

Abbots Glaze Stains

Chemical Environment Guide

What to combine each stain family with, and what to keep it away from. A practical reference by colourant family.

Find your stain family below to compare favourable glaze chemistry, firing conditions, and combinations to use with caution. Follow the stated firing range for your specific stain.

01 Cd-Se encapsulated (inclusion) reds, oranges & yellows

Typical chemistry: Cd-Si-Zr-Se / Zr-SiO₄-Cd

FAVOURABLE CHEMICAL ENVIRONMENT

- Stir the pre-milled stain into the glaze after the base glaze has finished milling. Add it during the final approximately 5% of mixing.
- Fires reliably in oxidation and standard reduction within the maker's stated maximum temperature.
- Zinc-containing glazes are generally fine for this encapsulated form.

AVOID / USE WITH CAUTION

- Prolonged ball-milling with the stain in the batch can grind through the protective zircon shell and wash out the colour. Add after 95% of the total glaze milling time.
- Do not exceed the printed maximum firing temperature: 1300°C for the Inclusion series.

02 Chrome-tin pinks, maroons & peach

Typical chemistry: Cr-Sn-Si-Ca / Sn-Cr

FAVOURABLE CHEMICAL ENVIRONMENT

- Needs a calcium-based glaze (whiting / CaCO₃, ideally ≥10–15% CaO) with tin oxide present in the melt to develop a clean pink-to-maroon colour.
- Fire in a clean, consistent oxidation atmosphere from start to finish.

AVOID / USE WITH CAUTION

- Zinc oxide, even in small amounts, turns the chromium brown or muddy instead of pink.
- Magnesium sources such as talc and dolomite can mute or shift the colour in a similar way. Keep zinc and magnesium as close to zero as the base glaze allows.
- Reduction destroys or badly dulls the colour. This family is oxidation-only.

03 Chrome-alumina greens

Typical chemistry: Cr-Al

FAVOURABLE CHEMICAL ENVIRONMENT

- One of the more chemically robust stain families, performing across a wide range of glaze chemistries and up to high temperatures (approximately 1400°C).

AVOID / USE WITH CAUTION

- Zinc-containing glazes can react with the chrome to produce muddy brown or olive instead of clean green.
- Above about cone 6, chrome can volatilise ("chrome flashing") and leave pink or brown specks on adjacent tin-glazed ware. Keep these stains physically apart from tin-opacified whites and pinks in the kiln.

04 Cobalt blues, blacks & teals

Typical chemistry: Co-Al / Co-Si / Co-Cr-Al(-Zn) / Co-Ni-Cr-Fe / Co-Mn-Cr-Fe-Ni

FAVOURABLE CHEMICAL ENVIRONMENT

- The most forgiving family in the range: stable across almost any glaze chemistry and in both oxidation and reduction.
- Very high tinting strength means small additions go a long way. This can keep costs down, but makes accidental over-dosing easy.

AVOID / USE WITH CAUTION

- High-magnesia glazes can shift blue towards purple or lavender rather than greying it out.
- At higher concentrations, cobalt fluxes the glaze and can make heavily loaded glazes run on vertical surfaces. Test on a tile before full-strength use.
- Avoid in bone-china or phosphate-rich bodies, where cobalt can develop a reddish-violet cast.

05 Zirconium-praseodymium yellows

Typical chemistry: Zr-Si-Pr

FAVOURABLE CHEMICAL ENVIRONMENT

- Zircon-encapsulated and very stable across a wide temperature range, in both oxidation and reduction.
- Largely unaffected by the surrounding glaze chemistry.

AVOID / USE WITH CAUTION

- No major glaze-chemistry restrictions identified.
- Avoid unnecessary extended milling after adding the stain, and stay within the stated firing range.

06 Zirconium-vanadium turquoises / blues

Typical chemistry: Zr-Si-V (some blended with Pr for apple-green)

FAVOURABLE CHEMICAL ENVIRONMENT

- Zircon-hosted and robust, with broad temperature and atmosphere stability within the stain's stated firing range.
- Largely unaffected by glaze composition.

AVOID / USE WITH CAUTION

- No major documented restrictions.
- As with other zircon stains, avoid over-milling after adding the stain and respect the stated firing range.

07 Tin-antimony greys

Typical chemistry: Sn-Sb

FAVOURABLE CHEMICAL ENVIRONMENT

- Best suited to low-mid firing ranges, with a clean, consistent oxidation atmosphere throughout the firing.

AVOID / USE WITH CAUTION

- Antimony reduces very easily in a reduction atmosphere. The colour can grey out or disappear entirely.
- Antimony compounds are heat-sensitive and volatilise at higher stoneware or porcelain temperatures. Do not exceed the stain's rated range.

08 Iron-chrome-zinc browns

Typical chemistry: Cr-Fe-Zn / Cr-Al-Fe-Zn / Cr-Fe-Zn-Al

FAVOURABLE CHEMICAL ENVIRONMENT

- Broadly stable, workhorse browns. A consistent oxidation firing produces the cleanest colour.

AVOID / USE WITH CAUTION

- Heavy reduction can dull or flatten the colour.
- These stains already contain zinc as part of their intended colour chemistry. Extra zinc from the glaze base can still shift the hue. Keep total zinc moderate and test when changing the glaze base.

09 Zirconium silicate white / opacifier

Typical chemistry: Zr-SiO₄

FAVOURABLE CHEMICAL ENVIRONMENT

- A universal opacifying white, compatible with essentially all glaze chemistries.

AVOID / USE WITH CAUTION

- No significant restrictions. Very high-boron glazes can slightly soften opacity.