Surface Therapy #3[1]

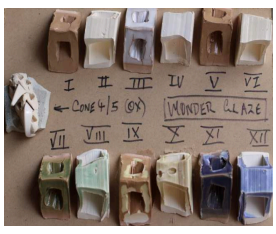
Glazes for functional ware - Written by Daniel Skeffington

Tea set with cherry dish. Val Gordon, (NSW) 2015

Loupes, rubber gloves, careless washer-uppers, subversive gurus, barrier agents, Janet's 'Wonder glaze' and nasty crack nasties.

Glazes for Functional Ware, is the topic for the third in the series featuring historical perspectives, a special focus on three international makers – including the Australian maker Janet deBoos, basic theory and science, further reading references and working recipe of slips and glazes suitable for layering, for you to try.



[1] Surface Therapy Issue 1,2,3 & 4 were originally published in an edited form by the Australian Ceramic Association under the tab 'Clay Stuff' on the Association's website. Go to - http://www.australianceramics.com/category/clay-stuff/

Glazes for functional ware with a focus on wide cone range firing

Even a short time spent researching this topic in the literature or on the web would scare the pants off the inquiring potter considering using or developing a glaze for functional use. If we're not poisoning our users, flakes of glaze might be ingested, lodge in our bodies and become internal cancerous alien monsters – worse, we might poison ourselves at any one point of the many steps in making. But even worse still, the glaze we might use might just not suit the 'fit for purpose' for what the work is intended – and we don't want Fair Trading breathing down our necks – do we? (lol).

So, a focus on what, for and why glazes to use on functional ware is a worthy topic in this series.

What is difficult and of primary importance in making functional ware, (sometimes referred to as 'domestic ware' or 'dinner ware' which are both limiting terms for this study, denying the many other 'functional' uses for ceramics), is to use a glaze that satisfies a whole bunch of criteria including and other than, health and safety issues. These will be discussed here within. Further still, if you're a beginner or have a mid-range of firing experience, when facing these maker dilemma, you want to start by using a glaze that is tolerant of a wide firing range and also have application on a wide clay body range as well – as an insurance for your work's successful completion and perhaps to make your world a little less stressful. For functional ware, the successful outcome of the surface treatment you will choose is for your vessel to have ultimately 'utility' as its core DNA and is either facilitated or complimented by that surface treatment.

Functional ware beginnings

There is a toss-up amongst scholars of antiquity as to the purpose of the first man-made clay objects. Were they objects of belief and ritual expression? - Think Venus of Dohi Vestonice[2] (29,000 – 25,000 BCE), or were they vessels to carry water from the stream to wash down mum's Woolly Mammoth stew? (It's not exactly fillet steak mum!) Whatever the functional purpose first devised, ceramics have been 'used' in such a fashion throughout millennia that as an invention, ceramic objects are among man's great achievements alongside the wheel, the toothbrush and the Internet. (Imagine life without a toothbrush – hell). And it's now gone full circle – we now have designer ceramic watches!

[2] https://en.wikipedia.org/wiki/Venus_of_Doln%C3%AD_Věstonice

Using clay for its utility to make things of utility has transcended time. It has an enduring currency. In this light, clay could even be blamed as a provocateur of our modern hubris ways. Alongside this development pathway has been an ever-increasing set of criteria in the making of functional ware. From a volume-holding vessel to a non-leaking vitreous body to a product that doesn't go 'ka-boom #|*!' when nuked in a billion kitchen microwaves, or an item needed to colour-match the board's dining-room curtains. The decision-set needed to develop functional ware is only multiplied by the considerations of what glaze to use or what surface treatment to apply.

Venus of Dohi Vestonice. Moravske Zemske Muzeum, Brno, Chez Republic. The oldest known ceramic artefact of utility.

