

# CHEMICAL REUSE

Using a volume of chemicals once will not destroy its ability to process film. One is always concerned about chemistry life and capacity, quality of results and economy when processing multiple rolls in a batch of chemistry. From the user's viewpoint it may seem that chemistry manufacturers are somewhat arbitrary about the number of films which can be processed before the chemistry must be discarded. This stems from the manufacturer not knowing - only guessing - four essential things: how many films will be processed in freshly mixed chemistry; in what manner and how long will the chemistry be stored before processing again; what contaminants have entered the system from either the water supply or from unintentional chemical intermingling; and how far can the results deviate from ideal before the user deems them unacceptable. All developers start on an inexorable downhill exhaustion path the moment they are mixed, and exhaust faster in the presence of air, contaminants and high temperature, and suffer superimposed stepwise exhaustion with each use. Best results are obtained when chemicals are used only once. 1st Developers greatly determine the characteristics and quality of a slide, whereas the other 2 baths will process-to-completion and can be reused, multiple times before any loss of quality. Increasing the processing times of the Color&Reversal and Bleaches&Fixer solutions for reuse will only ensure they process-to-completion. Reusing chemicals can cause color and density shifts. The more a chemical is reused the greater the shift. We can offer some observations on extended chemical capacity:

- If you accept the role as the final arbiter of acceptable results it is easily possible to process 25%, 50%, or even more rolls of film than those listed so long as all processing takes place within a few days after mixing the chemicals. There is only one rule in this exercise: process film until you no longer like the results. The safeguard in this procedure is that results generally will not plummet precipitously from "good" to "bad", but will change gradually.
- If you take full responsibility for quality of results, it is possible to process more film over a much longer time span. This procedure is somewhat risky unless you process some film every day or so to monitor chemistry performance. Otherwise, partially used working solutions left untouched for a week or more might have changed so significantly that you would suffer a dramatic decline in results. If you choose to operate under these conditions, our best advice would be to process a small piece of test film, and on the basis of these results, decide whether or not to commit valuable pictures to the chemistry.

