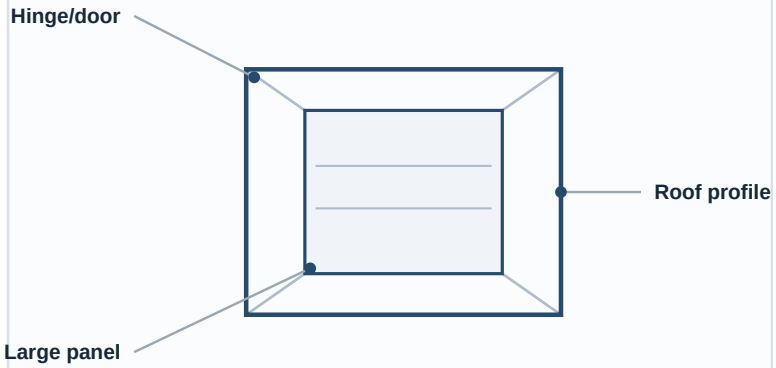
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Outdoor Cabinet (Freestanding Enclosure) — Outdoors; long-lasting protection under continuous UV, rain, salt spray and thermal cycling. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — OUTDOOR CABINET (FREESTANDING ENCLOSURE)



COATING CROSS-SECTION



Five questions define a coating system

1 MATERIAL
Galvanised steel or aluminium, 1.5–2.5 mm; a freestanding cabinet with large body panels, a roof/drip profile and a hinged door.

2 SURFACE
Oil and production residues are removed; white rust/zinc oxide is cleaned from galvanised surfaces and an active surface suited to a duplex (galvanising + powder) system is created for outdoor corrosion resistance.

3 GEOMETRY
Faraday effect at hinge and door edges and a water-trapping geometry in roof/drip profiles; risk of colour/gloss deviation under UV on large flat panels.

4 SERVICE CONDITIONS
Outdoors; long-lasting protection under continuous UV, rain, salt spray and thermal cycling

5 PRODUCTION TARGET
Medium-high volume; long-warranty outdoor quality with UV/weather resistance and colour consistency.

CONCLUSION: For the Outdoor Cabinet, the goal is not just a good-looking finish; it is a corrosion-resistant powder-coated surface that withstands UV and weathering for years and keeps its colour and gloss.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Outdoor Cabinet 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 + conversion

03 **COATING** Chemistry + film

04 **APPLICATION** Electrostatics + flow

05 **CURING** 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

Alkaline degreasing + multi-stage rinsing + iron/zinc phosphate or nano-ceramic conversion coating; the surface is optimised for duplex protection together with the galvanising.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

For outdoor UV and weather resistance, a smooth or fine-texture polyester (TGIC/TGIC-free) powder is selected; QUV/salt spray performance and colour retention are targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Electrostatic powder coating, 70–100 µm; edge coverage at hinges and door edges, a constant gun-to-part distance on large panels and a uniform oven profile give a consistent finish.

GEOMETRY EFFECT
Hinge/door • Roof profile • Large panel

Managing the process with data, not by eye

µm
FILM THICKNESS
Coating uniformity

°C
PART TEMPERATURE
Actual cure condition

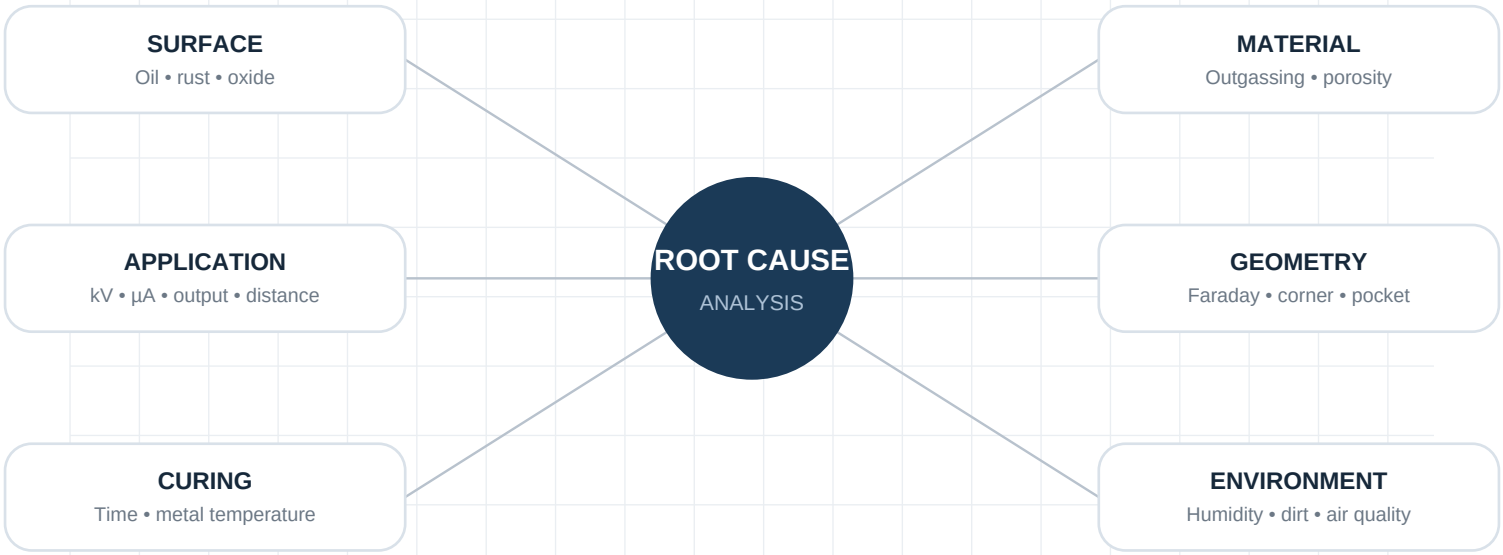
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Outdoor Cabinet 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

Coating defects rarely come from a single setting. The same symptom may stem from surface preparation, material, electrostatic behaviour, film thickness or curing.



Common defects and diagnostic approach

POOR ADHESION

The coating detaches from the surface or fails in testing.

CHECK: cleaning / pretreatment / cure

ORANGE PEEL

Uneven flow; the surface looks wavy or rough.

CHECK: film / flow / temperature

PINHOLE / CRATER

Pinholes or local craters 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 Outdoor Cabinet.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Outdoor Cabinet, 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



Elite / Elite Plus

Manual powder coating units; kV, µA and air settings.



Smart AI

Suggests settings for the part; guides the operator in manual work.



Manual Powder Coating Gun

Light, ergonomic hand gun.



Manual Powder Booth

Manual application and powder recovery.



Box Oven

Curing in batch production.

SERIES PRODUCTION

Automatic line



Automatic Powder Coating Gun

Series application in fixed or moving arrays.



OWL + Smart AI

Recipe-based, zone-by-zone application in difficult areas.



Single / Two-Axis Reciprocator

Automates the gun motion.



PVC Monocyclone Booth

Fast cleaning and powder recovery.



Powder Center

Fast colour change on automatic lines.



Conveyor Oven & Pretreatment

Surface preparation and curing on a continuous line.

OWL INTEGRATION In difficult areas such as hinge/door, roof profile, large panel, 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