Occupational hazards - the big one

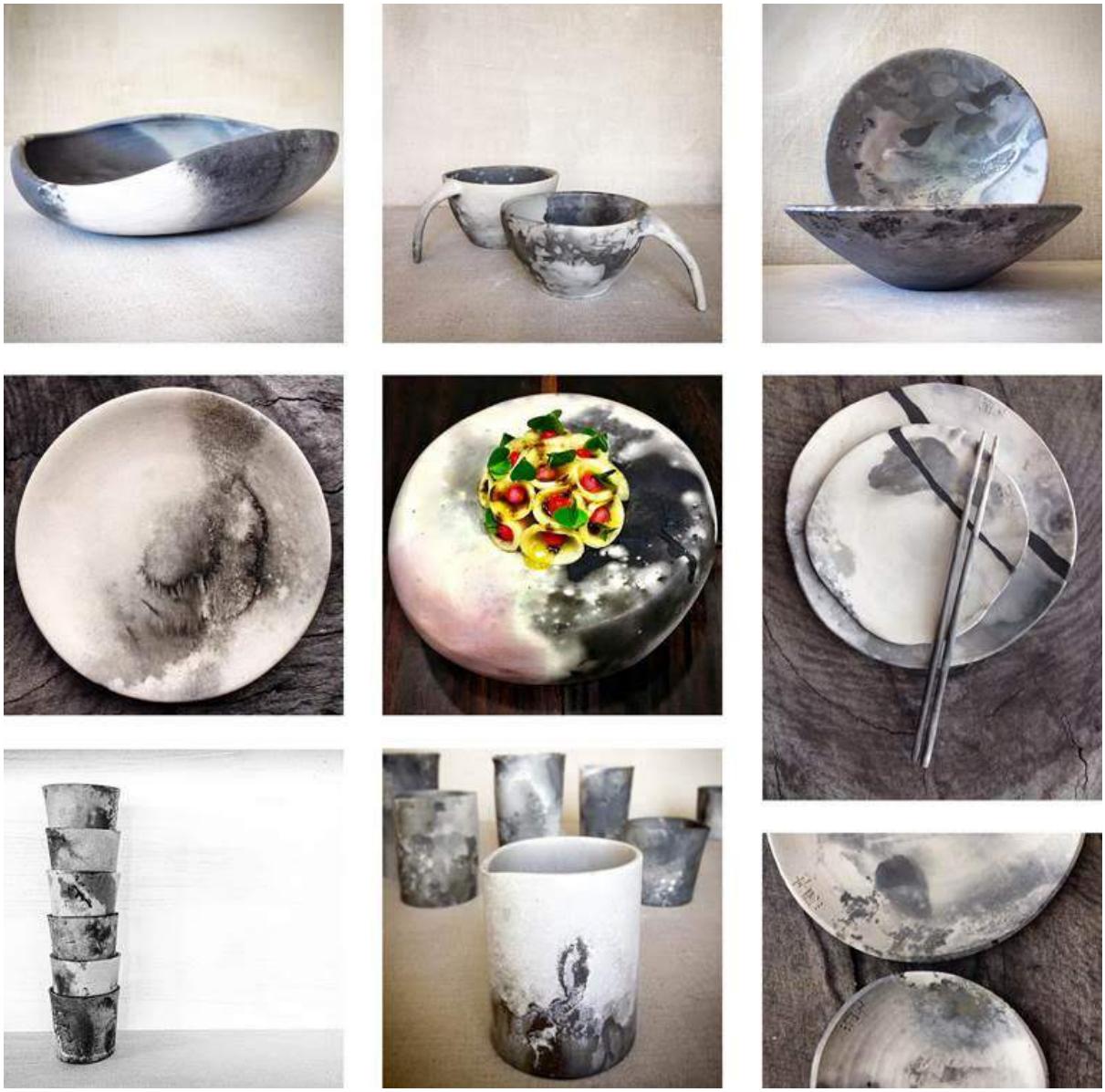
Next we explore the factors to be considered in choosing a glaze for practical ware: At the risk of blowing up my Mac, a Google search criteria, 'glazes for functional ware', yielded a plethora of stuff on health and safety issues. Top of the list is the evils of certain elements: lead, barium, manganese, copper, chrome, lithium, frits containing lead, stains containing unstable toxins, that should be either avoided or be treated with great caution when added to our glazes. These chemicals are well documented to be toxic and carcinogenic however it must be added that we makers use them routinely, so caution is necessary rather than exclusion. Don't get too excited about Internet scaremongering, use your Occ H&S procedures and confer with the Material Data Safety Sheets whenever in doubt. However, as an example of what can go pear shaped, Janet deBoos, Emeritus Fellow, School of Art, College of Arts & Social Sciences, Australian National University, originally published in BCT, her research on Barium; Living Dangerously: barium glaze research project - nasty stuff, detailing the stability, or rather lack of, and toxicity, in chronic breathing diseases, and mortality – and similarly for other compounds or cocktail combinations of them. So once you've got it, you've broken the egg, you can't unscramble it – sans a lung transplant or a wooden box. Ouch!
– go to: http://dx.doi.org/10.1179/bct.1999.98.1.35. [3] (Also published later in Ceramics Technical, 1999).

