

# KODAK Developer System Cleaner and Neutralizer

Kodak

TECHNICAL DATA / CHEMICAL

March 2010 • TI-2000

## GENERAL INFORMATION

- KODAK Developer System Cleaner and Neutralizer is designed to remove the buildup of silver deposits in developer tanks, recirculation systems, and on racks and rollers in processing machines.
- It consists of two solutions. The Cleaner removes the silver deposit, but may leave a brown residue. After cleaning, the Neutralizer removes the brown residue.
- Improved features of this product are:
  - Little or no odor is given off by the Cleaner.
  - Simplified mixing of the Cleaner, using equal amounts of Part A and Part B.
  - Longer useful life of the Cleaner, allowing it to be saved and re-used for up to two weeks.
- No change has been made to the Neutralizer solution.



### Warning

Do not use in fixer tanks!

Do not mix Developer System Cleaner directly with Neutralizer.

Improper mixing and handling, such as allowing the Cleaner to come into contact with residual developer or other processing solutions, can form irritating sulfur dioxide fumes. Use with adequate ventilation.

For Emergency Health, Safety, and Environmental Information on all Kodak products, call: (585) 722-5151, 24 hours a day.

## Material Safety Data Sheets (MSDS)

Obtain the Material Safety Data Sheet for this product and other Kodak chemicals at [www.kodak.com/go/msds](http://www.kodak.com/go/msds). You can also call (800) 242-2424, send a facsimile to (585) 722-3173, or write to:

Eastman Kodak Company

Material Safety Data Sheets

343 State Street

Rochester, NY 14650

Please provide the Catalog Number for this product, CAT 150 0719, when requesting the MSDS.

## MIXING



### Warning

Observe precautionary information on containers. Strong acid. Wear goggles or other eye protection when mixing or using KODAK Developer System Cleaner and Neutralizer.

Components	
Developer System Cleaner, Part A	1 bottle, liquid concentrate
Developer System Cleaner, Part B	1 bottle, liquid concentrate
Neutralizer	1 bottle, liquid concentrate

### Mixing Fresh Working Solutions for General Use:

For best results, prepare the necessary quantity of working strength Cleaner just prior to use. Unused working strength Cleaner may be stored for up to two weeks with only a slight loss of cleaning activity. The Neutralizer may be mixed in advance and stored for future use.

### To Make 1 Quart of Developer System Cleaner:

1. Start with 24 oz. water at 65 to 90°F (18 to 32°C)
2. With stirring, add 4 oz. Cleaner, Part A concentrate
3. Then, with stirring, add 4 oz. Cleaner, Part B concentrate
4. Mix until the solution is uniform.

### To Make 1 Litre of Developer System Cleaner:

1. Start with 750 mL water at 65 to 90°F (18 to 32°C)
2. With stirring, add 125 mL Cleaner, Part A concentrate
3. Then, with stirring, add 125 mL Cleaner, Part B concentrate
4. Mix until the solution is uniform.

### Or, to Mix by Proportion:

1. Divide the total quantity of working strength Cleaner desired by 8. This value equals 1 part.
2. Start with 6 parts water at 65 to 90°F (18 to 32°C).
3. With stirring, add 1 part Cleaner, Part A concentrate
4. Then, with stirring, add 1 part Cleaner, Part B concentrate
5. Mix until the solution is uniform.

**Note:** For routine cleaning of slight tar and/or silver buildup, a dilute solution made with up to 1/2 the above amounts of concentrates may be satisfactory.

**To Make 1 Quart of Neutralizer:**

1. Start with 28 oz. water at 65 to 90°F (18 to 32° C)
2. With stirring, add 4 oz. Neutralizer concentrate
3. Mix until the solution is uniform.

**To Make 1 Litre of Neutralizer:**

1. Start with 875 mL water at 65 to 90°F (18 to 32° C)
2. With stirring, add 125 mL Neutralizer concentrate
3. Mix until the solution is uniform.

