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Trends in Pressed Powder Technology

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Synopsis—A PRESSED POWDER is essentially a dry powder compressed in cake form to be applied to the body, face, or eyes with a puff, brush, or foam applicator. The parameters of RAW MATERIAL SELECTION and their uses in pressed powders are studied, and properties imparted to the face and eyes are briefly indicated. Representative FORMULATIONS, and MANUFACTURING and PRESSING TECHNIQUES encompassing modern compact face powder, blusher, eyeliner, eyebrow, eyeshadow, and rouge are detailed. This paper briefly covers quality control, equipment requirements, manufacturing problems, fashions, and trends in pressed powder developments.

Introduction

It was not until after World War I that the first pressed powder appeared on the market. The compact was a simple face powder molded into a pressed form by the addition of about 20% of plaster of Paris. The resultant product was very rough in texture and difficult to use. It required a lot of rubbing in order to remove sufficient powder for application (1, 2). Later improvements included the use of various gum binding agents. Most compacts, however, turned out either too hard or too soft. The next major advance in pressed powder technology occurred in the early 1930's when a facsimile of modern compact powder was prepared using petrolatum, ammonia, starch, and stearic acid as the binding agents (3). The first patents for cake make-up (4–6) were

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prepared by adding the fillers and pigments to the oils and waxes dispersed in water, drying the formed mixture, pulverizing the product, and compressing it into a cake form. Therefore, it appears that pressed cakes can be prepared from almost any good face powder provided a suitable binding agent is employed and a suitable compact press is utilized.

Constituents

In general terms, a pressed powder may be considered simply as a face powder in a different physical form and, therefore, it is not surprising to find that the constituents found in both are similar. Some raw materials have good compression qualities, while others do not and cause swelling or crumbling after being pressed. Therefore, a proper balance of hard-to-compress and easy-to-compress raw materials and binding agents must be utilized in preparing a suitable formulation. In practice, the following raw materials should be considered:

Fillers

Talc is the most important single component found in pressed powders. It gives some coverage and exhibits slip, spreadability, and smoothness to the finished cake. Talcs vary in color, transparency, slip, shine, density, particle size, smoothness, and compressibility. Many pressed powder formulations contain more than one kind of talc in order to achieve the most desirable effects needed for the intended product use.

Other ingredients used as fillers are kaolin, stearates, and carbonates. Kaolin imparts softness on application, has excellent adherent and absorbent properties, and assists in wetting and binding. Zinc and magnesium stearates are water repellent, they promote skin adherence and film formation, and they aid in producing a firm cake. Calcium and magnesium carbonates increase bulk, have good covering power and water absorbency, and aid in compressibility.

Binding Agents

These chemicals consist of different grades of mineral oils, fatty esters, lanolin and derivatives, cellulose gums, natural gums such as tragacanth or Karaya, emulsifying agents such as sodium and triethanolamine stearate, nonionics, and emulsions containing any and all of the aforementioned ingredients. Water and ethyl alcohol have been found successful as binding agents for difficult-to-press materials. Again, the

amount of binder and type vary with the particular formulation. Since binding is so important in producing a quality finished pressed product, much care must be used in selecting the proper binding agent and the correct amount to be used. Problems such as glazing (too hard a cake), crumbling or laminating (too soft a cake), cake tone, and the amount of color development on the skin may be attributed to improper binder or binder amounts.

Perfumes

When required, a perfume should be neutral in fragrance, compatible with other materials in the formulation, and nonirritating. Most pressed eye products do not contain perfume.

Colors

Different shades of pressed powders are generally obtained from two types of colors: (a) certified organic lakes and toners which cannot be used in the area of the eyes, and (b) noncertified inorganic pigments.

Certified organic lakes and toners are available in many bright shades and are used in face powder for their brilliance of color. Lakes have had the serious drawback that they are more easily oxidized, are not completely light-fast, and occasionally are subject to bleeding. Some of the most important organic lakes used in pressed powder are D&C Red No. 7 Calcium Lake, D&C Red No. 9 Barium Lake, D&C Red No. 10 Sodium Lake, D&C Red No. 37 Stearated, and D&C Yellow No. 5 Aluminum Lake. A natural organic product that may be used around the eye area is a bright blue-red powder called carmine.

