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An ILFORD Textbook

ILFORD

FORMULAE & PACKED CHEMICALS

ILFORD FORMULAE

AND PACKED CHEMICALS

AN **ILFORD** TEXTBOOK : PRICE ONE AND SIXPENCE

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Note to the Fourteenth Edition

A continuing demand for "the Ilford formula book" has warranted a completely new edition. This has provided an opportunity for rearranging the contents and it is believed that individual formulae will now be found more quickly.

New formulae which have come into general use in the past few years have been added, while some little-used formulae have been discontinued. Phenidone, a remarkable new developing agent produced in the Ilford Research Laboratories, is mentioned in the book for the first time.

When "Ilford Formulae" first appeared it was general practice for the photographer to compound his own solutions. Today, packed chemicals are widely used as a more convenient and more exact way of making up solutions. This change is reflected in the changed title of the book, which also draws attention to the growing Ilford range of packed chemicals in both solid and liquid forms.

March, 1953

'Phenidone' is a registered trade mark.

Extract from Terms of Business

PACKED CHEMICALS—Alteration of Published Formulae. Publication by us of the details of any of our photographic formulae is done to assist those who wish to make up their own preparations and for general information purposes only. While the packed chemicals sold by us will have approximately the same characteristics in use as preparations made up in accordance with the corresponding published formula the ingredients and weights used by us in the making them up may not be the same in all respects as those published.

GENERAL INFORMATION

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GENERAL INFORMATION

Making up solutions

In this book, quantities of solids are given in both British avoirdupois units and in metric units; liquids are expressed in Imperial and metric liquid units.

In making up a solution to a formula, either the avoirdupois system (the left-hand column) or the metric system (the right-hand column) must be followed throughout. Whichever system is adopted, the finished solution will have the same composition, but figures from the two columns must not be interchanged.

Dissolve the chemicals in the order given, using about three-quarters of the total water required. This water should be hot, at about 125° F (52° C.), and then cold water should be added to make up the full amount.

In formulae containing sulphuric acid, the acid must be added to the water, drop by drop; adding water to the acid is highly dangerous.

Substitution of chemicals

In formulae containing sodium sulphite, the quantities given are for sodium sulphite, crystalline. If sodium sulphite, anhydrous is used the quantities given must be halved.

In formulae containing sodium carbonate, the quantities given are for sodium carbonate, crystalline (decahydrate). If sodium carbonate, anhydrous is used the quantities given must be multiplied by three-eighths. If sodium carbonate, monohydrate is used the quantities given must be multiplied by four-ninths.

INTRODUCING PHENIDONE

Photographic developers

The developers used in practical photography are with very few exceptions compounded with mixtures of metol (usually known as Elon in the United States) and hydroquinone. The success of this mixture depends on the fact that the photographic properties of the mixture are superior to those of its components taken separately, and are not just equal to their sum or arithmetic mean.

The developing properties of hydroquinone were discovered more than 70 years ago (Abney, 1880) and metol was introduced by Hauff in 1891. Although hundreds of organic compounds capable of developing silver halides are known, the metol-hydroquinone mixture has retained its popularity because nothing had been found, until recently, to equal it in all-round efficiency and flexibility.

For special purposes other developers have found favour—well-known examples are the hydroquinone-caustic developers used for extreme contrast and the glycin developers used for warm tones—but for general photography and radiography nothing was known more efficient or economical than the M.Q. mixture. Familiar examples are the Ilford ID-2, ID-20 and ID-36 M.Q. formulae.

A new developing agent

It has been discovered recently in the Ilford laboratories* that phenyl pyrazolidone—Phenidone for short—has most of the properties of metol together with some quite

* See Kendall, J. D., *Phot. J.*, 91B, 124-5 (November-December, 1951).

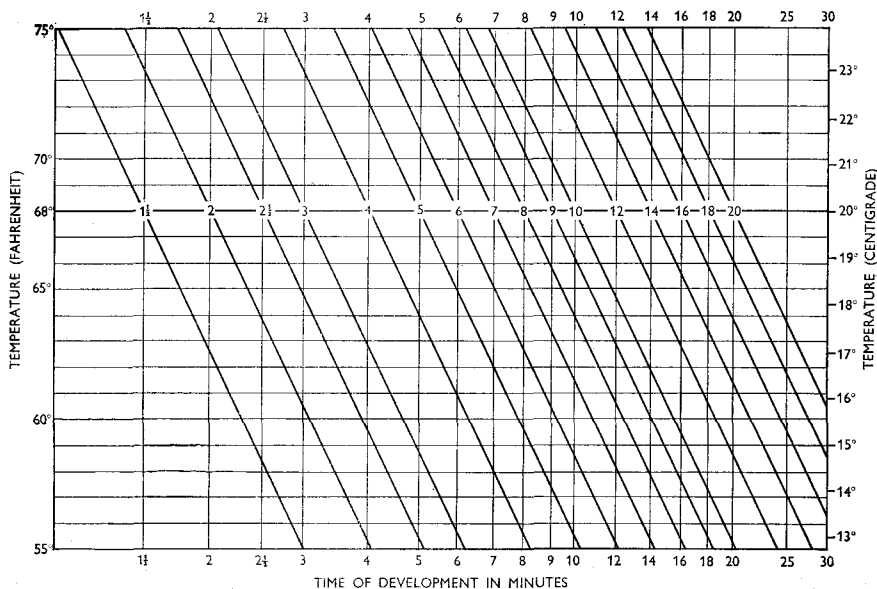
Kendall, J. D., *B. J. Phot. C*, 4837, 56-7 (30th January, 1953).

