



Metafix Process Monitoring and Effluent Control System

Industrial X-RAY - NDT

Metafix (UK) Ltd.

What's wrong with Silver Recovery Today?



- ✗ Virtually unchanged in 50 years?
- ✗ Unpredictable Results
- ✗ Messy – Un-auditable
- ✗ Health & Safety Concerns
- ✗ Compliance Issues
- ✗ Drain Issues
- ✗ Expensive - Parts, Service & Down Time
- ✗ Large space requirements

Metafix introduces: Process Monitoring and Effluent Control System



- ✓ Innovative Proven technology
- ✓ Clean – Compliance!
- ✓ Accountable Predictable Results
- ✓ NO Electrolytic! (30 amps vs 1.25)
- ✓ No Health & Safety Issues
- ✓ Easy maintenance
- ✓ Secure your Silver
- ✓ No Drain Issues

Metafix[®] Inc.

High Efficiency Metafix MiX eXchange Columns

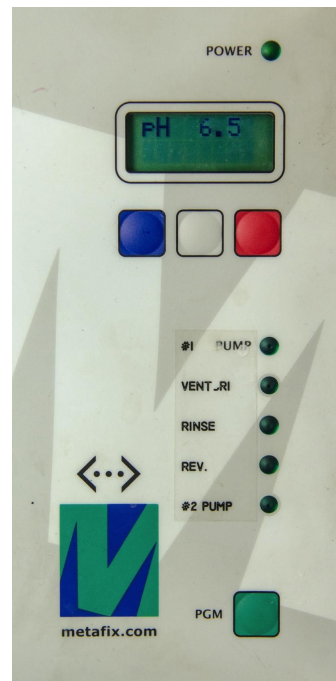


- ✓ Recovers Silver from Combined (Dev & Fix) (Patented Process) *Primary & Secondary recovery combined*
- ✓ Advanced Technology -
> 10,000 Photo lab Installations
- ✓ Shipping Drum - Containment
- ✓ Fast flow rates 1000 ml/min
- ✓ Made of 100% recyclable plastic
- ✓ MetaWool PATENTED recovery media – Ensures compliance
- ✓ Consistent - Predictable Results - Easy & cost effective to refine.

Metafix[®] Inc.

pH Measurement Replenishment Monitoring

- + Inline pH probe
 - + Indicates DEV/FIX ratio
 - + Validates replenishment rates



Metafix[®] Inc.

Replenishment rates

+ Manufacturers Recommended Rates

Structurix NDT Processors

	Si	S ECO
Standard Consumption	G135 Developer	900 ml/m ²
	G335 Fixer	700 - 1200 ml/m ²
	Water	13 l/m ²



DEV 900 + FIX 1200 = 2100 cc/sq meter

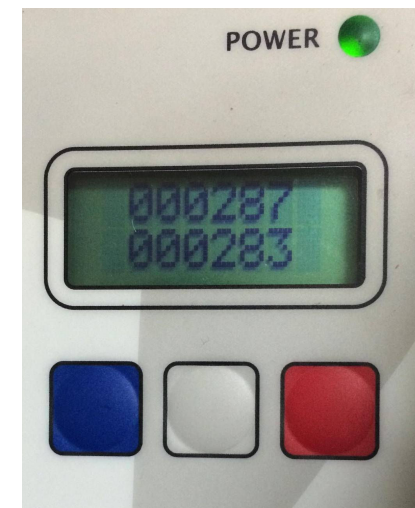
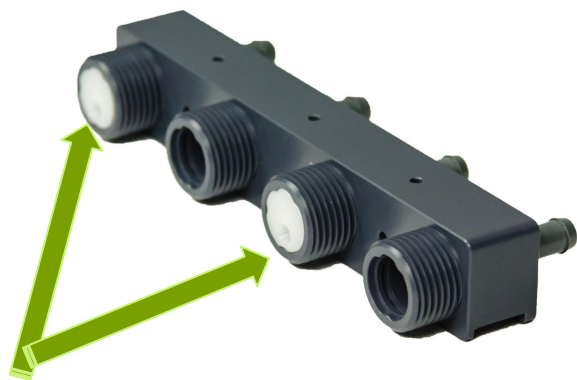
DEV 900 / 2100 = 43% of TOTAL

FIX 1200 / 2100 = 57% of TOTAL

***pH of combined chemistry should be between
6,9 to 7,1**

Highly Accurate Solution Flow Control

Accurate chemistry volume measurements
Accurate Solution Volumes tell all...



