# 4 TROUBLESHOOTING PROCESSES C-41 AND RA-4

This section describes the following:

- How to recognize common control-chart plotting patterns
- How to troubleshoot your process using the Visual Process Control Guides for Process C-41 and Process RA-4
- What corrective action to take to eliminate the source of your process control problem

The Visual Process Control Guides in this section are a one-page representation of how all common process control problems will plot on your control-chart. The red, green, and blue arrows on the guides correspond to the red, green and blue lines plotted on your control-chart, and the direction they will plot when problems are indicated. Once you familiarize yourself with the contents of this section, you will find it easy to recognize process problems and what action to take to correct these problems.

## Control-Chart Patterns

Once you have the control strip data plotted over time, it is important to recognize common control-chart patterns. How the control strip plots from day to day (history) can help you to determine the source of a problem. The history of a control chart-pattern can generally be separated into three categories: a trend, a sudden change (spike), or cycling.

**Trend**—When the control plot deviations change slowly from day to day in one direction (high or low), this is a trend. A control-chart pattern which is a trend usually indicates a chemical problem in one or more of your tank solutions. Trends are most often caused by:

- improper replenishment due to high or low replenishment rate
- incorrect mixing of replenisher
- evaporation or oxidation of tank solutions due to the processor operating in low utilization conditions

**Sudden Change/Spike—**A sudden change or spike occurs when the plot deviations change suddenly from one day to the next, or from one processed control strip to the next strip processed. This control-chart pattern could indicate both physical or chemical problems with the process, such as the following:

- a physical problem with the processor, such as tank solution temperatures or times that are too high or low
- a physical problem with the process such as an agitation pump not working properly
- incorrect densitometer readings due to a bad reading or a densitometer that is not calibrated
- contamination of developer due to bleach, fix or bleach-fix getting into the developer tank

**Cycling—**When the plot deviations constantly go from a high position to a low position (or vice versa) from day to day, or from strip to strip, this is known as cycling. A control control-chart pattern that cycles usually indicates a physical problem with the processor or densitometer, such as the following:

- a physical problem with the processor, such as tank solution temperatures that are too high or low or transport speed that is too fast or slow.
- inaccurate densitometer readings due to a densitometer that is not calibrated or inconsistent due to a bad lamp or other problems.

## TROUBLESHOOTING YOUR PROCESS

When the controls strip deviations on the control chart exceed an action limit, or indicate an out-of-control condition, follow these steps to troubleshoot the problem:

1. First check for set-up or operational errors
   - Make sure control strip code matches the reference strip code
   - Calibrate densitometer
   - Re-check control strip aims and verify correction factors
   - Verify the problem by processing a second control strip
   - Determine if any recent processor maintenance could have potentially resulted in a problem
   - Verify that previous tank or replenisher solutions were mixed correctly
   - Verify that the developer temperature, and other solution temperatures, are correct with a separate thermometer
2. Compare the plot deviations on your control-chart to the "Visual Process Control Guide" to pinpoint possible sources of the problem.
   - Compare the plot deviations for each control parameter on your control chart to the corresponding control parameter of the Visual Process Control Guide. Compare each control parameter separately; BP, D-max$_b$-Y$_b$, HD-LD, LD, D-min.
   - For plotted deviations that meet or exceed the action or control limit, match the pattern of the red, green and blue plot deviations to the visual representations on the Visual Process Control Guide. Pick the best-fit pattern, then record all the possible problems those plot deviations indicate.
   - Review the history of the plot deviations on your control-chart and determine whether the plots indicate a trend, and sudden change/spike, or a cycling pattern. Based upon this plot history, prioritize the possible problems you recorded, listing the most likely potential problems first and the least likely last.
3. Refer to corrective action section for resolution
   - Consider each potential cause on your prioritized list of potential problems, and check the corresponding operating conditions of the processor.
   - Do any testing required to verify problem as suggested in the Corrective Action and Prescriptions section.
   - Apply prescription as suggested in the Corrective Action and Prescriptions section to bring process with in control.
   - **Most importantly**, address root cause of the problem for final resolution, so it does not return.