DEVELOPMENT TIMES

The figures in the table opposite are the recommended times in minutes for development at 68° F. (20° C.), the recommended standard temperature. The times quoted for dish development apply when continuous agitation is given; those for tank development apply to intermittent agitation. The times quoted are recommended for general work; for portrait negatives they should be reduced by about one-third.

If it is not possible to work at 68° F. (20° C.), the development time required for another temperature may be ascertained approximately from the Ilford Time-temperature Development Chart given below.

ILFORD TIME-TEMPERATURE DEVELOPMENT CHART



To use the chart, first note in the table on page 7, the development time recommended at 68° F. (20° C.). Then follow the diagonal line corresponding to this time until it meets the horizontal line representing the temperature selected. The intersecting vertical line gives the development time required.

DEVELOPMENT TIMES

IN MINUTES AT 68° F. (20° C.)

Ilford material	Dish development times (see key below)		Tank development times (see key below)			
	(1)	(2)	(3)	(4)	(5)	(6)
ROLL FILMS						
Selochrome	4½	3½	8½	6½	9	9
FP3	3¾	2¾	7½	5½	8½	8½
HP3	4¾	3½	9	7	10	10
35 mm MINIATURE FILMS						
Pan F	—	—	—	—	6½	7½
FP3	—	—	—	—	8½	8½
HP3	—	—	—	—	10	10
FLAT FILMS						
N8.30 Fine Grain Ordinary						
Series 2	2	1½	4	3	7½	—
G8.30 Commercial Ortho ..	5	3¾	10	7½	12	—
Selochrome	3½	2½	7	5	7½	7½
Hyperchromatic	7	5	14	10	16	—
FP3	4¾	3½	9	7	10	10
HP3	4¾	3½	8½	6½	9	9
HPS	6	4½	12	9	14	14
PLATES						
N. 30 Ordinary	1¾	1¼	3½	2½	3¾	—
N. 25 Soft Ordinary	2½	2	5	4	6	—
Special Rapid	2½	2	5	4	6	—
Zenith	5	3¾	10	7½	12	—
G.30 Chromatic	2	1½	3¾	3	4¼	—
Selochrome	3	2¼	6	4½	6½	6½
Orthotone	3	2¼	6	4½	8½	—
R. 25 FP Special	2	1½	4	3	9	6
R.10 Special Rapid Panchromatic	2½	2	5	4	6	—
R.10 Soft Gradation Panchromatic	4¾	3½	9	7	10	10
FP4	4	3	8	6	9	9
HP3	4¾	3¾	8½	6½	9	9
HPS	6	4½	12	9	—	—

KEY TO DEVELOPERS

- | | |
|---|--|
| (1) ID-2 (1+2)
or PQ Universal (1+9) | (4) ID-36 (1+7)
ID-62 (1+7)
or PFP (1+3) |
| (2) ID-36 (1+3)
or ID-62 (1+3)
or PFP (1+1) | (5) ID-11 |
| (3) ID-2 (1+5)
or PQ Universal (1+19) | (6) ID-48 |

WEIGHTS & MEASURES

WEIGHTS

British avoirdupois units

1 dram	= 27.4 grains
16 drams	= 1 ounce
$\frac{1}{4}$ ounce	= 109 grains
$\frac{1}{2}$ ounce	= 219 grains
1 ounce	= 437.5 grains
16 ounces	= 1 pound
1 pound	= 7000 grains

Metric units

1000 milligrams	= 1 gram
1000 grams	= 1 kilogram

MEASURES

Imperial liquid units

1 fluid dram	= 60 minims
8 fluid drams	= 1 fluid ounce
1 fluid ounce	= 480 minims
20 fluid ounces	= 1 pint
2 pints	= 1 quart
4 quarts	= 1 Imp. gallon
1 Imp. gallon	= 480 fluid ounces
(1 fluid ounce of water weighs 1 ounce	
1 gallon of water weighs 10 pound	
1 cubic foot of water weighs 62.27lb.)	

Metric units

1 cubic cm.	= 1 millilitre
1000 cubic cm.	= 1 litre

CONVERSION RATIOS BETWEEN BRITISH AND METRIC UNITS

Weights

1 grain	= 64.8 milligrams
1 dram	= 1.77 grams
1 ounce	= 28.4 grams
1 pound	= 453.6 grams
1 gram	= 15.43 grains
	= 5.6432 drams
	= 0.0352 ounces

Measures

1 fluid dram	= 3.55 cubic cm.
1 fluid ounce	= 28.4 cubic cm.
1 pint	= 568.2 cubic cm.
1 gallon	= 4.546 litres

1 cubic cm.	= 16.9 minims
	= 0.282 fluid drams
	= 0.0353 fluid oz.
1 litre	= 35 $\frac{1}{4}$ fluid ounces (approx.)

American measures

In the U.S.A. fluid measure is different.

1 fluid ounce	= 29.6 cubic cm.
1 pint	= 16 fluid ounces = 473.1 cubic cm.
1 gallon	= 128 fluid ounces = 3.785 litres

TEMPERATURE SCALES

To convert Centigrade to Fahrenheit: multiply by $\frac{9}{5}$ and then add 32.

