KINGSFORM METALWORKS

ENGINEERING TOOLKIT

SURFACE FINISH GUIDE

Selection, specification, design control and inspection of metal finishing systems

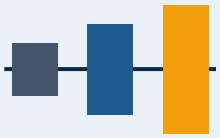
SELECT THE SYSTEM

Match substrate, environment, appearance, service life, maintenance and process capability.

DESIGN FOR COATING

Control edges, cavities, drainage, masking, rack points, threads and dimensional build.

VERIFY PERFORMANCE



Inspect preparation, film thickness, cure, adhesion, appearance, corrosion and function.

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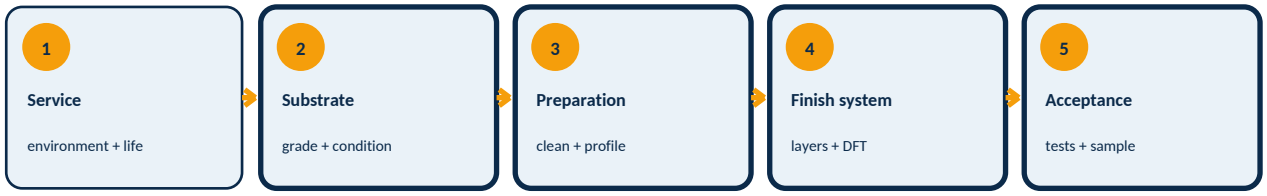
01 PURPOSE AND SPECIFICATION WORKFLOW

Specify the complete finish system

A finish is not only a color, plating name or salt-spray hour. It is a controlled system of substrate condition, preparation, chemistry, layer sequence, thickness, curing, masking, appearance and inspection.

RELEASE FORMAT

Specify substrate + preparation + finish system + layer thickness + color/gloss/texture + masking + cosmetic zones + test method + acceptance criteria + approved sample.



A complete finish specification controls the system, not only the color or coating name.

Questions to answer before selecting a finish

Question	Engineering output	Typical consequence if omitted
Where and how is the part used?	Corrosivity, chemicals, UV, temperature, wear and maintenance assumptions	Wrong coating family or unrealistic durability claim
What substrate and condition?	Grade, temper, surface, weld state, heat tint, scale, oil and previous coating	Poor adhesion, staining, color shift or hydrogen risk
What must remain uncoated?	Threads, fits, bearings, ground points, labels, seal areas and rack locations	Assembly failure, electrical problems or rework
What does the customer see?	Zone A/B/C, viewing distance, lighting, master sample and defect limits	Subjective rejection and batch disputes

DURABILITY IS NOT A WARRANTY PERIOD

A durability class or laboratory test is a planning input. Actual service life depends on design details, maintenance, damage, exposure and workmanship.

02 FINISH ROUTE SELECTION

Shortlist by substrate, environment and function

Use this table to select a process family. Final selection requires supplier confirmation, approved test panels and the governing product specification.

Finish route	Common substrate	Primary value	Main limitations / design checks
Powder coating	Steel, aluminum, selected stainless	Durable color/texture, low-VOC application, broad commercial availability	Faraday areas, edge coverage, cure temperature, rack points, masking, color batch
Liquid paint	Most metals with suitable prep	Flexible primers/topcoats, field repair, high-performance systems	Mix ratio, pot life, solvent, cure, overspray, runs, intercoat compatibility
E-coat / electrophoretic paint	Steel and conductive assemblies	Uniform primer and cavity coverage	Drainage, trapped air, line chemistry, rack contact, topcoat compatibility
Electroplated zinc	Iron and steel hardware	Thin sacrificial zinc, good dimensional control	Hydrogen embrittlement for susceptible high-strength parts, thread fit, chromate type
Hot-dip galvanizing	Fabricated carbon steel	Thick sacrificial zinc and robust outdoor protection	Vent/drain, distortion, zinc runs, thread allowance, reactive steel, appearance variation
Zinc-flake coating	Fasteners and small steel parts	Thin, high corrosion resistance without electroplating hydrogen charging	Licensed system, friction coefficient, topcoat, handling damage, geometry
Anodizing	Aluminum	Integral oxide, wear/corrosion/appearance options	Alloy/temper color, dimensional change, electrical insulation, weld/extrusion witness
Passivation / electropolish	Stainless steel	Clean passive surface; electropolish can improve smoothness and cleanability	Does not replace alloy selection or heat-tint removal; appearance and material removal