**Or, to Mix by Proportion:**

1. Divide the total quantity of working strength Neutralizer desired by 8. This value equals 1 part.
2. Start with 7 parts water at 65 to 90° F (18 to 32° C).
3. With stirring, add 1 part Neutralizer concentrate
4. Mix until the solution is uniform.

**Mixing Instructions for Common KODAK Processors**

Processor list is repeated to reflect metric measure and U.S. fluid measure.

**Metric Measure (Litres) to Make Working Strength Cleaner:**

KODAK Processor	Approximate Developer Tank Volume (litres)	Water (litres)	Part A Concentrate (litres)	Part B Concentrate (litres)
VERSAMAT Models 11, 1140, 411, 811, one dev tank	17.0	12.8	2.1	2.1
VERSAMAT Models 11, 1140, 411, 811, two dev tanks	34.0	25.4	4.3	4.3
VERSAMAT, Model 5	12.3	9.3	1.5	1.5
DEKTOMATIC, Model 65	10.5	7.9	1.3	1.3
POLYMAX	12.2	9.2	1.5	1.5
VERSAMAT 75, DN-3	11.4	8.6	1.4	1.4
VERSAMAT 75, DN-5	5.7	4.3	0.7	0.7
PROSTAR	1.3	0.9	0.2	0.2
KODAMATIC, Models 42A, 42S	8.0	6.0	1.0	1.0
KODAMATIC, Models 65A, 66S	10.6	8.0	1.3	1.3
KODAMATIC, Model 520	26.0	19.4	3.3	3.3
KODAMATIC, Model 710	27.0	20.2	3.4	3.4
KODAMATIC, Model 960	36.9	27.7	4.6	4.6
RP X-OMAT, Models M6-N, M6A-N	9.5	7.1	1.2	1.2
RP X-OMAT, Model M6AW	9.5	7.1	1.2	1.2
RP X-OMAT, Models M6B, stainless or plastic tanks	12.0	9.0	1.5	1.5
RP X-OMAT, Models M7, M7A, M7B	8.5	6.3	1.1	1.1
RP X-OMAT, Model M8	16.0	12.0	2.0	2.0
X-OMAT, Model M3	76.0	57.0	9.5	9.5
X-OMAT, Models M4, M4A, M4B-N, full cycle	25.5	19.1	3.2	3.2
X-OMAT, Models M4, M4A, M4B-N, RP-converted	27.0	20.2	3.4	3.4
X-OMAT, Models M5-N, M5A-N	9.5	7.1	1.2	1.2
X-OMAT, M20 Models 1 & 2	9.5	7.1	1.2	1.2
X-OMAT, Models M35, M35A, M35A-M	7.8	5.8	1.0	1.0
X-OMAT, Model SP	38.0	28.4	4.8	4.8
X-OMAT, Model 460RA, 480RA	10.7	8.1	1.3	1.3
X-OMAT, Model 270RA	8.5	6.3	1.1	1.1
Industrial X-OMAT, Model B	38.0	28.4	4.8	4.8
INDUSTREX, Model M6-I, stainless or plastic tanks	12.0	9.0	1.5	1.5