# TROUBLESHOOTING

PROBLEM	SOLUTION
Slides too dark	<ul style="list-style-type: none"><li>• Under exposure in the camera results in slides that are overall too dark.</li><li>• Outdated film may appear underexposed and fogged.</li><li>• 1st Developer temperature too low causes dark color cast slides.</li><li>• 1st Developer time too short increases overall density.</li><li>• 1st Developer contamination can result in fogged low contrast slides.</li><li>• 1st Developer over-diluted, exhausted or oxidized will result in faint images.</li><li>• Bleaches&amp;Fixer exhaustion leaves mask over highlights (high Dmin).</li><li>• Aerate Bleaches&amp;Fixer frequently. Oxidation encourages activity of bleaches. When film wont clear after 10 min retire chemistry and re-fix film.</li></ul>
Slides too thin	<ul style="list-style-type: none"><li>• Over exposure in the camera results in washed out highlights.</li><li>• Light/heat fogging before processing will appear as an overall haze.</li><li>• Outdated film may appear fogged (low Dmax).</li><li>• 1st Developer temperature too high results in washed out slides.</li><li>• 1st Developer time too long causes pushed contrast.</li><li>• 1st Developer contamination can cause washed out fogged slides.</li><li>• 1st Developer contaminated with fixer causes fog overall and blue or cyan cast.</li><li>• Rinse temperature too high (above 41°C/106°F) will cause pushed exposures.</li><li>• Color&amp;Reversal bath time too short, resulting in thin slides (low Dmax).</li></ul>
Slides off-color	<ul style="list-style-type: none"><li>• Processing at lower temperatures will result in color shifts.</li><li>• 1st Developer contamination affects color temperature.</li><li>• 1st Developer contamination with Color&amp;Reversal bath produces red cast in blacks.</li><li>• 1st Developer exhaustion or over-dilution reduces color separation.</li><li>• Color&amp;Reversal temp/time affects shadow color cast and density.</li><li>• Variation in Color&amp;Reversal pH causes color shifts on the blue-yellow and green-magenta axis with Ektachrome and Fujichrome films.</li><li>• Poor wash after Color&amp;Reversal bath leaves color cast in highlights.</li><li>• Color&amp;Reversal bath contamination can result in color casts in blacks.</li><li>• Bleaches&amp;Fixer inactivity can cause color casts. Aerate before use.</li><li>• Variations in agitation may result in color shifts.</li><li>• Wrong color filter on lens will result in a color cast.</li></ul>
Dirty/milky appearance	<ul style="list-style-type: none"><li>• Silver residues will appear dirty or streaky. Return film to Bleaches&amp;Fixer bath for 5 minutes. Aerate Bleaches&amp;Fixer frequently. Oxidation encourages activity of bleaches. When film wont clear after 10 min retire chemistry and re-fix film.</li><li>• Sulfur precipitation in Bleaches&amp;Fixer (white dots) is from overexposure to air.</li><li>• Silver Halide residues have a milky appearance, caused from exhaustion of fixer.</li></ul>
Black spots	<ul style="list-style-type: none"><li>• Air bubbles on the film from improper agitation will prevent processing in spots.</li><li>• Dirt in the solutions can embed in the emulsion.</li><li>• Dirt and chemistry residues in tank will cause small black specs on the film.</li><li>• Dust during drying process may settle on the wet film. Dry in clean space.</li></ul>
Scum on film	<ul style="list-style-type: none"><li>• Residue from wash water can dry onto film. Rinse with distilled water and squeegee.</li></ul>
Scratches and wear	<ul style="list-style-type: none"><li>• Equipment issues result in straight colored or clear lines along the length of the film.</li><li>• Mishandling of film causes irregular scratches, pressure exposure &amp; crescent kinks.</li></ul>
Stripes and spots	<ul style="list-style-type: none"><li>• Water or chemicals coming in contact with film results in colored chemistry splashes.</li><li>• Uneven chemistry distribution or agitation will leave perpendicular stripes and spots.</li><li>• Light leaks in camera or before and during processing causes bright stripes.</li></ul>
Blank film with no frame numbers	<ul style="list-style-type: none"><li>• Opaque slides were processed out of order, or 1st or 3rd bath omitted completely.</li><li>• Clear slides were fogged, processed out of order, or Color&amp;Reversal bath omitted.</li></ul>
Blank sections	<ul style="list-style-type: none"><li>• Film loaded in tank incorrectly</li><li>• Insufficient chemical volume for tank</li></ul>

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™ Fujichrome is a trademark of the FUJIFILM Corporation.

# SAFETY NOTES

**WARNING** This kit contains chemicals that may be hazardous if misused. Always wear safety glasses, rubber gloves and protective clothing, such as a lab coat or plastic apron, when working with chemicals. While the hazard rating of this kit is low, caution should be exercised. Do not allow children to use this kit without adult supervision.

## D6 DAYLIGHT CHROME 1ST DEVELOPER

**Contains: Potassium Hydroquinone Monosulfonate.** May cause irritation. Avoid skin contact. In case of contact, flush with water. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **INDUCE VOMITING. Contact a physician immediately!**

## T6 TUNGSTEN CHROME 1ST DEVELOPER

**Contains: Hydroquinone(123-31-9).4(hydroymethyl)-4-methyl-1-phenylpyrazolidin** May cause irritation. Avoid skin contact. In case of contact, flush with water. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **INDUCE VOMITING. Contact a physician!**

## D9 DYNAMIC CHROME 1ST DEVELOPER

**Contains: Hydroquinone(123-31-9).4(hydroymethyl)-4-methyl-1-phenylpyrazolidin** May cause irritation. Avoid skin contact. In case of contact, flush with water. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **INDUCE VOMITING. Contact a physician!**

## Cr6 COLOR&REVERSAL PART A

**Contains: Sodium Phosphate.** May cause irritation. Avoid skin contact. In case of contact, flush with water. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **DO NOT INDUCE VOMITING. Contact a physician immediately!**

## Cr6 COLOR&REVERSAL PART B

**Contains: 4-amino-N-ethyl-N-(βmethanesulfonamidoethyl)-M-toluidine sesquisulfate monohydrate.** May cause irritation. Avoid skin contact. In case of contact, flush with water. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **DO NOT INDUCE VOMITING. Contact a physician immediately!**

