



RED CROWN ENGINEERED SURFACE COLORANTS

Updated September of 2006

Red Crown Engineered Engobes® are fully engineered and individually customized to our customers color target and performance parameters. “Just add Water” and apply. **Red Crown Engineered Engobes®** and Surface Coatings are individually formulated and custom engineered ceramic coatings that are applied to clay roofing tiles, facing brick and clay pavers. Engobes are engineered to fit your ceramic body’s dry and fired shrinkage. Every Red Crown Engineered coating is individually fired as part of our extensive Quality Control Process. Clay based Red Crown Engineered Engobes offer excellent opacity that extends the natural color pallet of every heavy clay manufacturer.

Red Crown Translucent® Engobes are low opacity ceramic coatings that allow body texture to remain an integral part of brick design. These ceramic coatings are highly pigmented, yet allow the individual character of the brick body to have a role in your brick design.

Red Crown Translucent® Engobes are available in a full pallet of colors. These environmentally friendly coatings are fully engineered for fired shrinkage and individually customized to our customers color target. “Just add Water” and apply.

Red Crown Applied Flashes® replace color effects achieved by energy intensive reduction firing. These environmentally friendly coatings are available in a full pallet of natural flash colors, are fully engineered and individually customized to our customers color target and performance parameters. “Just add Water” and apply.

Red Crown Dry Applied Colorants™ are pigment concentrates individually formulated and custom engineered to be mixed with sand to add color and texture to the brick design. “Just add Sand” and apply.

The foregoing is the best information The Prince Minerals Company has on this subject. While it is presented in good faith and is believed to be accurate and reliable, Prince Minerals Company makes no recommendation, representation or warranty, expressed or implied, as to its accuracy or the use to which it is put or the results obtained thereby.

DESIGN PARAMETERS FOR RCEE



Customer firing correlation

Color, firing temperatures, specific gravity and opacity are just a few of the stringent design parameters which Prince Minerals takes into consideration when designing your custom engobes.



Engineered Viscosity & Deflocculation Optimization



Stable color formulation for firing temperatures ranging from 1700° - 2200° F



Engobe Body Fit and Corrected Body Fit



Water of Retention - Drying Time

At Prince Minerals, we will follow these design guidelines and parameters to insure that the custom engobes created for your manufacturing needs, meet your requirements.

ENGOBE OPACITY



100%

75%

50%

Uncoated

ENGINEERED APPLIED FLASHES

COMMERCIALLY AVAILABLE



04-0101
BLACK ICE



04-0104
GUN METAL



07-0100
GARNET GRAY



04-0103
STORMY GRAY



04-0102
MARSH GRAY

CUSTOM COLORS



3701



3702



3401



3402



3403



3404



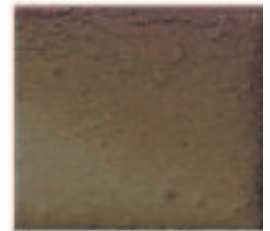
3201



3301



3501



3601

DRY APPLIED COLORANTS

All pigment color variations available within this publication can be custom engineered to your color target and performance parameters using Red Crown Dry Applied Colorants™.

CUSTOM COLOR SHADE NUMBERS



3701



3702



3401



3402



3403



3404



3201



3301



3501



3601

TRANSLUCENT ENGOBES

The following are examples of Red Crown Translucent® Engobes applied to a typical Redshale or Fireclay body. All pigment color variations available within this publication can be custom engineered to your color target and performance parameters using translucent engobes. This provides a very diverse color pallet range for your product.



RED CROWN ENGINEERED ENGOBES



1101 1102 1103



1401 1402 1403



1104 1105 1106



1404 1405 1406



1107 1108 1109



1407 1408 1409



1201 1202 1203



1410 1411 1412



1204 1205 1206



1413 1414 1415



1301 1302 1303



1307 1308 1309

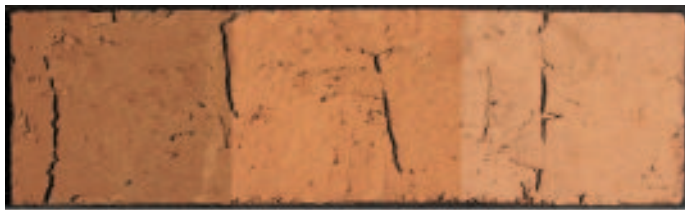


1304 1305 1306



1310 1311 1312

RED CROWN ENGINEERED ENGOBES



1313 1314 1315



1416 1417 1418



1316 1317 1318



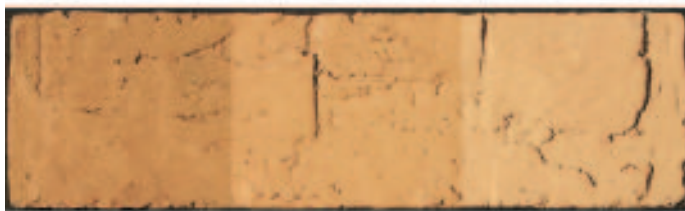
1419 1420 1421



1501 1502 1503



1601 1602 1603



1504 1505 1506



1604 1605 1606



1507 1508 1509



1607 1608 1609



1510 1511 1512



1610 1611 1612



1513 1514 1515



1613 1614 1615

RED CROWN ENGINEERED ENGOBES



1701 1702 1703



1704 1705 1706



1707 1708 1709



1710 1711 1712



1713 1714 1715



1716 1717 1718



1719 1720 1721



1801 1802 1803



1804 1805 1806



1807 1808 1809



1901 1902 1903



1904 1905 1906



1907 1908 1909



1910 1911 1912

RED CROWN ENGOBE RHEOLOGY

Measuring Specific Gravity and Viscosity

Specific Gravity is defined as the comparison of a liquid's weight with the weight of an equal volume of water. In other words it is the weight per unit of volume of the slip. In metric it is simple: water weighs one gram per cc (cc's and milliliters are the same). If an engobe slurry weighs 1.4 grams per cc, then it has a specific gravity of 1.4; it is 1.4 times heavier than water. A slurry with a specific gravity that is too high is said to be "heavy" (the more solids in a slurry, the higher its specific gravity will be, the more water, the lower it will be).

Viscosity refers to the mobility of the slurry; its "thickness" or "runniness". A slurry that has high viscosity is thick like syrup and one that has low viscosity is fluid. A deflocculant is used to lower the viscosity of a slurry. A slurry with a viscosity that is too high is said to be "thick", one that is too low is said to be "thin".



Specific Gravity Test Procedure:

- Step 1 - Fill 1000 ml pitcher with a minimum of 600 ml of thoroughly mixed engobe.
- Step 2 - Place a 500 ml polycarbonate Erlenmeyer flask on a balance and tare to zero reading.
- Step 3 - Pour engobe slurry into flask up to the 500 ml graduation and record weight.
- Step 4 - Calculate specific gravity by dividing weight by volume.
Example: 710 grams/ 500 ml (cc) = 1.42 gms/ cc

Viscosity Test Procedure:

- Step 1 - After measuring the correct specific gravity, place stopper - glass tubing assembly snugly into spout of flask.
- Step 2 - Simultaneously flip flask over and start timing with stopwatch.
- Step 3 - Stop timer when engobe flow starts to drip from end of glass tubing and record time in seconds.



Engobe Specific Gravity and Viscosity adjustments:

When the specific gravity is higher than desired add more water and re-measure. If the specific gravity is lower than desired add more pre-blended engobe and re-measure. When the specific gravity is correct and the viscosity measures too high, add a deflocculant in small increments and re-measure.

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