Oh, don't forget skin absorption issues associated with these nasties as well, particularly when mixing chemicals or when applying the glaze, it's also a no no. So wear gloves! At this point it is worth repeating the previous 'Surface Therapy' text on what is commonly known as 'glaze hygiene' – Note: Always apply appropriate Health and Safety practices and protection when working with glazes and ceramic equipment. Always use a P2 dust mask, get those rubber gloves out of the bedroom and use protective eye ware. For handling instructions including toxicities of individual glaze ingredients go to www.msds.com/ [4]

It's not only our exposure to these nasties in the making of our pots that's of concern but it's the care of our customer users as well. Can this be stretched legally to duty of care issues? And if so consider that 'our future is in the making - its in our hands' (sounds like a manifesto) – so what of our duty of care to the environment? When using an object with glaze of toxic elements, an acidic medium like vinegar or lemon juice – think salad dressing, can cause leaching of

[3] Living Dangerously: barium glaze research project. J DeBoos, British Ceramic Transmissions. Vol.98:1 (1999) pp 35-38
[4] Material Data Safety Sheets - www.msds.com/

the metals into the foodstuffs. The result is not too hard to imagine. Dishwashers use high alkaline detergents which over time can degrade the surface of a glaze making free and dangerous previously mentioned encapsulated metallic substances known to be human very un-friendly. Think how many times that client restaurant will be washing it's dinnerware, a.k.a. multiple times each night!!



Made OF Australia's Dinnerware

For this reason - food safety, and for other listed reasons here within, we bare mention of a new product called and consisting of ‘Liquid Quartz’. It acts as a barrier agent on all unglazed fired ceramic surfaces eliminating the need for

glazes completely and allowing alternatively fired objects (eg saggar, bisque, pit fired or unglazed ware (Naked Raku)), to be used as functional ware.
Go to: madeofaustralia.com/products.
It's complete list of virtues are well-documented and demonstrated on this website. “It’s transformative,” says Anna-Marie Wallace, “We can now realise an oft-dreamed desire to use work like unglazed functional ware, and where in the past there was no longevity what-so-ever. For me - and I know for many others, it expands our oeuvre, our product offer and our customer base.”

Made OF Australia's Dinnerware Range - Saggar fired with native Australian flora - Sealed with Liquid Quartz for Food Safety - From 11cm to 27cm

Going further afield, the glaze choices we make may also have a negative impact on our environment. The fumes from our firing, the tailings from our glaze buckets disappear from us into the atmosphere and oceans but their legacies may have lasting and toxic consequences on our world. Consider!

The sober, nay macabre issues discussed above are just ‘scratching the surface’ - my clever segue into our next section - but before then, explore the following reference not only for more doom and gloom but also some messages of hope of how to make things right: Digitalfire Reference Database, (Technical Articles) – ‘Are your glazes food safe or are they leachable?’[5]

[5] Digitalfire Reference Database, (Technical Articles) – ‘Are your glazes food safe or are they leachable? https://digitalfire.com/4sight/education/are_your_glazes_food_safe_or_are_they_leachable_12.html

Extended considerations

What are some of the other considerations for your functional ware surfaces? A humorous anecdote of a certain writer highlights an obvious one: Imagine an exhibition of new work – vases and bowls proudly setup on plinths in a beautiful space the night before the opening. The vases were filled with water and flowers to compliment the forms, photographs were taken and the doors locked ready for the 10am official opening the next day. Next day there was a swimming pool where the floor should have been. (Bugger those hairline glaze crazings and unglazed foot rims!) DOES YOUR WORK NEED TO BE VITRIFIED? If so, go to McMeekan's [6] lesson 101, definitive guide to testing and specification of clays and raw materials. Note well – a glaze should never be relied on to 'seal the deal' - that is to 100% vitrify a pot, but the glassier the better! Take my advice, avoid embarrassment, pre-fill your vases before you take them anywhere near your curator or gallery directory and get yourself a Loupe to closely check the glaze minutiae. (Where was Liquid Quartz when I needed it?)

But wait there's more - think about the following:

- Functional ware with crazed glazes (planned or otherwise), might also be porous (sucking up moisture), a combination that potentially is a breeding ground for nasty bacteria and subsequent transfer for human exposure. Imagine, one of our church could one day be the scourge of the world having been husband to the next superbug or, of lesser proportions, perhaps a bowl of bacteria is what that vexatious user is waiting for!

- When the going gets tough the tough get going! Is the ware up to it? Is the body and glaze strong, robust and substantial enough to be 'fit for purpose'? The most beautiful micron-thin porcelain vessel might not be an appropriate body for eating out of, or it might not provide sufficient insulation to prevent skin scalding regardless of how delicious that jasmine tea is in it. Can your ware stand up to the rigours of knife and fork scratching? Sink stacking? A careless washer-upper? Food and chemical staining, surface degrading?