## Bf6 BLEACHES&FIXER PART A

**Contains: Ammonium Thiosulfate.** May cause irritation. Avoid skin contact. In case of contact, flush with water. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **INDUCE VOMITING. Contact a physician immediately!**

## Bf6 BLEACHES&FIXER PART B

**Contains: (Ethylenedinitrillo) tetraacetic acid EDTA.** May cause irritation. Avoid skin contact. In case of contact, flush with water and wash with a non-alkaline soap. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **INDUCE VOMITING. Contact a physician immediately!**

## Bf6 BLEACHES&FIXER PART C

**Contains: Acetic Acid.** May cause burns. Avoid skin contact. In case of contact, flush with water and wash with a non-alkaline soap. DO NOT ALLOW EYE CONTACT. In case of eye contact, flush with water for 15 minutes and contact a physician immediately! DO NOT TAKE INTERNALLY. If swallowed, **DO NOT INDUCE VOMITING. Contact a physician immediately!**

MSDS (Material Safety Data Sheets) for this kit are available by written request.

# CineStill<sup>6</sup> Cs

## CREATIVE SLIDE

# 3-BATH PROCESS

*For color-timing chrome, reversal and E-6 compatible film*

## E-6 COLOR REVERSAL PROCESSING INSTRUCTIONS:

Makes complicated chemistry simplified alchemy! The number of processing baths for E-6 film is reduced from 6 to 3. The reversal step occurs during color development in a Color&Reversal bath, and the bleach and conditioner steps are combined with the fixing step in a Bleaches&Fixer bath. Color-timing is performed with alternative 1st Developers to achieve full creative control of your slides.

Maintaining temperature is not essential beyond pouring in the 1st developer. When a temperature control bath is not available, simply preheat the 1st Developer +2°F warmer, and the other baths will automatically process-to-completion as they cool down. Only the 1st developer is time and temperature critical because it controls contrast and color.

These instructions will show you how to process slides and how to reuse the chemicals for extended life.

## WARNING

**This kit contains chemicals that may be harmful if misused. Do not allow children to use this kit without adult supervision. Read all safety notes before proceeding.**

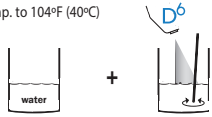
## EQUIPMENT NEEDED FOR PROCESSING SLIDES

- A processing tank and reels or a rotary-tube type processor.
- Three empty chemical storage bottles.
- A graduated pitcher.
- TCS-1000 temperature control system, or  
A timer, an accurate thermometer and a tempered water bath.

# MIXING CHEMICALS

## Daylight Chrome NEUTRAL-TONE 5500K SLIDES

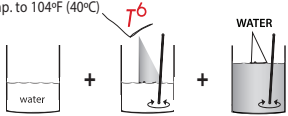
- Place 16oz (470ml) of 85-140°F (60°C)\* water into a clean glass or plastic pitcher.
- Use a clean plastic stir stick or the TCS-1000 to circulate the liquid.
- While circulating, add the contents of this bottle.
- Top off solution with water to make 1000ml. Mix well.
- \*Concentrate will drop temp. to 104°F (40°C)



Store mixed stock solution in a tightly capped, completely filled storage container for up to 2-6 weeks. Yellows with age and turns dark amber when perished. Oxygen and contaminants cause developing agents to perish.

## Tungsten Chrome COOL-TONE 3200K 'E100' SLIDES

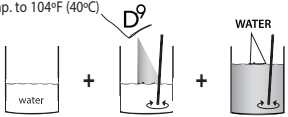
- Place 20-23oz (600-700ml) of 85-111°F (44°C)\* water into a clean glass or plastic pitcher.
- Use a clean plastic stir stick or the TCS-1000 to circulate the liquid.
- While circulating, add the contents of the powder packet.
- Top off solution with water to make 1000ml. Mix well.
- \*Powder will drop temp. to 104°F (40°C)



Store mixed stock solution in a tightly capped, completely filled storage container for up to 2-6 weeks. Yellows with age and turns amber when perished. Oxygen and contaminants cause developing agents to perish.

