Using KODAK Negative Film Processing Chemicals, Type L

Kodak alaris

CURRENT INFORMATION SUMMARY

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KODAK Negative Film Processing Chemicals, Type L, and KODAK Rinse Tablets are specially made for use in processors designed for the Process CN-16L cycle. The chemicals and tablets are part of Kodak Alaris' systems approach that enables users of other manufacturer's minilabs to provide customers with high-quality film processing in KODAK chemicals.

OBTAINING THE CHEMICALS

These products will be offered in the U.S. and Canada:

Product	Min/Mult Order Qty	CAT Number
KODAK FLEXICOLOR Developer Replenisher LORR, 10 Litres	4	823 1672
KODAK FLEXICOLOR Developer Starter LORR	1	660 1074
KODAK Negative Film Bleach Replenisher, Type L	4	818 9276
KODAK Negative Film Fixer Replenisher, Type L	4	864 3819
KODAK Negative Film Rinse and Replenisher, Type L	10	817 4278
KODAK Rinse Tablets	4	191 3110

Parts A, B and C of 10 L KODAK FLEXICOLOR Developer Replenisher LORR and Film Water Measuring Bottle

CONVERTING TO THE *KODAK* NEGATIVE FILM PROCESSING CHEMICALS, TYPE L

Converting to KODAK Negative Film Processing Chemicals, Type L, is easy because no modifications to the processor are required. You can mix and replenish these KODAK chemicals on top of existing solutions. Standard operating specifications are shown in Figure 1, on page 3.

Preparing Replenisher Solutions

Follow the instructions below to prepare replenisher solutions.

Developer Replenisher (N1-R)

Use KODAK FLEXICOLOR Developer Replenisher LORR, CAT No. No. 23 1672. To mix 10 litres, use 1 Part A, 1 Part B, and 1 Part C, along with water, according to the directions below.

Note: Before mixing replenisher, make sure that the solution level is low enough to accommodate 10 litres.

1. Fill an empty, clean 5 L bottle with 4.49 L of water at 21 to 38°C (70 to 100°F). Pour it into the developer replenisher tank in the processor.
2. Repeat Step 1.
3. Add the contents of 1 bottle of Part A to the developer replenisher tank. Move the mixing rod up and down 8 to 10 times to mix.
4. Add the contents of 1 bottle of Part B to the developer replenisher tank. Move the mixing rod up and down 8 to 10 times to mix.
5. Add the contents of 1 bottle of Part C to the developer replenisher tank. Move the mixing rod up and down 8 to 10 times to mix.

Bleach Replenisher (N2-R)

Use KODAK Negative Film Bleach Replenisher, Type L, CAT No. 818 9276. This product is sold in 2-litre bottles; it is ready to use as replenisher and requires no mixing.

Fixer Replenisher (N3-R)

Use KODAK Negative Film Fixer Replenisher, Type L, CAT No. 864 3819. This product is sold in 2-litre bottles; it is ready to use as replenisher and requires no mixing.

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Rinse Replenisher (NS-R)

Use KODAK Rinse Tablets, CAT No. 191 3110. This product is sold as tablets, which need to be mixed with water. To mix Rinse Replenisher, dissolve 2 Rinse Tablets in 8 litres of water at 21 to 38°C (70 to 100°F).

Stabilizer/Final Rinse Replenisher (N4-R)

Use KODAK Negative Film Rinse and Replenisher, Type L, CAT No. 817 4278. This product is sold as a single-part concentrate bottle. Use the directions below make 8 litres. The mixed solution can be used as a replenisher or working tank.

Note: Before mixing replenisher, make sure that the solution level is low enough to accommodate 8 litres.

1. Add 4 litres of water at 21 to 38°C (70 to 100°F) to the N4-R tank.
2. Repeat Step 1.
3. Add the contents of 1 bottle of KODAK Negative Film Rinse and Replenisher to N4-R Tank. Move the mixing rod up and down 8 to 10 times to mix.

KODAK Negative Film Type L Processing Chemicals—ready-to-use bleach, rinse concentrate, and ready-to-use fixer

Disposing of Empty Bottles

Triple-rinse empty chemical bottles after use. The triple-rinsed bottles are not considered to be hazardous waste. To dispose of them, place the bottles and corrugated shipping materials with your other recyclable goods.

