Glaze Forward



by Diana Pancioli

WHY USE CONE 6 REDUCTION?

First of all Cone 6 saves money. Some say it costs less by almost a third compared to Cone 10. Secondly, it helps preserve the kiln; Cone 6 is much easier on kilns than Cone 10. Thirdly, less gas used means less carbon emissions produced and a greener planet for polar bears and humans. Lastly, a reduction atmosphere makes beautiful glazes, whatever the temperature.

The development of cone 6 Reduction glazes was originally an attempt to insure that our expensive new gas kiln would last a long time. It has. Extending its life was my major goal ten years ago; saving fuel and reducing emissions were secondary, until now.

Having fired cone 10 R for many years, I also thought that it might be fun to add something to the literature by developing reduction glazes for a lower temperature. After several years of firing a handful of glazes at 6R, I applied for a summer grant to develop a better palette. I tested hundreds of glazes—anything I could find that was written for mid-range. The 22 glazes chosen for Glaze Forward are the product of that summer's research. (Thank you Eastern Michigan University.)

My first goal was to lower the temperature of traditional Cone 10R glazes-- celadon, temmoku, iron saturate, shino, copper red, etc. I revised some favorite formulae to the new lower temperature. The remainder were selected from many tests; I hoped to provide a range of colors, surfaces, and bases that would satisfy many tastes and encourage experimentation by others.

I have provided a list of the sources of these glazes. You will recognize some of them from cone 10. I renamed all the glazes according to their surface qualities so that (a) they would not be mistaken for their cone 10 versions and (b) their names would give my students a clue about each glaze's color and appearance.

I sent some glazes to the Alfred Analytical Testing Laboratory for leach testing. The results are reported in the notes at the bottom of each glaze page. Some testing still needs to be done.

John Hesselberth has been generous in allowing me to use a version of his software "GlazeMaster" to present the glaze recipes, their photos, and their chemical analyses for you. (Thank you John.)

Diana Pancioli Glaze Forward January, 2009

Recipe Nan	ne	Green	Gl	OSS					
Cone	6	Surfa	ice	Glossy		Color	Τrι	le Green	
Firing	Rec	duction		Recipe Set	Pancio	oli ^6 R	edu	uction	
Test Sa	amp	le IDs						Date Created	Date Printed
								5/1/2008	12/20/2008
Ingredients		% A	or nt.		Unity	Weig	ht	Mole	
Cornwall Stone		3	8.0			%		70	
Whiting			4.0	Li₂O					
FeldsparCuster			1.0	Na₂O	0.125	2.	75	3.01	
FeldsparKona F	4		0.0	K ₂ O	0.102	3.	43	2.47	
Barium Carbonate)		1.0	MgO	0.053	0.	76	1.29	
Dolomite			3.0	CaO	0.544	10.	85	13.14	
Ball ClayOld Min	e #4		5.0	SrO					a
Silica			8.0	BaO	0.176	9.	63	4.26	12012
				ZnO					1101
				PbO					
-				Subtotal Alkalis	0.227	6.	17	5.48	12
				Fluxes	1.000	27.	42	24.16	
				Al ₂ O ₃	0.351	12.	74	8.49	135 30 17 5 1 Mar 19
Add	otal	s 10	0.0	B ₂ O ₃ Fe ₂ O ₃	0.003	0.	18	0.08	OGG
				SiO ₂	2.776	59.	34	67.08	3.8
				TiO ₂	0.003	0.	10	0.08	
				P ₂ O ₅	0.004	0.	21	0.10	Glaze Photo
				Si:Al	7.90				
				Exp Coeff	79.82				
Comments				L.O.I.	11.28		R	ecipe Cost,	\$ / Ib 0.91

Derived from Cone 10 "Dimig Green"

This beautiful glossy green stays green unless the reduction is too heavy. Sometimes a pink blush will highlight one side of the piece. This glaze crazes. (Probably more flint will fix it). It is a stronger green with 5% copper but also leaches more. Becasue of the high copper content and the barium it is not useful as a liner. Strontium substitution for the barium doesn't work. It helps fix the crazing but the color changes to a muddy pink. At 4% copper carbonate it leached 23.2 mg/l copper

At 5% it leached 43.1 mg/l copper and 14.2 barium. Thin to medium application

Recipe Na	me	Deni	m Bl	ue					
Cone	6	Sur	face	Semiglossy		Color me	edium blue		
Firing	Re	duction		Recipe Set	Pancio	oli ^6 Red	uction		
Test S	Sam	ple IDs			I		Date Crea	ted Date F	rinted
	-		I				5/2/2008	8 12/20	/2008
Ingredients			% or Amt.		Unity	Weight	Mole	I	
FeldsparCuster			40.0	_		70	70		
Whiting			16.0	Li₂O					
Talc			9.0	Na₂O	0.099	2.39	2.43		
FritFerro 3134			9.0	K₂O	0.123	4.48	3.00		
KaolinEPK			10.0	MgO	0.194	3.03	4.73		
Silica			16.0	CaO	0.584	12.68	14.23		
				SrO					CONTRACTOR OF T
				BaO				LAN SEC	and the first
				ZnO					1.4.6.2.1
				PbO				2. 31	Qaac
				Subtotal Alkalis	0.222	6.87	5.42	000	2000
				Fluxes	1.000	22.58	24.38	200	0000
				AI_2O_3	0.297	11.72	7.24	Contraction of the local distance	A DESCRIPTION OF A DESC
	Tota	als	100.0	B_2O_3	0.085	2.29	2.07	And the second	
Add				Fe ₂ O ₃	0.003	0.19	0.07	1.221.23	AND
Cobalt Carbonate	e		1.2	SiO	0.745	62.16	66.20		-10
Copper Carbona	te		1.2	310 ₂	2.715	03.10	00.20		
Titanium Dioxide			2.0		0.001	0.03	0.03		
Bentonite			2.0	P_2O_5	0.000	0.01	0.01	G	laze Photo
				Si:Al	0 1 5				
				Exp Coeff	74 11				
Comments				L.O.I.	9.17	F	Recipe Cos	st, \$ / lb	0.90

This is a Val Cushing glaze; the master has done it again. This glaze is probably stable enough to pass a leach test, which means you can use it at these colorant levels on the interiors of vessels for food use.