Dominant requirement	First route to review	Secondary check
Lowest cost, indoor steel	Powder or liquid paint over controlled pretreatment	Edge radius, weld cleanup, color and assembly masking
Outdoor fabricated steel	Protective paint system, HDG, duplex HDG + paint, or thermal-spray metal	Corrosivity, durability target, drainage and maintainability
Visible aluminum	Anodizing or powder coating	Alloy, surface pretreatment, extrusion lines and color sample
Hygienic stainless	Defined mechanical finish plus cleaning/pickling/passivation or electropolish	Roughness, weld treatment, drainage and contamination control

03 SURFACE PREPARATION

Performance starts before the first coating layer

Most premature coating failures begin with oil, oxide, soluble salts, weld contamination, poor surface profile or trapped moisture. Preparation must match the substrate and coating chemistry.

Typical organic coating stack and where failures start

Performance depends on substrate condition, geometry, pretreatment, layer compatibility, cure and final thickness distribution.

Substrate	Preparation objectives	Typical controls
Carbon steel	Remove oil, rust, mill scale, weld spatter, sharp burrs and salts; create the required profile	Degrease, abrasive blast or chemical pretreatment; verify cleanliness/profile and dust
Galvanized steel	Remove oils, zinc salts and passivation incompatible with the next coat; create adhesion without damaging zinc	Approved sweep blast or conversion pretreatment; control dwell, pressure and abrasives
Stainless steel	Avoid embedded iron; remove heat tint/scale where corrosion performance requires it	Dedicated tools, cleaning, pickling/passivation or mechanical finish; rinse and dry
Aluminum	Remove oil and oxide; provide stable conversion or anodic surface	Alkaline clean, etch/deoxidize, conversion coating or anodize; control alloy and rinse quality

DO NOT COAT OVER UNKNOWN CONTAMINATION

A clean-looking part can still carry silicone, chloride, cutting fluid, release agent or shop iron. Identify the upstream process and define cleaning verification.

04 ORGANIC COATING SYSTEMS

Powder, liquid paint and e-coat

Organic coatings protect mainly by barrier action and, where used, inhibitive or sacrificial pigments. The layer sequence must be compatible and fully cured.

System	Typical screening range*	Best use	Critical controls
Single-layer powder	Often ~60-120 um DFT	Indoor to moderate outdoor fabricated parts where approved pretreatment is available	Film distribution, edge coverage, cure window, Faraday areas, reclaim contamination
Primer + powder topcoat	Often ~100-180 um total	Higher corrosion demand, difficult steel, visible exterior parts	Intercoat adhesion, overbake, total build, grounding and recoat timing
Liquid primer + topcoat	Often ~60-200+ um total	High-performance, large parts, field repair or specific chemical/UV resistance	Mix ratio, induction, wet film, flash-off, solvent, pot life and ambient conditions
E-coat primer	Often ~15-35 um	Complex conductive assemblies and cavities, frequently under powder or liquid topcoat	Bath control, drain holes, rack contact, cure, sealants and topcoat adhesion

*Screening ranges are common commercial examples, not universal acceptance limits. Use the approved coating supplier data and drawing specification.

