



Bridge You and Nano

Exponential Business and Technologies Company

Powder Contact Angle of Cosmetics

Powders are commonly found in daily life, and are essential to our way of living. From foods such as cocoa, spices, coffee, grains, to other industry products such as pigments, hybrid powders for improved corrosion resistance, polymer additives for coatings, metal powders for sintering, etc. In the personal care or beauty industry, body and cosmetic powders are a necessity of daily life.

Cosmetic foundations need to react with various liquids in different ways. The powders need to be waterproof in order to prevent smudging, running, or general removal of makeup. Alcohols are used in toners and makeup removers and need to have sufficient wetting in order to have affinity with the powder. Oil is also used in some makeup removers. Olive oil is used as a substitute for the natural oils that skin exudes as well as to show how the powder would interact with other cleaners. One such way of characterizing loose powder is through powder contact angle via compressed pellets.

Powder contact angle test is comprised of compressing the powder into a pellet and then testing on a goniometer with a desired test liquid. Compressing the powder is essential, if the loose powder is too fragile or bumpy, that would be detrimental to the test. The trick is to compress the powder into a flat pellet so that the surface is smooth, without cracks or pits. From there, a standard goniometer test is performed on the powder pellet.

For this application note, a drugstore brand of loose powder foundation makeup was compacted into pellets. The liquids chosen for contact angle measurements include water, ethyl alcohol, and olive oil. Table 1 lists the contact angles of the various liquids measured on the cosmetic powder pellets. It can be noted that both alcohol and olive oil have low contact angles with the foundation makeup while water has a high contact angle with it. This shows the cosmetic powder can be easily distributed on skin, easily removed by alcohol or oil-based makeup removers, and has water-resistant properties, making it an optimized foundation makeup product from wettability and removal point of view.

Table 1. Contact Angles of Various Liquids on a Cosmetic Powder Pellet

Test	Ethyl Alcohol	Water	Olive Oil
1	22.9	91.8	30.7
2	27.5	89.0	27.8
3	21.6	91.1	30.2
4	23.5	89.0	30.4
5	25.9	91.7	28.9
Average	24.3	90.5	29.6
S. D.	2.4	1.4	1.2



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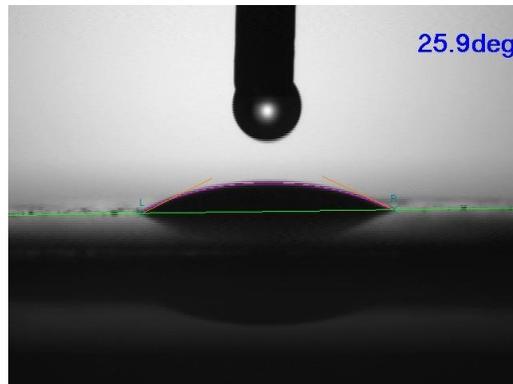


Figure 1. Image of an ethyl alcohol droplet on cosmetic powder pellet.

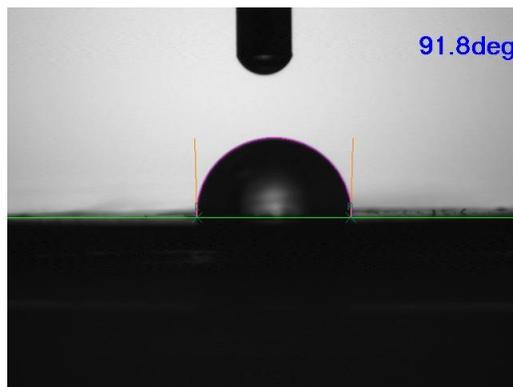


Figure 2. Image of a water droplet on cosmetic powder pellet.

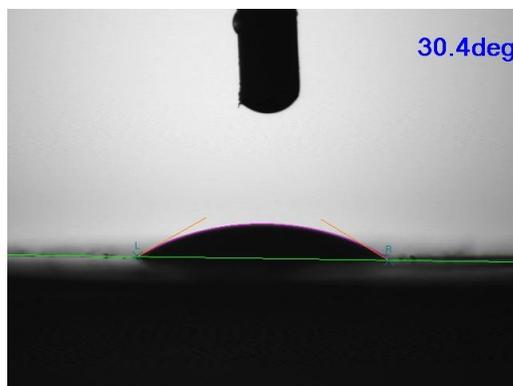


Figure 3. Image of an olive oil droplet on cosmetic powder pellet.