PREPARING WORKING TANK SOLUTIONS

Mix working tank solutions according to the instructions below in the volumes required for your CN-16L processor. Turn off the processor while making the working tank solution.

Developer Tank (N1)

Use mixed FLEXICOLOR Developer Replenisher LORR, water, and FLEXICOLOR Developer Starter LORR, to make a developer working tank solution, following the table below. Add the mixed developer replenisher and starter to the N1 developer tank, then add water. When the processor is turned on, the solution will mix as the temperature warms up to specification.

Film Processor	Tank Volume (Litres)	FLEXICOLOR Developer Replenisher, LORR, CAT No. 812 1857 (Litres)	Water (Litres)	FLEXICOLOR Developer Starter, LORR, CAT No. 848 5153 (Litres)
—	1.0	0.763	0.207	0.030
FP232B	9.4	7.172	1.946	0.282
FP360/362	11.5	8.775	2.380	0.345
FP560/562	17.2	13.124	3.560	0.516
FP920/922	28.7	21.898	5.941	0.861

Bleach Tank (N2)

Use KODAK Negative Film Bleach Replenisher, Type L, CAT No. 818 9276, with water to make a bleach working tank solution as per the directions in the table below. Add the bleach replenisher to the N2 bleach tank, then add water. When the processor is turned on, the solution will mix as the temperature warms up to specification.

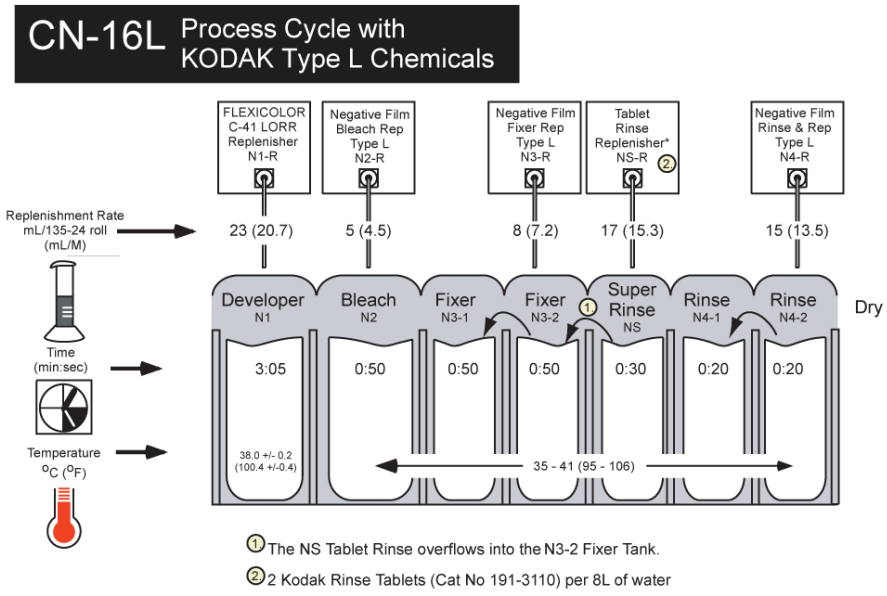
Film Processor	Tank Volume (Litres)	Negative Film Bleach Replenisher, CAT No. 818 9276	Water (Litres)
—	1.0	0.700	0.300
FP232B	4.1	2.870	1.230
FP360/362	5.0	3.500	1.500
FP560/562	5.0	3.500	1.500
FP920/922	7.8	5.460	2.340

Fixer Tank (N3)

Use KODAK Negative Film Fixer Replenisher, Type L, along with water to make a working tank solution as per the table below. Add the fixer replenisher to the N3-1 or N3-2 fixer tank, then add water. When the processor is turned on, the solution will mix as the temperature warms up to specification.

Film Processor	Tank Volume (Litres)	Negative Film Fixer Replenisher, CAT No. 864 3819 (Litres)	Water (Litres)
—	1.0	0.350	0.650
FP232B	8.6	3.010	5.590
FP360/362	5.0	1.750	3.250
FP560/562	5.0	1.750	3.250
FP920/922	7.1	2.485	4.615

Figure 1 Specifications for Process CN-16L



Super Rinse (NS)

Use KODAK Rinse Tablets, CAT No. 191 3110. Dissolve 2 Rinse Tablets in 8 litres of water at 21 to 38°C (70 to 100°F). This solution can be used as a replenisher or working tank solution.