Leach test results not yet completed.

Recipe Nan	ne	Cold	Yello	w					
Cone	6	Surf	ace	Semiglossy		Color	yel	low	
Firing	Re	duction		Recipe Set	Pancio	oli ^6 Re	edu	iction	
Test Sa	amp	le IDs			1		-	Date Create	d Date Printed
	-		1				Γ	5/1/2008	12/20/2008
Ingredients		% م	6 or Amt.		Unity	Weigl	ht	Mole	I
FeldsparKona F	4		34.0			%		70	
Barium Carbonate	•		20.0	Li₂O					
Dolomite			16.0	Na₂O	0.166	4.4	47	5.06	
FritFerro 3110			10.0	K ₂ O	0.053	2.1	19	1.63	
KaolinEPK			8.0	MgO	0.219	3.8	83	6.66	
Silica			12.0	CaO	0.294	7.1	18	8.98	
				SrO					A REAL PROPERTY AND A REAL PROPERTY AND A
				BaO	0.267	17.8	85	8.15	2×9 with 1
				ZnO				h	E. N. AVER
				PbO					
				Subtotal Alkalis	0.220	6.6	66	6.69	
				Fluxes	1.000	35.5	52	30.49	115 19
				Al ₂ O ₃	0.263	11.6	65	8.01	A summer
Т	Tota	ls 1	00.0	B ₂ O ₃	0.010	0.3	30	0.30	
Add				Fe ₂ O ₃	0.002	0.1	16	0.07	• CV
Bentonite			2.0	S:O		50 (2.4	C1.00	-/
Zircopax			10.0	SIO ₂	2.004	52.3	31	61.09	
Iron OxideRed			2.0	TiO ₂	0.001	0.0	03	0.02	
				P ₂ O ₅	0.000	0.0	01	0.01	Glaze Photo
				Si:Al	7.62				
				Exp Coeff	85.18				
Comments				L.O.I.	12.99		R	ecipe Cost,	\$ / Ib 0.98

Derived from Cone 10 "Alfred Yellow"

This cold yellow glaze goes to pale blue where thick and warm brown where thin. Strontium does not work as a substitute for barium in this glaze. The yellow color is completely lost with strontium.

This is not a liner glaze. It leaches barium at 7.25 mg/l.

Recipe Na	me	Dark	Satir	ו					
Cone	6	Su	face	Semiglossy		Color te	al, green, b	ack	
Firing	Re	duction	· ·	Recipe Set	Pancio	oli ^6 Red	uction		
Test S	amj	ple IDs			1		Date Crea	ed Date Printed	
	-		I				5/3/2008	3 12/20/2008	_
Ingredients			% or Amt.		Unity	Weight	Mole	1	
FeldsparKona F	4		48.0	_		%	70		
Whiting			16.0	Li₂O			_		
FritFerro 3134			6.0	Na₂O	0.219	4.41	4.63		
Ball ClayOld Mir	ne #	4	12.0	K ₂ O	0.089	2.73	1.88		
KaolinEPK			7.0	MgO	0.008	0.11	0.17		
Flint			11.0	CaO	0.684	12.47	14.45		
				SrO				1 - al a	And and the second
				BaO				191	atterne .
				ZnO				- For the	
				PbO				12 11	
				Subtotal Alkalis	0.308	7.14	6.51	112	15 M
				Fluxes	1.000	19.71	21.14	4 1 50	1
				Al ₂ O ₃	0.516	17.09	10.90	and the second	
	Tota	als	100.0	B ₂ O ₃	0.068	1.54	1.44	and the second	A LAND MARK
Add				Fe ₂ O ₃	0.005	0.24	0.10		DI
Iron OxideRed			5.0	0.0			00.07	-	VS
Cobalt Carbonate	9		3.0	SIO ₂	3.135	61.22	66.27		-
Bentonite			2.0	TiO ₂	0.007	0.18	0.15		
				P ₂ O ₅	0.000	0.01	0.00	Glaze Ph	noto
				Si:Al	6.08				
				Exp Coeff	77.82				
Comments				L.O.I.	10.06		Recipe Cos	t, \$ / Ib 1	.00

Derived from E. Cooper's "Matt Iron"

A textured satin with variegated color. The attractive teal/green/black color mix will change to a smooth satin black with more dark colorants but may also then be in danger of leaching. A dark glaze should contain no more than 2 to 3 percent cobalt if it is to be used as a liner. This glaze is more colorful on an iron-bearing clay body.

At 6% cobalt (twice as much as the recipe calls for) it leached 0.1 mg/l of cobalt.

Recipe Name	Satin Cel	adon				
Cone 6	Surface	Semiglossy		Color Ce	elery	
Firing Red	luction	Recipe Set	Pancio	oli ^6 Red	uction	
Test Sampl	le IDs		1		Date Crea	ted Date Printed
	I				5/2/2008	8 12/20/2008
Ingredients	% or Amt.		Unity	Weight	Mole	I
Nepheline Syenite	34.0			70	/0	
Whiting	20.0	Li₂O				
Talc	5.0	Na₂O	0.181	4.21	4.31	
FritFerro 3110	2.0	K₂O	0.058	2.04	1.38	
Ball ClayOld Mine #4	19.0	MgO	0.124	1.88	2.97	
Silica	20.0	CaO	0.638	13.44	15.24	
	_	SrO				AVAL 1
		BaO				
		ZnO				
		PbO				
		Subtotal Alkalis	0.238	6.25	5.69	10 1165
		Fluxes	1.000	21.57	23.89	ICA I
		Al ₂ O ₃	0.394	15.12	9.43	1001
Totals	s 100.0	B ₂ O ₃	0.002	0.06	0.05	
Add	·	Fe ₂ O ₃	0.005	0.31	0.12	Ser.
Iron OxideRed	1.5				00.00	2
Bentonite	2.0	5102	2.775	62.66	00.30	
			0.009	0.26	0.21	
		P ₂ O ₅				Glaze Photo
		Si:Al	7.03			
		Exp Coeff	75.65			
Comments		L.O.I.	11.77	F	Recipe Cos	it, \$ / lb 0.26

Derived from E. Cooper's "Clear Pale Olive"

A lovely satin celadon (more celery colored, not blue). The addition of more silica will make it shinier and move toward correcting the crazing (which is only visible if you stain it). But I don't like the glaze as well with the silica addition. I added a little frit to give it a slight sheen.

