium Choice LaserJet Paper
- HP LaserJet Paper
- HP Printing Paper
- HP MultiPurpose Paper
- HP Office Paper
- HP Office Recycled Paper

HP LaserJet Black & White Transparency

Type: 4.3 mm (0.169 in) thickness

Compatible with: HP LaserJet black and white printers

Suggested use: Overhead presentations, and report and manual covers

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	50 sheets per box	92296T
A4 210 by 297 mm (8.3 by 11.7 in)	50 sheets per box	92296U

HP Color LaserJet Transparency

Type: 5 mm (0.197 in) thickness

Compatible with: HP Color LaserJet printers

Suggested use: Overhead presentations, and report and manual covers

Size	Quantity	HP part number

Letter	50 sheets per box	C2934A
A4 210 by 297 mm (8.3 by 11.7 in)	50 sheets per box	C2936A

HP LaserJet Soft Gloss Paper

Type: 32 lb weight, coated paper

Compatible with: HP Color LaserJet printers and HP LaserJet black and white printers

Suggested use: Documents with photographic images or graphics and charts, engineering designs, brochures, sales material, pamphlets, and calendars

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	50 sheets per box	C4179A
A4 210 by 297 mm (8.3 by 11.7 in)	50 sheets per box	C4179B

HP Premium Choice LaserJet Paper

Type: 32 lb weight / 98 brightness

Compatible with: HP Color LaserJet printers, HP LaserJet black and white printers, and color copiers

Suggested use: Hardcopy presentations, business plans, reports, proposals, data sheets, price lists, and newsletters

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPU1132
Tabloid 279 by 432 mm (11 by 17 in)	250 sheets per ream 6-ream carton	HPU1732
A4 210 by 297 mm (8.3 by 11.7 in)	500 sheets per ream 4-ream carton	CHP410

A4 210 by 297 mm (8.3 by 11.7 in)	250 sheets per ream 8-ream carton	CHP415
A3 297 by 420 mm (11.7 by 16.5 in)	500 sheets per ream 4-ream carton	CHP420

HP LaserJet Paper

Type: 24 lb weight / 96 brightness

Compatible with: HP Color LaserJet printers and HP LaserJet black and white printers

Suggested use: Letterhead, high-value memos, legal documents, and direct mail or correspondence

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPJ1124
Letter 216 by 279 mm (8.5 by 11 in)	200 sheets per ream 12-ream carton	HPJ200C
Letter, three hole 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPJ113H
Legal 216 by 356 mm (8.5 by 14 in)	500 sheets per ream 10-ream carton	HPJ1424
Tabloid 279 by 432 mm (11 by 17 in)	500 sheets per ream 5-ream carton	HPJ1724
A4 210 by 297 mm (8.3 by 11.7 in)	500 sheets per ream 5-ream carton	CPH310

HP Printing Paper

Type: 22 lb weight / 92 brightness

Compatible with: HP Color LaserJet printers, HP LaserJet black and white printers, and HP InkJet printers

Suggested use: Correspondence, and all documents printed with HP LaserJet and InkJet technology

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPP1122
Tabloid 279 by 432 mm (11 by 17 in)	500 sheets per ream 10-ream carton	HPP1722
A4 210 by 297 mm (8.3 by 11.7 in)	500 sheets per ream 5-ream carton	CHP210
A3 297 by 420 mm (11.7 by 16.5 in)	500 sheets per ream 5-ream carton	CHP220

HP MultiPurpose Paper

Type: 20 lb weight / 90 brightness

Compatible with: HP Color LaserJet printers, HP LaserJet black and white printers, copiers, and fax machines

Suggested use: Copier and fax needs, correspondence, drafts, memos, and e-mails

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPM1120
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 5-ream carton	HPM115R
Letter 216 by 279 mm (8.5 by 11 in)	250 sheets per ream 12-ream carton	HP25011
Letter, three-hole 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream cartons	HPM113H
Legal 216 by 356 mm (8.5 by 14 in)	500 sheets per ream 10-ream carton	HPM1420
Tabloid 279 by 432 mm (11 by 17 in)	500 sheets per ream 5-ream carton	HPM1720

HP Office Paper

Type: 20 lb weight / 84 brightness

Compatible with: All office equipment, such as laser and inkjet printers, copiers, and fax machines

Suggested use: Copier and fax needs and high volume printing

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPC8511
Letter, three hole 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPC3HP
Letter 216 by 279 mm (8.5 by 11 in)	Quick Pack 2,500 sheets per carton	HP2500S
Legal 216 by 356 mm (8.5 by 14 in)	500 sheets per ream 10-ream carton	HPC8514
Tabloid 279 by 432 mm (11 by 17 in)	500 sheets per ream 5-ream carton	HPC1117
A4 210 by 297 mm (8.3 by 11.7 in)	500 sheets per ream 5-ream carton	CHP110
A3 297 by 420 mm (11.7 by 16.5 in)	500 sheets per ream 5-ream carton	CHP120

HP Office Recycled Paper

Type: 20 lb weight / 84 brightness

Compatible with: All office equipment, such as Laser and inkjet printers, copiers, and fax machines

Suggested use: Copier and fax needs and high volume printing

Size	Quantity	HP part number
Letter 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPE1120
Letter, three hole 216 by 279 mm (8.5 by 11 in)	500 sheets per ream 10-ream carton	HPE113H
Legal 216 by 356 mm (8.5 by 14 in)	500 sheets per ream 10-ream carton	HPE1420

Guidelines for shipping and storing print media

The performance of HP LaserJet printers depends on the condition of the print media used. This section contains recommendations for shipping and storing media, and provides information about environmental effects on media.

