FUJIFILM
Value from Innovation

TECHNICAL BULLETIN

PROCESS C41

NEGACOLOR AND ENVIRONEG PROCESSING CHEMICALS

For the processing of films compatible
with the C41 process

October 2020
version E01 / 10-20

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Your local FUJIFILM representative can give technical advice if required.

I. INTRODUCTION

This new issue of the Technical Bulletin **TB Process C41 Negacolor and EnviroNeg Processing Chemicals**" contains all information on FUJIFILM Belgium products available for C41 film processing.

EnviroNeg Developer 60 AC is the latest FUJIFILM Belgium development to counter the undesirable and unstable film processing quality caused by the low processing volumes increasingly found today. It has been specially designed for use in all types of film processor that are having problems with low throughput. This includes minilabs, professional dip & dunk (hanger) type machines and hand lines (also known as deep tank processing), and even photofinishing processors that are now too big for your current film volumes.

EnviroNeg RA Bleach VR AC is designed as the ideal partner for EnviroNeg Developer 60 AC for use in all types of film processor that employ the C41RA process – typically minilabs.
This product is a variable ratio high-speed single part bleach for the C41RA process and part of the Air Control product range.
But this bleach can also be used for low throughput in C41RA processors (typically minilabs) by running at an increased replenishment rate with a diluted Replenisher, and can also be used as bleach for the C41B process running at standard replenishment rate with a diluted Replenisher.

FUJIFILM Belgium continues to produce and support C41 product range despite the changed market conditions (considerable lower processing volumes of C41 films).

This Technical Bulletin has been well accepted by the market. It not only tells you a bit more about the individual process steps and functions, but just as importantly it will guide you in more detail through the FUJIFILM Belgium Process Option chart, making it easier for the customer to make his correct choice.

Once you have confirmed your product of choice through cross-checking the chapter "Process Specifications", you will be able to find all process specifications such as the physical parameters, chemical specifications and mixing instructions, including regeneration procedures in the individual chapters. Process Monitoring, Care and Storage of Solutions complete this Technical Bulletin.

Even though this Technical Bulletin does contain a lot of important information, we also realise that additional information may be wanted in your day-to-day operation. If you have any queries, FUJIFILM has an experienced team of Technical Experts available to you.

Do not hesitate to contact your local FUJIFILM representatives; they will be happy to assist you at any time.

II. PROCESS DESCRIPTION

FUJIFILM Belgium offers a wide range of C41 processing chemicals, of which the Air Control products are unique in their category.

The **Negacolor** and **EnviroNeg** Chemical Systems are based on all liquid concentrates designed to process all films compatible with the C41 process. The Negacolor and EnviroNeg chemicals may be used in continuous film processors, automatic batch processors (rack and tank), manual tanks, minilabs, disc processors and in roller transport processors. The EnviroNeg chemicals are state-of-the-art products, reducing the environmental pollution to an absolute minimum.

Options are available covering process C41B, C41RA and other proprietary C41 processes in addition to the standard C41 process. **Super stabilizers** are also available for washless processors - commonly designated as for processes C41BNP ("Non Plumbed") and C41RANP.

If there are any queries as to which is the most suitable chemistry for your application, please consult your FUJIFILM representative. A comparison table of the various process options may be found in this brochure.

III. PROCESSING STEPS AND FUNCTIONS

1. DEVELOPMENT

The developer produces a silver image in the film emulsion layers from the latent image produced when the film is exposed. At the same time, the developer - which is locally oxidised by this reaction - combines with couplers incorporated in the emulsion and produces colour dyes. The quantity of dye produced is proportional to the amount of silver image produced.

2. BLEACHING

This bath converts the metallic silver image formed during development back into silver halide in order to make it possible for the fixer to remove the silver from the emulsion.

3. FIXING

The fixer dissolves the bleached silver image and the unexposed and therefore undeveloped silver halide originally present in the film emulsion, which can then be washed out by the wash.

4. WASHING

A water wash as commonly found in larger processors, works by removing all processing chemicals and by-products from the film emulsion. Correct wash water rate and temperature are critical for long term dye stability.

5. STABILIZING

This contains a wetting agent and other propriety chemicals featuring uniform drying of the film and long term stability.

6. SUPER STABILIZING

The super stabilizer option, commonly used in minilabs in place of a water wash, works by washing the majority of processing chemicals and by-products from the film emulsion and then reacting with any remaining chemicals to form stable, inert compounds and preventing dye fading. All Fuji Hunt C41 stabilizers are formaldehyde-free (FF).

IV. PROCESS OPTIONS

1. DEVELOPERS

We continue to offer a complete range of straight replenished developers.

A. Developer Replenishers

- **EnviroNeg Developer Replenisher 60 AC**

Is a high replenishment rate 3-part developer, with a replenishment rate of 60 mL/135-24 film. It has been designed to give greatly improved resistance to oxidation and low throughput conditions, providing much improved process stability and quality and greatly extending the bath lifetime.
Under normal low or even very low throughput conditions, proper use of this developer will avoid the requirement for regular developer retanking, previously necessary to retain process activity.

- **EnviroNeg Developer Replenisher AC**

Is a standard replenishment rate 3-part developer, with a replenishment rate of 41 mL/135-24 film. It's ideally suited to the lower throughput processors found in professional laboratories, and also for low volume minilabs.
This replenishment rate leads to improved process stability and cleanliness due to shorter tank turnover time and offers significant advantages where good process control has proved difficult.

- **EnviroNeg Developer Replenisher LR AC**

This has been the most commonly used low replenishment rate 3-part developer, with a replenishment rate of 21 mL/135-24 film. It's used in a wide range of processors and suitable in most situations where there is a reasonable amount of throughput.
This developer is particularly suitable for use in high volume laboratories and busy minilabs.
However, the days of high film volumes are now generally in the past, and existing users of this product may need to be thinking of changing to either **EnviroNeg Developer Replenisher AC**, or to **EnviroNeg Developer Replenisher 60 AC** to maintain tank turnover rates essential for a good process.

In order to decide if **EnviroNeg Developer Replenisher LR AC** can be used, please consult our EnviroNeg Developer Selection Chart below.

EnviroNeg Developer Selection Chart - Overview

The following table can be used to select the most appropriate products for your processor.