**U.S. Measure (Gallons and Fluid Ounces) to Make Working Strength Cleaner:**

KODAK Processor	Approximate Developer Tank Volume (gallons)	Water (gallons + ounces)	Part A Concentrate (gallons + ounces)	Part B Concentrate (gallons + ounces)
VERSAMAT Models 11, 1140, 411, 811, one dev tank	4.5	3 + 48	0 + 72	0 + 72
VERSAMAT Models 11, 1140, 411, 811, two dev tanks	9.0	6 + 96	1 + 16	1 + 16
VERSAMAT, Model 5	3.25	2 + 56	0 + 52	0 + 52
DEKTOMATIC, Model 65	2.6	1 + 122	0 + 42	0 + 42
POLYMAX	3.2	2 + 51	0 + 51	0 + 51
VERSAMAT 75, DN-3	3.0	2 + 32	0 + 48	0 + 48
VERSAMAT 75, DN-5	1.5	1 + 16	0 + 24	0 + 24
PROSTAR	0.34	0 + 32	0 + 5.5	0 + 5.5
KODAMATIC, Models 42A, 42S	2.1	1 + 74	0 + 34	0 + 34
KODAMATIC, Models 65A, 66S	2.8	2 + 13	0 + 45	0 + 45
KODAMATIC, Model 520	6.9	5 + 22	0 + 110	0 + 110
KODAMATIC, Model 710	7.1	5 + 42	1 + 114	1 + 114
KODAMATIC, Model 960	9.7	7 + 35	1 + 27	1 + 27
RP X-OMAT, Models M6-N, M6A-N	2.5	1 + 112	0 + 40	0 + 40
RP X-OMAT, Model M6AW	2.5	1 + 112	0 + 40	0 + 40
RP X-OMAT, Models M6B, stainless or plastic tanks	3.16	2 + 47	0 + 51	0 + 51
RP X-OMAT, Models M7, M7A, M7B	3.25	1 + 88	0 + 36	0 + 36
RP X-OMAT, Model M8	4.3	3 + 29	0 + 69	0 + 69
X-OMAT, Model M3	20.0	15 + 0	2 + 64	2 + 64
X-OMAT, Models M4, M4A, M4B-N, full cycle	6.75	5 + 8	0 + 108	0 + 108
X-OMAT, Models M4, M4A, M4B-N, RP-converted	7.125	5 + 44	0 + 114	0 + 114
X-OMAT, Models M5-N, M5A-N	2.5	1 + 112	0 + 40	0 + 40
X-OMAT, M20 Models 1 & 2	2.5	1 + 112	0 + 40	0 + 40
X-OMAT, Models M35, M35A, M35A-M	2.07	1 + 71	0 + 33	0 + 33
X-OMAT, Model SP	10.0	7 + 64	1 + 32	1 + 32
X-OMAT, Model 460RA, 480RA	2.75	2 + 8	0 + 44	0 + 44
X-OMAT, Model 270RA	2.25	1 + 88	0 + 36	0 + 36
Industrial X-OMAT, Model B	10.0	7 + 64	1 + 32	1 + 32
INDUSTREX, Model M6-I, stainless or plastic tanks	3.16	2 + 47	0 + 51	0 + 51

## PROCESSOR CLEANUP PROCEDURES



### Warning

Improper handling, such as allowing the Cleaner to come into contact with residual developer, can form irritating sulfur dioxide fumes. Be sure to thoroughly rinse the processor tanks, racks, and recirculation system with clean water before applying Developer System Cleaner. Contamination of the Cleaner with developer will cause the color to change to yellow.

Disabling the replenishment system is recommended to prevent inadvertent contamination of the Cleaner with developer. Do not mix the Cleaner with the Neutralizer, or with other processing solutions, except as noted below.

Observe precautionary information on containers. Use caution, and wear appropriate protective clothing and eye protection when handling solutions.

Use working solutions at 65 to 95° F (18 to 35° C). The Cleaner may be used in processors that operate at up to 101° F (38° C), but resetting the developer tank temperature downward may be necessary if the Cleaner develops an annoying odor. Remember to reset the developer tank temperature to normal after cleaning is complete.

### Cleaning Racks and Tanks in One Operation

1. Completely drain the developer from the machine and remove any filters from the circulation system.
2. Thoroughly rinse the developer tank(s) and racks. If rollers are hollow, remove the racks and clean them separately to avoid contamination. (See below for cleaning racks outside of the machine.) Then fill the tank(s) with water, and turn on the recirculation pump to completely circulate the rinse water through the system.
3. Completely drain the rinse water from the tank(s), racks, and circulation system.
4. Fill the developer tank(s) with working strength Developer System Cleaner. Turn on the recirculation pump and circulate the Cleaner for 5 to 30 minutes.
5. Completely drain the Cleaner and thoroughly rinse the tank(s), racks, and recirculation system with water, and then drain, as per steps 2 and 3.