## Dynamic Chrome WARM-TONE DYNAMIC SLIDES

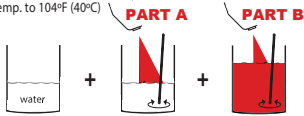
- Place 20-23oz (600-700ml) of 85-111°F (44°C)\* water into a clean glass or plastic pitcher.
- Use a clean plastic stir stick or the TCS-1000 to circulate the liquid.
- While circulating, add the contents of the powder packet.
- Top off solution with water to make 1000ml. Mix well.
- \*Powder will drop temp. to 104°F (40°C)



Store mixed stock solution in a tightly capped, completely filled storage container for up to 2-6 weeks. Yellows with age and turns amber when perished. Oxygen and contaminants cause developing agents to perish.

## COLOR&REVERSAL SLIDE SOLUTION

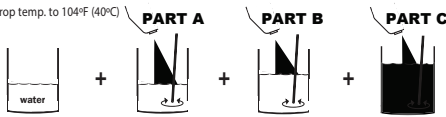
- Prepare 22oz. (650ml) of 85-115°F (46°C)\* water in a clean 1 quart (1L) container
- Use a clean plastic stir stick or the TCS-1000 to circulate the liquid.
- Continue stirring, add the contents of the bottle marked "PART A 2"
- Continue stirring, add the contents of the bottle marked "PART B 3"
- \*Concentrates will drop temp. to 104°F (40°C)



Store mixed stock solution in a tightly capped, completely filled storage container for up to 6-12 weeks. Turns dark brown or opaque when oxidation protection is exhausted. Variation in color development pH causes color shifts.

## BLEACHES&FIXER SLIDE SOLUTION

- Prepare 14 oz. (414 ml) of 85-140°F (60°C)\* water in a clean 1 quart (1L) container
- Use a clean plastic stir stick or the TCS-1000 to circulate the liquid.
- While stirring, add the contents of the bottle marked "PART A 4"
- Continue stirring, add the contents of the bottle marked "PART B 5"
- Continue stirring, add the contents of the bottle marked "PART C 6"
- \*Concentrates will drop temp. to 104°F (40°C)



Store mixed stock solution in a tightly capped storage container with air inside for up to 2-4 months. Aerate frequently. Oxidation encourages activity of bleaches. When film won't clear after 10 min retire chemistry and re-fix film.

**Note:** If the chemical concentrate appears to have floating crystal flakes or powder, heat the entire bottle of concentrated chemistry to at least 85°F and shake until all particles are dissolved.

# PROCESSING SLIDE FILM

## Standard Processing Steps For Rotation or Inversion Methods

For processing with a Paterson® JOB0® or LAB-BOX® plastic tank or a stainless tank with rotation or inversion agitation, or open tank with lift rod agitation. Rotation tanks and chemicals should be tempered in a water bath with the TCS-1000 to maintain solution temperatures. †Add 2°F to the developer before using inversions without a bath.

	TIME†	TEMP‡	AGITATION§
<b>1</b>	1st Developer Bath 6-9 min. <small>see "COLOR-TIMING SLIDE FILM"</small>	104°F (40°C)	Continuous Agitation, or for 15 sec. (6 lifts or 6 Inversion cycles*) every 30 seconds.
	Rinse	60 Sec.	102°F (39°C)‡ Running water or fill and empty tank 6 times
<b>2</b>	Color&Reversal Bath	> 6 min. 80°F - 104°F (26°C - 40°C)	Same as above
THE REMAINING STEPS MAY BE PERFORMED IN ROOM LIGHT WITH THE TANK LID OFF			
	Rinse	60 Sec.	75°F - 104°F (24°C - 40°C) Running water or fill and empty tank 6 times
<b>3</b>	Bleaches& Fixer Bath	6-10 min. 75°F - 104°F (24°C - 40°C)	Same as above
	Wash	> 6 min.	< 140°F (60°C) Running water or fill & empty tank > 10 times

\* Inversion cycle = 1 back and forth rotation and/or inversion while changing direction.

† Time varies between 1st Developer baths, e.g., D6 and T6 1+1 Dil. are 6min, whereas D9 1+1 Dil. is 9min. @104°F (40°C). See labels.