Shipping media

When shipping print media through different environments, use plastic wrap to wrap all cartons on the shipping pallet. When shipping media across bodies of water, also wrap individual cartons. Packaging must protect the media from physical damage.

Storing media

Follow these guidelines when stacking and storing print media:

- **DO NOT** store cartons or reams directly on the floor; place cartons on a pallet or on shelves.
- **DO NOT** store individual reams in a manner that will result in curling or warping.
- Rewrap partially used packages of media before storing.
- **DO NOT** stack more than six cartons on top of each other.
- Stack each carton squarely on top of the one underneath.
- Stack each carton upright.
- **DO NOT** place anything on top of media, regardless of whether the paper is packaged or unpackaged.
- Store envelopes in a protective box to avoid damaging the envelope edges.
- Keep stored media away from extremes in temperature and humidity.
- **DO NOT** store printed documents in vinyl folders (which can contain plasticizers) and do not expose the documents to petroleum-based solvents.

Environmental considerations

HP LaserJet printers are designed to operate in a wide range of environmental conditions. For best performance, store and use media at 20° to 24° C (68° to 75° F), with a relative humidity of 45 to 55 percent. Follow these guidelines when media is used in an environment outside those temperature and humidity ranges:

- **DO NOT** expose the media to extremes in humidity or temperature. If media is left unwrapped or in the printer input tray, extreme changes in the environment will cause the media assume unwanted characteristics.
- In the case of extreme humidity, keep paper and envelopes tightly wrapped in plastic.

If a significant temperature difference occurs between the media storage area and the printer's operating environment, allow the media time to adjust to the temperature in the printer's operating environment before unwrapping it. The greater the temperature difference and the greater the amount of media to acclimate, the longer this time period should be. Allow one day for every 10° C (20° F) difference in temperature between storage environment and printing environment.

Troubleshooting

Introduction

Print-quality and media-handling problems usually result from print media that does not meet the specifications described in this guide, has been stored improperly, or is not in good condition.

The following sections further explain the possible causes of and solutions to print media problems.

Troubleshooting checklist

Ask the following questions to determine if the print media is causing print-quality problems:

- Does your media meet the specifications outlined in this document? (See "Types of print media to avoid" and "Print media specifications".)
- Is the media in good condition? Is the media bent or wrinkled?
- Are you using the printing procedures outlined in the printer user guide?
- Are you observing correct practices when handling media? (See the guidelines in your printer user guide for loading media.)
- Are your print-quality problems isolated to a specific type of media?
- Did you check the following aspects of the environment in which the printer operates? See "Environmental considerations".
  - temperature
  - humidity
  - exposure to sunlight
  - cleanliness

Basic troubleshooting

If you cannot determine the cause of your print defects by using information from the previous section, try the following procedures:

1. Try print media from another lot or from a different manufacturer.
2. Flip the paper over in the input tray, or turn it from front to rear (both, if necessary).
3. If you have an envelope print-quality problem, print a sheet of paper to determine if the problem is caused by the variable thickness of your envelope.
   - If the paper's print quality is good, re-examine your envelope and see "Envelope construction" for more information.
   - If the paper's print quality is poor, you might have a printer problem. See the documentation that came with your printer for further troubleshooting.
4. Read the rest of this Troubleshooting section for further troubleshooting information, perform the maintenance procedures recommended in your printer user guide, or see the troubleshooting section in your printer user guide.

Paper problems

This section provides information about conditions that can indicate paper problems. These conditions include high occurrences of jams, high numbers of multiple feeds, and post-image curl.

CAUTION Do not reuse jammed paper. Doing so can damage the printer.

Frequent paper jams

The following table lists possible causes of frequent paper jams and suggested actions.

Note To recover from a paper jam, follow the directions listed in your HP LaserJet printer user guide.

Cause	Action(s)
Paper is too stiff or heavy. Heavy or stiff paper might not be able to negotiate the paper path or be picked up from the input tray.	• Make sure the paper does not exceed the basis weight listed for your printer as specified in the user documentation for your printer. • Manually feed the paper into the printer. • Use the correct output bin, as shown in your printer user guide. • Use a lighter-weight paper.
Paper is too smooth or too rough.	• Change the paper type or manually feed the paper into the printer. See your printer user guide for the correct output tray selection.
Paper is not cut to specification. This can cause poor print alignment, misstacking, improper fit in the input tray, or difficulties for the paper sensors.	• Change the paper type or try another ream of paper.
Paper is too light or too flimsy.	• Make sure the paper meets the specifications listed for basis weight in "Print media specifications".
Paper adjustments are set incorrectly in the printer.	• Make sure all paper adjustments have been set correctly. See the user documentation for your printer for more information.