Metafix[®] Inc.

Drain Maintenance

Metafix **ENVIROJET**

- + Keep drains clean
- + Closed discharge - No fumes
- + Commingles all processing solutions
- + Easy Compliance Testing
- + Drains spent eXchangers



BUT, its Not Just Silver
Recovery....

**....Audited Process
Monitoring**

NDT = Standards

- + Every standard refers to the manufacturer requirements



Designation: E 999 – 99

Standard Guide for Controlling the Quality of Industrial Radiographic Film Processing :

« 7.2.4: For processors with replenishment systems, **USE THE REPLENISHMENT RATES RECOMMENDED BY THE FILM OR SOLUTION MANUFACTURER** »



BAM

Federal Institute for
Materials Research
and Testing

“ According to **DIN EN ISO 11699-1:2012** and **ASTM E1815-08** ; Developer and fixer were mixed with water corresponding to the manufacture requirements ”



ASTM ; American Society for Testing and Materials, An American National Standard

ISO ; International Organization for Standardization

Quality Control

- + Measure
- + Report
 - + Live data, Internet connected
 - + Automatic reports and alarms
 - + E-Mails Reports

Cumulative Volumes
Silver Reports
Alarms
Volume/Film Sizes
Daily pH Graphics
Start & Finish
Time



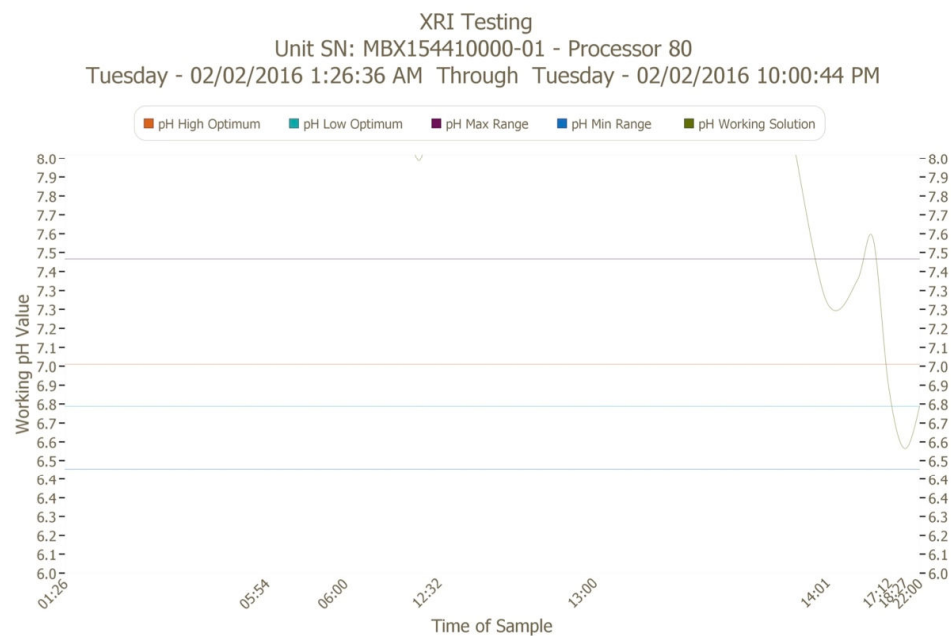
Metafix[®] Inc.