To convert Fahrenheit to Centigrade: subtract 32 and then multiply by $\frac{5}{9}$.

ILFORD DEVELOPERS

		Supplied as a packed chemical	page
ID-1	Pyro-soda	—	12
ID-2	Metol-hydroquinone	P	12
ID-3	Metol	—	13
	For films and plates		
	For films, plates and enlarging papers		
ID-4	Pyro-metol	—	13
ID-6	Pyro-metol-hydroquinone	—	13
	For bulk development of roll films		
ID-6R	Replenisher for ID-6	—	14
ID-9	Amidol	—	14
ID-11	Fine Grain	P	14
ID-13	Hydroquinone-caustic	—	15
	For high-contrast films and plates		
ID-19	X-ray	P	15
ID-19R	Replenisher for ID-19	P	16
ID-19	Dental X-ray	P	16
* ID-20	Phenidone-hydroquinone	P	16
ID-20	Metol-hydroquinone	—	17
ID-22	Amidol	—	17
ID-33	Oscillograph	P	17
ID-34	Metol-hydroquinone	—	18
	For bulk development of roll films		
ID-34R	Replenisher for ID-34	—	18
ID-36	Metol-hydroquinone	P	18
* ID-36	Phenidone-hydroquinone	P	19
* ID-42	Blue Label	P	19
* ID-42R	Replenisher for ID-42	P	19
* ID-46	Long Life	P	20
* ID-47	Rapid Radiographic X-ray	P	20
* ID-48	Extra Fine Grain	P	20
	For films and plates		

* Formula not published

P—packed in powder form
continued overleaf

ILFORD DEVELOPERS

Continued

		Supplied as a packed chemical	page
ID-55 Metol-hydroquinone	For documents and photo- mechanical papers	—	21
ID-60 Glycin	For films and plates	—	21
ID-61 Glycin-hydroquinone	For Plastika paper	—	21
ID-62 Phenidone-hydroquinone	For films, plates & papers	—	22
* ID-66	For bromide paper for picture telegraph equip- ment	L	22
* Caustic-hydroquinone	For high contrast films and plates	P	22
* Concentrated Dental X-ray	—	L	23
* Concentrated X-ray	—	L	23
* Replenisher for Concentrated X-ray	—	L	23
* Contrast FF	For films, plates & papers	L	24
* Document Paper	For document and photo- mechanical papers	P	24
* Formalith	For "lith-type" films and plates	P	24
* PFP	For films, plates & papers	P	25
* PQ Universal	For films, plates & papers	L	25

* Formula not published

P—packed in powder form

L—packed in liquid form

A GUIDE TO

THE SELECTION OF

ILFORD DEVELOPERS

FOR FILMS, PLATES AND PAPERS (Universal Developers)	ID-36, ID-62, Contrast FF, PFP, PQ Universal
FOR ROLL FILMS	<i>For general use</i> ID-2, ID-36, PFP, PQ Universal <i>For fine grain</i> ID-11, ID-48 <i>For bulk D. & P. development</i> ID-6, ID-6R, ID-34, ID-34R, ID-46
FOR 35 mm. MINIATURE FILMS	ID-11, ID-48
FOR FLAT FILMS AND PLATES	<i>For normal contrast</i> ID-1, ID-2, ID-4, ID-9, ID-36 ID-46, ID-62, Contrast FF, PFP, PQ Universal <i>For high contrast</i> ID-2, ID-13, ID-19, ID-19R Caustic-hydroquinone, Contrast FF Formalith (for "lith-type" films and plates only) <i>For low contrast</i> ID-3, ID-11, ID-60 <i>For fine grain</i> ID-11, ID-48
FOR LANTERN PLATES	ID-20, ID-36, PFP, PQ Universal
FOR X-RAY FILMS AND PAPERS	ID-19, ID-19R, ID-42, ID-42R, ID-47, Concentrated X-ray Developer and Replenisher, Concentrated Dental X-ray
FOR FILMS FOR MASS MINIATURE RADIOGRAPHY	ID-42, ID-42R
FOR RECORDING FILMS AND PAPERS	ID-19, ID-19R, ID-33, ID-47
FOR AERIAL FILMS	ID-3, ID-19, ID-19R
FOR CONTACT PAPERS	ID-36, Contrast FF, PFP, PQ Universal
FOR ENLARGING PAPERS	ID-3, ID-20, ID-22, ID-36, ID-61, ID-66 (for picture tele- graph equipment only), Contrast FF, PFP, PQ Universal
FOR DOCUMENT AND PHOTOMECHANICAL PAPERS	ID-55, Document Paper

DEVELOPERS

ID-1

Pyro-Soda

A general-purpose staining developer for films and plates.

STOCK SOLUTION A

Potassium metabisulphite	2 oz.	} or {	25 g.
Pyrogalllic acid	8 oz.		100 g.
Water, up to	80 oz.		1000 c.c.

Ensure that the potassium metabisulphite is dissolved before adding the pyrogalllic acid.

STOCK SOLUTION B

Sodium carbonate, cryst.	8 oz.	} or {	100 g.
Sodium sulphite, cryst.	8 oz.		100 g.
Potassium bromide	42 gr.		1.2 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

Dish: Mix 1 part A, 10 parts B, 9 parts water.

Tank: Mix 1 part A, 5 parts B, 20 parts water.

ID-2

Metol-
Hydroquinone

The standard M.Q. developer for films and plates, and a non-caustic developer for high-contrast graphic arts films and plates.

