GLENN ZWEYGARDT

PORCELAIN ENAMEL - a fired ceramic/glass making material - 1500 F

PROCEDURE - metal surface must be clean of dirt, oil, grease, etc.
- if possible, sandblast clean, as chemically cleaning is dangerous at large scale; coating and firing should be done right after cleaning to prevent contamination
- apply first ground coat and fire, then apply cover coats for color, repeating cover coat application until desired color results. (Ground coat develops oxide to oxide bonding which allows for a fit between metal and cover coat.)
- firing time should be reasonably fast; at small scale, the kiln can be preheated to around 800 F. Firing should be in a strictly oxidation atmosphere in either electric or gas kilns. Approximately 2-5 minutes at 1500 F (slightly lower for cover coats); longer for metal thickness over 1/4".

GROUND COAT FORMULA	
Ground Coat Fritt	1,000 gm
Clay (China clay or enameling clay)	70 gm
Silica	100 gm
Bentonite	1.88 gm
Granular Borax	1.25 gm
Magnesium Carb.	1.25 gm
Sodium Nitrite	.63 gm
Water	600 cc

COVER COAT FORMULA	
Cover Coat Fritt	1,000 gm
Clay (China clay)	40 gm
Bentonite	2.5 gm
Potassium Carb.	2.5 gm
Sodium Nitrite	2.5 gm
Gum	.30 gm
Color oxides	-as desired-
Water	450 cc

Milling time - 6 to 10 hours

Specific gravity - 1.12 to 1.74 (for spraying)

Color oxides - normal ceramic oxides can be used to effect color such as copper and cobalt; however, commercial enameling oxides are more effective in producing color, suggested percentages range from 5% up to 30%, (20% average, 30% max. saturation). Achieving correct colors may take many tests. If color reproduction is desired, then enameling oxides are a must along with careful notes on your formula. B.F. Drakenfeld & Co. and the O. Hommell Co. are excellent oxide sources.