There are many colors available among the inorganic pigments which are stable, light-fast, and nonbleeders. Aluminum powder, titanium dioxide and zinc oxide, carbon black and iron oxide black, yellow, red and brown iron oxides, ultramarine blue and violet, iron blue, manganese violet, anhydrous (Cr_2O_3) and hydrated [$Cr(OH_3)$] chrome green oxide are among the most popular shades used in this class.

Finally, one cannot discuss pigments without discussing the pearlescent varieties needed to produce frosted shades of pressed powder. Mica, titanium-coated mica, bismuth oxychloride, bismuth oxychloride–coated talc, bismuth oxychloride laminated on mica, and pearl flakes ($CaCO_3$) are the most popular frosting materials used today. Natural pearl or guanine flakes are too costly and rarely used. Aluminum powder may also be used as a pearlescent material, but tends to produce dull, gray shades if not used properly. The coated and laminated mica materials

are generally used for cake tone and sparkle and not for feel. They are relatively coarse when compared to the various grades of bismuth oxychloride which have more slip and luster when applied to skin. The bismuth oxychloride material is more compressible than the mica counterparts which are difficult to press in concentration above 15%, without special binders. Water, alcohol, and emulsions have been used as successful binding agents when high amounts of titanium-coated mica are used in pressed powder formulations.

If a special binder is not employed a spongy, crumbling cake is produced, due to the laminar quality of mica. Many formulations contain blends of bismuth oxychloride and titanium-coated mica products in order to achieve combined top tone and skin effects. Bismuth products are not light-fast and may darken on extended exposure to daylight.

Quality Control Methods

There are several basic steps in the quality control of pressed powder. First, and perhaps foremost, is the checking of colors to be used in the cake. Usually colors are checked for shades by making a 1% dilution in any standard talc, and the solution is then micropulverized through a 0.027-in. screen. Certain tolerances must be allowed for, as there are some slight variations from color batch to color batch. Color differences should be critically evaluated if the pigment is on the dirty or gray side, as it is possible to alter a final shade towards the gray side but almost impossible to brighten one on the gray or dirty side. Talcs, kaolin, and other fillers do not require too elaborate checking except for an occasional spot check of their specifications. Note should be taken of the color of the talc itself, as talc is the major ingredient in most powders, and differences in color may affect the finished cake tone. Raw materials, especially talcs and pigments, should be continuously checked for bacteriological contamination.

A discussion dealing with make-up would not be complete without considering the technical aspects of formulation, evaluation, and pressing of these products.

Formulation Aspects

Pressed powder technology can be divided into two basic areas of formulation. The first group comprises those cake powders that are applied to the face or cheek area. Those cakes that are applied all over the face area called "pressed powder" cakes. Their intended use is either as a complete make-up finish to the face when applied alone, or as a

finish when applied over a liquid make-up base. They function to cover all skin imperfections and to give the skin a flawless, even look that remains the same all day long.

A simple trick which helps set a powder finish and keeps the shine away is to blot the face powder gently with a moistened piece of cotton after application.

Several years ago the trend in pressed powders was for a "heavier coverage" type of powder, but with the increased popularity of the "unmade-up" natural look, powders have become more and more transparent. Another innovation in recent years is the advent of the so-called blotter type of pressed powder. In Table I a sample of this type of pressed powder is shown.

Table I
Blotting Face Powder

Ingredients	Per Cent w/w
French talc	q.s.
Kaolin	35.0
Magnesium carbonate	3.0
Zinc stearate	5.0
Zinc oxide	5.0
Microcel E[a]	1.0
Heavy visc. mineral oil	5.0
	100.0

[a] Johns Manville Co., New York, N. Y.

This powder cake is specifically formulated with materials that have high oil absorption properties. The theory behind this is that powder having such unusual absorption quality will absorb excess facial oils and keep the face from developing a shine. Care should be taken in the choice of raw materials that lend to this type of formulation since they may be more difficult to press.

The sample formulations represented in Table II exemplify "pressed powder cakes" that have a relatively high covering power. These are more popular with middle-aged women whose skin generally has more flaws.

