



Materials Suitable for Use in Photographic Processing Systems

When you select materials for use in a processing system, keep in mind both general and specific requirements. This list will help you to determine if a material is correct for a specific use, and to select an appropriate material for repair or replacement parts.

Materials Suitable For Use In Photographic Processing Systems
Chemical and Photographic Activity

Material	Developers	Mild Acid Rinse	Fixing Bath	Dichromate Bleach	Ferricvanide Bleach	Ferric Chloride Bleach	Fe EDTA or Fe EDTA Bleaches and Bleach-Fixes	Potassium Permanganate Bleach	Persulfate Bleach	Wash	Common Application	Remarks
METALS (rolled, drawn, or wrought)												
Aluminum	N	N	N	N	N	N	N	N	N	N	2, 3, 7	Avoid excessive flow velocity pipes or attrition due to undissolved solids. In ferricvanide bleach, corrosion deposits form and, without proper care, can be deposited on film, etc.
Brass, Red (85% copper)	N	N	N	N	*	N	N	N	N	N	2*, 3*, 7*	
Brass, Yellow (65% copper)	N	N	N	N	N	N	N	N	N	N	2*, 3*, 7*	
Bronze, Silicone	N	N	N	N	*	N	N	N	N	N	2*, 3*, 7*	
Copper (deoxidized)	N	N	N	N	*	N	N	N	N	N	2*, 3*, 7*	
<i>Hastelloy C</i>	S	S	S	S	S	N	S	S	S	S	1-7	For hardened springs
<i>Illium R Alloy</i>	S	S	S	S	*	—	—	S	*	S	5, 6	
<i>Incoloy 825</i>	S	S	S	S	*	N	—	S	*	S	7	
<i>Inconel Alloy</i>	S	*	N	*	*	N	—	*	*	S	1, 2, 3, 4, 5, 7	
Iron	N	N	N	N	N	N	N	N	N	N	2, 3, 5	
Lead	N	N	N	*	*	N	N	—	N	N	6	For sink and small-tank linings; also weights for clips. Corrosion deposits form and can be deposited on film, etc.
<i>Monel</i>	*	N	N	N	N	N	—	—	N	S	2-7	
Nichrome Alloys, Various	*	N	N	—	—	N	—	—	—	N	6	
Nickel	S	N	N	N	N	—	—	—	N	*	2-7	
Nickel Silver (German)	N	N	N	N	N	—	—	—	—	N	—	
Silver	S	S	S	S	S	N	—	N	N	S	6	
Silver Solder (45% silver min.)	*	*	N	N	N	N	—	N	N	*	—	
Solder (tin-lead)	N	N	N	N	N	N	—	N	N	N	—	

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Stainless steels												
AISI Type 302	S	*	N	N	N	N	N	N	N	*	1, 2, 3, 4, 6, 7	
AISI Type 303 (without selenium)	S	*	N	N	N	N	N	N	N	*	1, 4, 6	
AISI Type 303 (selenium-bearing)	S	N	N	N	N	N	N	N	N	N	1, 4, 6	
AISI Type 304 & 304L	S	*	N	N	N	N	N	S	N	*	1 - 4, 6, 7	
AISI Type 316 & 316L	S	S	S	S	*	N	*	S	*	S	1 - 4, 6, 7	
AISI Type 321, 347, 348	S	*	N	N	N	N	-	-	-	*	1 - 4, 6, 7	
AISI Type 420	*	*	N	N	N	N	-	-	-	*	5, 6	For hardened springs, wearing parts, sprockets, chain, etc. Parts must be completely immersed.
AISI Type 430	*	*	N	N	N	N	-	-	-	*	1, 4, 6, 7	Parts must be completely immersed.
Carpenter 20Cb-3	S	S	S	S	*	N	-	-	-	S	1-7	
Tantalum	N	S	S	S	S	-	-	S	-	S	2, 3, 6	
Tin N	N	N	N	N	N	N	N	N	N	N	2, 3	
Titanium	S	S	S	S	S	S	S	S	S	S	1, 2, 3, 5, 7	Must be welded in an inert atmosphere
Zinc	N	N	N	N	N	N	N	N	N	N	-	