STOCK SOLUTION

Metol	70 gr.	} or {	2 g.
Sodium sulphite, cryst.	12 oz.		150 g.
Hydroquinone	280 gr.		8 g.
Sodium carbonate, cryst.	8 oz.		100 g.
Potassium bromide	70 gr.		2 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

FOR NORMAL USE

Dish: Dilute 1 part with 2 parts water.

Tank: Dilute 1 part with 5 parts water.

FOR LINE AND SCREEN WORK (High Contrast)

Use at stock solution strength.

REPLENISHER FOR TANK DEVELOPMENT

Make up as for tank strength developer but omit the potassium bromide.

ID-2 is available as an Ilford packed developer, in powder form, in amounts to make:

80 oz. (2.25 litres) stock solution or **1½ galls.** (6.75 litres) working solution (dish).

1 gall. (4.5 litres) stock solution or **3 galls.** (13.5 litres) working solution (dish).

2½ galls. (11.25 litres) stock solution or **7½ galls.** (33.75 litres) working solution (dish).

DEVELOPERS

A soft-working developer for films and plates, giving maximum emulsion speed. Also suitable for enlarging papers when a softer result than that given by ID-20 is required.

STOCK SOLUTION A

Metol	420 gr.	} or {	12 g.
Sodium sulphite, cryst.	8 oz.		100 g.
Water, up to	80 oz.		1000 c.c.

STOCK SOLUTION B

Sodium carbonate, cryst.	16 oz.	} or {	200 g.
Potassium bromide	70 gr.		2 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

Dish or tank: Mix 1 part A, 1 part B and 6 parts water.

Note.—If desired, ID-3 may be made up as a single-solution developer, but where consistency of performance is required, e.g. in colour work, the two-solution formula given is strongly recommended, having greatly improved keeping qualities.

ID-3

Metol

An energetic staining dish developer for films and plates.

STOCK SOLUTION A

Metol	140 gr.	} or {	4 g.
Potassium metabisulphite	420 gr.		12 g.
Pyrogalllic acid	420 gr.		12 g.
Water, up to	80 oz.		1000 c.c.

STOCK SOLUTION B

Sodium carbonate, cryst.	16 oz.	} or {	200 g.
Water, up	80 oz.		1000 c.c.

WORKING STRENGTH

Dish: Mix equal parts of A and B.

ID-4

Pyro-Metol

An energetic pyro-metol-hydroquinone developer for the bulk development of roll films in D. & P. tanks.

Metol	21 gr.	} or {	0.6 g.
Sodium sulphite, cryst.	1 oz. 175 gr.		17.5 g.
Sodium bisulphite	350 gr.		10 g.
Hydroquinone	119 gr.		3.4 g.
Pyrogalllic acid	21 gr.		0.6 g.
Sodium carbonate, cryst.	4 oz.		50 g.
Potassium bromide	1½ gr.		0.05 g.
Water, up to	80 oz.		1000 c.c.

Use in tank without dilution.

ID-6

P.M.Q.
Roll Film Tank

DEVELOPERS

ID-6R

Replenisher
for ID-6

A replenisher designed to maintain the activity of ID-6 developer, and thus prolong its life.

STOCK SOLUTION

Metol	$\frac{1}{4}$ oz.	} or {	3.1 g.
Sodium sulphite, cryst.	4 oz.		50 g.
Sodium bisulphite	2 oz.		25 g.
Hydroquinone	$\frac{3}{4}$ oz.		9.4 g.
Sodium carbonate, cryst.	12 oz.		150 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

Dilute with an equal quantity of water and add to the developer tank as required to maintain the level of the solution.

ID-9

Amidol

An amidol developer for films and plates.

Sodium sulphite, cryst.	16 oz.	} or {	200 g.
Amidol	1 oz. 262 gr.		20 g.
Potassium bromide	210 gr.		6 g.
Water, up to	80 oz.		1000 c.c.

Use in dish without dilution.

In common with other amidol developers ID-9 does not keep well and should be made up as required.

ID-11

Fine Grain

An M.Q. borax developer for films and plates. Gives grain fine enough for all normal requirements without loss of emulsion speed.

Metol	70 gr.	} or {	2 g.
Sodium sulphite, cryst.	16 oz.		200 g.
Hydroquinone	175 gr.		5 g.
Borax	70 gr.		2 g.
Water, up to	80 oz.		1000 c.c.

Use without dilution in dish or tank.

ID-11 is available as an Ilford packed developer, in powder form, in amounts to make:

10 oz. (285 c.c.) working solution.

20 oz. (570 c.c.) working solution.

80 oz. (2.25 litres) working solution.

1 gall. (4.5 litres) working solution.

3 galls. (13.5 litres) working solution.

DEVELOPERS

For maximum contrast in line and screen negatives and positives.

STOCK SOLUTION A

Hydroquinone	2 oz.	} or {	25 g.
Potassium metabisulphite	2 oz.		25 g.
Potassium bromide	2 oz.		25 g.
Water, up to	80 oz.		1000 c.c.

STOCK SOLUTION B

Potassium hydroxide (caustic potash)	4 oz.	} or {	50 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

Dish: Mix equal parts of A and B, before use, and allow to cool.

An Ilford packed developer—Ilford Caustic-hydroquinone developer—giving similar results in use to ID-13 is described on page 22.