‡ When not using a temperature control bath, add +2°F(1°C) to the 1st Developer with the TCS-1000 before processing.

§ Use recommended agitation or rotary drum constant agitation may be used at recommended temperature with lower chemical volumes.

## Processing Notes

- An optional pre-soak of tempered water may be used to pre-warm the film and tank at the developer temperature.
- Use water at the temperature you want to use to develop your film. This allows for shorter warm-up time.
- Keep everything very clean. A few drops of chemicals, soap or other contaminants can destroy the developers.
- Mark your containers clearly. This will prevent confusion and processing out of order.
- Use safety glasses and rubber gloves while working with chemicals. Also wear a lab coat or other protective clothing.
- Do not allow children to use this kit without adult supervision.
- A "Final Rinse" of distilled water, Hexamine (fungicide) and/or Photo-Flo (surfactant) may be used.
- Modern color films have "Stabilizers" in the emulsion, released by the conditioner in the Bleaches&Fixer Bath.
- Film more than 20 years old may require a formalin or formaldehyde based Stabilizer preservative.

## Push/Pull Processing

If you have exposed film at a different ISO than what is rated by the manufacturer, you can alter the processing to match your exposure. This is referred to as push or pull processing. This is done with E-6 film by increasing or decreasing the time the film spends in the 1st Developer. Push processing is used when film is exposed at a higher ISO than it is normally rated. As a rule, pushing should be done only when necessary (i.e. when higher film speed is needed) because image quality does suffer somewhat. When pushing is required, start with the highest speed film available. In other words, pushing an ASA 100 film two stops to ASA 400 offers no benefit since an ASA 400 film is already available. Pull processing is when film is exposed at a lower ISO than it is normally rated. Use the chart below for adjusted first developer times. Pushing can also be achieved by not diluting the stock solution to 1+1. Adjust 1st Developer time only. Best results will be obtained at 104°F.

## Push/Pull Processing & Variable Temperature Development Chart

For ease of use, the chart below lists D6 dilutions and development times<sup>(1)</sup> for variable temperatures<sup>(2)</sup>.

D6 1ST DEVELOPER BATH	72°F <sup>(2)</sup>	75°F <sup>(2)</sup>	80°F <sup>(2)</sup>	85°F <sup>(2)</sup>	90°F <sup>(2)</sup>	95°F <sup>(2)</sup>	104°F <sup>(1)</sup>
Normal 1+1 dilution <sup>(1)</sup>							
Push +1 Stock solution	26 min.	23 min.	19 min.	15 min.	12 min.	9 min.	6 min. <sup>(1)</sup>
Push +1 1+1 dilution	X	X	25 min.	20 min.	16 min.	12 min.	8 min.
Push +2 Stock solution	X	X	X	26.5 min.	21.25 min.	16 min.	10.5 min.
Push +2 1+1 dilution	X	X	X	X	X	X	X
Push +3 Stock solution	X	X	X	X	X	X	X
Pull -1 1+1 dilution	22 min.	18 min.	14 min.	11 min.	9 min.	7 min.	4.5 min.
Normal Stock solution							
Pull -2 1+1 dilution	17 min.	14 min.	11 min.	8.5 min.	7 min.	5.5 min.	3.5 min.
Pull -1 Stock solution							
Agitation <sup>(4)</sup>	Continuous for first minute then 6 Inversions every 2 minutes		Continuous first 30 sec. then 6 Inversions every minute		Continuous or for 15 sec. (6 Inversions) every 30 sec.		
	22°C	24°C	27°C	29.5°C	32°C	35°C	40°C
For remaining steps refer to "Standard Processing Steps" above							

<sup>(1)</sup> Recommended dilution, time and temperature for optimal results

<sup>(2)</sup> Processing at lower temperatures will result in density and color shifts

<sup>(3)</sup> Push processing results in increased contrast and color saturation

<sup>(4)</sup> Variation in agitation may result in color shifts

# COLOR-TIMING SLIDE FILM

## D6 Daylight Chrome NEUTRAL-TONE 5500K SLIDES

"DaylightChrome" 1st Developer renders approximately 6+ stops of usable dynamic-range with brighter whites and moderately enhanced color saturation, just like conventional E-6 processing. Mixed stock solution can be measured out at 1/2 the tank capacity and diluted 1+1 with water to make a working solution for normal development. Stock solution can also be used for push processing while maintaining time and temperature.