C41 Developer Selection and Replenshment Rate Chart

Films/Week	Developer Tank Size (L)							
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**
200	1	1	1	2	3	3	3	4
150	1	2	2	3	3	3	4	4
100	1	2	3	3	4	4	4	4
80	2	3	3	4	4	4	4	NR
60	2	3	4	4	4	4	NR	NR
40	3	4	4	4	NR	NR	NR	NR
20	3	4	NR	NR	NR	NR	NR	NR
10	4	NR	NR	NR	NR	NR	NR	NR

1	Use EnvroNeg Developer LR AC @ 21 ml/135-24
2	Use EnviroNeg Developer AC @41 ml/135-24
3	Use EnviroNeg Developer 60 AC @60 ml/135-24
4	Use EnviroNeg Developer 60 AC @70 ml/135-24
NR	Not Recommended

Please note that the recommendations in this chart depend on good working practices by the laboratory, but provide a good starting point. This means a floating lid or balls in the developer replenisher tank, mixing only the minimum volume of developer at one time (no multiple 5 litre packs mixed together, for example), running only normal operating hours, compensation for evaporation, etc. Some processors may be more tolerant of low throughput than others, depending on processor design.

EnviroNeg Developer 60 AC is run at 60 mL/135-24 film under normal low throughput conditions, but the replenishment rate can be increased up to 70 mL/135-24 film under very low throughput conditions (see VI.6 C41 Low Throughput page 15).

When use of **EnviroNeg Developer 60 AC** is indicated for a C41RA process, a higher replenishment rate bleach is also recommended. **EnviroNeg RA Bleach VR AC** can run at a higher Replenishment rate of 10 mL/135-24 using the appropriate dilution.

Although it is possible, we do not recommend the use of **EnviroNeg Developer 60 AC** with high film volumes.

When use of **EnviroNeg Developer AC** or **EnviroNeg Developer LR AC** is indicated for a C41RA processor (typically a minilab), we recommend to use standard RA Bleach, **EnviroNeg RA Bleach VR AC** at Replenishment rate of 5 mL/135-24 .

2. BLEACHES

Several bleach systems are available for the C41 process to cover the wide number of process variants that have been introduced.

A. Replenished bleaches

- **Negacolor Ultra Bleach 3**

Negacolor Ultra Bleach 3 is the recommended bleach for all types of C41 processor with bleach times ranging from 3 min to 6 min 30 sec and having an intermediate wash installed between bleach and fixer. And it is fully compatible with all emulsions available on the market today. **Negacolor Ultra Bleach 3** can be regenerated by collecting overflow and adding bleach concentrate.

- **EnviroNeg RA Bleach VR AC**

EnviroNeg RA Bleach VR AC is a variable ratio high-speed single part bleach for the C41RA process and part of the Air Control product range.
It is designed to operate with the C41RA bleach processing time of 45 to 60 sec and has a very low 5 mL/135-24 film replenishment rate. It is available in 2 x 5 L packs.

This product can also be used for low throughput in C41RA processors (typically minilabs) by running at an increased REP RATE of 10 mL/135-24 with a diluted Replenisher (see Mixing Instructions). It should than be used in combination with the low throughput **EnviroNeg Developer 60 AC**.

Additionally this product can also be used as bleach for the C41B process running at 5 mL/135-24 film replenishment rate with a diluted Replenisher (see Mixing Instructions).

B. Regenerated Bleaches

- **Negacolor Ultra Bleach 3**

This bleach can be regenerated by collecting overflow and adding the same concentrate as being used for the preparation of tank and replenisher (see IV.2.A Replenished bleaches on page 9).

3. FIXERS

FUJIFILM Belgium has several fixer systems available to cover the wide range of needs that can arise with the C41 process. The whole subject of fixers is covered more fully in the FUJIFILM Belgium Technical Bulletin "Fixing Systems".

A. Replenished fixers

- **Super Unilec Fixer**

Super Unilec Fixer is the most commonly used fixer in the non-minilab environment, covering many requirements. This fixer can not only be used as a normal replenisher in standard C41 processors operating at a fixing time in the range 4 min 20 sec to 6 min 30 sec but can also be used in a closed loop continuous electrolytic desilvering system at a reduced replenishment rate. In addition, **Super Unilec Fixer** is also suitable for batchwise electrolytic desilvering and fixer regeneration.

- **Negacolor RA Fixer**

Negacolor RA Fixer is a high activity fixer, specially designed for the very short 1 min 30 sec fixer time of the C41RA and C41RANP processes, and also suitable for use in the C41B process.

B. Regenerated fixers

(see FUJIFILM Belgium Technical Bulletin “Fixing Systems”)

➢ Super Unilec Fixer

Super Unilec Fixer is the recommended concentrate for “closed loop continuous electrolytic fixer desilvering” and also for use when electrolytic desilvering and Fixer Regeneration is installed.

This system may require correction for specific gravity and pH at regular intervals. This fixer is also suited for use in paper processing where a separate bleach and fixer cycle is employed. Full details may be found in the Fixing Systems Technical Bulletin.

4. STABILIZER AND SUPERFLO STABILIZER

➢ EnviroNeg FF Superflo Stabilizer MB AC

EnviroNeg FF Superflo Stabilizer MB AC is a 100% "formaldehyde free" film stabilizer and film super stabilizer for use in all processors. This product can be replenished on top of existing C41 Stabilizer.

V. PROCESS OPTION CHART

Bath	Time	Replenishment Rate (mL/m 135 film)	Replenishment Rate (mL/135-24 film)
EnviroNeg Developer 60 AC (1) – ***LOW VOLUME***	3'15"	56	60
EnviroNeg Developer AC	3'15"	38	41
EnviroNeg Developer LR AC	3'15"	19	21
Negacolor Ultra Bleach 3 (2)	3' - 6'30"	30	35
EnviroNeg RA Bleach VR AC (3) ***FOR C41RA @ 5 mL/135-24 FILM***	45" - 60"	9	10
EnviroNeg RA Bleach VR AC (3) ***FOR C41RA @ 10 mL/135-24 FILM – LOW VOLUME***	45" - 60"	4.5	5
EnviroNeg RA Bleach VR AC (3) ***FOR C41B @ 5 mL/135-24 FILM***	3' - 4'20"	4.5	5
Super Unilec Fixer (4)	4'20"- 6'30"	30	35
Negacolor RA Fixer (5)	1'30"	30	35
Environeg FF Superflo Stabilizer MB AC (6)	40" - 1'05"	18 (Continuous) 32 (Dip & Dunk)	20 (Continuous) 35 (Dip & Dunk)
EnviroNeg FF Superflo Stabilizer MB AC (6)	2'20"	30	35
EnviroNeg FF Superflo Stabilizer MB AC (6) **+** EnviroNeg FF Superflo Stabilizer MB AC	1'40" 40"	35 30	40 35

(1) **EnviroNeg Developer 60 AC** was designed for normal replenishment at 60 mL/135-24 film. Under normal low throughput conditions, this will provide an excellent process. Under very low throughput conditions, as low as 3 films/day for a 10 litre development tank, developer replenishment rate should be increased by 15% up to 70 mL/135-24 film.
Please see EnviroNeg Developer Selection Chart - Overview on page 8 and Recommendation for very Low Throughput on page 15 for more details.