Stabilizer/Final Rinse Tanks (N4-1 & N4-2)

Reference previous instructions for making replenisher. When mixed, KODAK Negative Film Rinse and Replenisher, Type L, solution can be used as a replenisher or working tank.

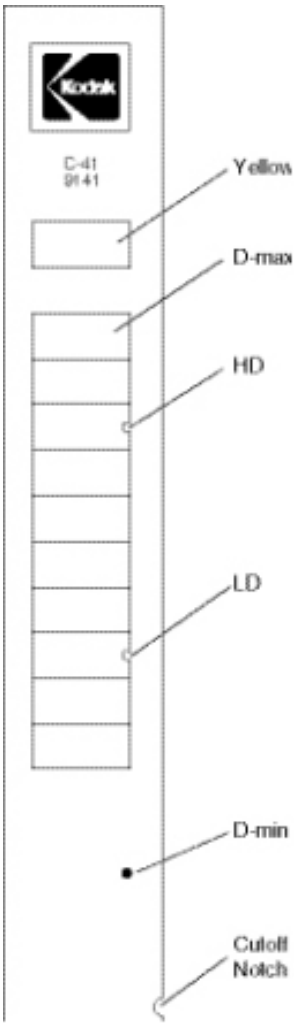
USING *KODAK* CONTROL STRIPS, PROCESS C-41, TO MONITOR THE PROCESS

Use KODAK Control Strips, Process C-41 for monitoring the performance of your Process CN-16L processor.

Each time you process a control strip, position it in the same location in the processor. Process a control strip at these times:

- At the beginning of the day or shift, before processing customer work.
- At the end of the day or shift.

Note: If you start using KODAK Control Strips, Process C-41, immediately upon conversion, the activity of the developer tank will be high and cause the HD-LD to plot high from aim. As the developer seasons, the HD-LD will fall to within normal tolerances for HD-L. No corrective action is necessary.



Plotting Control-Strip Densities

Create a control chart by using the KODAK Process Record Form Y-55 or similar graph paper. Your chart should have the format of the Process CN-16L "Visual Process Control Guide" shown on page 8.

Tolerances and Limits for KODAK Control Strips, Process C-41

Measurement	Aim-Value Adjustment Tolerance	Action Limits	Control Limits	Color-Balance Spread Limit
D-min	±0.03	±0.03	±0.05	—
LD	±0.04	±0.06	±0.08	—
HD-LD	±0.03	±0.07	±0.09	±0.09
$D\text{-}max_b\text{-}Y_b$	±0.07	+0.10	+0.12	—

1. Before you begin to use a box of control strips, remove the reference strip from the box, and store it at room temperature.
2. Use a precision densitometer to measure the densities in the center of the Yellow, HD, LD, and D-min patches on the reference strip. Do not move the strip as you make the density readings or you may affect the precision and repeatability of the measurement. Use transmission mode Status M.
3. To obtain the aim densities, apply the correction factors to the densities read in Step 2. The correction factors are found on a sheet packaged with the control strips. Make sure you use the correction factors for Process CN-16L. To obtain the HD-LD aim value, subtract the adjusted LD value form the adjusted HD value. To obtain the D-maxb -Yb aim value, subtract the adjusted blue density of the yellow step from the adjusted blue density of the D-max step. Use the Process CN-16L Reference Aims Worksheet on page 9 to help calculate the aim densities.

Note: If you are using an older code of control strip that does not list correction factors for Process CN-16L, apply the Process Factors listed in the following table to the density readings after applying the regular correction factors for Process C-41.

Additional Process CN-16L Adjustment Factors for Use with Process C-41 Control Strips			
Step	**R**	**G**	**B**
Yellow	0.00	0.00	0.00
D-max	0.00	0.00	+0.04
HD	+0.04	0.00	+0.04
LD	0.00	0.00	0.00
D-min	0.00	0.00	0.00

4. Process a control strip and measure the Yellow, D maxb-Yb, HD, LD, and D-min patches.
5. Calculate the variations from aim by subtracting the aim densities from your control-strip densities. Plot the variations on your control chart. Plot variations that are higher than the corresponding aim values (+ values) above the aim line. Plot variations that are lower than the aim values (- values) below the aim line.