- Method of making: often functional ware is required to be duplicated - can your design be appropriately moulded or production thrown? Glazed economically? Have you made it as easy as possible within the design

[6] Notes for Potters in Australia, Vol. 1. Raw Materials and Clay Bodies. Ivan McMeekin. NSW University Press Ltd, 1967

brief to produce the desired outcome? Is the making and glazing time efficient?

- Cost of production? Implied immediately above, is the ware made in an efficient way? – Design time? Making time? Materials cost? Can you use cheaper porcelain?

- Fit design brief – will the spaghetti marinara spill off that square plate with no rim? Will the wine jus pool in that spot next to the wagyu beef medallion – just as planned?

- And what about colour and decoration? Does the ware's appearance suit the menu to be served? Flowers to be plonked in? The décor? The user? The 'now' aesthetic.

Black Colander, Prue Venables. 2011. Skepsi Gallery exhibition. Purchased by Castlemaine Gallery, Vic. 24 x 27 x 18. Photo: Nicholas Hannah

There's no contemporary artist maker like Prue Venables[7], the subversive guru of Australian domestic ware, to get you thinking about the criteria for successful functional ware. Her approach questions our use of clay and glazes in their place as functional pieces. Is that pieced bowl or ladle useless? Or is it a very functional sieve, a slotted spoon? What is needed to make a functional piece useful? What is useful? What has been the thinking in it's making? What syntax gets the message heard and understood? Venables has responded to our material world – beauty, ambiguity, form and dysformia. She invites our own response – Venables the funster, the provocateur!

[7] Prue Venables website information - www.beavergalleries.com.au/venables

Case study – A functional ware focus of a new enterprise in Singapore

Michelle Lim and Ng Seok Har of MUDrock with their functional ware, Singapore. Jan 2016.

Michelle Lim and Ng Seok Har are makers who have started their new clay enterprise called 'Mud Rock'[8], in Singapore with the specific focus to deliver commissioned functional work for this idiosyncratic and bustling foodies paradise and for the top-end, one-off dinner-set buyer. "We have identified the trend for restaurant managers and their chiefs to deliver a richer experience for their diners. It's a wholistic approach involving market gardeners, butchers, provedores, interior designers and ceramic artists." She smiles seeing the fun of it all. They also supply a range of work for the new Singapore National Museum of Modern Art gift shop, important startup business 'cash flow'. Typically their

[8] MudROCK ceramics, Singapore; www.mudrockceramics.com

work is client brief-based. “We conduct our commissions as if we were running any business” says Seok, “It is not only important to deliver the outcome client’s expect of us but we see this client as a springboard to future ‘word of mouth’ business. We need to get the brief right and to do this we have to ask the right questions. And most of these are about expectations”.
Seok lists:

- What is the ware to be used for?
- What is the extent of the use?
- How will the ware be maintained/cleaned?
- Are there limitations imposed by the table/ furniture?
- What kind of food is to be served?
- What are the other elements of the table service to be complimented – the flatware, linen?
- What are the colour and surface decoration requirements and ideas?
- What variations of the design are required? (soup, dinner, entrée plate etc etc)
- Who are the decision makers in the final selection? What are their individual requirements – for example, the Chief will have different expectations from the owner?
- To what extent is artistic expression in the work expected?

Michelle, a protégée of deBoos and graduate of Canberra’s ANU, discusses the esoteric nature of the brief: “We find that our clients want original, unique designs, striking and noticeable, often to a point where the ware adds to the brand of the restaurant, yet the pieces must compliment the food first of all and then the whole ambiance, but always being careful not to overpower the food presentation. The work also needs to satisfy certain performance design criteria. Our work must inhabit the spaces they are used in. The fun part starts when we develop our test samples based on the brief. We take a lot of time to deliver on what we believe are the client’s expectations so our model and marquette making and glaze testing is a significant part of the delivery timeline. Getting it right means we have listened to the client. Making and selling functional ware is a new ballgame for us. We are bespoke makers now where previously we made according to our own aesthetic and offered it for sale – obviously to someone who connects with it. This is a new dynamic for us. Our response is very much manifest in the glaze and surface decoration we use and is one of the most important features of our ware.

Decisions, decisions, decisions – the attached Decision Algorithm may sort through the criteria of glaze selection for functional ware.