(2) **Negacolor Ultra Bleach 3** can be regenerated. In case of regeneration, the actual overflow rates to the drain are far lower. 20 mL/L in case of closed loop desilvering

(3) **EnviroNeg RA Bleach VR AC** is a variable ratio high-speed one-part bleach for the C41RA process. It is designed to operate with the C41RA bleach processing time of 45 to 60 sec and has a very low 5 mL/135-24 film replenishment rate. It is available in 2 x 5 L packs.
This product can also be used for low throughput in C41RA processors (typically minilabs) by running at an increased REP RATE of 10 mL/135-24 with a diluted Replenisher (see Mixing Instructions). It should than be used in combination with the low throughput **EnviroNeg Developer 60 AC**.
And this bleach can be used as bleach for the **C41B** process running at 5 mL/135-24 film replenishment rate with a diluted Replenisher (see Mixing Instructions).

(4) Fixer replenishment rates are for replenished process. For closed loop electrolytic fixer, replenishment rates can be reduced by 35% from the above rates. See the FUJIFILM Europe Technical Bulletin "Fixing Systems" for further details.

(5) Two tank counter current cascade flow.

(6) **EnviroNeg FF Superflo Stabilizer MB AC** is normally used in a 3-tank counter current cascade system. This can however be used in a minilab in place of conventional Stabilizer following a water wash. In this case, bath time is 40".

VI. PROCESS SPECIFICATIONS

1. GENERAL C41

	Developer	Bleach	Wash	Fixer	Wash	Stabilizer
Time (1)	3'15"	3'00" to 6'30"	1'05"	4'20" to 6'30"	3'15"	1'05"
Temperature (2)	37.8°C ± 0.15°C	37.8°C ± 3°C	35.0°C ± 5°C	37.8°C ± 3°C	35.0°C ± 5°C	24°C - 40°C
Circulation and Filtration	Required	Required		Required		
Agitation	Nitrogen or turbulation	Oil-free air		Nitrogen or oil-free air turbulation		
CONTINUOUS (CINE TYPE) PROCESSOR WITH EFFICIENT SQUEEGUEES (3)						
Wash rate			1250 mL/ 135-24 film		2500 mL/ 135-24 film	
RACK AND TANK PROCESSOR OR CINE WITHOUT EFFICIENT SQUEEGUEES (3)						
			2500 mL/ 135-24 film		3750 mL/ 135-24 film	

(1) Processing latitude can be increased by extending the bleaching and fixing times to 6 minutes and 30 seconds. The extra processing time will substantially reduce the possibility of leuco cyan and/or retained silver in processed film.

(2) Due to the relatively high temperature of the processing solutions, evaporation can occur resulting in lower tank levels. Therefore water, not replenisher, should be added to restore tank levels.

(3) The wash water rates given are for a two-tank counter current system as commonly found on most processors. If a third wash tank is installed, these wash rates may be halved.

2. C41B

Bath	Time	Temp. (°C)	Replenish. Rate (mL/135-24 film)
EnviroNeg Developer LR AC	3'15"	37.8°C ± 0.15°C	21
or EnviroNeg Developer AC	3'15"	37.8°C ± 0.15°C	41
or EnviroNeg Developer 60 AC (1) – ***LOW VOLUME***	3'15"	37.8°C ± 0.15°C	60
EnviroNeg RA Bleach VR AC (2) ***FOR C41B @ 5 mL/135-24 FILM***	3' - 4'20"	38°C ± 3°C	5
Negacolor RA Fixer (3)	4' - 4'20"	38°C ± 3°C	35
Wash	1'40"	35°C ± 3°C	1250
EnviroNeg FF Superflo Stabilizer MB AC (4)	40"	38°C ± 3°C	35

(1) **EnviroNeg Developer 60 AC** was designed for normal replenishment at 60 mL/135-24 film. Under normal low throughput conditions, this will provide an excellent process. Under very low throughput conditions, as low as 3 films/day for a 10 litre development tank, developer replenishment rate should be increased by 15% up to 70 mL/135-24 film.
Please see EnviroNeg Developer Selection Chart - Overview on page 8 and Recommendation for very Low Throughput on page 15 for more details.

(2) **EnviroNeg RA Bleach VR AC** can also be used as bleach for the C41B process running at 5 mL/135-24 film replenishment rate with a diluted Replenisher (see Mixing Instructions).

(3) Two tank counter current cascade flow.

(4) **EnviroNeg FF Superflo Stabilizer MB AC** can be used in a minilab to replace a conventional final Stabilizer following a water wash. In this case, bath time is 40".

3. C41BNP

Bath	Time	Temp. (°C)	Replenish. Rate (mL/135-24 Film)
EnviroNeg Developer LR AC *or* EnviroNeg Developer AC *or* EnviroNeg Developer 60 AC (1) – ***LOW VOLUME***	3'15" 3'15" 3'15"	37.8°C ± 0.15°C 37.8°C ± 0.15°C 37.8°C ± 0.15°C	21 41 60
EnviroNeg RA Bleach VR AC (2) ***FOR C41B @ 5 mL/135-24 FILM***	3' - 4'20"	38°C ± 3°C	5
Negacolor RA Fixer (3)	4 '- 4'20"	38°C ± 3°C	35
EnviroNeg FF Superflo Stabilizer MB AC (4)	2'20"	38°C ± 3°C	35
EnviroNeg FF Superflo Stabilizer MB AC (4)	1'40"	38°C ± 3°C	40
+ EnviroNeg FF Superflo Stabilizer MB AC (4)	40"	38°C ± 3°C	35

(1) **EnviroNeg Developer 60 AC** was designed for normal replenishment at 60 mL/135-24 film. Under normal low throughput conditions, this will provide an excellent process. Under very low throughput conditions, as low as 3 films/day for a 10 litre development tank, developer replenishment rate should be increased by 15% up to 70 mL/135-24 film.
Please see EnviroNeg Developer Selection Chart - Overview on page 8 and Recommendation for very Low Throughput on page 15 for more details.

(2) **EnviroNeg RA Bleach VR AC** can also be used as bleach for the C41B process running at 5 mL/135-24 film replenishment rate with a diluted Replenisher (see Mixing Instructions).

(3) Two tank counter current flow, equal times in both tanks.

(4) **EnviroNeg FF Superflo Stabilizer MB AC** is normally used in a 3 to 4-tank counter current cascade system but also can be used in a minilab to replace a conventional final Stabilizer following a water wash. In this case, bath time is 40".

