KODAK VISION Color Negative Control Strips

Process ECN-2

Technical Data and Crossover Information

Kodak VISION COLOR NEGATIVE CONTROL STRIPS

Note: While the data presented are typical of production coatings, they do not represent standards which must be met by Kodak. Varying storage, exposure, and processing conditions will affect results. The company reserves the right to change and improve characteristics at any time.

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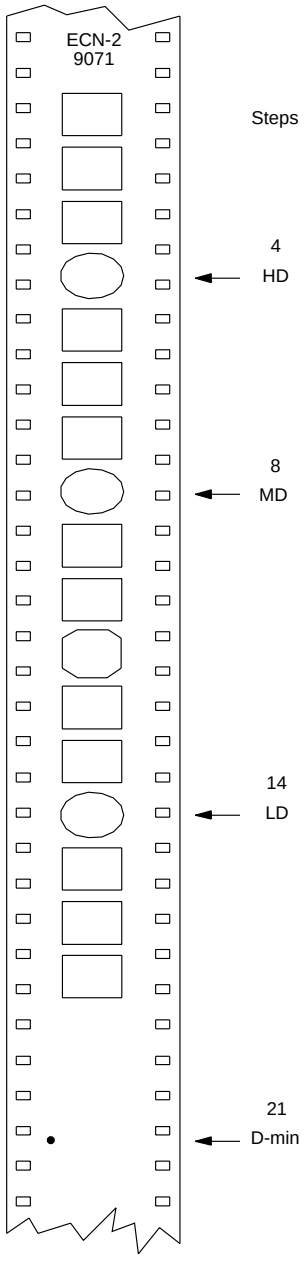
Introduction

KODAK VISION Color Negative Control Strips (Figure 1) are intended for the control of Process ECN-2 using the procedures described in KODAK Publication No. H-24, *Manual for Processing EASTMAN Motion Picture Films, Module 1, Process Control*.

The first batch of KODAK VISION Color Negative Control Strips is code 7121 for 35 mm, CAT 152 0469 and code 7122 for 16 mm, CAT 152 0444.

Figure 1 Processed Control Strip - 35mm



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Important Improvements

KODAK VISION Color Negative Control Strips incorporate several important improvements into the control strips for Process ECN-2.

- A VISION emulsion is being used for process control. The new format is exposed on KODAK VISION 200T Color Negative Film 5274, while the former ECN control strip was exposed on EASTMAN EXR 100T Color Negative Film 5248.
- To provide additional D-logH curve information on processing variations, the log exposure range of the new control strip is 0-4 LogE rather than the former 0-3 LogE range. Consequently, you will observe a slight change in the absolute values of the density steps.
- The physical format of the control strip has been modified to include clearly defined oval shapes for the LD, MD, and HD steps, and a D-min indicator dot that allows easier alignment of the strip for densitometry. The octagonal shape identifies Step 11.

KODAK VISION Color Negative Control Strips, Process ECN-2, are packaged in 100-foot rolls containing at least 120 exposures and a processed reference strip. The exposures on the roll are spaced at 9.5-inch intervals. Each exposure has 21 gray-scale steps at 0.20 log H increments (2/3 camera stop). The former ECN control strip on EASTMAN EXR 100T Color Negative Film 5248 was exposed at 0.15 log H increments (1/2 camera stop) per step.

The reference strip accompanying each roll was exposed along with all other control strips; it was then processed under specified well-controlled conditions. An instruction sheet enclosed with the package contains process deviation (correction) factors, if they are required, to determine your laboratory process aim numbers. A four-digit code number appearing on the carton, can, control strips, reference strips, and instruction sheet, identifies each production batch of strips.

Control Strip Log Exposure Range

The graphs in Figure 2 and Figure 3 demonstrate the differences between the former ECN control strip exposed on EASTMAN EXR 100T Color Negative Film 5248, and the new format exposed on KODAK VISION 200T Color Negative Film 5274.

As a result of the transition to the 0-4 exposure gradient, the sensitometric curve and associated parameters will be somewhat different than those calculated on the former control strips. The most obvious difference is that the new control strip sensitometric curves will reach higher densities and hence give more information about the exposure range of the negative product.

Physically, the center-to-center step distance has been maintained on the new control strips; no problems should be encountered with existing automatic densitometers.

Once the transition to the new control strips is complete, and the new control step reference values have been determined, continue to use KODAK VISION Color Negative Control Strips in the same manner as your previous control strips.

Please contact your Kodak representative for additional information on monitoring your process with control strips.

Figure 2 ECN-2 Control Strip Exposed on EASTMAN EXR 100T Color Negative Film 5248