This glaze settled out more than the others despite the addition of bentonite so I added a small amount of Epsom salts to keep it in suspension

Not as nice on porcelain.

Recipe	e Nai	me	Textu	red	Blue					
C	one	6	Surf	ace	Semiglossy		Color Cu	Irdled blue	S	
Fi	iring	Red	uction		Recipe Set	Pancio	oli ^6 Red	uction		
Т	est S	ampl	e IDs					Date Crea	ated Date F	Printed
								5/2/200	08 12/20)/2008
Ingredients			% A	or mt.		Unity	Weight	Mole	I	
Nepheline S	yenit	е		30.0	-		/0	70		
FritFerro 31	134			20.0	Li₂O					
Talc				17.0	Na₂O	0.192	5.47	5.48		
Whiting				10.0	K₂O	0.036	1.55	1.02		
KaolinEPK				13.0	MgO	0.302	5.59	8.61		
Silica				10.0	CaO	0.470	12.09	13.39		A CALL SAL COMPANY OF THE REAL
			_ _		SrO				Con an hu	The second second
					BaO				CALME	The fry
					ZnO				CICI	
<u> </u>					PbO				N22 3.48	
					Subtotal Alkalis	0.228	7.02	6.50	and a	
					Fluxes	1.000	24.70	28.50	1	
					AI_2O_3	0.276	12.89	7.85	1 ment	the state of
		Totals	s 1	00.0	B ₂ O ₃	0.156	4.99	4.45		PRICE TO THE PRICE
Add					Fe ₂ O ₃	0.002	0.17	0.06	1	9+D
Zircopax				10.0	SiO			50.00	a star and	ID
Rutile				3.0	5102	2.074	57.15	59.09	Anno anno a	Langerer al comerce
Cobalt Carb	onate	9		0.5	TiO ₂	0.001	0.04	0.03	THE REPORT OF	A STATE OF THE OWNER, STATE
Copper Carl	oonat	te		1.0	P ₂ O ₅	0.000	0.02	0.01	G	laze Photo
Bentonite				2.0	61.41					
					SI:AI	7.53				
					Exp Coeff	75.59	5	Pecine Co	st \$/lb	0.88
Comments					L.O.I.	7.47	ľ		σι, ψ/ΙΟ	0.00

This is Marcia Selsor's Waxy White base with a number of colorants added. This variation is derived from a 50/50 color blend with rutile incorporated in the base for texture. There are other nice combinations with rutile but this one remains a favorite. Gloes glossy on interiors and breaks beautifully over textures.

Medium application.

Recipe Name	Chun or .	Jun				
Cone 6	Surface	Semiglossy		Color B	right texture	d white
Firing R	eduction	Recipe Set	Pancio	oli ^6 Red	luction	
Test Sam	ple IDs		1		Date Creat	ted Date Printed
	I				5/2/2008	3 12/20/2008
Ingredients	% or Amt.	_	Unity	Weight	Mole	1
FeldsparKona F4	34.0			70	70	
Whiting	10.0	Li₂O			_	
Dolomite	6.0	Na₂O	0.186	4.42	4.45	
Zinc Oxide	3.0	K₂O	0.049	1.76	5 1.17	
FritFerro 3134	17.0	MgO	0.089	1.37	2.12	
Silica	30.0	CaO	0.572	12.28	3 13.65	
		SrO				A STATISTICS
		BaO				0202002119
		ZnO	0.104	3.23	3 2.48	
		PbO				
		Subtotal Alkalis	0.235	6.19	5.62	
		Fluxes	1.000	23.07	23.87	And the second second
		Al ₂ O ₃	0.186	7.26	6 4.44	Contraction and the second second
Tot	als 100.0	B ₂ O ₃	0.159	4.23	3.79	
Add	1	Fe ₂ O ₃	0.001	0.07	0.03	Sec. Marxing
Bentonite	2.0				07.07	-urald
		SIO ₂	2.843	65.36	67.87	and the second se
		TiO ₂			_	
		P_2O_5				Glaze Photo
		Si:Al	15.28			
		Exp Coeff	73.37			
Comments		L.O.I.	7.23		Recipe Cos	t, \$ / lb 0.59

MarciaSelsor's "Jun", unchanged.

This is a beautiful bright marshmellow-like white textured semi-gloss. I tried adjusting this formula but it didn't come out as well as the original. (You might want to try to take out the zinc.) The difficulty is that to make this glaze more stable one has to destroy an important quality--its ability to run and hold itself in beautiful fat drips. (Don't use near the foot.)

I accept that it might not last as long with the dishwasher use (although after 3 years of use I can't see any changes). Application depends on where you want the glaze to form drips. (It is good lightly tinted too, with small amounts of iron or nickel.)