Geometry controls coating distribution

Geometry	Risk	Design response
Sharp external edge	Low film build and early corrosion	Deburr and radius edges; use edge-retentive primer or stripe coat where specified
Deep narrow recess	Powder Faraday shielding / spray shadow	Open access, adjust gun path, add drain/air path, validate with witness panels
Lap seam / crevice	Pretreatment trapped or uncoated crevice	Redesign, seal after compatible pretreatment, or specify corrosion-tolerant joint
Closed tube	Trapped liquid, pressure, incomplete internal coverage	Vent/drain or keep dry and sealed; define internal protection separately

CURE IS A PART-TEMPERATURE REQUIREMENT

Oven air temperature alone does not prove cure. Heavy weldments and mixed gauges can heat at different rates; verify time at metal temperature or an approved equivalent.

05 ZINC-BASED PROTECTION FOR STEEL

Electro-zinc, hot-dip galvanizing, zinc flake and thermal spray

Zinc protects steel sacrificially. Coating method changes thickness, appearance, dimensional effect, hydrogen risk and suitability for fabricated assemblies.

Process	Typical characteristics	Design / procurement controls
Electroplated zinc	Thin, smooth, controlled appearance; common on fasteners and hardware	Specify standard, thickness class, supplementary finish, color, sealer, thread fit and embrittlement controls
Hot-dip galvanizing	Thicker metallurgical zinc; variable gray/spangle; robust sacrificial protection	Vent/drain, immersion orientation, distortion, coating drainage, thread oversize and touch-up method
Zinc-flake	Thin non-electrolytic flake layers; good on high-strength fasteners	System name, base/topcoat, friction range, recess fill, cure and damage during assembly
Thermal-sprayed zinc/aluminum	Metal spray on prepared steel; suitable for large structures and maintenance	Blast profile, spray thickness, seal coat, edge treatment and coating continuity

Hot-dip galvanizing: design for complete filling, venting and drainage

Hole size and location depend on section volume, immersion orientation, galvanizer practice and safety review. Confirm before release.

HYDROGEN EMBRITTLEMENT NEEDS A MATERIAL-AND-PROCESS REVIEW

Susceptibility rises with high hardness/strength, tensile stress and hydrogen-charging processes such as acid pickling or electroplating. Do not rely on a generic bake note without the governing specification and process sequence.

06 STAINLESS STEEL FINISHES

Appearance, cleanability and corrosion are separate requirements

Stainless corrosion resistance depends on grade, heat tint, contamination, geometry and environment. A bright finish does not automatically mean a fully restored passive surface.

Finish / treatment	Primary purpose	Key notes
2B / mill finish	General sheet finish	Useful baseline for hidden or lightly visible parts; mill batch and forming marks remain relevant
BA / bright annealed	Reflective sheet appearance	Handling and weld witness are highly visible; matching fabricated areas is difficult
No.4 / directional polish	Decorative, appliance and architectural appearance	Specify grit/roughness target, grain direction, sample and weld-blend method
Bead blast / satin blast	Uniform matte appearance	Media type, contamination, angle, pressure and batch consistency govern color/texture
Pickling	Remove scale and heat tint	Can change appearance and dimension slightly; rinse quality and acid handling are critical
Passivation	Remove free iron / support passive surface	Not a substitute for descaling or correct alloy selection; specify treatment and verification
Electropolishing	Smooth/brighten and preferentially remove surface metal	Can improve cleanability and corrosion behavior; alters edges, dimensions and visual uniformity

Issue	Likely cause	Control
Tea staining / rust spots	Iron contamination, chloride deposit, crevice or unsuitable grade	Dedicated tools, cleaning, drainage, grade review and maintenance plan
Weld zone corrodes first	Heat tint/oxide, crevice, rough weld or depleted surface	Define weld cleanup, pickling/passivation and acceptance sample
Grain mismatch	Different stock, polishing direction or local blend	Mark grain direction, use same lot where critical, blend to a master sample

PASSIVATION DOES NOT REMOVE HEAVY SCALE

Cleaning, descaling/pickling and passivation are different operations. Select the sequence from the actual surface condition.

