EPSON Colorworks Technical Training

Optimizing Epson Print and NVT Settings for Efficient Production

EPSON
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ColorWorks TM-C7500 Series

ColorWorks CW-6000 & 6500 Series

EPSON Nozzle Verification Technology

- Epson Nozzle Verification Technology (NVT) detects nozzle clogs and automatically performs head maintenance to clear clogged and missing nozzles.
- NVT is very useful, but out of the box NVT settings can at times be too aggressive in situations where a higher degree of print quality may not be necessary.
- Too much NVT related head maintenance can contribute to needless ink consumption and production slowdowns.
- NVT settings can be optimized using by using the Printer Setting Utility or the printer's Operator Panel to configure efficient use of ink, decrease down time and enhance productivity.

*NVT settings should be determined after careful analysis of print quality and production requirements. Decreasing or disabling of NVT may result in inadequate print quality due to lines and artifacts caused by clogged and missing nozzles. If aggressively reducing or disabling NVT, performing manual head maintenance by printing Nozzle Check patterns and using cleaning procedures from the Operator Panel or Printer Setting utility should be done regularly.

CAUTION	This Nozzle Verification Technology cannot detect 100% of dot missing cases. It cannot detect 100% of missing dots and ink droplet curvature.
	• Print head maintenance is executed for all heads simultaneously. It is not executed only for the heads and ink in which nozzle clogging was detected. • The Nozzle Verification Technology uses a small amount of ink. • After detecting a missing dot, cleaning is performed automatically and ink is also used in the cleaning.

TM-C7500 Nozzle Verification Technology Explained

Self nozzle check is run at the following times.

- Starting a printing job or per printed sheets specified in the interval of Nozzle check interval
- Power is turned ON
- The maintenance box cover is closed
- The roll paper cover or paper set cover is closed after a paper jam.

C7500 Nozzle Verification Technology

- The TM-C7500 has Nozzle Verification Technology that detects clogged nozzles. One can choose to have the Nozzle Verification Technology to be Enabled or Disabled, adjust the Nozzle check interval and Threshold of clogged nozzles based on preferences for print quality and productivity.

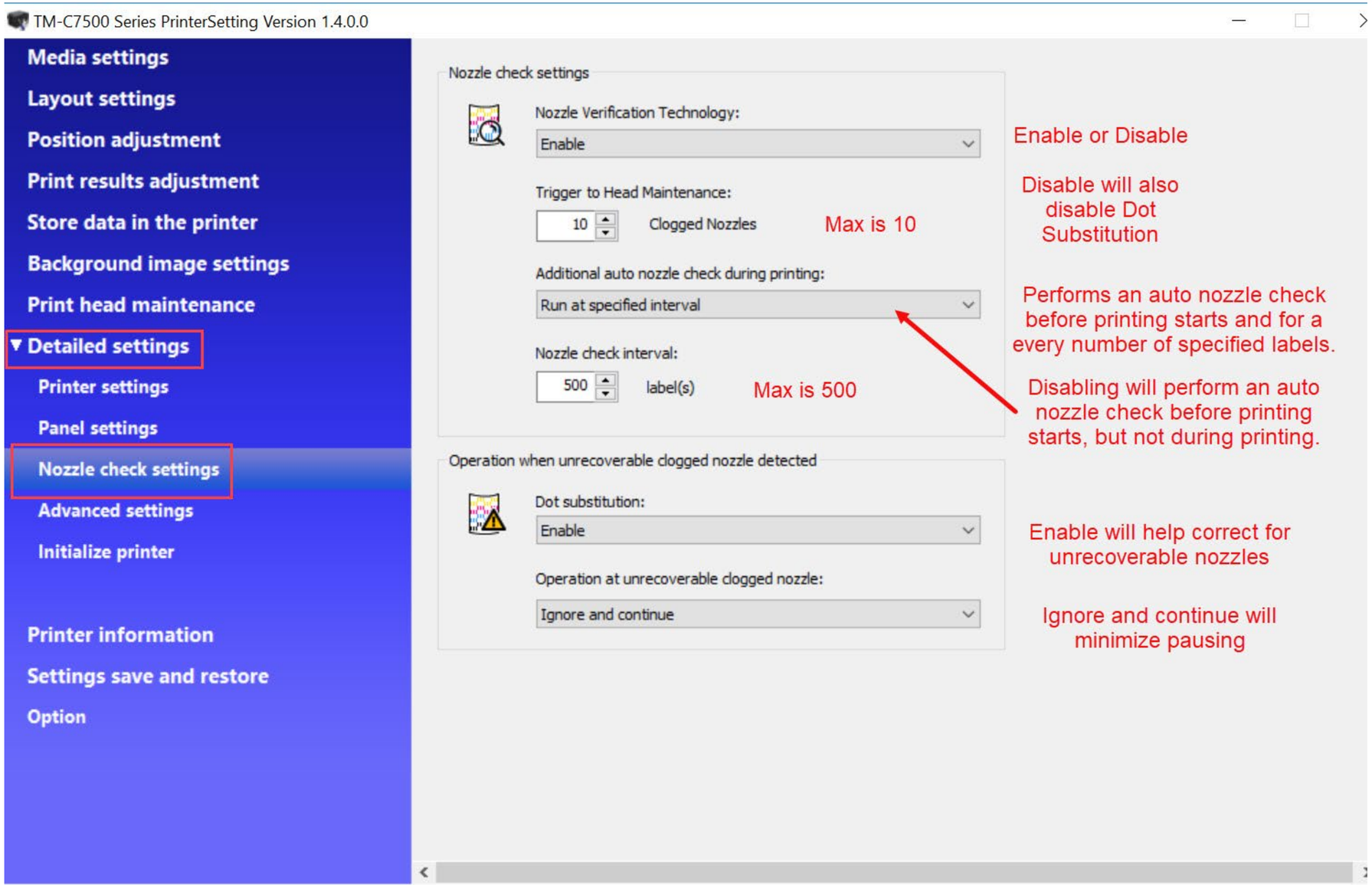
- When unrecoverable clogging of nozzles occurs, the C7500 can also carry out supplemental dot substitution using nearby nozzles by enabling the Dot substitution system. This helps to improve a noticeable decrease in print and barcode quality due to irrecoverable clogged nozzles.

