



COATED PAPER POSSESSING A SILKY FEEL

The present invention relates to a coating composition comprising polyurethane microbeads and to the paper coated on at least one face with said coating composition, advantageously on both its faces.

Papers of various types or with various compositions can be coated so as to enhance the quality of their surface.

A coating composition used conventionally for this purpose is a dispersion comprising pigments, which can be organic or inorganic pigments.

The coating composition can also comprise other additives.

Paper intended for printing, such as paper for books, magazines, brochures or annual reports, or paper intended for packaging is often manufactured by coating a base paper using one or more coating units, sometimes followed by calendering.

The final product should generally have surface characteristics improved for the use which is made of it.

These surface characteristics are mainly reflected by a modification in the visual appearance of the paper, i.e. by an increase in its whiteness, in its gloss or in its opacity.

The search for a certain surface feel for the sheet covered with the coating is fairly new per se.

In the prior patent FR 2 791 368, the Applicant Company had been interested in providing a packaging sheet which would include a characteristic which would recall one of the essential characteristics of the product to be packaged, in particular for cosmetic products to be applied to the skin.

The Applicant Company thus proposed to provide a characteristic which evokes the destination, namely the skin, that is to say the feel or the softness of the skin.

The desired feel could be obtained by applying, to the surface of the sheet, a layer which comprised expandable thermoplastic microspheres.



This patent was targeted, inter alia, at solving the problems of machinability of these sheets during printing, in particular the problems of separation of sheets in stacks because of the antislip properties of the added microspheres.

5 Generally, coated thin paper often raises serious problems during printing or during converting operations, the commonest being in the context of offset printing: chalking and setting-off.

 Chalking corresponds to the detachment of the coating in the form of a dry powder during printing, which phenomenon can become more marked with
10 successive passages of the sheet in printing or converting machines.

 This phenomenon results from poor binder/pigment metering, the pigment being in an excessively high percentage with respect to the binder.

 It can also result from the size and the shape of the pigment particles.

 Setting-off corresponds to the transfer of print from one sheet to the other, in
15 particular during stacking.

 More or less intense ink stains are thus often observed on the verso of a sheet, originating from the ink of the recto of the sheet underneath.

 When the stack is taken apart, the crunching of the sheets is heard, more or less loudly.

20 This phenomenon, if it is slight, is known as setting-off.

 It is picking if paper elements participate in the separation.

 It is stack adhesion if it is no longer possible to separate these sheets from one another.

 The paper can participate in this phenomenon due to the fact that a paper
25 unsuited to the ink can have a poor ability to accept the ink and to the fact that a paper having an uneven surface condition requires too much ink for correct printing.

 In the light of these considerations, the Applicant Company has endeavored to provide a paper having a silky feel, which are [sic] coated preferably on these [sic] two faces and which does not exhibit the problems of printability and of machinability
30 stated above.

A first aim of the invention is therefore to provide a coating composition for coated papers intended to be printed in offset, characterized in that the pigments used in the coating are polyurethane microbeads having a mean size of less than 10 micrometers and advantageously of approximately 7 micrometers.

5 In particular, the invention is characterized in that the binder used in the coating is an aqueous emulsion of polyurethane and preferably a soft polyurethane having a degree of elongation of greater than or equal to 500%.

In particular, the invention is characterized in that the level of binder with respect to the pigments is greater than or equal to 40% by dry weight and preferably
10 greater than or equal to 200%.

Another aim of the invention is to provide a coated paper having a silky feel, comprising at least one face coated with a coating composition as defined above and advantageously these [sic] two faces.

Said paper is characterized in that it can be printed in offset with low, indeed
15 even nonexistent, setting-off and chalking.

The paper is based on cellulose fibers and has a grammage of between 70 and 500 g/m², preferably between 100 and 300 g/m².

According to a specific case, the paper is transparent or translucent.

More particularly, the paper constitutes a tracing paper.

20 The term "tracing paper" is understood to mean a paper as defined by the international standard ISO 4046-1978 in part 6.94.

More particularly, the invention is characterized in that said paper is a tracing paper, obtained in particular by hard beating of the cellulose fibers of which it is composed.