07 ALUMINUM FINISHES

Anodizing, conversion coating and organic topcoats

Aluminum alloy, temper, extrusion practice, weld filler, machining and pretreatment all affect final appearance. Always evaluate representative production material.

Finish	What it provides	Critical limits / appearance factors
Decorative/protective anodize	Integral oxide for corrosion resistance and color/appearance	Alloy and temper color, pretreatment texture, sealing, weld/extrusion lines, electrical insulation
Hard anodize	Thicker/harder oxide for wear and selected corrosion service	Dimensional build and penetration, edge burning, color variation, fatigue concerns, masking
Chemical conversion coating	Thin conversion layer for paint adhesion, corrosion and electrical interface	Chemistry class, contact resistance, rinse, storage time and compatibility with topcoat
Powder or liquid coating	Color, UV and barrier protection	Pretreatment quality, filiform corrosion risk, extrusion seams, outgassing and cure temperature
Mechanical polish / blast	Decorative texture or pre-anodize appearance	Tool marks, smearing, embedded media, grain direction and batch uniformity

Feature	Coating effect	Drawing action
Precision bore / slide fit	Anodic oxide changes effective size; hard anodize can be significant	Specify mask or pre/post-finish dimension and measurement condition
Thread	Build changes pitch/crest clearance and increases friction	Mask, chase after finish if allowed, or compensate thread class with supplier approval
Electrical ground	Anodize is electrically insulating	Mask contact pad or use approved conductive conversion coating and verify resistance
Welded assembly	Weld and HAZ may anodize with different color	Approve sample, hide weld, choose coating instead, or accept documented variation

COLOR CODES DO NOT CONTROL ANODIZED APPEARANCE

Anodized color depends on alloy chemistry, temper, surface condition, thickness, dye, sealing and viewing angle. Use range panels or a signed master sample.

08 SPECIALTY METALLIC AND CONVERSION FINISHES

Use only with a defined function and governing specification

Nickel, chrome, electroless nickel, phosphate, black oxide and related finishes solve specific wear, appearance, solderability or assembly needs. They require tighter chemistry and substrate control than a generic finish note suggests.

Finish	Common function	Important controls
Electroless nickel (Ni-P)	Uniform deposit, corrosion/wear, complex geometry	Phosphorus level, heat treatment, thickness, substrate activation, porosity and dimensional build
Electro-nickel / chrome	Decorative or engineering surface	Layer stack, nickel type, chrome type, polishing, rack marks, hydrogen risk and environmental compliance
Phosphate + oil/paint	Paint pretreatment, break-in, temporary corrosion protection	Coating weight, crystal structure, oil/sealer, cleanliness and downstream compatibility
Black oxide	Low-dimensional black appearance on ferrous parts	Limited corrosion resistance without oil/wax; surface prep and post-seal govern performance
Mechanical plating	Zinc/alloy coating without electroplating current	Part size/shape, impact damage, coating thickness distribution and supplementary finish
PVD / vacuum coating	Decorative color, hardness or wear in selected applications	Line-of-sight, substrate polish, adhesion layer, temperature, thickness and color sample

Selection filters

Filter	Question to resolve before quotation
Dimension	Is the deposit additive, partly penetrating, or intentionally removed from critical surfaces?
Base material	Can the substrate tolerate cleaning, activation, heat treatment, hydrogen charging and process temperature?
Tribology	What friction coefficient, lubrication, wear pair and contact pressure must be achieved?
Compliance	Are Cr(VI), nickel release, food contact, RoHS/REACH, automotive or customer restrictions applicable?
Verification	Which thickness, composition, porosity, hardness, adhesion or corrosion tests are required?