- The C7500 also has a constant head maintenance function that sprays miniscule dots during printing to keep nozzles clear. This function can also be optimized to promote faster production.

** Settings described in the following pages are for instructional purposes only and are not endorsed for all situations. Users will need to determine their own preferences to balance between print quality and productivity requirements.*

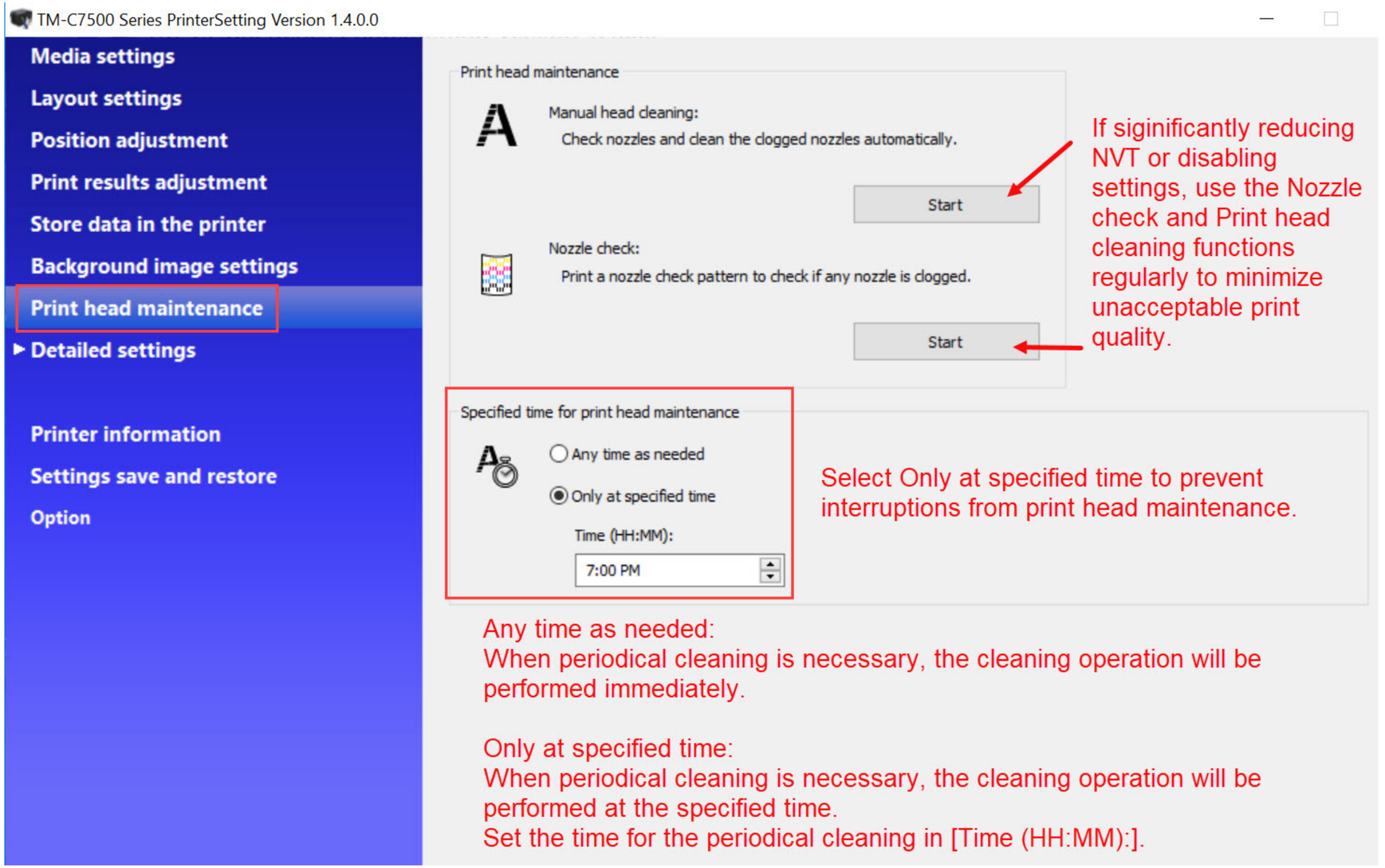
TM-C7500 Series Printer Setting Utility NVT Settings

- The TM-C7500 Printer Setting utility has settings for optimizing NVT for quality and productivity.
- Displayed are examples of settings that have been configured to minimize the amount of pausing and ink usage while still maintaining an acceptable degree of print quality.
- Selecting Disable for Nozzle Verification Technology will also disable Dot substitution.
- If disabling NVT make sure to print Nozzle check patterns and do cleaning regularly using the Print head maintenance functions.