25 In particular, the invention is characterized in that the weight of said layer on at least one of the faces is between 2 and 10 g/m² on a dry basis, preferably between 3 and 6 g/m².

Said paper is also characterized by a coefficient of dynamic friction between its coated recto face and its other verso face, also coated, of less than or equal to 1.0,
30 which measurement is carried out according to the standard NF-Q-03-082 with a block weighing 200 g.

The coefficient of dynamic friction reflects the ability of the sheet to stick at the start of a displacement; the higher it is, the greater the difficulty in initiating a movement of a sheet in a stack.

Comparative examples and nonlimiting examples of the implementation of the invention and other advantages, possibly, are described below.

EXAMPLES:

Examples 1 to 5:

A composition comprising polyurethane microbeads of different sizes, as mentioned in table 1, is applied, using an air blade coater, to a sheet of base paper having a grammage of 100 g/m^2 , more specifically the reference Conqueror CX 22 sold by the Applicant Company, in a proportion of 5 g/m^2 approximately per face.

The composition comprising polyurethane microbeads is prepared in an aqueous medium and comprises, as dry weight [sic]:

- 24.7 parts of water
- 0.1 part of wetting agent
- 33.3 parts of an aqueous polyurethane emulsion Witcobond 290 H
- 20 parts of polyurethane microbeads
- 0.5 part of pH regulator
- 1 part of thickener.

Examples 6 to 13:

A composition comprising polyurethane microbeads with a mean size of approximately 7 micrometers is applied, using an air blade coater, to a sheet of base paper having a grammage of 100 g/m^2 , more specifically the reference Conqueror CX 22 sold by the Applicant Company, in a proportion of 5 g/m^2 on a dry basis

approximately per face, the level of binder being varied with respect to the weight of pigment as mentioned in table 2.

The composition comprising polyurethane microbeads is prepared in an aqueous medium and comprises, as dry weight:

- 5 - variable parts on a dry basis of an aqueous polyurethane emulsion Rolflex PAD
- 20 parts of polyurethane microbeads Daiplocoat RHU 5070
- 0.5 part of pH regulator
- 1 part of a thickener

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IMPLEMENTATION OF THE TESTS:

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- The feel of the face comprising the coating of polyurethane microbeads is assessed by hand.

- The response of the virgin paper to the chalking test is determined so as to demonstrate the propensity of the coating to disintegrate when passing through a machine. The chalking test is carried out in the following way:

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- a) a block with dimensions of 40 mm × 40 mm and with a weight of 2 kg, mounted on a trolley and covered with a black felt made of fabric (mixture of 70% wool, 30% polyamide), is applied to one or more paper sheets coated with said coating,

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- b) a single pass is carried out over the paper, so as to cover a total length of 6 m,
- c) the felt is removed from the block,
- d) the reflectivity of the felt is measured using an Elrepho device (the value measured being approximately 1.4 for the untreated fabric),

- The response of the printed paper to the setting-off test is determined, so as to demonstrate the propensity of the paper to result in setting-off during machine stacking. The setting-off test is carried out in the following way:

- a) test specimens of the paper to be tested are prepared with a width of 48 mm and a length of 250 mm,
- b) a Prufbau test device having a station No. 1 for printing and a station No. 2 for print transfer is used,
- c) the pressure of the station No. 1 is adjusted to 1 000 N and the pressure of the station No. 2 is adjusted to 400 N,
- d) the speed of the device is adjusted to 0.5 m/sec,
- e) the inking roller of the station No. 1 is inked for 30 sec with a blue ink of Huber 408010 type,
- f) a conveyor equipped with a test specimen is positioned in front of the station No. 1,
- g) an uninked roll is positioned on the station No. 2,
- h) the test specimen is printed on the station No. 1,
- i) the stopwatch is started immediately after printing,
- j) a test specimen of the same paper is positioned, using an adhesive tape, on the blank roll of the station No. 2,
- k) once 120 sec have passed on the stopwatch, the conveyor equipped with the printed test specimen is set underway as far as the blanket,
- l) the test specimen of the station No. 2 is immediately separated from its roll,
- m) the optical density of the cyan transferred to the blank test specimen is measured using an Xrite densitometer.

