ALE resource guide

Material and finishing guide for repeat machined components

A practical guide for buyers preparing drawings, RFQs and repeat component orders where material selection, heat treatment, coating, plating, anodising or surface finish affects fit, wear, corrosion resistance or inspection.

Built for repeat component supply

Use this guide before issuing drawings for shafts, bushes, housings, flanges, plates, brackets, rollers, pump components, vehicle parts and machinery spares. It is not a substitute for design engineering or material certification advice. It is a buyer-side checklist for cleaner RFQs and lower supply risk.

Next step

If a part needs material control, external finishing, inspection evidence or repeat supply, start with a component supply review. Attach the drawing, material call-up, finish requirement and any known service conditions.

Start a component supply review

When to use this guide

Material and finish details often look secondary on an RFQ. They are not. The wrong grade, heat treatment, coating thickness, masking instruction or surface finish can change how a component fits, wears, seals or assembles.

Use this guide when a machined component is used in rotating, reciprocating, vibrating, sealing, sliding, pumping, conveying or load-carrying equipment. It is also useful when the same part will be ordered again and the next batch needs to match the approved one.

- Repeat machined components where the same drawing will be used for future orders.
- Critical spares where late supply, poor fit or material change can stop equipment.
- Parts with anodising, hard anodising, plating, coating, e-coat, heat treatment, hardening, passivation or other external operations.
- Parts with bearing fits, seal faces, threads, dowel locations, sliding surfaces, welded interfaces or masking requirements.
- Parts supplied from old drawings, inherited data, scanned drawings or incomplete purchasing records.

Information to lock down before RFQ

Item	What to specify	Notes for repeat supply
Material grade	Exact grade, standard and condition	Avoid broad labels such as stainless, aluminium or tool steel unless the grade is not yet decided.
Material source	Mill certificate, customer supplied stock, or supplier supplied stock	State if certificates, batch traceability or country of origin are required.
Heat treatment	Process, hardness range, case depth, standard and timing	Confirm whether machining happens before, after or between heat treatment stages.
Surface finish	Ra value, machined finish, polished face, ground face or cosmetic requirement	Separate functional surfaces from cosmetic surfaces.
Coating or plating	Type, thickness, colour, standard, masking and post-treatment	Coating thickness affects fits, bores, threads and sealing surfaces.
Critical features	Bearing fits, bores, grooves, seal faces, datums, threads, slots and location faces	Mark features requiring inspection evidence. Do not “over tolerance”.
Service conditions	Wear, corrosion, washdown, heat, impact, chemical exposure or outdoor use	Useful where material or finish selection is still being reviewed.
Revision control	Drawing revision, approved sample status and previous batch notes	The last accepted part is often as important as the drawing.

Material guide

The following notes are not design rules. They are RFQ and purchasing checks. The aim is to remove ambiguity before the job enters machining, inspection and finishing.

Material group	Common component use	RFQ checks
Carbon and mild steels	Shafts, brackets, collars, spacers, housings, plates, guards, general machinery parts.	Call up the grade, condition and any hardening, blackening, plating, paint or coating. State if weldability or post-machining treatment matters.
Alloy steels	Drive shafts, pins, heavy-duty parts, wear parts, high-load machine components.	State grade, hardness target, heat treatment process and any post-treatment machining. Allow for distortion risk after heat treatment.
Tool steels	Wear parts, punches, nests, tooling, special machine parts.	Specify grade, hardness range, heat treatment and surface treatment. Do not assume all tool steels machine or finish the same way.
Stainless steels	Pump parts, food machinery components, fluid handling, corrosion-sensitive spares.	Specify grade and finish. State if passivation, electropolish or hygienic surface requirements apply.
Aluminium	Plates, housings, brackets, automation parts, light-duty machine components.	Specify grade and temper. If anodising or hard anodising is required, state colour, thickness, masking and visual expectations.
Brass, bronze and copper alloys	Bushes, sleeves, wear parts, electrical or fluid-adjacent components.	Specify exact alloy. Bearing and wear applications need clear mating surface and lubrication context.
Engineering plastics	Spacers, wear strips, guides, bushes, electrical or low-friction components.	Specify polymer grade, colour and temperature or chemical exposure. Avoid generic plastic call-ups.
Castings and forgings	Pump bodies, housings, brackets, heavy equipment parts.	Provide casting or forging drawing, machining datum plan, material certificate requirement and allowance condition. Specify actions for casting or forging quality issues e.g. porosity tolerance