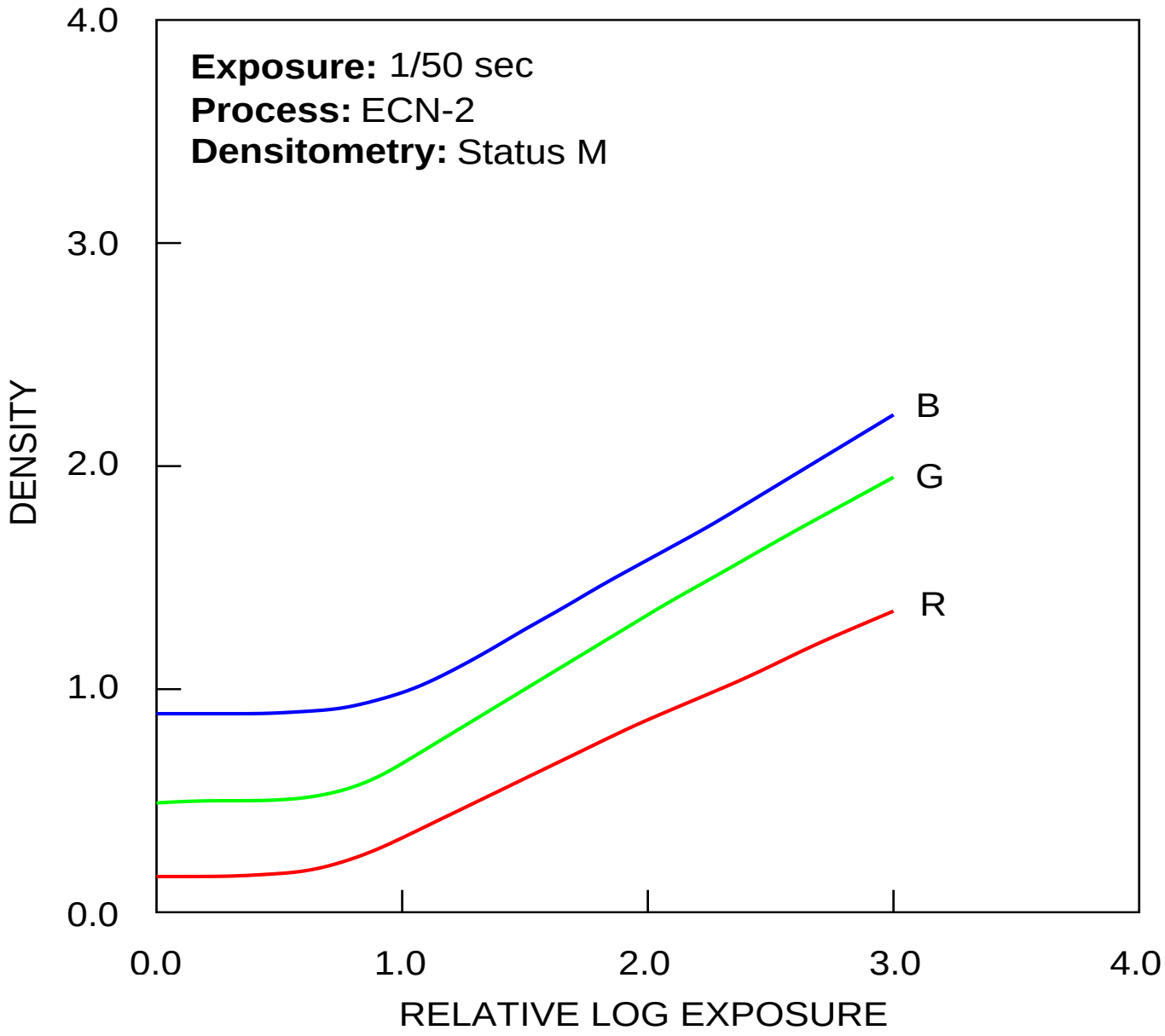
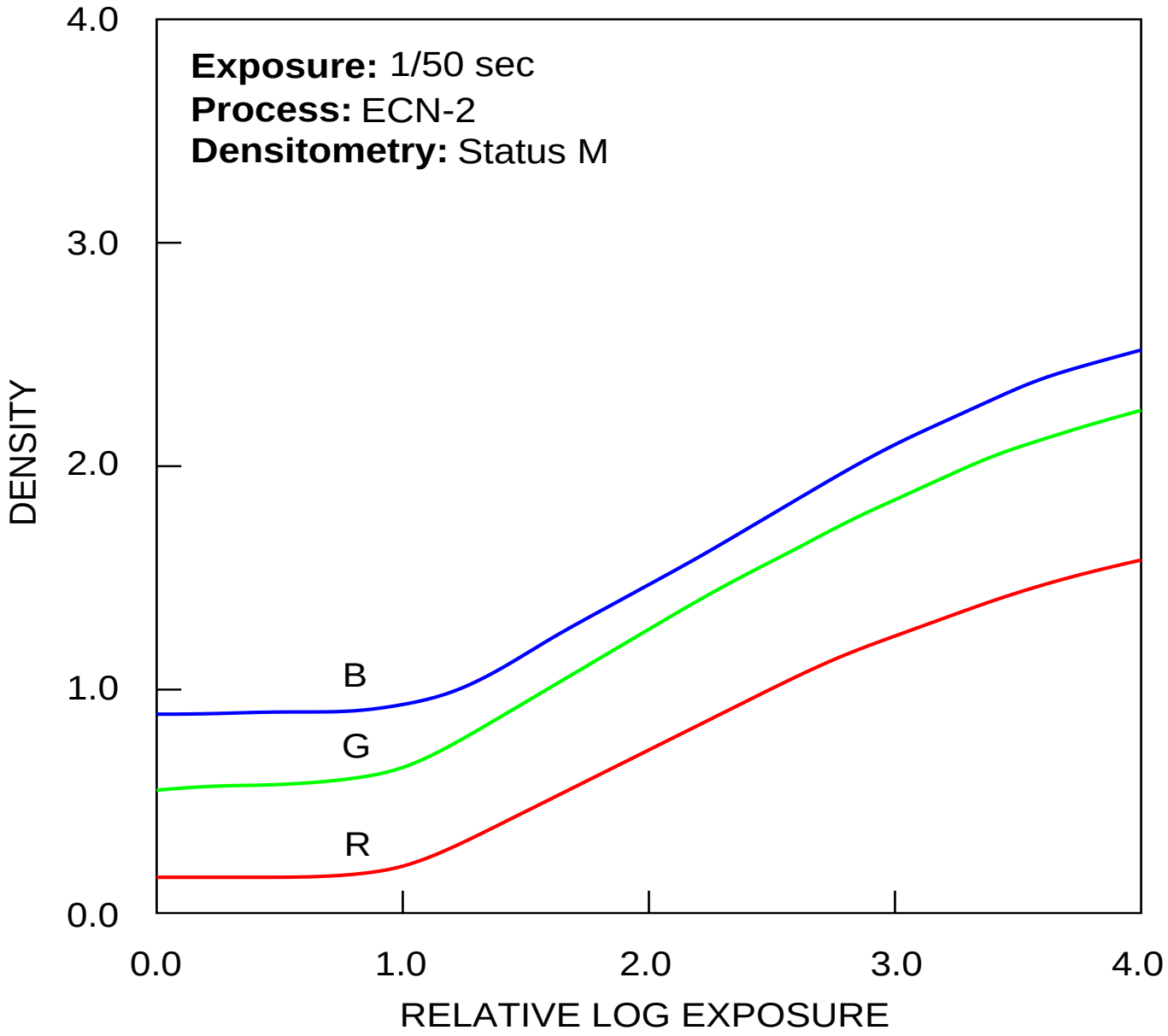


Figure 3 ECN-2 Control Strip Exposed on KODAK VISION 200T Color Negative Film 5274



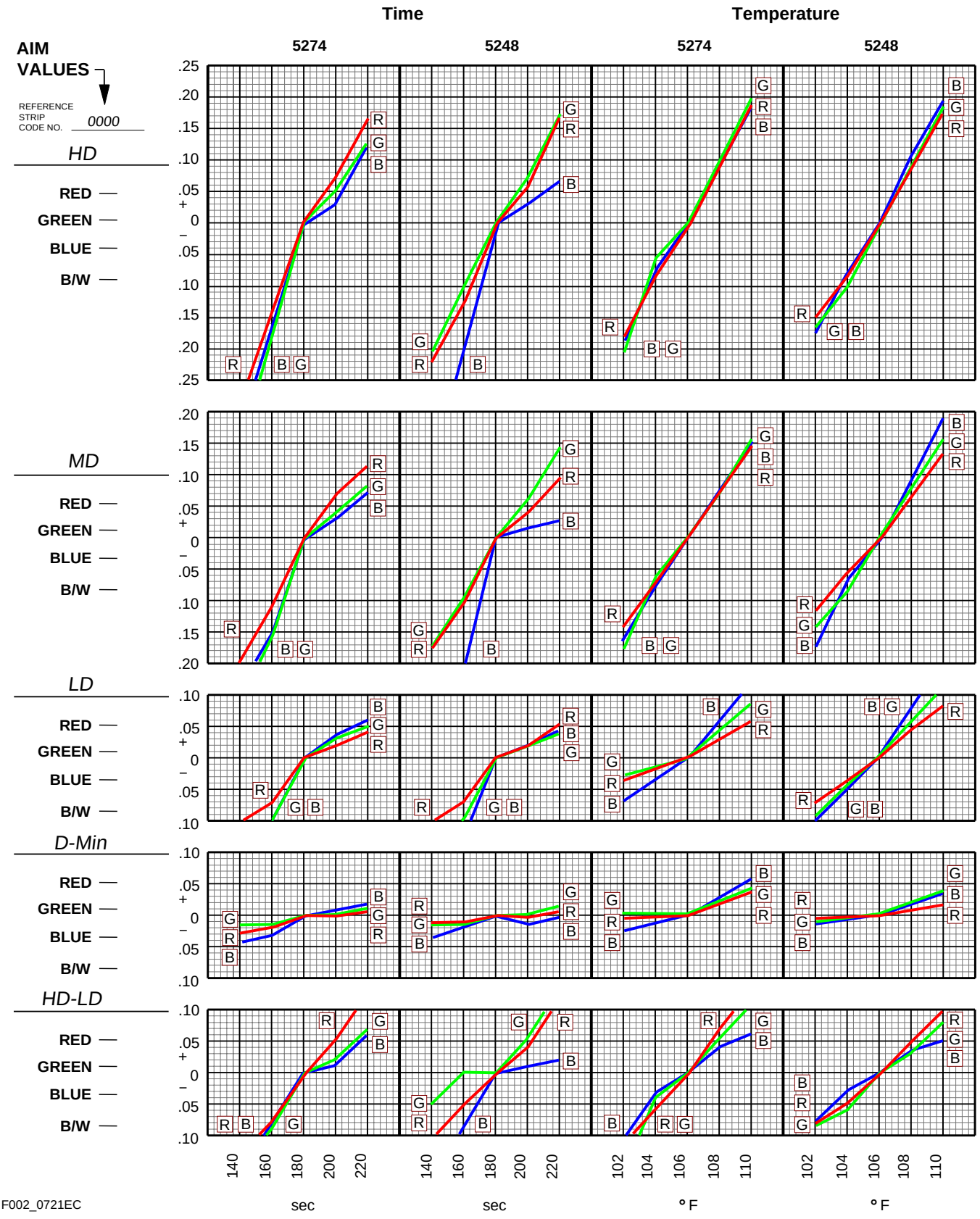
Effects of Mechanical and Chemical Variations

