VARIATIONS IN VOLUMES

a) Volume of diazo

1. Decrease to 75% of the specified volume results in a somewhat weaker product.

2. Increase to 50% or 100% of the specified volume results in a slightly lighter masstone and slightly yellower shade and tint.

b) Volume of BON Solution

1. Decrease in volume to 75% or 50% of the specified volume is without considerable effect on tinctorial properties, if the alkalinity of coupling is slightly reduced. A 3-5% reduction in the amount of caustic soda used for dissolving the BON, is suggested in this case. This will lower the final pH to 7.5-8.5 (measured after coupling is completed). Higher alkalinity (pH above 8.5) will cause loss of strength in the case of the more concentrated coupling. A 50% increase in volume of the BON solution in connection with the decrease in caustic soda to 95% of original is recommended. Decrease in volume to 25% of that specified results in light masstone and loss of strength.

2. Increase in volume by 50-100% results in slightly lighter masstone and yellower shade and tint.

VARIATIONS IN THE TEMPERATURE OF COUPLING

a) Decrease in coupling temperature to 30° or 25°C results in darker masstone and slightly increased strength. Coupling at 25°C gives maximum depth and strength. Coupling at 15°C gives a somewhat lighter masstone and lower strength. It is advisable to decrease the rate of coupling at a decreased coupling temperature; i.e.

Coupling temperature	40°C	30°C	25°C
" rate	30 min.	45 min.	1-1/2 hrs.

b) Increase in coupling temperature results in lighter masstone and bluer undertone and tint with loss of strength at temperatures above 40°C.

VARIATIONS IN ALKALINITY OF COUPLING

The initial amount of NaOH used in the preparation of BON and Rosin solutions gives an end point pH of 9.5 ± 0.2 (measured after coupling is completed).

a) A 3-5% decrease in caustic gives an end point pH of 7.5-8.5 . This lower end point pH is of importance for maintenance of the full strength in the case of the more concentrated coupling; i.e., where the volume of the BON solution is reduced to 50% of that specified in the formulation.

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b) Decrease in alkalinity to an endpoint of pH 7.2 or below tends to lower the depth of masstone and lowers the strength and yield.

pH ADJUSTMENT AFTER COUPLING

The pH adjustment in K-1552 is apparently unnecessary (no effect on tinctorial properties was observed by adjusting the pH to 10.5-10.8).

DEVELOPMENT (heating to 72°C after coupling)

This is without beneficial effect but tends to produce a somewhat lighter, duller masstone. Since the calcium toner is apparently completely developed during coupling, the heat treatment necessary in the orthodox RT-443-D procedure can be omitted in K-1552.

ACCESSORY AGENTS

Tobias Acid (TOBA) and ortho-naphthionic acid are very effective for increasing the depth of masstone and blueness of undertone and tint. Ortho-naphthionic acid is the more potent agent. Tobias acid is suited in the case where an increase in depth of masstone is desired without too much deviation in shade and tint from the K-1552 product. Amounts of 1-2% of the accessory reagents in substitution for PTMSA seem sufficient to produce dark masstone material for shading purposes. Larger amounts of the agents give further increase in depth of masstone and blueness of tints, the greatest effects on depth being obtained in the range up to 10% of ortho-naphthionic and 15%-20% of Tobias acid.

AGITATION AFTER COUPLING

The pigment slurry should be agitated after the addition of the diazo until the coupling is completed; i.e., negative test for diazo. This point is reached during an agitation period of about 30 minutes on the regular K-1552. The agitation period may have to be extended to 60 min. or longer where further modifications are introduced; i.e., coupling at reduced volume and at reduced temperature.

VARIATIONS IN THE AMOUNT OF SODIUM ACETATE

Sodium Acetate seems to facilitate the coupling reaction. Omission of sodium acetate causes slow coupling and results in a light masstone and low strength product.

OTHER BUFFERS IN THE COUPLING

Ammonium chloride, disodium phosphate and sodium formate were of little or no beneficial effect. Ammonium chloride (amounts of 10 lbs. per 1 mol.) caused light masstone, blue undertone and tint and a slight loss in strength. Sodium formate seems to have a slight accelerating action on the coupling. A product of slightly lighter masstone and somewhat lower strength results. Disodium phosphate shows no effect on tinctorial properties.

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VARIATIONS IN THE AMOUNT OF ROSIN

a) A 20% increase in rosin causes a slight increase in depth of masstone and a somewhat bluer shade and tint without considerable loss of strength; the yield is increased correspondingly.

b) Decrease in rosin results in increased strength, decreased depth of masstone and decreased printing finish; the yield decreases proportionally.

DUPLICABILITY

The duplicability of the K-1552 process is very good (as judged from the results of a laboratory duplicability study).

YIELD

The yield (as is) is based on the average of four individual charges; the deviations were ± 1.2%. K-1552 contains 1.3% water (by Toluene distillation test).

DRYING TEMPERATURE

Drying at elevated temperature 212°F (140°F initial) results in a somewhat lighter masstone, somewhat bluer undertone and somewhat lower strength.

F. L. PFEIFFER

2/19/42

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NOTES ON RED TONER K-1552

The first component (PTMSA) has in the past been purchased from the Dye Works in two forms; viz.,

"Lithosol" Acid RBA, the free acid, mol. wt. = 187 and
"Lithosol" Acid RB, the sodium salt, mol.wt. = 209.

The N code N-175 was assigned to both intermediates. Either is satisfactory for this formula. However, when the acid RB is used, the caustic soda is not required to effect solution, and 209 lbs. of the intermediate should be used for a 1 mol. charge.

A variable study on this process has not as yet been run in the laboratory. It is questionable whether the usual RT-443-D process variables could be used effectively in this method.

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