TM-C7500 Series Printer Setting Utility NVT Settings

- The TM-C7500 Printer Setting utility has functions for Print head maintenance. These can be used in combination with NVT and should be used before printing jobs when NVT is disabled or reduced significantly.
- Periodic head maintenance can interrupt production time unless a specific time is set. Set the time during non-production time.
- If the printer has been left unused without being powered, the cleaning may be run when the printer is turned on.

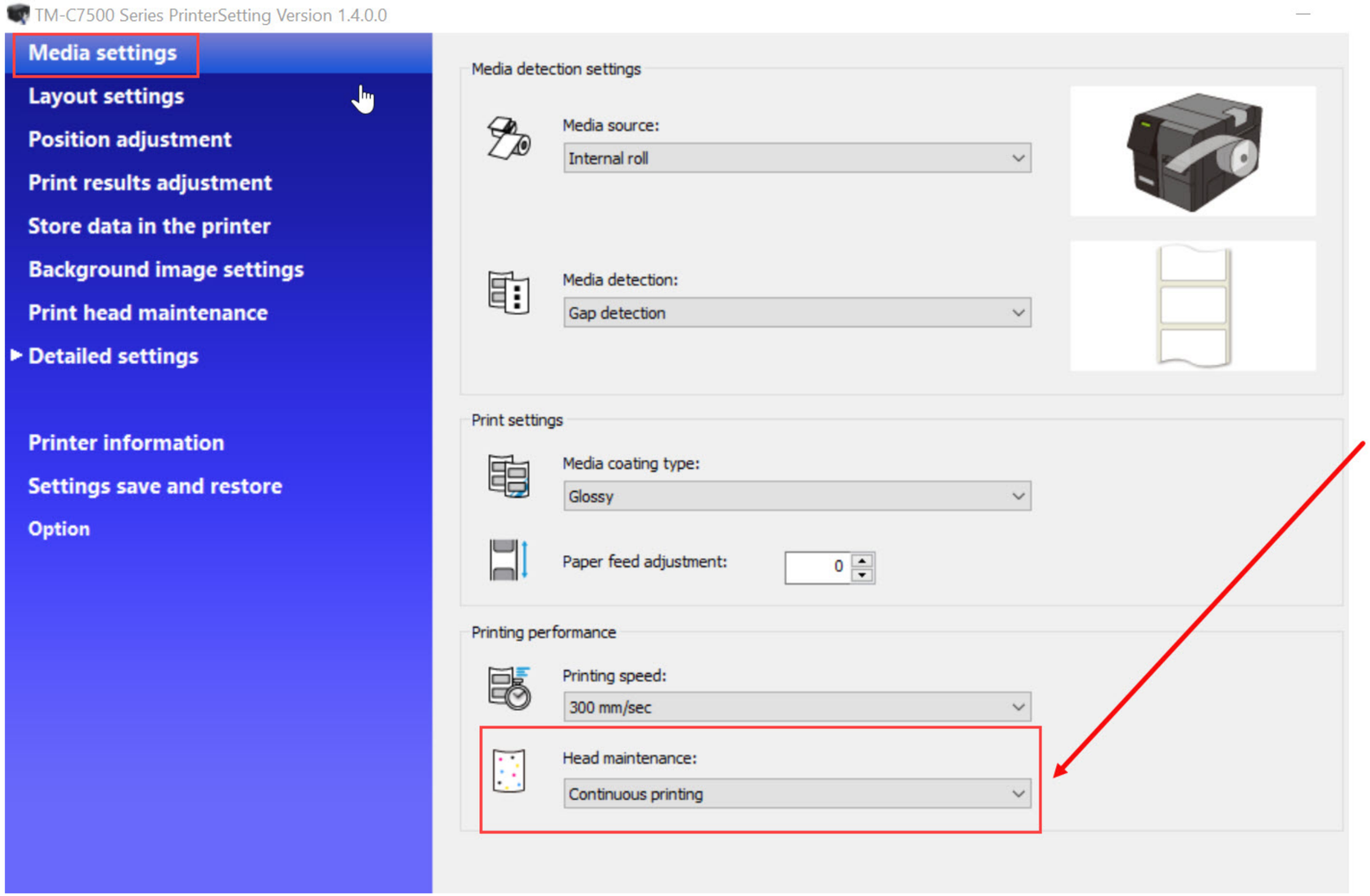


TM-C7500 Series Printer Setting Utility NVT Settings

- The TM-C7500 Printer Setting utility has a feature for controlling Head maintenance where very fine dots are sprayed during printing.

