PORCELAIN

Porcelain has long been synonymous with treasure. It was developed in China, where Jingdezhen has been a center for production of porcelain for 1000 years.

A true porcelain clay body is vitrified (i.e. glass-like, will hold water without a glaze), fine-grained, white, and translucent when thin, with a bell-like ring when struck. It's generally fired at cone 10-11. Developed in China, it was centuries before western potters learned the secret of porcelain. In her book *Arcanum: The Extraordinary True Story*, Janet Gleeson dramatically recounts the story of the discovery in Europe of how to make porcelain. Today, although porcelain is widely available and affordable, it maintains an aura of glamor and exclusivity because it is a demanding clay to form and fire, with the potential for high attrition.

Some porcelain bodies tend to be deflocculated, which causes the body to have working and drying problems. Deflocculated clay are **thixotropic**, and become softer when moved. This means a piece that feels dry enough to trim may become much softer as it is worked upon. Deflocculated bodies have trouble drying, as the parallel clay particles at the edges pack together as the water evaporates, closing the path for interior water to exit. This can cause uneven shrinkage that results in warping and cracking.

The density of the clay may cause edges and extensions to dry before the rest of the work, with the potential for cracking. Careful drying can address this.

In firing, true porcelain is fluxed enough to vitrify and become translucent when thin. This may cause warping and cracking in firing. Commercial producers may address this difficulty by bisquing porcelain bodies to maturity in supports or bedded in alumina oxide, then using special glaze gums and binders to apply the glaze to the vitrified wares, and firing lower for the glaze firing.

The challenge in formulating porcelain is to maintain whiteness and translucency and yet have sufficient plasticity for forming. Kaolins are white, pure, primary clays, but very refractory and not overly plastic. Ball clays are plastic, sedimentary clay, but contain traces of iron that cause reduced porcelain to have a grey-ish tinge (or oxidized porcelain to be a creamy color). Flux must be added in sufficient amounts to produce translucency, but flux is a non-plastic ingredient that reduces plasticity. Chinese kaolins are more plastic than those available in the west. Frank Hamer in *A Potters' Dictionary of Materials and Techniques* suggests that David Leach used bentonite to increase the plasticity of his porcelain without undue additions of iron. Bentonite can increase the tendency toward thixotropy. Hamer also states that re-using porcelain scrap may cause bloating unless it is pugged and de-aired. There is no hard boundary between porcelain and white stoneware. For ceramists who do not need translucency and absolute whiteness, going toward white stoneware bodies (less flux, additional ball clay, perhaps some fireclay added) will increase workability.

Resources:
Contemporary Studio Porcelain by Peter Lane
Stoneware & Porcelain; the Art of High-Fired Pottery by Daniel Rhodes
Studio Potter magazine, vol. 6, no. 2 is an issue on porcelain

Porcelain Casting Slip Tom Spleth
cone 8-10

Grolleg	30
kaolin Georgia	12
Ball clay	8
Flint	20
pyrotrol	12
Custer feldspar	18
	100
+ Darvan	0.4

Porcelain Margaret Bohls
C 10

Grolleg	50
Tile 6 clay	50
Custer feldspar	39.5
Flint	26
Pyrotrol *	23.7
Bentonite	4
	193.2

*Pyrotrol is a brand of pyrophyllite

Porcelain Casting Slip Reeves
C 10 Translucent, prone to slumping

Feldspar	34
Kaolin	40
Flint	26
	100
Darvan	0.01
water	35-40

Porcelain Peter Beasecker c 10

#6 Tile clay	30
EPK	15
Tennessee #1	5
Custer feldspar	27
Flint	23
	100
Bentonite	2
Epsom salts	0.25

Porcelain 2 Peter Beasecker c 10

Grolleg	50
Custer feldspar	27
Flint	23
	100
Bentonite	2
Epsom salts	0.25

Porcelain Matt Long c 10

Tile 6 clay	31
EPK	15
Custer spar	25
Silica	15
Ball clay	6
Pyrophyllite	8
	100
bentonite	2

Porcelain Tim Mather c 10 Not the whitest, but good working qualities

Tile 6 clay	38.5
Kentucky OM #4	19.2
Flint	19.2
Custer feldspar	23.1
	100

Grey Porcelain Bill Brouillard c10
Good for salt and wood. Grayish in reduction

Tile 6 clay	25
XX Sagger	15
Ball clay	10
Feldspar	30
Flint	20
	100
bentonite	1

Porcelain David Leach c 8-10
Good for larger pieces

Grolleg	60
Custer spar	25
silica (200 mesh)	20
	105
bentonite	5

Porcelain John Reeve c 8-11
Superior translucency and workability

Grolleg	50
Custer spar	43
flint	32
bentonite	6
	131

Porcelain Tom Turner c 10
12% shrinkage

Tile 6 kaolin	50
Kaopaque	20-25
F-4 spar	40
flint	36
Ceramitalc 10AC	3
Veegum-T	1.5
	80.5

Sweet Georgia Porcelain Sandy Simon c 10

Tile 6	75
Kaopaque	25
silica (225 mesh)	45
pot spar	55
V-Gum T	1
	201
handful of Epsom salts	