ID-13

Hydroquinone-
Caustic

The standard developer for X-ray films and papers, aerial films and scientific materials requiring an active M.Q. developer.

STOCK SOLUTION

Metol	77 gr.	} or {	2.2 g.
Sodium sulphite, cryst.	11 oz. 227 gr.		144 g.
Hydroquinone	308 gr.		8.8 g.
Sodium carbonate, cryst.	10 oz. 175 gr.		130 g.
Potassium bromide	140 gr.		4 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

X-RAY FILMS AND PAPERS

Use without dilution.

AERIAL FILMS

Use without dilution.

SCIENTIFIC MATERIALS

See instructions issued with the material concerned.

ID-19 is available as an Ilford packed developer, in powder form, in amounts to make:

80 oz. (2.25 litres) working solution.

1 gall. (4.5 litres) working solution.

2 galls. (9 litres) working solution.

3 galls. (13.5 litres) working solution.

5 galls. (22.5 litres) working solution.

(See also page 16.)

ID-19

X-ray

DEVELOPERS

ID-19R

Replenisher
for ID-19

A replenisher designed to maintain the activity of ID-19 developer and thus prolong its life.

Metol	140 gr.	} or {	4 g.
Sodium sulphite, cryst.	11 oz. 227 gr.		144 g.
Hydroquinone	1 oz. 122 gr.		16 g.
Sodium carbonate, cryst.	10 oz. 175 gr.		130 g.
Sodium hydroxide (caustic soda)	262 gr.		7.5 g.
Water, up to	80 oz.		1000 c.c.

Add to the developer tank as required to maintain the level of the solution. Under normal working conditions, where the tank is in regular use, a total quantity of replenisher equal to that of the original developer may be added before it becomes necessary to discard the solution and clean out the tank.

ID-19R is available as an Ilford packed replenisher, in powder form, in amounts to make:

- 1 gall. (4.5 litres) working solution (in two 80 oz. units).*
- 2 galls. (9 litres) working solution (in two 1 gall. units).*

ID-19

Dental X-ray

To meet the requirements of dental radiographers, ID-19 is supplied under the label "Ilford ID-19 Dental X-ray Developer" in boxes of six small packets, each to make 12 oz. (350 c.c.) of working solution.

An Ilford developer packed in liquid form—Ilford Concentrated Dental X-ray developer—giving similar results in use to ID-19 Dental X-Ray developer is described on page 23.

ID-20

Phenidone-
Hydroquinone

A general-purpose P.Q. developer for enlarging papers, recommended as the standard developer for Ilford Bromide, Plastika and Multigrade papers and Warm-black Lantern plates. Packed in powder form to make up a concentrated stock solution which is diluted to four times its volume for normal use, or to twice its volume for press use.

ID-20 Phenidone-Hydroquinone Developer is available only as an Ilford packed developer in amounts to make:

- 80 oz. (2.25 litres) stock solution or 2 galls. (9 litres) working solution.*
- 1 gall. (4.5 litres) stock solution or 4 galls. (18 litres) working solution.*
- 2½ galls. (11.25 litres) stock solution or 10 galls. (45 litres) working solution.*
- 5 galls. (22.5 litres) stock solution or 20 galls. (90 litres) working solution.*

ID-20 Phenidone-hydroquinone developer gives similar results in use to ID-20 Metol-hydroquinone developer, the formula of which is given on page 17.

DEVELOPERS

The standard M.Q. formula for enlarging papers. Also recommended for the development of Ilford Warm-black Lantern Plates.

STOCK SOLUTION

Metol	105 gr.	} OR {	3 g.
Sodium sulphite, cryst.	8 oz.		100 g.
Hydroquinone	420 gr.		12 g.
Sodium carbonate, cryst.	12 oz. 350 gr.		160 g.
Potassium bromide	140 gr.		4 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

FOR NORMAL USE

Dilute 1 part with 3 parts water.

FOR PRESS USE

Dilute 1 part with 1 part water.

An Ilford packed developer—Ilford ID-20 Phenidone-hydroquinone developer—giving similar results in use to ID-20 Metol-hydroquinone developer is described on page 16.

ID-20

Metol-
Hydroquinone

An amidol developer for enlarging papers.

Sodium sulphite, cryst.	4 oz.	} OR {	50 g.
Amidol	210 gr.		6 g.
Potassium bromide	28 gr.		0.8 g.
Water, up to	80 oz.		1000 c.c.

Use without dilution.

In common with other amidol developers ID-22 does not keep well and should be made up as required.

ID-22

Amidol

A high-activity M.Q. developer for the development of recording films and papers.

Metol	175 gr.	} OR {	5 g.
Sodium sulphite, cryst.	8 oz.		100 g.
Hydroquinone	280 gr.		8 g.
Sodium carbonate, cryst.	8 oz.		100 g.
Potassium bromide	175 gr.		5 g.
Water, up to	80 oz.		1000 c.c.

Use without dilution.

ID-33 is available as an Ilford packed developer, in powder form, in amounts to make:

8 oz. (2.25 litres) working solution.

1 gall. (4.5 litres) working solution.

2 galls. (9 litres) working solution.

ID-33

Oscillograph

DEVELOPERS

ID-34

Metol-
Hydroquinone

An energetic M.Q. developer for the bulk development of roll films in D. & P. tanks.

