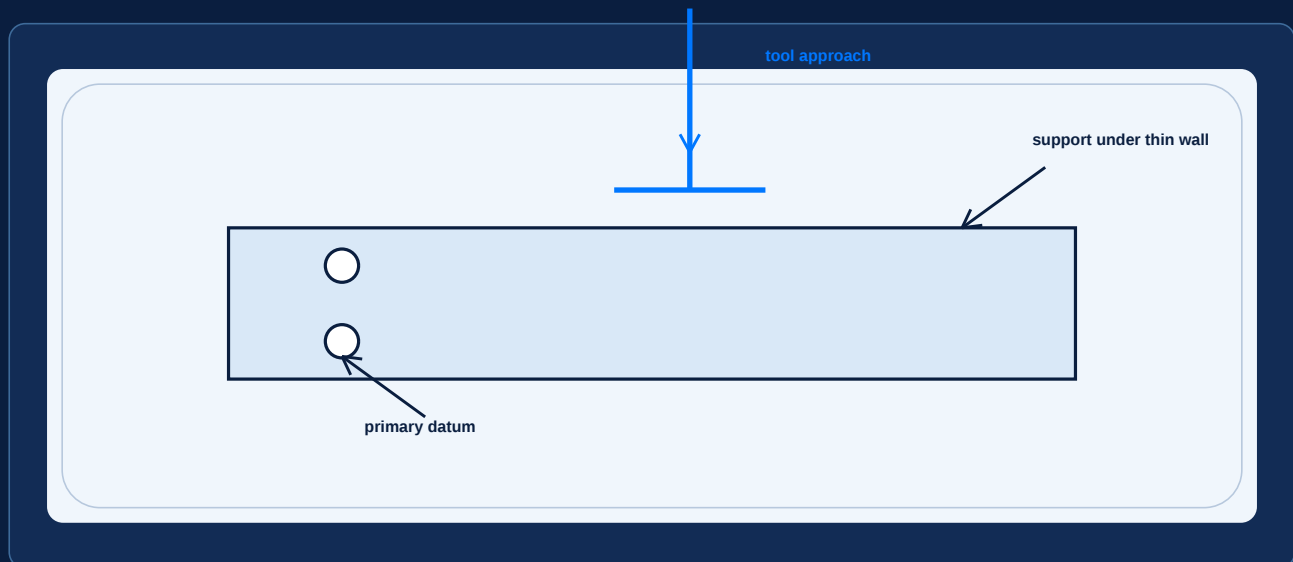


DIE CAST PARTS FOR POST-MACHINING

Protect datums, stock and tool access from casting to final inspection



USE THIS GUIDE TO

plan casting geometry and final machining as one repeatable route.

DIE CAST PARTS FOR POST-MACHINING

Design logic and guide map

ENGINEERING REFERENCE

START WITH FUNCTION

Create stable cast datums, reserve stock, protect holes and seals, then define inspection from final function.

FOUR-STEP DESIGN LOGIC

01 Function

What must fit, seal, locate or remain cosmetic?

02 Process

Which process route creates the feature?

03 Setup

Where are datums, tools, supports and gauges?

04 Release

What evidence is required before approval?

GUIDE MAP

Section	Topic	Practical result
01	Cast datum	Create a stable face for the first setup.
02	Stock map	Reserve consistent stock on functional faces.
03	Holes and threads	Protect drilling, tapping and boring paths.
04	Sealing lands	Provide enough machined land for the seal.
05	Fixture concept	Support the part without distortion.
06	Porosity risk	Keep critical machining away from high-risk mass.
07	Inspection	Measure final features from final datums.
08	Drawing review	Close stock, datum and evidence gaps.