Figures 4 through 13 illustrate some of the major photographic effects of mechanical and chemical variations on KODAK VISION Color Negative Control Strips exposed on 5274 Film compared to the former EASTMAN EXR Control Strips exposed on 5248 Film. Each plot shows the effect of a change in a process variable (horizontal axis), on the dye density of the processed film (vertical axis). These density plots are deviated against the standard level for each variable (e.g. standard level for the variable is represented by zero density).

The magnitude of the changes shown in these plots should not be considered to be process control limits. Also, the data presented are qualitative, not quantitative. The plots were derived from experiments using small laboratory machines in which all constituents were held constant except the variable being studied. Hence, the figures should be used only as trend charts and guides. If two or more process variable are changed, the resulting photographic effect illustrated may not be additive. Interactions can occur that produce effects other than those predicted by addition. The plots in this publication are representative only; they do not contain all possible solution problems. Most of the important photographic effects take place in the developer.

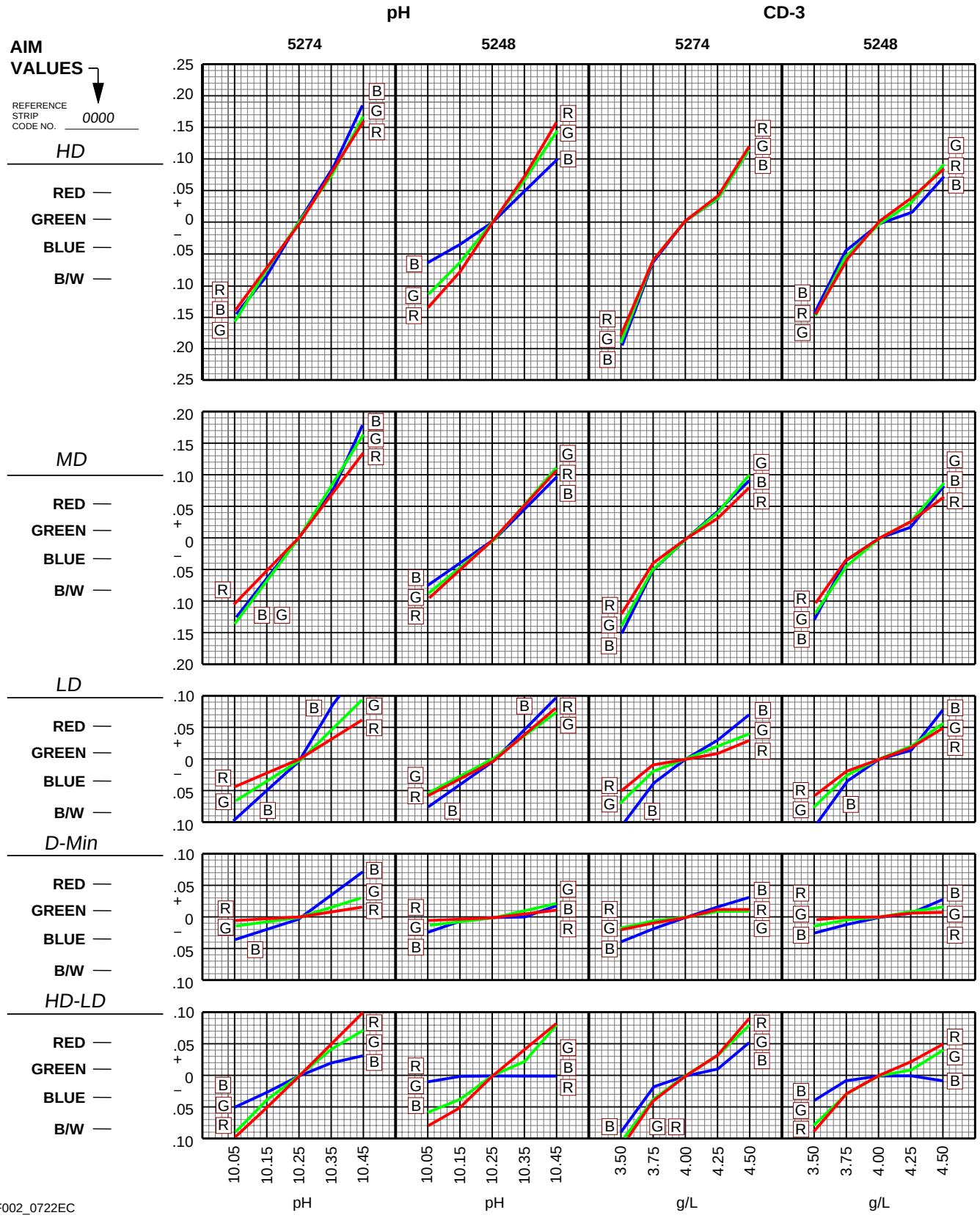
Developer Mechanical Factors

Figure 4 Effects of Time and Temperature Variations
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



