FUJIFILM
Value from Innovation

TECHNICAL BULLETIN

PROCESS RA4

ENVIROCHEM AND CPRA PROCESSING CHEMICALS

For the processing of papers compatible
with the RA4 process

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Technical docs available on FUJIFILM websites :

- FUJIFILM Europe\Photochemicals : PL Product lists & TB technical bulletins
- FUJIFILM Belgium ESCLUSIVO : distributor web site for PL Product lists & TB technical bulletins, PIS Product Information Sheets, TIS Technical Information Sheets, SG Sales Guides, OASIS process control, …
- originalphotopaper.com/products/photochemicals/

Your local FUJIFILM representative can give technical advice if required.

I. INTRODUCTION

This new issue of the Technical Bulletin "Process RA4 Envirochem and CPRA Processing Chemicals" contains all information on FUJIFILM Belgium's products and brings you up to date on the very latest product releases.

FUJIFILM Belgium has complemented its RA4 product range with more economical and ecological products in all market segments.

FUJIFILM Belgium has been very successful with the introduction of Monopart products in the Minilab market, with a full range of developers covering replenishment rates from 45 to 160 mL/m² available. A comprehensive list of Monopart bleach-fixes for standard and fast processing conditions with associated starter is available.
All are homogeneous type, single part products offering important benefits. They are very easy to mix, less risk of mixing error, requiring less packaging and storage space, only one drum to clean and dispose of. The **Fuji Hunt EnviroPrint Monopart (MP) developer** product range "**MP60 AC – MP73 AC – MP108 – MP160**" runs at 38°C complemented with **47 AC** at 38.5°C and offers the unique feature of easy conversion from one type to another by basically adjusting the replenishment rate only. Which product to run depends on seasonal production volume.

Our **RA4 regeneration product range** for use in Finisher Laboratories, reducing chemical effluent and laboratory processing costs as much as possible, has been optimized to improve the photographic print quality (increased Dmax and improved contrast).

Also for use at Large Finisher Laboratories only, **EnviroPrint CP48 II Developer** and **CP48 II Bleach-Fix Replenisher** are available for use in Fuji Frontier 350, 355, 370, 375 and 390 systems as a replacement for the drop-in Fuji CP48S II and CP48HV II cartridges. These products require connection to an external replenishment tank system, and require high paper throughput.

To fulfil the requirements of the Professional market, FUJIFILM advises the use of its **CPRA Digital Pro Developer AC**. This odour-free developer is designed especially for use in roller transport processors dedicated to Photo Digital Printers such as Durst Lambda, Theta and Epsilon, Océ Lightjet, ZBE Chromira, Polielettronica LaserLab, Noritsu LPS24 Pro, etc., but is also suitable for general RA4 processing.
This 2-part, Air Controlled Developer features a high activity, clean working, secured whiteness and considerably improved Dmax values on Paper and Display material.
CPRA Digital Pro Bleach-Fix AC is a 2-part odour-free bleach-fix designed to complement **CPRA Digital Pro Developer AC**. It is designed for use in medium and wide format paper processors, has excellent resistance to oxidation in low throughput conditions, and guarantees clean whites.

The **Fuji Hunt EnviroPrint FP range** of monopart, Air Control products is also available, fully compatible with the wide range of Fast Processing minilabs found in the market. **EnviroPrint FP Developer MR** and **EnviroPrint FP Bleach-Fix MR** are medium replenishment rate products ideally suited to most makes of minilab under a wide range of usage conditions. The monopart bleach-fix, **EnviroPrint FP Bleach-Fix** can also be used for standard processing.

EnviroPrint K15 Developers MP90 is specially designed for installation on Photo-Me KIS DKS 15xx – DKS 16xx – DKS 17xx series of minilabs and complete the Fast Processing product range. More info can be found in the Technical Bulletin (TB) Minilab Chemical Guide.

The **EnviroPrint ADM Paper Cartridge** is FUJIFILM Belgium's alternative for the Agfa easy paper box 110. The FUJIFILM Belgium's ADM Paper Cartridge runs under the same standard conditions as the Agfa product and is designed to be used in the Agfa D-lab.1, D-Lab.2(+) and Netlab series of minilabs.

Detailed info on Minilab related chemicals is to be found in our Technical Bulletin (TB) Minilab Chemical Guide.

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 guides 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 the product of your choice by cross-checking the chapter "Process Specifications", you find all process specifications such as the physical parameters, chemical specifications and mixing instructions including regeneration procedures in the individual chapters.

Process Monitoring, Chemical Handling and Storage complete this Technical Bulletin.

Even though this Technical Bulletin does contain a lot of important information, we also realize that additional information may be wanted in your day-to-day operation.

If you have any queries, FUJIFILM has a large and experienced team of Technical Experts available to you.

Do not hesitate to contact your local FUJIFILM representative, he will be most happy to assist you at any time.

Please also note that additional information such as Technical Information Sheets, processing and process control tips, and the latest information about new products is also available on our website.

II. PROCESS DESCRIPTION

CPRA Digital Pro processing chemicals are designed for processing any RA4 process-compatible paper in roller transport processors dedicated to Photo Digital Printers such as Durst Lambda, Theta and Epsilon, Océ Lightjet, ZBE Chromira, Polielettronica LaserLab, Noritsu LPS24 Pro, etc., but is also suitable for general RA4 processing.
The developer is designed to work at a temperature of 35°C and are available for minilab, leader belt and ciné-type processors and roller transport machines.

CPRA Digital Pro Developer AC is an odour-free 2-part odour-free developer which features a high activity, clean working, secured whiteness and considerably improved Dmax values on Paper and Display material.

CPRA Digital Pro Bleach-Fix AC is a 2-part odour-free bleach-fix designed for use in medium and wide format paper processors, has excellent resistance to oxidation in low throughput conditions, and guarantees clean whites.

The **Envirochem range**, represents "state of the art" products introduced by FUJIFILM to reduce photochemical pollution to a minimum. Their use is equally beneficial to minilabs and traditional labs and includes a full range of developers and bleach-fixers covering replenishment rates from 45 to 160 mL/m² for developers and 35 to 215 mL/m² for bleach-fixes.
The developers are designed to work at a temperature of 38°C**,** apart from **EnviroPrint 47 Developer Replenisher AC** and **EnviroPrint CP48 II Developer**, which runs at 38.5°C.

The Envirochem range offers you a product range Air Control products, eliminating the unpleasant smell of conventional RA4 chemicals and guaranteeing a pleasant environment for the customer. Additionally the characters ‘AC’ have been added in the product name.

In other formulas where the smelly substances were not replaced, a chemical masking agent (melon fragrance) has been introduced.

III. PROCESSING STEPS AND FUNCTIONS

1. DEVELOPER

The developer produces a silver image in the paper emulsion layers from the latent image produced when the paper is exposed. At the same time, the developer – which is locally oxidized 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. BLEACH-FIX

The bleach-fix acts as a combined bleach and fix bath. The metallic silver image produced during development, plus all undeveloped silver salts remaining in the paper are removed in this bath as soluble silver salts.

3. BLEACH (FOR SEPARATE RA4 BLEACH AND FIX PROCESS)

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. The action is the same as for the bleaching step on a conventional C41 process.

4. FIX (FOR SEPARATE RA4 BLEACH AND FIX PROCESS)

The fixer removes the bleached silver image and the unexposed and therefore undeveloped silver halide originally present in the paper emulsion.

5. WASH

A water wash, as commonly found in larger processors, works by removing all processing chemicals and by-products from the paper emulsion. A correct wash water rate and temperature are critical with respect to long-term dye stability.

6. SUPER STABILIZER

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 paper emulsion to reduce (or eliminate) dye fading and staining, and to minimize or reduce algae growth.

IV. PROCESS OPTIONS

1. DEVELOPERS

A. Developer Replenishers

Two categories of developer replenishers are available:

- **Envirochem / EnviroPrint Developers**
- **CPRA Developers**

Both categories offer you a complete range of Air Control products.

EnviroPrint Developers

The Envirochem range of products has been introduced in order to reduce photochemical pollution to a minimum. EnviroPrint Developers allow approaching zero overflow from process tanks, greatly reducing discharge to drain. They are suitable for use in any processors with a reasonable level of throughput, and offer particular advantages for minilab, leader belt and ciné-type processors.

An extremely important benefit of the Envirochem product range is that all developers run at 38°C (**EnviroPrint 47 Developer Replenisher AC** and **EnviroPrint CP48 II Developer** requires 38.5°C), so alteration between these developers is very easy and convenient. You can choose between a low or high replenishment rate developer, keeping your product always in good condition. This is a very interesting feature as depending on the season, low or high throughput, your process will always be in good condition. By doing so, you not only save money, but you will also contribute to a greener environment.

- **EnviroPrint Developer MP160**

EnviroPrint Developer MP 160 is a standard replenishment rate monopart developer, designed for easy use under a wide range of processing conditions. Its standard replenishment rate allows this product to be used at times of lower throughput in minilab, leader belt and roller transport processors that, in busier times, would otherwise be using our **EnviroPrint Developer MP108, MP73 AC** or **MP60 AC** developers.

