

# **Wirentic (Pvt) Limited**

## **Powering a Bright Future**

### **OPERATIONAL, INSTALLATION & SAFETY MANUAL**

**Project:** Kon-Tiki I (850L) Open Fire Cone Kiln

**Contract Ref:** WPL-KT1-2025-001

**Manufacturer:** Wirentic (Pvt). Ltd.

#### **What is the Kon-Tiki biochar kiln?**

The Kon-Tiki biochar kiln is the fastest, cleanest way to make medium-sized batches of biochar from local biomass with minimal processing, and condition it for application. The Kon-Tiki deep-cone flame-curtain process was developed by Dr Paul Taylor (author of 'The Biochar Revolution' book) and Hans-Peter Schmidt at the Ithaka Institute in Switzerland in 2014. In 2020 its use has been recorded in 80+ countries. The kiln was named Kon-Tiki after the Peruvian sun God, and inspired by the voyage of discovery of the Kon-Tiki raft Thor Heyerdahl sailed across the Pacific.

#### **1. TECHNICAL SPECIFICATIONS**



**View of the Fabricated Kon-Tiki I**

- Model: Kon-Tiki I
- Capacity: 850 Liters.
- Cone & Body: SS400, 4T Plate (Heavy Duty).
- Bottom: Dished Bottom Plate (SS400, 4T).
- Internal Mesh: Dual SS400 Grates (#12 and #6) for biomass separation.



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Pakistan

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- Drainage: 50A Ball Valve for "Quench Water" (liquid nutrient) recovery.

## **2. SITE SET-UP & INSTALLATION**



**Photo of the Kiln placed on the Ground.**

- **Placement:** Position the kiln on level, non-flammable soil or a concrete pad. Ensure a 5-meter vertical clearance from trees or rooflines.
- **Water Supply:** Set up a water reservoir (IBC tank or high-pressure hose) at least 3 meters away from the kiln to prevent heat damage to the supply.
- **Workstation:** Establish a "Yield Station" nearby with your 300kg Platform Scale to record the weight of dry feedstock and finished char.
- **Grounding:** Use the Earth Continuity Tester to ensure the metal structure is safely grounded if using electronic sensors.



### 3. THE BIOCHAR PRODUCTION PROCESS

#### 3.1 Feedstock Preparation

- Materials: Wheat straw, rice husk, corn cobs, cotton residue or sugarcane trash.
- Moisture Content: Must be <20%.
- Sizing: Cut residue into 20–40 cm lengths to ensure it fits the 1.5m rim profile.

#### 3.2 Operation (The Flame Curtain Method)

- Top-Down Ignition: Build a small pile of dry wood in the center and light it from the top.
- The Vortex Effect: As the cone heats up, a natural air vortex forms. This creates the "Flame Curtain."
- Layering: Add a new layer (3-5 inches) only when the previous layer turns glowing red. The flame "cap" on top burns the smoke and protects the carbon below from oxygen.
- Temperature Limit: Maintain between 200°C and 300°C. Avoid exceeding 500°C to prevent ash formation.

### 4. MANDATORY SAFETY & EQUIPMENT

#### LIST OF MANDATORY SAFETY & EQUIPMENT:

- Flame-Retardant Workwear
- Heat-Resistant Gloves
- Waterproof Gloves
- Safety Goggles
- Face Shield
- Safety Shoes
- Respirator Mask (Minimum N95 / P2 level)
- Fire Extinguisher (Multi-purpose)
- Fire Blanket
- Platform Scale (Capacity  $\geq$ 200 kg, recommended 300 kg)
- Personal Protective Equipment (PPE)



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Safety	Long sleeve & long pants	Flame-Retardant Workwear	2	
Safety	For high-temperature handling	Heat-Resistant Gloves	2	
Safety	For quenching operation	Waterproof Gloves	2	
Safety	Industrial grade	Safety Goggles	2	
Safety	Full face protection	Face Shield	2	
Safety	Heat-resistant, anti-slip	Safety Shoes	2	
Safety	Minimum N95 / P2 level	Respirator Mask	2	
Emergency	Multi-purpose	Fire Extinguisher	1	
Emergency	Emergency fire suppression	Fire Blanket	1	
Measurement	Capacity ≥200 kg (recommended 300 kg)	Platform Scale	1	

#### Photo of Face Shield, Heat resistant Gloves, and Respirator

- Industrial Face Shield: Mandatory during quenching to protect against high velocity steam.
- Heat Resistant Gloves: Must be worn at all times when feeding the kiln.
- N95/P2 Respirator: Wear when handling dry char to prevent inhalation of fine carbon dust.



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### 4.2 Industrial Tool Kit (Included for Maintenance)

- 300kg Platform Scale: To measure biomass input vs. biochar output.
- Automatic Wire Stripper & Crimping Pliers: For maintenance of thermal sensors/thermocouples.
- Earth Continuity Tester: To verify safety grounding of the SS400 structure.

### 5. QUENCHING & RECOVERY

- Stop Feeding: Begin quenching when the kiln is 85% full of glowing char.
- Spray Technique: Spray water slowly from the rim inward. Stand back to avoid the steam cloud.
- Liquid Recovery: Open the 50A Ball Valve to collect the nutrient-rich water (can be used as liquid fertilizer).
- Cooling: Allow the char to sit for 2–4 hours until the temperature is <50°C before handling.



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### **6. MAINTENANCE**

Post Batch: Use a wire brush to clear the internal SS400 mesh of small debris.

Storage: Use the tiltable base to store the kiln at an angle to prevent rainwater from pooling in the bottom.

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Location: Steel Fabrication Market, I-10/3, Islamabad, Pakistan.



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