RESULTS:

The results of the tests for examples 1 to 5 are presented in table 1.

It is found that, even though the majority of the papers have a fairly satisfactory response to the setting-off and chalking tests, only microbead sizes of less than 10 micrometers make it possible to obtain an acceptable silky feel.

The results of the tests for examples 6 to 13 allow it to be concluded that, on
 5 choosing a size of microbeads which makes it possible to obtain the desired silky feel, it is subsequently necessary to choose a level of binder of greater than or equal to 40% in order to have correct chalking and of greater than or equal to 200% in order to have correct setting-off.

This is because chalking is considered to be satisfactory below 2 and setting-
 10 off below 0.1.

A scanning electron microscope view of a paper exhibiting, from the viewpoint of the Applicant Company, a silky feel has been represented in figures 1 and 2.

This paper was obtained by depositing, on a Conqueror CX 22 base paper
 15 having a grammage of 100 g/m², the following coating composition on these [sic] two faces:

2.8 kg of water,
 0.03 kg of wetting agent Texapon Z95P,
 81 kg [sic] of binder Rolflex PAD sold by Lamberti,
 20 6.1 kg of polyurethane microbeads Daiplocoat RHU 5070 sold by Promecome,
 1 kg of a thickener CMC Blanose 7M65, at 2.5%, sold by Aqualon,
 in a proportion of 5.4 g/m² as dry weight per face, the amounts being expressed as commercial weight.

The paper obtained was subsequently calendered.

25 The photographs respectively represent a top view, magnified 200 times, and a cutaway view, magnified 2 000 times.

The paper obtained really exhibits a silky feel on these [sic] two faces.

On measuring the coefficient of dynamic friction of the coated paper on itself according to the standard NF-Q-03-082 with a block weighing 200 g, a value of 0.8 is
 30 obtained, which value is able to ensure good machinability of the sheets on printing or converting machines.

Name of the particles	Daipacoat	Decolam F7	Decolam FT	Decolam F	Decolam W
Size of the particles (in micrometers)	7	10	28	28	50
Silky feel	YES	Passable	Moderate	Moderate	NO
Chalking	1.8	1.6	1.6	1.6	1.4
Setting-off	0.4	0.32	0.41	0.39	0.2

Table No.º1

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Level of binder % pigment [sic]	10%	20%	30%	40%	50%	100%	150%	400%
Silky feel	YES	YES	YES	YES	YES	YES	YES	YES
Chalking	15.5	6	3.6	1.9	1.7	1.5	1.5	1.5
Setting-off	0.282	0.326	0.327	0.354	0.367	0.123	0.104	0.07

Table No. 2

CLAIMS

- 5 1) A coating composition for coated papers intended to be printed in offset
 comprising pigments and a binder, characterized in that the coating
 pigments are polyurethane microbeads having a size of less than
 10 micrometers and advantageously of approximately 7 micrometers.
- 10 2) The coating composition as claimed in claim 1, characterized in that the
 binder used is an aqueous emulsion of polyurethane, preferably having a
 degree of elongation of greater than or equal to 500%.
- 15 3) The coating composition as claimed in claim 2, characterized in that the
 level of binder with respect to the pigments is greater than or equal to
 40% by weight and preferably greater than or equal to 200%.
- 20 4) A paper having a silky feel, comprising at least one face coated with a
 coating composition as claimed in one of the preceding claims and
 advantageously these [sic] two faces.
- 25 5) The paper as claimed in the preceding claim, characterized in that the
 coefficient of dynamic friction between the coated recto face and the
 other verso face, also coated, of this paper is less than or equal to 1.0,
 which measurement is carried out according to the standard
 NF-Q-03-082 with a block weighing 200 g.
- 6) The paper as claimed in either of claims 4 and 5, characterized in that
 the weight of the coating applied to at least one face is between 2 and
 10 g/m² by dry weight and preferably between 3 and 6 g/m².

- 7) The paper as claimed in one of claims 4 to 6, characterized in that it constitutes a tracing paper, obtained in particular by hard beating of the cellulose fibers of which it is composed.