- **EnviroPrint Developer MP108**

EnviroPrint Developer MP 108 is a "medium" rate monopart developer, designed for customers wishing to work at a lower replenishment rate compared to normal, but who cannot use a true low replenishment developer.
Its medium replenishment rate makes it ideal for the lower throughput minilab and conventional laboratories that cannot justify using our **EnviroPrint Developer MP60 AC**.

- **EnviroPrint Developer MP73 AC**

EnviroPrint Developer MP73 AC is a low replenishment rate developer recommended when production volume throughput conditions do not justify the use of **EnviroPrint Developer MP60 AC**. This developer, belonging to the Air Control product range, has the advantage of monopart mixing, and is fully compatible with all other MP developers.

- **EnviroPrint Developer MP60 AC**

EnviroPrint Developer MP60 AC is a very low replenishment rate monopart developer. It is a homogeneous liquid concentrate that easily mixes with water and is designed to run at a replenishment rate of 60 mL/m².

This developer, belonging to the Air Control product range, can be replenished on top of any developer belonging to the EnviroPrint / Envirochem product range.

- **EnviroPrint 47 Developer AC**

EnviroPrint 47 Developer AC is designed to offer the lowest available replenishment rate of only 45 mL/m² at a slightly higher temperature of 38.5°C. This developer, belonging to the Air Control product range, is best used in combination with **EnviroPrint 47 Bleach-Fix Replenisher AC**.

- **EnviroPrint CP48 II Developer**

EnviroPrint CP48 II Developer is provided for use in large Finisher laboratories only as a replacement for the CP48S II / CP48HV II cartridge system used in FUJIFILM Frontier 330, 350, 355, 370, 375 and 390. Replenishment and processing conditions are as for FUJIFILM Frontier chemistry. Connection to an external replenishment tank system is required.

- **EnviroPrint FP (Fast Processing) Developer MR**

This monopart product has been extensively tested with a wide range of minilabs running at various short developer time configurations. It has been optimized for the lowest possible replenishment rate, and offers flexibility on dilution ratio and replenishment rate to suit development times from 20 to 33 seconds.

CPRA Developers

- **CPRA Digital Pro Developer AC**

This "Professional lab" product has been especially designed for use in large format roller transport processors dedicated to Photo Digital Printers such as Durst Lambda, Theta and Epsilon, Océ Lightjet, ZBE Chromira, Polielettronica LaserLab, etc. The product belongs to the Air Controlled range and consists of only 2 parts. It features a high activity, clean working, secured whiteness and largely improved Dmax values on Paper and Display material. Additionally, this developer gives a very stable process, and is also suitable for use with conventional analogue printing.

B. Developer Regenerators

Developer Regeneration is an alternative to low replenishment rate chemistries, as it offers the lowest possible developer waste generation and important chemical cost savings. RA4 Developer regeneration is very much practised in the large photofinishing market. The most commonly system used nowadays is "Developer regeneration without the use of ion exchange resins". Developer overflow is collected and rebuilt with specially designed developer regenerator parts. Depending on the type of processors installed, squeegee adjustments and maintenance applied, the volume of collected overflow will differ. In order to regenerate your developer with **EnviroPrint Developer Regenerator HV**, you must be able to recover at least 650 mL of developer overflow for every litre of replenisher added to the processor. No specialised chemical analyses are required, the only control needed is density and pH-measurement and related correction. Upon request, fully defined chemical specifications are supplied to support your process.

The recommended developer to be installed when preparing for developer regeneration is EnviroPrint Developer. However if you are running a different chemistry, your local FUJIFILM representative will assist you during the conversion period and avoid any unnecessary chemical draining and environmental pollution.

One developer regenerator option is currently available:

- **EnviroPrint Developer Regenerator HV**

This option is very flexible and rebuild additions can be adjusted according to available developer overflow volumes.

➢ EnviroPrint Developer Regenerator HV

Is a variable "High Volume" developer regenerator, allowing regeneration of 650 mL up to 700 mL developer overflow (or more), to which water and regenerator parts are added to make 1 litre of replenisher. A rebuild ratio of 65% is equivalent to an effective replenishment rate of 56 mL/m², whereas 70% gives you an effective replenishment rate of 48 mL/m².

Important:

When the developer is continually recycled, there is an accumulation of dirt and colour from sensitising dyes and restrainers, which can cause sensitometric deviations. With the introduction of leader belt free processors, very low developer carry over volumes can be achieved, resulting in the collection of larger volumes of developer overflow. Large Photofinishers have explored this situation to regenerate their overflow at rebuild ratios as high as 80%, giving an effective replenishment rate of only 32 mL/m². The higher the rebuild ratio, the higher the accumulation of by-products. Installing a filter and also an adsorber resin will help with clearing up the colour of the developer and take out some oxidation products, but it will not remove the high tech restrainers released from the emulsion. Please be aware of this and pay extreme care, otherwise poor print quality may become your enemy, resulting in loss of business.

C. How to choose your Developer

Standard RA4 Process

DEV Tank Size (L)	10x15 prints/ day													
	120	240	480	720	960	1200	1440	1680	1920	2160	2400	2640	2880	3120
40	NR	NR	NR	NR	1	1	2	2	3	3	4	4	4	5
35	NR	NR	NR	1	1	2	2	3	3	4	4	4	5	5
30	NR	NR	NR	1	2	2	3	3	4	4	5	5	5	5
25	NR	NR	NR	1	2	3	4	4	5	5	5	5	5	5
20	NR	NR	1	2	3	4	4	5	5	5	5	5	5	5
15	NR	NR	2	3	4	5	5	5	5	5	5	5	5	5
10	NR	1	3	4	5	5	5	5	5	5	5	5	5	5
5	1	3	5	5	5	5	5	5	5	5	5	5	5	5
	1.8	3.6	7.2	10.8	14.4	18.0	21.6	25.2	28.8	28.8	36.0	39.6	43.2	46.8
	m² paper/day													

NR	Not recommended
1	EnviroPrint Developer MP160 / EnviroPrint Bleach-Fix 215 AC
2	EnviroPrint Developer MP108 / EnviroPrint Bleach-Fix 108 AC
3	EnviroPrint Developer MP73 AC / EnviroPrint Bleach-Fix 70 AC
4	EnviroPrint Developer MP60 AC / EnviroPrint Bleach-Fix 55 AC
5	EnviroPrint 47 Developer AC / EnviroPrint 47 Bleach-Fix AC

RA4 Fast Processing

DEV Tank Size (L)	10x15 prints/ day													
	120	240	480	720	960	1200	1440	1680	1920	2160	2400	2640	2880	3120
40	NR	NR	NR	NR	NR	1	1	1	1	1	2	2	2	2
35	NR	NR	NR	NR	NR	1	1	1	2	2	2	2	2	2
30	NR	NR	NR	NR	1	1	1	2	2	2	2	2	2	2
25	NR	NR	NR	NR	1	1	2	2	2	2	2	2	2	2
20	NR	NR	NR	1	1	2	2	2	2	2	2	2	2	2
15	NR	NR	1	1	2	2	2	2	2	2	2	2	2	2
10	NR	NR	1	2	2	2	2	2	2	2	2	2	2	2
5	NR	1	2	2	2	2	2	2	2	2	2	2	2	2
	1.8	3.6	7.2	10.8	14.4	18.0	21.6	25.2	28.8	28.8	36.0	39.6	43.2	46.8
	m² paper/day													

NR	Not recommended
1	EnviroPrint FP Developer MR / EnviroPrint FP Bleach-Fix MR
2	EnviroPrint 47 Developer AC @ 60 ml/m²/ EnviroPrint FP Bleach-Fix MR

2. BLEACH-FIXERS

A. Bleach-Fix Replenishers

Two categories of Bleach-Fixer Replenishers are available:

- **EnviroPrint Bleach-Fix AC**
- **CPRA Bleach-Fix AC**, running at 35°C

Both categories offer you a complete range of Air Control products.

Fuji Hunt Bleach-Fix Replenishers are partly available as 2-part products, partly available as monopart products, both being Air Controlled.

These products no longer generate the unpleasant smell of acetic acid. They are now much better buffered against oxidation. Product stability has been greatly improved and, more importantly, better print whites are guaranteed.

EnviroPrint Bleach-Fixers AC

➢ EnviroPrint Bleach-Fix 215 AC

Is the standard 215 mL/m² replenishment rate 2-part product for all types of paper processors. It is equally suited for use in minilabs, roller transport processors (at high enough throughput), and many other processors.
It is also the recommended product to be installed when Bleach-Fix regeneration (with or without electrolytic desilvering) is being considered.

➢ EnviroPrint Bleach-Fix 108 AC

Is a 108 mL/m² replenishment rate 2-part product and is the ideal companion for **EnviroPrint Developer MP108**.