Recipe Na	me	Trar	nspare	ent Gloss					
Cone	6	Su	urface	Glossy		Color G	еу		-
Firing	Re	eductio	n	Recipe Set	Pancio	oli ^6 Red	uction		
Test S	Sam	ple IDs	5		1		Date Crea	ted Date	Printed
			1				5/3/200	8 12/*	19/2008
Ingredients		_	% or Amt.		Unity	Weight	Mole	1	
FritFerro 3195			29.0			70	/0		
Wollastonite			29.0	Li₂O					
Magnesium Carb	ona	ate	4.0	Na₂O	0.081	2.01	2.02		
KaolinEPK			19.0	K₂O	0.002	0.08	0.05		
Flint			19.0	MgO	0.158	2.55	3.94		
				CaO	0.759	16.99	18.90		
				SrO				1. 11 1.	Carlo
				BaO				X	Early Street
				ZnO				1	- 1 -
				PbO				1.18	101-
				Subtotal	0.083	2 00	2.07	E. h	Bast Mar Luck
				Total	0.005	2.03	2.07	0	100 14 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
				Fluxes	1.000	21.63	24.91	-	
				Al ₂ O ₃	0.290	11.81	7.23	the st	
	Tota	als	100.0	B_2O_3	0.261	7.25	6.50	COLUMN D	
Add				Fe ₂ O ₃	0.004	0.25	0.10	2.25	70
Bentonite			2.0	0.0			04.04		TR
				SIO ₂	2.457	58.95	61.21		No. of Concession, name of Street, or other
				TiO₂	0.002	0.06	0.05		
				P ₂ O ₅	0.000	0.02	0.01		Glaze Photo
				Si·AI	0.47				
			I		0.47				
-			l		6.04	F	Recipe Cos	st, \$/lb	0.78
Comments				L.U.I.	0.04				

An adjustment of Pete Pinnell's "1214"

This transparent fits quite well on the clay body I used, which shrinks 13%. This glaze may be used as a liner. A small addition of iron will convert it to a grey/green celadon.

Thin application.

Recipe N	an	ne	Ten	nmoku	C6R						
Cone	• [6	Sı	Irface	Glossy		Color Black/Red				
Firing	g	Red	uctio	n	Recipe Set	Pancio	oli ^6 Re	du	ction		
Test	S	ampl	e IDs	5		I		I	Date Create	d Date	Printed
				1					5/3/2008	12/19	9/2008
Ingredients				% or Amt.		Unity	Weigh	t	Mole %	I	
FeldsparCuste	r			58.0	_		/0		70		
Whiting				18.0	Li₂O						
Ball ClayOld N	lin	e #4		12.0	Na₂O	0.105	1.9	8	2.08		
Silica				12.0	K₂O	0.230	6.6	1	4.57		
	_		_ -		MgO	0.008	0.1	0	0.17		
	_		_ -		CaO	0.657	11.2	1	13.03		
	_		_ -		SrO				1	-	A STREET
					BaO					- Kan	No CEL
	-				ZnO					A A	
					PbO						2 Y 786 C 4
			-11		Subtotal	0 335	8.5	8	6.65	12 X 14	
						0.000	0.0	0	0.00		
					Fluxes	1.000	19.9	0	19.85	Page 1	and based
					Al ₂ O ₃	0.474	14.7	2	9.41	信息	State of the second
	٦	otals	5	100.0	B ₂ O ₃						(And the second
Add					Fe ₂ O ₃	0.006	0.2	7	0.11		TEM
Iron OxideRed				13.0	0:0			-	70.40	and the second	
Bentonite				2.0	5102	3.551	64.9	5	70.49	in particular distances	
	_		_! -			0.007	0.1	6	0.13		
	_		_ -		P ₂ O ₅					G	Blaze Photo
					Si:Al	7.49					
					Exp Coeff	78.72					
Comments					L.O.I.	9.67		R	ecipe Cost,	\$ / Ib	0.49

An adjustment of Hamer's "Temmoku"

This cone 6 Temmoku has 13% iron, a lot more than a Temmoku at Cone 10. At cone 6 reduction Temmokus seem to need more than the usual 8% required at Cone 10 to give the same black/red color break. At 11% iron this formula makes a handsome orange glaze with darker brown coloration in the depths.

Recipe Name Speck	kle				
Cone 6 Surfa	ace Semimatte		Color wh	nite with spe	eckles
Firing Reduction	Recipe Set	Pancio	oli ^6 Red	uction	
Test Sample IDs				Date Crea	ted Date Printed
	1		[5/3/200	8 12/19/2008
Ingredients 4	o or mt.	Unity	Weight	Mole %	I
Nepheline Syenite	34.0		/0	70	
Whiting	29.0 Li₂O				
Cornwall Stone	15.0 Na₂O	0.173	5.21	5.46	
FritFerro 3134	5.0 K₂O	0.056	2.57	1.77	
KaolinEPK	14.0 MgO	0.007	0.15	0.23	
Flint	^{3.0} CaO	0.764	20.85	24.15	
	SrO				and the second second second
	BaO				a contraction and
	ZnO				and a start of the
	PbO				and a start and Sugar
	Subtotal Alkalis	0.229	7.78	7.23	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
	Fluxes	1.000	28.78	31.61	COS H Sand
		0.371	18.40	11.72	and the to be
Totals 10	B_2O_3	0.040	1.37	1.27	000
Add	Fe ₂ O ₃	0.003	0.20	0.08	SPK
Zircopax	10.0		54.07	55.00	the second second second second second
Ilmenitegranular	3.0 SIO ₂	1.747	51.07	0.05	
Bentonite	2.0 TIO ₂	0.002	0.06	0.05	
	P_2O_5	0.002	0.11	0.05	Glaze Photo
	Si:Al	1 71			
	Exp Coeff	89.80			
Comments	L.O.I.	15.46	F	Recipe Cos	t, \$ / lb 0.59

Derived for E. cooper's "Cream Matt Speckle"

A smooth off-white semi-matte with orangy speckles. The matte is not useful as a liner.

Apply thin to medium.

