

IG SERIES LEAD FREE INGLAZE COLOURS FOR TABLEWARE, EARTHENWARE, STONEWARE, PORCELAIN, BONE CHINA & TILE

TECHNICAL DATA SHEET AND USAGE

The IG Series are manufactured Technically Lead Free and provide a compact range of colours for Inglaze application. The colours can also be used under Low Solubility Glazes and provide a compact intense range of colours designed for maximum miscibility.

MAIN PROPERTIES

High color intensity

The highest intensity is obtained by printing the colours without flux addition. Gloss and intensity can be fine-tuned by adding a higher or lower amount of mixing fluxes.

Excellent particle size powder distribution

The particle size of the colours will vary depending on the composition, in this series the Typical Diameter particle D50=3-5 microns and D90=15-20 microns with trace residue on a 120 s sieve.

Very good resistance

Mechanical and chemical resistance is generally determined by the glaze used and for tableware coming into contact with food therefore we would recommend Lead Free glazes to optimize performance.

Low thermal expansion coefficient

The Coefficient of thermal expansion is suitable for different materials:

70-75 x 10⁻⁷·1/K (50 to 300°C)

90-95 x 10⁻⁷·1/K (300 to 500°C)

MISCIBILITY AND COMPATIBILITY

All colours are designed for maximum intermixing. The Main Group can be intermixed together, and the use of different Mixing Flux is suitable to create pleasing pastel shades with the exception of Cadmium Group.

For dilution of colours, in order from highest to lowest opacity, we can use the fluxes below:

| | |
|------------------------|---|
| IG-9000-C Mixing White | (Suitable for dilution of all colours between 10-20%) |
| IG-9038-C Cover Flux | |
| IG-9001-T Super White | |
| IG-9047-T Mixing White | (Suitable for achieve pastel colours between 10-90%) |

The colours of Cadmium Group are stable and intermixable fully each other. Also, they are especially compatible with IG-9047-T and IG-9006-K.

Please Note:

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APPLICATION

DIRECT SCREEN PRINTING AND DECALS

For direct screen printing or for decal transfers we recommend using either a 73T or 90T Mesh or 230/200 GP Stainless Steel Mesh.

120T can be used for most IG colours to achieve halftone effects, however we do not recommend colours IG-9011-H, IG-9022-M, IG-9024-M, IG-9037-M, and IG-9046-M without trialling in the customers conditions as these colours require an optimum deposit recommended using a 90T - 73T to ensure stability.

To avoid cracking, chipping, and flaking issues it is recommended not to exceed 25 microns thickness equivalent to 62T or double printing using a 73T such an excessive colour deposit can also be detrimental to durability.

As a guide, recommended mixing ratios and mediums below:

| Reference | Description | Parts medium per 10 parts of colour | Water Media | Oil-based Media |
|-----------|---------------------------|-------------------------------------|-------------|-----------------|
| L427 | WATER MISCIBLE MEDIUM | 3,5 | ✓ | |
| W172 | WATERBASED PRINT MEDIUM | 3,5 | ✓ | |
| M286D | SEMI-THIXO S/PRINT MEDIUM | 6 | | ✓ |
| M286T | THIXOTROPIC S/P MEDIUM | 8 | | ✓ |
| M51D | SCREEN TRANSFER MEDIUM | 5 | | ✓ |
| M6 | DIRECT PRINT MEDIUM | 3,5 | | ✓ |

HANDPAINTING-MACHINE BANDING AND LINING & SPRAYING OR AEROGRAPHING

The colours can be supplied as dry powder for painting directly onto glazed. We recommend adding 10-20% of IG-9000-C Mixing Flux, for heavier application deposits when painting. In addition, we can supply a range of Inglaze Colours more suitable for Hard Paste Porcelain, or where more fusibility is required upon application.

The colours can also be supplied with or in the following mediums:

| Reference | Description | Parts medium per 10 parts of colour | Water Media | Oil-based Media |
|-----------|------------------------------|-------------------------------------|-------------|-----------------|
| W108 | WATERBASED HAND PAINT MEDIUM | 6 | ✓ | |
| W157/B | WATERBASED HAND PAINT MEDIUM | 8,5 | ✓ | |
| M162N | GELLED BANDING MEDIUM | 6 | | ✓ |
| M9 | HAND PAINTING MEDIUM | 3,5 | | ✓ |

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FIRING RECOMMENDATIONS

Dependant on the substrate, glaze type and application we generally recommend the colours are fired between 1020-1200°C. Firing stability is significantly influenced by firing cycle times and kiln density as well as by the types of substrates, glaze, and thickness of application.