➢ EnviroPrint Bleach-Fix 70 AC

Is a 70 mL/m² replenishment rate 2-part product suitable for use in any processor with high volume throughput. This gives greatly reduced overflow volumes and lower cost. Its use is not recommended in roller transport processors. The higher level of oxidation in these machines would cause sulphurization of the fixing agent and staining due to excessive quantities of oxidised developer from the carry over.

➢ EnviroPrint Bleach-Fix 55 AC

Is designed as low replenishment, non-regenerable bleach-fix for applications in high and medium volume minilab processors. The recommended replenishment is as low as 55 mL/m² and offers the advantage of greatly reduced overflow volumes and lower cost. **EnviroPrint Bleach-Fix 55 AC** is a 2-part product.

➢ EnviroPrint Bleach-Fix VR AC

Allows you to run your process at a replenishment rate of 55, 70, 108 or 215 mL/m² depending on the production period (medium or high peak season) you are working in, just by following different mixing instructions. **EnviroPrint Bleach-Fix VR AC** is a 2-part product

➢ EnviroPrint 47 Bleach-Fix AC

The innovative extremely low replenishment rate **EnviroPrint 47 Bleach-Fix AC** can be used in combination with **EnviroPrint 47 Replenisher AC**. To ensure a constant high product stability, the bleach-fix has been designed as a two-part product to be mixed with water to make fresh replenisher.

This product can also be used by large Finisher laboratories as a replacement for the CP48S II / CP48HV II cartridge system used in FUJIFILM Frontier 350, 355, 370, 375 and 390. Replenishment and processing conditions are as for FUJIFILM Frontier chemistry; please see your FUJIFILM Frontier documentation.

➢ EnviroPrint CP48 II Bleach-Fix

EnviroPrint CP48 II Bleach-Fix is provided for use in large Finisher laboratories as a replacement for the CP48S II / CP48HV II cartridge system used in FUJIFILM Frontier 350, 355, 370, 375 and 390. Replenishment and processing conditions are as for FUJIFILM Frontier chemistry chemistry; please see your FUJIFILM Frontier documentation. **EnviroPrint CP48HVII Bleach-Fix** is a 2-part product.

➢ EnviroPrint Bleach Fix MP 215 AC

EnviroPrint Bleach-Fix MP215 AC is an Air Controlled monopart odourless bleach-fix designed as an easy-to-use alternative to the standard 2-part **EnviroPrint Bleach-Fix 215 AC** for minilabs. This monopart product offers easy and convenient mixing, giving reduced risk of mixing error, and reduced packaging waste.

➢ EnviroPrint FP Bleach-Fix MR

EnviroPrint FP Bleach-Fix MR is an Air Controlled odourless monopart bleach-fix designed for use with **EnviroPrint FP Developer MR** in fast processing minilabs. This monopart product offers easy and convenient mixing, and is suitable for minilabs designed to accept a monopart bleach-fix concentrate.

CPRA Bleach-Fix AC

➢ CPRA Digital Pro Bleach-Fix AC

CPRA Digital Pro Bleach-Fix AC is designed for use with **CPRA Digital Pro Developer AC** in large format roller transport processors. The product belongs to the Air Controlled range and consists of only 2 parts. It features an even better resistance to aerial oxidation and low throughput, and increased resistance to stain formation in the paper whites – all with the standard bleach-fix replenishment rate.
Additionally, this bleach-fix provides a very stable process, and is also suitable for use with conventional analogue printing.

B. Regenerated Bleach-Fix Replenishers

➢ EnviroPrint Electrolytic Bleach-Fix Regenerator

EnviroPrint Electrolytic Bleach-Fix regeneration is a conventional regeneration system for those laboratories who wish to desilver the Bleach-Fix prior to rebuilding.

When implementing the Electrolytic Bleach-Fix regeneration system, chemical waste can be reduced and carry over levels of silver into the wash-water will be decreased to an absolute minimum. Further chemical waste reduction can be achieved when installing a well configured low flow wash followed by a main wash, or go for the ultimate waste control system by installing a chemical wash concept.

In order to recover the maximum amount of silver, desilvering of the low flow wash or chemical wash is recommended.

3. SEPARATED BLEACH AND FIX SYSTEM

A. Separate Bleach

- **EnviroPrint Bio-Bleach**

EnviroPrint Bio-Bleach is designed to reduce pollution to a minimum.

This bleach is using a 100% Biodegradable bleaching substance, drastically reducing the total concentration level of strong complexing agents by as much as 80%. The new product guarantees long-term product stability.

This product can easily be regenerated using a single part concentrate, giving almost no bleach overflow.

Your local FUJIFILM technical representative can assist when considering regeneration with **EnviroPrint Bio-Bleach** and in making the correct choice of system for your laboratory.

B. Separate Fixer

- **Super Unilec Fixer**

Super Unilec Fixer is the most commonly used fixer, covering many requirements. It can be used as a non-desilvered replenished fixer as well as in a closed loop continuous electrolytic desilvering system at a reduced replenishment rate.

This product can easily be regenerated using a single part concentrate, giving almost no fixer overflow. This regeneration system may require correction for specific gravity and pH at regular intervals.

This fixer can be used in both film and paper processing systems.

Detailed information can be found in the FUJIFILM Belgium Technical Bulletin "Fixing Systems".

Your FUJIFILM technical representative can assist when considering regeneration with **Super Unilec Fixer** and in making the correct choice of system for your laboratory.

4. STABILIZERS

The main purpose of **Super Stabilizers** is to remove processing chemicals and unwanted reaction products from the imaging layers, obtaining optimum whites and guaranteeing long-term image stability. Achieving this target with the far lower wash volumes applied with **Super Stabilizer**, compared to a conventional water wash, is much more difficult and critical.

Accomplishing this ultimate goal under the different market processing conditions requires well-designed chemical formulations.

FUJIFILM Belgium offers a versatile **Super Stabilizer**, which will meet these criteria and meet your most stringent demands.

➢ EnviroPrint Super Stabilizer AC

EnviroPrint Super Stabilizer AC is a monopart product designed for use in all types of "washless" minilabs. The stabilizer has been specially formulated to reduce or eliminate the excessive staining commonly associated with washless rinses, and to minimise or eliminate algae growth.

EnviroPrint Super Stabilizer AC may also be used in other types of processor that are operated in-line with manufacturer-recommended specifications for washless operation.

➢ EnviroPrint FP Super Stabilizer AC

This product is designed for use in fast processing minilabs, and should be used in combination with other FUJIFILM Belgium's EnviroPrint FP products.
More info can be found in the Technical Bulletin (TB) Minilab Chemical Guide or in the latest version of TIS016 RA4 FP chemistry for Fast Processing.

5. ADDITIVES

Even though products have been intensively tested and recognized by the market as giving excellent performance, even under extreme conditions, it is always possible that local conditions temporarily exceed the acceptable tolerance.

The water quality entering the lab may suddenly have become extremely hard as it is coming from a different source, processing throughput may be very low on a particular processor….

When these situations occur, FUJIFILM Belgium can supply you with an appropriate additive to help you to keep your production running under the new circumstances.

The following special additives can be supplied by FUJIFILM Belgium to meet special requirements. None of these additives is required in a normal RA4 process; they have all been introduced to address specific problems, or to fine-tune the process to meet the requirements of well-controlled professional laboratories. These additives are only available through your FUJIFILM technical representative.

- **Ultra Bleach-Fix Extender**
- **Acticide MV** to prevent biological growth in wash tanks

➢ Ultra Bleach-Fix Extender

This product is for use in bleach-fixes and replenishers where excessive oxidation leading to sulphurization is a problem due to adverse processing conditions.

Dosing: 5 – 15 mL per litre bleach-fix tank and/or replenisher.

➢ Acticide MV

It is unusual for biological growth to be found in well-maintained processors with open wash systems and adequate wash water flow rates. If problems are experienced, your first step should be an examination the water supply system and quality, carried out by a specialist company.

We offer Acticide MV to inhibit biological growth in all larger photographic processors.

Please consult your FUJIFILM representative for further information.

V. PROCESS SPECIFICATIONS

1. STANDARD PROCESS

Bath	Time	Temperature (°C)
EnviroPrint Developers (1)	45 "	38.0°C ± 0.3°C
CPRA Developers	45 "	35.0°C ± 0.3°C
Bleach-Fix	45 "	35.0°C ± 3.0°C
Wash Water	90 "	35.0°C ± 5.0°C
or **EnviroPrint Super Stabilizer AC**	90 "	34.0°C ± 4.0°C

(1) **EnviroPrint 47 Developer Replenisher AC** and **EnviroPrint CP48 II Developer** have a processing temperature of 38.5°C ± 0.3°C.

These values are nominal and may need to be altered depending on the requirements of machine and sensitometric quality.

Note: Wash or **EnviroPrint Super Stabilizer AC** is used as required. The wash water rate should be in the range 2-11 L/m², depending on the number of wash tanks. **EnviroPrint Super Stabilizer AC** replenishment rate is normally 250 mL/m² where four counter-current tanks are used, but it may be necessary to increase this if only three tanks are fitted. See "Standard Replenishment Rates" on the following pages for further details.