- Displayed is an example of Head maintenance settings configured to not pause, but still working to maintain clear nozzles.

- Note that this setting is also found in the Epson driver and if selected there will take priority.



Ink flushing, fires very fine dots during printing to keep nozzles from clogging.

Selecting CONTINUOUS PRINTING will spray more fine dots without pausing for head maintenance and will print faster.

Selecting PAUSE FOR MAINTENANCE will spray fewer dots but will pause for maintenance slowing print times.

*Also found in the Epson printer driver preferences under Options. When this item is set in the printer driver, the value entered in PrinterSetting is ignored.

Configuring C7500 Operator Panel Nozzle Verification Settings

The C7500 Operator Panel settings are displayed on the right in the order they are listed on the printer Operator Panel.

- HEAD MAINTENANCE – Ink flushing, fires very fine dots during printing to keep nozzles from clogging.
- Selecting CONTINUOUS PRINTING will spray more fine dots without pausing for head maintenance. Selecting PAUSE FOR MAINTENANCE will spray fewer dots but will pause for maintenance.

C7500 Operator Panel Settings

Toggle between the Menu, OK and Arrow keys to edit settings.

Settings menu item		Available settings	Default setting
CLEANING		• YES • NO	-
NOZZLE CHECK		• YES • NO	-
PRINTER SETUP1	MEDIA TYPE	• PLAIN • MATTE1 • MATTE2 • SYNTHETIC • GLOSSY	MATTE2
	MEDIA FORM	• DIE-CUT LABEL • CONT. LABEL • CONT. PAPER	DIE-CUT LABEL
	MEDIA DETECT	• BLACK MARK • GAP • NONE *	GAP
	MEDIA SOURCE	• INTERNAL ROLL • EXTERNAL FEED	INTERNAL ROLL
	LEFT GAP	0 to 2,551 [pixel]	47
	LABEL WIDTH	0 to 2,551 [pixel]	2,551
	LABEL LENGTH	0 to 14,173 [pixel]	3,600
	LEFT MARGIN	0 to 35 [pixel]	35
	RIGHT MARGIN	0 to 35 [pixel]	35
	TOP MARGIN	0 to 35 [pixel]	35
	BOTTOM MARGIN	0 to 35 [pixel]	35
	V. POSITION	48 to -48 [pixel]	0
	H. POSITION	-24 to +24 [pixel]	0
	PRINTING SPEED	• 150[mm/s] • 300[mm/s]	300[mm/s]
	RESOLUTION	• 600[dpi] • 300[dpi] • 200[dpi]	600[dpi]
*	HEAD MAINTENANCE	• PAUSE FOR MAINTE-NANCE • CONTINUOUS PRINTING	PAUSE FOR MAIN-TENANCE
	PAPER HANDLING AFTER PRINT	• NO CUT • CUT	NO CUT
	CUT POSITION	-35 to +35 [pixel]	0
	PAPER FEED ADJUSTMENT	-99 to +99	0

Configuring C7500 Operator Panel Nozzle Verification Settings

- NOZZLE VERIFICATION TECHNOLOGY
- Selecting DISABLE will display a NOZZLE CHECK DISABLED message when printing. All other NVT functions are disabled.
- NOZZLE CHECK INTERVAL
- Setting max of 500 will minimize interruptions & ink consumption.
- OPERATION AT CLOGGED NOZZLE
- Selecting CONTINUE will minimize pausing & ink consumption.
- THRESHOLD OF CLOGGED NOZZLES
- Setting a higher value will minimize head maintenance, setting too low will trigger head maintenance more often.
- SCHEDULED CLEAN
- Set ENABLE to schedule maintenance.
- CLEANING TIME
- Set up in non-production time period.

Settings menu item		Available settings	Default setting
PRINTER SETUP1	PRINT PAPER FEED ADJ. PATTERN	• YES • NO	-
PRINTER SETUP2 *	NOZZLE VERIFICATION TECHNOLOGY	• ENABLE • DISABLE	ENABLE
*	NOZZLE CHECK INTERVAL	0 to 500 [sheets]	0 sheets
*	OPERATION AT CLOGGED NOZZLE	• CONTINUE • NOTIFY	CONTINUE
*	THRESHOLD OF CLOGGED NOZZLES	0 to 10 [nozzles]	6
	REPRINT	• ENABLE • DISABLE	ENABLE
	POWER ON ACTION	• FEED • CALIBRATION • NO FEED	FEED
	PAPER CHANGE ACTION	• FEED • CALIBRATION • NO FEED	FEED
	CANCEL ACTION	• JOB ONLY • JOB/RAM DRIVE	JOB ONLY
*	SCHEDULED CLEAN	• ENABLE • DISABLE	DISABLE
*	CLEANING TIME	HH:MM (24-hour clock)	00:00
	INCOMPLETE LABEL *	• NO CUT • CUT	CUT
PRINTER SETUP3	LCD BRIGHTNESS	• OFF • LEVEL1 • LEVEL2 • LEVEL3	LEVEL2
	LCD CONTRAST	• 0 to 10	5
	BEEPER VOLUME	• OFF • LOW • MEDIUM • HIGH • MAX	MEDIUM
	INK LOW LED	• DISPLAY • NO DISPLAY	DISPLAY

Configuring C7500 Operator Panel Nozzle Verification Settings

- DOT SUBSTITUTION
- Enabling will help to compensate for unrecoverable nozzles – see slide 15.