Recipe N	an	ne	Shi	no						
Cone	•	6	S	urface	Semiglossy		Color w	/hite/red		
Firing	g	Red	uctic	on	Recipe Set	Pancio	oli ^6 Red	duction		
Test	Sa	ampl	e ID:	s				Date Cre	ated Date	Printed
				1				5/3/20	08 12/19	9/2008
Ingredients				% or Amt.		Unity	Weight	t Mole	'	
Nepheline Syer	ite	;		40.0			/0	70	_	
SpodumeneFo	00	te		30.0	Li₂O	0.247	1.80	6 4.19) —	
Soda Ash				8.0	Na₂O	0.607	9.4	5 10.28	3	
Ball ClayOld N	lin	e #4	_ -	17.0	K₂O	0.108	2.5	5 1.83	3	
KaolinEPK	_		_ -	5.0	MgO	0.012	0.12	2 0.20)	
	_		_ -		CaO	0.026	0.3	6 0.43	3	
	-				SrO				Constanting of the local division of the loc	A REAL PROPERTY
<u> </u>	-				BaO				ANAL ST	
			-1		ZnO				Same	He was a strength
			-1		PbO				Contraction of the second	
					Subtotal Alkalis	0.962	13.8	6 16.29		Str. A
					Fluxes	1.000	14.34	4 16.93		~~~
					Al ₂ O ₃	0.977	25.0	1 16.54		1 10 10 10 12 S
Add	Т	otals	5	100.0	B ₂ O ₃ Fe ₂ O ₃	0.025	1.00	0 0.42	2	- 54
Bentonite				2.0			1	_	Carlon and	-11-
					SiO ₂	3.893	58.7	0 65.91	1	a second statement of the second
					TiO₂	0.012	0.23	3 0.20) _	
					P ₂ O ₅	0.000	0.0	1 0.00) G	ilaze Photo
					Si·AI	2.00				
					Exp Coeff	3.98				
•						6.54		Recipe Co	ost, \$ / Ib	0.14
Comments					L.U.I.	0.54				

Derived from a cone 10 glaze "Porcelain Shino"

Shinos are temperamental. This one needs strong reduction and is more effective on a dark iron body. It is rather bland on white stoneware. It is capable of carbon trapping. It also crazes. This glaze does not work well thickly applied.

Application should be thin to medium.

Recipe Nan	ne	Satin \	Nhi	teC6R					
Cone	6	Surfa	ice	Semiglossy		Color wh	ite		
Firing	Red	duction		Recipe Set	Pancio	oli ^6 Red	uction		
Test Sa	amp	le IDs			1		Date Crea	ed Date Printed	
	-	I					5/3/200	3 12/19/2008	
Ingredients		% Aı	or nt.		Unity	Weight	Mole	I	
FeldsparKona F4	4	3	8.0			70	70		
Whiting		2	20.0	Li₂O					
Talc			5.0	Na₂O	0.153	3.95	4.07		
FritFerro 3134			8.0	K ₂ O	0.055	2.16	1.46		
KaolinEPK		1	8.0	MgO	0.107	1.79	2.84		
Flint		1	1.0	CaO	0.685	16.00	18.22		
				SrO					
				BaO					
				ZnO					
				PbO					
-				Subtotal Alkalis	0.208	6.11	5.54		
				Fluxes	1.000	23.90	26.60		
				Al ₂ O ₃	0.381	16.17	10.14		
Т	otal	s 10	0.0	B ₂ O ₃	0.073	2.10	1.93		
Add		1		Fe ₂ O ₃	0.003	0.19	0.08	SI	N
Zircopax			8.0	0:0			01.00	Contraction of the second	
Bentonite			2.0	SIO ₂	2.301	57.54	61.20	No. of Concession, name	-
				TiO₂	0.002	0.06	0.05		
				P ₂ O ₅	0.000	0.02	0.01	Glaze Photo	
				Si:Al	6.04				
		I		Exp Coeff	77.89				
Comments				L.O.I.	12.19	F	Recipe Cos	t, \$ / lb 0.47	

Derived from E. Cooper's "Cool Matt Blue"

This is a cool white satin. If you want it more matte, remove 2% frit. If you want it a little shinier, add 2% frit. Can be used as a liner glaze.

Recipe Na	me	Pale	Blue	Matte				
Cone	6	Sur	face	Matte		Color Pa	ale turquois	se
Firing	Firing Reduction			Recipe Set	Pancic	oli ^6 Red	uction	
Test Sample II		le IDs					Date Crea	ted Date Printed
			1				5/3/2008	8 12/19/2008
Ingredients		Å	% or Amt.		Unity	Weight	Mole %	,
FeldsparCuster			55.0			/0	70	
Whiting			24.0	Li₂O				
KaolinEPK			14.0	Na₂O	0.081	1.92	2.03	
Flint			7.0	K₂O	0.180	6.44	4.48	
				MgO	0.006	0.09	0.14	
				CaO	0.733	15.66	18.30	
				SrO				Substantian and the second statements
				BaO				Research and Research and
				ZnO				and the state of the state of the state
				PbO				
				Subtotal	0 261	8 36	6.51	
				Total	0.201	0.00	0.01	
				Fluxes	1.000	24.11	24.95	
				Al ₂ O ₃	0.435	16.87	10.84	and the second second second
-	Tota	ls 1	00.0	B ₂ O ₃				-
Add				Fe ₂ O ₃	0.004	0.23	0.10	PA
Zircopax			10.0					10
Cobalt Carbonate	e		0.5	SiO ₂	2.567	58.72	64.06	
Copper Carbonat	te		3.0	TiO ₂	0.002	0.05	0.04	
Rutile			6.0	P ₂ O ₅	0.000	0.02	0.01	Glaze Photo
Bentonite			2.0	0:- A I				
				51:AI	5.91			
				Exp Coeff	83.49	c	Racine Cos	et ¢/lb 0.83
Comments				L.O.I.	13.07	Г		

Derived from Rick Malgrem "Bronze/Green Matte"

A light blue which breaks to a darker grey in deep places. Too matte to be used as a liner.