2. SEPARATED BLEACH & FIX SYSTEM: PROCESS RA4

Bath	Time	Temperature (°C)	Replenishment Rate
Developer	45 "	(1)	(2)
Stop Bath (3)	15 "	25°C ± 5°C	150 mL/m²
Wash	15 "	32°C ± 3°C	1.5 L/m²
Bleach	75 "	32°C ± 3°C	100 mL/m²
Wash	45 "	32°C ± 3°C	2 L/m²
Fixer	45 "	32°C ± 3°C	55 mL/m² (4)
Wash	90 "	32°C ± 3°C	2 - 5 L/m²

(1) Depends on developer (see V PROCESS SPECIFICATIONS – Standard Process on page 16 for further details).

(2) Depends on developer (see VI.1 STANDARD REPLENISHMENT RATES – Developers on page 17 for further details).

(3) Stop Bath is a 0.7% acetic acid solution.

(4) **Super Unilec Fixer** with continuous closed loop desilvering. Other options are available; see the FUJIFILM Belgium Technical Bulletin "Fixing Systems" for further information.

Note: Times given are minimum times except for developer.

3. FAST PROCESSING

Full information is available in the Technical Bulletin (TB) Minilab Chemical Guide and in the latest version of TIS016 RA4 FP chemistry for Fast Processing.
Contact your local FUJIFILM Technical Representative or visit our web site if you require further information.

VI. STANDARD REPLENISHMENT RATES

1. DEVELOPERS

	Standard Replenishment Rate mL/m²
EnviroPrint Developer MP160	160
EnviroPrint Developer MP108	108
EnviroPrint Developer MP73 AC	73
EnviroPrint Developer MP60 AC	60
EnviroPrint 47 Developer AC	45
EnviroPrint CP48 II Developer	45
EnviroPrint FP Developer MR	See TB Minilab Chemical Guide or latest version of TIS016 RA4 FP chemistry for Fast Processing
CPRA Digital Pro Developer AC (2)	215 – 325

(1) Replenisher amount per 25 x 20 cm (10 by 8 inches) is 8 mL.

(2) The suggested replenishment rate for paper processing may be varied within the range 215 – 325 mL/m² according to the specific conditions on your processor. In times of high productions volumes, resulting in a very high tank turn over (> 0.75 TTO/week), it can be considered to lower the replenishment rate as low as 180 mL/m² for paper. At any time the standard replenishment rate for display material is 495 mL/m².

2. BLEACH-FIXERS

	Standard	Effective
	Replenishment Rate mL/m²	
EnviroPrint Electrolytic Bleach-Fix Regenerator (1)	215	17 - 21
EnviroPrint Bleach-Fix 215 AC (2)	215	/
CPRA Digital Pro Bleach-Fix AC (2)	215	/
EnviroPrint Bleach-Fix 108 AC	108	/
EnviroPrint Bleach-Fix 70 AC	70	/
EnviroPrint FP Bleach-Fix Replenisher MR for 45 seconds Process @ REP RATE 70 mL/m²	70	/
EnviroPrint Bleach-Fix 55 AC	55	/
EnviroPrint 47 Bleach-Fix AC	35	/
EnviroPrint CP48 II Bleach-Fix	35	/
EnviroPrint Bleach-Fix MP 215 AC	215	/
EnviroPrint FP Bleach-Fix MR	See TB Minilab Chemical Guide or latest version of TIS016 RA4 FP chemistry for Fast Processing	

(1) Exact replenishment rate depends on carry over and evaporation.

(2) Replenisher amount per 25 x 20 cm (10" x 8") is 11 mL for processing colour papers. For processing display materials such as FujiTrans and FujiClear, the recommended replenishment rate for these products is 495 mL/m². Use of regenerated bleach-fix in roller transport processors is not recommended.

3. BLEACHES

	Standard	Effective
	Replenishment Rate mL/m²	
EnviroPrint Bio-Bleach (1)	100	5

(1) Exact replenishment rate depends on carry over and evaporation.

4. FIXERS

	Standard	Effective
	Replenishment Rate mL/m²	
Super Unilec (1 + 4 Dilution)	200 - 290	200 - 290
Super Unilec (1 + 3 Dilution) (1)	< 55	< 55
Super Unilec (Regeneration)	290	~11

(1) With continuous "in-line" electrolytic desilvering.

5. STABILIZERS

The indicated replenishment rates below are valid for **EnviroPrint Super Stabilizer AC**

# Cascaded tanks	Replenishment rate (mL/m²)
6	160
5	200
4	250
3	350

- **EnviroPrint FP Super Stabilizer AC**

See the Technical Information Sheet (TIS016) “RA4 FP chemistry for Fast Processing”, the Technical Bulletin (TB) Minilab Chemical Guide or related processor PIS for further information.

VII. STARTERS

1. FOR ENVIROCHEM DEVELOPERS

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

Developer	Starter
EnviroPrint Developer MP160	EnviroPrint General Developer Starter AC
EnviroPrint Developer MP108	EnviroPrint General Developer Starter AC
EnviroPrint Developer MP73 AC	EnviroPrint General Developer Starter AC
EnviroPrint Developer MP60 AC	EnviroPrint General Developer Starter AC
EnviroPrint 47 Developer AC	EnviroPrint General Developer Starter AC
EnviroPrint CP48 II Developer	No starter; use Start-up kit FUJIFILM CP-48S II P1 (to make 4.2L of tank solution) or FUJIFILM CP-48S II P1 1x10L
EnviroPrint ADM Developer	No starter; use start-up kit FUJIFILM CP49E P1 (to make 3.7L of tank solution)
EnviroPrint FP Developer MR	EnviroPrint General Developer Starter AC

Note:

Never use starters designed for E6 or C41 processes. This would result in having to discard the developer.

2. FOR CPRA DEVELOPERS

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

Developer	Starter
CPRA Digital Pro Developer AC	EnviroPrint General Developer Starter AC

Note:

Never use starters designed for the E6 or C41 processes. This would result in having to discard the developer.

3. FOR OTHER SOLUTIONS

Generally starters are not required for bleach-fix, RA4 bleach and fix, or stabilizer systems, except:

Bleach-Fix	Starter
EnviroPrint FP Bleach-Fix MR (1)	EnviroPrint Bleach-Fix MP Starter AC

(1) See the latest version of TIS016 RA4 FP chemistry for Fast Processing or the Technical Bulletin (TB) Minilab Chemical Guide for further information.

Note:

When preparing a new working tank of Bleach-Fix MP tank-solution, 2 options are available to guarantee the best possible print quality from the start:

- Option 1: Mix fresh tank solution in combination with **EnviroPrint Bleach-Fix MP Starter AC**.
- Option 2: Mix fresh tank solution without starter. This option requires 8-12 hours chemistry re-circulation in the processor to optimise the processing condition.

VIII. MIXING INSTRUCTIONS

FUJIFILM Belgium supplies chemicals in a variety of pack sizes to suit most requirements. However, particularly for the smaller user, it may be necessary to split packs to suit specific needs. For this reason, the information needed to mix intermediate volumes of chemicals is given below.

FUJIFILM Belgium does not recommend this as general practice; concentrates are less stable in partially filled bottles and containers than in full, unopened bottles. If possible, it is always better to purchase chemicals in the pack size that suits your mixing requirements rather than buying a larger pack and splitting it.

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 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 a matter from the laboratory; 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

EnviroPrint Developer Replenisher MP160				
To make 1 litre	**Water**	**Conc.**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	800 mL	200 mL	-	-
TANK	780 mL	140 mL	-	80 mL
TANK from REPL	220 mL	-	700 mL	80 mL

EnviroPrint Developer Replenisher MP108				
To make 1 litre	**Water**	**Conc.**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	800 mL	200 mL	-	-
TANK	800 mL	120 mL	-	80 mL
TANK from REPL	320 mL	-	600 mL	80 mL

EnviroPrint Developer Replenisher MP73 AC				
To make 1 litre	**Water**	**Conc.**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	800 mL	200 mL	-	-
TANK	790 mL	100 mL	-	110 mL
TANK from REPL	390 mL	-	500 mL	110 mL

EnviroPrint Developer Replenisher MP60 AC				
To make 1 litre	**Water**	**Conc.**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	800 mL	200 mL	-	-
TANK	800 mL	80 mL	-	120 mL
TANK from REPL	480 mL	-	400 mL	120 mL

EnviroPrint 47 Developer Replenisher AC				
To make 1 litre	**Water**	**Conc.**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	740 mL	260 mL	-	-
TANK	792 mL	78 mL	-	130 mL
TANK from REPL	570 mL	-	300 mL	130 mL

EnviroPrint CP48 II Developer Replenisher		
To make 1 litre	**Water**	**Conc.**
REPLENISHER	740 mL	260 mL
TANK	Use FUJIFILM CP-48S II P1 Startup Kit – To make 1x 4.2 L	

CPRA Digital Pro Developer Replenisher AC					
To make 1 litre	**Water**	**Part A**	**Part B**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	795 mL	105 mL	100 mL	-	-
TANK	796 mL	84 mL	80 mL	-	40 mL
TANK from REPL	160 mL	-	-	800 mL	40 mL

EnviroPrint FP Developer Replenisher MR
For mixing instructions for **EnviroPrint FP Developer MR**, please see Technical Bulletin (TB) Minilab Chemical Guide or related Technical Information Sheet (TIS016) for fast processing.

