

# Technical Information

## FK22

Performance Pigments and Colors

### New Inclusion Pigments

Ferro has expanded its range of red and orange inclusion pigments with three new, intense colours. Available are: Orange 230 540, Red 270 552, as well as Dark Red 270 561.

These new inclusion pigments have an excellent price-performance ratio together with high stability.

They are perfectly suitable for matching given red and orange shades. Especially the colours with moderate intensity can be achieved in a very economic way. The inclusion pigments are intermiscible. They may also be mixed with other zircon or brown stains.

Additionally, they show a very high thermal stability. This ensures both a high level of production safety and excellent end-product profitability. Due to their refiring stability and temperature stability, they are suitable for tableware, earthenware, stoneware and sanitary ceramics.

The thermal stability of these pigments is based on the encapsulation of the coloured cadmium sulfoselenide with zircon-silicate, like it is in the proven types of inclusion pigments.



Fig. 1: Application example of 230 540

Even under reducing firing conditions they demonstrate good firing stability.

The maximum colour saturation is achieved with pigment additions of 5 to 10 weight-%. Glaze systems containing lead, lime, zinc, boron, or zircon improve the colour development of inclusion pigments. Alkali-rich glazes reduce the colour intensity.

To avoid mechanical destruction of inclusion pigments during glaze preparation, we recommend adding the stain only after 95 % of the total milling time.

One of the advantages of the cadmium inclusion pigments is a reduced cadmium solubility compared to conventional cadmium glazes. The cadmium solubility as well as the selenium solubility of the intense pigments are below the detection limit (test in 4 % acetic acid according to DIN 1388, glaze 40-TR166).

Table 1 lists the colour values in a typical glaze, figures 1 to 3 show application and colour examples.



Fig. 2: Application examples of 270 552 and 270 561

The average particle size of the new, intense inclusion pigments is approx. 12 µm, with a d<sub>90</sub> of ca. 28 µm. On a 45 µm sieve, the residue lies at 2 %.

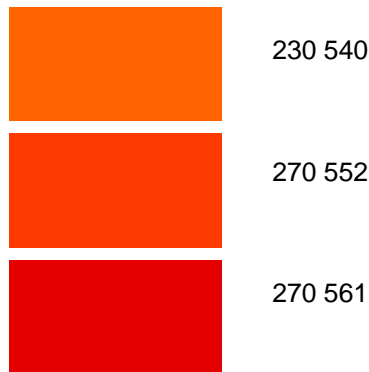


Fig. 3: Colour examples of the inclusion pigments (5 % pigment addition in a transparent glaze)

While every attempt has been made to reproduce colours exactly, the colour samples shown here may differ from fired ceramic products.

**Table 1: Colourimetric values\* of the intense inclusion pigments (5 weight-% pigment in transparent glaze, 1130 °C)**

Pigment	Colour	L*	a*	b*	C*	h*
230 540	Orange	64,9	43,7	52,4	68,3	50,2
270 552	Red	54,0	49,0	34,1	59,7	34,8
270 561	Dark Red	48,2	41,7	22,8	47,6	28,7

\*Measurement according to CIELAB 1976, 10° standard observer, D65

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