4. C41RA

Bath	Time	Temp. (°C)	Replenish. Rate (mL/135-24 Film)
EnviroNeg Developer LR AC *or* EnviroNeg Developer AC *or* EnviroNeg Developer 60 AC (1)	3'15" 3'15" 3'15"	37.8°C ± 0.15°C 37.8°C ± 0.15°C 37.8°C ± 0.15°C	21 41 60
EnviroNeg RA Bleach VR AC (2) ***FOR C41RA @ 5 mL/135-24 FILM***	45"- 60"	38°C ± 3°C	5
Negacolor RA Fixer (3)	1'30"	38°C ± 3°C	35
Wash (4)	1'40"	35°C ± 3°C	1250
EnviroNeg FF Superflo Stabilizer MB AC (5)	1'30"	38°C ± 3°C	35

(1) **EnviroNeg Developer 60 AC** was designed for normal replenishment at 60 mL/135-24 film. Under normal low throughput conditions, this will provide an excellent process. Under very low throughput conditions, as low as 3 films/day for a 10 litre development tank, developer replenishment rate should be increased by 15% up to 70 mL/135-24 film.
Please see EnviroNeg Developer Selection Chart - Overview on page 8 and Recommendation for very Low Throughput on page 15 for more details.

(2) **EnviroNeg RA Bleach VR AC** is a variable ratio high-speed one-part bleach for the C41RA process. It is designed to operate with the C41RA bleach processing time of 45 to 60 sec and has a very low 5 mL/135-24 film replenishment rate. It is available in 2 x 5 L packs.
EnviroNeg RA Bleach VR AC can also be used for low throughput in C41RA processors (typically minilabs) by running at an increased REP RATE of 10 mL/135-24 with a diluted Replenisher (see mixing instructions). It should than be used in combination with the low throughput **EnviroNeg Developer 60 AC**.

(3) Two tank counter current flow, equal times in both tanks.

(4) Follow film manufacturer's recommendation.

(5) **EnviroNeg FF Superflo Stabilizer MB AC** can be used in a minilab to replace a conventional final Stabilizer following a water wash. In this case, bath time is 40".

5. C41 RANP

A. High Film Volume

Bath	Time	Temp. (°C)	Replenish. Rate (mL/135-24 Film)
EnviroNeg Developer LR AC	3'15"	37.8°C ± 0.15°C	21
or EnviroNeg Developer AC	3'15"	37.8°C ± 0.15°C	41
EnviroNeg RA Bleach VR AC (2) ***FOR C41RA @ 5 mL/135-24 FILM***	45"- 60"	38°C ± 3°C	5
Negacolor RA Fixer (3)	1'30"	38°C ± 3°C	35
EnviroNeg FF Superflo Stabilizer MB AC (4)	1'00"	38°C ± 3°C	40

B. Low Film Volume

Bath	Time	Temp. (°C)	Replenish. Rate (mL/135-24 Film)
EnviroNeg Developer 60 AC(1) - ***LOW VOLUME***	3'15"	37.8°C ± 0.15°C	60
EnviroNeg RA Bleach VR AC (2) ***FOR C41RA @ 10 mL/135-24 FILM – LOW VOLUME***	45"- 60"	38°C ± 3°C	10
Negacolor RA Fixer (3)	1'30"	38°C ± 3°C	50
EnviroNeg FF Superflo Stabilizer MB AC (4)	1'00"	38°C ± 3°C	60

(1) **EnviroNeg Developer 60 AC** was designed for normal replenishment at 60 mL/135-24 film. Under normal low throughput conditions, this will provide an excellent process. Under very low throughput conditions, as low as 3 films/day for a 10 litre development tank, developer replenishment rate should be increased by 15% up to 70 mL/135-24 film.
Please see EnviroNeg Developer Selection Chart - Overview on page 8 and Recommendation for very Low Throughput on page 15 for more details.

(2) **EnviroNeg RA Bleach VR AC** is a variable ratio high-speed one-part bleach for the C41RA process. It is designed to operate with the C41RA bleach processing time of 45 to 60 sec and has a very low 5 mL/135-24 film replenishment rate. It is available in 2 x 5 L packs.
EnviroNeg RA Bleach VR AC can also be used for low throughput in C41RA processors (typically minilabs) by running at an increased REP RATE of 10 mL/135-24 with a diluted Replenisher (see mixing instructions). It should than be used in combination with the low throughput **EnviroNeg Developer 60 AC**.

(3) Two tank counter current flow, equal times in both tanks.

(4) **EnviroNeg FF Superflo Stabilizer MB AC** is used in a 3 to 4-tank counter current cascade system.

6. C41 LOW THROUGHPUT

EnviroNeg Developer Replenisher 60 AC is recommended for all low or very low throughput C41 processors – including minilabs, professional dip & dunk and roller transport processors, and hand lines.

EnviroNeg Developer 60 AC is run at 60 mL/135-24 film under normal low throughput conditions.

Minilabs suffering from low film volume are recommended to switch to **EnviroNeg Developer Replenisher 60 AC.**
C41RA minilabs should also switch to **EnviroNeg RA Bleach VR AC** @ replenishment rate of 10 mL/135-24 Film (with a diluted Replenisher -see mixing instructions).

In low throughput – and especially in very low throughput – situations, it is recommended that you increase the fixer and stabiliser replenishment rates by 50% compared to the standard replenishment rates. On a typical minilab, this will therefore mean a **Negacolor RA Fixer** replenishment rate of 50 mL/135-24 film, and a **EnviroNeg FF Superflo Stabilizer MB AC** replenishment rate of 60 mL/135-24 film.

Please see the FUJIFILM Belgium Technical Information Sheet “TIS EnviroNeg Developer AC 60 Minilab” for further information.

Professional laboratories suffering from low film volume should convert to a higher replenishment rate developer - switch from LR (21 ml/roll) to standard developer (41 ml/roll) or from standard (41 ml/roll) to low volume developer (60 ml/roll).
Likewise also bleach regeneration - if still practiced - should be stopped immediately, and the system should be converted back to a replenishment-only system. Any collected bleach overflow waiting for regeneration should be discarded.

Please consult our ***EnviroNeg Developer Selection Chart - Overview*** on page 8 to select the most appropriate developer for your processor.

Please see the FUJIFILM Belgium Technical Information Sheet “TIS EnviroNeg Developer AC 60 Prolab” for further information.

Recommendation for very Low Throughput

EnviroNeg Developer 60 AC and **EnviroNeg RA Bleach VR AC** have been designed to allow good quality in most low throughput situations on minilabs.