For details on developer regeneration see chapter IX.1 CHEMICAL REGENERATION Developer Regeneration on page 27.

2. BLEACH-FIXERS & BLEACH-FIXER REPLENISHERS

EnviroPrint Bleach-Fix & Replenisher 215 AC			
To make 1 litre	**Water**	**Part A**	**Part B**
TANK & REPLENISHER	760 mL	120 mL	120 mL

EnviroPrint Bleach-Fix & Replenisher 215 AC should be used if fresh (non-regenerated) bleach-fix replenisher is required for use with the EnviroPrint bleach-fix regeneration processes.

For details of EnviroPrint bleach-fix regeneration see IX.2 Bleach-Fix Regeneration on page 28.

EnviroPrint Bleach-Fix Replenisher 108 AC				
To make 1 litre	**Water**	**Part A**	**Part B**	**Replenisher**
REPLENISHER	670 mL	180 mL	150 mL	-
TANK	760 mL	120 mL	120 mL	-
TANK from REPL	333 mL	-	-	667 mL

EnviroPrint Bleach-Fix Replenisher 70 AC				
To make 1 litre	**Water**	**Part A**	**Part B**	**Replenisher**
REPLENISHER	600 mL	220 mL	180 mL	-
TANK	760 mL	120 mL	120 mL	-
TANK from REPL	455 mL	-	-	545 mL

EnviroPrint Bleach-Fix Replenisher 55 AC				
To make 1 litre	**Water**	**Part A**	**Part B**	**Replenisher**
REPLENISHER	550 mL	250 mL	200 mL	-
TANK	760 mL	120 mL	120 mL	-
TANK from REPL	520 mL	-	-	480 mL

EnviroPrint Bleach-Fix Replenisher VR AC				
To make 1 litre	**Water**	**Part A**	**Part B**	**Replenisher**
@ RR 215 mL/m²				
REPLENISHER & TANK	760 mL	120 mL	120 mL	-
@ RR 108 mL/m²				
REPLENISHER	670 mL	180 mL	150 mL	-
TANK	760 mL	120 mL	120 mL	-
TANK from REPL	333 mL	-	-	667 mL
@ RR 70 mL/m²				
REPLENISHER	600 mL	220 mL	180 mL	-
TANK	760 mL	120 mL	120 mL	-
TANK from REPL	455 mL	-	-	545 mL
@ RR 55 mL/m²				
REPLENISHER	550 mL	250 mL	200 mL	-
TANK	760 mL	120 mL	120 mL	-
TANK from REPL	520 mL	-	-	480 mL

EnviroPrint 47 Bleach-Fix Replenisher AC				
To make 1 litre	**Water**	**Part A**	**Part B**	**Replenisher**
TANK	666 ml	167 ml	167 ml	-
REPLENISHER	330 ml	335 ml	335 ml	-
TANK from REPL	500 ml	-	-	500 ml

EnviroPrint Bleach-Fix Replenisher MP215 AC				
To make 1 litre	**Water**	**Conc**	**EnviroPrint BX MP Starter AC**	**Replenisher**
OPTION 1				
REPLENISHER	700 mL	300 mL	-	-
TANK	730 mL	250 mL	20 mL	-
TANK from REPL	147 mL	-	20 mL	833 mL
OPTION 2				
TANK & REPLENISHER (1)	700 mL	300 mL		

(1) OPTION 2 requires 8 – 12 hours recirculation in the processor tank before use.

EnviroPrint CP48 II Bleach-Fix Replenisher			
To make 1 litre	**Water**	**Part A**	**Part B**
REPLENISHER	330 mL	335 mL	335 mL
TANK	Use FUJIFILM CP-48S II P2 - To make 1x4.2L or 1x10L		

CPRA Digital Pro Bleach-Fix AC			
To make 1 litre	**Water**	**Part A**	**Part B**
TANK & REPLENISHER	720 mL	120 mL	160 mL

EnviroPrint FP Bleach-Fix Replenisher MR for 45 seconds Process @ REP RATE 70 mL/m²				
To make 1 litre	**Water**	**Conc.**	**EnviroPrint BX MP Starter AC**	**Replenisher**
OPTION 1				
REPLENISHER	540 mL	460 mL	-	-
TANK	730 mL	250 mL	20 mL	-
TANK from REPL	437 mL	-	20 mL	543
OPTION 2				
REPLENISHER	540 mL	460 mL	-	-
TANK	700 mL	300 mL	-	-
TANK from REPL(1)	348 mL	-	-	652 mL

(1) OPTION 2 (without BX Starter) requires 8 – 12 hours recirculation in the processor before use.

EnviroPrint FP Bleach-Fix Replenisher MR / for Fast Processing
For mixing instructions for **EnviroPrint FP Bleach-Fix Replenisher MR**, please check the latest version of TIS016 RA4 FP chemistry for Fast Processing or Technical Bulletin (TB) Minilab Chemical Guide.

For details of bleach-fix regeneration see IX.2 Bleach-Fix Regeneration on page 28.

3. STOP BATH

RA4 Stop Bath		
To make 1 litre	**Water**	**Acetic Acid 60% w/w**
TANK & REPLENISHER	988.3 mL	11.7 mL

4. BLEACH

EnviroPrint Bio-Bleach			
To make 1 litre	**Water**	**Conc.**	**Nitric Acid 20% w/w**
REPLENISHER	743,5 mL	250 mL	6,5 mL
TANK	835 mL	165 mL	-

For details on bleach regeneration see IX.3 Bio-Bleach Regeneration on page 30.

5. FIXERS

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

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

For details on fixer regeneration see IX.4 Fixer Regeneration on page 30.

Also check our fixer process options in Technical Bulletin "Fixing Systems" for full information on available recycling and desilvering process options.

6. STABILIZER AND STABILIZER REPLENISHER

EnviroPrint Super Stabilizer & Replenisher AC		
To make 1 litre	**Water**	**Conc.**
TANK & REPLENISHER	990 mL	10 mL

EnviroPrint FP Super Stabilizer & Replenisher / Fast process
For mixing instructions for **EnviroPrint FP Super Stabilizer & Replenisher**, please check the latest version of TIS016 RA4 FP chemistry for Fast Processing or Technical Bulletin (TB) Minilab Chemical Guide.

IX. CHEMICAL REGENERATION

1. DEVELOPER REGENERATION

It is the policy of FUJIFILM Belgium to offer regeneration procedures and products wherever possible with the intention of reducing chemical effluent and laboratory processing costs as much as possible. Regeneration can be operated by adding regenerator concentrates to a measured volume of overflow.

No analyses or resin regenerations are necessary.

EnviroPrint Developer is very easy to regenerate by using **EnviroPrint Developer Regenerator HV** concentrates. **Parts 1R, Multigen CD60** and **3R** are available, with variable addition rates depending on the volume of overflow recovered.

System Startup / Tank Replacement

An EnviroPrint Developer regeneration system is usually started from a normal replenished system. Originally the developer replenisher would have been standard **EnviroPrint Developer**; when a new regeneration system is started, the first step is to collect the developer overflow from the processor in a suitable tank. As more replenisher is required, this collected overflow is regenerated to make more replenisher following the instructions below. This rebuilt replenisher is then used exactly as before, with no change of replenishment rate.

If you do not have enough regenerated replenisher to keep the system running for some reason – such as contamination, loss of developer overflow due to poor squeegees, or leakage – you can always make more fresh replenisher from standard **EnviroPrint Developer MP160** as required.

Replacement of a working tank solution in a processor – because of contamination or some other reason – is much the same as for non-regenerated chemistry. Instructions are given below :

EnviroPrint Developer Replenisher MP160 - Tank Solution / Replenisher replacement				
To make 1 litre	**Water**	**EnviroPrint Developer MP160**	**Replenisher**	**EP General Dev. Starter AC**
REPLENISHER	800 ml	200 ml	-	-
TANK	780 ml	140 ml	-	80 ml
TANK from REPL	220 ml	-	700 ml	80 ml

EnviroPrint Developer Regenerator HV allows a substantial volume of developer overflow to be re-utilised. The High Ratio (HR) system can be used to rebuild 650 or 700 mL of overflow. This is equivalent to an effective replenishment rate of just 56 mL/m² or 48 mL/m² respectively. In this case, **EnviroPrint Developer Regenerator HV Part 1R, Multigen CD60** and **EnviroPrint Developer Regenerator HV Part 3R** will be used. Please discuss mixing instructions for rebuilds with less than 650 mL or more than 700 mL overflow with your local FUJIFILM representative.