Frequent multiple paper feeds

The following table lists possible causes of frequent multiple paper feeds and suggested actions.

Cause	Action(s)
Paper is added in small amounts to the input tray.	• Add only large amounts of paper to the input tray, and avoid mixing paper types in the input tray.
Paper is too dry, not moist enough. (Insufficient moisture makes paper less conductive and creates static buildup.	• Try another ream of paper. • Change the paper type. • Make sure that the paper is properly acclimated (see "Conditioning print media").
Paper is too light or too thin.	• Change the paper type.
Paper is too smooth or too rough. Surfaces tend to interlock or stick together.	• Change the paper type.
Paper is embossed or has raised letterhead.	• Change the paper type.
Paper adjustments are set incorrectly.	• Make sure all paper adjustments have been set correctly. See the user documentation for your printer for more information.
Paper sticks together at the edges (edgeweld). Edgeweld is caused by the use of dull cutting blades during the manufacturing process.	• Bend the paper in an upside-down “u” shape to break the weld. • Try a different ream of paper. • Try a different paper manufacturer.

Reducing post-image curl

When an HP LaserJet printer prints a sheet of paper, the sheet develops a curvature called post-image curl. Generally, the higher the moisture content of the paper, the greater the curl.

Both the paper and the printer affect the amount of post-image curl. In the papermaking process, stresses that can cause curl are manufactured into the paper, so different papers will have differing amounts of post-image curl. In the printing process, the paper is subjected to the heat and pressure of the fusing assembly as well as to the contours of the paper path.

Cause	Action(s)
Paper is too moist, resulting in waviness or curl.	• Print to the face-up output bin. (This option is not available with some printers.)
	• Turn the paper stack over or turn it around in the input tray to reverse the direction of the paper.
	• Change to a different type or brand of paper.
	• You may need to acclimate the paper to your environment to diminish differences in heat and moisture. See "Conditioning print media".
	• Follow the storage and handling specifications in this document. (See "Guidelines for shipping and storing print media".)
	• On HP Color LaserJet printers, reduce toner coverage by using dither patterns rather than solid fill.
	• The grain of the paper can affect the curl of the paper. Therefore, if you are feeding the paper in landscape mode (horizontally) and are experiencing curl, try feeding the paper in portrait mode (vertically).

Envelope problems

High rates of jams, gray areas printing on envelopes, or wrinkling can indicate problems with envelopes.

Frequent envelope jams

Overfilling the envelope tray and misadjusting its guides are the most common causes of jams. However, if the envelope tray is properly loaded, the envelopes might be causing the problems.

To recover from an envelope jam, follow the directions listed in your HP LaserJet printer user guide.

CAUTION Do not reuse jammed envelopes. Doing so can damage the printer.

Cause	Action(s)
Envelopes are poorly manufactured.	• Make sure the leading edge is straight, with a sharp, well-creased fold. The envelope must not have more than two thicknesses of paper along any leading edge. The folded layers of paper should form a point at the leading-edge corners (see the figure in "Envelope construction"). • Purchase envelopes that are manufactured correctly, or run the side of a pen or pencil over the envelope edges to flatten them.
Envelopes are not creased sufficiently to have sharp edges.	• Crease the leading edge of the envelope with the side of a pen or pencil, or change to a different type or brand.
Envelopes are wrinkled, bent, or curled.	• Use envelopes with edges that are thin and sharply creased.
Envelopes are too stiff or heavy. Stiff or heavy envelopes cannot negotiate the paper path or be picked up from the envelope tray.	• Use a lighter-weight envelope. Do not exceed 105 g/m^2 (28 lb).
Envelopes are too smooth (not enough friction for transport) or too rough	• Change to a different type of envelope.
Envelope is inserted too far into the manual feed slot.	• Insert the envelope only until you feel a slight resistance.

Gray areas on envelopes

Cause	Action(s)
Envelope has seams or multiple layers.	• Avoid printing over seams or other multiple layer areas.
The toner density setting in the printing software might be too light.	• Reduce background (gray shading in non-imaged areas) by adjusting the toner density setting of the print to a darker setting. See the documentation that came with your printer.

Wrinkling

Wrinkles that form in envelopes after printing usually are caused by the following envelope conditions:

Cause	Action(s)
Loose envelope construction.	• Try different envelopes that are better constructed. See "Envelope construction" for characteristics of good envelope construction.
Folds are not sharply creased.	• Try different envelopes that are better constructed. See "Envelope construction" for characteristics of good envelope construction.
Low weight/low strength paper used in envelope construction.	• Try different envelopes that are better constructed. See "Envelope construction" for characteristics of good envelope construction.
High moisture content.	• You may need to acclimate the envelope to your environment to diminish differences in heat and moisture. See "Conditioning print media".