Recipe Name	Ochre/Re	ed					
Cone 6	Surface	Semimatte		Color	Ocl	nre breaking	to red
Firing Re	duction	Recipe Set	Pancio	oli ^6 Re	edu	ction	
Test Sam	ple IDs				-	Date Create	d Date Printed
	-				Γ	5/3/2008	12/19/2008
Ingredients	% or Amt.		Unity	Weigh	ht	Mole	1
FeldsparCuster	40.0			70		70	
Whiting	21.0	Li₂O					
Dolomite	13.0	Na₂O	0.042	1.5	53	1.59	
Bone Ash	6.0	K₂O	0.092	5.0)7	3.47	
KaolinEPK	15.0	MgO	0.148	3.4	49	5.59	
Flint	4.0	CaO	0.718	23.5	56	27.10	
		SrO					Contraction of the second
		BaO					
		ZnO					
		PbO					Variative Care Comment
		Subtotal Alkalis	0.134	6.6	50	5.07	A SO
		Fluxes	1.000	33.6	65	37.75	
		Al ₂ O ₃	0.259	15.4	47	9.79	
Tota Add	als 99.0	B ₂ O ₃ Fe ₂ O ₂	0.002	0.5	20	0.12	O A D
Superpax	5.0		0.003	0.2	23		UK
Iron OxideRed	8.0	SiO ₂	1.347	47.3	35	50.86	And the second second
Bentonite	3.0	TiO₂	0.001	0.0	06	0.04	
		P ₂ O ₅	0.038	3.1	16	1.44	Glaze Photo
		Si:Al	5 19				
		Exp Coeff	85.25				
Comments		L.O.I.	17.92		R	ecipe Cost,	\$ / Ib 0.60

Derived from Hayden "Cinnamon Red"

This glaze, as indicated by its name, gives a nice color shift from ochre to iron red. It is low in silica so it is not a candidate for a liner glaze for food use.

Recipe Na	me	Iron Re	əd							
Cone	6	Surfa	ce	Semimatte		Color	Ru	sty red with	flecks	
Firing	Re	duction		Recipe Set	Pancio	oli ^6 R	edı	uction		
Test S	amp	ole IDs					_	Date Creat	ed Date	Printed
		1						5/1/2008	3 12/19	9/2008
Ingredients		% Ar	or nt.		Unity	Weig	ht	Mole %	I	
Nepheline Syenit	e	4	9.0	_		70		/0		
Bone Ash		1	1.0	Li₂O						
Whiting			8.0	Na₂O	0.218	5.	14	5.41		
Talc			7.0	K ₂ O	0.068	2.	44	1.69		
KaolinEPK			6.0	MgO	0.158	2.	43	3.92		
Silica		1	9.0	CaO	0.557	11.	89	13.84		
				SrO						
				BaO						2. 2.2.1
				ZnO						141 N. L.A.
				PbO					A COLUMN TO A	ALL ALL
				Subtotal Alkalis	0.286	7.	58	7.10	1.1	A 4
				Fluxes	1.000	21.	90	24.86		1.1
				Al ₂ O ₃	0.374	14.	53	9.30		and the second states
A -1-1	Tota	ls 10	0.0	B ₂ O ₃						
				Fe ₂ O ₃	0.002	0.	11	0.05	1.5	TR
Iron OxideRed		1	6.0	SiO	2 5 5 5	58	47	63 51	Succession in which the	and the second second
Dentonite			2.0	TiO.	0.001	0	02	0.02	1000	
				P ₂ O ₂	0.091	1	9 <u>-</u> 9 <u>4</u>	2 27	~	
<u> </u>				• 2~5	5.001	4.		/	(-	biaze Photo
				Si:Al	6.83					
				Exp Coeff	75.98			_		
Comments			L.O.I.	5.28	5.28		Recipe Cost, \$ / Ib		0.44	

Derived from Cone 10 "Oharata Red"

This iron red satin glaze is low in silica so probably it is not good for use as a liner for food containers. but it has an interesting ability to form smallsparkly crystals spaced out in the glaze. The addition of 10% flint will make it a shiny two toned iron saturate and will make it useful as a liner.

Recipe Name	Fake	Ash					
Cone 6	Sur	ace	Typical Ash	Rivulets	Color Be	ige, yellow,	red, green
Firing R	eduction		Recipe Se	et Pancio	li ^6 Red	uction	
Test Sam	ple IDs					Date Create	ed Date Printed
		1				5/2/2008	12/19/2008
Ingredients	9) 	6 or Amt.		Unity	Weight	Mole %	I
Dolomite		25.0	Г		/0	/0	
Strontium Carbonate	.	9.0	Li₂O	0.055	0.99	2.16	
Bone Ash		5.0	Na₂O	0.039	1.44	1.51	
Lithium Carbonate		2.0	K₂O	0.026	1.50	1.03	
FritFerro 3134		10.0	MgO	0.290	7.08	11.40	
Ball ClayOld Mine #	#4	24.0	CaO	0.464	15.74	18.23	
Red Art		23.0	SrO	0.125	7.85	4.92	State of the state
Silica	!	2.0	BaO				2 PM
			ZnO				A MARTIN
			PbO				and a start of the
			Subtotal Alkalis	0.120	3.94	4.70	131-11
			Fluxes	1.000	34.61	39.25	Sel III X
			Al ₂ O ₃	0.214	13.21	8.41	The second second
Tot	als 1	00.0	B ₂ O ₃	0.068	2.87	2.67	
Add			Fe ₂ O ₃	0.026	2.46	1.00	O FA
Bentonite		2.0			I		
			SiO ₂	1.195	43.40	46.92	
			TiO ₂	0.014	0.66	0.54	
			P_2O_5	0.031	2.64	1.21	Glaze Photo
			Si:Al	5.58			
			Exp Coeff	75.01			• • • • • • • • • • • • • • • • • • •
Comments			L.O.I.	19.47	F	Recipe Cost	, \$ / Ib 0.79

An adjustment of "Andie's Fake Ash"

This is a beautifully variegated fake ash glaze. It is a brighter yellow on porcelain with hints of green where thicker and terra cotta colored where thin. it is not stable because it is low in silica but to alter it would change the ash effect. While it might not meet strict requirements of stability, I use it anyway (having substituted strontium for barium). It is lovely on plates and bowls. If you wish to be more careful in your use of it you could put it instead on vases, spoon jars, dry storage jars, and other non wet food items. It is more beautiful with strontium as a substitute (one of the few I tested that is).