Normally it is not necessary to carry out analytical tests whilst rebuilding, but if a laboratory wishes to monitor its process analytically, operating concentrations of key ingredients can be provided by FUJIFILM Belgium. In particular, the FUJIFILM Belgium **OASIS Pro** chemical and process control system is ideally suited to this task. The attention of users of **EnviroPrint Developer Regenerator HV** is drawn on the fact that any regeneration system is a dynamic balance achieved under the specific conditions of a given processor. Processors vary from one to another in operating characteristics, in particular carry over on paper and leader belts. Processors without leader belts may need modified chemical rebuild formulae compared to machines

with leader belts. All formulae for rebuilding specified volumes of overflow are only approximate. More particularly it is not possible to guarantee the achievement of the correct pH or solution density. It is essential for optimum photographic quality that adjustments at the rebuilding stage are made by the laboratory to achieve pH and density within specification. Out of specification rebuilt developer replenisher will certainly give rise to out of control photographic results.

To regenerate EnviroPrint Developer overflow:

EnviroPrint Developer Regenerator HV Option 1: Rebuilding Ratio 65/35				
EP Developer Overflow	**Water**	**EP Developer Regenerator HV Part 1R**	**Multigen CD60**	**EP Developer Regenerator HV Part 3R**
650 mL	318,7 mL	7,0 mL	6,3 mL	18 mL

EnviroPrint Developer Regenerator HV Option 2: Rebuilding Ratio 70/30				
EP Developer Overflow	**Water**	**EP Developer Regenerator HV Part 1R**	**Multigen CD60**	**EP Developer Regenerator HV Part 3R**
700 mL	272,8 mL	6,2 mL	6,0 mL	15 mL

These volumes may be varied to modify replenisher activity if required.

FUJIFILM Belgium recommends measuring pH after rebuilding and to adjust to the specification see X.4 pH AND DENSITY SPECIFICATIONS - Seasoned Recycled Tank solutions & Replenishers on page 34.

Note:

If acid is added to the developer, there will be an effervescence of carbon dioxide due to the carbonate present in the developer. It is also necessary to control the density within the given specification. This can be achieved by adjusting the density of the overflow prior to regeneration if automatic blending equipment is used. Do not change replenishment rate from 160 mL/m².

2. BLEACH-FIX REGENERATION

Note: Use of regenerated bleach-fix is not recommended on roller transport processors.

A. EnviroPrint Electrolytic Bleach-Fix Regenerator

EnviroPrint Bleach-Fix 215 AC can also be regenerated with **EnviroPrint Electrolytic Bleach-Fix** Regenerator chemicals using the conventional route of desilvering the bleach-fix prior to regeneration.

The bleach-fix system is started by filling the processor and replenisher tank with **EnviroPrint Bleach-Fix 215 AC**.

Note:

In the Photographic market, two systems are being offered of which system 2 is a so-called "economical and low tech approach".

Fujifilm is in favour of offering the original "high tech" version, guaranteeing a more stable chemistry (system 1). Whenever customers insist on using the "economical, low tech version" (system 2), your local FUJIFILM Technical representative can give you the required support.

To maintain and assure good processing conditions it is necessary to periodically check tank and rebuilt replenisher for their key ingredients.

To regenerate the Bleach-Fix overflow:

SYSTEM 1

1. Collect overflow from bleach-fix tank.
2. Add 15 mL **EnviroPrint Electrolytic Bleach-Fix Regenerator Part A** for every litre of overflow.
3. Check pH, and adjust if necessary to within the range 7.8 - 8.1.
4. Desilver electrolytically to 0.5 - 1.0 g/L silver.
5. If necessary aerate desilvered overflow until most of the ferrous iron is converted back to ferric iron (2-4 hours). The maximum ferrous iron level is 10% of total iron.
6. Add **EnviroPrint Electrolytic Bleach-Fix Regenerator Parts B & C**, plus acetic acid as follows:

EnviroPrint Electrolytic Bleach-Fix Regenerator System 1: High tech version				
Desilvered, aerated Overflow	**Part B**	**Part C**	**Acetic Acid 60% w/w** (1)	**Water**
860 mL	32 mL	57 mL	13 - 18 mL	To make 1L
1000 mL	37 mL	66 mL	15 - 21 mL	To make 1160mL

(1) It may be necessary to vary additions of acetic acid to obtain the correct pH. see X.4 pH AND DENSITY SPECIFICATIONS - Seasoned Recycled Tank solutions & Replenishers on page 34.

7. Pump regenerated overflow back to bleach-fix replenisher tank.

SYSTEM 2

1. Collect overflow from bleach-fix tank.
2. Check pH, and adjust to pH range 7.8 - 8.1.
3. Desilver electrolytically to 0.5 - 1.0 g/L silver.
4. If necessary aerate desilvered overflow until most of the ferrous iron is converted back to ferric iron (2-4 hours). The maximum ferrous iron level is 10% of total iron.
5. Add **EnviroPrint Electrolytic Bleach-Fix Regenerator Parts B & C**, plus acetic acid as follows:

EnviroPrint Electrolytic Bleach-Fix Regenerator System 2: economical, low tech version				
Desilvered, aerated Overflow	**Part B**	**Part C**	**Acetic Acid 60% w/w** (1)	**Water**
900 mL	24 mL	40 mL	13 - 18 mL	To make 1L
1000 mL	27 mL	44 mL	14 - 20 mL	To make 1110mL

(1) It may be necessary to vary additions of acetic acid to obtain the correct pH. see X.4 pH AND DENSITY SPECIFICATIONS - Seasoned Recycled Tank solutions & Replenishers on page 34.

6. Pump regenerated overflow back to bleach-fix replenisher tank.

System 2 doesn't necessarily guarantee a long-term stable rebuilt replenisher. Some additional Bleach-fix stabilising compound is omitted by not adding part A.

3. BIO-BLEACH REGENERATION

The rebuilding instructions given below are approximate. The volume of the concentrate and acid required to obtain a rebuilt replenisher within specification, depends on the characteristics of the processing machine.

To regenerate Bio-bleach overflow:

EnviroPrint Bio-Bleach (1)			
Overflow	**Conc.**	**Nitric Acid 20% w/w** (2)	**Water**
945 mL	50 mL	1-5 mL	To make 1 L
1000 mL	53 mL	1-5,5 mL	To make 1060 mL

(1) It is essential for this bleach that the density of the tank solution does not drop below the minimum required value of 1.024 g/cm³ at 20°C. For the correct pH value, see X.4 pH AND DENSITY SPECIFICATIONS - Seasoned Recycled Tank solutions & Replenishers on page 34 on page.

(2) Adjust volume to achieve a pH within specifications. See X.4 pH AND DENSITY SPECIFICATIONS - Seasoned Recycled Tank solutions & Replenishers on page 34.

4. FIXER REGENERATION

The rebuilding instructions given below are approximate. The volume of the concentrate and acid required to obtain a rebuilt replenisher within specification, depends on the processor characteristics.

Super Unilec can be used for RA4 fixer regeneration which has the advantage of minimising fixer overflow volume. The fixer solution in the processor should be continuously electrolytically desilvered in the processor or batch-wise before regeneration to a silver concentration of 0.5 - 1.0 g/L.

Freshly prepared Super Unilec tank solution can be used to fill the processor.

To regenerate the fixer overflow

Super Unilec	
Fixer overflow	**Conc.**
1000 mL	27-38 mL (1)

(1) It may be necessary to add more Super Unilec concentrate if there is a high carry-over of wash water into the processor fixer tank.
Addition of water and adjustment of the pH may be necessary to maintain the replenisher within specification. See X.4 pH AND DENSITY SPECIFICATIONS - Seasoned Recycled Tank solutions & Replenishers on page 34 on page.