**Note:** Steps 4 and 5 may have to be repeated when cleaning a heavy buildup of silver or tar. A telltale sign that the developer tank needs a second cleaning is when the cleaner solution loses its purple color, or becomes very cloudy or murky. This happens when the cleaner is exhausted, and you should repeat steps 4 and 5.



### Warning

Failure to adequately rinse away all of the Developer System Cleaner before the Neutralizer is added can lead to the formation of irritating sulfur dioxide fumes!

6. Fill the tank(s) with working strength Neutralizer. Circulate the Neutralizer for 5 to 30 minutes.
7. Completely drain the Neutralizer and thoroughly rinse the tank(s) and racks with water. Then fill the tank(s) with water and turn on the recirculation pump to completely circulate the rinse water through the system. Completely drain the rinse water.
8. Replace racks if they were cleaned separately. Replace recirculation filters, refill the tanks with developer, and check that developer tank temperature is set to normal.

### Cleaning Racks Separately

1. Remove racks from the machine to a sink and thoroughly rinse with water to remove all traces of developer.
2. Use a wash bottle filled with working strength Developer System Cleaner to direct a stream of cleaner to the parts of the racks that require cleaning. A sponge and/or brush are also effective.



### Important

Do not use a spray bottle that will create a mist or vapor.

Occupational exposure to strong inorganic mists or vapors containing sulfuric acid is carcinogenic to humans. This product is not expected to generate mists or vapors when product instructions for mixing and use are followed. Minimize the potential for the production of aerosols.

**Note:** If the Cleaner appears to “bead up” on rack parts, rinse off the Cleaner with water, and wet the parts with a working strength solution of either KODAK Photo-flo 200 Solution, or KODAK Final Rinse, Process E-6. Then directly re-apply the cleaner.

3. When the racks are clean, thoroughly rinse with water to remove the cleaner, and drain completely.
4. Use a wash bottle filled with working strength Neutralizer to direct a stream onto the parts of the racks that were treated with Cleaner.
5. Thoroughly rinse the racks with water to remove the Neutralizer, and drain completely.
6. Reassemble racks if necessary, and return them to the processor.

## Double Cleaning Procedure for Severely Dirty Processor

1. Drain developer tank.
2. Rinse thoroughly with 80 to 100° F (27 to 38° C) water using hose.
3. Fill tank with 80 to 100° F (27 to 38° C) water. Recirculate for 5 minutes. Drain. Repeat.
4. Fill tank with working strength systems cleaner. Recirculate systems cleaner 30 minutes. Drain and rinse thoroughly with 80 to 100° F (27 to 38° C) water using hose. Repeat.
5. Fill tank with 80 to 100° F (27 to 38° C) water. Recirculate 5 minutes. Drain.
6. Fill with working strength neutralizer. Recirculate neutralizer 30 minutes. Drain and rinse thoroughly with 80 to 100° F (27 to 38° C) water using hose.
7. Remove rack to sink for separate cleaning.
8. Inspect bottom of tank for precipitates. Flush out any debris.
9. In sink, use squirt bottle to apply Developer Systems Cleaner to all rollers and rack surfaces. Scrub rollers and rack surfaces with brushes or sponges to remove silver. Rinse rack.
10. Use squirt bottle to apply neutralizer to all rollers and rack surfaces. Rinse rack.
11. Put rack back in tank.
12. Fill tank with 80 to 100° F (27 to 38° C) water. Recirculate 5 minutes. Drain. Repeat.
13. Install new filter in developer. Fill tank with fresh developer.

## Reusing Solutions

The used solutions can be saved and reused several times over a period of up to two weeks.

To maintain the efficiency of the solutions, small amounts of concentrate can be added just before reuse. As a starting point, add an amount of each concentrate equal to about 2% of the volume of the solution being reused.

For each liter of Developer System Cleaner solution being reused, add 20 ml of Cleaner, Part A concentrate and 20ml Cleaner, Part B concentrate and stir. For each liter of Neutralizer being reused, add 20 ml of Neutralizer concentrate and stir.