AVOID LEGACY SHORTHAND WITHOUT CHEMISTRY

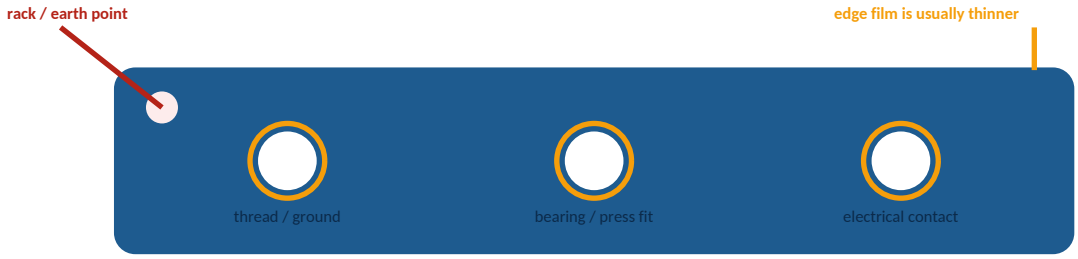
Notes such as "yellow zinc" or "black nickel" can hide major process differences. State the standard, coating type, thickness, supplementary treatment and compliance restrictions.

09 THICKNESS, TOLERANCE AND MASKING

Control the finish as part of the dimensional stack

Coatings can close holes, tighten threads, reduce bearing clearances, change edge radius and move cosmetic interfaces. Define whether dimensions apply before or after finishing.

Masking, contact points and coating build must be designed into the drawing



Specify mask limits, acceptable witness marks, plug/cap removal, post-coat cleaning and dimensional acceptance after coating.

Feature	Risk from finish	Recommended drawing control
External dimension	Build adds to size; nonuniformity changes flatness/fit	State pre- or post-finish size; include realistic coating variation
Internal bore / slot	Build reduces opening; liquid/powder can bridge corners	Mask, machine after finish, or enlarge only with supplier-confirmed allowance
Threaded feature	Pitch diameter and friction change; plug buildup may damage assembly	Mask, fit-class compensation or post-finish chase under controlled acceptance
Ground / electrical pad	Organic/anodic layers insulate; corrosion starts at exposed pad	Define mask shape, protective grease/seal, contact resistance and final cover
Press fit / bearing seat	Coating can crush, peel or shift interference	Normally mask or machine after; specify cleanliness and edge transition
Rack / hanging point	Witness mark or incomplete coating	Locate in hidden zone and define acceptable size/count

DO NOT ADD A SINGLE GENERIC ALLOWANCE

Actual build depends on process, geometry, current density, spray path, drainage and measurement method. Get the approved process window from the finisher.

10 COLOR, GLOSS, TEXTURE AND COSMETIC QUALITY

Replace subjective language with measurable zones and samples

Terms such as "smooth," "matte," "no defects" or "same color" are not sufficient for production acceptance. Define appearance under controlled conditions.

Define cosmetic zones by customer view, lighting and distance

ZONE A - primary visible

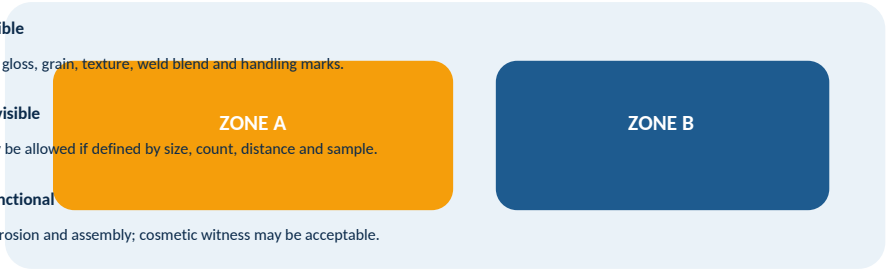
Tighter limits for color, gloss, grain, texture, weld blend and handling marks.

ZONE B - secondary visible

Controlled defects may be allowed if defined by size, count, distance and sample.

ZONE C - hidden / functional

Focus on coverage, corrosion and assembly; cosmetic witness may be acceptable.