If your film throughput is extremely low it might still possible to run a satisfactory film process by increasing the replenishment rate of ALL baths – developer, bleach, fixer and stabiliser – by 15%.
You will never have a perfect process with such low film volumes, but the results are much improved from any other options you have available other than frequent processor retanking, and might still be acceptable for obtaining good quality (digital) prints. Bath temperatures and mixing instruction remain unchanged.

The **EnviroNeg Developer 60 AC** will than run at an increased replenishment rate of 70 mL/135-24 film.

VII. STANDARD REPLENISHMENT RATES (1)

Machine type :	Continuous with efficient squeegees mL/*m*	Rack & Tank *mL/roll or sheet*	Roller transport	
			mL/m	*mL/roll*
EnviroNeg Developer Replenisher AC (2) Typical rates for ASA 100-200 films				
Standard Rolls				
135-12	38	23	38	23
135-24	38	41	38	41
135-36	38	60	38	60
120	85	69	85	69
220	85	140	172	140
Sheet Films				
10.2 x 12.7 cm		20		
12.7 x 17.8 cm		34		
20.4 x 25.4 cm		75		
27.9 x 35.6 cm		205		
EnviroNeg Developer Replenisher AC Typical rates for ASA 400-1600 films				
Standard Rolls				
135-12	54	32	54	32
135-24	54	59	54	59
135-36	54	87	54	87
120	122	99	122	99
220	122	201	247	201
EnviroNeg Bio-Bleach AC, Negacolor Ultra Bleach 3, Super Unilec Fixer (3) (4)				
Standard Films				
135-12	30	29	30	22
135-24	30	48	30	36
135-36	30	66	30	49
120	63	66	63	51
220	63	134	63	103
Sheet Films				
10.2 x 12.7 cm		15		
12.7 x 17.8 cm		29		
20.4 x 25.4 cm		59		
27.9 x 35.6 cm		110		
EnviroNeg FF Superflow Stabilizer MB AC				
Standard Films				
135-12	18	21	32	21
135-24	18	35	32	35
135-36	18	48	32	48
120	38	48	67	48
220	38	98	67	98
Sheet Films				
10.2 x 12.7 cm		11		
12.7 x 17.8 cm		21		
20.4 x 25.4 cm		43		
27.9 x 35.6 cm		80		

(1) Recommended replenishment rates are nominal; actual replenishment rates for each processor should be determined by photographic quality and behaviour as indicated by the processed control strips.

(2) Replenishment rate for **EnviroNeg Developer LR AC** is 50% of the quoted figures for **EnviroNeg Developer AC**. Replenishment rate for **EnviroNeg Developer 60 AC** is 150% of the quoted figures for **EnviroNeg Developer AC**.

(3) Fixer replenishment rates are for replenished process. For closed loop electrolytic fixer, replenishment rates can be reduced by 35% from the above rates. See the FUJIFILM Europe Technical Bulletin "Fixing Systems" for further details.

(4) For **Super Unilec Fixer** at 1+3: Use half of the above fix replenishment rates.

VIII. STARTERS

1. FOR DEVELOPERS

There is one universal starter to prepare all developer tank solutions: **EnviroNeg Universal Developer Starter AC**.

2. FOR BLEACHES

Ensure that the correct starter is used for the following tank solutions :

Bleach tank solution	**Starter**
Negacolor Ultra Bleach 3	Negacolor Ultra Bleach 3 Starter

IX. MIXING INSTRUCTIONS

Working or tank solutions must be prepared when initially filling a processor or when using chemicals on a "one-shot" basis.

They may be prepared by the more convenient of one of two routes - either directly from replenisher concentrates or from already mixed replenisher. The choice whether to mix directly from concentrates or from mixed replenisher is for the laboratory to decide; as long as the correct amount of water and/or starter is added, the end result is the same.

Generally it is necessary to add a starter with developers and some bleaches; other solutions are normally used either at replenisher strength or just with simple dilution of the replenisher.

1. DEVELOPERS & DEVELOPER REPLENISHERS

EnviroNeg Developer Replenisher 60 AC - *LOW VOLUME*						
To make 1 litre	**Water**	**Part A**	**Part B**	**Part C**	**Rep**	**Starter (1)**
REPLENISHER	864 mL	100 mL	13.7 mL	22.7 mL	-	-
TANK	876 mL	80 mL	11 mL	18.2 mL	-	15 mL
TANK from REP	185 mL	-	-	-	800 mL	15 mL

(1) Required starter is **EnviroNeg Universal Developer Starter AC**.

EnviroNeg Developer Replenisher AC (small packs up to 50L)						
To make 1 litre	**Water**	**Part A**	**Part B**	**Part C**	**Rep**	**Starter (1)**
REPLENISHER	890 mL	80 mL	10 mL	20.4 mL	-	-
TANK	892 mL	68 mL	8.5 mL	17.3 mL	-	15 mL
TANK from REP	135 mL	-	-	-	850 mL	15 mL

(1) Required starter is **EnviroNeg Universal Developer Starter AC**.

EnviroNeg Developer Replenisher AC (large volume mixes)						
To make 1 litre	**Water**	**Part A**	**Polyneg B (2)**	**Polyneg C (2)**	**Rep**	**Starter (1)**
REPLENISHER	900 mL	80 mL	10 mL	10.2 mL	-	-
TANK	900 mL	68 mL	8.5 mL	8.7 mL	-	15 mL
TANK from REP	135 mL	-	-	-	850 mL	15 mL

(1) Required starter is **EnviroNeg Universal Developer Starter AC**.

(2) **Polyneg B** / **Polyneg C** should be used for large volume mixes.

EnviroNeg Developer Replenisher LR AC (small packs up to 50L)						
To make 1 litre	**Water**	**Part A**	**Part B**	**Part C**	**Rep**	**Starter (1)**
REPLENISHER	887 mL	80 mL	11 mL	22 mL	-	-
TANK	885 mL	60 mL	8.2 mL	16.5 mL	-	30 mL
TANK from REP	220 mL	-	-	-	750 mL	30 mL

(1) Required starter is **EnviroNeg Universal Developer Starter AC**.

EnviroNeg Developer Replenisher LR AC (*large volume mixes)*						
To make 1 litre	**Water**	**Part A**	**Polyneg B (2)**	**Polyneg C (2)**	**Rep**	**Starter (1)**
REPLENISHER	898 mL	80 mL	11 mL	11 mL	-	-
TANK	894 mL	60 mL	8.2 mL	8.2 mL	-	30 mL
TANK from REP	220 mL	-	-	-	750 mL	30 mL

(1) Required starter is **EnviroNeg Universal Developer Starter AC**.

(2) **Polyneg B** / **Polyneg C** should be used for large volume mixes.