# Process C-41
# Visual Process Control Guide

**D-max$_B$-Y$_B$**
**(+ 0.10 & 0.12)**
**Bleach Activity**
- retained silver

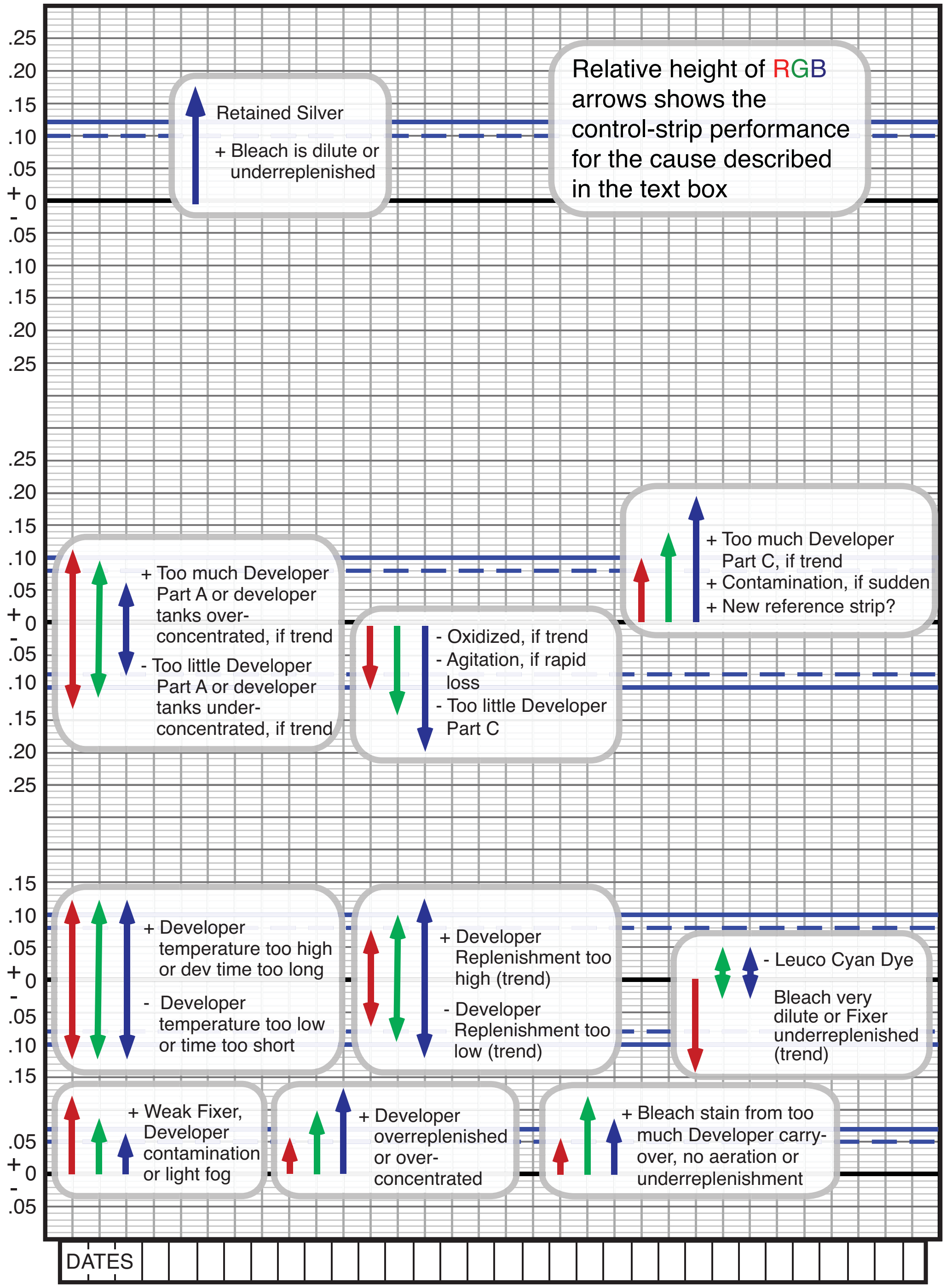
**HD-LD**
**(+/- 0.08 & 0.10)**
**Developer Activity**
- concentration
- contamination
- oxidation/low utilization
- agitation
- mix errors

**LD**
**(+/- 0.08 & 0.10)**
**Developer Activity**
- time/temp
- replenishment

**D-min**
**(+ 0.05 & 0.07)**
**Developer,**
- overconcentration
- overreplenishment

**Bleach,**
- stain

**Fixer Activity**
- retained silver halide




PROCESS: ____________

MACHINE: ____________

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## PROCESS C-41 CORRECTIVE ACTION AND PRESCRIPTIONS

Use these corrective actions and prescriptions for Process C-41.