- *Disabling NOZZLE VERIFICATION TECHNOLOGY in PRINER SETUP2 will disable DOT SUBSTITUTION.

- More information regarding Nozzle Verification Technology can be found in the Epson TM-C7500 Technical Reference Guide.

Settings menu item		Available settings	Default setting
PRINTER SETUP3	LANGUAGE	• JAPANESE • ENGLISH • FRENCH • GERMAN • ITALIAN • SPANISH • PORTUGUESE • DUTCH	According to market destination
	CLOCK	MM/DD/YY HH:MM	-
	CONTROL PREFIX	0x20 to 7E	0x7E
	FORMAT PREFIX	0x20 to 7E	0x5E
	DELIMITER CHAR	0x20 to 7E	0x2C
	FACTORY RESET	• YES • NO	-
	ERASE MEMORY	• YES • NO	-
	INITIALIZE I/F	• YES • NO	-
	INITIALIZE MEDIA DETECTION SENSOR	• YES • NO	-
COLOR CONTROLS	MODE	• EPSON PREFERRED • EPSON STANDARD	EPSON PREFERRED
	INK PROFILE	-6 to +4	0
	RATIO OF BLACK	-6 to 0 (Available settings vary with media type)	0
	FEATHER EDGES	• ENABLE • DISABLE	DISABLE
*	DOT SUBSTITUTION	• ENABLE • DISABLE	ENABLE
	BANDING	-2 to +2	0
MAINTENANCE	CALIBRATION	• YES • NO	-
	INK RECHARGE	• YES • NO	-
	PRINT INFO	• STATUS BASIC • STATUS SETUP • STATUS NETWORK • LIST FONT • LIST BARCODE • LIST IMAGE • LIST TEMPLATE	-

CW-C6000 Series Nozzle Verification Technology Explained

Self nozzle check is automatically run at the following times.

When the printer is turned on.

- When the front cover or the paper cover is closed after a paper jam.
- Just before running a regularly scheduled cleaning.

C6000 Series Nozzle Verification Technology

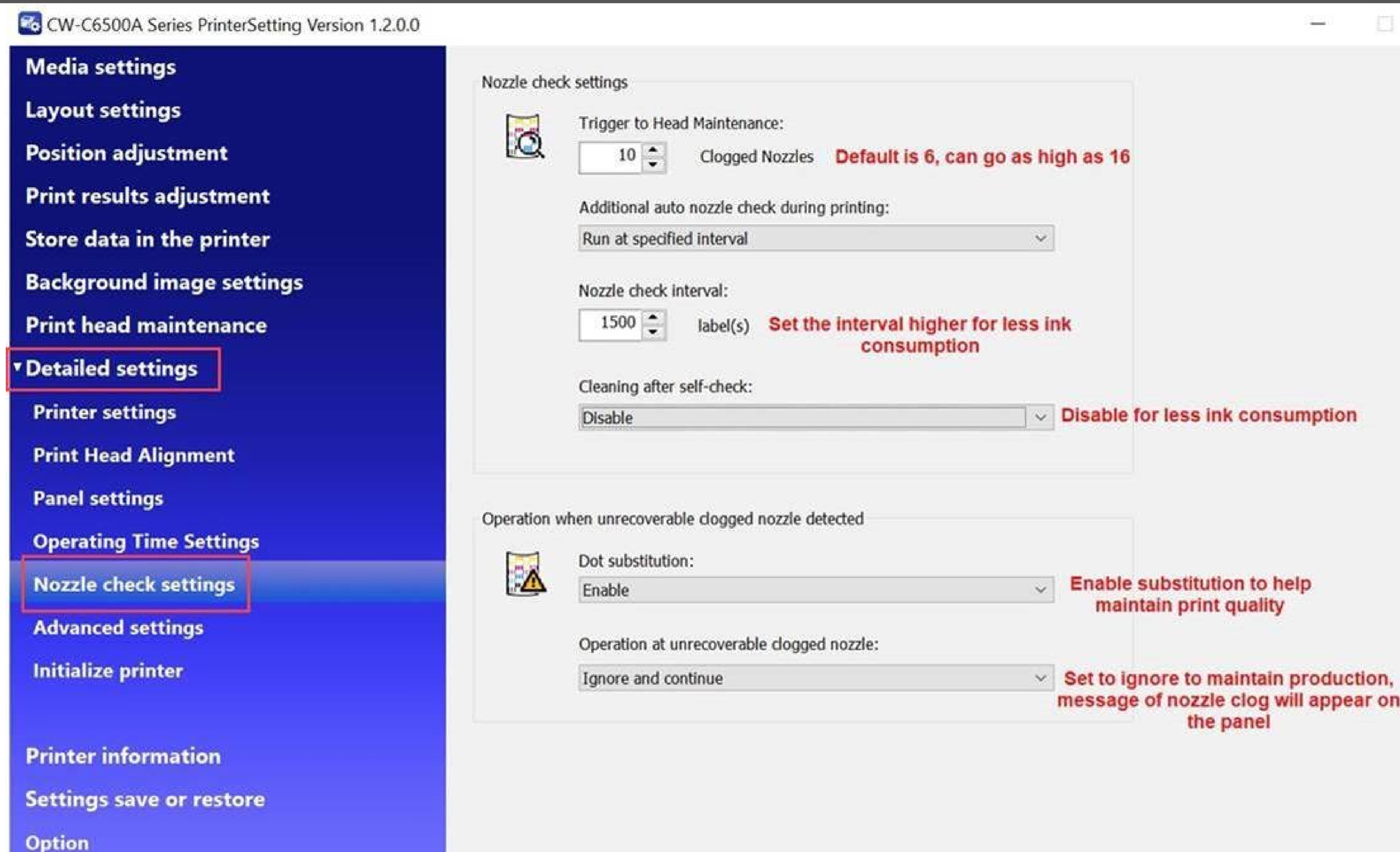
- When the Nozzle check settings are turned On, a self nozzle check is run when the number of printouts has reached the number specified as the interval of the self-check. If the result of self nozzle check exceeds the specified threshold, a head cleaning is run automatically to clear the nozzle clogging. After the cleaning, the self nozzle check is run again. If the result of the check still exceeds the threshold, auto cleaning is performed again.

