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T E C H N I C A L I N F O S H E E T

Cinechem Motion Picture Products

ECN-2 Chemistry

I. DESCRIPTION

Cinechem Motion Picture Products are designed to get the best results. They can be used in different types of ciné processors under variable conditions.

All the products are liquid concentrates that easily mix with water.

II. PROCESSING STEP FUNCTIONS

Prebath

The prebath is an alkaline solution which softens the black anti-halation backing to facilitate its elimination in the rem-jet removal and rinse that follows. It is therefore necessary to control the pH and specific gravity of this alkaline solution.

Rem-jet Removal and Rinse

While directly applying a water spray to both sides of the film, the black backing is completely removed by means of buffer rollers. It is important that a water spray be applied also to the buffer rollers to keep them clean at all times.

Developer

The colour developer causes metallic silver and colour dye images to appear in the emulsion. The colour developer composition and functions are described below.

- Colour Developing Agent:

The colour developing agent reduces the exposed silver halides to metallic silver. The colour developing agent itself is thus oxidized and its oxidation by-products react with the neighbouring couplers to form colour dye images.

- Preservative:

The preservative inhibits aerial oxidation of the colour developing agent by preventing the colour developer from absorbing oxygen from the air.

- Accelerator:

The accelerator increases the rate of development by making the colour developer alkaline.

- Restrainer:

The restrainer is added to the colour developer in order to restrain chemical fog formation by increasing the halogen concentration

Since colour developer composition variability is as detrimental to photographic properties as processing time, temperature, and solution pH fluctuations, developer composition needs to be strictly controlled.

Stop Bath

An acid stop bath halts the development action of the colour developer in the emulsion layer. The development action is halted quickly by the stop bath when a dye image of desired density has been obtained. The stop bath also removes any colour developing agent retained in the emulsion.

Wash

The wash bath removes any stop solution clinging to the film or retained in the emulsion layer so as to prevent contamination of the bleach with the stop solution.

Bleach

The metallic silver formed in the development, and the colloidal silver in the yellow-filter layer between the blue and the green sensitive layers, are converted by the bleach to silver halides which can be removed in the fixer that follows. The bleach composition and function are described below.

- Oxidising Agent:
Oxidises metallic silver formed during development

- Halogenating Agent:
It reacts with the above mentioned oxidised metallic silver to form silver bromide.

Wash

This wash removes any bleach clinging to the film or retained in the emulsion and is necessary to prevent bleach contamination of the fixer.

Fixer

The fixer removes all silver halides in the emulsion layer. The fixer composition and function are described below.

- Fixing Agent:
The fixing agent converts silver halides to a silver thiosulphate complex which is soluble in water.

- Preservative:
The preservative prevents decomposition of thiosulphate and adjusts solution pH.

Wash

This wash bath removes any fixer ingredients including silver thiosulphate complex retained in the emulsion. These fixer ingredients, if not completely removed, will cause the dye image to discolour or fade during storage. For best results a counter-current cascade tank arrangement (more than one tank arranged so that wash water flows in the direction opposite to film travel) is recommended. This wash tank arrangement also saves water.

Final Rinse

The wetting agent prevents uneven drying and water mark faults.

III. PROCESS PARAMETERS

	Time	Temperature (℃)	Replenishment Rate / 100 ft (30.5 m) of 35 mm film
Prebath	10”	27.0 ± 1.0	400 ml
Rem-jet Removal and Rinse		27.0 - 38	
Developer	180”	41.1 ± 0.1	900 ml
Stop Bath	30”	32.5 ± 5.5	600 ml
Wash	30”	32.5 ± 5.5	1.3 L
Bleach	180”	27.0 ± 1.0	200 ml
Wash	60”	32.5 ± 5.5	1.3 L
Fixer	120”	38 ± 1.0	600 ml
Wash	120”	32.5 ± 5.5	270 ml
Final Rinse	10”	32.5 ± 5.5	400 ml

The table above shows recommended replenishment rates and processing temperatures. As with other chemistries, differences between paper brands and production volumes mean that you need to fine-tune your process.

IV. MIXING INSTRUCTIONS

Cinechem ECN-2 Prebath	Water	Conc	To make
Replenisher	700 ml	300 ml	1000 ml
Tank	700 ml	300 ml	1000 ml

Cinechem ECN-2 Developer	Water	Conc Part A	Conc Part B	Replenisher	Starter*	To make
Replenisher	750 ml	200 ml	50 ml	-	-	1000 ml
Tank	762.5 ml	150 ml	37.5 ml	-	50 ml	1000 ml
Tank from Replenisher	200 ml	-	-	750 ml	50 ml	1000 ml

*Please note that the starter to be used is Cinechem ECN-2 Developer Starter.

