# • SLIPS & ENGOBES •

## • FROM VAL CUSHING NOTEBOOKS •

### WHITE SLIPS AND ENGOBES FOR C/4•5•6 TO C/9•10

PERCENTAGE LIMITS FOR C/4 TO C/9 WHITE BASE SLIPS ( ENGOBES).

THE CHART BELOW GIVES ONE SET OF LIMITS FOR WET TO LEATHER HARD APPLICATION AND ANOTHER SET OF LIMITS FOR BONE DRY TO BISQUE APPLICATION. FOR C/4•5•6 RANGE, INCREASE THE SPAR OR OTHER FLUXES.

| MATERIALS | BASIC FUNCTION OF THE MATERIAL IN THE SLIP | WET TO LEATHER HARD APPLICATIOIN | BONE DRY TO BISQUE APPLICATION |
|---|---|---|---|
| NON PLASTIC, REFRACTORY KAOLIN | Whiteness - Low Shrinkage | 5% To 20% | 10% To 25% |
| PLASTIC KAOLIN | Whiteness - ModerateShrinkage | 15% To 30% | 5% To 10% |
| CALCINED KAOLIN | Whiteness - No Shrinkage | NONE | 10% To 25% |
| BALL CLAY | Contributes high shrinkage - Helps slip to flow- Helps dry strength and suspension of slip | 15% To 30% | 0% To 5% |
| FELDSPAR | Main flux -Causes melting, Promotes color in slip | 10% To 30% | 10% To 30% |
| 3MgO-4SiO2: TALC | Flux - Good for low and high temperatures | 0% To 25% | 0% To 25% |
| (Ca CO3) WHITING | Flux - Best for high temperatures. - Use with feldspar | 0% To 8% | 0% To 8% |
| SEVERAL COMPOSITIONS AT VARIOUS TEMPS. FRIT | Strong flux for low temperatures..- Promotes various colors according to type Soda Frit turns Copper Blue etc. | 0% To 20% | 0% To 20% |
| (Na2O-2 B2O3) soluble BORAX | Hardens slip surface when dry, adds flux(melting) and . intensifies colors(some) | 0% To 8% | 0% to 8% |
| (Na2 CO3) soluble SODA ASH | As above and will begin to deflocculate the slip | 0% to 5% or not both | 0% to 5% |
| TIN OXIDE | Opacifier, Whiteness - slip covers better | 0% To 10% | 0% To 10% |
| OPAX | As above - but has about half the stength of Tin Oxide | 0% To 15% | 0% To 15% |
| (SiO2) FLINT | Helps slip fit glaze - Cuts dry shrinkage - Helps hardness and whiteness | 10% To 20% | 10% TO 25% |

THIS COLUMN SHOULD TOTAL 100% - TOTAL CLAY CONTENT FOR WET SLIP SHOULD BE IN THE RANGE OF 50% TO 75% WITH 1/2 OF TOTAL AS BALL CLAY.

THIS COLUMN SHOULD TOTAL 100% - TOTAL CLAY CONTENT SHOULD NOT EXCEED 50% AND 1/2 OF THE TOTAL SHOULD BE CALCINED CLAY.

### BELOW ARE A FEW GENERALITIES ABOUT SLIPS (ENGOBES)

1. LESS CLAY AND MORE FLUX GIVES EARLIER VITRIFICATION.
2. AT C/9, 3% TO 4% WHITING IS AS STRONG A FLUX AS 8% TO 10% FELDSPAR.
3. THE WET SLIP SHOULD BE WELL SCREENED (50 - 60 MESH).
4. OPACIFIERS ALLOW YOU TO GET GOOD WHITENESS WITH THIN APPLICATIONS.
5. BE SURE YOU HAVE ENOUGH FLUX AT A GIVEN TEMPERATURE. OTHERWISE SLIP MAY (BE TOO POROUS) CAUSE CRAZING.
6. TOO MUCH NON PLASTIC CLAY MAY CAUSE "PEELING" AND BAD ADHERENCE.
7. STRONG COLOR IN SLIPS (WITHOUT GLAZE OVER) REQUIRES HIGH PERCENTAGES OF OXIDES.
8. VERY THICK APPLICATIONS OF SLIP MAY BE THE CAUSE OF CRACKING OR PEELING OF SLIP.
9. SLIPS FOR WET CLAY APPLICATION MUST BE MADE TO SHRINK WITH THE BODY. USE PLASTIC CLAYS.
10. SLIPS FOR DRY & BISQUE APPLICATION MUST HAVE LOW SHRINKAGE. USE CALCINED CLAY AND LOWER TOTAL CONTENT
11. SLIPS FORC/4-5-6 SHOULD HAVE MORE FLUX - ADD FRIT AND/OR TALC TO THE FELDSPAR.
12. GROG, SAND, WOODASH, GRANULAR MATERIALS MAY BE ADDED FOR TEXTURAL SURFACES.
13. THE WHITE BASE SLIP IS BEST TO BEGIN WITH FOR THE DEVELOPEMENT OF COLORS.
14. A DEFLOCCULATED SLIP (WITH LOWER WATER CONTENT) HELPS SOLVE APPLICATION PROBLEMS.
15. SLIP FOR BISQUE APPLICATION SHOULD BE DEFLOCCULATED FOR BEST RESULTS.
16. GLAZE INTENSIFIES COLORING OXIDES IN THE SLIP (WITHOUT GLAZE OVER, COLORS ARE PALER).
17. ZINC OXIDE & BARIUM CARBONATE IN THE GLAZE, IMPROVE THE COBALT BLUES IN THE SLIP(INTENSIFIES).

These are just a few of many "Hints" about slips (engobes). VAL CUSHING