Metatrax

Daily Reports – Out of Control

Metafix - MetaTrax NDT Process Monitoring System

XRI Testing_Processor 80



Metafix Summary Report

Transmissions: 56

pH

pH Minimum: 6.6
pH Maximum: 9.1
pH Average: 8.14

Time

Startup Time: 02-02-2016 1:26:36 AM
Last Time: 02-02-2016 10:00:44 PM
Working Time: 20:34:08

Solution Estimates

Dev: Liters 15.9 - Gal 4.2
Fix: Liters 21.1 - Gal 5.6
Treated Total: Liters 37 - Gal 10

Film Estimates

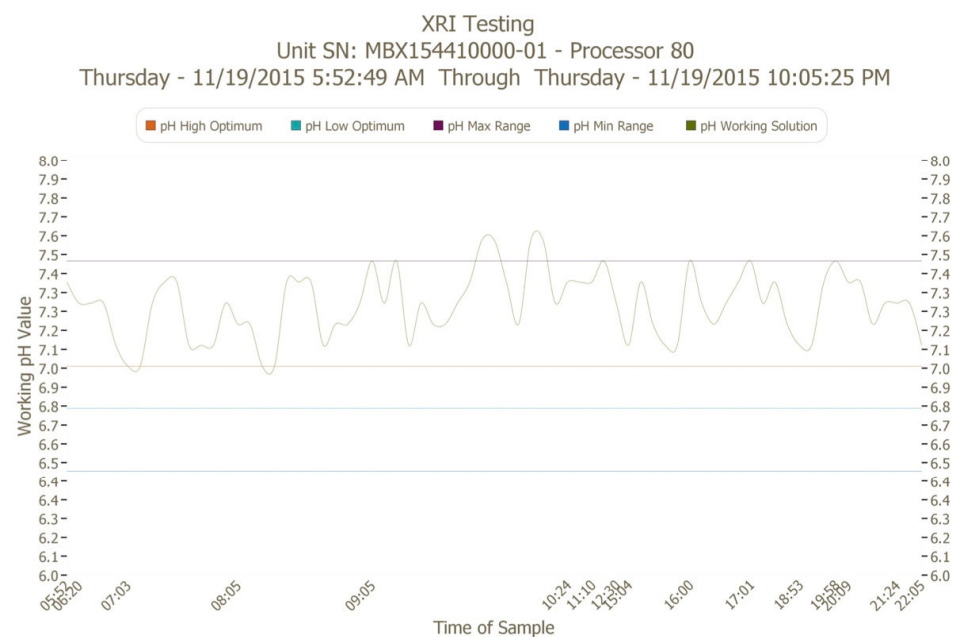
Film SqM: 17.8
Film SqFt: 191.4
Film 14x17: 115.6
Film Weight Lbs.: 11.8

Metatrax

Daily Reports – Active Day

Metafix - MetaTrax NDT Process Monitoring System

XRI Testing_Processor 80



Metafix Summary Report

Transmissions: 71

pH

pH Minimum: 7
pH Maximum: 7.6
pH Average: 7.29

Time

Startup Time: 11-19-2015 5:52:49 AM
Last Time: 11-19-2015 10:05:25 PM
Working Time: 16:12:36

Solution Estimates

Dev: Liters 34.4 - Gal 9.1
Fix: Liters 45.6 - Gal 12
Treated Total: Liters 80 - Gal 21