### D-$max_b$—$Y_b$

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-$max_b$-$Y_b$ indicates a retained-silver problem, confirm it with the following test.

1. Immerse the processed control strip that plotted high in D-$max_b$-$Y_b$ in bleach replenisher concentrate, and soak the strip for 5 minutes; agitate intermittently.
2. Remove the strip, rinse it thoroughly with water for 5 minutes, and allow it to dry.
3. Reread the strip, and re-plot D-$max_b$-$Y_b$.
4. Compare the new plot to the original plot. A difference of 0.08 density units or more confirms a bleaching problem. If there is no difference or a change of less than 0.08, the bleach is not a problem. See the "Process C-41 Visual Process Control Guide" for other possible causes.

### Prescription

- For C-41RA and C-41B Processors: If the plot is 0.25 density units over aim or less, add bleach replenisher concentrate directly to the working tank in an amount equal to 70 mL per litre of bleach tank solution. If plots are over 0.25 density units high, replace all the tank with freshly mixed bleach tank solution.

### HD - LD (Contrast)

HD-LD monitors developer activity. Contrast is a primary indicator of problems with **developer agitation**, **oxidation**, **concentration**, or **contamination**. If the developer tank solution is under-agitated, diluted, or oxidized, the plots will be low. If it is overconcentrated or contaminated, the plots will be high.

You must dump and replace the developer tank solution in these situations:

- Plots are more than 0.16 density unit over or under aim.
- The developer is contaminated
- The developer is too dilute (underconcentrated)
- A mix error in the developer replenisher causes out-of-control plots.

If the plots are less than 0.16 density unit over or under aim, you can try a prescription.

### Prescription

- For **high HD-LD** plots:

  *Overconcentration:* Dilute the developer tank solution with an amount of warm water equal to 5 percent of the developer tank volume. Repeat as necessary until the process is in control.

- For **low HD-LD** plots:

  *Under-agitation:* Replace the agitation pump on the processor.

  *Oxidation:* If air bubbles are visible in the developer tank, look for a small air leak or loose fitting. If oxidation is caused by low utilization, see KODAK Publication No. CIS-246, "Operating Minilabs in Periods of Low Production Volumes." Replace the developer tank with a fresh working tank solution.

### LD (Speed)

LD monitors developer activity. Speed is a primary indicator of problems with **developer time, temperature, and especially replenishment rate**. A long developer time, a temperature that's too high, or overreplenishment , will cause high LD plots. A short developer time, a low temperature, or underreplenishment, will cause low LD plots.

Check developer time and temperature, and adjust them to specifications. Developer time should be 3:15 ± 5 seconds; temperature should be 37.8 ± 0.15°C (100 ± 0.25°F).

If the plots are more than 0.16 density unit over or under aim, dump and replace the developer. If the plots are less than 0.16 density unit over or under, you can try a prescription.

### Prescriptions

- For **high LD** plots:

  *Overreplenishment:* Make a solution of 1 part FLEXICOLOR Developer Starter LORR to 4 parts water. Add the mixture to the developer tank at a rate of 50 mL per litre of tank solution. Repeat additions until the process is in control.

- For **low LD** plots:

  *Underreplenishment:* Add 50 mL of mixed FLEXICOLOR Developer Replenisher LORR per litre of tank solution to the developer tank. Repeat additions until the process is in control.