If any of the variations from aim plots beyond the action or control limits, process another control strip. If the second control strip confirms the results of the first strip, determine the cause of the problem. Using the "Visual Process Control Guide" on page 8 provides a good starting place. If the problem is not readily correctable, contact Kodak Alaris Service and Support.

USING THE "VISUAL PROCESS CONTROL GUIDE" AND *KODAK* CONTROL STRIPS TO TROUBLESHOOT PROCESS CN-16L

If your Process CN-16L control chart indicates an out-of-control plot position, use the "Visual Process Control Guide" as follows to troubleshoot the process and apply corrective action.

First check for operational errors:

- Make sure the control-strip code matches the reference-strip code.
- Calibrate the densitometer.
- Re-check the control-strip aims and verify the correction factors.
- Verify the problem by processing a second control strip.
- Determine if any recent processor maintenance could have caused a problem.
- Verify that tank and replenisher solutions were mixed correctly.
- Use an accurate thermometer to verify that the developer temperature and other solution temperatures are correct.

Match your plots to the "Visual Process Control Guide" to identify the problem:

- Match your control plots to the examples given on the "Visual Process Control Guide." Compare only one plot parameter at a time (D-maxb-Yb, HD-LD, LD, D min). Note that the pattern of the red, green, and blue plot deviations can be an indicator of different problems.
- Write down the problems indicated by each parameter for the plots that are out of control. Consider that you may have more than one problem occurring at the same time.
- Consider each potential cause of the out-of-control condition, and verify the operational conditions of the processor.

When you have determined the most likely cause(s) of the out-of-control condition, take corrective action to eliminate the cause, and use the prescriptions to eliminate the symptom of the problem.

Corrective Action and Prescriptions

$D\text{-}max_b - Y_b$:

This parameter monitors the performance of the bleach solution for retained silver. A bleach solution that is underreplenished or diluted will not efficiently bleach the film, leaving retained silver in higher-density areas. If the D-maxb-Yb indicates a retained-silver problem, confirm it with the following test.

1. Immerse the processed control strip in the bleach tank, and soak it for 4 minutes.
2. Remove the strip, rinse it thoroughly with water for 4 minutes, and dry it.
3. Re-read the strip, re-plot D-maxb-Yb, and compare the new plot to the earlier plot. If the new plot shows a difference of -0.05 density unit or more (lower), it confirms a bleaching problem. If there is no change or less than a 0.05 change, the bleach is not a problem. See the "Visual Process Control Guide" for other possible causes.

HD-LD (Contrast)

This parameter monitors developer activity. Contrast is the primary indicator of developer (N1) agitation, oxidation, concentration, or contamination. If the developer tank solution is under-agitated, too dilute, or oxidized, the plots will be low. If the developer tank solution is overconcentrated or contaminated, the plots will be high. If the process is very out of control, i.e., by more than 0.15 density unit over or under aim, replace all of the developer tank solution. If the developer is contaminated, make sure you rinse the tank out thoroughly, and then replace all of the developer tank solution. If the plots are less than 0.15 density unit over or under aim, you can risk a prescription.

Prescriptions:

- *For high HD-LD plots*:
  Overconcentration: Dilute the developer with warm water in an amount equal to 5 percent of the volume in the developer tank. Repeat as necessary until the process is in control.
- *For low HD-LD plots*:
  Under-agitation: Call a service representative to fix the agitation pump on the processor.
- *Oxidation*: Check for air bubbles in the developer tank, and call a service technician if bubbles are visible. If oxidation is caused by low utilization, see the corrective action in Kodak Alaris Publication No. CIS-246, Operating Minilabs at Low Levels of Utilization. This publication is available on the Kodak Alaris website at www.kodakalaris.com/go/professional.

LD (SPEED)

This parameter monitors developer activity. Speed is the primary indicator of problems with developer time, temperature, and especially replenishment rate. For development time that is too long, temperature that is too high, or overreplenishment, the LD plots will be high. For time that is too short, temperature that is too low, or underreplenishment, the LD plots will be low. Check the developer time and temperature, and adjust them to specification. The developer time should be 3:05 ± 0:05; the temperature should be 38 ± 0.2°C.