Finishing and treatment guide

Process	Common use	RFQ checks
Heat treatment / hardening	Wear resistance, strength, durability, bearing or shaft service.	Specify process, hardness range, case depth, standard and when hardness is measured.
Stress relief	Long parts, heavily machined billets, welded or flame-cut stock, precision plates.	Specify if required before finish machining. Useful where movement could affect flatness or bore position.
Anodising	Aluminium plates, housings, brackets and cosmetic or corrosion-resistant parts.	State colour, class, thickness, masking and required post-anodise dimensions.
Hard anodising	Wear surfaces, sliding or corrosion-exposed aluminium parts.	Confirm coating thickness, build-up allowance and any sealing requirements.
Zinc plating	Steel brackets, hardware, spacers and general corrosion protection.	State clear, yellow, black or other finish, thickness and masking. Hydrogen embrittlement risk must be checked for high-strength steels.
Nickel / electroless nickel	Wear, corrosion or process components requiring controlled coating.	State thickness, masking, post-treatment and dimensions after plating.
E-coat / powder coat / paint	Vehicle, machinery, brackets, covers, housings and exposed components.	Identify threaded holes, bearing faces, earth points, dowel holes, mating faces and masked surfaces.
Passivation / electropolish	Stainless pump, food, fluid and corrosion-sensitive parts.	State the required standard, finish level, cleaning requirements and packaging needs.
Black oxide / phosphate	Machine components, tools, fastener-adjacent parts and light corrosion protection.	State whether the finish is functional, cosmetic or both.
Laser marking / engraving	Part identification, revision control, batch control, assembly direction.	Provide exact text, location, depth and whether marking occurs before or after coating.

Fit and finish risks

Most finishing problems are not caused by the coating process alone. Drawings should state which surfaces are functional, what needs masking, and whether dimensions apply before or after finishing.

Risk area	Production effect	Control action
Coating thickness	Bores, shafts, threads and sliding faces may become tight or unusable.	State before-finish and after-finish dimensions where needed.
Masking not defined	Plating or coating lands on bearing faces, dowel holes, seal faces or earth points.	Mark all no-coat areas on the drawing.
Heat-treatment movement	Flatness, bore position, concentricity or straightness can move after hardening.	Confirm process order and whether finish machining is required after treatment.
Surface roughness missing	Seal faces, sliding surfaces or bearing fits may be machined to the wrong finish.	Call up Ra values only where they matter. Avoid blanket requirements.
Material substitution	Equivalent material may not behave the same under heat, wear, corrosion or coating.	Require written approval before substitution.
Thread condition	Internal or external threads may change after coating or plating.	State masking, chasing, gauge requirement or after-finish thread condition.
Visual finish ambiguity	Cosmetic expectations become a dispute after manufacture.	State if appearance matters. Provide reference photos if needed.

Inspection and evidence

The inspection requirement should match the part risk. A one-off low-risk bracket does not need the same evidence as a repeat, critical process pump component, shaft, seal carrier, or vehicle suspension part. For repeat supply, inspection notes should be kept with the drawing and batch history.

- Material certificate, if grade traceability is required.
- Heat-treatment certificate or hardness report, if hardening is required.
- Coating, plating or anodising certificate, if the finish has functional or customer approval requirements.
- Dimensional inspection report for critical features, especially fits, bores, shafts, datums, threads and seal faces.
- Photographic record for masked areas, finish condition or customer-approved visual standards.
- Revision record showing which drawing, finish and inspection requirement applied to the approved batch.

Buyer checklist before sending the RFQ

#	Check	Status
1	Drawing revision is current and approved for manufacture.	Yes / No / Review
2	Material grade, standard and condition are stated.	Yes / No / Review
3	Material certificate requirement is stated.	Required / Not required / Review
4	Heat treatment, hardening or stress relief requirements are stated.	Required / Not required / Review
5	Finish type, colour, thickness and standard are stated.	Required / Not required / Review
6	Masked areas are marked on the drawing or sketch.	Yes / No / Review
7	Critical post-finish dimensions are identified.	Yes / No / Review
8	Inspection evidence required with the batch is listed.	Yes / No / Review
9	Service conditions are known where they influence material or finish.	Known / Unknown / Review
10	Repeat demand, batch size and timing are included.	Known / Unknown / Review

What to send ALE

- Drawing, revision, STEP or CAD file.
- Material grade, standard and supply responsibility.
- Heat treatment, coating, plating, anodising, paint or finishing specification.
- Critical dimensions and inspection evidence required.
- Quantity, expected repeat demand and required timing.
- Photos of the existing part, failed part or previous batch if they add context.
- Previous supplier notes, non-conformance history or known problem areas, if available.

Useful related ALE resources

Use these resources with this guide when preparing repeat machined component work for review.

Resource	Use it when
RFQ readiness guide	The RFQ is missing quantity, revision, material, finish, timing or inspection data.
Drawing health checklist	The drawing is old, incomplete, uncontrolled or missing material and finish notes.
Inspection requirement primer	The buyer needs to decide what evidence should come with the batch.
Controlled first batch guide	A new supplier or new process needs to be proven before repeat supply.
Customer critical parts register	Approved parts need a controlled record for future orders.
Component supply review	The part has repeat demand, supply risk or unclear technical requirements.

Next step

If a part needs material control, external finishing, inspection evidence or repeat supply, start with a component supply review. Attach the drawing, material call-up, finish requirement and any known service conditions.

Start a component supply review

Document status: website resource, external use. Review any legal, safety-critical or regulated material claims against the customer drawing and order requirements before manufacture.