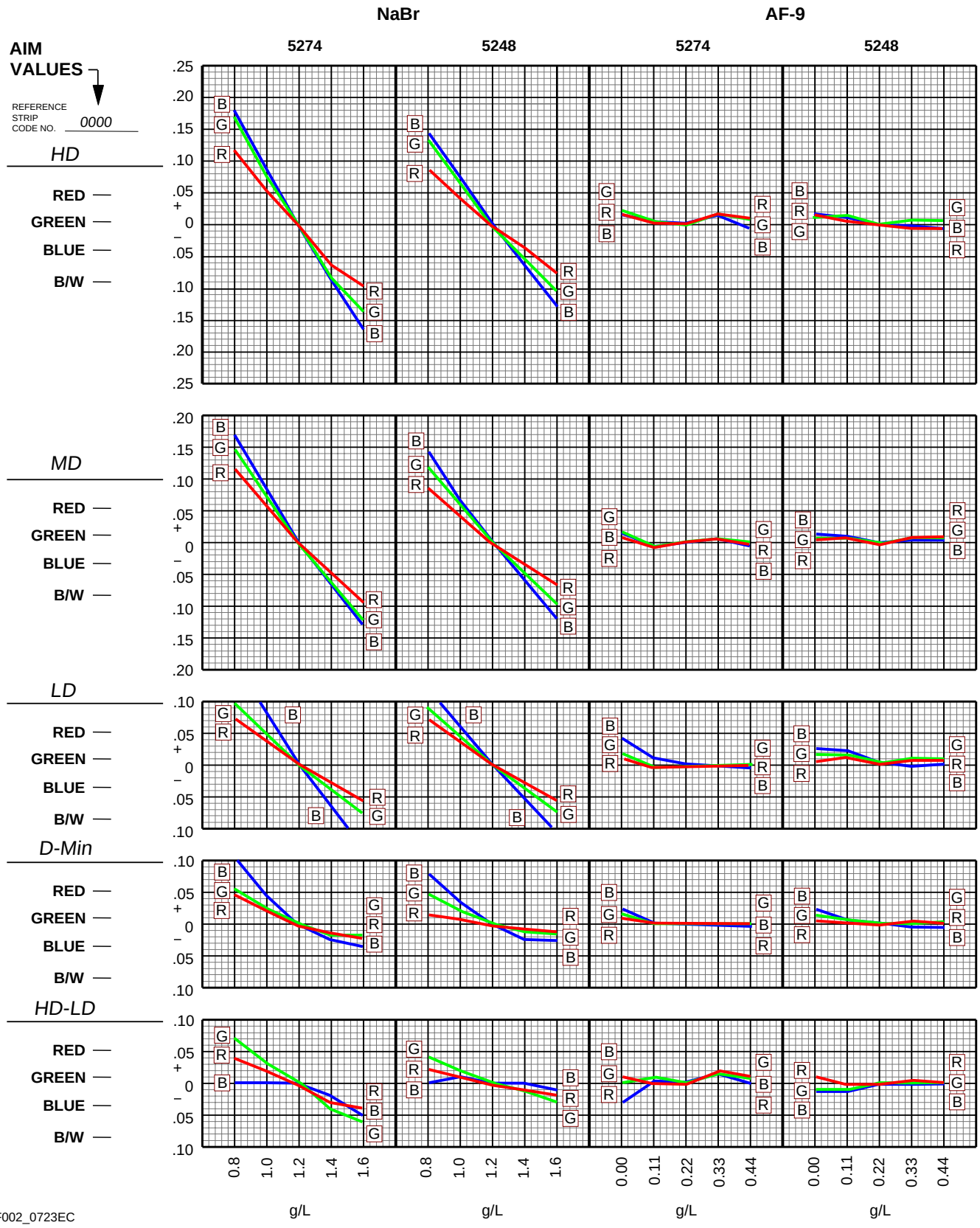
Developer Chemical Factors

Figure 5 Effects of pH and CD-3 Variations
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



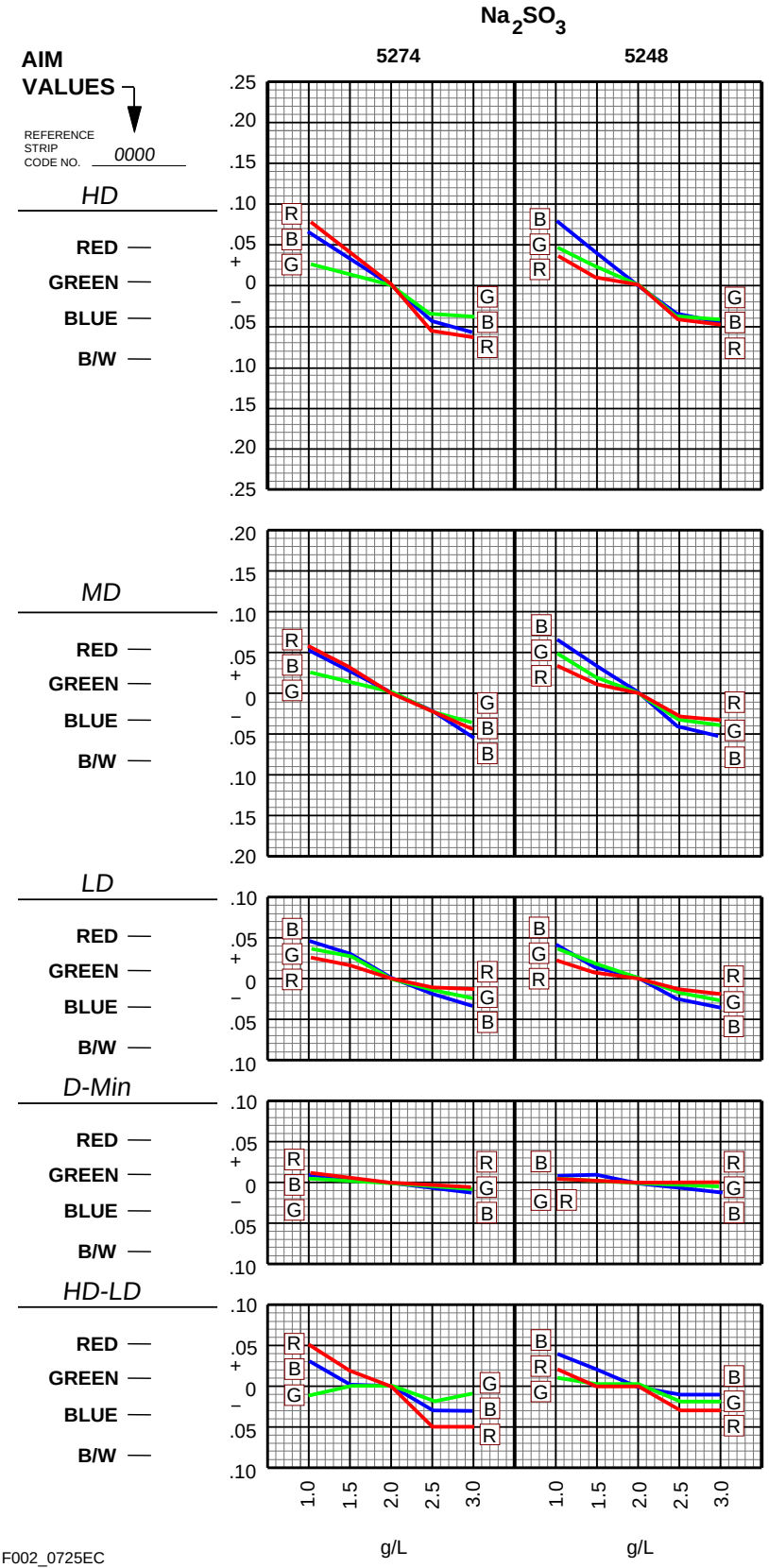
Developer Chemical Factors

Figure 6 Effects of NaBr and AF-9 Variations
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