Film Estimates

Film SqM: 38
Film SqFt: 409.3
Film 14x17: 247.1
Film Weight Lbs.: 25.3

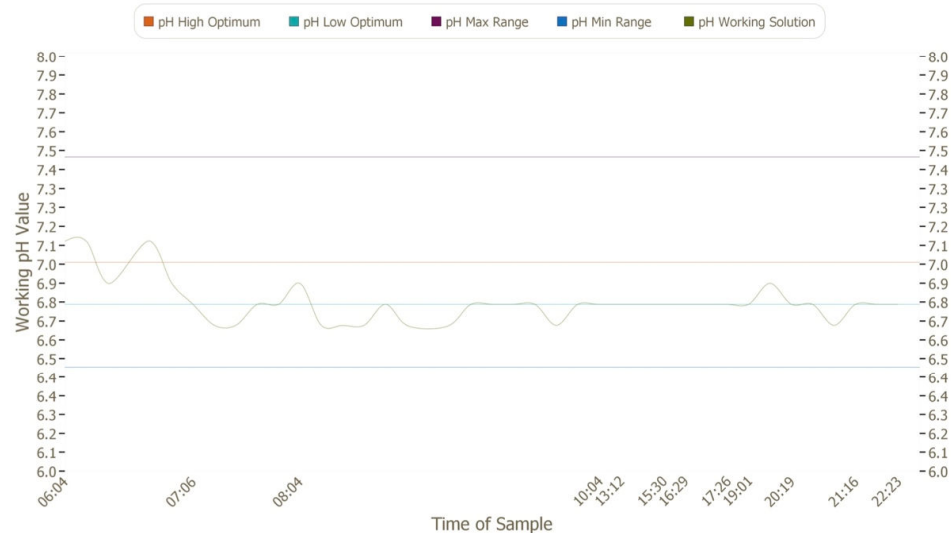
Metatrax

Daily Reports – Great Day

Metafix - MetaTrax NDT Process Monitoring System

XRI Testing_Processor 80

XRI Testing
Unit SN: MBX154410000-01 - Processor 80
Wednesday - 02/03/2016 6:04:11 AM Through Wednesday - 02/03/2016 10:24:34 PM



Metafix Summary Report

Transmissions: 41

pH

pH Minimum: **6.7**
pH Maximum: **7.1**
pH Average: **6.81**

Time

Startup Time: **02-03-2016 6:04:11 AM**
Last Time: **02-03-2016 10:24:34 PM**
Working Time: **16:20:23**

Solution Estimates

Dev: Liters **14.6** - Gal **3.9**
Fix: Liters **19.4** - Gal **5.1**
Treated Total: Liters **34** - Gal **9**

Film Estimates

Film SqM: **16.1**
Film SqFt: **173.9**
Film 14x17: **105**
Film Weight Lbs.: **10.7**

Payment Model

Films Processed (History)	
Film Count	33150
Films -> Chemistry (Liters)	10689
Ag Spot / Toz	£12.00
<u>PCC Revenue</u>	
T/oz Ag	363.34
T/oz->Grams	11299.9
Value	£4360.08
Grams/Liter	1.00
<u>Film</u>	
14x17 Square inches	238
Square inches -> Sq/M	1550
Films / Meter	6.51
<u>Chemistry</u>	
Fixer Rep Rate/ Sq/M	900
Dev Rep Rate/ Sq/M	1200
Total Chemistry/ Sq/M (cc)	2100
Total Chemistry - cc/Film	322

- + Recovery Report
 - + chemistry volume
 - + film volume
 - + time
 - + silver recovered

- + for complete transparent auditing

Replenishment Monitoring



Metafix[®] Inc.

Metafix MetaTrax

Complete Environmental Management System

Tracking

- ✓ Network Connection
- ✓ We advise Lab Staff of Column status and verify operation of equipment on site

Samples

- ✓ We request
- ✓ Return Performance Reports

Incidents (Support)

- ✓ Calls/ Question from Staff
- ✓ Documented & auditable
- ✓ 12 Hours/ Day (Toll Free)

Payment

- ✓ Column Statements
- ✓ Management Summary of all reports by Lab

Systematic Effluent Process Control

- + Patented Technology
- + Recovers Silver from Fixer **and** Developer
- + Small Footprint 1M² 3 ft²
- + Rapid Recovery
- + Keeps up with maximum Processor output without holding tanks
- + Primary and Secondary Recovery through one Column, from high concentration to compliance
- + Simple and Quick Column exchanged
- + Pressure monitoring
 - + Optimizes Column life and safe Handling
- + Recovery Report
 - + Consolidates Chemistry Volume, Film Volume, Time with Silver Recovered, for Complete transparent Auditing



Metafix[®] Inc.