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METALS, CAST												
Bronze. Silicon e.n., <i>Everdue Alloy</i>	N	N	N	N	*	N	—	—	—	N	2*, 3*, 5*, 6*	See "Brass, Red," under "Metals."
<i>Chlorimet 3</i>	S	S	S	S	N	—	—	—	—	S	2,3,5,6	For chemical-drain piping.
<i>Durichlor</i>	—	N	N	N	N	—	—	—	—	N	2, 3, 5, 6	For chemical-drain piping.
<i>Durimet 20</i>	S	S	S	S	N	—	—	—	—	S	2, 3, 5, 6	For chemical-drain piping.
<i>Duriron</i>	—	N	N	N	N	—	—	—	—	N	2, 3, 5, 6	For chemical-drain piping.
<i>Hastelloy C</i>	S	S	S	S	S	N	S	—	—	S	2, 3,4, 6	
<i>Illium G Alloy</i>	S	S	S	S	N	—	—	—	—	S	2, 3, 5, 6	
<i>Inconel Alloy</i>	S	*	N	*	*	N	—	—	—	S	2, 3, 5, 6	
Iron N	N	N	N	N	N	N	N	—	—	N	2, 3, 5, 6	
<i>Ni-Resist</i>	—	N	N	N	N	N	—	—	—	N	2, 3, 5, 6	For chemical-drain piping.
Stainless steels												
ACI Designation, CF-8 (AISI Type 304)	S	*	N	N	N	N	N	—	—	*	2, 3, 5, 6	
ACI Designation, CF-8C (AISI Type 347)	S	*	N	N	N	N	—	—	—	*	2, 5, 6	
ACI Designation, CF-8M (AISI Type 316)	S	S	S	S	N	N	*	—	—	S	2, 5, 6	
<i>Stellite No. 1</i>	S	S	S	S	S	—	—	—	—	S	6	For hardened-wear surfaces.
<i>Worthite</i>	S	S	S	S	N	—	—	—	—	S	2, 5	

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COATED METALS (STEEL)												
Acrylic BFC (BFC 66-01)	*	—	*	—	—	—	—	—	—	—	1*, 6*, 7*	Softens and stains.
Epoxy												
Carboline 110	N	—	N	—	—	—	—	—	—	—	1*, 4*, 6*, 7*	Softens and stains.
Crete Patch (mastic)	S	S	S	S	S	—	—	—	—	S	—	For floor finish.
Ebon 1001, 1007 (with Shell amine catalyst)	S	S	S	S	S	—	—	—	—	S	1, 4, 6, 7	
Epoxy Series A	S	—	S	—	—	—	—	—	—	—	1, 4, 6, 7	Stains.
Phenoline 300 (mastic)	S	S	S	S	S	—	—	—	—	S	—	For floor finish.
Tropical No. 1	N	—	N	—	—	—	—	—	—	—	1, 4, 6, 7	Softens and stains.
Epoxy-Tar	S	S	S	S	S	—	—	—	—	S	6, 7	For concrete also.
Furan (Jet-Kote)	—	—	—	S	S	—	—	—	—	—	6, 7	Brittle: fractures on impact.
Glass	S	S	S	S	S	S	S	—	—	S	2*, 3*, 5*, 6*, 7*	Brittle: fractures on impact.
Hard Rubber	*	S	S	S	S	—	—	—	—	S	2, 3, 5, 6, 7	Possibly fluidized bed coatings would be useful.
Polyethylene	S	S	S	S	S	S	S	—	—	S	—	
Polyvinyl Chloride Plastisol	S	S	S	S	S	—	—	—	—	S	6, 7	
Ployvinylidene Chloride (Saran)	S	S	S	S	S	S	S	—	—	S	2, 3	
Urthane (BFC 91 series)	S	—	S	—	—	—	—	—	—	—	1, 4, 6, 7	
Vitreous Enamel	S	S	S	S	S	S	S	—	—	S	6	Brittle: fractures on impact