Decision algorithm - choosing a glaze for functional ware

Consider:

Preliminary Considerations

Research

- Published texts (academic, generalist)
- Internet
- Observation of existing work
- Mentor knowledge
- Own trialling

Client brief - desired utility

- Type of food
- Specific purpose
- Surrounding collateral. (flatware, linen)
- Colour and surface
- Surface decoration
- Branding marks requirements
- Surrounding décor
- Client aesthetic
- Maker artistic expression
- Income potential

Personal use or speculative sales – Desired utility

- Personal aesthetic
- Caesthetic
- Generalist purpose
- Income imperative

My Notes

Making

Clay body

- Colour compatibility with glaze
- Chemically/ structurally compatible
- Refractory process - Glaze fit

Glaze materials

- Consistent quality
- Accessibility
- Cost
- Oxides? Stains?
- Substitutability

Glazing environment

- Appropiate?
- Facilitating
- Equipment in good order

Method of making

- Thrown
- Hand built
- Molded
- Glaze dipped
- Glaze sprayed
- Glaze brushed

Firing

- Firing regime
- Oxidisation
- Reduction
- Kiln furniture protection
- Kiln population
- Kiln characteristics

Fired result

- Surface texture
- Vitreous ?
- Glaze strength
- Food staining

Environment

- Atmosphere – firing fumes
- Waste disposal, water or solid waste
- Materials acquisition footprint

My Notes

Other considerations

Maker Health & Safety

- Toxic glaze elements
- Aspiration
- Skin contact
- Safety equipment

User Health & Safety

- Chemical leaching
- Foodstuff safety/ reaction
- Surface degrading
- Crazed surfaces – hygiene
- Breakage behaviour/ sharps danger

Duty of care

- Fit for purpose
- Longevity
- Quality of materials

Ethical issues

- Attribution of glaze development
- Client toxicity protection

Desired finished product outcomes

- Glaze maturation
- Fit for purpose
- Glaze toughness
- Heat shock resistance
- Utilitarian / flexibility of use
- Colour response
- Surface response
- Satisfys aesthetic

My Notes

Master class - Australian setting

Like Singapore's MudRock, many contemporary Australian makers have taken the challenge of producing functional wares for dining settings and for very similar reasons – brand identity, points of differentiation, immersive dining experiences etc. All no doubt grapple with the complex considerations we have so far highlighted, yet each brief would have its own idiosyncratic requirements to overcome. Non-the-less success can be sweet: check out the family enterprise of Robert Gordon[9]; go to robertgordonaustralia.com - to view their extensive range of functional ware. Also, based in Newcastle are Paul Davis and Jacqueline Clayton. They deliver commissioned work for high-end establishments such as Sydney Opera House's Bennelong restaurant and the Quay restaurant through their design company 'Press to Play'. See the following for picture samples of their work: www.Trip Advisor/ Bennelong Restaurant [10]

These success stories might seem all too high-end for the casual or mid-skilled artist maker, but consider them demonstrative of outcomes that have addressed the before-mentioned criteria. So in making a dinner set, vase, bowl, light shade, whatever, for yourself, your mum or your market-stall buyer the same decision-set can be a guide.

Glaze theory and deBoos' 'Wonder Glaze'

"To achieve an acceptable wide cone-range of firing glaze, potters automatically reduce the clay content, however the alumina in the clay as part of the glaze formulation actually keeps the glaze stable the higher it is fired. So make sure your clay content is available in useful proportions. Although reducing the clay content might drop the glaze melting temperature to earthenware - when it is fired higher it will melt and run more quickly as the melt will be less viscous. For this reason as well, having fluxes that act over a range of temperatures is desirable - it means that they 'even out' the melting range. For example, boric oxide in the frits and zinc are very good over mid-range, as is calcium from about 1100 (cone 03), upwards".

Like the chemistry interplay of materials above, other factors affect a glaze's 'firing temperature', or put another way: 'where it appears at its best, or how you want it to finally present – this is it's 'aesthetic maturation'. Your knowing that a 'mature' glaze can be part of a spectrum from softening to melting to running;

[9] Robert Gordon ceramics - go to www.robertgordonaustralia.com
[10] https://www.tripadvisor.com.au/ Bennelong Restaurant/ Images

that a target temperature is a function of both heat source and time where time affects the rate at which crystals in the material will disassociate and become flowing, therefore the quicker or slower of both the firing and the cooling will affect the glaze outcome; and the testing knowledge you have secured from your trials – all of the above will bring about knowledge of the firing range of your glaze.
For an excellent short account of the science of glaze temp determination go to Digitalfire Reference Database. Technical Articles: What determines a glaze's firing temperature?