**D-min (Clear Area of Strip)**
D-min monitors developer, bleach, or fixer problems. If the D-min indicates a developer problem, see either "HD-LD (Contrast)" or "LD (Speed)" for confirmation and corrective action. If the D-min indicates a bleach or fixer problem, see the corrective action below:

**Fixer (Retained Silver Halide)**—Retained silver halide is caused by an exhausted fixer solution due to underreplenishment, dilution, or oxidation. D-min will show retained silver halide with high plots, especially the Red D-min. To confirm retained silver halide, run this test:

1. Immerse the processed control strip that plotted high in D-min in mixed fixer replenisher, and soak it for 5 minutes; agitate intermittently.
2. Remove the strip, wash in running water for 5 minutes, and allow it to dry.
3. Reread the strip and replot the D-min density readings.
4. Compare the Red D-min to the original plot. A change of at least 0.05 density unit confirms a fixer problem. Replace the fixer tank solutions with freshly mixed fixer replenisher solution. If there is no change or a change of less than 0.05, the fixer is not a problem. See the "Process C-41 Visual Process Control Guide" for other possible causes.

# Process RA-4
# Visual Process Control Guide

**Yellow Patch**
- (Visual check only)

**Bleach-Fix Activity**
- retained silver

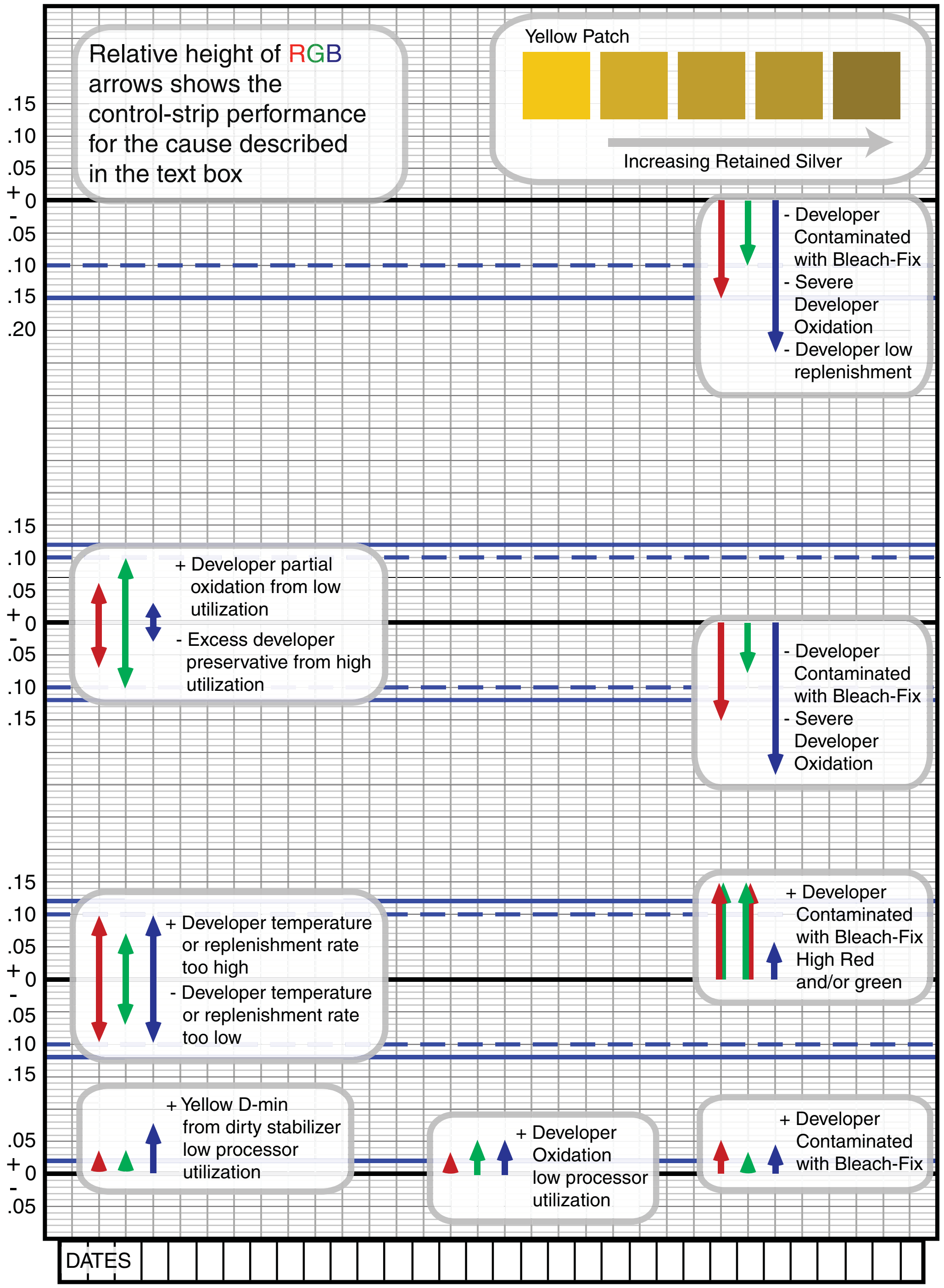
**Black Patch**
**(- 0.10 & - 0.15)**
**Developer Activity**
- severe oxidation
- contamination