Technical specification tables

U.S. paper grades

The U.S. paper grading system has evolved from custom and usage, resulting in similar papers having differently stated weights. For example, a 24-lb bond paper is exactly the same weight as a 60-lb book paper, or a 60-lb text, or a 33-lb cover. This is because basis weight is defined as the weight of 500 sheets of paper cut to basic size. The basic size for bond, book/text, cover, index, bristol, and tag are all different, so the given weights for these paper grades can be different although the physical weight is virtually identical. The tables in this section help clarify these differences. Note the difference in basic size for each grade, which affects the weight of 500 sheets of that grade.

Common paper grades and basis weights

The following table helps clarify differences in weights among paper grades. Note the difference in basic size for each grade, which affects the weight of 500 sheets of that grade.

Note The specifications in the following table are general and may not be optimal for your HP LaserJet printer. Refer to the documentation that came with your HP LaserJet printer.

Paper grade	Basic size	Basic area	Factor	Equivalent basis weights (example)
Bond	432 by 559 mm (17 by 22 in)	.241 m^2 (374.0 sq. in)	1.00	24# bond
Text	635 by 965 mm (25 by 38 in)	.613 m^2 (950.0 sq. in)	2.54	61# text
Book (coated or uncoated)	635 by 965 mm (25 by 38 in)	.613 m^2 (950.0 sq. in)	2.54	61# book
Cover	508 by 660 mm (20 by 26 in)	.335 m^2 (520.0 sq. in)	1.39	33# cover
Bristol	571 by 724 mm (22.5 by 28.5 in)	.414 m^2 (641.25 sq. in)	1.71	41# bristol
Index	648 by 775 mm (25.5 by 30.5 in)	.502 m^2 (777.75 sq. in)	2.08	50# index
Tag	610 by 910 mm (24 by 36 in)	.557 m^2 (864.0 sq. in)	2.31	55# tag
Metric weight	none	none	3.76	90 g/m^2

Weight equivalence table

The following table shows equivalent weights for different grades of paper. A bolded value indicates a commonly available standard weight for that grade.

Note

Text and book grades marked with an asterisk (*) actually calculate to 51, 61, 71, and 81 but are rounded to standard book/text weights of 50, 60, 70 and, 80.

Bond wt. (17 x 22 in)	Text/Book wt. (25 x 38 in)	Cover wt. (20 x 26 in)	Bristol wt. (22.5 x 28.5 in)	Index wt. (25.5 x 30.5 in)	Tag wt. (24 x 36 in)	Metric wt.
16#	41#	22#	27#	33#	37#	**60 g/m^2**
17#	43#	24#	29#	35#	39#	**64 g/m^2**
20#	50# *	28#	34#	42#	46#	**75 g/m^2**
21#	54#	30#	36#	44#	49#	**80 g/m^2**
24#	**60#** *	33#	41#	50#	55#	**90 g/m^2**
27#	68#	37#	45#	55#	61#	**100 g/m^2**
28#	**70#** *	39#	49#	58#	65#	105 g/m^2
29#	74#	41#	50#	61#	68#	**110 g/m^2**
32#	**80#** *	44#	55#	67#	74#	**120 g/m^2**
36#	90#	**50#**	62#	75#	83#	**135 g/m^2**
39#	**100#**	55#	**67#**	82#	91#	148 g/m^2
40#	101#	55#	68#	83#	92#	**150 g/m^2**
43#	110#	**60#**	74#	**90#**	**100#**	163 g/m^2
45#	115#	63#	77#	94#	104#	**170 g/m^2**
47#	119#	**65#**	80#	97#	108#	176 g/m^2
51#	128#	70#	86#	105#	117#	**190 g/m^2**
53#	134#	74#	90#	**110#**	122#	199 g/m^2
54#	137#	75#	93#	113#	**125#**	203 g/m^2
58#	146#	**80#**	98#	120#	133#	216 g/m^2
65#	165#	**90#**	111#	135#	**150#**	244 g/m^2
66#	169#	92#	114#	138#	154#	**250 g/m^2**
67#	171#	94#	115#	**140#**	155#	253 g/m^2
70#	178#	98#	**120#**	146#	162#	264 g/m^2
72#	183#	**100#**	123#	150#	166#	271 g/m^2

Print media specifications

This section contains specifications for the following types of print media:

- Paper
- Envelopes
- Adhesive labels
- Overhead tranparencies

Some of the specifications are explained in the "What the specifications mean" section.

What the specifications mean

The following specifications are defined in this section:

- Paper weight
- Electrical properties
- Moisture content
- Caliper
- Grain
- Stiffness
- Surface roughness
- Composition (furnish)
- Curl
- Finish (smoothness)
- Felt side vs. wire side

Paper weight

Paper weight is the weight of paper for a given area. Grammage is the weight in grams of one square meter of a paper. Basis weight is typically used in the U.S. and can sometimes be confusing because the measurement for areas change depending on the paper grade. Heavy paper becomes stiffer and harder to pick up and transport through the paper path and can also increase wear of rollers and guides and degrade print quality and toner adhesion. Very light paper can bend too easily and tend to feed multiple sheets or jam inside the paper path. See the "Paper" specifications section.