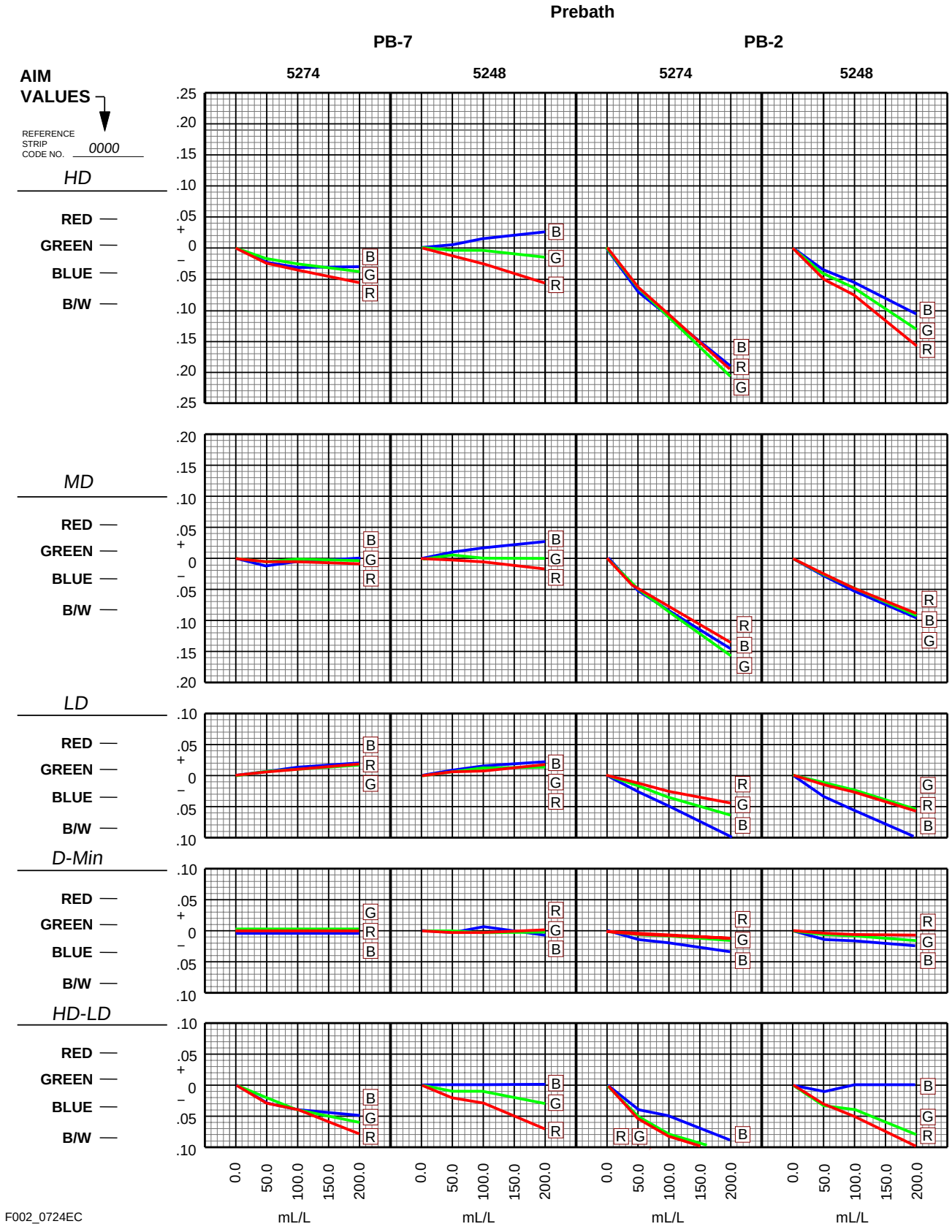
Developer Chemical Factors

Figure 7 Effects of Na_2SO_3 Variations
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



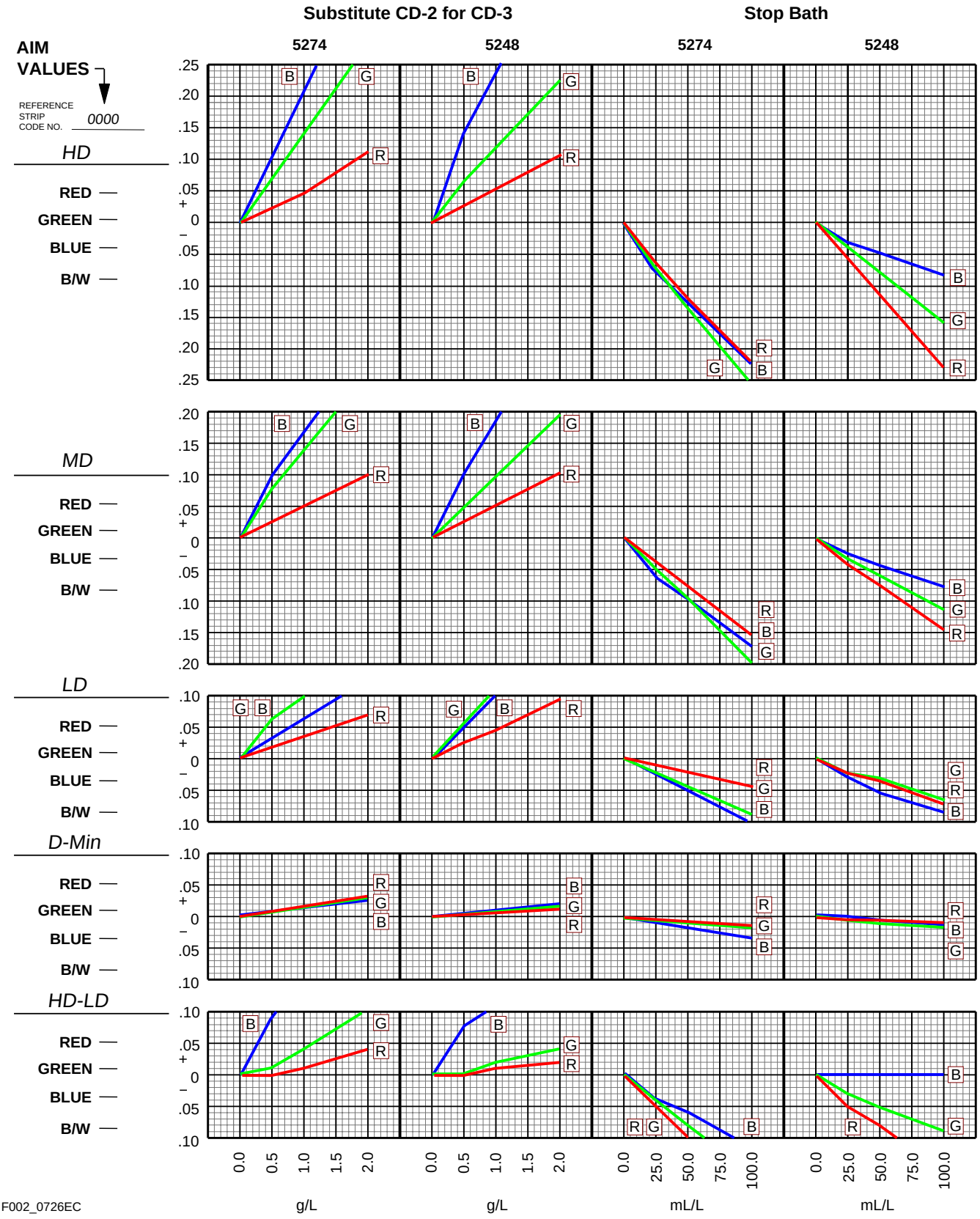
Developer Chemical Factors

Figure 8 Effects of Prebath Contamination
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