**HD-LD**
**(+/- 0.10 & 0.12)**
**Developer Activity**
- high and low utilization

**LD**
**(+/- 0.10 & 0.12)**
**Developer Activity**
- time/temp
- replenishment
- low utilization

**D-min**
**(+ 0.02)**
**Developer,**
- BF contamination
- low utilization

**Stabilizer**
- low utilization




PROCESS:____________

MACHINE: ____________

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## PROCESS RA-4 CORRECTIVE ACTION AND PRESCRIPTIONS

### Yellow Patch

The Yellow Patch monitors the performance of the bleach-fix solution for **retained silver.** There is no plotting of the yellow patch on a control chart, this is meant to be a visual reference only. Compare the yellow patch on a processed control strip with the yellow patch on the reference strip. If the yellow patch appears less saturated in color, or "muddy" compared to the reference, you may have retained silver. A bleach-fix solution that is underreplenished or diluted will not efficiently remove silver in the paper, leaving retained silver in higher density areas. You can confirm retained silver confirm by the following test:

1. Take your processed control strip and reprocess it back through the the processor in order to rebleach-fix the control strip, or use mixed PRIME SP Bleach-Fix Replenisher LORR and soak strip for 3 minutes, then wash for 3 minutes under running water.
2. Compare the Yellow Patch again on the reprocessed control strip to the yellow patch on the reference strip, if this has improved the yellow patch on the reprocessed strip, then you have confirmed a retained silver problem.

### Prescription

For a severe retained silver problems replace all of the bleach-fix tank. If there is any precipitate found in the bleach-fix tank (sulfurization), replace all of the bleach-fix tank. For minor retained silver problems, use this prescription:

- For PRIME SP Bleach-Fix LORR, or regular Bleach-Fix, replace 25% of the bleach-fix tank with an equivalent amount of mixed replenisher.

### D-max (Black Patch)

Monitors the performance of the developer for activity and contamination. There is no upper control limit for Black Patch. If the Black Patch plots are low, then it could be an indication of low developer activity due to under replenishment or oxidation. If the Blue Black patch is very low, out-of-control, separated from the red and green plots, it could be a sign of extremely low developer activity, short developer time, severe oxidation or a contaminated developer. See Prescriptions listed under the **LD** parameter.

### HD - LD (Contrast)

The HD-LD is monitor for developer activity. Usually this is a very steady plot parameter that is unresponsive to most process problems. However, it can help monitor problems due to **high** or **low utilization**, severe developer **oxidation**, **or contamination**.

- For HD-LD plots that are only marginally high, over the action limit or slightly over the control limit, this may be due to using PRIME SP Developer Replenisher LORR in a very low utilization conditions. Switch to EKTACOLOR Developer Replenisher RT.
- For HD-LD plots that are only marginally low, under the action limit or slightly under the control limit, this may be due to using EKTACOLOR Developer Replenisher RT in a mid to high utilization conditions. Switch to PRIME SP Developer Replenisher LORR.
- For HD-LD plots that are very low, with blue being more than 0.16 density units under aim, this may be due to severe developer oxidation or contamination. Dump and clean developer tank, replace with fresh developer tank solution.