CAUTION Avoid using extremely heavy or light paper. Use paper that falls within your printer's specified basis weight, as shown in the user documentation that came with your printer.

Electrical properties

The electrical resistivity of the paper is one of the most important properties for photocopy and laser papers. If resistance is too high, problems caused by static buildup can occur with paper handling and

print quality. If electrical resistivity is too low, poor image transfer and low density can result. Generally, paper has very high resistance, so paper manufacturers add salts or other materials to lower the resistivity.

Moisture content

Paper is hygroscopic; that is, it will absorb or give up moisture depending on the humidity in the air around it. The moisture content of paper has a great effect on its resistivity. Paper will absorb moisture in a high-humidity environment and lose moisture in a low humidity environment. Small increases in moisture content greatly reduce resistivity while small decreases in moisture content greatly increase resistivity.

Moisture content can also affect other paper properties such as curl, stiffness, and dimensional size. Higher moisture content can make paper prone to curl and wrinkling during printing, make a sheet limp, and increase the dimensions of a cut sheet. Paper performance can change significantly with seasonal or weather changes, which affect the humidity in the printing environment.

Caliper

Caliper is the thickness of a sheet of paper or other print media. It is typically specified in mils (one-thousandth of an inch) or millimeters. It is closely associated with paper weight but not directly, because some papers have more bulk (less density) than others.

Grain

Grain is the orientation of paper fibers in paper. Fibers tend to align themselves in the process direction of the paper machine. Papers are stiffer in the grain direction. Most cut sheet papers are cut long grain, that is, with the grain direction parallel with the long edge of the sheet. For heavier weight papers (>135 gsm) Hewlett-Packard recommends using short-grain paper, if available, to improve feeding and reduce wear to the paper path.

Stiffness

A minimum stiffness is required for paper to separate from the transfer and fuser rollers. Most long-grain papers greater than 60 gsm will have adequate stiffness to transport through the printer. Generally, stiffness increases with paper weight.

Surface roughness

Surface roughness of papers can affect print quality, feeding, and fusing (toner adhesion). If paper is very smooth, background particles are more easily seen and sheets tend to stick together and create multiple feeds. Very rough papers can degrade transfer of toner onto the page, causing jagged edges or toner scatter. Fusing (toner adhesion) can also be drastically reduced on very rough papers. Roughness is usually measured using an air leak method such as the Sheffield method. Typical Sheffield values for different paper surfaces are:

- around 120 to 150 for xerographic grades (wove or regular finishes)
- around 40 to 60 for very smooth laser or coated grades
- around 250 to 300 for cockle finishes
- greater than 350 for traditional linen and laid finishes

Composition (furnish)

Composition (furnish) is the mixture of various materials, such as fiber, filler, sizing materials, and other additives, used to make the paper stock. Fillers such as calcium carbonate, clay, or talc are added to paper to fill in the spaces between fibers.

For optimum performance of your HP LaserJet printer, use paper made from 100% chemical wood pulp and/or cotton fiber. Recycled paper, made with no more than 5% groundwood, is also acceptable. To ensure that paper of a special fiber composition will work correctly in your printer, test it before purchasing large quantities.

Note Avoid using print media containing materials that melt, vaporize, offset, discolor, or release undesirable emissions when exposed to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).

Curl

Curl is curvature or wave in a sheet of paper before or after printing. Sheets might curl before printing if they are exposed to humid conditions or very dry conditions. Residual stresses in the sheet or high moisture content can also affect the level of curl after printing. Good process control by the paper manufacturer and proper paper storage and handling will minimize curl problems.

Curl is typically measured by laying the sheet of paper on a flat surface and measuring the height of the corners. There are two types of curl:

- In-ream curl is the amount of curl in a sheet of paper before printing. In-ream curl results from the paper-manufacturing process or from exposure to the environment. Paper with excessive in-ream curl might lead to feeding and print-quality problems.
- Post-image curl is the amount of curl in a sheet of paper after printing. Post-image curl results from exposure to the fusing process and the paper path in the printer. Paper with excessive post-image curl can be difficult to handle or to use in automatic-feed photocopiers.

Finish (smoothness)

Paper for laser printers should not have a heavy texture or a glossy smoothness unless the paper is specifically designed to work with your HP LaserJet printer. Printed output on textured paper might have broken character edges and show poor toner adhesion. On the HP Color LaserJet printers, textured paper will cause inconsistent or blotchy colors and can wrinkle in the fuser. Glossy-smooth paper tends to highlight defects such as stray toner particles, and might not hold toner. If a glossy paper is desired for the HP Color LaserJet printer, try HP's Soft Gloss paper (see "Purchasing HP print media"). For sharp resolution or detail, use a smooth paper.

Paper finish is typically measured using air-leak methods. We recommend a range for smoothness using the Sheffield method. Equivalent values for other methods can be found in "Comparisons of paper smoothness".

Avoid using paper with embossed or raised surfaces, because spotty printing and misfeeding can occur. It is possible to print satisfactorily on paper that has embossed areas in the leading edge, trailing edge, or areas where print will not appear on the paper; however, misfeeding or jamming can occur.

