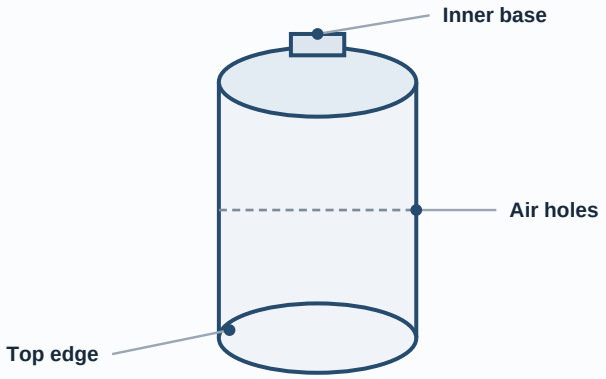
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Pellet Stove Burn Pot — Continuous high temperature (500 °C and above), cyclic combustion, fly ash, slag and acidic condensate. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — PELLET STOVE BURN POT



COATING CROSS-SECTION



Five questions define a coating system

1 MATERIAL
Heat-resistant steel / enamelling steel with a perforated wall. A small, critical combustion component exposed to intense heat and ash build-up.

2 SURFACE
Burrs at hole edges and oil are removed; a uniform surface that adheres even inside the holes is prepared on the perforated wall.

3 GEOMETRY
A perforated wall and a narrow inner volume; sharp hole edges, Faraday effect inside the holes and a risk of ash/slag adhesion.

4 SERVICE CONDITIONS
Continuous high temperature (500 °C and above), cyclic combustion, fly ash, slag and acidic condensate

5 PRODUCTION TARGET
Medium volume; continuous coverage that preserves the hole geometry and a smooth inner surface that reduces ash adhesion.

CONCLUSION: For the Pellet Stove Burn Pot, the goal is not just a good-looking finish; it is a pore-free enamel surface that reduces ash adhesion and preserves the hole geometry under continuous high temperature, slag and acidic condensate.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Pellet Stove Burn Pot cannot be coated like just any part. A sound process needs measurement, pretreatment, the right coating selection, application and verification to work together.

01 **ANALYSIS** Substrate + surface

02 **PRETREATMENT** Cleaning + surface

03 **ENAMEL** Chemistry + coat

04 **APPLICATION** Electrostatics + flow

05 **FIRING** Time + temperature

06 **VERIFICATION** Test + record

A. Surface Characterisation

The condition of the substrate surface (cleanliness, roughness, oxide/scale and any weld zones) is determined. The right process starts with the right definition of the surface.

MEASURABLE INPUTS
Surface cleanliness • roughness • weld marks

B. Pretreatment Design

Surface activation after deburring and degreasing; uniform pretreatment on the perforated wall, right into the holes.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Enamel System Selection

A heat-resistant vitreous enamel resistant to high temperature, slag and acidic condensate is selected; a smooth, self-cleaning surface that reduces ash/slag adhesion is targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

In electrostatic powder enamel, a low ramp rate, a suitable current limit and directed gun motion give continuous coverage at hole edges and in the inner volume; powder thickness is controlled so the holes do not clog, followed by fusion firing.

