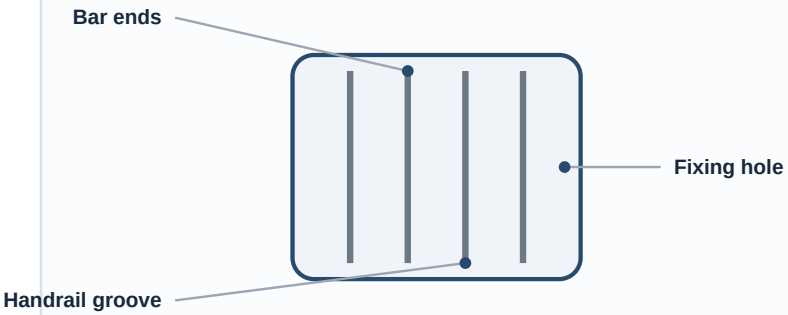
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Balustrade & Cladding Profiles — Outdoor UV, weathering, wear from hand contact and mechanical load on balconies and stairs. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — BALUSTRADE & CLADDING PROFILES



COATING CROSS-SECTION



Five questions define a coating system

1 MATERIAL
Extruded aluminium handrails, posts and infill bars (EN AW-6063 T6) with connection flanges; a mixed load with different sections hung together.

2 SURFACE
Extrusion oil and pre-assembly residues must be removed; a clean, uniform surface at bar ends and fixing holes.

3 GEOMETRY
Closely spaced thin bars shadow each other (Faraday); fixing holes and the handrail groove tend to edge pull-back and powder build-up.

4 SERVICE CONDITIONS
Outdoor UV, weathering, wear from hand contact and mechanical load on balconies and stairs

5 PRODUCTION TARGET
Medium volume, many sections; an efficient line with a consistent hanging layout and colour.

CONCLUSION: For the Balustrade & Cladding Profiles, the goal is not just a good-looking finish; it is a scratch-resistant powder-coated surface, fully covered even between closely spaced bars, that withstands outdoor UV and hand contact.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Balustrade & Cladding Profiles 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

Degreasing, etching, rinsing and chrome-free conversion coating; dip-based pretreatment is preferred for full wetting of thin bars.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

Qualicoat class 2 superdurable polyester for outdoor use and touch load; scratch and stain resistance and gloss retention are targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Powder coating, 60–80 µm; low corona current, reduced powder output and a hanger/gun layout matched to bar spacing reduce mutual shadowing between bars.

GEOMETRY EFFECT
Bar ends • Fixing hole • Handrail groove

Managing the process with data, not by eye

µm
FILM THICKNESS
Coating uniformity

°C
PART TEMPERATURE
Actual cure condition

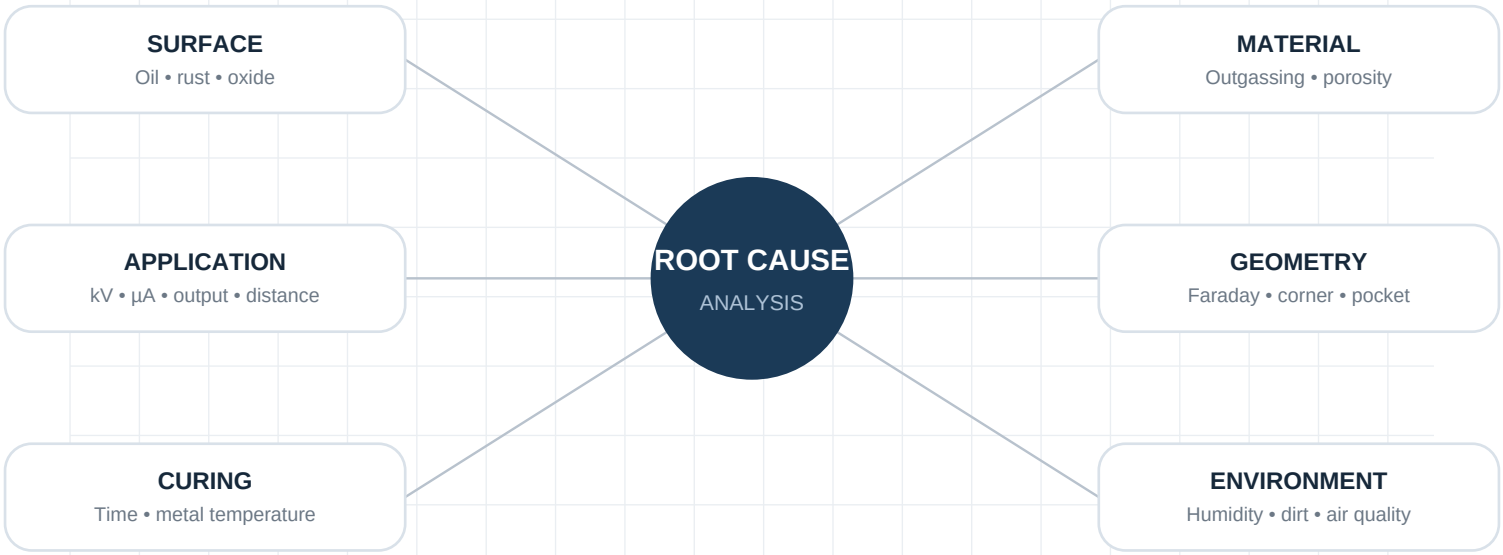
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Balustrade & Cladding Profiles 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 Balustrade & Cladding Profiles.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Balustrade & Cladding Profiles, 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 bar ends, fixing hole, handrail groove, OWL applies targeted, zone-by-zone coating with a Smart AI recipe. For details, see the “OWL — Wire & Mesh” 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