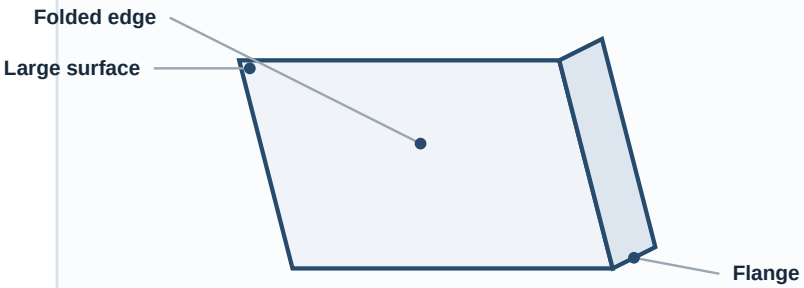
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Body Panels (Hood, Fender, Cab Sheet) — Outdoor UV, rain/humidity, fertiliser-chemical splash and high expectations for visible surface quality. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — BODY PANELS (HOOD, FENDER, CAB SHEET)



COATING CROSS-SECTION



Five questions define a coating system

1. **MATERIAL**
   Cold-rolled steel or aluminium sheet, 0.8–2.0 mm; folded edges, flanges and large visible surfaces.

2. **SURFACE**
   Drawing/forming oils and residues are removed; a uniform, clean substrate is essential on the large visible surface.

3. **GEOMETRY**
   Faraday cage effect at folded edges and flanges; risk of colour/gloss deviation and orange peel on large flat surfaces.

4. **SERVICE CONDITIONS**
   Outdoor UV, rain/humidity, fertiliser-chemical splash and high expectations for visible surface quality

5. **PRODUCTION TARGET**
   Medium-high volume; target: OEM colour consistency, high hiding power and low scrap.

CONCLUSION: For the Body Panels, the goal is not just a good-looking finish; it is a flexible powder-coated surface that withstands outdoor UV and humidity, with consistent colour and gloss across large surfaces.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Body Panels 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

Nano-ceramic or zinc phosphate conversion coating; fast, uniform pretreatment on thin sheet and a good adhesion base.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

For outdoor durability, a UV-stable polyester (optionally superdurable) powder is selected; colour/gloss stability and flexibility are targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Electrostatic powder coating, 60–90 µm; charge and gun distance are set for folded-edge coverage, and a reciprocator motion recipe gives a uniform film on large surfaces.

GEOMETRY EFFECT
Folded edge • Flange • Large surface

Managing the process with data, not by eye

µm
FILM THICKNESS
Coating uniformity

°C
PART TEMPERATURE
Actual cure condition

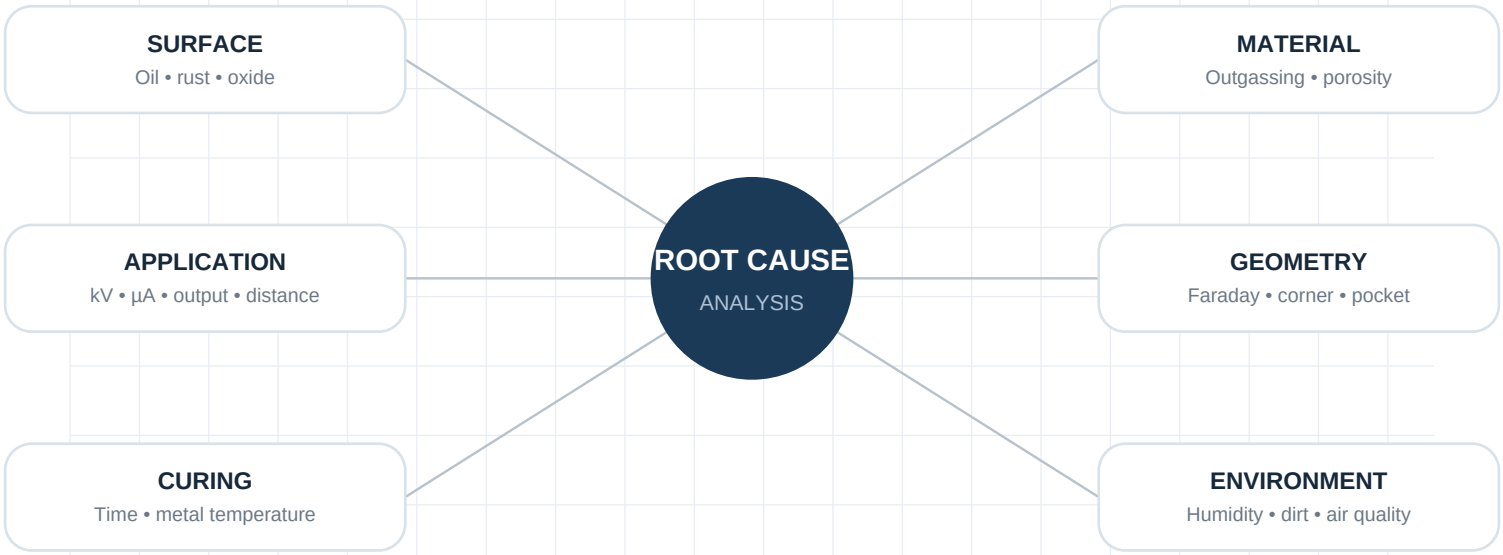
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Body Panels 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 Body Panels.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Body Panels, 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.



Smart AI

The same application on every part, by recipe.



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.

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