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THERMOPLASTIC												
ABS (Acrylonitrile-Butadiene-Styrene)*	S	S	S	S	S	S	S	—	N	S	2, 3, 5, 6, 7	Softens in glacial acetic acid.
Acetal												
homopolymer	*	N	N	N	N	N	*	—	N	S	5*, 6	
copolymer	S	—	N	N	N	N	*	—	—	S	5, 6	
Methyl Methacrylate	N	S	S	S	S	*	—	—	N	S	2, 3, 6	
Cellulose Acetate-Butyrate	N	S	S	—	—	—	—	—	—	S	—	
Methylpentene	*	S	S	S	S	—	—	—	—	S	—	
Nylon	S	S	S	S	S	N	S	—	N	S	6	
Polyaryl ether	S	S	S	S	S	S	S	—	—	S	2, 3, 5, 6, 7	
Polycarbonate	N	S	S	—	—	N	N	—	N	S	6	Stress cracks in developers.
Polychlorotrifluoroethylene	S	S	S	S	S	S	S	S	S	S	5, 6	
Polyethylene	S	S	S	S	S	S	S	S	S	S	2, 3, 5, 6, 7	Susceptible to stress-corrosion cracking.
Polyimide	*	S	S	S	S	—	S	—	—	S	6	
Polyphenylene oxide	S	S	S	S	S	S	S	—	—	S	2, 3, 5, 6, 7	
Polyphenylene sulfide	S	S	S	S	S	S	S	—	—	S	2, 3, 5, 6, 7	
Polypropylene	S	S	S	S	S	S	S	S	S	S	2, 3, 5, 6, 7	
Polystyrene	*	S	S	S	S	S	S	—	—	S	6	Some grades are brittle.
Polysulfone	S	S	S	S	S	S	S	—	—	S	2, 3, 5, 6, 7	
Polytetrafluoroethylene	S	S	S	S	S	S	S	S	S	S	5, 6	For gaskets, pumps, seals, bushings, bearings, cams, gears.
Polyurethane	N	N	*	—	—	N	—	*	N	S	6	
Polyvinyl Chloride (rigid Type 1)	S	S	S	S	S	S	S	*	S	S	2-7	
Polyvinyl Chloride (rigid Type 2)	—	—	—	—	—	—	—	—	S	—	—	
Polyvinyl Dichloride	S	S	S	S	S	S	S	—	*	S	2-7	
Polyvinylidene Chloride	S	S	S	S	S	S	S	—	—	S	6, 7	Preseasoning recommended before use.
SAN (Styrene-Acrylonitrile)	N	S	S	S	S	S	S	—	—	S		

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Thermosets												
Allyl Cr-39	S	S	S	S	S	*	—	—	—	S	6	Without reinforcement, restricted to small parts.
Epoxy with Fiber-Glass Reinforcement	S	S	S	S	S	*	—	*	—	S	1, 4, 6, 7	
Hard Rubber	S	S	S	S	S	—	—	—	—	S	6, 7	Somewhat brittle.
Phenol-Formaldehyde with	N	S	S	*	S	*	0	0	0	S	6	Somewhat brittle.
Cotton- or Nylon-Fabric Reinforcement	N	S	S	*	S	—	—	—	—	S	4, 6	More dimensionally stable in solutions if nylon-reinforced.
Polyester with Fiber-Glass Reinforcement	S	S	S	S	S	*	*	*	—	S	1, 4, 5, 7	Styrene component must be fully reacted to prevent harmful photographic effects.