- When unrecoverable clogging of nozzles occurs, the C6000 can also carry out supplemental dot substitution using nearby nozzles by enabling the Dot substitution system. This helps to improve a noticeable decrease in print and barcode quality due to irrecoverable clogged nozzles.

** Settings described in the following pages are for instructional purposes only and are not endorsed for all situations. Users will need to determine their own preferences to balance between print quality and productivity requirements.*

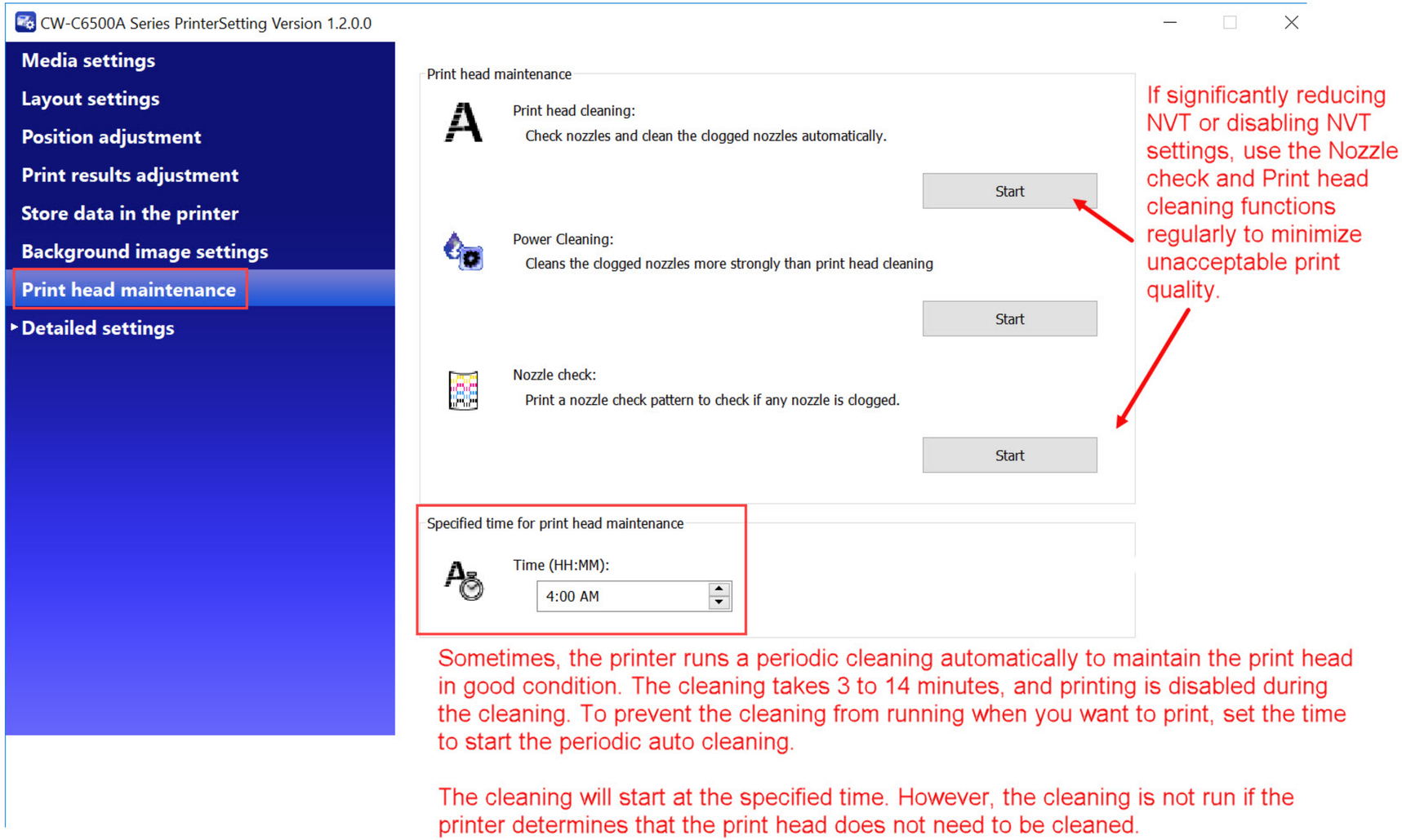
CW-C6000 Series Printer Setting Utility NVT Settings