As previously stated, the trend today is for a more transparent type of cake. The desired effect may be achieved by several different approaches or combinations thereof. The simplest one is the removal of titanium dioxide or zinc oxide from the formulations. The second and more

Table II

Pressed Face Powders

Ingredients	Per Cent w/w		
	Sample 1	Sample 2	Sample 3
Alabama talc 141[a]	q.s.	q.s.	...
French talc	...	...	q.s.
Kaolin	16.0	20.0	10.0
Zinc stearate	4.0	...	1.5
Magnesium stearate	...	3.0	...
Magnesium carbonate	...	1.5	...
Titanium dioxide	10–20	15–20	10–20
Pigment	1–10	1–10	1–10
Mineral oil, 70 visc.	3.0	...	...
Isopropyl myristate	...	2.5	...
Isopropyl palmitate	...	...	1.5
Liquid cholesterol emulsifier[b]	...	...	1.5
	100.0	100.0	100.0

[a] Whittaker, Clark & Daniels, New York, N. Y.

[b] Amerchol Products (Amerchol L-101), Edison, N. J.; Malmstrom Chem. Corp. (Nimlserol-D), Linden, N. J.

delicate approach is in the choice of talcs and fillers. Many of the talcs previously mentioned, while excellent for pressing, exhibit a fairly high amount of opacity. The quantities of these types of talcs should be reduced and replaced in formulations by more transparent ones such as Italian talc, North Carolina, India, and Metropolitan talc (samples 1, 2, and 3 in Table III). Kaolin and metallic stearate levels in the formulations should be properly balanced since these materials give opacity. All materials should be carefully blended so as to produce a tablet which has a good texture and low coverage and still presses easily without glazing. Table III summarizes these translucent types of face powder.

In all the examples in Tables II and III, the binder may be introduced in some type of emulsion system. The water is driven off by using a jacketed type of mixer such as a Baker-Perkins.* This method of introducing the binder produces a very uniform, smooth tablet.

Included in the group of pressed powder products are those cakes that are applied to the cheek area specifically. They have shown increased popularity in recent years and for the most part have replaced the old type cake and cream rouges. The function of the blush-on is to give a subtle highlight or glow to the cheek. The old fashioned cake

* Baker-Perkins Inc., Saginaw, Mich. 48601.

Table III
Translucent Pressed Face Powders

Ingredients	Per Cent w/w		
	Sample 1	Sample 2	Sample 3
Alabama talc 141[a]	q.s.	q.s.	...
North Carolina talc	...	...	q.s.
French talc	...	...	30.0
Italian talc	...	30.0	...
Kaolin	5.0	10.0	5.0
Zinc stearate	1.5	3.0	1.5
Magnesium carbonate	...	...	1.0
Pigments	0–1.5	0–1.5	0–1.5
Low viscosity mineral oil	3.0	...	...
Isopropyl myristate	...	...	2.5
Acetylated wool wax alcohols[b]	...	3.0	...
	100.0	100.0	100.0

[a] Whittaker, Clark & Daniels New York, N. Y.
[b] Amerchol Products (Acetulan), Edison, N. J.; Malmstrom Chem. Co. (Acetol), Linden, N. J.

rouges are much too intense and unnatural for the "unmade-up" look of today. Perhaps the most significant difference between the pressed face powder and blush-on is the amount and types of pigment used.

Blush-ons normally contain a higher percentage of lakes than do regular pressed powders and therefore highlight the cheek area in a subtle manner. The formulation principles that aid the chemist in his choice of raw materials for pressed face powder cakes also apply to blush-ons. The trend today is towards more sheer, translucent cakes, and careful consideration as to the choice of material and levels is needed. The uses of these materials are exemplified in the samples in Table IV. Sample 1 produces a more translucent cake.

Pearlescent blushers have also come into great demand and are being used more for day time wear rather than primarily for the evening. The formulating chemist has a much greater choice of pearlescent materials than he had ever had in the past and can create many unusual effects with their usage. Titanium dioxide may be used in low amounts if it is desired to produce a bright shade. In sample 2, Table V, the gum solution is needed in order to press the powder because of the high amount of titanium-coated mica. A soft, spongy cake would result if a binder of this type were not used. Table V demonstrates the proper blend of materials necessary to produce a pearlescent blusher powder.

Table IV

Matte Blush-on Powders

Ingredients	Per Cent w/w	
	Sample 1	Sample 2
Talc WS[a]	q.s.	...
Talc 141[b]	...	q.s.
Italian talc	20.0	...
Metropolitan talc #1[b]	...	40.0
Zinc stearate	10.0	3.0
Calcium carbonate	...	3.0
Magnesium carbonate	...	3.0
Pigments and organic lakes	q.s.	q.s.
Mineral oil 70 visc.	3.0	...
Isopropyl myristate	...	4.0
	100.0	100.0

[a] C. B. Chrystal Co., New York, N. Y.