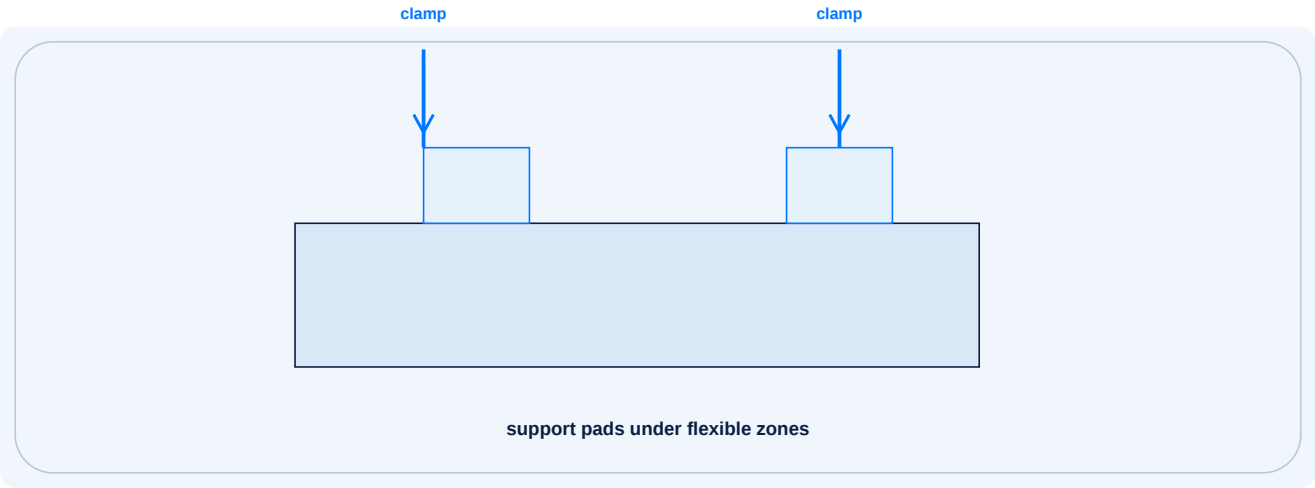
REFERENCE RULE

The drawing, purchase order and approved inspection plan remain the controlling documents.

DIE CAST PARTS FOR POST-MACHINING

A stable pad makes the first setup repeatable.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Datum pad	Add a broad, supported pad for location.	A thin cast edge can rock or shift.
Stock	Leave enough material to clean the datum.	Too little stock leaves flash or porosity.
Sequence	Machine the primary datum before dependent features.	A changing reference can move every later feature.

USE WHEN

Add a broad, supported pad for location.

AVOID

A thin cast edge can rock or shift.

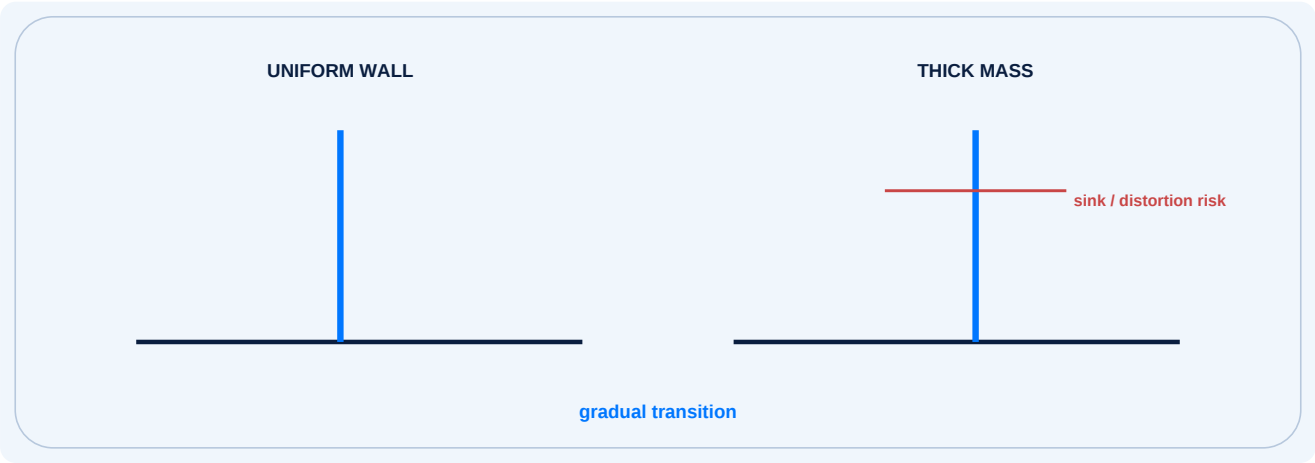
PROCESS CONTROL

Review the datum and fixture concept before the casting tool is released.