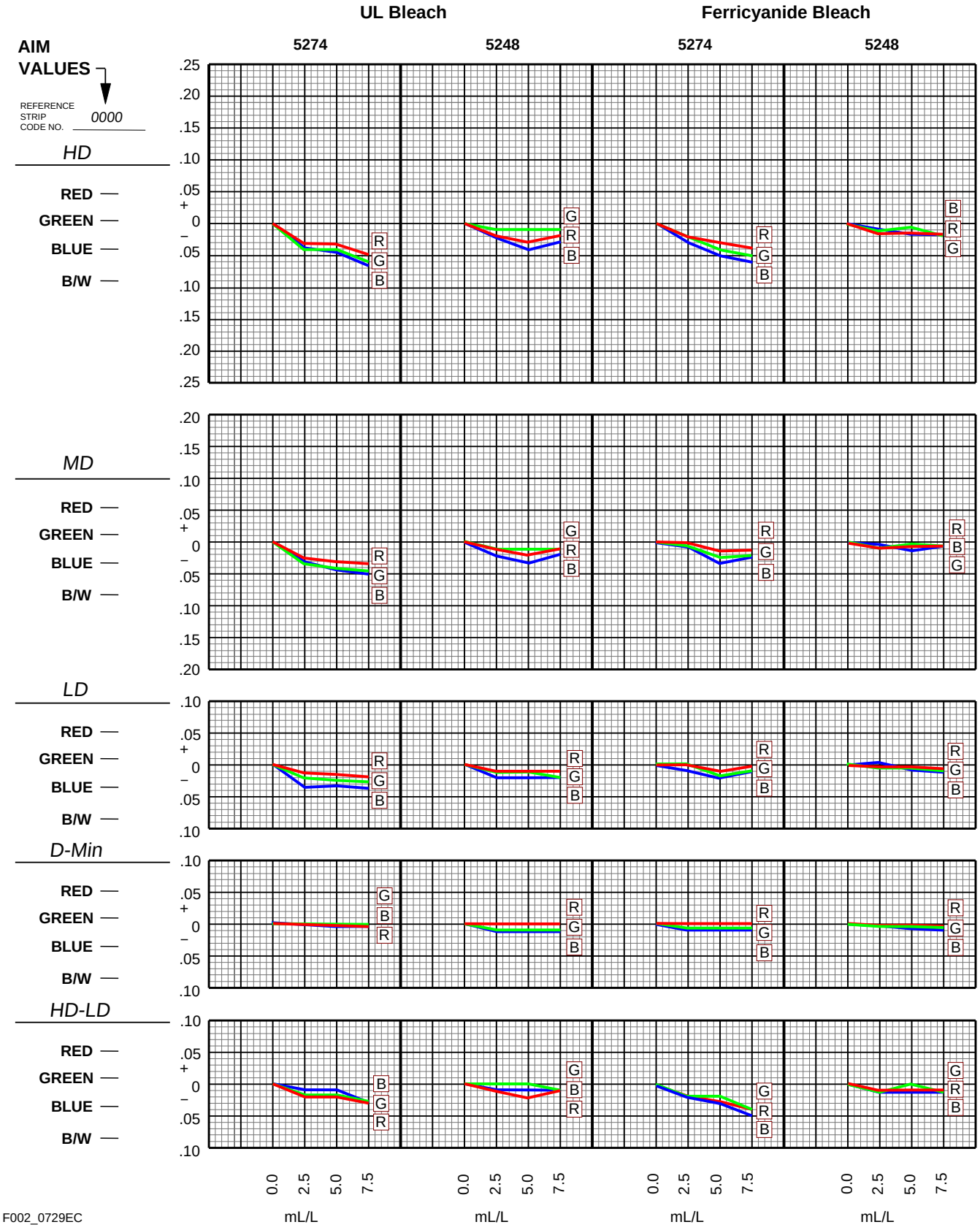
Developer Chemical Factors

Figure 9 Effects of CD-2 for CD-3 and Stop Bath Contamination
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



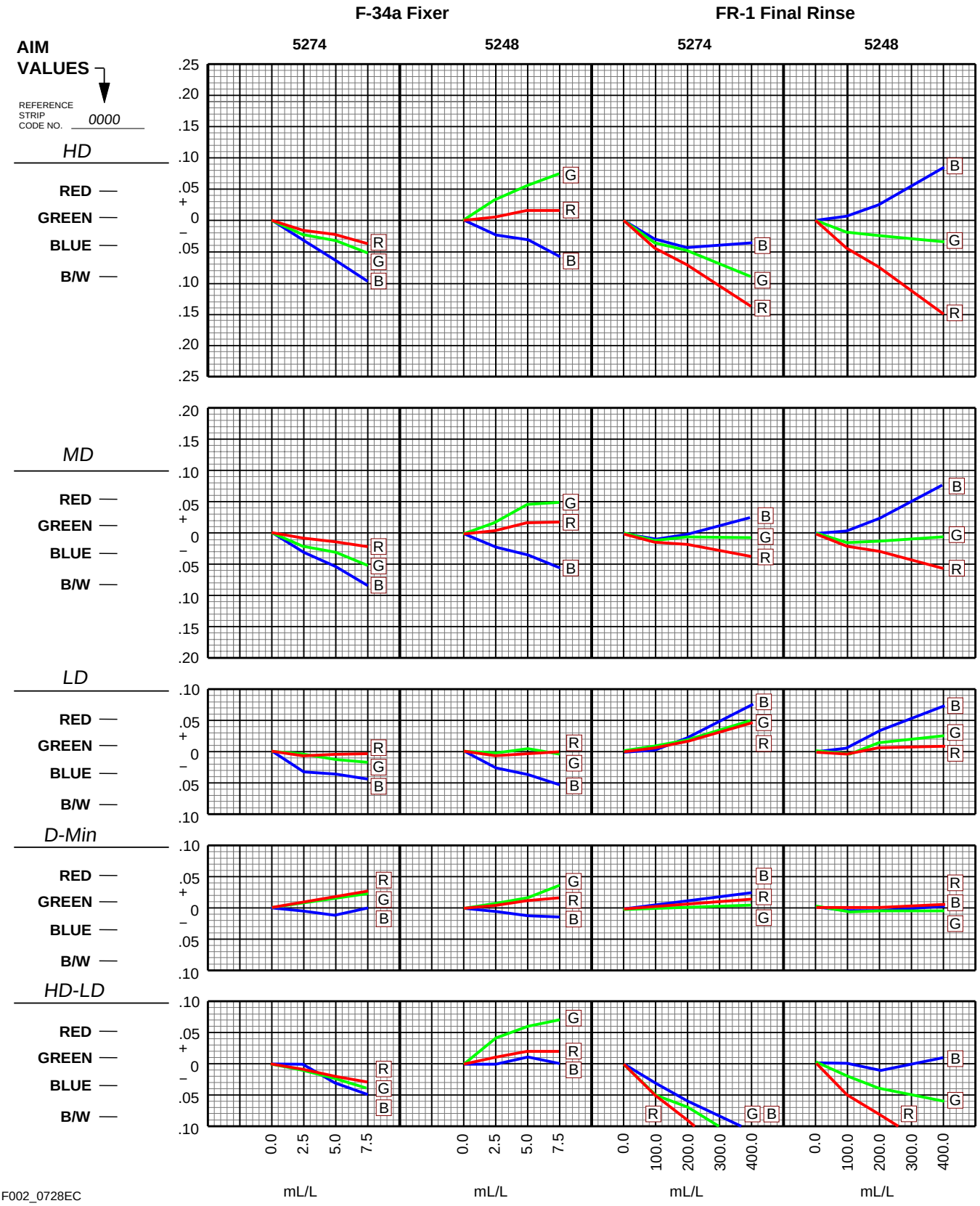
Developer Chemical Factors

Figure 10 Effects of Bleach Contamination
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