Metol	21 gr.	} or {	0.6 g.
Sodium sulphite, cryst.	11 oz. 262 gr.		20 g.
Sodium bisulphite	87 gr.		2.5 g.
Hydroquinone	$\frac{1}{4}$ oz.		3.1 g.
Sodium carbonate, cryst.	2 oz.		25 g.
Potassium bromide	10 $\frac{1}{2}$ gr.		0.3 g.
Water, up to	80 oz.		1000 c.c.

Use in tank without dilution.

ID-34R

Replenisher
for ID-34

A replenisher designed to maintain the activity of ID-34.

Metol	$\frac{1}{4}$ oz.	} or {	3.1 g.
Sodium sulphite, cryst.	3 oz. 52 gr.		39 g.
Sodium bisulphite	161 gr.		4.6 g.
Hydroquinone	$\frac{1}{4}$ oz.		3.1 g.
Sodium carbonate, cryst.	4 oz.		50 g.
Water, up to	80 oz.		1000 c.c.

Use without dilution, adding to the developer as required to maintain the level of the solution.

ID-36

Metol-
Hydroquinone

A universal M.Q. developer for films, plates and papers. Recommended as the standard formula for contact papers and for Ilford Contact and Special Lantern Plates.

STOCK SOLUTION

Metol	105 gr.	} or {	3 g.
Sodium sulphite, cryst.	8 oz.		100 g.
Hydroquinone	1 oz.		12.5 g.
Sodium carbonate, cryst.	15 oz.		187.5 g.
Potassium bromide	26 gr.		0.75 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

FILMS AND PLATES

Dish: Dilute 1 part stock solution with 3 parts water.

Tank: Dilute 1 part stock solution with 7 parts water.

CONTACT PAPERS, CONTACT AND SPECIAL LANTERN PLATES

Dilute 1 part stock solution with 1 part water.

ENLARGING PAPERS

Dilute 1 part stock solution with 3 parts water.

ID-36 Metol-Hydroquinone Developer is available as an Ilford packed developer in small packings for amateur use to make **4 oz. (114 c.c.) working strength developer (contact papers).**

An Ilford developer packed in professional sizes—Ilford ID-36 Phenidone-hydroquinone developer—giving similar results to ID-36 Metol-hydroquinone is described on page 19.

DEVELOPERS

A universal P.Q. developer for films, plates and papers, recommended as the standard developer for contact papers and for Ilford Contact and Special Lantern Plates. Packed in powder form to make up a concentrated solution which is diluted to four times its volume for the dish development of films and plates, and for the development of enlarging papers, to eight times its volume for the tank development of films and plates, and to twice its volume for the development of contact papers and lantern plates.

ID-36 Phenidone-Hydroquinone Developer is available only as an Ilford packed developer, in powder form, in amounts to make:

Size No. 1: **80 oz.** (2.25 litres) stock solution or **1 gall.** (4.5 litres) working solution (contact papers).

Size No. 2: **1 gall.** (4.5 litres) stock solution or **2 galls.** (9 litres) working solution (contact papers).

Size No. 3: **2½ galls.** (11.25 litres) stock solution or **5 galls.** (22.5 litres) working solution (contact papers).

Size No. 5: **6 galls.** (22.5 litres) stock solution or **12 galls.** (54 litres) working solution (contact papers).

ID-36 Phenidone-hydroquinone developer gives similar results in use to ID-36 Metol-hydroquinone developer, the formula of which is on page 18.

A highly active metol-hydroquinone developer for X-ray films and X-ray paper, giving radiographs of rather greater density and contrast than Ilford ID-19 X-ray Developer.

ID-42 is available only as an Ilford packed developer, in powder form, in amounts to make:

80 oz. (2.25 litres) working solution.

1 gall. (4.5 litres) working solution.

2 galls. (9 litres) working solution.

3 galls. (13.5 litres) working solution.

5 galls. (22.5 litres) working solution.

An Ilford developer packed in liquid form—Ilford Concentrated X-ray developer—giving similar results in use to ID-42 is described on page 23.

A replenisher designed to maintain the activity of ID-42 developer and thus prolong its life. Under normal working conditions, where the tank is in regular use, a total quantity of replenisher equal to that of the original developer may be added before it becomes necessary to discard the solution and clean out the tank.

ID-42R is available only as an Ilford packed replenisher, in powder form, in amounts to make:

1 gall. (4.5 litres) working solution (in two 80 oz. units).

2 galls. (9 litres) working solution (in two 1 gall. units).

ID-36

Phenidone-
Hydroquinone

ID-42

Blue Label

ID-42R

Replenisher
for ID-42

DEVELOPERS

ID-46

Long Life

A metol-hydroquinone film and plate developer with replenisher, to meet the needs both of professional photographers and of large-scale D. & P. establishments for a standardised processing technique. Packed in powder form in convenient units for small and large-scale processing. A definite amount of replenisher is associated with each size of developer packing, making it possible to maintain the activity of the developer at a constant level until all the replenisher has been added.

ID-46 is available only as an Ilford packed developer, in powder form, to make the following quantities of working strength developer:

Professional sizes

2 galls. (9 litres) with one **80 oz.** (2.25 litres) replenisher unit.

3 galls. (13.5 litres) with one $\frac{1}{2}$ **gall.** (3.5 litres) replenisher unit.

D. & P. sizes

5 galls. (22.5 litres) with five **1 gall.** (4.5 litres) replenisher unit.

12 galls. (54 litres) with six **2 galls.** (9 litres) replenisher unit.