DIE CAST PARTS FOR POST-MACHINING

Stock should be consistent without masking casting risk.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Functional face	Show stock and final land dimensions.	Too much stock adds time; too little fails the fit.
Transition	Blend stock at wall changes.	A local heavy zone can expose porosity after machining.
Drawing	Separate cast and final dimensions.	A single dimension can hide two processes.

USE WHEN

Show stock and final land dimensions.

AVOID

Too much stock adds time; too little fails the fit.

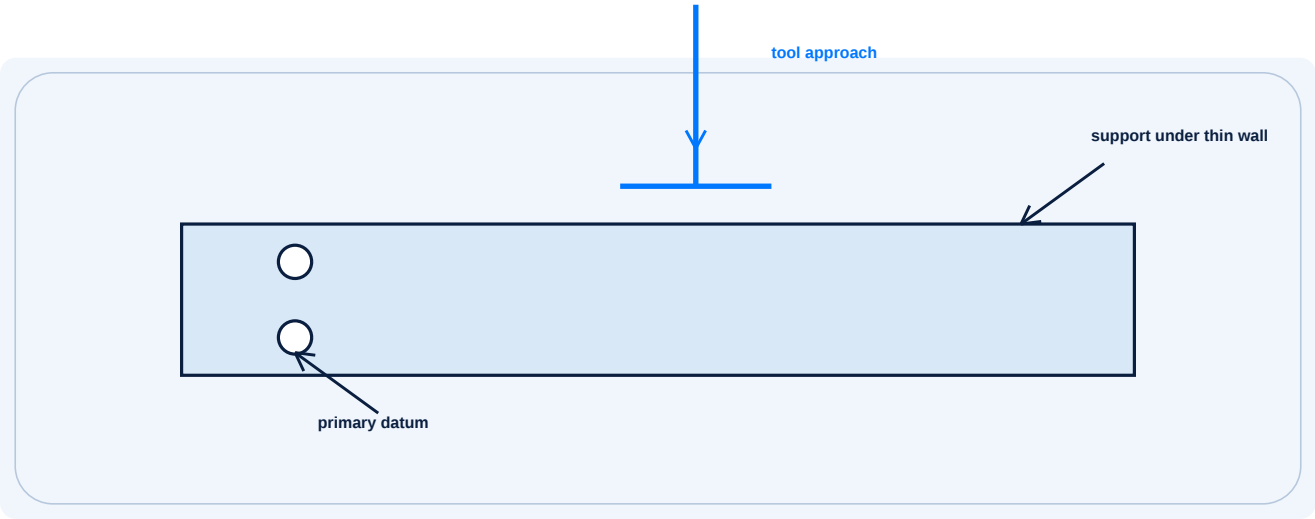
PROCESS CONTROL

Use a stock map to connect the casting model, machining drawing and inspection plan.

DIE CAST PARTS FOR POST-MACHINING

Hole-making needs material, access and a clear datum chain.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Drill path	Keep the approach clear and support the hole zone.	A tool can break through a thin wall or porous area.
Bore / ream	Reserve material for the final size operation.	Insufficient stock forces an undersize or position compromise.
Thread	Define depth, class and runout relief.	Blind thread details can fail gauge inspection.