Cinechem ECN-2 / ECP-2D Stop Bath	Water	Conc	To make
Replenisher	950 ml	50 ml	1000 ml
Tank	950 ml	50 ml	1000 ml

Cinechem ECN-2 / ECP-2D Bleach (Fresh)	Water	Conc †	To make
Replenisher	700 ml	300 ml	1000 ml
Tank	700 ml	300 ml	1000 ml

† Using Cinechem Bleach 2-Plus concentrate

Cinechem ECN-2 / ECP-2D Bleach (Regen)	Overflow	Conc †	To make
Regenerated Replenisher	850 ml ‡	150 ml ‡	1000 ml
Tank	1000 ml	0 ml	1000 ml

† Using Cinechem Bleach 2-Plus concentrate
‡ Worst case bleach regeneration data with inefficient processor operation; expected regeneration rebuild for a well maintained process around 860-890 ml overflow plus 110-140ml concentrate / 1000ml regenerated replenisher. See below for further information.

Cinechem ECN-2 / ECP-2D Fixer (Fresh) #	Water	Conc	To make
Replenisher	700 ml	300 ml	1000 ml
Tank	700 ml	300 ml	1000 ml

 # Fixer Note :
Fixer regeneration recommended for all but the smallest laboratories. This allows for very considerable savings in chemical costs and significant reduction in chemical wastes being sent to drain – all without affecting fixing / process sensitometry. Silver recovery required for fixer regeneration; several options available depending on laboratory configuration / requirements. Please discuss with Cinechem Foto Ltd as required to ensure that the optimum method is found for your laboratory.

Cinechem ECN-2 / ECP-2D Final Rinse	Water	Conc	To make
Replenisher	990 ml	10 ml	1000 ml
Tank	990 ml	10 ml	1000 ml

V. BLEACH REGENERATION

The same bleach concentrate may be used for preparation of both fresh (non-regenerated) replenisher and tank solutions, and for regenerating the bleach overflow from your processor. Bleach is regeneration strongly recommended for all but the smallest laboratories to minimise costs and waste to drain. Fresh replenisher – compared with regenerated replenisher – uses about double the amount of chemistry. Why not cut your bleach costs in half?

Bleach regeneration involves very simple operations. Just collect the bleach overflow from your processor, measure the specific gravity (density) of the overflow with a hydrometer (or other suitable device), and add Cinechem Bleach 2-Plus concentrate according to the information supplied by Cinechem with your chemistry. Mix the bleach and pump it into your replenisher tank ready for it to be reused exactly as for fresh bleach. No additional analysis required. No changes to replenishment rate or any other operating conditions.

Bleach regeneration is perfectly suited for use with an automatic mixer, such as those supplied by Rockwell Hitec (see http://www.rockwellhitec.eu/), but can also be carried out as a manual mixing process.

By definition, bleach tank overflow IS bleach working tank solution – it is what comes out of the bleach tank. If you need to top up with additional bleach tank solution due to a leak or similar, you can just use overflow. However, bleach overflow must not be used to compensate for low bleach tank levels caused by evaporation.

VI. PRODUCT LINE-UP

Product	Cat. No. / Available sizes (concentrates)	
ECN-2 Developer Starter	911445 - 10 L drum	
ECN-2 Prebath	911454 - 20 L drum	1000 L IBC
ECN-2 Developer Part A	911448 - 20 L drum	1000 L IBC
ECN-2 Developer Part B	911451 - 20 L drum	210 L drum
ECN-2 Developer Part B	911453 - 4 x 5 L drum	
ECN-2 / ECP-2D Stop Bath	911433 - 24 L drum	999724 - 860 L IBC
ECN-2 / ECP-2D Bleach 2-Plus	911436 - 20 L drum	999734 - 640 L IBC
ECN-2 / ECP-2D Fixer	911439 - 20 L drum	999703 - 1000 L IBC
ECN-2 / ECP-2D Final Rinse	911442 - 6 x 1 L pack	999709 - 60 L drum

Other sizes available upon request. Cinechem ECN-2 Developer Part B available in 4x5L packs for mixing compatibility with Kodak kit chemistry, and also in 20L drums (at reduced cost) for those mixing larger quantities. IBCs and larger drums available as above for use with automatic mixers.

VII. STORAGE

The concentrates must not be stored below 5°C and above 30°C for a long period of time. Please be aware that the volume of replenisher solution prepared should not exceed 2 weeks expected consumption.

VIII. CHEMICAL WARNING

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. 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 MSDS and the hazard information on the packs of solution concentrate before attempting to handle the solutions.

The MSDS (Material Safety Data Sheets) are available on request if you do not have a copy.