Generic LPKF Solutions - US Gallons

LPKF PCB Cleaner 110 (1 Gallon Recipe)

Ingredient	Amount	Concentration	Purpose
20 Mule Team Borax (Sodium Tetraborate Decahydrate)	178 grams	~4.7%	Converts to Sodium Metaborate (alkaline cleaner, pH buffer)
Sodium Hydroxide (NaOH, pure lye flakes or pellets)	38 grams	~1%	Converts Borax into Sodium Metaborate; increases alkalinity
Triton X-100 (nonionic surfactant)	38 grams	~1%	Enhanced wetting and cleaning effectiveness
Distilled (DI) Water	~3.53 liters	Balance (~93.3%)	Solvent and carrier

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Step-by-Step Preparation Instructions:

Safety First:

Always wear protective gloves, safety goggles, and ensure proper ventilation.

Procedure:

1. **Initial Water:**
   - Begin by adding approximately **3 liters** of distilled water into a clean, plastic or glass container.
2. **Sodium Hydroxide Addition:**
   - Slowly add **38 grams** of Sodium Hydroxide flakes or pellets.
   - Stir gently until completely dissolved.
3. **Sodium Tetraborate (20 Mule Team Borax) Addition:**
   - Add **178 grams** of Borax slowly to the mixture.
   - Stir continuously until fully dissolved. This converts to Sodium Metaborate.
4. **Surfactant (Triton X-100) Addition:**
   - Add **38 grams** of Triton X-100.
   - Stir gently to mix uniformly. Slight foaming is normal.

5. **Final Dilution:**
- Add distilled water to reach a total volume of exactly **1 gallon (3.785 liters)**.
- Stir gently to mix thoroughly.

Storage:

Store sealed at room temperature. The solution remains effective for several months.

LPKF Cleaner 210 Formulation (1 Gallon Batch)

Ingredient	Amount	Concentration	Purpose
20 Mule Team Borax (Sodium Tetraborate Decahydrate)	178 grams	~4.7%	Converts to Sodium Metaborate (alkaline cleaner, buffer)
Sodium Hydroxide (NaOH, pure lye flakes or pellets)	38 grams	~1%	Converts Borax into Sodium Metaborate; increases alkalinity
Distilled (DI) Water	~3.57 liters	Balance (~94.3%)	Solvent and carrier

Step-by-Step Preparation Instructions:

Safety First: Always wear protective gloves, goggles, and ensure good ventilation.

Procedure:

Step 1: Initial Water
- Begin with approximately **3 liters** of distilled water in a clean plastic or glass container.

Step 2: Sodium Hydroxide Addition
- Slowly add **38 grams** Sodium Hydroxide (NaOH) into the water.
- Stir gently until completely dissolved.

Step 3: Borax Addition (Conversion to Sodium Metaborate)
- Slowly add **178 grams** of 20 Mule Team Borax, stirring continuously.

- Stir gently until the solution is completely clear, ensuring no undissolved solids remain.

Step 4: Final Dilution

- Top off the solution with distilled water to exactly **1 gallon (3.785 liters)**.
- Gently mix to ensure uniformity.

Step 5: Cooling and Storage

- Allow the solution to cool to room temperature before use or storage.

Storage:

Store sealed at room temperature. The solution remains effective for several months.

Activator 310 Formulation (1 Gallon Batch)

Ingredient	Amount	Purpose
Distilled/DI Water	~3.55 liters (~94%)	Solvent & carrier
Ketjenblack EC-300J	151 grams (~4%)	Conductive filler
Triton X-100 (or similar)	19–38 grams (~1%)	Surfactant for stable dispersion
Potassium Carbonate	38–57 grams (~1–2%)	pH Stabilizer (~pH 9–11)

Step-by-Step Preparation Instructions:

Safety First: Wear protective gloves, goggles, and ensure proper ventilation.

Procedure:

1. **Initial Water:**
   - Begin with approximately **3.4 liters** of distilled water in a clean plastic or glass container.
2. **Carbon Addition:**
   - Slowly add **151 grams** of Ketjenblack EC-300J while gently stirring to ensure proper dispersion.
3. **Surfactant Addition:**
   - Gradually add **19–38 grams** of Triton X-100 (or similar surfactant), continuing to stir.
4. **pH Adjustment:**
   - Add **38–57 grams** of Potassium Carbonate slowly to adjust the pH to approximately **9–11**.
   - Stir gently and monitor pH levels as needed.
5. **Final Mixing & Dispersion:**

- Stir gently and optionally use **sonication** to maximize dispersion and ensure uniformity.

6. **Final Dilution:**