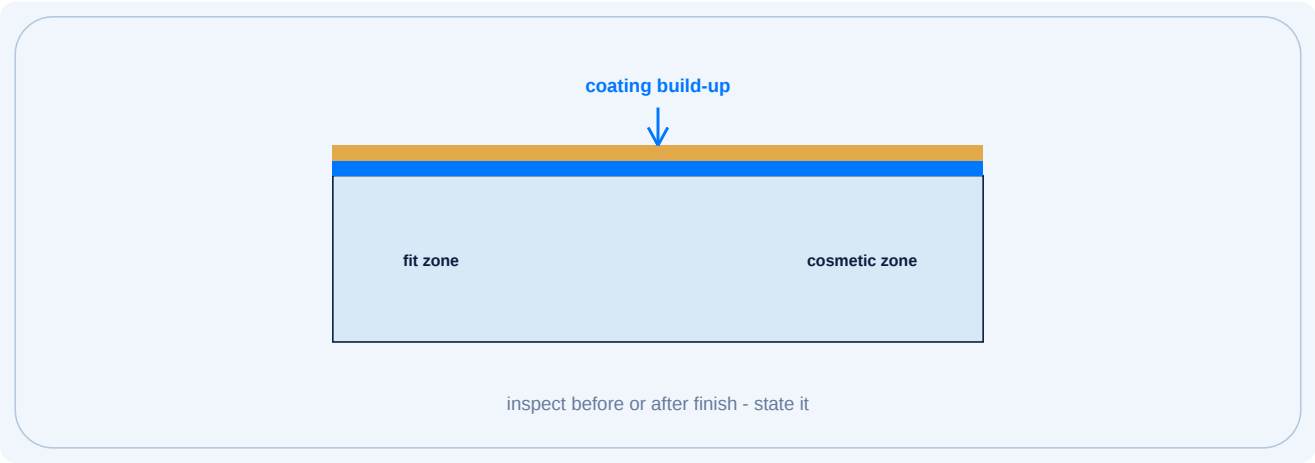
USE WHEN	AVOID
Keep the approach clear and support the hole zone.	A tool can break through a thin wall or porous area.

PROCESS CONTROL	Identify holes that are drilled, reamed, bored or tapped before supplier quotation.
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DIE CAST PARTS FOR POST-MACHINING

Seals need flatness, width and a clean flash-free path.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Land width	Provide a machined land wider than the seal contact.	A narrow land can leak after tolerance stack-up.
Flatness	Tie flatness to the final datum.	As-cast waviness can remain after partial machining.
Finish	State roughness and coating condition.	Coating build-up can change compression or fit.

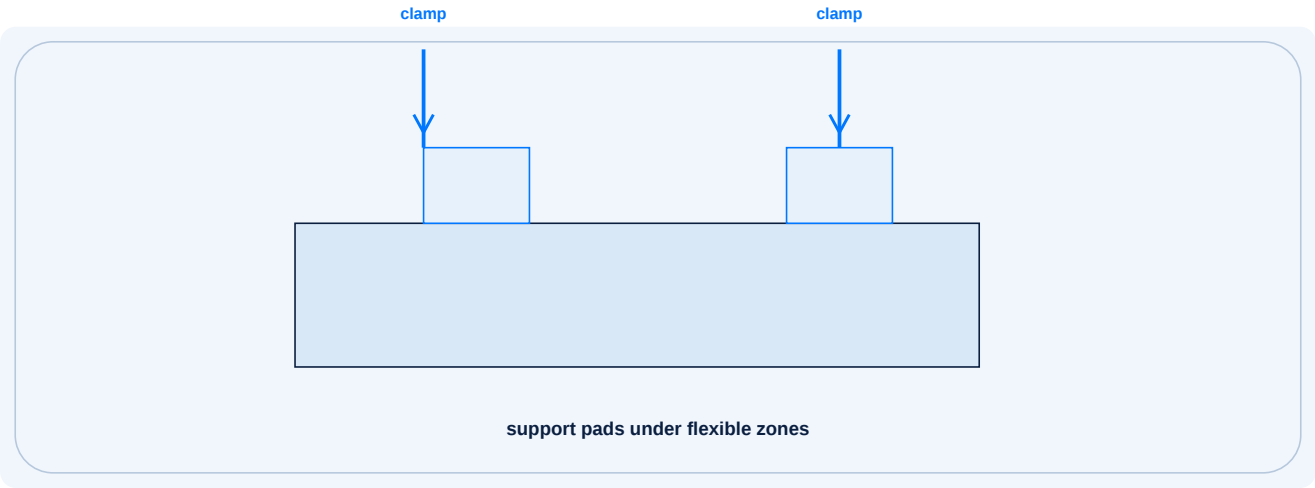
USE WHEN	AVOID
Provide a machined land wider than the seal contact.	A narrow land can leak after tolerance stack-up.