When made with barium it leached 3.28 mg/l

Recipe Name Da			k Blue									
Cone	6	Sı	urface	Glossy		Color True dark blue						
Firing	Re	eductio	n	Recipe Set	Recipe Set Pancioli ^6 Reduction							
Test S	Sam	ple IDs	6				Date Crea	ted Date	Printed			
			1				5/1/200	8 12/1	9/2008			
Ingredients			% or Amt.		Unity	Weight	Mole %	ľ				
FeldsparKona F	-4		41.0	_		70	/0					
Whiting			19.0	Li₂O								
FritFerro 3110			5.0	Na₂O	0.202	4.00	4.10					
KaolinEPK			10.0	K₂O	0.079	2.36	1.59					
Silica			25.0	MgO	0.005	0.07	0.10					
				CaO	0.714	12.77	14.49					
				SrO				STAT				
				BaO				XC	1 - 2			
				ZnO								
			(<u> </u>	PbO								
				Subtotal Alkalis	0.281	6.35	5.70	1				
				Total				4				
				Fluxes	1.000	19.19	20.29					
				Al ₂ O ₃	0.410	13.32	8.32	1				
	Tota	als	100.0	B ₂ O ₃	0.007	0.14	0.13	(Descention)	0 NO			
Add				Fe ₂ O ₃	0.003	0.13	0.05		UB			
Cobalt Carbonat	е		2.0	0.0			74.47	and the second second				
Iron OxideRed			1.5	SIO ₂	3.507	67.16	/1.1/					
Bentonite			2.0	TiO ₂	0.001	0.03	0.03					
				P ₂ O ₅	0.000	0.01	0.01	(Glaze Photo			
				Si·AI	0.50							
				Exp Coeff	0.00							
Commonte					9 97	F	Recipe Cos	st, \$/lb	0.79			
Comments					0.07							

Source: A mystery

This is a glossy dark blue. The addition of a small amount of iron keeps the blue from moving toward violet. It may be used as a liner glaze if the cobalt is kept at or under 2 percent. Brighter on porcelain.

No cobalt leaching was detected with 2% CoCO3 in the formula.

Recipe Name	e Co	oper R	ed					
Cone 6	S	urface	Semiglossy		Color Mo	ottled red		
Firing F	Reductio	on	Recipe Set	Pancio	li ^6 Red	uction		
Test Sample IDs		s		1		Date Creat	ed Date F	rinted
		I				5/2/2008	12/19	/2008
Ingredients		% or Amt.		Unity	Weight	Mole	I	
FeldsparCuster		74.0			70	70		
Whiting		11.0	Li₂O					
FritFerro 3124		10.0	Na₂O	0.175	3.02	3.20		
Silica		5.0	K₂O	0.303	7.93	5.53		
			MgO	0.003	0.03	0.05		
			CaO	0.520	8.11	9.50		
			SrO				201 10 10	and the second second
			BaO				100	1 1 2
			ZnO					
			PbO					A
			Subtotal Alkalis	0.478	10.95	8.73		VAL S
			Total	1 000	10.00	10.00	A	
			Fluxes	1.000	19.09	10.20	1	
			Al ₂ O ₃	0.508	14.41	9.29	and the second s	SUCT V STREET
То	otals	100.0	B ₂ O ₃	0.075	1.44	1.36		
Add			Fe ₂ O ₃	0.003	0.13	0.05		CR
Copper Carbonate		2.0	SiO		04.00	71.02		and the second se
Tin Oxide		2.0	5102	3.886	64.93	/1.02	No. of Concession, Name	Name of Concession, Name of Street, or other
Bentonite		2.0						
			P ₂ O ₅				G	laze Photo
			Si:Al	7 65				
			Exp Coeff	82,36				
Comments			L.O.I.	5.10	F	Recipe Cost	:, \$ / Ib	0.89

An adjustment of Pete Pinnell's "Cranberry"

This is a dependable bright copper red. It sometimes gives an attractive mottled surface.

It is not suitable as a liner glaze.

It leaches 12.2 mg/l copper

Recipe Name	Chocolate	e							
Cone 6	Surface	Semiglossy		Color	Bro	own variatio	ns		
Firing Rec	duction	Recipe Set	Pancic	li ^6 Reduction					
Test Samp	le IDs				_	Date Creat	ed Date Printed		
	I				[5/3/2008	12/19/2008		
Ingredients	% or Amt.		Unity	Weig	ht	Mole %	I		
Red Art	68.0			/0		70			
Zinc Oxide	18.0	Li₂O							
Whiting	10.0	Na₂O	0.028	0.	74	0.83			
FritFerro 3110	4.0	K₂O	0.077	3.	10	2.30			
		MgO	0.068	1.	17	2.03			
		CaO	0.267	6.	42	7.99			
		SrO					ALC: NOT A		
	_	BaO					Service States		
		ZnO	0.560	19.	52	16.75	C house and		
		PbO							
		Subtotal Alkalis	0.105	3.	84	3.13			
		Fluxes	1.000	30.	94	29.89	Contraction of the		
		Al ₂ O ₃	0.281	12.	26	8.40			
Total	s 100.0	B ₂ O ₃	0.004	0.	11	0.11			
Add		Fe ₂ O ₃	0.076	5.	20	2.27	CHOC		
Bentonite	2.0	S:O		50	4.4	E9.64	e no e		
		310 ₂	1.962	50.	44	0.69			
			0.023	0.	78	0.00			
		P_2O_5					Glaze Photo		
		Si:Al	6.98						
		Exp Coeff	74.31						
Comments		L.O.I.	7.78		R	ecipe Cost	, \$ / lb 0.73		

Derived from E. Cooper's "Brown Matte"

Although zinc is supposed to disappear in reduction, this glaze doesn't work without it. Chocolate looks like a slip glaze similar to old Albany slip glazes. I woul try using it under trailing, brush work, etc. The color varies subtly depending on where the flame touches it.