Felt side vs. wire side

Some methods of manufacturing paper result in two-sided paper properties. Along with other process variations, these properties can make one side of the paper the preferred side on which to print. The "top" side of the paper sheet, as it is formed, is known as the felt side. The "bottom" side is known as the wire side. Most manufacturers indicate the preferred printing side on the package. See "Reading a ream label".

Paper

The table below summarizes the paper specifications that provide the best performance.

Note The specifications listed in this section generally apply to all HP LaserJet printers but check the user documentation that came with your printer for product specific information.

Property	Specifications
Basis weight	64 gsm to 105 gsm (17 lb to 28 lb) typical. See the user documentation that came with your printer for specific printer and input limits.
Caliper	0.09 mm to 0.17 mm (3.5 mil to 6.5 mil) typical. See the user documentation that came with your printer for specific printer and input limits.
Minimum stiffness	1.2 minimum (Taber) machine direction; 0.8 minimum (Taber) cross direction.
Grain	portrait feeding: long grain up to 36#; short grain >36# landscape feeding: long grain.
Electrical surface resistivity	10^9 to 10^{13} ohms/square.
Electrical volume resistivity	10^9 to 10^{14} ohms - cm.
Surface roughness	100 to 190 Sheffield optimal; 30 to 350 Sheffield extended (fusing or feeding performance can be degraded at outer ranges).
Fusing compatibility	Must not scorch, melt, ignite, offset materials, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).
Furnish (composition)	100% chemical pulp and/or cotton content; recycled paper with up to 5% groundwood can be used.
Dimensional accuracy	Cut sheet within ±0.80 mm (±0.03 in) of nominal.
Cut edge quality	Cuts must be smooth and clean with no fray or edge roll.
Curl	Must lie flat within 5 mm (0.2 in).
Moisture content	4% to 6% by weight.
Packaging	Moisture-proof ream wrap.
Wax pick	12 minimum (Dennison).

Envelopes

The table below summarizes the envelope specifications that provide the best performance.

Note The specifications listed in this section generally apply to all HP LaserJet printers but check the user documentation that came with your printer for product specific information.

Property	Specifications
Basis weight	64 gsm to 105 gsm (17 lb to 28 lb) typical. See the user documentation that came with your printer for specific printer and input limits.
Caliper	0.09 mm to 0.14 mm (3.6 mil to 5.5 mil) typical single-layer thickness.
Surface roughness	100 to 200 Sheffield.
Fusing compatibility	All inks, adhesives, and other materials used in the envelope construction must be compatible with the heat and pressure of the fusing process. Materials must not scorch, melt, ignite, offset materials, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).
Dimensional accuracy and construction quality	Envelopes must be folded within ±1.01 mm (±0.04 in) of nominal size with no more than two thickness of paper anywhere along the leading edge; all folds must be sharply creased and construction must be tight (not baggy) to avoid wrinkling; envelopes must not be stuck together from excess seam adhesive (blocking); flap must be flat within 1.5 mm (0.059 in) over the width where adhesive is applied.
Curl	Envelopes must lie flat, with no more than 6 mm (0.25 in) curl across the entire surface.
Adhesive flap curl	Envelope flap should be flat, with 1.5 mm (0.059 in) over width where adhesive is applied.
Moisture content	4% to 6% by weight.
Grain	Different envelope constructions might require different grain orientations for best performance, which is left to the discretion of the converter.
Packaging	Protective box to prevent edge damage and maintain flatness.

Adhesive labels

The table below summarizes the adhesive label specifications that provide the best performance.

Note The specifications listed in this section generally apply to all HP LaserJet printers but check the user documentation that came with your printer for product specific information.

CAUTION Not all HP Color LaserJet printer support printing on labels. Please refer to your user guide to determine if your printer supports labels.

Property	Specifications
Adhesive	Must not be on any external surfaces of the label before, during, or after printing. Label construction, adhesive release strength, and die-cutting must not allow labels to peel of during printing.
Caliper	Must not exceed 0.23 mm (9.0 mils).
Fusing compatibility	All inks, adhesives, and other materials used in the label construction must be compatible with the heat and pressure of the fusing process. Materials must not scorch, melt, ignite, offset materials, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers).
Packaging	Moisture-proof wrap to preserve properties.
Shelf life	One year minimum, stored at 23° C (73° F) and 50% RH.

Overhead tranparencies

The table below summarizes the overhead tranparency specifications that provide the best performance.

Note The specifications listed in this section generally apply to all HP LaserJet printers but check the user documentation that came with your printer for product specific information.

Property	Specifications
Caliper	0.12 mm to 0.13 mm (4.8 mils to 5.2 mils) for HP Color LaserJet printers. 0.10 mm to 0.11 mm (4.0 mils to 4.4 mils) for HP black and white printers.
Electrical surface resistivity	2.0 to 15 by 10^{10} ohms/square.
Fusing compatibility	Overhead transparency materials must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset, or release undesirable emissions when heated to 205° C (401° F) for 0.1 second (0.4 second for HP Color LaserJet printers).