PROCESS CONTROL	Review the sealing land, machining stock and inspection gauge as one requirement.
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DIE CAST PARTS FOR POST-MACHINING

The fixture defines the final repeatability of post-machining.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Clamp zone	Clamp over supported cast material.	Over-restraint can bend the part.
Locators	Use functional datums and allow thermal release.	Point contact can create rocking or chatter.
Access	Keep tools and gauges away from clamps.	A hidden face cannot be inspected consistently.

USE WHEN

Clamp over supported cast material.

AVOID

Over-restraint can bend the part.

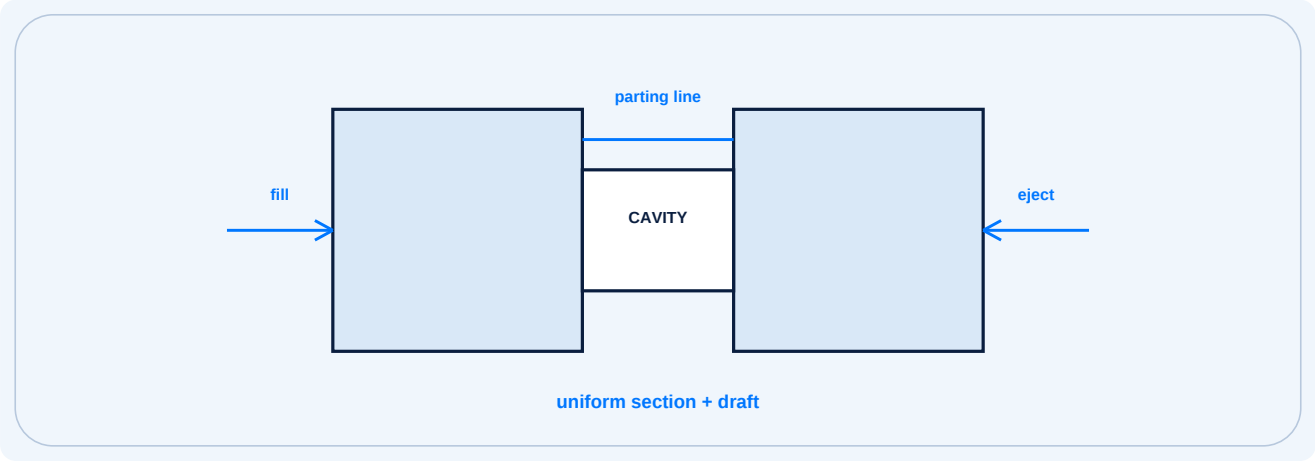
PROCESS CONTROL

Request a fixture sketch for flexible, thin-wall or multi-operation castings.

DIE CAST PARTS FOR POST-MACHINING

Machining can open hidden defects that were not visible as-cast.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Heavy section	Replace mass with ribs or cores.	Hot spots increase shrink and porosity.
Pressure zone	Identify leak or pressure-critical areas.	A repaired cosmetic surface may still leak.
Stock	Leave enough material without entering a defect zone.	Final machining can expose pores or inclusions.

USE WHEN

Replace mass with ribs or cores.

AVOID

Hot spots increase shrink and porosity.

PROCESS CONTROL

Define porosity, leakage and repair acceptance before tooling approval.

DIE CAST PARTS FOR POST-MACHINING

The inspection plan should mirror the machining sequence.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Condition	State temperature, restraint and finish condition.	Thermal or coating changes can consume the limit.
Datum logic	Use final functional datums for fit features.	Cast edges can vary between lots.
Report	Link size, process, lot and tool condition.	A bare result is not enough for root-cause work.

