Food-Grade Water-Based Ink User Guide

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I. Product Overview

1. Product Introduction

StarColor food-grade water-based ink is an eco-friendly printing ink specifically designed for **direct food-contact packaging materials**. It employs a water-based formula free from heavy metals, phthalates, and other harmful substances, complying with global food safety regulations (e.g., FDA, EU 10/2011, GB 9685).

- **Key Features**:
  - **Food-Grade Safety**: Passes migration tests to meet food-contact material requirements.
  - **Low VOC Emissions**: Solvent content <5%, minimizing environmental hazards.
  - **High Adhesion**: Compatible with paper, cardboard, and select food-grade plastic films.
- **Recommended Process**: Flexographic printing, supporting high-speed production and fine dot reproduction.

2. Applications

- **Primary Substrates**: Napkins, paper cups, pizza boxes, cake trays, baking parchment, etc.
- **Suitable Scenarios**: Packaging for direct or indirect contact with dry, non-greasy foods.
- **Limitations**: Not recommended for long-term contact with high-fat, high-temperature (>120°C), or high-humidity food packaging.

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II. Pre-Use Preparations

1. Storage Conditions

- **Unopened Ink**:
  - Temperature: 5–30°C, protected from sunlight and heat sources.
  - Shelf Life: 12 months (see production date on packaging).
- **Opened Ink**:
  - Seal containers tightly; use within 3 days. For extended storage, add 0.5%–1% antimicrobial agent.

2. Ink Preparation

- **Mixing**: Stir at low speed (300–500 rpm) for 10–15 minutes to eliminate sedimentation.
- **Dilution Guidelines**:
  - Recommended Diluents: Deionized water or food-grade ethanol (purity ⩾95%).
  - Dilution Ratio: Adjust based on printing speed and substrate absorption (initial suggestion: 5%–10% by weight).
  - **Caution**: Excessive dilution may reduce adhesion and color density.

3. Substrate Preparation

- **Surface Cleaning**: Remove dust, grease, and mold-release agents before printing.
- **Dyne Level Testing**:
  - Method: Use dyne pens or solutions to measure surface tension (recommended >38 mN/m).
  - If dyne levels are insufficient, apply corona treatment or a primer coating.

III. Printing Operational Guidelines

1. Parameter Settings

- **Viscosity Control**:
  - Target Range: 30–35 seconds (Ford Cup #4 at 25°C).
  - Adjustments: Each 1% diluent addition reduces viscosity by 1–2 seconds.
- **Drying Settings**:
  - Oven Temperature: 80–120°C (adjust based on substrate heat resistance).
  - Airflow: 15–25 m/s to ensure uniform drying of ink layers.
- **Anilox Roller Selection**:

Print Requirement	Line Count (LPI)	Ink Volume (BCM)
Solid Colors	250–400	5.0–8.0
Fine Details	600–800	2.5–4.0

2. Printing Techniques

- **Color Sequencing**:
  - Recommended Order: Light → dark to avoid contamination.
  - Drying Interval: Ensure prior color is surface-dry before applying the next.
- **Downtime Maintenance**:
  - For pauses >10 minutes, flush anilox rollers and plates with water-based cleaner to prevent clogging.

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IV. Common Issues & Solutions

1. Poor Drying

- **Symptoms**: Smudging or offsetting.
- **Causes**: Low oven temperature, excessive ink thickness, poor substrate absorption.
- **Solutions**:
  - Gradually increase oven temperature (5–10°C increments).
  - Reduce viscosity or ink application volume.
  - Switch to high-porosity substrates or apply primer.

2. Poor Adhesion

- **Symptoms**: Flaking or low abrasion resistance.
- **Causes**: Contaminated substrate, over-dilution, incomplete drying.
- **Solutions**:
  - Clean substrate with alcohol and retest dyne levels.
  - Decrease diluent percentage (restore viscosity with undiluted ink).
  - Extend drying time or raise oven temperature.

3. Color Deviation

- **Symptoms**: Mismatch with standard color swatches.
- **Causes**: Substrate background influence, batch variations.
- **Solutions**:
  - Apply white undercoat (for transparent/dark substrates).
  - Request same-batch ink or recalibrate color formulation.

4. Clogged Dots

- **Symptoms**: Blurred edges or lost details.
- **Causes**: Ink skinning, foreign particles.

- **Solutions**:
    - Filter ink through a 100-mesh sieve before use.
    - Minimize downtime or cover ink trays to reduce evaporation.

5. Residual Odor

- **Symptoms**: Slight solvent smell post-printing.
- **Causes**: Incomplete drying or curing.
- **Solutions**:
    - Extend post-curing time (24–48 hours in ventilated areas).
    - Inspect oven exhaust systems for proper function.

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V. Safety & Compliance

1. Food-Contact Compliance

- **Certifications**:
    - USA: FDA 21 CFR 175.300 (indirect food contact).
    - EU: EU 10/2011 (total migration ⩽10 mg/dm²).
    - China: GB 9685-2016 (specific migration limits).
- **Testing Reports**: Third-party migration test reports provided electronically upon request.

2. Safety Protocols

- Operators must wear nitrile gloves and dust-proof masks.
- Waste Ink: Collect and dispose through certified recycling agencies; never drain into sewage.

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VI. Maintenance & Storage

1. Equipment Cleaning

- **Routine**: Flush anilox rollers, blades, and trays with warm water (40–50°C) after shutdown.
- **Stubborn Residues**: Soak with pH-neutral cleaner (pH 6–8) for 10 minutes; avoid corrosive chemicals.

2. Ink Management

- **Opened Ink**: Refrigerate sealed containers (5–10°C); use within 7 days.
- **Skinned Ink**: Filter lightly skinned ink; discard heavily skinned batches.

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VII. Technical Support

- **Hotline**: alex@starcolor-ink.com
- **Whatsapp**: +8618011968332
- **Custom Services**: Color matching, drying optimization, substrate compatibility testing.
- **WebSite:** www.starcolor-ink.com

Appendix

1. Technical Specifications

Parameter	Range
Viscosity (25°C)	20–35 s (Ford #4)
pH	7.5–9.0
Solid Content	40%–45%
Density	1.1–1.2 g/cm³