RUBBERS AND ELASTOMERS

All commercial synthetic and natural rubbers contain sulfur in some form, usually in added vulcanizers, accelerators, or stabilizers. Sulfur compounds tend to desensitize photographic emulsions in the developer and the predeveloper steps. The amount of desensitization will depend on the type and amount of sulfur compound and on the process in which the rubber is used.

A number of rubber compositions have been developed that do not cause more desensitization than can normally be tolerated. Rubbers of this type are termed "low-desensitizing" or "sulfur-free," although they do contain sulfur and do cause some desensitization. The term "pure gum rubber" merely indicates a lack of filler, and in no way implies any lack of tendency to desensitize.

Most rubber are suitable in all photographic processing solutions only from a strict chemical-suitability standpoint.

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SYNTHETIC ELASTOMERS												
Chloroprene (<i>Neoprene</i>)	—	—	—	—	—	—	—	—	N	—	3	The synthetic elastomers are likely to produce photographic-activity effects in developers and predeveloper baths.
Chlorosulfonated Polyethylene (<i>Hypalon</i>)	—	—	—	—	—	—	—	—	N	—	3	Check the photographic activity before using these materials.
Ethylene Propylene Diene Terpolymer (EPDM)	—	—	—	—	—	—	—	—	*	—	3	
Fluoroelastomer (<i>Viton A</i>)	—	—	—	—	—	—	—	—	S	—	3	
Isobutylene Isoprene (<i>Butyl</i>)	—	—	—	—	—	—	—	—	N	—	3	
Nitrile (<i>Buna N</i>)	—	—	—	—	—	—	—	—	N	—	3	
Polyvinyl Chloride, Flexible												
<i>Koroseal</i> 116 K-PVC-75	*	S	S	S	S	S	S	—	—	S	3	Primarily for tubing
<i>Mayon</i> (food grade)	*	S	S	S	S	S	S	*	*	S	3	
<i>Excelon</i> RLB 1060	*	S	S	S	S	S	S	—	—	S	3	
Polyvinylchloride-Acetate, Flexible												
<i>Tygon</i> R-3603	*	S	S	S	S	*	—	—	*	S	3	
Silicone (RTV 60)	—	—	—	—	—	—	—	S	S	—	3	
Vulcanized Silicone	—	—	—	—	—	—	—	—	*	—	3	

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MISCELLANEOUS												
Alberene Stone, Grade 25	S	S	S	S	S	—	—	S	—	S	6	Brittle
Carbon	S	S	S	S	S	—	—	—	—	S	—	
Carbon-Plastic Composition (<i>Karbate grand</i>)	*	S	S	S	S	—	—	—	—	S	2*, 3*	
Glass, Heat-Resisting	S	S	S	S	S	S	S	S	S	S	2*, 3*, 5*, 6*	
Plywood (fully waterproof phenolic resin-bonded)	*	S	*	N	S	—	—	—	—	S	6*	
Vitreous Stoneware (Chemical Stoneware)	S	S	S	S	S	—	—	—	—	S	6*, 7*	
Wood (e.g., cypress)	*	S	*	N	S	—	—	—	—	S	6*, 7*	For platforms, stairs, supports near vessels.

KEY

S = Satisfactory

* = Use Questionable

N = Not Satisfactory

1 = Film handlers; devices that do not remain continuously in the solution and can be cleaned easily; tanks and trays for short-duration use.

2 = Fittings, particularly pipe fittings, valves, and faucets.

3 = Pipe, including tubing, used for transfer of liquids; usually not cleaned frequently.

4 = Racks, sprockets (metal only), and idlers that are immersed continuously or intermittently.

5 = Pumps.

6 = Small parts, trays, small tanks, paddles, brackets (metal only), etc., that may be continuously immersed or in contact with solution.

7 = Large tanks.

Materials Suitable for Use in Photographic Processing Systems

Consumer Imaging
EASTMAN KODAK COMPANY • ROCHESTER, NY 14650