2. BLEACHES & BLEACH REPLENISHERS

Negacolor Ultra Bleach 3				
To make 1 litre	**Water**	**Conc.**	**Replenisher**	**Starter (1)**
REPLENISHER	600 mL	400 mL	-	-
TANK	634 mL	350 mL	-	16 mL
TANK from REP	109 mL	-	875 mL	16 mL

(1) Required starter is **Negacolor Ultra Bleach 3 Starter**.

EnviroNeg RA Bleach VR AC (1) for C41RA @ 5 mL/135-24 Film			
To make 1 litre	**Water**	**Conc.**	**Replenisher**
REPLENISHER	-	1000 mL	-
TANK	333 mL	667 mL	-
TANK from REP	333 mL	-	667 mL

(1) **EnviroNeg RA Bleach VR AC** is a variable ratio high-speed one-part bleach. No starter is required for tank solution.

EnviroNeg RA Bleach VR AC (1) for C41RA @ 10 mL/135-24 Film - *LOW VOLUME*			
To make 1 litre	**Water**	**Conc.**	**Replenisher**
REPLENISHER	200 mL	800 mL	-
TANK	333 mL	667 mL	-
TANK from REP	166 mL	-	834 mL

(1) **EnviroNeg RA Bleach VR AC** is a variable ratio high-speed one-part bleach. No starter is required for tank solution.

EnviroNeg RA Bleach VR AC (1) for C41B @ 5 mL/135-24 Film			
To make 1 litre	**Water**	**Conc.**	**Replenisher**
REPLENISHER	200 mL	800 mL	-
TANK	333 mL	667 mL	-
TANK from REP	166 mL	-	834 mL

(1) **EnviroNeg RA Bleach VR AC** is a variable ratio high-speed one-part bleach. No starter is required for tank solution.

3. FIXERS & REPLENISHERS

See the FUJIFILM Belgium Technical Bulletin "Fixing Systems" for full information on available recycling and desilvering process options.

Negacolor RA Fixer & Replenisher		
To make 1 litre	**Water**	**Conc.**
TANK & REPLENISHER	750 mL	250 mL

Super Unilec Fixer – Simple replenishment		
To make 1 litre	**Water**	**Conc.**
TANK & REPLENISHER (=1+4)	800 mL	200 mL

Super Unilec Fixer - Closed loop electrolytic silver recovery			
To make 1 litre	**Water**	**Conc.**	**Replenisher**
REPLENISHER (=1+3)	750 mL	250 mL	-
TANK (=1+4)	800 mL	200 mL	-
TANK from REP (=1+4)	200 mL	-	800 mL

Super Unilec Fixer – Non-closed loop electrolytic silver recovery		
To make 1 litre	**Water**	**Conc.**
TANK & REPLENISHER (=1+4)	800 mL	200 mL

4. STABILIZER & REPLENISHERS

EnviroNeg FF Superflo Stabilizer MB AC		
To make 1 litre	**Water**	**Conc.**
TANK & REPLENISHER	990 mL	10 mL

Fresh working or tank solutions for all stabilizer and super stabilizer baths have the same composition as the replenisher. Simply fill the processor tank with replenisher if it is necessary to replace the tank solution.

X. CHEMICAL REGENERATION

1. DEVELOPER REGENERATION

The C41 Developer Regeneration product range has be discontinued but we do still offer a full product range of "'straight replenished" C41 developers.

Your local FUJIFILM representative can give technical advice if required.

2. BLEACH REGENERATION

NOTE: Bleach regeneration is not recommended when the laboratory is suffering from low or declining film volumes. Low throughout laboratories should use a standard replenished bleach.

Bleach regeneration is easily carried out and offers significant cost reductions and reduced quantities of bleach overflow into the drains. The volumes given below are typical for a well-run large processing laboratory. It must be recognised that each processing machine has its own carry-over rate and this influences significantly the amount of regenerator concentrate(s) added to the overflow to obtain a rebuilt replenisher within specification. If the process is to run trouble free it is essential that the pH and density specification of the rebuilt replenisher meet the specification.

A. Negacolor Ultra Bleach 3

Negacolor Ultra Bleach 3 Regenerated Replenisher			
Overflow	**Conc.**	**Acetic Acid 60% w/w**	**To make**
1000 mL	38 mL (1)	27 mL (1)	1065 mL
939 mL	36 mL (1)	25 mL (1)	1000 mL

(1) These values are approximate only and very dependent on processor conditions (carry-over, evaporation, etc.).

The tank solution density (at 20°C) must not be allowed to fall below 1.085 g/cm³ except when the processor has a stop bath and water wash between the developer and bleach tanks. In this case the tank solution density (at 20°C) can be as low as 1.082 g/cm³. The tank solution must be continuously aerated while the processing machine is running in order to avoid problems of either leuco cyan dye or silver retention.

The pH of the tank solution shouldn't be allowed to fall below 4.8. If necessary, decrease quantity of acetic acid during the regeneration operation.

3. FIXER REGENERATION

It is possible to apply fixer regeneration in combination with a closed loop silver recovery system for a film processor fixer with **Super Unilec Fixer**. The process involved is similar to that for the fixer from a separate bleach and fix paper process, but complicated by the amount of silver in film compared to paper, and by the amount of halide released during film fixing. Generally, at least 60% of a film fixer can be safely recycled. Possibly as much as 90% can be recycled, if there is a closed loop silver recovery installed and the fix bath time is sufficiently long.
For a full discussion of film fixer regeneration, please see the FUJIFILM Belgium Technical Bulletin "Fixing Systems".

