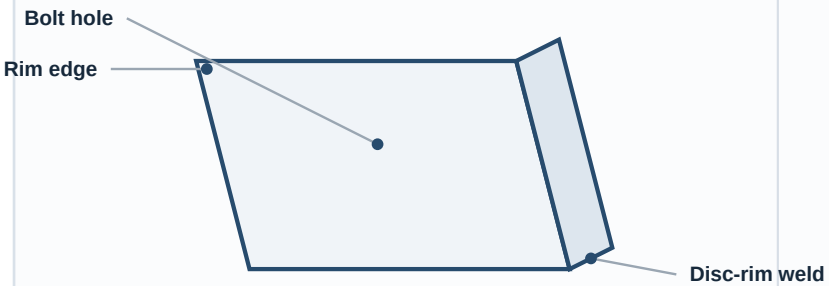
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Wheel Rim & Wheel Disc — Road/soil stone impact, fertiliser-salt splash, continuous cyclic load and UV. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — WHEEL RIM & WHEEL DISC



COATING CROSS-SECTION



Five questions define a coating system

1. **MATERIAL**
   Cold/hot-rolled steel rim, 3–8 mm; welded disc and rim with a perforated hub area.

2. **SURFACE**
   Mill scale, rust and oil are removed; a clean, active surface is ensured around the disc-rim weld and bolt holes.

3. **GEOMETRY**
   Faraday effect at bolt holes and the disc-rim weld zone; risk of film thinning at the rim edge, a surface exposed to stone chipping.

4. **SERVICE CONDITIONS**
   Road/soil stone impact, fertiliser-salt splash, continuous cyclic load and UV

5. **PRODUCTION TARGET**
   Medium-high volume; target: OEM colour match and high scratch/corrosion resistance.

CONCLUSION: For the Wheel Rim & Wheel Disc, the goal is not just a good-looking finish; it is a uniform powder-coated surface on perforated, welded geometry that withstands stone impact, salt corrosion and cyclic load.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Wheel Rim & Wheel Disc 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

Grit blasting or zinc phosphate conversion coating; uniform pretreatment in the perforated hub and weld zone.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

Against stone impact and salt corrosion, an epoxy primer + polyester topcoat system is selected; impact/scratch resistance and colour stability are targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Electrostatic powder coating, 70–100 µm; charge is set for penetration into bolt holes and the weld zone, and a rotating fixture gives uniform rim coverage.

GEOMETRY EFFECT
Bolt hole • Disc-rim weld • Rim edge

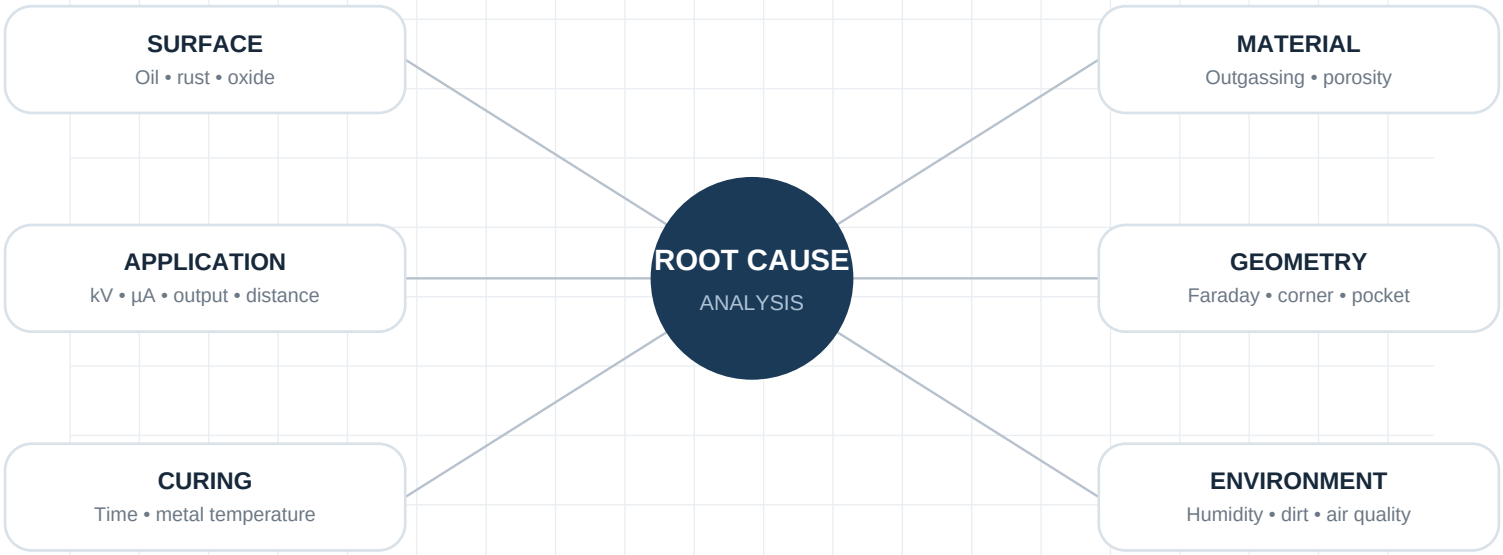
Managing the process with data, not by eye

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 Wheel Rim & Wheel Disc 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 Wheel Rim & Wheel Disc.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Wheel Rim & Wheel Disc, 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 bolt hole, disc-rim weld, rim edge, OWL applies targeted, zone-by-zone coating with a Smart AI recipe. For details, see the “OWL — Wheel Rim” 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