pH Scale DEV/FIX ratios

*Example of pH
ratios DEV/FIX
Structurix
Chemistry



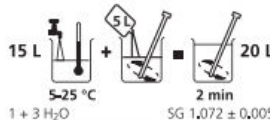
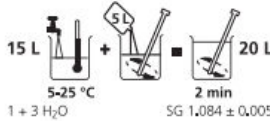
Dev. Vol. (ml)	pH Mixed Sol.	Vol. Dev/Vol. Fix	% (Dev/Fix)	% (Dev/Fix+Dev)
10,00	6,11	0,40	40,00	28,57
11,00	6,23	0,44	44,00	30,56
12,00	6,34	0,48	48,00	32,43
13,00	6,44	0,52	52,00	34,21
14,00	6,54	0,56	56,00	35,90
15,00	6,63	0,60	60,00	37,50
16,00	6,72	0,64	64,00	39,02
17,00	6,81	0,68	68,00	40,48
18,00	6,90	0,72	72,00	41,86
19,00	6,99	0,76	76,00	43,18
20,00	7,07	0,80	80,00	44,44
21,00	7,17	0,84	84,00	45,65
22,00	7,26	0,88	88,00	46,81
23,00	7,35	0,92	92,00	47,92
24,00	7,45	0,96	96,00	48,98
25,00	7,54	1,00	100,00	50,00
26,00	7,63	1,04	104,00	50,98
27,00	7,72	1,08	108,00	51,92
28,00	7,80	1,12	112,00	52,83
29,00	7,88	1,16	116,00	53,70
30,00	7,95	1,20	120,00	54,55
31,00	8,01	1,24	124,00	55,36

Replenishment rates

+ Manufacturers Recommended Rates

Carestream

Kodak

	Dilution Concentrate + H ₂ O	Replenishment Rate	pH Working Strength	Specific Gravity Working Strength	To Make Working Strength Solution
Developer					
Use INDUSTREX Single Part Developer and Replenisher. Material No. 5315288	1 + 3	665mL/m ² (e.g., 100 mL per 14 x 17 inch sheet)	10.40 +/- 0.10 (25° C, 77° F)	1.072 +/- 0.005 (20° C, 68° F)	 1 + 3 H ₂ O SG 1.072 ± 0.005
Fixer					
Use INDUSTREX LO Fixer and Replenisher. Material No. 5159082	1 + 3	1200mL/m ² (e.g., 180mL per 14 x 17 inch sheet)	4.90 +/- 0.10 (25° C, 77° F)	1.084 +/- 0.005 (20° C, 68° F)	 1 + 3 H ₂ O SG 1.084 ± 0.005

DEV 100 + FIX 180 = 280 ml/ 14x17 inch

DEV 100 / 280 = 36% of TOTAL

FIX 180 / 280 = 64% of TOTAL

*pH of combined chemistry to be determined

Metafix[®]
Inc.

Replenishment rates

+ Manufacturers Recommended Rates



STRUCTURIX

Recommended use of ecoDEV

Processing Time	Immersion Time	Temp. (°C)	Replenishment Rate
5 min. cycle	62.5 sec.	29° C	550 ml/m ²
8 min. cycle	100 sec.	27° C	900 ml/m ²

Recommended use of ecoFIX

Processing Time	Processor	Replenishment Rate
5 min. cycle	S ECO	700 ml/m ²
8 min. cycle	S ECO, M ECO	700 ml/m ²
8 min. cycle	U, NOVA	1200 ml/m ²

DEV 83ml + FIX 135ml = 218 ml/ 14x17 inch (5 min cycle)

DEV 83/218 = 38% of TOTAL

FIX 135/218 = 62% of TOTAL

*pH of combined chemistry to be determined

pH Measurements, a novel and accurate method to determine replenishments rates

- + Since there is a large spread in pH between buffered Developer and Fixer, Developer pH greater than 10 and Fixer lower than 5, the Mixed Volume of these two solutions results in a specific pH
- + A linear pH scale is easily made to demonstrate the effect of one on the other*
- + Knowing the manufacturer's recommended replenishment rate per size of film, then referring to the scale, will established the optimum pH values to monitor

Quality Control

- + Standards
- + pH Measurements
- + pH Scale DEV/FIX ratios
- + Replenishment rates
- + System 1 ; Replenishment Monitoring
- + System 2 ; Effluent Control





Metafix Process Monitoring and Effluent Control System

Industrial X-RAY - NDT

Metafix (UK) Ltd.