XI. PH AND DENSITY SPECIFICATIONS

1. FRESHLY PREPARED SOLUTIONS

pH AND DENSITY SPECIFICATIONS FOR FRESHLY PREPARED SOLUTIONS						
Product	Tank			Replenisher		
	pH (25°C)	Density (20°C) g/cm³	Density (2°°C) g/cm³	pH (25°C)	Density (20°C) g/cm³	Density (25°C) g/cm³
EnviroNeg Developer 60 AC	10.06 ± 0.05	1.034 ± 0.003	1.033 ± 0.003	10.13 ± 0.05	1.039 ± 0.003	1.038 ± 0.003
EnviroNeg Developer AC	10.07 ± 0.05	1.036 ± 0.003	1.035 ± 0.003	10.13 ± 0.05	1.039 ± 0.003	1.038 ± 0.003
EnviroNeg Developer LR AC	10.05 ± 0.05	1.036 ± 0.003	1.035 ± 0.003	10.17 ± 0.05	1.039 ± 0.003	1.038 ± 0.003
Negacolor Ultra Bleach 3	4.80 ± 0.10	1.082 ± 0.003	1.081 ± 0.003	4.70 ± 0.10	1.083 ± 0.003	1.082 ± 0.003
EnviroNeg RA Bleach VR AC (for C41RA @ 5 mL/135-24)	3.85 ± 0.10	1.080 ± 0.003	1.079 ± 0.003	3.85 ± 0.10	1.118 ± 0.003	1.117 ± 0.003
EnviroNeg RA Bleach VR AC (for C41RA @ 10 mL/135-24 -*LV*) (for C41B @ 5 mL/135-24)	3.85 ± 0.10	1.080 ± 0.003	1.079 ± 0.003	3.85 ± 0.10	1.096 ± 0.003	1.095 ± 0.003
Super Unilec Fixer 1 + 4	7.50 ± 0.20	1.087 ± 0.010	1.086 ± 0.010	7.50 ± 0.20	1.087 ± 0.010	1.086 ± 0.010
Super Unilec Fixer 1 + 3	-	-	-	7.50 ± 0.20	1.110 ± 0.010	1.109 ± 0.010
Negacolor RA Fixer	7.10 ± 0.20	1.081 ± 0.005	1.080 ± 0.005	7.10 ± 0.20	1.081 ± 0.005	1.080 ± 0.005

2. SEASONED REPLENISHED SOLUTIONS

pH AND DENSITY SPECIFICATIONS FOR SEASONED REPLENISHED SOLUTIONS				
Product	**Tank**			
	pH (25°C)	**Density (20°C) g/cm³**	**Density (25°C) g/cm³**	**Density (38°C) g/cm³**
EnviroNeg Developer 60 AC	10.03 ± 0.05	1.043 ± 0.003	1.042 ± 0.003	1.038 ± 0.003
EnviroNeg Developer AC	10.03 ± 0.05	1.039 ± 0.003	1.038 ± 0.003	1.034 ± 0.003
EnviroNeg Developer LR AC	10.03 ± 0.05	1.040 ± 0.003	1.039 ± 0.003	1.035 ± 0.003
Negacolor Ultra Bleach 3	4.90 ± 0.10	1.084 ± 0.005	1.083 ± 0.005	1.079 ± 0.005
EnviroNeg RA Bleach VR AC (for C41RA @ 5 mL/135-24)	4.40 ± 0.10	1.097 ± 0.015	1.096 ± 0.015	1.092 ± 0.015
EnviroNeg RA Bleach VR AC (for C41RA @ 10 mL/135-24 – ***Low Volume*** (for C41B @ 5 mL/135-24)	4.40 ± 0.10	1.088 ± 0.015	1.087 ± 0.015	1.083 ± 0.015
Super Unilec Fixer	6.70 ± 0.50	1.090 ± 0.010	1.089 ± 0.010	1.085 ± 0.010
Negacolor RA Fixer	6.70 ± 0.20	1.084 ± 0.010	1.083 ± 0.010	1.079 ± 0.010

3. SEASONED RECYCLED SOLUTIONS

pH AND DENSITY SPECIFICATIONS FOR SEASONED RECYCLED SOLUTIONS				
Product	**TANK**			
	pH (25°C)	**Density (20°C) g/cm³**	**Density (25°C) g/cm³**	**Density (38°C) g/cm³**
Negacolor Ultra Bleach 3	4.90 ± 0.10	1.090 ± 0.005	1.089 ± 0.005	1.085 ± 0.005
Super Unilec Fixer (1)	6.70 ± 0.50	1.090 ± 0.020	1.089 ± 0.020	1.085 ± 0.020

pH AND DENSITY SPECIFICATIONS FOR SEASONED RECYCLED SOLUTIONS			
Product	**REPLENISHER**		
	pH (25°C)	**Density (20°C) g/cm³**	**Density (25°C) g/cm³**
Negacolor Ultra Bleach 3	4.70 ± 0.10	1.095 ± 0.005	1.094 ± 0.005
Super Unilec Fixer (1)	6.70 ± 0.50	1.100 ± 0.020	1.099 ± 0.020

(1) See the FUJIFILM Belgium Technical Bulletin "Fixing Systems" for more details.

XII. CARE AND STORAGE OF SOLUTIONS

All FUJIFILM Belgium chemicals for use with the C41 process are supplied as all-liquid concentrates. They dissolve readily in water and no excessive mixing time is required. A maximum of 30 seconds mixing is needed to ensure complete dissolution after the addition of each concentrate to the solution being prepared.

None of the chemicals when used under normal conditions is subject to undue oxidation. However, the volume of developer replenisher prepared should not be for more than one week's normal consumption. Longer storage times will increase the degree of oxidation and lead to lower process activity.

The use of floating lids where replenishers are stored in vats will assist in reducing oxidation, especially in processors subject to low film throughput. If use of **EnviroNeg Developer 60 AC** is indicated, use of a floating lid or anti-oxidation balls or pellets in the developer replenisher tank is essential.

In processors with abnormally low turnover, oxidation of the developer will become a problem. In this case it is better to change to a developer with a higher replenishment rate (e.g. from **EnviroNeg Developer LR AC** to **EnviroNeg Developer AC**).
EnviroNeg Developer 60 AC and **EnviroNeg RA Bleach VR AC** @10ml/135-24 are products specially designed to greatly reduce the effects of low or very low film throughput increasingly found as film volumes continue to decrease and the film processors used become far too large for the number of films processed.

NEVER mix or store developer in containers that have contained bleach, fixer or bleach-fix, due to the risk of severe developer contamination. It is good practice to check the calibration of mixing vats once per year to ensure that changes in the shape of the vat have not occurred, thus giving rise to incorrect volumes.

All photographic processing solutions can exert harmful effects when brought into contact with human tissue to a greater or lesser extent, depending on the nature of the solution and its concentration. All users of such solutions should exercise the greatest care to avoid the chemicals contacting the skin, eyes or other parts of the body. Always wear solution resistant gloves and effective eye protection.

In case of accidental contact with processing solutions, wash the affected part with plenty of clean cold running water. Wash with an acidic soap and rinse thoroughly with water. Consult a medical doctor. Some photographic solutions produce irritating vapours, therefore thorough ventilation is essential. Do not inhale air above processing solutions.
Always read the hazard information on the packs of solution concentrate before attempting to handle the solution.

XIII. PROCESS MONITORING

It is recommended that the activity level of the chemical baths in each film processor should be monitored daily. Pre-exposed control strips should be run up to 2 or 3 times each day; the first strip prior to processing film, and then at evenly spaced intervals during production.

Whenever corrective action is taken, either to improve process control or adjust the processing machine, a control strip should be run to determine the effects of the change. It is wise to adjust the processor only after a trend has been established, which usually requires at least three control strips to have been run.