If the cleaning action still appears slower than normal, concentrate additions can be increased to 3 or 4%.

Some precipitate or sediment may settle out of the used Developer System Cleaner solution during storage. When preparing to reuse the cleaner, carefully pour the clear

purple solution off the top into a second container before proceeding, and discard the sediment remaining in the storage container.

Do not reuse cleaner that has lost its characteristic purple color, since this indicates the solution is completely exhausted.

## DISPOSAL

Discharge, treatment, or disposal of spent solutions may be subject to local, state, or federal laws. Contact appropriate authorities to determine the requirements that apply to the use of this product.

## Composition of the Solutions

**Developer System Cleaner:** Used Cleaner contains potassium permanganate, manganese dioxide, and sulfuric acid, and may contain a small amount of dissolved silver. The solution pH is approximately 2. (The pH of the solution may have to be raised prior to disposal.)

**Neutralizer:** Used Neutralizer contains sodium sulfite, sodium bisulfite, and citric acid. The used solution may also contain small amounts of manganese dioxide and dissolved silver.

## Effluent Considerations

The used cleaner and Neutralizer may be added to the same waste stream used for photographic developers, fixers, and wash water if recommended procedures were followed for the use of the product, including thorough rinsing of the processor tanks and racks after cleaning.

If the Cleaner mixes with dilute developer, such as might occur from developer overflow in a drain, a small quantity of manganese dioxide can form as precipitate. Subsequent use of the Neutralizer, or fixer overflow, will readily dissolve this precipitate as it goes down the drain.



## Warning

Do not allow used Cleaner to mix directly with used Neutralizer or fixer (except as noted below under "Desilvering Solutions," Step 5). Direct mixing can form irritating sulfur dioxide fumes.

In normal use, any residual Cleaner in the processor tanks, racks, and drain is well diluted with rinse water before the addition of the Neutralizer, minimizing the possibility of creating sulfur dioxide fumes. Follow proper procedures for the use and disposal of the solutions.

# KODAK Developer System Cleaner and Neutralizer

---

## Desilvering Exhausted Solutions

The level of silver in the used Cleaner solution is generally much lower than that found in used fixers. The Neutralizer generally contains even less silver than the Cleaner.

If necessary, a silver recovery cartridge can be used to remove silver from the Neutralizer. However, the use of a silver recovery cartridge is not recommended to remove silver from the Cleaner, since the low pH of the solution will greatly reduce the capacity of the cartridge. If local sewer codes require reduction in the silver content of the Cleaner effluent, check with local authorities for approval of the procedure outlined below.

1. Collect the used Cleaner, and add a solution of sodium chloride (table salt is acceptable) to yield 2 grams of salt per liter (7.5 g / gallon) in the combined mixture. Stir the salt solution thoroughly into the used Cleaner.
2. Let the mixture stand for a few hours to settle a small amount of precipitate containing manganese dioxide and most of the silver that was in the solution. The silver will be in the form of silver chloride.
3. Depending on local requirements, the clear liquid above the precipitate may have to be tested to verify that the silver level is low enough to allow discharge.
4. Separate as much of the used Cleaner liquid from the precipitate as possible. (Removing 90 to 95% of the liquid is sufficient.) If the removed liquid complies with local sewer codes, it can be discharged to the waste stream.
5. Add the remaining volume of solution that contains the precipitate to at least a 10 times greater volume of used Neutralizer or exhausted fixer. The precipitate, including the silver chloride, will dissolve.
6. Treat this solution in a silver recovery cartridge to remove the silver.

**Note:** If you have questions or need assistance, contact your local Kodak representative.

**Note:** The contents of this publication are subject to change without notice.

Kodak, Photo-Flo, Versamat, Dektomatic, Polymax, Prostar, Kodamatic, X-Omat, and Industrex are trademarks.

Revised 3-10

KODAK Developer System Cleaner and  
Neutralizer  
KODAK Publication No. TI-2000