- The CW-C6000 Printer Setting utility has functions for controlling NVT as displayed in the graphic.
- Displayed are examples of settings that have been configured to minimize the amount of pausing and ink usage while still maintaining an acceptable degree of print quality.



CW-C6000 Series Printer Setting Utility NVT Settings

- The CW-C6000 Printer Setting utility has functions for Print head maintenance. These can be used in combination with NVT and should be used before printing jobs when NVT is disabled or reduced significantly.
- Periodic head maintenance can interrupt production time unless a specific time is set. Set the time during non-production time.
- If the printer has been left unused without being powered, the cleaning may be run when the printer is turned on.



Sometimes, the printer runs a periodic cleaning automatically to maintain the print head in good condition. The cleaning takes 3 to 14 minutes, and printing is disabled during the cleaning. To prevent the cleaning from running when you want to print, set the time to start the periodic auto cleaning.

The cleaning will start at the specified time. However, the cleaning is not run if the printer determines that the print head does not need to be cleaned.

Setting the cleaning start time allows you to clean the print head without interrupting printing operation. The default time is “0:00”.

Configuring CW-C6000 Operator Panel Nozzle Verification Settings

The CW-C6000 series Operator Panel settings are displayed on the right.

- NOZZLE VERIFICATION TECHNOLOGY
- OFF will prevent nozzle checking
- NOZZLE CHECK INTERVAL
- Set to a value higher than 500, max is 13k
- OPERATION AT CLOGGED NOZZLE
- Selecting CONTINUE will minimize interruptions & ink consumption.
- THRESHOLD OF CLOGGED NOZZLES
- Setting a higher amount will minimize head maintenance, setting too low will trigger head maintenance more often.
- Cleaning After Nozzle Check
- Select OFF to save ink consumption and maintain production.
- Periodic Cleaning – Takes 2 to 30 minutes
- Set up in non-production time period.

CW-6000 Series Operator Panel

Select Menu, OK, Maintenance, Down 7 to Nozzle check settings

	Setting menu		Settings	Default	Lock Setting: General Settings	Lock Setting: Printer Settings	Lock Setting: Media Settings
	Print Head Alignment						
		Vertical Alignment		-	-	✔	-
		Horizontal Alignment			-	✔	-
	Calibration						
		Simple Media Detect		-	-	✔	-
		Media Detect			-	✔	-
		Roll Media Tension			-	✔	-
*	Nozzle check settings						
		Nozzle check settings	On	On	-	✔	-
			Off		-	✔	-
		Nozzle Check Interval	1to13000 [copies]	500 [copies]	-	✔	-
		Operation At Clogged Nozzle	Notify	Notify		✔	
			Continue print		-	✔	-
		Threshold Of Clogged Nozzles	0 to 16 [nozzles]	6 [nozzles]	-	✔	-
		Cleaning After Nozzle Check	On	On	-	✔	-
			Off		-	✔	-
	Periodic Cleaning		HH:MM (in increments of 1 min.)	0:00	-	✔	-
	Ink Discharging		-	-	-	✔	-
	General Settings						
	Basic Settings						
		LCD Brightness	1 to 5	5	✔	-	-
		Sound					
			Off	Medium	✔	-	-
			Low		✔	-	-
			Medium		✔	-	-
			High		✔	-	-
			Max		✔	-	-

Configuring CW-C6000 Operator Panel Nozzle Verification Settings

*Dot Substitution is controlled by the Nozzle Verification Technology function under Image Quality.

- Nozzle Verification Technology
- Enabled allows for supplementing missing dots caused by clogged nozzles with dots generated by nozzles adjacent to the clogged nozzles similar in concept to the C7500.

More information regarding Nozzle Verification Technology can be found in the Epson CW-C6000 Technical Reference Guide.