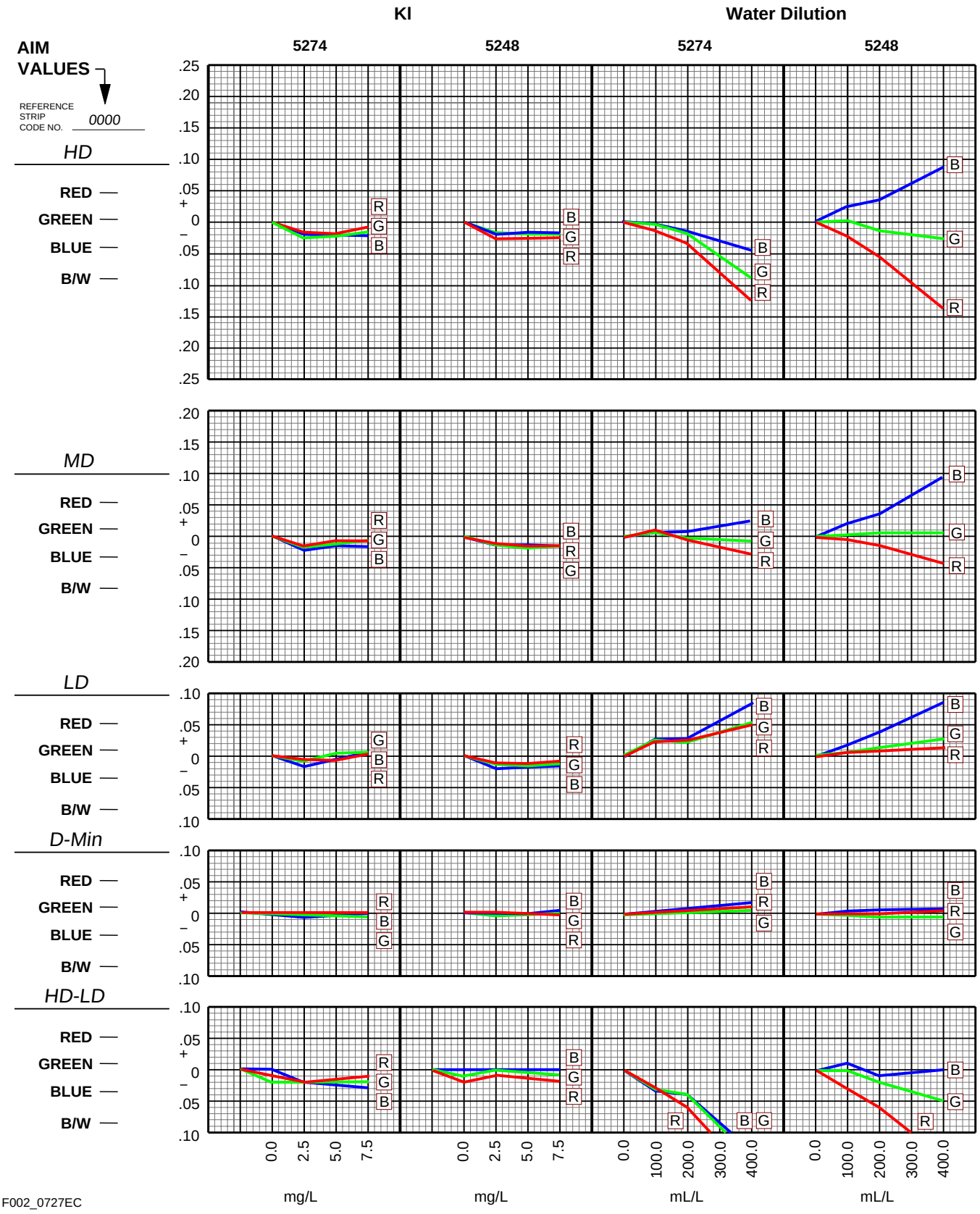
Developer Chemical Factors

Figure 11 Effects of F-34a Fixer and Final Rinse Contamination
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



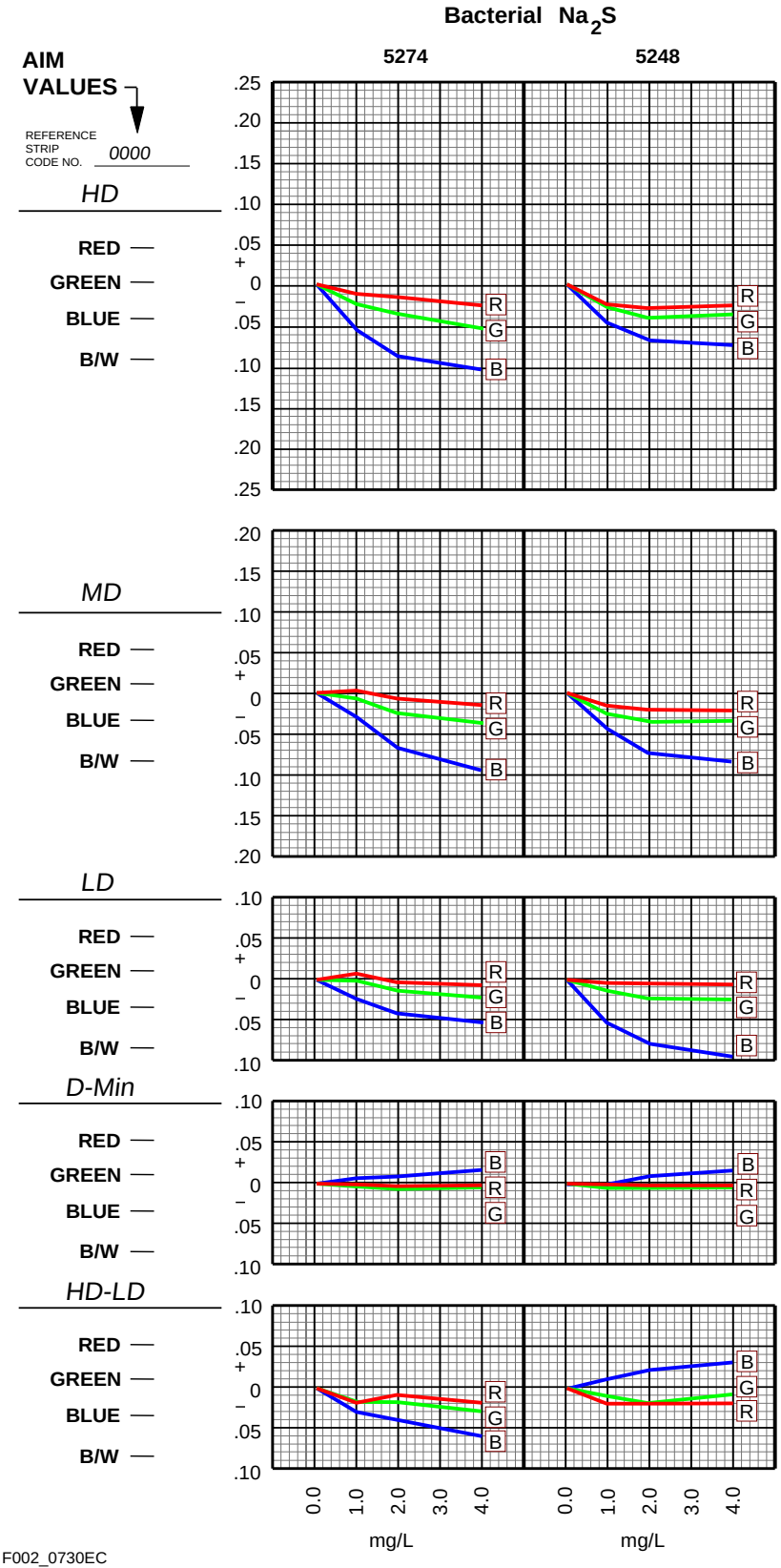
Developer Chemical Factors

Figure 12 Effects of KI Contamination and Water Dilution
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



Developer Chemical Factors

Figure 13 Effects of Bacterial Na_2S Contamination
—VISION Control Strips versus EXR Control Strips in Process ECN-2 Developer



Control-Strip Crossover

Important: During the inventory crossover from the old EXR Control Strips to the new VISION Control Strips, every effort should be taken in your operations to avoid switching back and forth. Your process control will be greatly simplified by depleting your supply of the EXR Control Strips (except for what is needed for crossover purposes) prior to utilizing the VISION Control Strips.