[b] Whittaker, Clark & Daniels, New York, N. Y.

Table V

Frosted Blush-on Powders

Ingredients	Per Cent w/w		
	Sample 1	Sample 2	Sample 3
Talc 141[a]	q.s.	q.s.	...
French talc	...	...	q.s.
Metropolitan talc #1[a]	...	...	10–20
Italian talc	...	...	10–20
Zinc stearate	10.0	10.0	1.5
Kaolin	10.0	10.0	5.0
Calcium carbonate	...	5.0	...
Pigment and organic lakes	q.s.	q.s.	q.s.
Mineral oil, 70 visc.	5.0	5.0	...
Liquid cholesterol emulsifier[b]	...	...	5.0
Titanium-coated mica[c]	15.0	15–30	...
Bismuth oxychloride[d]	...	...	10–30
5% Aqueous hydroxyethyl cellulose[e]	...	10.0	...
	100.0	100.0	100.0

[a] Whittaker, Clark & Daniels, New York, N. Y.

[b] Amerchol Products (Amerchol L-101), Edison, N. J.; Malmstrom Chem. Corp. (Nimlesterol-D), Linden, N. J.

[c] Mearl Corp. (Timica Pearl), New York, N. Y.; Rona Pearl Co. (MP-10), Bayonne, N. J.

[d] Mearl Corp. (Mearlite LBU), New York, N. Y.; Rona Pearl Co. (NLD), Bayonne, N. J.

[e] Union Carbide Chem. Corp. (Cellusize QP-3), New York, N. Y.

The next basic group of pressed cake powder includes those cakes that are applied to the eye area. These are cake eyeshadow, cake eyeliner, and cake eyebrow.

Cake eyeliner is the only pressed cake that is unique from all other cake products because of the method of application. Basically, all other cakes are used in the dry form. During eyeliner application, water is mixed with the powder and the creamy resultant emulsion is used to paint a line above the eyelash and sometimes below the lower lash. Normally, powder will not readily mix with water; therefore, a different type of binder has to be used which will form an emulsion upon the moistening of the cake with a wet brush. The two types of binder systems that meet this requirement are a soap binder (ionic) (sample 2, Table VI) or a nonionic binder system (sample 1, Table VI). The soap binder system is chiefly triethanolamine stearate or triethanolamine oleate or a combination of both. Included in this system may be glycols, lanolin and its derivatives, and other emulsifiers. The nonionic systems are usually some combinations of sorbitan ester emulsifiers and also may include other materials such as lanolin derivatives and glycols. Cake eyeliners are hard tablets and care must be used in the proper selection of fillers. Metallic stearates and calcium carbonate aid greatly in the pressing of a hard tablet. In order to pay off properly, there must be a proper balance of binder and pigment. Additional materials may be incorporated to help regulate the rate of water absorption of the cake. The cake should not absorb water too rapidly and act like a sponge, as this will not permit

Table VI
Cake Eyeliner

Ingredients	Per Cent w/w	
	Sample 1	Sample 2
Talc WS[a]	q.s.	...
French talc	...	q.s.
Magnesium stearate	3–10	...
Calcium carbonate	8–10	3–6
Aluminum stearate	...	3–6
Kaolin	...	8–15
Pigments	5–30	5–30
Nonionic binder	10–12	...
Soap binder	...	12–20
	100.0	100.0

[a] C. B. Chrystal Co., New York, N. Y.

the user to form an emulsion. On the other hand, if the cake does not absorb some water, it will stay wet for too long a time. Two types of cake eyeliners utilizing the aforementioned principle are shown in Table VI.

