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Color LW 12/600 PS: Life of Consumables & Printer (12/95)

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TOPIC -----

What factors affect the life of the Color LaserWriter 12/600 PS and its consumables? How do I determine when to replace the consumable items?

DISCUSSION -----

The Color LaserWriter 12/600 PS DC controller maintains several non-volatile parameters which are used to signal various alert conditions to the user. The list of stored parameters includes the following:

Begin_Table

Parameter Description	Range of values
Print delivery counter	0 -100,000 (prints)
Number of delivered prints following cleaning belt out warning	0 - 500 (prints)
Photoconductor life check-use counter	0 - 18,000 (counts)
Number of delivered prints following oil out warning	0 - 50 (prints)

End_Table

In addition to the parameters listed above, the I/O controller maintains a separate page counter which generates the page count value listed on the startup page. The printer does not maintain any special counters for tracking the life expectancy of the complete print engine. The Color LaserWriter 12/600 PS user's manual states that the minimum life expectancy is 5 years or 300,000 pages in black and white mode, and 150,000 pages in the full color mode. Many customers will get acceptable results well beyond these numbers as long as the printer is properly used and maintained according to the guidelines in the user's manual.

Fuser Assembly Life

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Apple recommends that the fuser be replaced after 60,000 pages by the customer using the instructions located in the user's manual. The fuser is included as part of a special maintenance kit available from finished goods that includes a fuser, transfer drum cleaning assembly, separation discharge unit, ozone filter, and air filter. The finished goods part numbers for the maintenance kit are M3867G/A for 110V printers, and M4234G/A for 220V printers.

The fuser life does not vary depending on the type of printing (black and white, color) because each printed page is only fused once. The fuser and alert LED's on the printer status panel turn on after a sensing arm in the fuser cleaning web assembly drops through a notch cut into the cleaning web fabric and triggers a photosensor. Once the LED's turn on the printer will allow 500 pages to be printed before shutting down. Apple recommends that the fuser be replaced after 60,000 pages, however there is enough cleaning web fabric to allow the fuser to print as many as 100,000 pages before the LED's turn on. Testing has shown that after approximately 60,000 pages the print quality may begin to deteriorate due to toner and paper dust accumulation indicating the need for the maintenance kit.

Fuser Oil Life

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The fuser oil used in the Color LaserWriter 12/600 PS is replenished from a user replaceable oil bottle. Each bottle contains enough oil for approximately 10,000 pages. The oil reservoir which is part of the fuser assembly contains a small plastic ball that floats on the surface of the oil. When the oil level drops to a predetermined level a photosensor is triggered a photosensor the oil low and alert LED's turn on. Once the LED's turn on the printer will allow 50 pages to be printed before shutting down.

Photoconductor Life

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The photoconductor life counter maintained on the DC controller is used to determine when the photoconductor and alert LED's should be turned on. As soon as the counter reaches 3000 prints as specified in the DC controller microcode, the LED's turn on. The counter increments only when printing full color documents, not black & white pages.

The life of the photoconductor varies depending on the type of printing being done because the photoconductor makes four passes when in the full color mode, and only one pass when in the black and white mode. The life of the photoconductor also varies depending on whether the printing is continuous or intermittent. During continuous printing the density calibration only has to be done once every 100 pages, however when the printer is operated intermittently the printer may have to perform the density calibration each time the printer is awakened from the sleep mode. Other mechanical areas of the printer such as the

fuser assembly are not activated during the calibration process and therefore their life expectancy does not change significantly depending on the type of printing being done.

Apple recommends that the photoconductor be replaced only after the customer determines that the print quality is no longer acceptable. For some customers this may be as early as 4,000 pages, but for other customers it may be significantly longer. Customers should keep the startup and demo pages in a binder after a new photoconductor is installed. This allows customers to judge their print quality by printing and comparing future startup and demo pages with those in the binder. It's also helpful to put the date at the top when the pages are printed.

Toner Cartridge Life

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The life of each toner cartridge will vary significantly depending on the type of printing being done. Documents which contain large areas of color will use more toner than a black and white text document. On average each toner cartridge should last approximately 4,000 pages when printing documents with average page coverage of 5%.

The printer uses a sweeping blade and two clear windows integrated into each toner cartridge to determine the amount of toner left in each cartridge. A photosensor located on the print engine measures the amount of time that the toner blocks each window as the sweeping blade passes by. When the toner reaches a preset level the alert and corresponding toner LEDs turn on. A toner low alert condition will not shut down the printer, however the print quality may be affected.

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