**LD (Speed)**

LD (Speed) monitors developer activity. It is the primary indicator of problems with developer **time, temperature, and replenishment rate**. If the plots are very out-of-control, by more than 0.16 density units over or under aim, dump and replace developer. If the plots are less than 0.16 density, a prescription can be risked.

- For **high LD** plots:

  *Temperature too high:* Check temperature with an accurate thermometer and make sure it is in specification, adjust if necessary. See Section 2, pages 2-7 and 2-8 for specifications.

  *Developer time too long:* Test developer time with stopwatch to make sure it is in specification, adjust if necessary. See Section 2, pages 2-7 and 2-8 for specifications.

  *Overreplenishment:* Remove a volume of developer tank solution equal to 5% of the total tank, replace with an equal amount of a mixed solution containing 9 parts water and 1 part EKTACOLOR Developer Starter. Add to developer tank, let temperature stabilize, and run a control strip. Repeat until in control. Also, verify the developer replenishment rate is set correctly, and calibrate developer replenisher pump. See Section 2, pages 2-7 and 2-8 for replenishment rate specifications.

  *Contamination:* If the Red and/or Green LD are very high and split from the Blue, then the problem is likely due to a developer contaminated with bleach-fix. The developer must be dumped and replaced with fresh developer tank solution. Make sure the tank is cleaned thoroughly.

- For **low LD** plots:

  *Temperature too low:* Check temperature with an accurate thermometer and make sure it is in specification, adjust if necessary. See Section 2, pages 2-7 and 2-8 for specifications.

  *Developer Time too Short:* Test developer time with stopwatch to make sure it is in specification, adjust if necessary. See Section 2, pages 2-7 and 2-8 for specifications.

  *Underreplenishment:* Remove a volume of developer tank solution equal to 5% of the tank volume. Add mixed developer replenisher to the tank, let temperature stabilize, and run a control strip. Repeat until it is in control.

**D-min (Stain)**

D-min monitors the performance of the developer and stabilizer. The control limit is plus 0.02 (D-min has no lower limit). The "whiteness" of the paper can be affected by three process conditions:

**Stabilizer Condition with Low Utilization**—High blue D-min with a yellow appearance on the processed control strip and paper is most commonly caused by the condition of the stabilizer tank solutions when the processor is running at low production volumes.

**Prescriptions**

- Periodic replacement of the first or second stabilizer tank following the bleach-fix tank may be sufficient. Otherwise, replace the solution in all stabilizer tanks with fresh mixes.
- During periods of low utilization, increase the replenishment rate for EKTACOLOR PRIME Stabilizer and Replenisher LORR from 195 mL/m2 to 248 mL/m2.

**Note:** See “Operating Minilabs in Period of Low Production Volumes,” page 2-10.

**Oxidized Developer**—High green and blue D-min with a pink or reddish appearance on the processed control strip and paper is most commonly caused by an oxidized developer due to aeration of the tank or low-volume operation.

**Prescriptions**

- Verify that no air leak into the recirculation system is causing developer oxidation.
- In cases of moderate oxidation, partial replacement of the developer tank volume—at least one-third—may resolve the problem. If the developer is severely oxidized, you must replace the developer tank solution with a fresh mix.

**Developer Contamination:** A high Red D-min or Blue D-min can indicate a problem with a developer contaminated with bleach-fix. The visual appearance of the D-min of the processed control strip or paper be cyan or yellow. Indications of a contamination developer should also be evident with high plots in LD and low Plots in the Black patch parameter. The developer tank should be rinsed out thoroughly, and replaced with new developer tank solution.

## APPENDIX

### Simplified Metric Conversion Charts

Because most laboratory measuring devices are calibrated in metric units, you can use the following table to convert U.S. units of volume, length, and weight to metric units. **Do not** use this table to convert from metric to U.S. values. Accuracy of the table is within one percent.

To use the table, find the number you are converting from at the top of the table for numbers from 1 to 9. For numbers greater than nine, find the number you are converting by using a combination of the number at the left side of the table and the number at the top.