Satirically so-called 'the Wonder Glaze'[11] for its forgiving properties, versatility and happy outcomes, Janet has used this glaze for an extended period of practice. It was also featured in her first volume 'Glazes for Australian Potters'.[12] "It's a clear glaze with an optional tin oxide additive for white, (Note well: With tin, in a reduction firing it will loose some of its opacity as the tin becomes a flux), however overall it's a great performing ubiquitous glaze. It seems to perform very well on functional ware and has the added benefit of having a wide cone-range maturation profile. It's a gift that keeps on giving."

Janet has provided three glazes for your consideration. The first is discussed further below and the second and third, both essentially stoneware glazes, are attached to this article as glaze sheets, as is the first.

Keeping in mind the above glaze behaviour and rationale, Janet's basic clear glaze formula follows. It's poignant to note the suggested firing cone range of this glaze, i.e. 01 – 8. This is a stretch of temperature maturation of 120 degrees – significantly wide compared to many glazes. The benefit here is flexibility though obviously the 'take home' appearance and your satisfaction of your output will differ within this range. (Your author's tests produced a consistent result between cone 01 – cone 6 as per the glaze test results picture below).

[11-12] Glazes for Australian Potters, J. DeBoos, Page 47, Glaze #52. Cassell Australia. 1978

deBoos Clear *(note: see attached glaze sheet)*

Fire cone 01 – 8 oxidisation

- Ferro frit 4108 (formally 4508) – 50 *(Flux. Low alumina, high calcium borosilicate frit)*
- Potash feldspar – 20 *(Also called Orthoclause. Flux, melts at 1200C)*
- Ball clay – 20 *(Highly plastic clay. Ball clay vitrifies between 1100 -1200C)*
- Magnesium carbonate (light) – 10 *(Opacifier up to 1170C then acts as Frit. 'MgCO$_3$ light mixes better in the glaze slop'[13])*

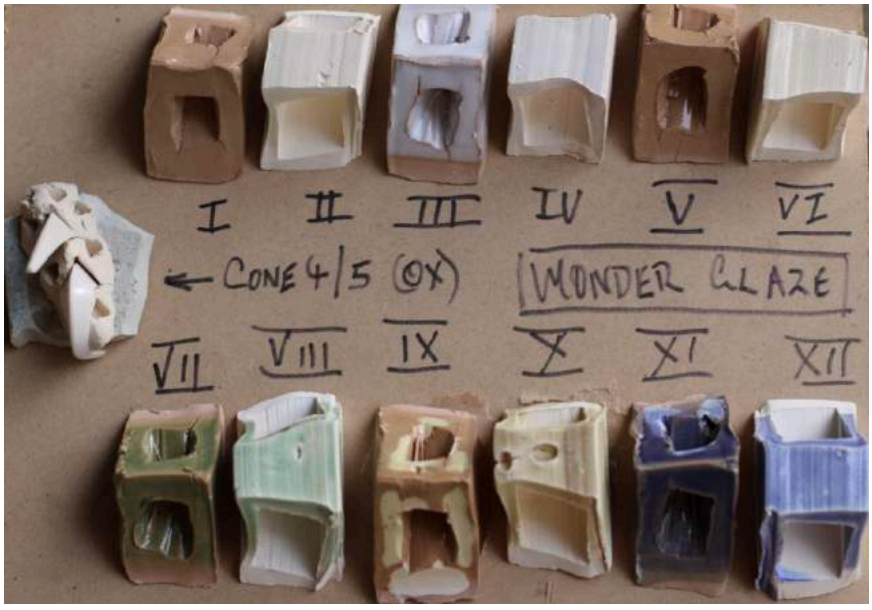
Janet's wise saws and variations

- A 'nice to have addition' is Tin oxide – 10 parts. This will have a 'whitening effect'. (Tin is an opacifier and whitener)
- So with the tin addition and used on a terracotta body at mid range, i.e. Cone 01 – 5/6, (1140-1200C), it delivers a smooth opaque white glaze which breaks to tan where applied thinly. If the clay body is white there is no break. The glaze can fire to cone 8 producing a higher gloss and a slightly pearly whiteness with the same body/colour responses. (Note - firing higher than cone 8 (1250C) can sometimes lead to blistering depending on the clay body and the firing schedule).
- The addition of 1 part red iron oxide makes the glaze a cream colour but with a tan break on edges. This break is due to the magnesium carbonate ingredient, which is also responsible for crawling if the glaze is applied too thickly at the lower temps.
- Colourants to try: copper (light greens): 1- 3 parts; chrome (greens): 0.2 – 1 part; cobalt (dark blues): 1- 3 parts.
- With the presence of the magnesium in the mix the above colourant adds might be compromised in the following ways:
- Copper tends to 'grey' rather than 'green' at the lower temps (1140-1160C) Cone 01
- Chrome tends to 'browns' rather than green
- Cobalt tends to produce mauve rather than sharp blue, (but as the temperature gets higher – the 'glossier' and 'bluer' is the outcome because the 'mauveness' is only present in the crystallisation of the glaze during