If the plots are very out of control, i.e., by more than 0.18 density unit over or under aim, dump the developer tank solution and replace it. If the plots are less than 0.18 density unit over or under aim, you can risk a prescription.

Prescriptions:

- *For high LD plots*:
  Overreplenishment: Make a solution of 1 part FLEXICOLOR Developer Starter LORR to 4 parts water. Add 25 mL of this solution per litre of developer tank solution. Repeat the additions until the process is in control. Check the replenishment-rate specification and the output of the developer replenisher pump, and calibrate.
- *For low LD plots*:
  Underreplenishment: Add 25 mL of mixed FLEXICOLOR Developer Replenisher LORR per litre of tank solution. Repeat the additions until the process is in control. Check the replenishment-rate specification and the output of the developer replenisher pump, and calibrate.

D-min (Clear Area of Film)

This parameter may monitor developer, bleach, or fixer problems. If a developer problem is indicated, see the HD-LD or LD parameter for confirmation and corrective action. If a bleach or fixer problem is indicated, see the corrective action below:

Bleach (Stain):

Developer carryover into the bleach can form a byproduct that can elevate D-min. This occurs when the bleach is underreplenished or under-aerated. Replace the bleach (N2) tank solution with fresh tank solution. Also:

- Check the bleach aeration to make sure it is working properly.
- Check the output of the bleach replenishment pump and calibrate.
- Check the replenishment rate for bleach, and adjust to the correct rate.

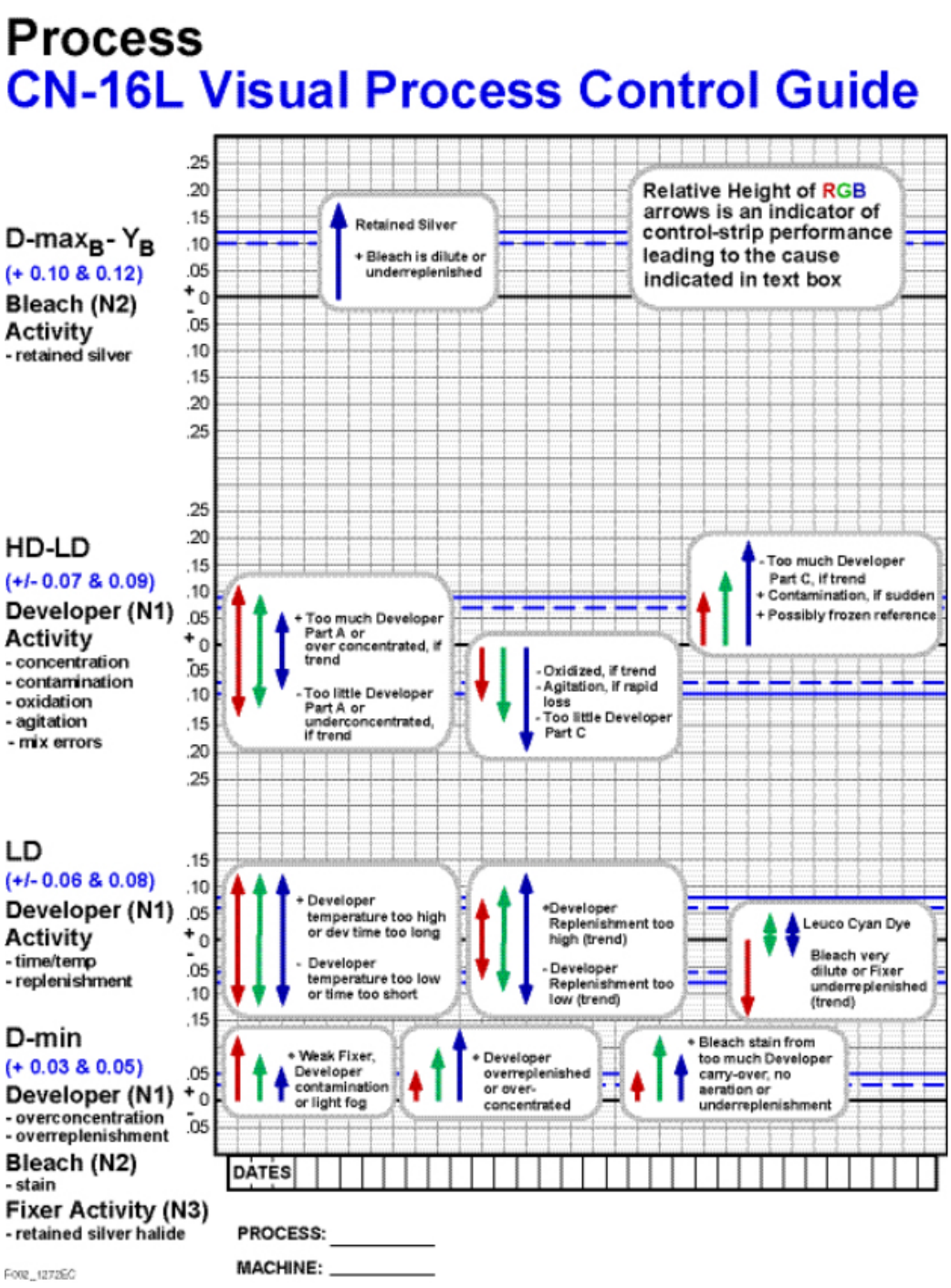
Fixer (Retained Silver Halide):