**Volume, Length, and Weight Conversion**

| **U.S. Gallons to Litres** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| gal | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | — | 3.8 | 7.6 | 11.4 | 15.1 | 18.9 | 22.7 | 26.5 | 30.3 | 34.1 |
| 10 | 37.8 | 41.6 | 45.4 | 49.2 | 53 | 56.8 | 60.6 | 64.4 | 68.1 | 71.9 |
| 20 | 75.7 | 79.5 | 83.3 | 87.1 | 90.8 | 94.6 | 98.4 | 102.2 | 106 | 107.8 |
| 30 | 113.6 | 117.3 | 121.1 | 124.9 | 128.7 | 132.5 | 136.3 | 140.1 | 143.8 | 147.6 |
| 40 | 151.4 | 155.2 | 159 | 162.8 | 166.6 | 170.3 | 174.1 | 177.9 | 181.7 | 185.5 |
| **U.S. Fluidouncess to Millilitres** | | | | | | | | | | |
| fl oz | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | — | 29.5 | 59 | 89 | 118 | 148 | 177 | 207 | 237 | 265 |
| 10 | 295 | 325 | 355 | 385 | 415 | 445 | 475 | 500 | 530 | 560 |
| 20 | 590 | 620 | 650 | 680 | 710 | 740 | 770 | 800 | 830 | 860 |
| 30 | 890 | 920 | 950 | 980 | 1006 | 1035 | 1065 | 1094 | 1124 | 1153 |
| **Inches to Centimetres** | | | | | | | | | | |
| in. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | — | 2.5 | 5.1 | 7.6 | 10.2 | 12.7 | 15.2 | 17.8 | 20.3 | 22.9 |
| 10 | 25.5 | 28.0 | 30.5 | 33.0 | 35.5 | 38.0 | 40.5 | 43.0 | 45.5 | 48.5 |
| 20 | 51 | 53 | 56 | 58 | 61 | 64 | 66 | 69 | 71 | 74 |
| 30 | 76 | 79 | 81 | 84 | 86 | 89 | 91 | 94 | 97 | 99 |
| **Ounces to grams** | | | | | | | | | | |
| oz | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | — | 28.5 | 57 | 85 | 113 | 142 | 170 | 198 | 227 | 255 |
| 10 | 285 | 310 | 340 | 370 | 395 | 425 | 455 | 480 | 510 | 540 |
| 20 | 570 | 600 | 620 | 650 | 680 | 710 | 740 | 770 | 790 | 820 |
| 30 | 850 | 880 | 910 | 940 | 960 | 990 | 1021 | 1049 | 1077 | 1106 |

You can use the following to convert from metric to U.S. values or from U.S. to metric values. To do this, multiply the metric or U.S. units in column 1 by the number in column 2 (e.g., to convert 450 millilitres to fluidounces, multiply 450 by 0.03382 = 15.22 fluidounces).

**Conversion Factors**

| To Convert | Multiply By |
|---|---|
| Millilitres to Fluidounces | 0.03382 |
| Fluidounces to Millilitres | 29.573 |
| Pints to Litres | 0.4732 |
| Litres to Pints | 2.113 |
| Quarts to Litres | 0.9463 |
| Litres to Quarts | 1.057 |
| Gallons to Litres | 3.785 |
| Litres to Gallons | 0.2642 |

### Temperature Conversion

To convert a temperature from one unit of measure to another, use the following table. Find the temperature you are converting from in the "°F or °C" column; if you are converting to degrees Celsius, read the number from the "to °C" column. If you are converting to degrees Fahrenheit, read the number from the "to °F" column.