GEOMETRY EFFECT
Air holes • Inner base • Top edge

Managing the process with data, not by eye

µm
COAT THICKNESS
Enamel coat uniformity

°C
FIRING TEMPERATURE
Actual firing condition

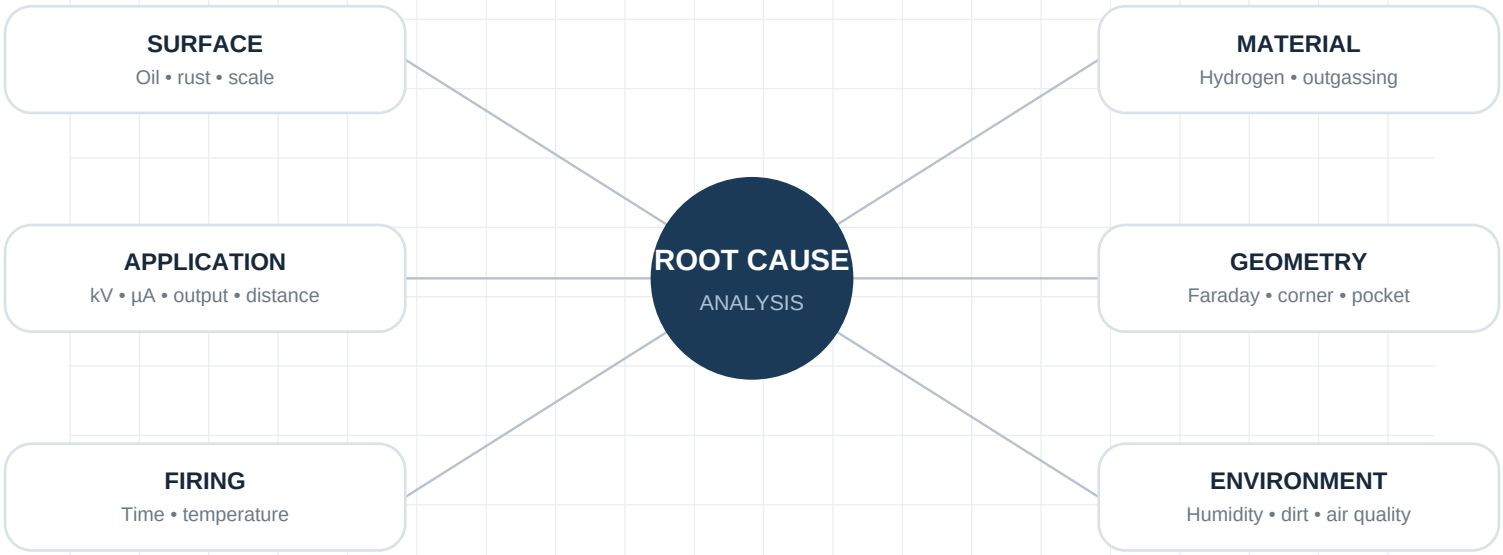
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Pellet Stove Burn Pot process, we define a process window rather than a single parameter. The aim is to reproduce the same surface quality across different shifts and part conditions.

A SURFACE DEFECT IS A SYMPTOM, NOT THE ROOT CAUSE

Enamel defects rarely come from a single setting. The same symptom may stem from surface preparation, the steel structure, electrostatic behaviour, coat thickness or firing.



Common defects and diagnostic approach

POOR ADHESION

The enamel detaches from the substrate or fails the impact test.

CHECK: surface / pretreatment / firing

FISH-SCALING

Scale-shaped enamel spalling appears after firing.

CHECK: steel / hydrogen / firing

PINHOLE / BLISTER

Pinholes or blisters form on the surface.

CHECK: dirt / gas / humidity / oven

FARADAY ZONE

Insufficient penetration in deep corners and pockets.

CHECK: geometry / kV-µA / air

BACK-IONIZATION

Star/blister defects from overcharging.

CHECK: current / distance / thickness

UNEVEN THICKNESS

Thin and thick areas on the same part.

CHECK: position / motion / output

DIAGNOSTIC PROTOCOL

1 Define the symptom → **2** Measure the data → **3** Isolate the cause → **4** Test one variable → **5** Standardise

A GOOD SURFACE PROCESS must be measurable • repeatable • traceable • optimisable. This approach is the basis of part-specific application guides for parts such as the Pellet Stove Burn Pot.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Pellet Stove Burn Pot, production volume drives the equipment choice. At low and medium volume, manual systems give flexibility; in series production, automatic systems apply the same recipe to every part.

LOW / MEDIUM VOLUME

Manual application



Smart (Powder Enamel)
Control unit for powder enamel application.



Powder Enamel Gun
Manual gun suited to enamel powder.



Powder Enamel Injectors
Feeding for abrasive enamel powder.



Powder Enamel Booth
Part-specific manual application booth.



Box Enamel Furnace
Firing in batch production.

SERIES PRODUCTION

Automatic line



Smart Automatic Powder Enamel
Line application with automatic guns.



OWL + Smart AI
Zone-by-zone application on corners, cavities and difficult areas.



Reciprocator
Automates the gun motion.



Automatic Powder Enamel Booth
In-line application and powder recovery.



Ultrasonic Recovery
Sieves recovered powder and separates foreign metal.



Powder Enamel Firing Furnace
Continuous firing, U-type or line-type.

OWL INTEGRATION In difficult areas such as air holes, inner base, top edge, OWL applies targeted, zone-by-zone coating with a Smart AI recipe. For details, see the “OWL — Cavity” application sheet.

PROJECT SUPPORT Share your line, your part and your production target, and we will define the equipment selection and the booth, oven and conveyor layout together. strong3000.com · info@strong3000.com · WhatsApp +90 537 353 54 19