ID-47

Rapid
Radiographic
X-Ray

A special quick-acting developer intended for the ultra-rapid processing of X-ray and oscillograph films. This developer was originally devised to permit radiographs taken in the operating theatre to be used by the surgeon as guides in the course of his work, and the development time for Ilford X-ray films is only 15 to 30 secs. at 68° F. (20° C.) according to the density and contrast required. The solution, which contains Phenidone, does not oxidise unduly rapidly and retains high activity even when a certain amount of oxidation has taken place. Ilford ID-47 developer is not, of course, intended to replace normal developers except when speed is of primary importance.

ID-47 is available only as an Ilford packed developer, in powder form, in amounts to make:

40 oz. (1140 c.c.) working solution.

80 oz. (2.25 litres) working solution.

ID-48

Extra Fine Grain

A negative developer containing a special grain restrainer. It is primarily intended for miniature films but is recommended also for the development of films or plates in any size when a very high degree of enlargement is contemplated. ID-48 is clean working and produces negatives having extremely fine grain with only a slight loss of emulsion speed, for which an increase of 50% over normal exposure is advised.

ID-48 is available only as an Ilford packed developer, in powder form, in amounts to make:

20 oz. (570 c.c.) working solution.

80 oz. (2.25 litres) working solution.

1 gall. (4.5 litres) working solution.

3 galls. (13.5 litres) working solution.

DEVELOPERS

A clean-working, high-contrast M.Q. developer for the development of document and photomechanical papers.

STOCK SOLUTION

Metol	52 gr.	} or {	1.5 g.
Sodium sulphite, cryst.	4 oz.		50 g.
Hydroquinone	$\frac{1}{2}$ oz.		6.25 g.
Sodium carbonate, cryst.	$7\frac{1}{2}$ oz.		94 g.
Potassium bromide	26 gr.		0.75 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

FOR PAPERS EXPOSED IN THE CAMERA

Use undiluted.

FOR REFLEX, CONTACT AND DOCUMENT ENLARGING PAPERS

Dilute with an equal quantity of water.

An Ilford packed developer—Ilford Document Paper developer—giving similar results in use to ID-55 is described on page 24.

ID-55

Metol-
Hydroquinone

A soft-working developer for films and plates, specially recommended for the preparation of masks on the Ilford R.25 FP Special Plate.

STOCK SOLUTION

Sodium sulphite, cryst.	3 oz. 87 gr.	} or {	40 g.
Glycin	2 oz. 175 gr.		30 g.
Potassium carbonate, anhyd.	4 oz. 350 gr.		60 g.
Water, up to	80 oz.		1000 c.c.

WORKING STRENGTH

Dish or tank: Dilute 1 part with 7 parts water.

ID-60

Glycin

For obtaining warmer tones on Ilford Plastika Paper.

Sodium sulphite, cryst.	4 oz. 210 gr.	} or {	56 g.
Glycin	149 gr.		4.25 g.
Sodium carbonate, cryst.	6 oz.		75 g.
Hydroquinone	262 gr.		7.5 g.
Potassium bromide	35 gr.		1 g.
Water, up to	80 oz.		1000 c.c.

Use undiluted.

ID-61

Glycin-
Hydroquinone

DEVELOPERS

ID-62

Phenidone-
Hydroquinone

A general-purpose P.Q. formula for films, plates and papers. Contains no metol.

STOCK SOLUTION

Sodium sulphite, cryst.	8 oz.	} or {	100 g.
Hydroquinone	420 gr.		12 g.
Sodium carbonate, cryst.	12 oz. 420 gr.		162 g.
Phenidone	17½ gr.		0.5 g.
Potassium bromide	70 gr.		2 g.
*Ilford IBT Restrainer, soln.	1 fl. oz. 288 m.		20 c.c.
Water, up to	80 oz.		1000 c.c.

** An alternative restrainer solution may be made by dissolving 10 grams of benzotriazole in 1 litre of 1% sodium carbonate solution.*

WORKING STRENGTH

FILMS AND PLATES

Dish: Dilute 1 part stock solution with 3 parts water.

Tank: Dilute 1 part stock solution with 7 parts water.

CONTACT PAPERS, CONTACT AND SPECIAL LANTERN PLATES

Dilute 1 part stock solution with 1 part water.

ENLARGING PAPERS, WARM-BLACK LANTERN PLATES

Dilute 1 part stock solution with 3 parts water.

An Ilford packed developer—Ilford PFP developer—giving similar results in use to ID-62 is described on page 25.

ID-66

A rapid-working P.Q. developer specially prepared for the development of bromide paper exposed in Muirhead and similar picture telegraph equipments, and not suitable for other purposes. Contains no metol and is non-caustic. Supplied in liquid form as a concentrated stock solution which is diluted to five times its volume for use.

ID-66 is available only as an Ilford packed developer in 80 oz. (2.25 litres) bottles of concentrated stock solution to make 2½ galls. (11.25 litres) of working solution.

Caustic-
Hydroquinone

For the dish development of high-contrast graphic arts films and plates, when maximum contrast is required. Also recommended for the development of certain special Ilford Plates used for scientific purposes when maximum contrast is required. Made up as two solutions, A and B, with excellent keeping qualities, but may, if preferred, also be stored as a single-solution developer.

Ilford Caustic-hydroquinone developer is available only as an Ilford packed developer, in powder form, in one size only, to make 1 gall. (4.5 litres) working solution.