Cake eyebrow, the next pressed powder in the group of eye products, has recently increased in popularity, greatly replacing, for the most part, the eyebrow pencil. The primary reason for this is the ease of application and the soft, natural look of the applied powder. Eyebrow pencils tend to give a harsh, definite line. It requires an expert touch to give the "unmade-up" look in fashion today. While the technology of cake eyebrow is similar in many ways to other pressed powder technology, there are several specific functions that make it stand apart. The first aspect is the area to which it is applied. Cake eyebrow is used to fill in the eyebrow and give it a full well-tapered look. It must have excellent adherence qualities to cling to an area that has short, relatively coarse hair. It must also apply smoothly and easily to give a matte, uniform appearance. The brush used should be firm and tapered. The cake must be quite firm so that it will not dust excessively when used. In order to achieve these qualities in the end product, the formulator must use higher quantities of the materials that give these specific properties. A relatively high percentage of metallic stearate and kaolin will help give these properties along with the use of good pressing talcs (sample 1, Table VII). Careful selection of a binder system and the proper amounts of same will also aid in the application qualities. Some useful materials are mineral oils, lanolin derivatives, vegetable oil triglycerides, and isopropyl esters. Workable cake eyebrow prototypes may be prepared from the samples shown in Table VII.

Pressed cake eyeshadows are perhaps the most extensively used cosmetic make-up item today. Many women have stopped wearing lipstick and only use some form of eyeshadow. Until five years ago, most eyeshadows were in either stick or cream form. Today, cake eyeshadow is the fashion and seems to be entrenched as a standard item. Although textures and shades are constantly changing, the fashion is still cake eyeshadow. Most popular today are the pearlescent shades. Recently, eyeshadows that can be applied either dry or wet have reached the market place. These are made to combine the properties of an eyeliner and a shadow.

Matte eyeshadow usually consists of a good quality pressing talc, and other materials such as kaolin, metallic stearates, chalk, magnesium carbonate, etc. (as exemplified in Table VIII). The primary difference between these products and pressed powders are the colors used. Eye-

Table VII
Cake Eyebrows

Ingredients	Per Cent w/w			
	Sample 1	Sample 2	Sample 3	Sample 4
Talc 141[a]	q.s.	...	q.s.	q.s.
Talc WS[b]	...	q.s.	...	...
Kaolin	15–20	12–15	15.0	12.1
Zinc stearate	5–10	4–8	8.0	10.0
Calcium carbonate	...	5–10	...	...
Italian talc	...	...	20.0	...
Iron oxide pigments	q.s.	q.s.	q.s.	q.s.
Mineral oil, 70 visc.	4–6	...	3.0	...
Trisolan[c]	...	6.0	...	...
Isopropyl myristate	...	...	3.0	...
Neobee M-5[d]	...	...	...	4.0
	100.0	100.0	100.0	100.0

[a] Whittaker, Clark & Daniels, New York, N. Y.
[b] C. B. Chrystal Co., New York, N. Y.
[c] Malmstrom Chem. Corp., Linden, N. J.
[d] Drew Chemical Co., New York, N. Y.

Table VIII
Matte Eyeshadow

Ingredients	Per Cent w/w Sample 1
Talc 141[a]	q.s. to 100.0
Kaolin	12–20
Zinc stearate	8–12
Pigments	10–40
Isopropyl palmitate	4.0
	100.0

[a] Whittaker, Clark & Daniels, New York, N. Y.

shadows contain chiefly ultramarine blues, violets, chrome green oxide hydrate and chrome green oxide anhydrous, ochres, and other iron oxide colors to give bright pastel shades. Titanium dioxide or zinc oxides are also used for coverage and to brighten shades. Trends today are for a very creamy, smooth formula type that does not apply heavily to the eyelid. Sheerness on application is desirable and the cake should not be dry or powdery in texture. A softer cake will help to give a creamier feeling upon application. If the correct amount of lb/in.^{2} is not used while pressing, a product having a completely different payoff and texture will

result. Also, most important is the type of applicator employed. The final cake must be evaluated with the specific brush or foam pad to be used. Important features are the texture of the brush, contour, material (foam pad or brush), and thickness of pad or bristle. These factors all influence the payoff of the final product. A basic matte eye shadow prototype is shown in Table VIII.