X. PH AND DENSITY SPECIFICATIONS

1. FRESHLY PREPARED TANK SOLUTIONS

pH AND DENSITY SPECIFICATIONS FOR FRESHLY PREPARED TANK SOLUTIONS

Product	Tank		
	pH 25°C	Density (g/cm³) 20°C	Density (g/cm³) 25°C
EnviroPrint Developer MP160	10.45 ± 0.05	1.030 ± 0.003	1.029 ± 0.003
EnviroPrint Developer MP108	10.37 ± 0.05	1.028 ± 0.003	1.027 ± 0.003
EnviroPrint Developer MP73 AC	10.38 ± 0.05	1.033 ± 0.003	1.032 ± 0.003
EnviroPrint Developer MP60 AC	10.28 ± 0.05	1. 032 ± 0.003	1.030 ± 0.003
EnviroPrint 47 Developer AC	10.15 ± 0.05	1.031 ± 0.003	1.030 ± 0.003
EnviroPrint FP Developer MR	See latest version of TIS016 RA4 FP chemistry for Fast Processing		
FUJI CP48 II Developer	10.16 ± 0.05	1.044 ± 0.003	1.043 ± 0.003
CPRA Digital Pro Developer AC	10.35 ± 0.05	1.033 ± 0.003	1.032 ± 0.003
EnviroPrint Bleach-Fix 215 AC	5.80 ± 0.20	1.063 ± 0.005	1.062 ± 0.005
EnviroPrint Bleach-Fix 108 AC	5.80 ± 0.20	1.063 ± 0.005	1.062 ± 0.005
EnviroPrint Bleach-Fix 70 AC	5.80 ± 0.20	1.063 ± 0.005	1.062 ± 0.005
EnviroPrint Bleach-Fix 55 AC	5.80 ± 0.20	1.063 ± 0.005	1.062 ± 0.005
EnviroPrint 47 Bleach-Fix AC	5.65 ± 0.20	1.080 ± 0.005	1.079 ± 0.005
EnviroPrint Bleach-Fix MP215 AC - OPTION 1	6.00 ± 0.30	1.070 ± 0.005	1.069 ± 0.005
EnviroPrint Bleach-Fix MP215 AC - OPTION 2	5.80 ± 0.30	1.080 ± 0.005	1.079 ± 0.005
EnviroPrint FP Bleach-Fix MR	See latest version of TIS016 RA4 FP chemistry for Fast Processing		
EnviroPrint FP Bleach-Fix MR 45 SECONDS PROCESS -OPTION 1	6.00 ± 0.30	1.070 ± 0.005	1.069 ± 0.005
EnviroPrint FP Bleach-Fix MR 45 SECONDS PROCESS -OPTION 2	5.80 ± 0.30	1.080 ± 0.005	1.079 ± 0.005
EnviroPrint CP48 II Bleach-Fix	6.00 ± 0.20	1.072 ± 0.005	1.071 ± 0.005
CPRA Digital Pro Bleach-Fix AC	5.80 ± 0.20	1.068 ± 0.005	1.067 ± 0.005
EnviroPrint Elect. Bio-Bx Regen.	6.50 ± 0.20	1.072 ± 0.005	1.071 ± 0.005
EnviroPrint Bio-Bleach	3.40 ± 0.10	1.039 ± 0.003	1.038 ± 0.003
Super Unilec Fixer Regeneration	Use **Super Unilec Fixer** for fresh start-up.		
Super Unilec Fixer (1 + 4)	7.50 ± 0.20	1.087 ± 0.010	1.086 ± 0.010

2. FRESHLY PREPARED REPLENISHER SOLUTION

pH AND DENSITY SPECIFICATIONS FOR FRESHLY PREPARED REPLENSIHER			
Product	**Replenisher**		
	pH 25°C	**Density (g/cm³) 20°C**	**Density (g/cm³) 25°C**
EnviroPrint Developer MP160	12.00 ± 0.05	1.028 ± 0.003	1.027 ± 0.003
EnviroPrint Developer MP108	12.10 ± 0.05	1.028 ± 0.003	1.028 ± 0.003
EnviroPrint Developer MP73 AC	12.38 ± 0.05	1.035 ± 0.003	1.034 ± 0.003
EnviroPrint Developer MP60 AC	12.50 ± 0.05	1.037 ± 0.003	1.036 ± 0.003
EnviroPrint 47 Developer AC	12.55 ± 0.05	1.043 ± 0.003	1.042 ± 0.003
EnviroPrint FP Developer MR	See latest version of TIS016 RA4 FP chemistry for Fast Processing		
EnviroPrint CP48 II Developer	12.55 ± 0.05	1.043 ± 0.003	1.042 ± 0.003
CPRA Digital Pro Developer AC	10.70 ± 0.05	1.034 ± 0.003	1.033 ± 0.003
EnviroPrint Bleach-Fix 215 AC	5.80 ± 0.20	1.063 ± 0.005	1.062 ± 0.005
EnviroPrint Bleach-Fix 108 AC	5.70 ± 0.20	1.088 ± 0.005	1.087 ± 0.005
EnviroPrint Bleach-Fix 70 AC	5.60 ± 0.20	1.106 ± 0.005	1.105 ± 0.005
EnviroPrint Bleach-Fix 55 AC	5.60 ± 0.20	1.119 ± 0.005	1.118 ± 0.005
EnviroPrint 47 Bleach-Fix AC	5.50 ± 0.20	1.155 ± 0.005	1.154 ± 0.005
EnviroPrint Bleach-Fix MP215 AC	5.80 ± 0.30	1.080 ± 0.005	1.079 ± 0.005
EnviroPrint FP Bleach-Fix MR	See latest version of TIS016 RA4 FP chemistry for Fast Processing		
EnviroPrint FP Bleach-Fix MR 45 SECONDS PROCESS	5.70 ± 0.30	1.120 ± 0.005	1.119 ± 0.005
EnviroPrint CP48 II Bleach-Fix	5.30 ± 0.20	1.121 ± 0.005	1.120 ± 0.005
CPRA Digital Pro Bleach-Fix AC	5.80 ± 0.20	1.068 ± 0.005	1.067 ± 0.005
EnviroPrint Bio-Bleach	3.20 ± 0.10	1.059 ± 0.003	1.058 ± 0.003
Super Unilec Fixer (1 + 4)	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

3. SEASONED TANK SOLUTIONS

pH AND DENSITY SPECIFICATIONS FOR SEASONED(1) TANK SOLUTION				
Product	**Tank**			
	pH	**Density (g/cm³)**		
	25°C	**20°C**	**25°C**	**processing temperature(2)**
EnviroPrint Developer MP160	10.30 ± 0.05	1.031 ± 0.003	1.030 ± 0.003	1.026 ± 0.003
EnviroPrint Developer MP108	10.28 ± 0.05	1.029 ± 0.003	1.028 ± 0.003	1.024 ± 0.003
EnviroPrint Developer MP73 AC	10.15 ± 0.05	1.038 ± 0.003	1.037 ± 0.003	1.033 ± 0.003
EnviroPrint Developer MP60 AC	10.25 ± 0.05	1.040 ± 0.003	1.039 ± 0.003	1.035 ± 0.003
EnviroPrint 47 Developer AC	10.08 ± 0.05	1.050 ± 0.003	1.049 ± 0.003	1.045 ± 0.003
EnviroPrint FP Developer MR	See latest version of TIS016 RA4 FP chemistry for Fast Processing			
EnviroPrint CP48 II Developer	10.28 ± 0.05	1.052 ± 0.003	1.051 ± 0.003	1.048 ± 0.003
CPRA Digital Pro Developer AC	10.20 ± 0.05	1.037 ± 0.003	1.036 ± 0.003	1.032 ± 0.003
EnviroPrint Bleach-Fix 215 AC	6.50 ± 0.20	1.065 ± 0.010	1.064 ± 0.010	1.060 ± 0.010
EnviroPrint Bleach-Fix 108 AC	6.60 ± 0.20	1.078 ± 0.010	1.077 ± 0.010	1.073 ± 0.010
EnviroPrint Bleach-Fix 70 AC	6.65 ± 0.20	1.087 ± 0.010	1.086 ± 0.010	1.082 ± 0.010
EnviroPrint Bleach-Fix 55 AC	6.70 ± 0.20	1.093 ± 0.010	1.092 ± 0.010	1.088 ± 0.010
EnviroPrint 47 Bleach-Fix AC	7.20 ± 0.20	1.125 ± 0.010	1.124 ± 0.010	1.121 ± 0.010
EnviroPrint Bleach-Fix MP215 AC	6.50 ± 0.30	1.102 ± 0.005	1.101 ± 0.005	1.098 ± 0.005
EnviroPrint FP Bleach-Fix MR	See latest version of TIS016 RA4 FP chemistry for Fast Processing			
EnviroPrint FP Bleach-Fix MR 45 SECONDS PROCESS	6.60 ± 0.30	1.102 ± 0.010	1.101 ± 0.010	1.098 ± 0.010
EnviroPrint CP48 II Bleach-Fix	6.30 ± 0.20	1. 098 ± 0.010	1.097 ± 0.010	1.093 ± 0.010
CPRA Digital Pro Bleach-Fix AC	6.50 ± 0.20	1.070 ± 0.010	1.069 ± 0.010	1.066 ± 0.010
EnviroPrint Bio-Bleach	3.60 ± 0.10	1.039 ± 0.003	1.038 ± 0.003	1.035 ± 0.003
Super Unilec Fixer	6.70 ± 0.50	1.090 ± 0.010	1.089 ± 0.010	1.087 ± 0.010

(1) After 3 tank turn-overs. A tank turn-over is defined as the consumption of a volume of replenisher equal to the tank solution volume.

(2) Recommended mid-spec processing temperature, see V PROCESS SPECIFICATIONS on page 16.