Retained silver halide is caused by an exhausted fixer solution due to underreplenishment, dilution, or oxidation. This is indicated by a high D-min, especially the red D min. To confirm retained silver halide, run this test:

1. Immerse the processed control strip in the fixer tank and soak it for 7 minutes.
2. Remove the strip, rinse it thoroughly with water for 3 minutes, and dry it.
3. Re-read the strip and re-plot D-min. Compare the red D-min to the earlier plot. If the new plot shows a difference of at least 0.05 (lower), it confirms a fixer problem. Replace both fixer tanks with KODAK Negative Film FC Tank Fixer. Use directions on page 3. Also, check the output of the fixer replenisher pump and calibrate. Set the fixer replenishment rate to the correct value.

If there is no change or less than a 0.05 change, the fixer is not a problem. See the "Visual Process Control Guide" for other possible causes.

Figure 2


Process
CN-16L Visual Process Control Guide
D-max$_B$- Y$_B$
(+ 0.10 & 0.12)
Bleach (N2)
Activity
- retained silver
HD-LD
(+/- 0.07 & 0.09)
Developer (N1)
Activity
- concentration
- contamination
- oxidation
- agitation
- mix errors
LD
(+/- 0.06 & 0.08)
Developer (N1)
Activity
- time/temp
- replenishment
D-min
(+ 0.03 & 0.05)
Developer (N1)
- overconcentration
- overreplenishment
Bleach (N2)
- stain
Fixer Activity (N3)
- retained silver halide
.25
.20
.15
.10
.05
+ 0
- .05
.10
.15
.20
.25
Retained Silver
+ Bleach is dilute or underreplenished
Relative Height of RGB arrows is an indicator of control-strip performance leading to the cause indicated in text box
+ Too much Developer Part A or over concentrated, if trend
- Too little Developer Part A or underconcentrated, if trend
- Oxidized, if trend
- Agitation, if rapid loss
- Too little Developer Part C
- Too much Developer Part C, if trend
+ Contamination, if sudden
+ Possibly frozen reference
+ Developer temperature too high or dev time too long
- Developer temperature too low or time too short
+Developer Replenishment too high (trend)
- Developer Replenishment too low (trend)
Leuco Cyan Dye
Bleach very dilute or Fixer underreplenished (trend)
+ Weak Fixer, Developer contamination or light fog
+ Developer overreplenished or over-concentrated
+ Bleach stain from too much Developer carry-over, no aeration or underreplenishment
DATES
PROCESS: _____
MACHINE: _____
F092_1272EC

Process CN-16L

Reference Aims Worksheet

Date: _____ Code:_____

	Red	Green	Blue
D-max$_b$ Density Readings			
Control Strip Correction Factor			
Corrected D-max			
Yellow$_b$ Density Reading			
Control Strip Correction Factor			
Corrected Yellow$_b$			
AIM D-max$_b$-Y$_b$			
HD Density Readings			
Control Strip Correction Factors			
Corrected HD			
LD Density Readings			
Control Strip Correction Factors			
AIM LD			
AIM HD-LD			
D-min Density Readings			
Control Strip Correction Factors			
AIM D-min			

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