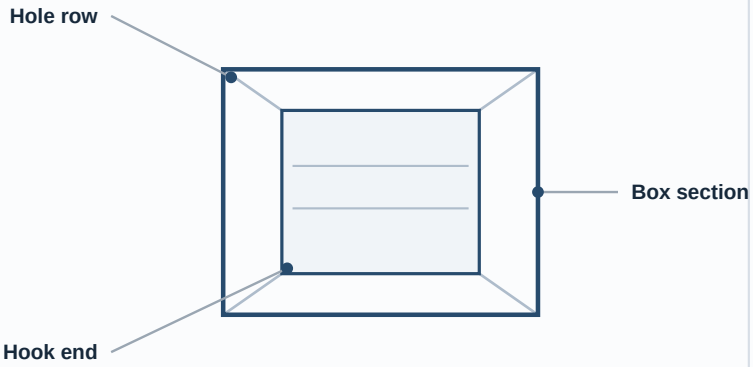
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Industrial Racking & Storage Uprights/Beams — Continuous static load, friction/scratching, pallet contact and indoor humidity. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — INDUSTRIAL RACKING & STORAGE UPRIGHTS/BEAMS



COATING CROSS-SECTION



Five questions define a coating system

1. **MATERIAL**
   Roll-formed structural steel profile (S235/S355 class), 1.5–3 mm; perforated uprights and box-section beams.
2. **SURFACE**
   Mill scale, oil and punching burrs must be removed; a clean, active substrate is required on load-bearing surfaces.
3. **GEOMETRY**
   Faraday cage at the upright hole rows and inside box sections; risk of edge pull-back at hook/end edges and scratching under load.
4. **SERVICE CONDITIONS**
   Continuous static load, friction/scratching, pallet contact and indoor humidity
5. **PRODUCTION TARGET**
   High volume; line efficiency with a consistent film that affects load-bearing capacity and low scrap.

CONCLUSION: For the Industrial Racking & Storage Uprights/Beams, the goal is not just a good-looking finish; it is a powder-coated surface with consistent film thickness that resists wear and scratching under static load and friction.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Industrial Racking & Storage Uprights/Beams 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

Alkaline degreasing + conversion coating or grit blasting; special preparation for scale and burr removal on thick sections.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

A polyester thermoset powder with high wear and scratch resistance and good mechanical strength is selected; curing at ~180–200 °C.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Powder coating, 70–90 µm; a low ramp rate, suitable charge and a gun motion recipe are set for penetration into hole rows and box-section interiors.

GEOMETRY EFFECT
Hole row • Box section • Hook end

Managing the process with data, not by eye

µm
FILM THICKNESS
Coating uniformity

°C
PART TEMPERATURE
Actual cure condition

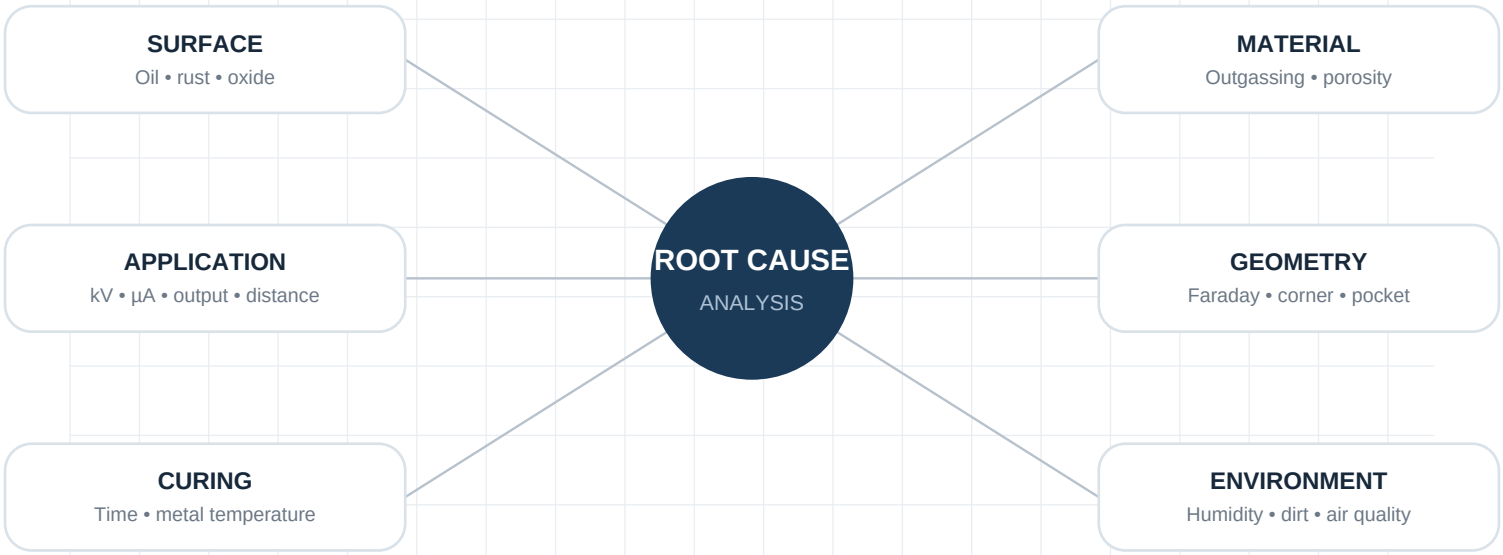
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Industrial Racking & Storage Uprights/Beams 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 Industrial Racking & Storage Uprights/Beams.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Industrial Racking & Storage Uprights/Beams, 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 hole row, box section, hook end, OWL applies targeted, zone-by-zone coating with a Smart AI recipe. For details, see the “OWL — Cavity” 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