Appearance item	How to specify	Common source of variation
Color	Standard code plus approved physical sample and permitted instrument delta if required	Substrate, film thickness, cure, batch, gloss, texture and lighting
Gloss	Measurement angle and target range; include texture effects	Film build, cure, powder lot, surface roughness and instrument angle
Texture	Named product/system plus tactile/visual master sample	Gun setup, film thickness, oven profile and part geometry
Directional grain	Arrow on drawing, grit/roughness range and blend requirements	Stock lot, local weld repair, tool path and operator technique
Defects	Maximum size/count per zone, viewing distance, illumination and sample board	Dust, craters, pinholes, sags, rack marks, weld witness and handling

Recommended visual inspection conditions

Parameter	Define in the specification
Lighting	Type, approximate illuminance and whether direct/reflected light is used
Distance and angle	Normal customer viewing distance, viewing angle and inspection time
Sample	Signed master panel/part, allowed range panels, storage and replacement method
Cleanliness	Part clean and dry; fingerprints, protective film and packaging condition controlled

11 CORROSION SYSTEM SELECTION

Match the environment, geometry and maintenance plan

Corrosion protection is a system that includes material, coating, drainage, crevice control, edge treatment, damage repair and inspection access.

Service scenario	Routes to evaluate	Critical design questions
Dry indoor	Pretreated powder, liquid paint, black oxide + oil for controlled hardware, bare stainless/aluminum where suitable	Condensation, cleaning chemicals, handling wear and cosmetic standard
Humid indoor / intermittent wash	E-coat + topcoat, robust powder system, zinc + sealer, stainless or anodized aluminum	Drainage, trapped liquid, detergent, temperature and repair access
General outdoor	ISO 12944-type paint system, HDG, duplex HDG + paint, anodized/coated aluminum, suitable stainless	Corrosivity category, UV, edges, fasteners, crevices, maintenance interval
Coastal / chloride	Higher-performance paint/duplex, suitable stainless grade, sealed anodize or qualified aluminum coating	Salt deposition, washing, crevices, galvanic area ratio and coating damage
Chemical / process	Media-specific lining, stainless/alloy, compatible organic coating or specialist metallic coating	Exact chemical, concentration, temperature, immersion/splash, cleaning and permeation

Duplex system	Why it can help	What must be controlled
HDG + paint / powder	Sacrificial zinc plus barrier and color; damage tolerance may improve	Galvanizing surface age/condition, sweep blast or pretreatment, gas pinholes, adhesion and compatible repair
Zinc-rich primer + topcoat	Sacrificial pigment plus barrier topcoat	Blast profile, zinc loading/contact, overcoat window, DFT and edge stripe coat
E-coat + powder / liquid	Cavity primer plus visible/UV topcoat	Intercoat compatibility, cure schedule, sealants, drains and total build

SALT SPRAY HOURS DO NOT PREDICT FIELD LIFE DIRECTLY

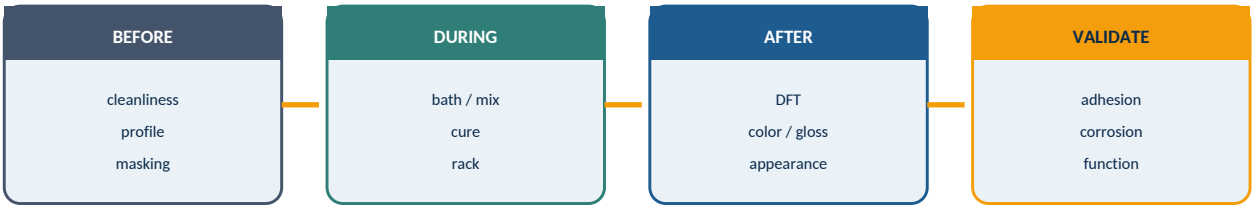
ISO 9227 defines test apparatus and procedure but does not prescribe a universal exposure time or field-life conversion. Use the applicable product/system specification and defined failure criteria.