| to °C | °F or °C | to °F | to °C | °F or °C | to °F | to °C | °F or °C | to °F |
|---|---|---|---|---|---|---|---|---|
| 37.78 | 100 | 212.0 | 18.33 | 65 | 149.0 | -1.11 | 30 | 86.0 |
| 37.22 | 99 | 210.2 | 17.78 | 64 | 147.2 | -1.67 | 29 | 84.2 |
| 36.67 | 98 | 208.4 | 17.22 | 63 | 145.4 | -2.22 | 28 | 82.4 |
| 36.11 | 97 | 206.6 | 16.67 | 62 | 143.6 | -2.78 | 27 | 80.6 |
| 35.56 | 96 | 204.8 | 16.11 | 61 | 141.8 | -3.33 | 26 | 78.8 |
| 35.00 | 95 | 203.0 | 15.56 | 60 | 140.0 | -3.89 | 25 | 77.0 |
| 34.44 | 94 | 201.2 | 15.00 | 59 | 138.2 | -4.44 | 24 | 75.2 |
| 33.89 | 93 | 199.4 | 14.44 | 58 | 136.4 | -5.00 | 23 | 73.4 |
| 33.33 | 92 | 197.6 | 13.89 | 57 | 134.6 | -5.56 | 22 | 71.6 |
| 32.78 | 91 | 195.8 | 13.33 | 56 | 132.8 | -6.11 | 21 | 69.8 |
| 32.22 | 90 | 194.0 | 12.78 | 55 | 131.0 | -6.67 | 20 | 68.0 |
| 31.67 | 89 | 192.2 | 12.22 | 54 | 129.2 | -7.22 | 19 | 66.2 |
| 31.11 | 88 | 190.4 | 11.67 | 53 | 127.4 | -7.78 | 18 | 64.4 |
| 30.56 | 87 | 188.6 | 11.11 | 52 | 125.6 | -8.33 | 17 | 62.6 |
| 30.00 | 86 | 186.8 | 10.56 | 51 | 123.8 | -8.89 | 16 | 60.8 |
| 29.44 | 85 | 185.0 | 10.00 | 50 | 122.0 | -9.44 | 15 | 59.0 |
| 28.89 | 84 | 183.2 | 9.44 | 49 | 120.2 | -10.00 | 14 | 57.2 |
| 28.33 | 83 | 181.4 | 8.89 | 48 | 118.4 | -10.56 | 13 | 55.4 |
| 27.78 | 82 | 179.6 | 8.33 | 47 | 116.6 | -11.11 | 12 | 53.6 |
| 27.22 | 81 | 177.8 | 7.78 | 46 | 114.8 | -11.67 | 11 | 51.8 |
| 26.67 | 80 | 176.0 | 7.22 | 45 | 113.0 | -12.22 | 10 | 50.0 |
| 26.11 | 79 | 174.2 | 6.67 | 44 | 111.2 | -12.78 | 9 | 48.2 |
| 25.56 | 78 | 172.4 | 6.11 | 43 | 109.4 | -13.33 | 8 | 46.4 |
| 25.00 | 77 | 170.6 | 5.56 | 42 | 107.6 | -13.89 | 7 | 44.6 |
| 24.44 | 76 | 168.8 | 5.00 | 41 | 105.8 | -14.44 | 6 | 42.8 |
| 23.89 | 75 | 167.0 | 4.44 | 40 | 104.0 | -15.00 | 5 | 41.0 |
| 23.33 | 74 | 165.2 | 3.89 | 39 | 102.2 | -15.56 | 4 | 39.2 |
| 22.78 | 73 | 163.4 | 3.33 | 38 | 100.4 | -16.11 | 3 | 37.4 |
| 22.22 | 72 | 161.6 | 2.78 | 37 | 98.6 | -16.67 | 2 | 35.6 |
| 21.67 | 71 | 159.8 | 2.22 | 36 | 96.8 | -17.22 | 1 | 33.8 |
| 21.11 | 70 | 158.0 | 1.67 | 35 | 95.0 | -17.78 | 0 | 32.0 |
| 20.56 | 69 | 156.2 | 1.11 | 34 | 93.2 | -18.33 | -1 | 30.2 |
| 20.00 | 68 | 154.4 | 0.56 | 33 | 91.4 | -18.89 | -2 | 28.4 |
| 19.44 | 67 | 152.6 | 0.00 | 32 | 89.6 | -19.44 | -3 | 26.6 |
| 18.89 | 66 | 150.8 | -0.56 | 31 | 87.8 | -20.00 | -4 | 24.8 |

For temperatures not shown in the above table, use the following formulas:

1. To convert to degrees Celsius, add 40 to the Fahrenheit temperature. Then divide by 1.8; subtract 40 from the result.
2. To convert to degrees Fahrenheit, add 40 to the Celsius temperature. Then multiply by 1.8; subtract 40 from the result.



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Using KODAK Chemicals in Minilabs
KODAK Publication No. Z-100-4

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