

PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Improvements in or relating to Coagulation of Latex

We, THE NATURAL RUBBER PRODUCERS' RESEARCH ASSOCIATION, a British Body Corporate, of 19 Buckingham Street, Adelphi, London, W.C.2, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention is for improvements in or relating to the coagulation of latex.

The conventional procedure for the preparation of sheet or crepe rubber from fresh rubber latex is by acidification of the latex which is usually previously diluted to dry rubber content of about 15% by weight. Under these conditions the rubber coagulates and is subsequently washed (on a *creeping* mill for instance) to remove dirt and other non-rubber constituents.

usually 20 The acid which is usually employed for this purpose is formic acid in an amount to produce a concentration in the latex of about 2½% by weight; acetic acid and occasionally sulphuric acid have been used to effect the necessary acidification.

30 One of the important properties required of a good grade of sheet rubber is that it should not degrade too rapidly under hot mixing conditions.

A test for this property involves heating a small pellet of the sheeted rubber at 140°C. in air for 30 minutes. The resistance to high temperature mixing conditions is then measured by the percentage retention of the Wallace plastimeter (bulk viscosity) value after this treatment ("Plasticity retention index").

40 Provided other properties are not inferior the better grades of rubber have the highest plasticity retention index (Q). A top grade ribbed smoked sheet grade rubber (RSS1) will have a Q value of at least 70 whereas

very inferior grades of rubber will have Q values of less than 20.

We have now found that both the use of preservatives added to the latex in the field (to prevent biological spoilage) and the type of acid used to coagulate the latex profoundly affect the value of Q.

Thus the addition of ammonia (the commonest latex preservative) to produce in the latex a pH value of 10 reduces the value of Q to about 5 within a few hours when using formic or acetic acid as coagulants.

55 The present invention is based upon our discovery that the use of phosphoric acid as the coagulant results in a dramatic increase in Q values both in fresh latex and in ammonia-preserved latex as compared with the use of formic and acetic acids.

According to the present invention, therefore, there is provided a process for the coagulation of natural rubber latex which comprises adding to fresh rubber latex an amount of phosphoric acid sufficient to reduce the pH of the latex at least to the coagulation point; the latex may contain an amount of ammonia sufficient to preserve it from substantial biological spoilage. The amounts of phosphoric acid added are preferably such as to produce a pH value in the range of 6 to 3 in the latex depending on the vulcanising characteristics required of the rubber in accordance with existing practice.

65 In addition to the advantages of producing sheet rubbers having high Q values, we have found that the use of phosphoric acid in place of formic or acetic acid results in a dramatic reduction in the iron pick-up from the creping rollers by approximately an order in magnitude (for example from 300 to 30 parts per million of iron) with a consequent improvement in the colour of the sheet rubber; the reduction of iron con-

[Price 4s. 6d.]



tamination in the latex is accompanied by a dramatic reduction in the corrosive rusting of the creping rollers.

The use of phosphoric acid does not interfere in any way with the recently introduced crumbing process using castor oil or with the use of sodium *metabisulphite* as a polyphenol oxidase inhibitor (enzymic darkening).

metabisulphite

rubber

There do not appear to be any significant differences between *rubber* coagulated with formic acid and those coagulated with phos-

phoric acid in respect of the normal analytical determinations for acetone extract, free fatty acids, moisture, nitrogen or ash contents.

The curing characteristics of latices coagulated with phosphoric acid do not appear to be exceptional in any way.

The following Table illustrates the comparisons between the effect of coagulating various rubber latices with formic acid, acetic acid and phosphoric acid (H_3PO_4):—

TABLE

Latex	Rubber	Coagulant	Q
25 Fresh	RSS1	Formic Acid	78
"	RSS	Acetic Acid	95
"	Crepe	" "	60
30 Metabisulphite preserved	"	" "	69
Ammonia preserved	"	" "	15 (after 5 hours)
Fresh	"	H_3PO_4	101
"	Crumb (Castor oil process)	Acetic Acid	71
35 Ammonia preserved	Crepe	Formic Acid	5
"	"	Acetic Acid	5
"	"	H_3PO_4	50
"	Crumb	H_3PO_4	72
40 " + Metabisulphite preserved	Crepe	H_3PO_4	65

The results in the foregoing Table show the very great advantage arising from the use of phosphoric acid particularly in the presence of preservatives for the latex.

WHAT WE CLAIM IS:—

1. A process for the coagulation of natural rubber latex which comprises adding to fresh rubber latex an amount of phosphoric acid sufficient to reduce the pH of the latex at least to the coagulation point.

2. A process according to claim 1 wherein the pH of the latex is reduced to a value in the range of 6 to 3.

3. A process according to claim 1 or claim 2 wherein the latex contains ammonia

in an amount sufficient to prevent substantial biological spoilage.

4. A process according to any of the preceding claims wherein the latex contains sodium metabisulphite.

5. The process for the coagulation of natural rubber latex by the addition of phosphoric acid substantially as described.

6. Sheet or crepe natural rubber when produced by the process claimed in any of the preceding claims.

STEVENSON, LANGNER, PARRY & ROLLINSON,

Chartered Patent Agents,
Agents for the Applicants.



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