⚙️ **Normal Development:** 1+1 Dilution ~ 6 min. @104°F (40°C)

**Push +1:** Stock Solution ~ 6 min. or 1+1 Dilution ~ 8 min.

**Push +2:** Stock Solution ~ 8 min.

**Pull -1:** 1+1 Dilution ~ 4.5 min.

## T6 Tungsten Chrome COOL-TONE 3200K 'E100' SLIDES

"TungstenChrome" 1st Developer renders approximately 6+ stops of usable dynamic-range with clean whites, and moderately enhanced color saturation. Mixed stock solution can be measured out at 1/2 the tank capacity and diluted 1+1 with water to make a working solution for normal cool-tone development. Stock solution can also be used for push processing while maintaining time and temperature.

⚙️ **Cool-Tone Development:** 1+1 Dilution ~ 6 min. @104°F (40°C)

**Push +1:** Stock Solution ~ 6 min. or 1+1 Dilution ~ 8 min.

**Push +2:** Stock Solution ~ 8 min.

**Pull -1:** 1+1 Dilution ~ 4.5 min.

## D9 Dynamic Chrome WARM-TONE DYNAMIC SLIDES

"DynamicChrome" 1st Developer renders approximately 9+ stops of usable dynamic-range while maintaining vibrant color-contrast and rich warm-tones with preserved highlight and shadow detail (optimized for scanning) for a more cinematic look. Mixed stock solution can be measured out at 1/2 the tank capacity and diluted 1+1 with water to make a working solution for normal warm-tone development. Dilute 1+2 or 1+3 with water for further preserved highlight detail and a more neutral color balance.

⚙️ **Warm-Tone Development:** 1+1 Dilution ~ 9 min. @104°F (40°C)

**Extended Highlight Latitude:** 1+2 Dilution ~ 10.5 min.

**Pull -1 (overexposed film):** 1+3 Dilution ~ 12 min.

Push processing is not recommended with DynamicChrome

# SOLUTION CAPACITIES

The solution capacities given in the charts below recommend how many films you can reliably process in various quantities of mixed and diluted working solutions, before exhausting their strength. 1st Developers are weakened after a single-use and should be used only once, whereas the other 2 baths may be reused multiple times before any loss of quality. See "CHEMICAL REUSE" on reverse side...

## 1ST DEVELOPER SLIDE SOLUTION CAPACITIES

FILM SIZE	110 (20 exp.)	126	135 (24 exp.)	135 (36 exp.)	120	220	4 x 5 (sheets)	8 x 10 (sheets)
Rolls per 1000 ml (32 oz.) 1+1 DIL.	36	16	12	8	8	4	32	8
Rolls per 480 ml (16 oz.) 1+1 DIL.	18	8	6	4	4	2	16	4
Rolls per 240 ml (8 oz.) 1+1 DIL.	9	4	3	2	2	1	8	2

## COLOR&REVERSAL SLIDE SOLUTION CAPACITIES

FILM SIZE	110 (20 exp.)	126	135 (24 exp.)	135 (36 exp.)	120	220	4 x 5 (sheets)	8 x 10 (sheets)
Rolls per 1000 ml (32 oz.) STOCK	72	32	24	16	16	8	64	16
Rolls per 480 ml (16 oz.) STOCK	32	16	12	8	8	4	32	8
Rolls per 240 ml (8 oz.) STOCK	18	8	6	4	4	2	16	4

## BLEACHES&FIXER SLIDE SOLUTION CAPACITIES

FILM SIZE	110 (20 exp.)	126	135 (24 exp.)	135 (36 exp.)	120	220	4 x 5 (sheets)	8 x 10 (sheets)
Rolls per 1000 ml (32 oz.) STOCK	108	48	36	24	24	12	96	24
Rolls per 480 ml (16 oz.) STOCK	54	24	18	12	12	6	48	12
Rolls per 240 ml (8 oz.) STOCK	27	12	9	6	6	3	24	6