As a guide:

| | |
|----------------------|---------------------|
| Hard Paste Porcelain | 1150 - 1200 degrees |
| Soft Paste Porcelain | 1100 - 1150 degrees |
| Stoneware | 1050 - 1150 degrees |
| Bone China | 980 - 1100 degrees |

* Conventional Cycles of 3,5 hours, 1060°C, 30 minutes Soak is recommended with an operating range of between 1020-1100°C maximum.

** For firing on Porcelain type glazes and cycles of 60-120 minutes cold to cold, we would suggest a range of between 1060-1200°C

Most colours are thermally stable and can be fired up to 1160°C except for IG-9022-M and IG-9037-M.

We recommend testing under the customers firing own conditions.

ACID AND ALKALI RESISTANCE

The chemical resistance of the fired color layers is influenced by the color deposit, the firing conditions and the glaze. The colors don't show a visible attack with 4%acetic acid solution (22±2°C, 24h) as well as with 5% sodium carbonate solution (60±2°C, 32h).

METAL RELEASE CHARACTERISTICS

Every effort is made to manufacture these colours 'technically' Lead free, however as the colours are applied on top of the glaze, mechanical and chemical resistance is generally determined by the glaze used and for tableware coming into contact with food therefore we would recommend Lead Free glazes to optimize performance.

IG-9038-C Cover Flux can be used for enhancing gloss and helping improve chemical durability.

Solubility of some colours particularly can impact mechanical resistance and metal release in the case of Cobalt and Cadmium pigments. Solubility for Cadmium Inclusion Pigments is shown to be very low because of the encapsulation process making them quite less soluble than conventional pigments. It is known that some glazes contain cadmium and that where firing of Lead and Cadmium containing products has taken place such metals are present in the kiln lining and can contribute to detected metal release, therefore we recommend customers validate performance under their own conditions.




























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REFERENCES

| | Colour | Reference | | Colour Composition | Pantone |
|---|---|------------|---------------------|---------------------|---------|
| Main Group: |  | IG-9001-T | Super White | Zr-Si | |
| |  | IG-9047-T | Mixing White | Zr-Si | |
| |  | IG-9002-E | Black | Cr-Fe-Co | Black C |
| |  | IG-9005-T | Grey | Cr-Fe-Co-Zr-Si | 7543 C |
| |  | IG-9006-K | Leaf Green | Pr-Zr-Si-Co-Cr-Zn | 348 C |
| |  | IG-9008-N | Turquoise | V-Zr-Si | 6121 C |
| |  | IG-9010-K | Green Blue | Cr-Co-Zn-Si | 3292 C |
| |  | IG-9011-H | Sunflower | Pr-Cd-S-Se-Fe-Zr-Si | 7408 C |
| |  | IG-9015-R | Brown | Fe-Zr-Si-Cr-Co | 7594 C |
| |  | IG-9016-M | Coral | Fe-Cd-S-Se-Zr-Si | 4063 C |
| |  | IG-9017-L | Navy Blue | Co-Al-Zr-Si | 2146 C |
| |  | IG-9019-L | Blue Green | Co-Cr-Al-Zn-Zr-Si | 2188 C |
| |  | IG-9020-K | Aquamarine | Co-Cr-Al-Zn-Zr-Si | 7708 C |
| |  | IG-9021-L | Light Blue | Co-Al-Zr-Si | 2144 C |
| |  | IG-9022-M | Rose Pink | Sn-Ca-Si-Cr-Zr | 7430 C |
| |  | IG-9024-M | Maroon | Cd-S-Se-Zr-Si-Co-Al | 202 C |
| |  | IG-9031-K | Green | Cr-Si | 2266 C |
| |  | IG-9032-H | Lemon Yellow | Pr-Cd-S-Zr-Si | 106 C |
| |  | IG-9033-M | Dark Purple | Cd-S-Se-Zr-Si-Co-Al | 2765 C |
| |  | IG-9037-M | Strong Pink | Sn-Ca-Si-Cr-Zr | 4071 C |
|  | IG-9041-N | Cyan | Co-Cr-Al-Zn-V-Zr-Si | 285 C | |
|  | IG-9042-L | Azure Blue | Co-Al-Zr-Si | 2132 C | |
|  | IG-9046-M | Crimson | Cd-S-Se-Co-Al-Zr-Si | 7622 C | |
| | | IG-9000-C | Mixing Flux | - | |
| | | IG-9038-C | Cover Flux | - | |
| Cadmium Group: |  | IG-9003-H | Yellow | Pr-Cd-S-Zr-Si | 107 C |
| |  | IG-9012-H | Bright Orange | Cd-S-Se-Zr-Si | 165 C |
| |  | IG-9013-M | Bright Red | Cd-S-Se-Zr-Si | 2035 C |
| |  | IG-9014-M | Dark Red | Cd-S-Se-Zr-Si | 4059 C |

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