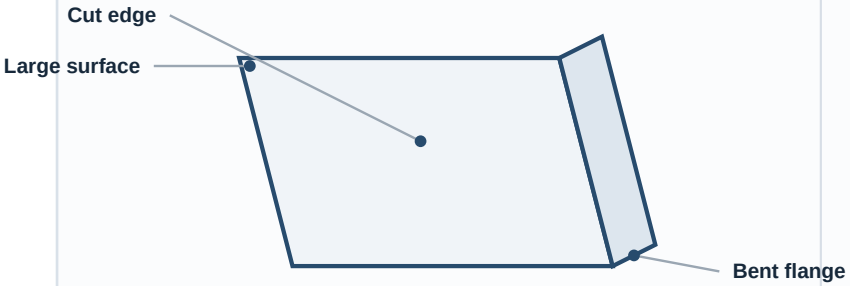
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Sheet-Metal Parts & Cabinet/Housing Panels — Indoor/outdoor use, humidity, cleaning and expectations for visible surface quality. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — SHEET-METAL PARTS & CABINET/HOUSING PANELS



COATING CROSS-SECTION



Five questions define a coating system

1. **MATERIAL**
   Cold-rolled or galvanised sheet (DC01/DX51D), 0.8–2 mm; panels produced by laser cutting, bending and spot welding.

2. **SURFACE**
   Laser/cutting burrs, oil and galvanising residues must be removed; a uniform substrate is essential on the large flat surface.

3. **GEOMETRY**
   Faraday effect at bent flanges and hole/grille areas; risk of colour/gloss deviation on the large flat surface and pull-back at cut edges.

4. **SERVICE CONDITIONS**
   Indoor/outdoor use, humidity, cleaning and expectations for visible surface quality

5. **PRODUCTION TARGET**
   Medium-high volume; a fast line with colour consistency, a repeatable finish and low scrap.

CONCLUSION: For the Sheet-Metal Parts & Cabinet/Housing Panels, the goal is not just a good-looking finish; it is a durable powder-coated surface, consistent in colour and gloss across large surfaces and covered at the edges.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Sheet-Metal Parts & Cabinet/Housing 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	02	03	04	05	06
ANALYSIS	**PRETREATMENT**	**COATING**	**APPLICATION**	**CURING**	**VERIFICATION**
Substrate + surface	Cleaning + conversion	Chemistry + film	Electrostatics + flow	Time + temperature	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 + nano-ceramic/phosphate conversion coating; special preparation for cut edges and galvanising.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

An epoxy-polyester or polyester powder is selected by appearance, flexibility and service environment; curing at ~160–200 °C.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Powder coating, 60–80 µm; gun/charge settings to reach bent flanges and a uniform film on the large surface, with a balanced oven profile.

GEOMETRY EFFECT
Cut edge • Bent flange • Large surface

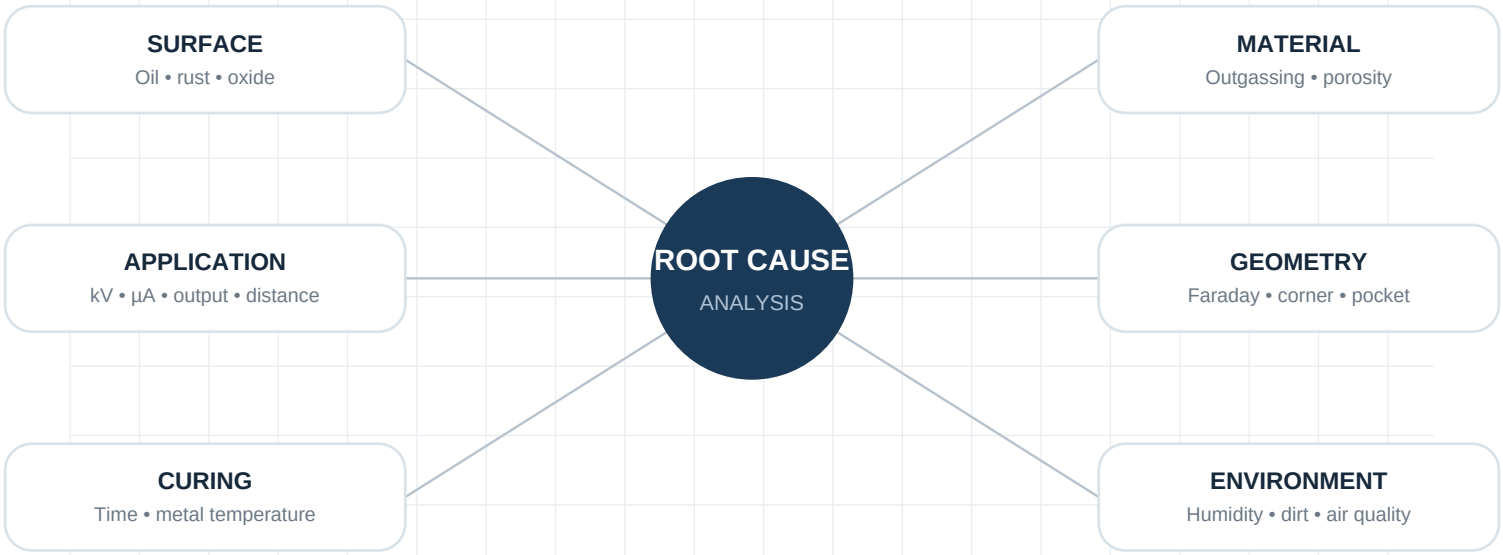
Managing the process with data, not by eye

µm	°C	kV / µA	Ω
FILM THICKNESS	**PART TEMPERATURE**	**ELECTROSTATIC CHARGE**	**GROUNDING**
Coating uniformity	Actual cure condition	Transfer and penetration	Charge dissipation and stability

ENGINEERING PRINCIPLE In the Sheet-Metal Parts & Cabinet/Housing 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 Sheet-Metal Parts & Cabinet/Housing Panels.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Sheet-Metal Parts & Cabinet/Housing 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