Recipe Name	Blue	/Gree	n Gloss								
Cone 6	Su	rface	Glossy		Color blue/green/brown						
Firing F	Reductior	l .	Recipe Set	Pancic	oli ^6 Reduction						
Test Sample IDs						Date Crea	ted Date P	rinted			
		1				5/3/200	8 12/19/	/2008			
Ingredients		% or Amt.		Unity	Weight	Mole %	I				
Nepheline Syenite		27.0			70	/0					
FritFerro 3134		27.0	Li₂O								
FritFerro 3110		20.0	Na₂O	0.476	8.72	8.98					
Ball ClayOld Mine	#4	13.0	K₂O	0.067	1.87	1.27					
Flint		13.0	MgO	0.007	0.08	0.13					
			CaO	0.450	7.47	8.51					
			SrO				C. CONNER	Are Marrie			
			BaO				No the	142100			
			ZnO				K - friend	Real States			
			PbO				1	Contraction of States			
			Alkalis	0.543	10.59	10.25	E and C	CON AND			
			Total	4 0 0 0		40.00	10-2000	State of the state			
			Fluxes	1.000	18.14	18.89	A ACT				
			Al ₂ O ₃	0.362	10.90	6.83	A REAL PROPERTY AND	The second			
То	tals	100.0	B ₂ O ₃	0.335	6.91	6.34	Constant of the local division of the local	-			
Add			Fe ₂ O ₃	0.004	0.17	0.07	X	BG			
Cobalt Carbonate		1.3	0.0			07.75		and the second second			
Iron OxideRed		2.0	SIO ₂	3.587	63.71	67.75	And in case of the local division of the loc	the state of the s			
Titanium Dioxide		6.7	TiO ₂	0.007	0.16	0.13					
Bentonite		2.0	P ₂ O ₅				Gla	aze Photo			
			Si:Al	9 92							
			Exp Coeff	82.77							
Comments			L.O.I.	2.22	F	Recipe Cos	st, \$ / Ib	1.56			

Derived from E. Cooper's "Medium Blue".

This glaze has nice color shifts from light blue to medium green where thicker, to dark brown where thin. May be stable. I added a small amount of Epsom salts to keep it in good suspension because the large quantity of frit in this glaze can cause it to settle badly, despite the addition of bentonite.

Recipe Nan	ne	Ash B	row	n						
Cone	6	Surfa	ace	Matte		Color	Me	dium brown		
Firing	Rec	luction		Recipe Set	Pancic	oli ^6 R	edı	uction		
Test Sa	amp	le IDs					_	Date Create	ed Date I	Printed
								5/3/2008	12/19	9/2008
Ingredients		% A	or mt.		Unity	Weig	ht	Mole %	,	
Red Art		{	50.0			/0		70		
Whiting			9.0	Li₂O						
Barium Carbonate)		1.0	Na₂O	0.004	0.0	09	0.11		
Ball ClayOld Min	e #4		0.0	K₂O	0.077	2.	51	1.86		
Flint			0.0	MgO	0.072	1.0	01	1.76		
		_! _		CaO	0.658	12.8	83	15.97		
		_!		SrO				3	Fridance	The Case of
				BaO	0.188	10.	04	4.57	You (1.42
				ZnO					June 2	C OF OF
				PbO					UOR.	2000
				Subtotal Alkalis	0.081	2.0	60	1.97	200	000
				Fluxes	1.000	26.4	48	24.26	PART -	OKA PLU
-				Al ₂ O ₃	0.365	12.9	92	8.85		The second of the second of the second se
T Add	fotal	s 10	0.0	B ₂ O ₃ Fe ₂ O ₃	0 077	4.3	29	1.88		OAB
Bentonite			2.0		0.011		-			TIP,
				SiO ₂	2.653	55.3	34	64.34	1	the second s
				TiO₂	0.028	0.	76	0.67		
				P ₂ O ₅					G	laze Photo
				Si:Al	7.27					
L				Exp Coeff	74.83					
Comments				L.O.I.	14.90		R	ecipe Cost,	\$ / Ib	0.41

Derived from E. Cooper's "Broken Yellow Brown"

The substitution of strontium in this glaze was less than successful. The original glaze has a surface complexity which was lost with the substitution.

This is not a liner glaze.

Thin to medium application

Leach test results not vet in.

Recipe Name	AmberC	6R				
Cone 6	Surface	Glossy		Color Am	nber	
Firing Red	luction	Recipe Set	Pancio	oli ^6 Redu	uction	
Test Samp	e IDs				Date Crea	ted Date Printed
-	I			[5/3/2008	3 12/19/2008
Ingredients	% or Amt.		Unity	Weight	Mole	1
Red Art	39.0			70	/0	
Nepheline Syenite	18.0	Li₂O				
Whiting	15.0	Na₂O	0.106	2.51	2.61	
Wollastonite	9.0	K₂O	0.075	2.71	1.86	
Dolomite	2.0	MgO	0.088	1.36	2.18	
FritFerro 3134	4.0	CaO	0.731	15.65	18.06	
KaolinEPK	3.0	SrO				weighter hand and the second
Flint	10.0	BaO				TO THE CLE
[_	ZnO				CODE -
		PbO				
		Subtotal Alkalis	0.181	5.22	4.48	
		Fluxes	1.000	22.23	24.71	Concert, See of
		Al ₂ O ₃	0.341	13.29	8.43	Statement of the second statement of the
Totals	s 100.0	B ₂ O ₃	0.039	1.03	0.96	
Add		Fe ₂ O ₃	0.052	3.17	1.28	AMB
		SiO ₂	2.599	59.64	64.23	Supervised in the second
		TiO₂	0.015	0.47	0.38	
		P_2O_5	0.000	0.00	0.00	Glaze Photo
		Si:Al	7.61			
		Exp Coeff	76.41			
Comments		L.O.I.	10.53	R	ecipe Cos	t, \$/lb 0.29

Derived from cone 10 "Amber Celadon"

I tested a number of variations of this recipe; I hope to simplify it, but the resulting changes produced a much less interesting glaze. You could try adding a percent of iron if you want it a little darker.