[13] The Potters Dictionary of Materials and Techniques. F. Hamer. 6th Edition 2015. Bloomsbury Academic Publishing. First Printed 1975. ISBN HB 9781408184196. Reviewed by Ursula Burgoyne, pp 66, JAC April 2016. Available at www.australianceramics.com

cooling; i.e the faster the cooling the ‘bluer’ the results; the slower the cooling the lighter the colour.

- So to avoid the effects of the magnesium on colour response, it can be substituted with: zinc oxide (glassier results and some colour compromises), calcite (slightly glassier and colours usually pretty true), dolomite (midway results), barium carbonate (good results with glossier and brighter colour responses) or talc.
- Stains work well with this glaze but test or check that their maturation temperature corresponds with your firing temperature.



deBoos Wonder Glaze trials

Test #	Details. Fired in Oxygen kiln to Cone 4 (touching) (each test - 3 dips in glaze mix)	Description of result/ observation
I	Red clay – Clear Wonder glaze – no additives	Clear gloss, even coverage
II	White clay – Clear Wonder glaze – no additives	Clear gloss, even coverage
III	Red clay - Wonder glaze + 10% Tin Oxide	Milky white, even coverage
IV	White clay - Wonder glaze + 10% Tin Oxide	Milky white, even coverage
V	Red clay - Wonder glaze + 1% Red Iron Oxide	Slight cream, even coverage
VI	White clay - Wonder glaze + 1% Red Iron Oxide	Slight cream, even coverage
VII	Red clay - Wonder glaze + 2% Copper Carbonate	Moss green, even coverage
VIII	White clay - Wonder glaze + 1% Copper Carbonate	Light green, even coverage
IX	Red clay - Wonder glaze + 0.5 % Chrome	Slight darkening to clear, even coverage
X	White clay - Wonder glaze + 0.5 % Chrome	Slight green, even coverage
XI	Red clay - Wonder glaze + 1% Cobalt Carbonate	Cobalt blue, even coverage. Note - attractive breaks on edges
XII	White clay - Wonder glaze + 1% Cobalt Carbonate	Soft cobalt blue, even coverage

General observation: Colorant seemed to spread evenly throughout the glaze. No cracks, dunting etc. Consistent, pleasing, glossy glaze.

Last word – your core artistic endeavour

When venturing into the land of teapots and plates and vases this article ponders what might influence your glaze choices. Either making to sell or to give to somebody else, prompts consideration of a set of criteria you need to deliver of your outcome. (I refer you again to the linked decision tree). A final thought to consider as well, perhaps foremost, is forsaking your own aesthetic as needs be when making for others, in favour of your client's tastes. Are you willing to go there? Does the vocabulary of your artistic expression fit suitably alongside your functional ware criteria and is this sufficiently satisfying for you? Does this pay the bills? Perhaps a maker/client collaborative model like MudRock's is the way forward. Alternatively make like British potter Daniel Smith[14] does. He has consistently made his functional ware consistently and used the same glaze for much of his professional making life. With all this consistent focus no wonder it looks so good and sells like hot cakes.

Daniel Smith, UK, Nest of bowls. Largest bowl: 39 cms dia x 10cms

[14] Daniel Smith Ceramics – www.danielsmith-ceramics.com

Working with a new glaze

The tried and true method of working with a new glaze is first to conduct trials. A systematic approach in discovering the multiple possibilities of any one glaze is well documented in Greg Daly's international bestseller "Glazes and Glazing Techniques." Greg demonstrates basic and advanced methods of examining a glaze so the artist can make an informed decision of what might be appropriate for the work at hand. Key points are - 'document, document and document' and be methodical. Temper your expectations, be prepared to have dud trials and document these so that you learn from them.