Iridescent or pearlized eyeshadows have become extremely popular in the past five years. Through the use of pearlescent products, women have been able to achieve more striking effects in the application of eye make-up. The formulating chemist now has a number of different pearlescent materials at his disposal and can achieve many unique effects. The choice of ingredients depends upon the pricing of the final product as well as the desired effects. The most widely used pearlescent material is bismuth oxychloride. The cost of the material is quite high in relation to the other ingredients and this usually influences the amount to be used in the final products. $BiOCl_2$ produces a high luster on the skin and may be pressed with relative ease in high quantities, as shown in sample 3, Table IX. $BiOCl_2$ does not give much sparkle to the cake tone of the final cake. If this effect is desired in cake tone, the materials best suited are titanium-coated micas and pearl flakes, as shown in samples 1 and 2, Table IX. Bismuth-coated micas are now being used in greater quantities as a replacement in part for straight $BiOCl_2$. However, these types of materials tend to produce soft, spongy cakes if not formulated properly. A properly formulated pearlescent shadow will most likely have a blend of several types of pearlescent materials, as no single ingredient is able to satisfy all requirements. Samples 4 and 5, Table IX, exemplify this fact. Amounts used will vary with the desired effects to be achieved. The use of titanium dioxide, zinc oxide, and other opaque materials will tend to reduce the pearlescent skin effect and their usage should be very low. Kaolin and zinc stearate help to produce a more stable cake. The amount and type of binder used is also of great consequence. If titanium-coated micas and $BiOCl_2$-coated micas are used in quantities over 15–20%, a water-binding system should be incorporated, as demonstrated in Table IX, sample 2. If not, soft spongy cakes will result. However, with a proper selection of binder, up to 50% of these materials may be incorporated in a cake, if so desired. Low amounts of $BiOCl_2$ are being incorporated today in many so-called unpearlized shades in order to achieve a creamier brighter effect. The use of blends of various materials to produce a number of cosmetic effects in pearled eyeshadows is demonstrated in Table IX.

Table IX
Frosted Eyeshadows

Ingredients	Per Cent w/w				
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Talc 141[a]	q.s.	q.s.	...	q.s.	...
French talc	...	...	25.0	...	20.0
Italian talc	...	...	20.0	...	q.s.
Zinc stearate	6.0	10.0	5.0	10.0	10.0
Kaolin	8.0	...	5.0	...	...
Pigments	q.s.	q.s.	q.s.	q.s.	q.s.
Robane[b]	5.0	...	...	...	...
Neobee M-5[c]	...	6.0	...	...	...
Mineral oil, 70 visc.	...	...	...	6.0	5.0
Ethyl hexyl palmitate[d]	...	...	5.0	...	...
Bismuth oxychloride[e]	15.0	...	40.0	10.0	20.0
Titanium-coated mica[f]	15.0	40.0	...	10.0	...
Bismuth oxychloride-coated mica[g]	...	...	...	10.0	20.0
Pearl flakes 120°[h]	5–15.0	...	...	...	...
5% Aqueous hydroxyethyl cellulose[i]	...	10.0	...	...	...
	100.0	100.0	100.0	100.0	100.0

[a] Whittaker, Clark & Daniels, New York, N. Y.
[b] Robeco Chem. Co., New York, N. Y.
[c] Drew Chem. Co., New York, N. Y.
[d] Van Dyke & Co. (Ceraphyl 368), Belleville, N. J.
[e] Mearl Corp. (Mearlite LBU), New York, N. Y.; Rona Pearl Co. (NLD), Bayonne, N. J.
[f] Mearl Corp. (Timica Pearl), New York, N. Y.; Rona Pearl Co. (MP-10), Bayonne, N. J.
[g] Mallinckrodt Chem. Corp. (Bilite 20), St. Louis, Mo.
[h] Pearl Products Corp., New York, N. Y.
[i] Union Carbide Chem. Corp. (Cellusize QP3), New York, N. Y.

No discussion of pressed powders would be complete without a short section on cake rouge. The number of users of cake rouge has in fact declined in recent years. However, there is still a hard core of women who will use no other substitute. No make-up line is really complete without several shades of cake rouge. The shade range varies from pinks to corals to reds. A cake rouge is a pressed powder that has a predominance of organic lakes rather than iron oxides, although there may be a combination of both. The percentage of lakes can be as high as 20–30%, as shown in Table X. The manufacture of cake rouge is an operation that requires a great deal of clean-up time and should be kept in a special area. The high percentages of organic lakes used, which have great staining power, present several specific problems in manufacturing. Ordinary binder systems do not properly wet down the pigment and tend

