

35286 Relief white 760–860°C

Lead- and cadmium-free onglaze relief white

1. General Information

35286 is lead- and cadmium-free, intermixable, onglaze relief white for porcelain, bone china, earthenware, vitreous china.

Features!

- Very opaque and white
- Can make high relief
- Low C.O.E.
- Low firing temperature
- Lead and cadmium free
- Can overprint and mix with other colors



2. Firing Conditions

Type of ware	Firing range
Porcelain	800–860°C
Bone china	760–860°C
Earthenware	760–840°C
Vitreous china	760–860°C

35286 is suitable for both normal firing for 3–10 hours and fast-firing for 60–120 minutes, cold-to-cold conditions. They should also be only used with lead-free colors and glazes. They must be fired only under lead-free conditions to avoid heavy lead release.

3. Application

35286 is suitable for screen-transfer printing, direct printing, spraying, pad printing and hand painting.

4. Coefficient of Thermal Expansion (C.O.E.)

Product	Thermal Expansion (C.O.E.)
35286 relief white	$6.2 \times 10^{-6}/^{\circ}\text{C}$

35286 is carefully developed and tested under optimum conditions to minimize cracking or chipping problems. The maximum thickness of the color layer should be below 30–50 μm (approx. by 100 mesh/40T, 1–2 time printing) for porcelain glaze (C.O.E. $4.5\text{--}5.5 \times 10^{-6}/^{\circ}\text{C}$). Thicker printing of more than 50 μm could be allowed for bone china, earthen ware and vitreous china (C.O.E. $5.5\text{--}8.5 \times 10^{-6}/^{\circ}\text{C}$) However, it is necessary to test the cracking or chipping before mass production. The results will depend on the end-user's conditions.

5. Particle size of Distribution (P.S.D.)

Product	D ₅₀ average	D ₁₀₀ biggest
35286 relief white	2.5–3 μm	15–20 μm

6. Printing

【6.1 Relief printing】

We recommend mesh sizes that are 100–120 mesh (40–48T) polyester for all screen applications. We recommend printing 1–3 times. We do not recommend printing more than 4 times when there is a pinhole and a bubble on the surface and there is a drying time problem. The following is data on the thickness of fired 35286 by different mesh size (polyester), for your reference.

Printing (35286 : PM2, 10 : 6.5)	100 mesh/40T	120 mesh/48T
1 time printing	30 μm	20 μm
2 time printing	50 μm	35 μm
3 time printing	70 μm	50 μm
4 time printing	90 μm	65 μm
5 time printing	110 μm	80 μm

【6.2 Normal printing】

35286 can be printed by finer mesh up to 350 mesh (140T) polyester.

【6.3 Medium ratio and cover coat】

35286 relief white : Medium PM2	10 : 6-7
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We recommend PM2 flowing medium for relief printing. Adding just sufficient medium will improve the surface of relief, if it has pinhole problems.

We recommend C33 cover coat by printing 70 mesh (27T).

Lead-and-cadmium free onglaze colors absorb moisture easily. Therefore, keep the powder colors in a dry place. We recommend drying the color powder before using.

7. Color and Mixability

35286 can be overprinted and mixed with **SELECTION 35, 36** and **39** colors in any proportions. However, we recommend a testing of the stability of mixing colors and overprinted flux colors under end-user's firing conditions before mass production.

8. Chemical durability

Chemical durability of 35286 depends on type of ware, glaze, kiln, color deposit and firing conditions. The following are the results of tests on vitreous china, fired at 830°C, with 10 minutes of soaking time and 120 minutes of cold-to-cold firing conditions of gas kiln in production.

【8.1 Residual lead and cadmium content】

35286 contains less than 300 ppm residual lead and less than 100 ppm residual cadmium and are therefore in compliance with Californian Proposition 65, FDA, EU and Japanese requirements.

【8.2 Lead and cadmium release】

According to the DI EN 1388-1-2 test, 35286 shows lead and cadmium releases is below AAS limits.

【8.3 Acid resistance】

According to the DI EN 1388-1-2 test, 35286 does not show any visible attack after immersion in a 4% acetic acid solution for 24 hours at a room temperature $22\pm 2^{\circ}\text{C}$.

【8.4 Alkali resistance】

According to the ASTM C556-88 test, 35286 does not show visible attack for up to 4 hours.

9. Material Safety Data Sheet (MSDS)

Material safety data sheet (MSDS) of 35286 is available on request.

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