4. SEASONED RECYCLED TANK SOLUTIONS & REPLENISHERS

pH AND DENSITY SPECIFICATIONS FOR SEASONED(1) TANK SOLUTION				
Product	**TANK**			
	pH	**Density (g/cm³)**		
	25°C	**20°C**	**25°C**	**Processing temperature(2)**
EP Developer Regen. HV 65/35	10.20 ± 0.05	1.041 ± 0.003	1.040 ± 0.003	1.036 ± 0.003
EP Developer Regen. HV 70/30	10.25 ± 0.05	1.042 ± 0.003	1.041 ± 0.003	1.037 ± 0.003
EP Electrolytic Bleach-Fix Reg.	6.60 ± 0.20	1.115 ± 0.020	1.114 ± 0.020	1.111 ± 0.020
EnviroPrint Bio-Bleach	3.60 ± 0.10	1.027 ± 0.003	1.026 ± 0.003	1.023 ± 0.003
Super Unilec Fixer (3)	6.70 ± 0.50	1.090 ± 0.020	1.089 ± 0.020	1.087 ± 0.020

pH AND DENSITY SPECIFICATIONS FOR SEASONED(1) REPLENISHER SOLUTION			
Product	**REPLENISHER**		
	pH	**Density (g/cm³)**	
	25°C	**20°C**	**25°C**
EnviroPrint Developer Regen. HV 65/35	10.75 ± 0.03	1.040 ± 0.003	1.039 ± 0.003
EnviroPrint Developer Regen. HV 70/30	10.80 ± 0.03	1.041 ± 0.003	1.040 ± 0.003
EnviroPrint Electrolytic Bleach-Fix Reg.	6.30 ± 0.20	1.125 ± 0.020	1.124 ± 0.020
EnviroPrint Bio-Bleach	3.20 ± 0.10	1.035 ± 0.003	1.034 ± 0.003
Super Unilec Fixer (3)	6.70 ± 0.20	1.100 ± 0.020	1.099 ± 0.020

(1) After 3 regeneration cycles.

(2) Recommended mid-spec processing temperature, see V PROCESS SPECIFICATIONS on page 16.

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

XI. PROCESS MONITORING

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

FUJIFILM Belgium chemicals for the RA4 process are designed to be used with any RA4-compatible paper. However, it is **most important** that you monitor your paper process with process control strips from the same manufacturer who makes your paper. There are quite significant differences between the papers from different manufacturers.

Whenever corrective action is taken, either to improve process control or to 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 keeps at least two code numbers or series of strips on hand as variations between different series can be quite large. A sharp variation with a new code number may not be the processor, but rather may be the difference between the control strips themselves. It should be standard practice to process a strip with a new code along with one of the current code numbers to determine 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 plotting of D-max values in addition to the normal control plots of D-min (Stain), LD (Speed), and HD-LD (Contrast). With the RA4 process, the D-max step can be a considerable aid in early detection of many processing problems, as this reading is representative of the point at which all of the chemicals are having to work at their hardest. The D-max step is particularly sensitive to changes in chemical activity, while the HD-LD step is rarely affected.

XII. HANDLING PROCESSING SOLUTIONS

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 solutions.

XIII. CARE AND STORAGE OF SOLUTIONS

All FUJIFILM Belgium chemicals for use with the RA4 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 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 and bleach-fix 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.

In processors with abnormally low turnover, oxidation of both the developer and bleach-fix will become a problem. In this case it is better to change to a developer with a higher replenishment rate (e.g. from **EnviroPrint Developer MP73 AC** to **EnviroPrint Developer MP160**).

Ultra Bleach-Fix Extender may be added to all RA4 Bleach-Fixes to overcome sulphurization

NEVER mix or store developer in containers, which have contained bleach-fix or 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, causing incorrect volumes.

XIV. TROUBLESHOOTING FOR THE RA4 PROCESS

Within the scope of this brochure, it is not possible to give a full description of all the process variations that can occur with different manufacturers' papers. You are advised to obtain a copy of the relevant process control manual for the paper/control strips from the manufacturer of the paper products concerned. There are significant differences between the papers themselves, and it is true that a manual for one paper will be based on that company's chemicals and conditions. However, the differences between the results on different manufacturers' chemicals are in general small compared to the results on different papers, and the paper manufacturers' manual will serve as the best guide. It is however possible to lay down some general guidelines and hints for all papers. These are to be found in the chart on the following pages.

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!

XV. TROUBLESHOOTING - CORRECTIVE ACTIONS

Problem	Probable Cause(s)	Corrective Action(s)
Low values in LD and D-max.	1. Developer temperature too low.	1. Increase developer temperature. It should not be necessary to exceed +1°C above process specification.
	2. Development time too short.	2. Check developer time is 45 sec. and adjust as necessary. Check developer solution in processor tank.
	3. Insufficient developer agitation.	3. Check developer filters and recirculation pump. Change as required.
	4. Developer under replenished.	4. Check and correct developer replenishment rate. Add developer replenisher to processor tank. **Take care** with regenerated developer systems - under replenished developer overflows can cause production of an unbalanced replenisher.
	5. Developer oxidised.	5. Dump developer and replace with fresh solution.
	6. Incorrect mixing or regeneration of developer replenisher: pH too low, too diluted, insufficient developing agent, too much developer starter added.	6. Check mixing or regeneration chemical additions. Either correct problems with chemical analysis or dump replenisher and replace with a fresh mix.
Low blue D-max, possibly low blue LD and HD-LD (Fuji paper).	1. Developer under replenished. Low CD3 in developer. Due to either incorrect mixing or regeneration of previously under replenished developer.	1. Correct as above. Preferably correct by chemical analysis; otherwise add CD3 by adding appropriate concentrate. **Take care** with regenerated developer systems - incorrect addition can cause unbalanced developer overflows causing production of an unbalanced replenisher.

Problem	Probable Cause(s)	Corrective Action(s)
High value in LD and D-max.	1. Developer temperature too high.	1. Decrease developer temperature. It should not exceed -1°C below process specification.
	2. Development time too long.	2. Check developer time is 45 sec. and adjust as necessary.
	3. Developer over replenished.	3. Check and correct developer replenishment rate. Add developer starter and water to processor tank. **Take care** with regenerated developer systems - over replenished developer overflows can cause production of an unbalanced replenisher.
	4. Developer too concentrated.	4. Check density and add water to processor to correct to aim. If this is a low throughput processor, investigate a system of regular checks and corrections for density, particularly with **EnviroPrint Developer MP73 AC, EnviroPrint Developer MP60 AC and EnviroPrint 47 Developer AC.**
	5. Incorrect mixing or regeneration of developer/ replenisher: pH too high, too concentrated, excess developing agent; not enough developer starter added	5. Check mixing or regeneration chemical additions. Either correct problems with chemical analysis or dump replenisher and replace with a fresh mix.
High blue D-min (yellowish whites on paper).	1. Exhausted or dirty super stabilizer or washes.	1. Dump super stabilizer and replace with fresh solution. Clean and refill wash tanks.
	2. Too high a pH in Stop Bath in RA4 separated bleach and fix process. Maximum pH is 4.5.	2. Check replenisher mixing and replenishment rate. (0.7% acetic acid solution).
	3. Dirty bleach-fix; usually caused by excessive developer carryover plus low throughput.	3. Dump bleach-fix and replace with fresh solution. Instead, it may be possible to clean the bleach-fix through an active carbon filter.
	4. Low sulphite in bleach/fix with Air Control (AC) Developers	4. Use a higher replenishment rate bleach-fix to ensure good tank turnover rates, use **CPRA Digital Pro Bleach-Fix**, or add **Ultra Bleach-Fix Extender.**

Problem	Probable Cause(s)	Corrective Action(s)
Low red D-max (reddish blacks on paper).	1. pH of bleach-fix too low. 2. Bleach-fix time too long. 3. Contamination of developer with super stabilizer. 4. Incorrect mixing or regeneration of developer replenisher: too much antioxidant added. 5. Incorrect mixing or inadequate recirculation of monopart bleach-fix.	1. Check and adjust bleach-fix pH to within recommended values. 2. Adjust bleach-fix time to 45 sec. for RA-type bleach-fixes. 3. Dump developer and replace with fresh solution. Ensure that paper leaders are not being reused on processor. 4. Check mixing or regeneration chemical additions. Either correct problems with chemical analysis or dump replenisher and replace with a fresh mix. Never add sulphite to developers. 5. Check bleach-fix starter was added when preparing fresh monopart bleach-fix working tank. If starter not used, ensure recirculation time in processor exceeds 8 hours after retanking – or use **EP Bleach-Fix 70 AC** (2 part version).
Low green D-max and LD (cyan/green blacks on Fuji paper).	1. Developer contaminated with bleach-fix (or fixer on separate bleach and fix systems).	1. Dump developer and replace with fresh solution. **Take care** with regenerated developer systems - contaminated developer overflows can cause production of a contaminated replenisher. Ensure any contaminated processor is isolated from developer collection system.
Retained silver in paper (verified with infra-red viewer).	1. Underactive bleach-fix - possibly under replenished bleach-fix, excessive developer carry over, incorrect mixing or regeneration, high ferrous (iron II) levels, etc. 2. Underactive bleach and/or fix (separate bleach and fix systems).	1. Check and adjust developer squeegees; check bleach-fix mixing and replenishment; check bleach-fix time. Correct any chemical errors (density, etc.) by chemical analysis, or dump and replace bleach-fix. 2. Check parameters as for bleach-fix above.
Brown precipitation in RA4 fixer tank solution.	Excessive carry-over of bleach into the fixer tank.	Check bleach tank squeegees. Ensure fix pH value is within tolerance *(see X.4 pH AND DENSITY SPECIFICATIONS).*