It is strongly urged that each photo-processing laboratory keep at least two code numbers of series of strips on hand as variation between different series can be quite large. Sharp variations with a new code number may not be caused by the processor, but rather may be the difference between the control strips themselves. It should be standard practice to process two strips with the new and old codes together to check that both strips record the same chemical activity. It is also recommended that the densitometer be re-calibrated and that reference strips be re-read in case any large deviations are experienced. This procedure will eliminate erroneous readings due to a problem with the densitometer or strips.

FUJIFILM Belgium recommends the use of the **OASIS Pro** quality control system for local process monitoring. FUJIFILM Belgium can also offer a highly professional monitoring service from our factory in Belgium. Please consult your FUJIFILM representative or look for **OASIS Pro** on the FUJIFILM Europe Photo chemicals website.

XIV. TROUBLESHOOTING FOR THE C41 PROCESS

Within the scope of this brochure, it is not possible to give a full description of all of the process variations that can occur with different manufacturers film control strips. You are advised to obtain a copy of the relevant process control manual for the filmstrips from the manufacturer of the filmstrips concerned.

Most process control problems are traced to variations in temperature, too short an immersion time, too high or too low a replenishment rate or inadequate circulation – or, increasingly as film volumes decline – problems with evaporation and/or oxidation (especially for the developer). Occasionally, chemicals are mixed improperly and sometimes the bleach is not being aerated.

Problems indicated by out of control blue and green values, are usually traceable to the developer step. Low red values, on the other hand, are most often caused by under active bleach. Contrast is greatly affected by the agitation rate in the developer.

As a general rule, where you have a choice of actions for solving or investigating a process control problem and you have no specific indication that one particular course of action is the answer, choose a simple physical change as the first test - usually temperature. It is easy to change a temperature up or down, and little time is lost. You should only make chemical changes when you have checked the basic physical parameters - once you have put chemicals (or water) into a processor tank, you cannot take them out! Do not forget to process a further strip if you have made a change to the process.

XV. LOW THROUGHPUT

Most of today's problems with C41 chemistry – for minilabs, prolabs and finishers – can be traced to low throughput, or basically having a processor that is too big for your current film volumes. Give serious consideration to change to a higher replenishment rate developer – **LR** to standard, or standard (or even LR!) to **EnviroNeg Developer 60 AC**. Don't forget the secondary baths! Please see our website for full details.

XVI. TROUBLESHOOTING - CORRECTIVE ACTIONS

Problem	Probable Cause(s)	Corrective Action(s)
High values in D-Min, LD & HD. Blue value is highest.	1. Developer temperature higher than process specification. 2. Over-replenishment of developer. 3. Excessive agitation in developer. 4. Excessive development time. 5. Over-concentration of developer caused by evaporation. 6. Over-concentration of developer replenisher due to mixing error. 7. Underactive bleach which is not immediately stopping developer action due to high pH of the bleach.	1. Adjust developer temperature to 37.8 °C. 2. Reduce developer replenishment rate to standard. 3. Reduce developer agitation. 4. Adjust developer immersion time to 3 min. 15 sec. 5. Add small quantity of water to developer solution. 6. Dump replenisher and mix fresh in accordance with instructions. 7. Check developer squeegees. Adjust the bleach pH to specification with acetic acid.
High values in D-Min, Green value is highest. Low or very low values in HD-LD and possibly LD, Blue value usually lowest	1. Underactive developer caused by low film throughput. 2. Oxidised developer and/or bleach caused by low film throughout and use of inappropriate chemistry. 3. Excessive processor operating hours for current film volumes. 4. Mixing too much developer at a time.	1. Change from **LR** to standard developer, or to **EnviroNeg Developer 60 AC** and **EnviroNeg Bleach VR AC for C41RA @ 10 mL/135-24 Film *LOW VOLUME***, according to selection table on page 8. 2. Check that correct bleach procedures are in use – as above. 3. Consider running processor for less hours per day or less days per week. 4. Use smaller packs, or mix one pack at a time instead of multiple packs.
Low values in D-Min, LD & HD. Blue value is lowest.	5. Underactive developer caused by low temperature, low replenishment rate, low agitation, short time or over diluted replenisher.	5. Check process specifications and adjust to standard.
Low values in LD & HD. High values in D-Min.	1. Trace bleach contamination in the developer caused by excessive air agitation of the bleach.	1. Reduce airflow to the bleach.

Problem	Probable Cause(s)	Corrective Action(s)
Retained silver in film - verified by infrared viewer.	Underactive bleach caused by: 1. Excessive developer carry-over into bleach. 2. Short immersion time in bleach. 3. Under-replenished time in bleach. 4. High Fe(II) concentration in bleach due to under-aeration. 5. Error in mixing of replenisher or regeneration of bleach replenisher.	1. Adjust developer squeegees. For regenerated bleach adjust bleach tank solution & replenisher densities. 2. Increase immersion time up to 6 min 30 sec. 3. Increase bleach replenishment rate. 4. Increase aeration. 5. Dump replenisher and make fresh mix, or adjust working tank bleach and replenisher bath.
Low red values in HD and HD-LD.	Underactive bleach caused by : 1. Excessive developer carry-over, short time in bleach, underreplenishment of bleach, high Fe(II) concentration or error in bleach mix ratio. 2. Over-replenishment of bleach. 3. Out of balance recirculated fixer from electrolytic recovery unit. 4. Over-concentration of bleach due to evaporation. 5. Low pH and/or high bleach contamination in the fixer.	1. See corrections 1 to 5 in "Retained silver in film" section for corrective action. 2. Raise pH of bleach to specification. Adjust bleach replenishment rate to specification. 3. Dump all fixer and mix fresh solution. 4. Add small amount of water to processor bleach tank to adjust density to specification. 5. Adjust pH of fixer tank to between 6.2 and 7.2. Check flow rate of wash between the bleach and the fixer.
Spots or streaks on film.	1. Low wash flow rate between fixer and stabilizer. 2. Under-replenished or dirty stabilizer. 3. Dirt in dryer or high dryer temperature.	1. Dump and refill wash tank. Adjust flow rate to specification. 2. Dump and refill process stabilizer tank. 3. Clean dryer. Reduce dryer temperature.
Black residue in developer replenisher tank.	Excessive mixing of developer replenisher.	Mix developer according to instructions. Reduce mixing propeller size and/or propeller speed or mixing rate.
Sharp increase in D-Min, LD & HD. Blue value is the highest.	Contamination of processor tank developer, usually with fixer.	Dump processor tank developer, clean tank, change filters and refill with starter, water and replenisher. Check mixing tank for contamination.