12 INSPECTION AND VALIDATION

Measure the system, not one isolated result

Inspection should link each risk to a method, sampling plan, instrument, location and acceptance rule. Keep process records for traceability.

Inspection plan: verify each layer of the finish system



A salt spray report cannot replace surface preparation records, DFT mapping, cure verification and functional checks.

Characteristic	Typical method	Important limitation
Surface cleanliness / profile	Visual standard, replica tape/profilometer, dust/salt checks	Method must suit substrate and coating system; roughness affects DFT readings
Film / coating thickness	Magnetic, eddy current, XRF, microscopy or mass methods	Calibrate for substrate, curvature, roughness and alloy; define number/location of readings
Adhesion / separation resistance	Cross-cut, pull-off or bend/impact test as applicable	Cross-cut is an empirical classification and not a direct adhesion-strength measurement
Cure	Oven profile, solvent rub, hardness or approved supplier test	Surface hardness alone may not prove full cure through the film
Color / gloss	Spectrophotometer and glossmeter plus visual sample	Geometry, texture, metamerism and measurement angle affect results
Corrosion performance	Salt spray, cyclic corrosion, humidity, immersion or field exposure	Use the correct damage/scribe, exposure, specimen and failure rating for the system
Functional fit	Assembly, torque, electrical resistance, sealing or wear test	A visually acceptable finish can still fail the product function

DEFINE MEASUREMENT LOCATIONS

Coating thickness at broad flat areas does not prove edge, recess, weld, tube interior or rack-point coverage. Include a location map for critical parts.

13 DEFECT DIAGNOSIS

Trace the symptom back to preparation, application, cure or design

Do not repair the visible symptom until the process cause is known. Rework can trap contamination or change dimensions, color and adhesion.

Defect	Likely causes	Corrective actions to investigate
Blistering	Contamination, soluble salts, trapped moisture, osmotic pressure, poor pretreatment	Audit cleaning/rinsing, salt level, dry-off, substrate porosity and exposure chemistry
Peeling / adhesion loss	Oil/silicone, oxide, incompatible layers, missed recoat window, undercure/overbake	Confirm prep, compatibility, cure profile, handling and recoat process
Pinholes / craters	Outgassing, contamination, weld porosity, thick film, poor flash-off	Bake-out, improve cleaning, reduce build, repair welds, change powder/paint system
Orange peel / texture shift	Viscosity, film thickness, gun settings, cure ramp, powder lot	Control material condition, application settings, DFT and oven profile
Sags / runs	Excess wet film, low viscosity, poor flash or orientation	Adjust pass count, viscosity, flash time, hanger angle and wet-film control
Early edge rust	Sharp edge, low film build, damage, no stripe coat	Radius/deburr, edge-retentive primer, stripe coat and packaging protection
White rust on zinc	Wet storage, poor ventilation, condensate, aggressive salts	Dry/separate parts, improve passivation/sealer, packaging and storage
Color mismatch	Different substrate/lot, film build, cure, gloss, texture or lighting	Use master/range samples, same system/lot, instrument + visual acceptance
Galvanized runs / spikes	Drainage/orientation, chemistry, geometry and withdrawal conditions	Review vent/drain and immersion plan; define dressing limits and repair

CONTROL REWORK AS A SPECIAL PROCESS

Define removal method, maximum recoat cycles, substrate damage limits, masking, cure exposure and re-inspection. Uncontrolled touch-up can hide a systemic problem.

14 DRAWING, RFQ AND RELEASE CHECKLIST

Give the finisher enough information to control the result

Use the sample specification block below as a structure. Replace each placeholder with project-specific requirements and the approved supplier process.