There will come a time when you will need to begin using a new batch of control strips. A new batch means a new code number, not a fresh box of strips with the same code number. **Please be aware** no two batches of control strips are identical because of slight differences in product, exposures, process, etc. And therefore, the aim value numbers will not match (however, on rare occasions they could), even with the application of the deviation factors.

When you first started using control strips, you had no previous reference and you set up your aim value parameters by reading the densities of the specified (D-min, LD, MD, HD, or D-max) control reference steps and applying the deviation numbers supplied with that batch. Using a new batch of strips is really no different, except you will have a new set of aim numbers,

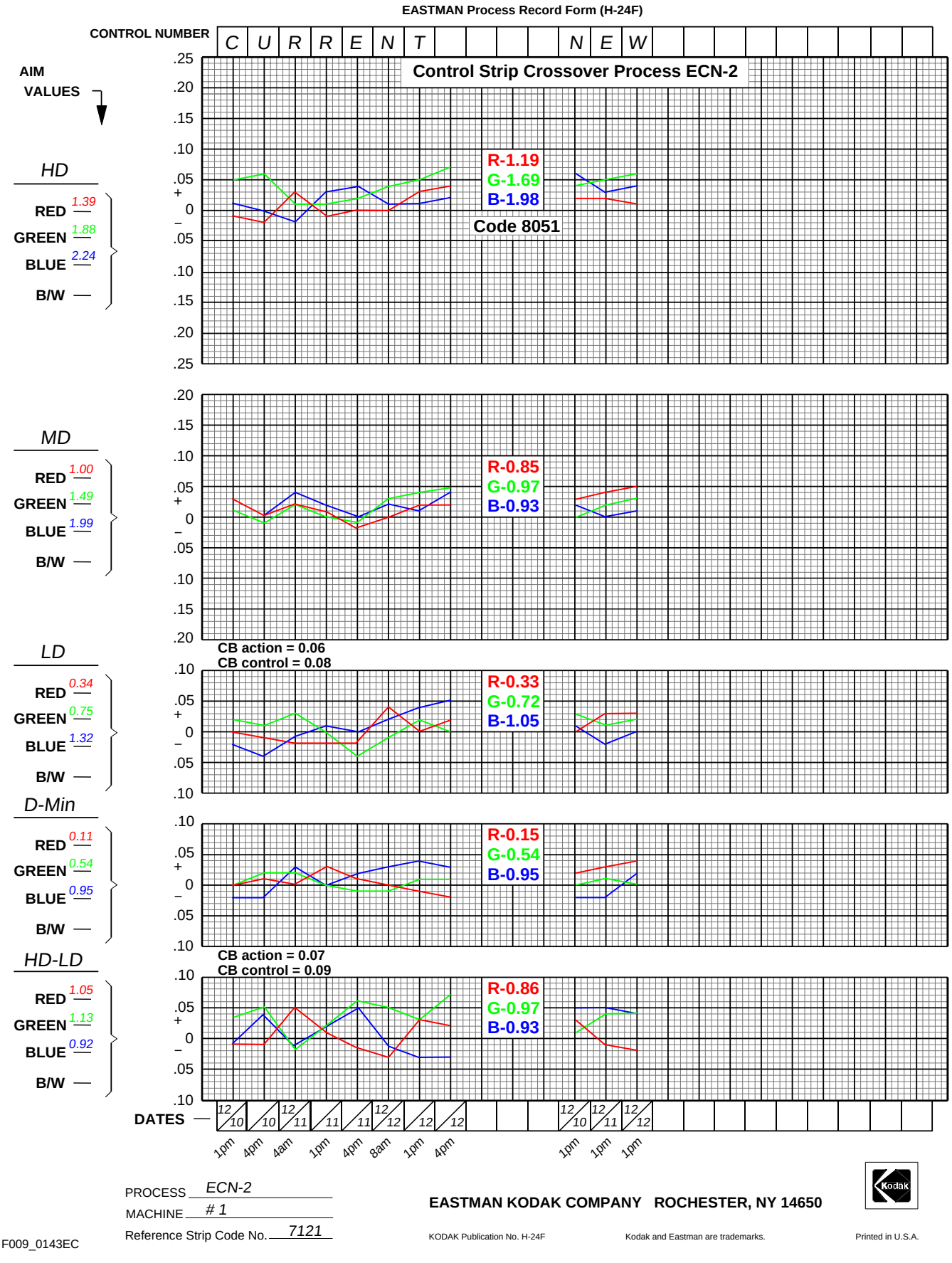
As the time approaches to change to a new batch (code), you will want to make a “crossover” from the current, or old batch. Crossover simply means to adapt to a change in aim numbers, not a change in processing technique. You should begin the crossover with at least a week’s supply of strips still available (never wait until you run out).

The crossover to a new batch lets you get a “feel” for the new set of aim numbers. Do **not** attempt to match the new aim numbers to the old ones. If you do, you probably will find it necessary to change the mechanical and/or chemical specifications of the process, and this will most likely lead to a non-conforming unacceptable process. You will notice some differences in the way the new batch trends as compared to the previous batch. this is a normal batch-to-batch variation, and is to be expected. If you are unable to maintain a plot within your action limits with the new control-strip batch, call your Kodak representative to assist you.

Use the following crossover procedure each time a new code number is put into service:

- Determine the aim values for the new batch, the same as you did for the current or old batch by reading the specified steps (D-min, LD, MD, and HD or D-max) of the reference strip and applying the correction factors. If there is more than one roll of the same batch, average the corresponding step densities for all reference strips in the batch, then apply the correction factors.
- Process an old and new control strip simultaneously at least three separate times. Do this at different times of the day, and better yet, on different days, until you have a number of pairs. During this time, continue to control the process with data from the old strips.
- Post the new aim values on the same form as the old, leaving an appropriate space between the two aim sets (as illustrated in Figure 14). This way you can see the differences of each control strip reaction at a glance. You will observe the tracking of the “old” batch as compared to the “new” batch, with each plotted to its individual set of aim numbers. Both should be tracking in similar directions, but not exactly. However, they still should be within the same action and control limits. Please remember, no matter how the aim densities differ in numerical value, you still use each set as your zero (0) reference line.
- Once you are comfortable with the new batch of control strips, use a new H-24F or Y-55 form to separate and not confuse the old and new aim numbers while making the daily notations.
- If, for some reason, there is a need to adjust the process to conform to the new batch of control strips to new action and control limits, cease processing and evaluate the entire system. Such a need for change indicates a fundamental system difficulty, which most likely involves all aspects of the process, not necessarily a problem with the new batch of control strips. If difficulty continues, contact your Kodak technical representative.

Figure 14 Control-Strip Crossover for Process ECN-2



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KODAK VISION Color Negative Control Strips

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