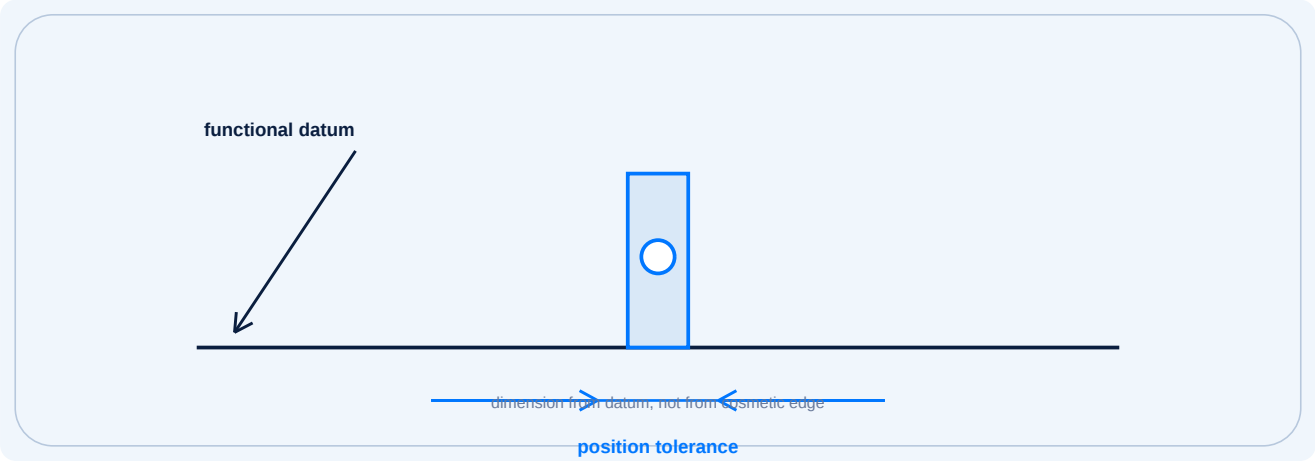
USE WHEN	AVOID
State temperature, restraint and finish condition.	Thermal or coating changes can consume the limit.

PROCESS CONTROL	Approve the first-article report format before production start.
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DIE CAST PARTS FOR POST-MACHINING

Use a controlled review before committing die and fixture cost.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Drawing	Show cast and final dimensions separately.	Supplier may assume the wrong operation.
Model	Mark stock, datum pads and no-machining zones.	Hidden intent creates rework.
Approval	Assign open actions and due dates.	Unowned changes delay release.

USE WHEN	AVOID
Show cast and final dimensions separately.	Supplier may assume the wrong operation.

PROCESS CONTROL	Send the drawing, 3D model, quantity and finish requirement for engineering feedback.
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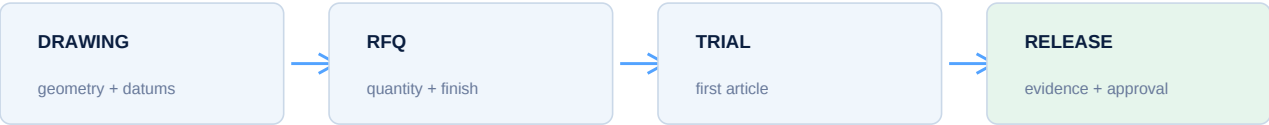
DIE CAST PARTS FOR POST-MACHINING

Drawing review checklist before RFQ or production release

RELEASE CHECKLIST

- ☐ Primary machining datums are stable and accessible.
- ☐ Machining stock is shown on the casting drawing.
- ☐ Holes are protected from breakthrough and porosity.
- ☐ Clamp pads or support ribs are included.
- ☐ Sealing lands remain wide after machining.
- ☐ Tool and gauge approach directions are clear.
- ☐ Final datums differ deliberately from cast edges.
- ☐ Inspection condition before or after finishing is stated.
- ☐ Casting and machining tolerances are separated.
- ☐ Fixture concept has been reviewed.

RELEASE PATH



DECISION RECORD

Record the drawing revision, open question, owner, target date and final customer decision in the related checklist workbook.

DIE CAST PARTS FOR POST-MACHINING

RFQ and release worksheet

DRAWING INPUTS

Part number	Revision	Process
Alloy / temper	Quantity	Minimum feature
General tolerance	Critical tolerance	Critical datum
Finish	Inspection condition	Target date

CUSTOMER / SUPPLIER ACTION

Action	Owner	Due date	Decision / evidence

ENGINEERING SUPPORT

Send the 2D drawing, 3D model, quantity and finish requirement for a practical design review.

baosongprecision.com/contact-us/