CW-C6000 Series Operator Panel

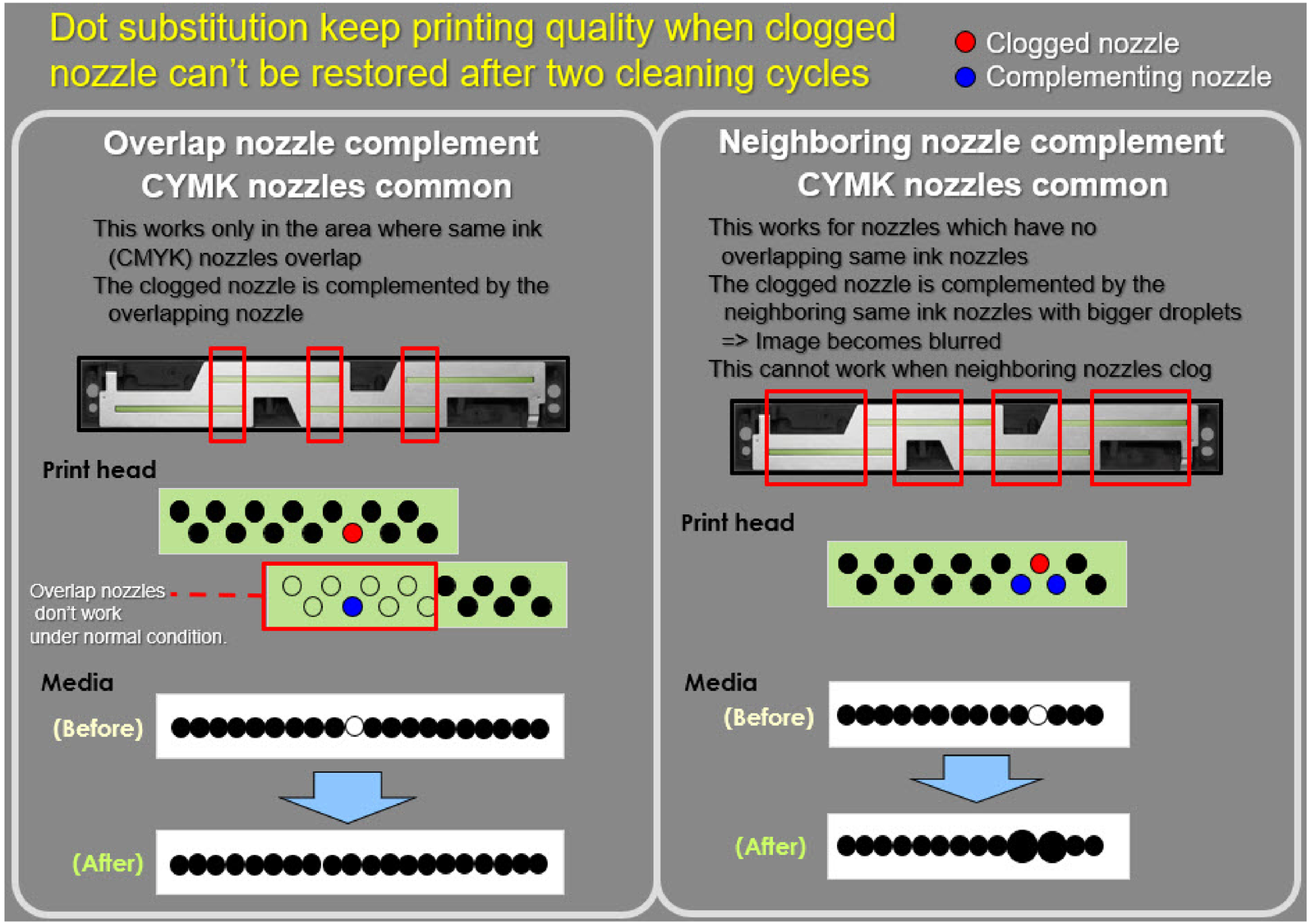
Select Menu, General Settings, Printer Settings, Image Quality, Down 5 to Nozzle Verification Technology

Setting menu	Settings	Default	Lock Setting: General Settings	Lock Setting: Printer Settings	Lock Setting: Media Settings
Ink Profile	-6 to +4 (in increments of 1)	0	-	✔	-
Ratio of Black to Composite	-6 to 0 (in increments of 1)	0 *Changes to "-2" when Black ink type is matte black, Media type is Plain Paper, Matte Paper or Texture Paper Print Quality is Speed, Normal, or Quality	-	✔	-
Dry Time	0 to 5 sec. (in increments of 0.1 sec.)	0 sec.	-	✔	-
Nozzle Verification Technology					
Enable		Enable	-	✔	-
Disable			-	✔	-
Bar Width Adjustment	- 2 to +2 (in increments of 1)	0	-	✔	-
Print Options					
Print Mode					
Cut (Auto cutter model only)		For auto cutter model: Stop at Cut Position	-	✔	-
Stop at Cut Position (Auto cutter model only)			-	✔	-
Stop at Peel-Off Position (Auto cutter model only)		For peeler model: Peel-Off	-	✔	-
Peel-Off (Peeler model only)			-	✔	-
Peel-Off for Auto Labeler (Peeler model only)			-	✔	-
Rewind			-	✔	-
Cut Position (Auto cutter model only)	±10.8[mm]/ ±0.425 [inch]	0[mm]/ 0[inch]	-	✔	-

EPSON C7500 Dot Substitution Technology Explained

The supplementary nozzle function performs dot compensation by using a combination of other nozzles allowing printing to continue when clogged nozzles occur. This reduces wasted prints or lost printing time due to stopping while printing.

While it does not completely correct for inadequate print and barcode quality, the system carries out supplementation according to nozzle dropout information known at the start of printing. It is not able to supplement nozzle dropouts that occur during the current printing process.



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