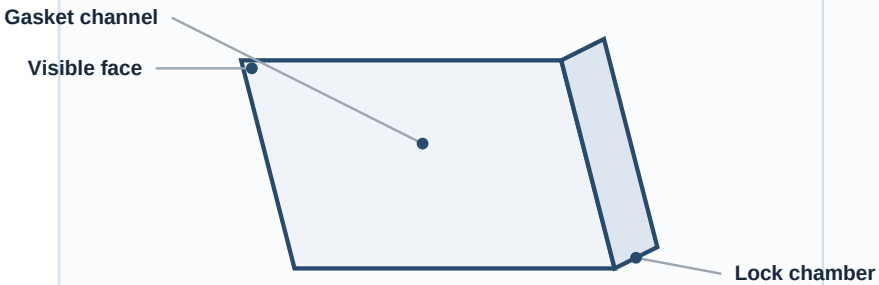
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Window & Door System Profiles (Thermally Broken) — Long life under condensation at the indoor-outdoor boundary, opening-closing wear, UV and gasket pressure. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — WINDOW & DOOR SYSTEM PROFILES (THERMALLY BROKEN)



COATING CROSS-SECTION



Five questions define a coating system

1 MATERIAL
Extruded aluminium (EN AW-6063 T6); a multi-chamber section with a polyamide thermal break, gasket channels and lock chambers. The coating is applied to the bare profile before the polyamide is assembled.

2 SURFACE
Extrusion oil and machining residues must be removed; uniform etching and conversion coating that leave no deposits in gasket channels.

3 GEOMETRY
Narrow gasket channels and lock chambers are Faraday zones; the visible face needs consistent gloss, while hidden surfaces need corrosion coverage.

4 SERVICE CONDITIONS
Long life under condensation at the indoor-outdoor boundary, opening-closing wear, UV and gasket pressure

5 PRODUCTION TARGET
High volume, many colours; line efficiency through fast colour change and low scrap.

CONCLUSION: For the Window & Door System Profiles, the goal is not just a good-looking finish; it is a powder-coated surface, fully covered on all visible and hidden faces, that withstands opening-closing cycles, condensation and UV.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Window & Door System 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-and-drain or an optimised spray geometry prevents solution entrapment in the channels.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

Qualicoat class 1/2 polyester powder according to decorative look, flexibility and outdoor exposure; a consistent appearance in fine-texture or smooth finishes is targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Powder coating, 60–80 µm; a low ramp rate, gun angles aimed at channel openings and a profile rotation/hanging recipe are set for coverage in narrow channels.

GEOMETRY EFFECT
Gasket channel • Lock chamber • Visible face

Managing the process with data, not by eye

µm
FILM THICKNESS
Coating uniformity

°C
PART TEMPERATURE
Actual cure condition

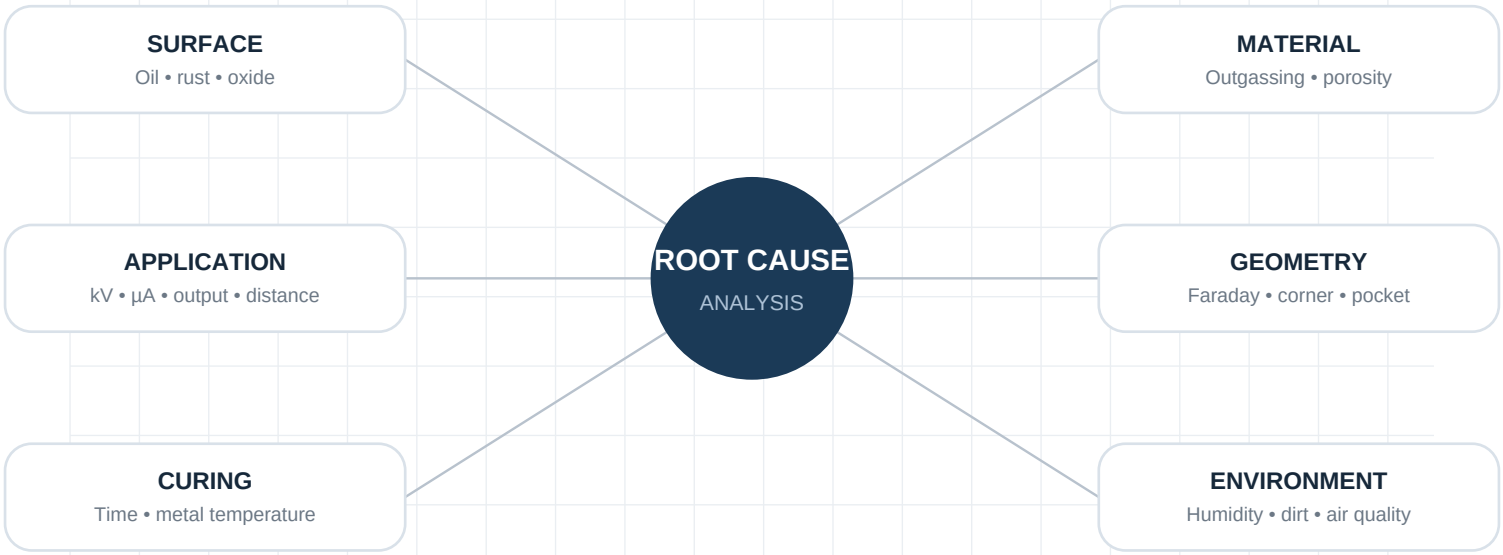
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Window & Door System 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 Window & Door System Profiles.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Window & Door System 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 gasket channel, lock chamber, visible face, OWL applies targeted, zone-by-zone coating with a Smart AI recipe. For details, see the “OWL — Profile & Pipe” 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