Table X
Cake Rouge

Ingredients	Per Cent w/w
	Base
Talc WS[a]	80.40
Kaolin	12.30
Zinc stearate	2.45
Titanium dioxide	4.90
	100.00
	Binder
Liposorb L-20[b]	7.70
Liquid cholesterol emulsifier[c]	7.70
Perfume	5.50
Water, deionized	q.s. to 100%
	Formula
Base	41.5
Pigment and lakes	5–20
Talc 141[d]	q.s. to 100
Binder	1.40
Water, deionized	7.10
	100.00

[a] C. B. Chrystal Co., New York, N. Y.
[b] Lipo Chem. Inc., New York, N. Y.
[c] Amerchol Products (Amerchol L-101), Edison, N. J.; Malmstrom Chem. Corp. (Nimlesterol-D), Linden, N. J.
[d] Whittaker, Clark & Daniels, New York, N. Y.

to leave dark spots. Wetting agents must be used in the system to ensure proper dispersion of the oils in the pigments. Pressure spraying of binders and double pulverization also help ensure a smooth, uniform product. Good pressing talcs, kaolin, and metallic stearates are also necessary. A specific cake rouge formulation is represented in Table X.

Manufacturing and Pressing Techniques

Although the exact method of manufacturing depends upon formulation, most pressed powders are made either by damp or dry compression. In the damp process, the powder and color are combined and mixed with a suitable binder and perfume, if required, in a pony mixer or a ribbon type blender, passed once or twice through a micropulverizer, compressed into pans, and dried in a current of warm air. There are variations of this procedure depending on the binder system and the equipment available. Some manufacturers who employ emulsion binders use a heated

mixer to drive off the excess water before completing batches, so that the drying procedure is eliminated.

In the dry process, the powder is subjected to compression without being wetted to any appreciable extent. Little or no liquid binder is required. Processing of pressed powders has varied considerably with the advent of pearlescent products. A considerable amount of experimental work is necessary to determine the proper mixer, mixing time, and milling or pulverizing techniques to be utilized in pressed powder technology. Color and pearlescent development is related to the amount and type of mixing employed. Pearlescent materials break down easily with overmixing and the change of appearance in the final pressed product is quite noticeable. Twin-shell blenders and the Littleford* mixer have been used successfully in place of ribbon-type mixers in producing powders. Hammer, pebble mills, and air mills have also found a place in pressed powder technology.

After manufacture, the prepared batch should be pressed immediately. If this is not feasible, bulk powders should be stored in double polyethylene bags inside airtight containers. Compression into pans is done automatically or semiautomatically with an air, hydraulic, or cam-operated type press, such as a Kemwall.† Pans are composed of steel, tin, or aluminum, depending upon product specifications. It is necessary to carry out trials to obtain the optimum pressure needed for each product. The pressure exerted by the press varies with the type of press used, and the amount and type of binder used, formulation type, and the shape of the pan. If the pressure is too high, the result is a tablet which is too hard, has poor payoff, and has a tendency to glaze. A very low pressure produces a soft cake, prone to breakage, which rubs off easily. Pressures usually vary from 300 to 2000 psi. Pearlescent products generally are more difficult to press and require a higher pressure. Often pressures are varied to accommodate the type of applicator to be utilized with the product.

It is necessary that the powder be uniform before pressing so that no air pockets are formed during compression. This causes the cake to break more easily. A ribbon of silk is usually inserted between the pressing die and powder before each compressing action, to keep the surface matte and prevent shine. Generally, cake eyebrow, liner, and rouge are usually pressed hardest, eyeshadows intermediately hard, and face powder and blushers softest. Each type of product should have its control

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† Kemwall iDstributors, Ltd., Brooklyn, N. Y. 11223.

as to optimum hardness. Tablet hardness may be measured by using a penetrometer or some other tactile sensitive instrument. Tablet breakage may be empirically measured by drop tests from heights of at least 18 inches and shipping tests. Finished cakes may be also checked for shade control by application on skin, white paper, on a powder puff, or variations and combinations of each aforementioned method. Attention shrould be given to the even filling of the pans in all cases where the pressure of the press is not self-adjusting, such as with a cam-operated press; pressure trial adjustments are necessary to determine exact consistency and cake payoff.

Summary

Retrospectively, it should be evident that manufacture of a successful pressed powder requires much experimentation, together with keen mechanical ability. The specialized machinery and technology required to manufacture these products successfully, the competition in pricing, the labor of manufacture, and the need for a wide range of shades and product prototypes are some of the reasons why very few cosmetic firms manufacture their own pressed powder products.

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