Standard media sizes used in laser printers

This section lists the English and Metric dimensions of the most commonly used paper, envelope, and card stock sizes. See the user documentation that came with your printer for specific information about the media supported by your HP LaserJet printer. Use only media that is supported by your printer.

Paper

Size	English dimension	Metric dimension
Letter	8.5 by 11.0 in	216 by 279 mm
Legal	8.5 by 14.0 in	215.9 by 355.6 mm
Executive	7.25 by 10.50 in	184 by 267 mm
Tabloid/ledger	11 by 17 in	279.4 by 431.8 mm
Ledger full bleed	12.00 by 18.00 in	304.8 by 469.9 mm
A3	11.69 by 16.54 in	297 by 420 mm
A3 full bleed	12.28 by 17.32 in	312 by 440 mm
A4	8.27 by 11.70 in	210 by 297 mm
A5	5.83 by 8.27 in	148 by 210 mm
B3 (JIS)	14.33 by 20.24 in	364 by 514 mm
B3 (ISO)	3.90 by 19.69 in	353 by 500 mm
B4 (JIS)	10.12 by 14.33 in	257 by 364 mm
B4 (ISO)	9.84 by 13.90 in	250 by 353 mm
B5 (JIS)	7.17 by 10.12 in	182 by 257 mm
B5 (ISO)	6.93 by 9.84 in	176 by 250 mm
Folio JIS exec	8.50 by 13.00 in	216 by 330 mm
8K (JIS)	10.63 by 15.35 in	270 by 390 mm
16K (JIS)	7.68 by 10.63 in	195 by 270 mm

Envelopes

Size	English dimension	Metric dimension
US #6 3/4 envelope	3.63 by 6.50 in	92.1 by 465.1 mm
US #9 envelope	3.88 by 8.88 by in	98.4 by 225 mm
US #11 envelope	4.50 by 10.38 in	114.3 by 263.5 mm
Commercial #10	4.13 by 9.50 in	104.9 by 241.3 mm
#5 1/2 baronial envelope	4.38 by 5.75 in	111 by 146 mm
#6 baronial envelope	4.75 by 6.50 in	121 by 165 mm
#7 3/4 (Monarch)	3.88 by 7.50 in	98.4 by 190.5 mm
A2 announcement envelope	4.38 by 5.75	111 by 146 mm
A6 announcement envelope	4.75 by 6.50 in	121 by 165 mm
B5	6.93 by 9.84 in	176 by 250 mm
C5	6.38 by 9.02 in	162 by 229 mm
DL	4.33 by 8.66 in	110 by 220 mm
ISO C5/6 envelope	4.49 by 9.02 in	114 mm by 229 mm
ISO C6 envelope	4.49 by 6.38 in	114 by 162 mm

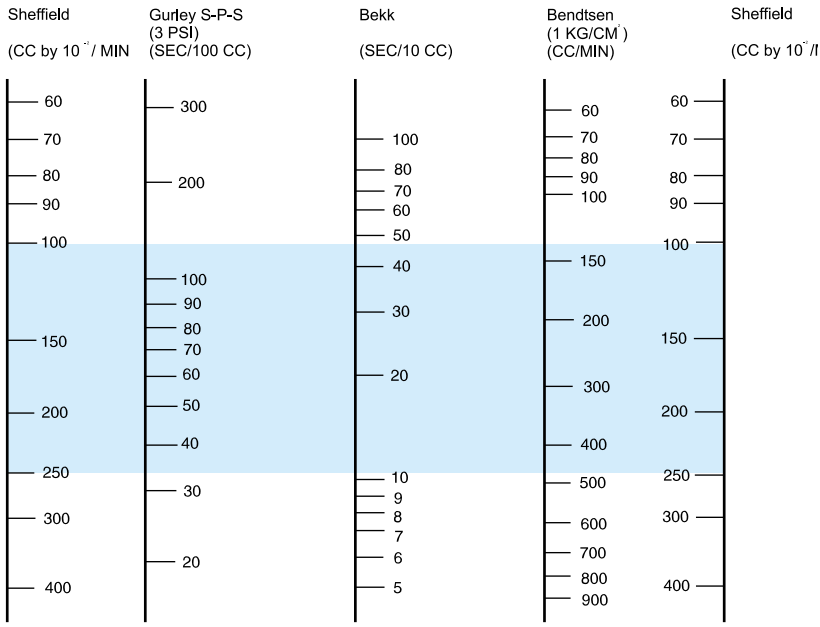
Card stock

Size	English dimensions	Metric dimensions
Index card (3x5)	3.00 by 5.00in	76.2 by 127 mm
Index card (4x6)	4.00 by 6.00 in	101.6 by 152.4 mm
Index card (5x8)	5.00 by 8.00 in	127 by 203.2 mm
US postcard	3.50 by 5.50 in	88.9 by 139.7 mm
European postcard	4.13 by 5.83 in	105 by 148 mm
J postcard (hagaki)	3.94 by 5.83 in	100 by 148 mm
J double postcard (oufuku hagaki)	5.83 by 7.87 in	148 by 200 mm

Comparisons of paper smoothness

Smoothness typically is expressed in terms of Sheffield, Gurley, Bekk, or Bendtsen units. HP LaserJet printers generally require a smoothness of between 100 and 200 Sheffield.