Specification field	Example content structure
Substrate	Material grade / temper / product form; weld condition and prohibited substitutions
Preparation	Cleaning, blast/pretreatment method, required profile or condition, edge rounding and weld cleanup
Finish system	Primer/topcoat or plating/anodize system, governing standard, approved product and color
Thickness	Target/range, measurement method, excluded zones and critical-location map
Masking / rack	Threads, fits, grounds, seal areas, contact points; acceptable witness location/size
Appearance	Zone A/B/C, color/gloss/texture, grain direction, master sample, defect limits
Validation	Adhesion/cure/corrosion/functional tests, sampling, reporting and retention samples

1. Service environment and design life defined
2. Substrate grade and condition released
3. Finish standard and revision identified
4. Surface preparation method specified
5. Weld spatter/heat tint/oxide disposition defined
6. Edges and burr condition controlled
7. Pretreatment compatible with topcoat
8. Layer sequence and approved product defined
9. Thickness target/range and method defined
10. Critical measurement locations mapped
11. Dimensions stated pre- or post-finish
12. Threads, fits and bearings reviewed
13. Masking limits and removal requirements shown
14. Rack/earth/contact witness locations approved
15. Vent/drain and cavity protection reviewed
16. Cure / bake limit compatible with material
17. Color, gloss and texture acceptance defined
18. Cosmetic zones and viewing conditions defined
19. Master/range samples controlled
20. Adhesion/cure tests selected
21. Corrosion test and failure criteria selected
22. Functional assembly test included
23. Packaging prevents abrasion/wet storage
24. Rework and touch-up method approved

RFQ MINIMUM

Provide 2D drawing, 3D model where useful, substrate certificate requirement, annual/batch quantity, service environment, approved finish specification, appearance sample and packaging method.

15 STANDARDS AND OFFICIAL REFERENCES

Confirm the current edition and customer contract before use

The references below define scope, terminology, test methods or process requirements. Purchase and apply the complete standard where it governs the product.

Reference	Use in finish specification	Official page
ISO 12944-2:2017	Corrosivity environments for protective paint systems on steel	https://www.iso.org/standard/64834.html
ISO 12944-5:2019	Protective paint systems for steel structures	https://www.iso.org/standard/77795.html
ISO 12944-6:2018	Laboratory performance test methods for protective paint systems	https://www.iso.org/standard/51378.html
ISO 8501-1:2007	Visual assessment of steel surface cleanliness	https://www.iso.org/standard/43426.html
ISO 2808:2019	Determination of film thickness	https://www.iso.org/standard/71583.html
ISO 2409:2020	Cross-cut test for paint coatings	https://www.iso.org/standard/76041.html
ISO 9227:2022 + Amd 1:2024	Salt spray test apparatus and procedure	https://www.iso.org/standard/81744.html
ISO 1461:2022	Hot-dip galvanized coatings on fabricated iron and steel	https://www.iso.org/standard/81435.html
ISO 2063-1:2019	Thermal-sprayed zinc, aluminum and alloys for corrosion protection	https://www.iso.org/standard/76499.html
ISO 7599:2018	Decorative and protective anodizing of aluminum	https://www.iso.org/standard/70156.html
ISO 10074:2021	Hard anodic oxidation coatings on aluminum	https://www.iso.org/standard/80119.html
ASTM B633-23	Electrodeposited zinc coatings on iron and steel	https://store.astm.org/b0633-23.html
ASTM A380/A380M-25	Cleaning, descaling, pickling and passivation of stainless steel	https://store.astm.org/a0380_a0380m-25.html
ASTM A967/A967M-25	Chemical passivation treatments for stainless steel parts	https://store.astm.org/a0967_a0967m-25.html

STANDARD STATUS NOTE

As of 2026-07-18, ISO 12944-5:2019 remains published while a committee draft revision is under development. ISO 9227:2022 has Amendment 1:2024. Always confirm status at release.

KINGSFORM ENGINEERING TOOLKIT

Use KFR-004 Surface Finish Selection Workbook to compare candidate finish routes, capture inputs and record approval decisions.

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