DEVELOPERS

A Phenidone-hydroquinone developer for dental X-ray films, designed to produce clean radiographs of high contrast, and balanced to give radiographic quality comparable with Ilford ID-19 Dental X-ray developer. It is specially adjusted to withstand standing for several weeks in a tank without replenishment. Supplied in liquid form as a concentrated stock solution which is diluted to four times its volume for use.

Concentrated Dental X-Ray

Ilford Concentrated Dental X-ray developer is available only as an Ilford packed developer in **20 oz.** (225 c.c.) bottles of concentrated stock solution to make 80 oz. (2.25 litres) of working solution.

Ilford Concentrated Dental X-ray developer gives similar results in use to Ilford ID-19 Dental X-ray developer, an Ilford developer packed in powder form, the packings and formula of which are given on pages 15 and 16.

An active Phenidone-hydroquinone Developer for radiography. Balanced to give radiographic quality comparable with Ilford ID-42 Blue Label developer. Supplied in liquid form as a concentrated stock solution which is diluted to four times its volume for use.

Concentrated X-Ray

Ilford Concentrated X-ray developer is available only as an Ilford packed developer in the following amounts:

40 oz. (1140 c.c.) bottle of concentrated stock solution to make 1 gall. (4.5 litres) of working solution.

80 oz. (2.25 litres) bottle of concentrated stock solution to make 2 galls. (9 litres) of working solution.

An Ilford developer packed in powder form—Ilford ID-42 Blue Label developer—giving similar results in use to Ilford Concentrated X-ray Developer is described on page 19.

A replenisher designed to maintain the activity of Ilford Concentrated X-ray developer and thus prolong the life of the developer. Supplied in liquid form as a concentrated stock solution which is diluted to four times its volume for use.

Replenisher for Concentrated X-Ray

Ilford Replenisher for Concentrated X-ray developer is available only as an Ilford packed replenisher in the following amounts:

40 oz. (1140 c.c.) bottle of concentrated stock solution to make 1 gall. (4.5 litres) working solution.

80 oz. (2.25 litres) bottle of concentrated stock solution to make 2 galls. (9 litres) of working solution.

DEVELOPERS

Contrast FF

A rapid and clean-working Phenidone-hydroquinone developer for films, plates and papers, primarily intended for press work. Supplied in liquid form as a concentrated stock solution which is diluted to five times its volume for normal use, or to ten times its volume when a less active developer is required. Contrast FF contains no metol and is non-caustic. It has excellent keeping qualities, and the working solution can be left in an open dish for several days without deterioration.

Contrast FF is obtainable only as an Ilford packed developer in the following amounts:

20 oz. (570 c.c.) bottle of concentrated stock solution to make 100 oz. (2840 c.c.) working solution (normal strength).

40 oz. (1140 c.c.) bottle of concentrated stock solution to make 1½ galls. (5.5 litres) working solution (normal strength).

80 oz. (2.25 litres) bottle of concentrated stock solution to make 2½ galls. (11.25 litres) working solution (normal strength).

5 galls. (22.5 litres) bottle of concentrated stock solution to make 25 galls. (112.5 litres) working solution (normal strength).

Document Paper

A clean-working, high-contrast, metol-hydroquinone developer specially prepared for use in document copying machines with all types of document and photomechanical papers.

Ilford Document Paper Developer is available only as an Ilford packed developer, in powder form, in one size only, to make **1 gall.** (4.5 litres) working solution for papers exposed in the camera, or **2 galls.** (9 litres) for reflex, contact and document enlarging papers.

Ilford Document Paper developer gives similar results in use to ID-55, the formula of which is given on page 21.

Formalith

A formaldehyde-hydroquinone developer specially intended for the development of screen or line negatives on Ilford Formalith and similar "lith-type" films and plates. It is not recommended for use with other sensitised materials. With the Formalith emulsion, Formalith Developer gives an extremely steep characteristic curve with practically no foot, and yields exceptionally sharp and dense dots or lines on a perfectly clear background. Its performance in this respect is unrivalled by any other combination of sensitised material and developer.

Formalith developer is available only as an Ilford packed developer, in powder form, in one size only to make **1 gall.** (4.5 litres) working solution.

DEVELOPERS

A Phenidone-hydroquinone developer for roll films, flat films, plates and papers. Packed in powder form to make up a concentrated stock solution which is diluted to twice its volume for the dish development of films and plates and for the development of enlarging papers, and to four times its volume for the tank development of film and plates. For contact papers the stock solution is used undiluted.

PFP

PFP is available only as an Ilford packed developer in amounts to make:

Size No. 1: **10 oz.** (285 c.c.) stock solution.

Size No. 2: **40 oz.** (1140 c.c.) stock solution.

Ilford PFP developer gives similar results in use to ID-62, the formula of which is given on page 22.

A Phenidone-hydroquinone developer for roll films, flat films, plates and papers. Supplied in liquid form as a highly concentrated stock solution which is diluted to ten times its volume for the dish development of films and plates and for the development of enlarging papers, to twenty times its volume for the tank development of films and plates and to five times its volume for the development of contact papers.

PQ Universal

PQ Universal developer is available only as an Ilford packed developer in the following amounts:

8 oz. (225 c.c.) bottle of concentrated stock solution.

20 oz. (570 c.c.) bottle of concentrated stock solution.

80 oz. (2.25 litres) bottle of concentrated stock solution.