The figure below compares the different types of smoothness.



Glossary

brightness Refers to the reflectance and whiteness of a sheet of paper. Higher brightness papers are more expensive to produce and are usually associated with higher quality.

caliper The thickness of a sheet of paper or other print media.

carrier sheet The sheet to which labels are temporarily attached. Usually this sheet has a “slick” feeling or appears shiny.

curl The level of curvature or wave that a sheet has before or after printing.

cut-edge condition Condition of the edges of paper, which can affect paper’s ability to feed properly.

cutouts Any portion of the media that has been removed, including binder holes, notches, square cuts.

density Relative darkness of print.

die-cuts Cuts between individual labels. Die-cuts are made by a machine in a predefined pattern.

duplex Printing on both the front and back sides of a sheet of paper.

electrical properties The electrical resistivity of the print media.

face sheet The face sheet is the printable surface on a sheet of adhesive labels and can be made from different materials, including paper, polyester, and vinyl. It is common for a face sheet to be die-cut so that individual shapes can be removed after printing. Polyester and vinyl labels require a topcoat to provide the proper electrical and

toner adhesion properties. It is important to purchase labels from a knowledgeable converter who is familiar with these processes and with laser printing.

finish/smoothness Characterizes a paper's finish. Textured paper causes inconsistent or blotchy print and can wrinkle. Glossy-smooth paper tends to highlight defects and might not hold toner. For best results, use smooth paper.

finishing precision Dimensions (length and width) of a piece of media, how closely it is cut to the stated size, and how square it is. Use media that is accurately cut, so that it can be handled properly.

furnish (composition) Composition (furnish) is the mixture of various materials, such as fiber, filler, sizing materials, and other additives, used to make the paper stock.

fusing compatibility Compatibility of print media used in the printer and how it reacts when exposed to the fuser's temperature of:

- 205° C (401° F) for 0.1 second (0.2 second for HP Color LaserJet printers) for paper, labels, and envelopes; and
- 205° C (401° F) for 0.1 second (0.4 second for HP Color LaserJet printers) for overhead transparency materials

Print media should not discolor, melt, offset, release undesirable emissions, or break down in any way.

grain The orientation of paper fibers in paper.

gray background Paper looks gray or appears dirty because small toner particles are transferred to non-printed areas (white space). This condition is a symptom of a print-quality problem.

groundwood Wood fibers that are extracted using a mechanical rather than a chemical process. Groundwood papers are generally weaker than chemical wood papers.

mils One mil = 0.001 in.

moisture content How much moisture print media will absorb or give up depending on the humidity in the air around it.

offset A printing process in which ink or toner is transferred from a preprinted form or a printed page onto rollers in the printer.

opacity Determines degree to which printed matter shows through a sheet of paper (either from the backside of a duplexed page or from an adjacent sheet).

packaging Packaging is an important consideration when using paper in an HP LaserJet printer, because adequate packaging maintains the correct level of moisture and protects paper from damage during transport and storage.

paper weight Paper weight is measured on a metric scale (called basis weight or grammage) as the weight in grams of one square meter of paper. Basis weight is an important characteristic of paper. Paper that is too light or too heavy can cause misfeeds, misstacking, jams, poor print quality, or excessive mechanical wear to the printer.

perforations A hole or series of holes punched through the paper to aid in the separation of one piece of paper from another.

pH Refers to the acidity/alkalinity of paper as determined by the TAPPI (Technical Association of the Pulp and Paper Industry) cold-extraction method.

photocopy paper A grade of paper suitable for printing by the electrophotographic process. This paper is characterized by a smooth finish, heat stability, non-curling qualities, and good aesthetic properties (such as color, brightness, and cleanliness).

pre-consumer waste Paper that never reaches the customer after it has been manufactured. Pre-consumer waste can be unused paper stock, bindery trimmings, envelope cuttings, business forms, or unsold books or magazines.

print media Paper, envelopes, overhead transparencies, and labels used with printers. Print media used in HP LaserJet printers must meet the guidelines and specifications listed in this guide.

post-consumer waste Paper that the customer has used. Post-consumer waste can be office paper, mail, used boxes, old newspapers, or magazines.

simplex Printing one side of a sheet of paper.

smoothness Surface smoothness is determined by measuring the rate of air flow between the sheet surface and a flat reference surface. Smoothness usually is expressed in Sheffield or Bekk units.

stiffness How resistant print media is to bending or flexing.

watermark An impression made in a wet sheet of paper as it is being manufactured. Watermarks are visible when the sheet is held up to light. They appear as a word, symbol, or other impression.

waste paper A generic term used for post-consumer waste and some pre-consumer waste.

wax pick Characterizes the resistance of the surface layer of a sheet to the breakaway of surface fragments. Expressed in Dennison units.

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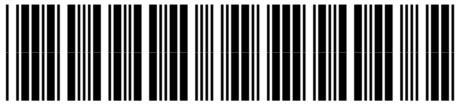

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