Once you have found a glaze to your liking and there is a pleasing aesthetic fit to your work, (not all glazes 'fit' all styles of work) – be sure to record the particulars of your glaze, your fired result and thoughts for further investigation. One such record keeping document can be accessed, downloaded and printed from the JAC's website – www.australianceramics.com/journal/glazerecordtemplate

Suggested resources

JAC online resources – Formula (recipes) and glaze record template:

- www.australianceramics.com/journal/surfacetreatment/recipes
- www.australianceramics.com/journal/glazerecordtemplate

Web-based resources and 'go to' sites

- www.Pinterest.com/glage-recipes
- Venus of Dohi Vestonice. Moravske Zemske Muzeum, Brno, Chez Republic. https://en.wikipedia.org/wiki/Venus_of_Doln%C3%AD_Věstonice
- Ceramics Arts Daily www.ceramicartsdaily.org
- Ceramics Recipes.Org www.ceramicsrecipes.org
- Prue Venables – www.beavergalleries.com.au/**venables**.htm;
- Janet deBoos - go to Sabbia Gallery.com or Google Images
- NG Seok Har and Michelle Lim - MudRock – www.mudrockceramics.com
- Paul Davis - 'Press to play' - https://www.daao.org.au/bio/paul-davis/biography/ https://www.tripadvisor.com.au/ Bennelong Restaurant/ Images
- Robert Gordon Ceramics – robertgordonaustralia.com
- Anna-Maree Wallace - Made of Australia – madeofaustralia.com/products
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Thank you for the assistance with content ideas and technical details to Val Gordon and Tony Martin. Thank you Janet DeBoos – always generous.

Do you want more?

'Glazes for functional ware' is the third topic in this planned on-going series. Next is 'Layering'. We are keen to know what you want. Please contribute to feedback on this series. Tell us what you want more of and less of:

Go to - CeramicSweetSpot.com/feedback.

Thank you

Glaze Record (deBoos Wonder Glaze)

Glaze type Clear Gloss glaze – Ideal for Functional ware

Glaze name *Wonder Glaze* Group *Test for Red and White clay* Number

Description *Clear Gloss with options of Tin and other colourants*

Attributed to: *J. DeBoos*

Firing temp/ Cone range *- cone 01 – cone 8*

Firing condition/ process Oxidisation ✔ Reduction □ Soak time *nill*

Comments/ instructions

Material	Recipe	X 1 kilo	X 5 kilo
Ball Clay	20		
Potash Feldspar	20		
Magnesium Carbonate (light)	10		
Frit 4108	50		
OPTIONAL for white Tin Oxide	10		
Possible COLOURANTS options			
Copper Carbonate	2%		
Cobalt Carbonate	1%		
Red Iron Oxide	1%		
Chrome	0.5%		

Firing Schedule/ log

Firing cycle Cone Kiln position

Time	Temp	Rack rate	

Cone response:

Fired glaze result:

Glaze Record (deBoos Stoneware Clear Glaze)

Glaze type Clear Gloss glaze – Ideal for Functional Stoneware

Glaze name *Wonder Glaze* Group Number

Description Stoneware *Clear Gloss with options of Tin and other colourants*

Attributed to: *J. DeBoos*

Firing temp/ Cone range *- cone 7 – cone 11*

Firing condition/ process Oxidisation ✔ Reduction □ Soak time *nill*

Comments/ instructions Apply thin application

Material	Recipe	X 1 kilo	X 5 kilo
Calcite	20		
Potash Feldspar	38		
Kaolin/Ballclay	13		
Silica	30		
Dolomite	5		
Zinc oxide	5		
Bentonite (optional)	3		
Possible COLOURANTS options			
Copper Carbonate	2%		
Cobalt Carbonate	1%		
Red Iron Oxide	1%		
Chrome	0.5%		

Firing Schedule/ log

Firing cycle Cone Kiln position

Time	Temp	Rack rate	

Cone response:

Glaze Record (deBoos Clear Glaze - Mid Range Clay)

Glaze type Clear Gloss glaze – Ideal for Functional ware

Glaze name *Wonder Glaze* Group *Test for Red and White clay* Number

Description *Clear Gloss with options of Tin and other colourants*

Attributed to: *J. DeBoos*

Firing temp/ Cone range *- cone 6 – cone 8*

Firing condition/ process Oxidisation ✔ Reduction □ Soak time *nill*

Comments/ instructions Blisters beyond cone 9/10

Material	Recipe	X 1 kilo	X 5 kilo
Ball Clay	20		
Potash Feldspar	20		
Frit 4108	20		
Silica	20		
Calcite	20		
OPTIONAL for white Tin Oxide	10		
Possible COLOURANTS options			
Copper Carbonate	2%		
Cobalt Carbonate	1%		
Red Iron Oxide	1%		
Chrome	0.5%		

Firing Schedule/ log

Firing cycle Cone Kiln position

Time	Temp	Rack rate	

Cone response:

Fired glaze result: