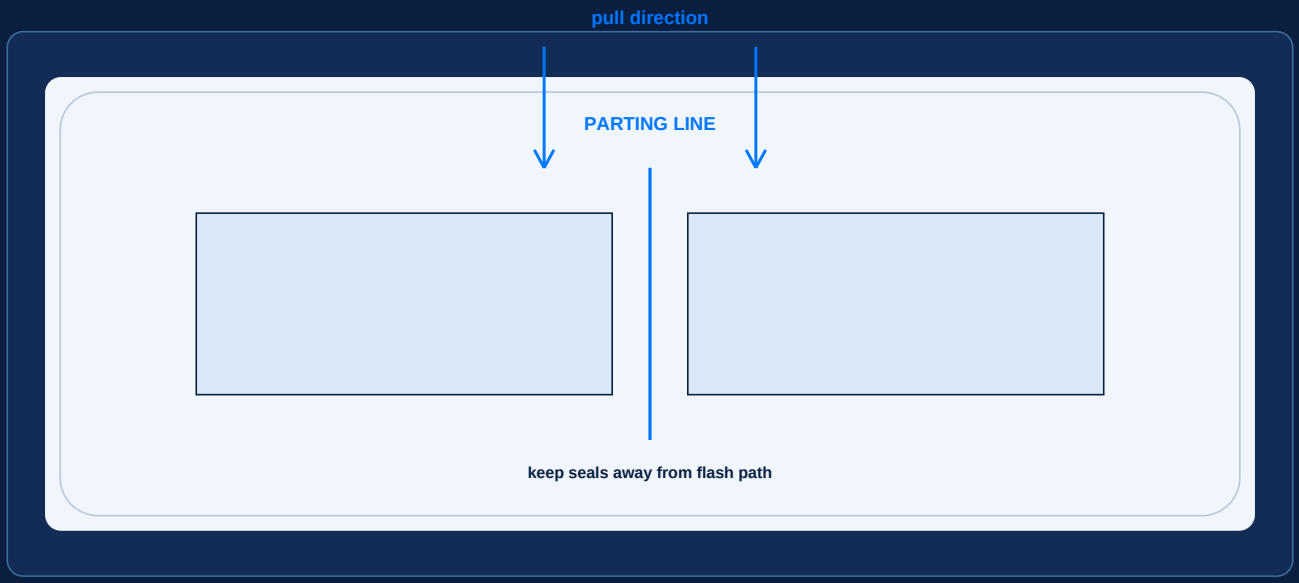
BAOSONG PRECISION

WALL, DRAFT & PARTING LINE GUIDE

Reference guide for stable cast geometry and predictable tooling outcomes



USE THIS GUIDE TO

coordinate three connected decisions before the die is released.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Design logic and guide map

ENGINEERING REFERENCE

START WITH FUNCTION

Choose the pull direction, then balance wall mass, draft, texture, parting, flash and ejection.

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

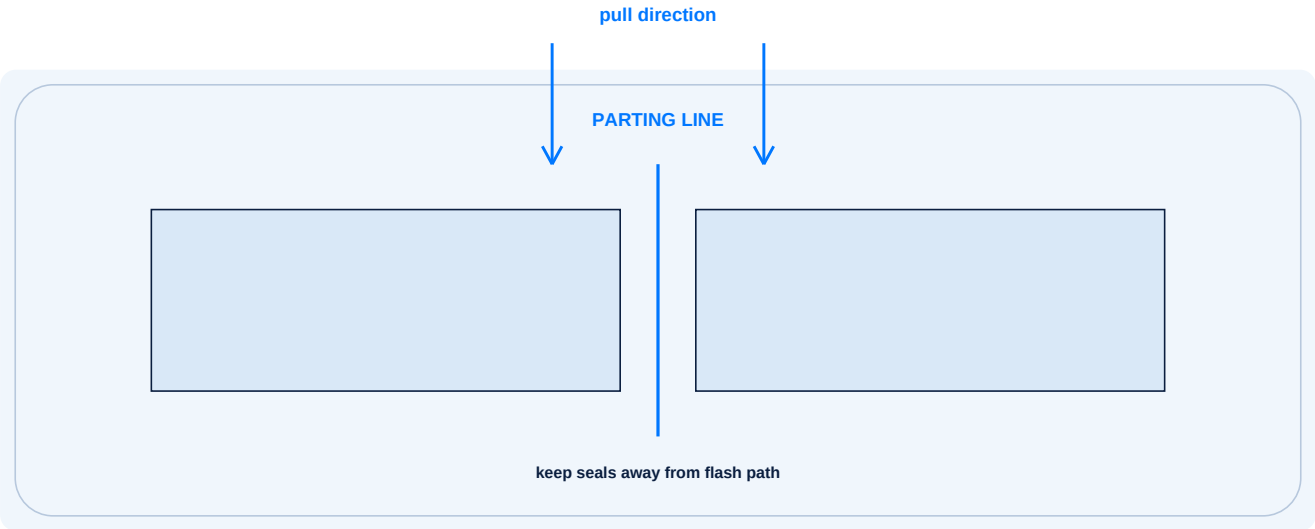
Section	Topic	Practical result
01	Three decisions	See wall, draft and parting as one system.
02	Wall transitions	Use ribs and gradual blends instead of heavy masses.
03	Draft by surface	Increase draft for depth, texture and cosmetic pull.
04	Parting line	Keep flash and mismatch away from function.
05	Texture and finish	Treat texture as a draft and cosmetic requirement.
06	Ejection and trim	Reserve marks and flash clean-up access.
07	Tolerances	Set limits from the process and datum condition.
08	Drawing review	Record exceptions and supplier feedback.

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

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

A change to one often changes the other two.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Wall	Keep sections balanced and transitions gradual.	Heavy mass creates shrink and distortion.
Draft	Align draft with the opening direction and texture.	Low draft increases drag and scuffing.
Parting	Keep line and flash away from function.	A visible line can become a cosmetic rejection.

USE WHEN

Keep sections balanced and transitions gradual.

AVOID

Heavy mass creates shrink and distortion.

PROCESS CONTROL

Freeze pull direction, wall strategy and parting intent together, not as separate late notes.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Ribs and fillets help material flow and reduce hot spots.

DESIGN PRINCIPLE

PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Transition	Blend changes in wall thickness.	Abrupt transitions create local shrink and stress.
Rib	Use a rib to add stiffness without a solid pad.	A thick rib can still behave like heavy mass.
Fillet	Round wall-to-floor and wall-to-rib junctions.	Sharp internal corners reduce flow stability.

USE WHEN

Blend changes in wall thickness.

AVOID

Abrupt transitions create local shrink and stress.

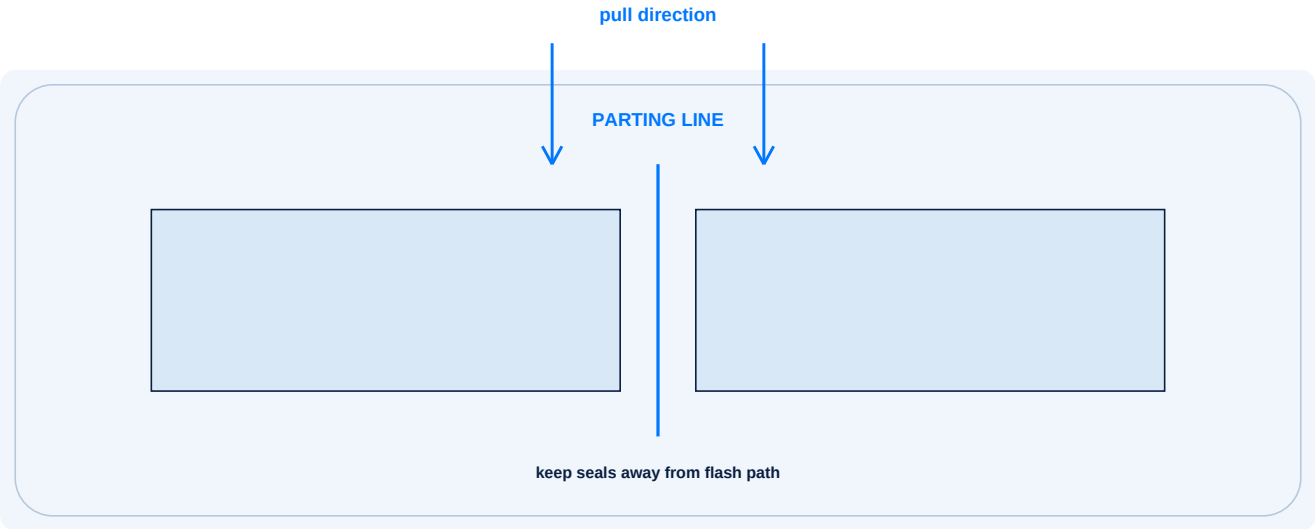
PROCESS CONTROL

Show minimum wall and transition intent on the section or detail view.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Draft is part of the surface specification.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Smooth wall	Use draft compatible with the pull direction.	A near-zero wall can drag during ejection.
Texture	Add extra draft for deep texture or grain.	Texture pull can damage appearance.
Core	Review internal draft and core access.	Internal surfaces can be harder to repair after tool release.

USE WHEN

Use draft compatible with the pull direction.

AVOID

A near-zero wall can drag during ejection.

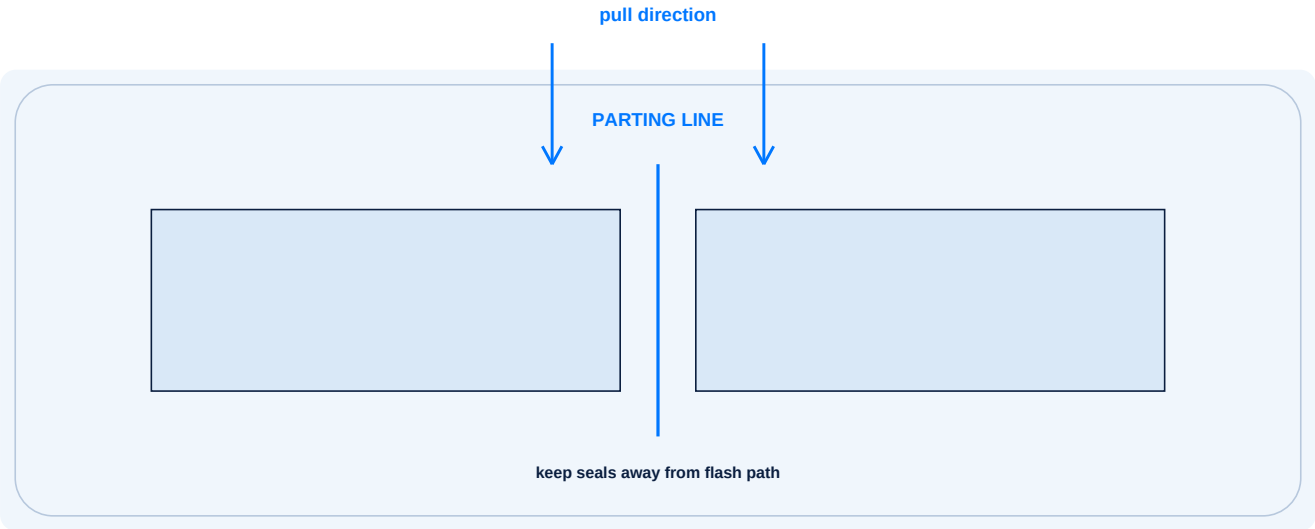
PROCESS CONTROL

State draft by surface group and note texture assumptions before quoting the die.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

The line affects cosmetic review, seals and machining datums.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Cosmetic face	Keep the line off primary viewing faces.	Mismatch or flash can fail appearance approval.
Seal	Keep flash path away from sealing land.	Trim variation can create leakage or high spots.
Datum	Prefer a machined or stable reference surface.	A parting witness is a poor precision datum.

USE WHEN

Keep the line off primary viewing faces.

AVOID

Mismatch or flash can fail appearance approval.

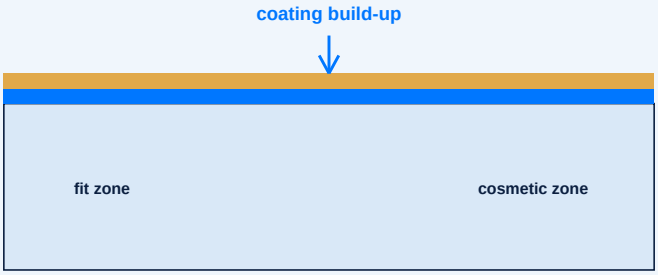
PROCESS CONTROL

Mark the proposed line and define clean-up limits before tooling approval.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Texture changes release, appearance and inspection conditions.

DESIGN PRINCIPLE



inspect before or after finish - state it

PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Texture depth	Match texture depth to draft and pull direction.	Deep texture can tear or show uneven gloss.
Cosmetic zone	Set viewing distance and approved sample.	Unclear viewing conditions create subjective rejects.
Machining zone	Separate as-cast texture from machined faces.	A finish note cannot override a functional fit.

USE WHEN

Match texture depth to draft and pull direction.

AVOID

Deep texture can tear or show uneven gloss.

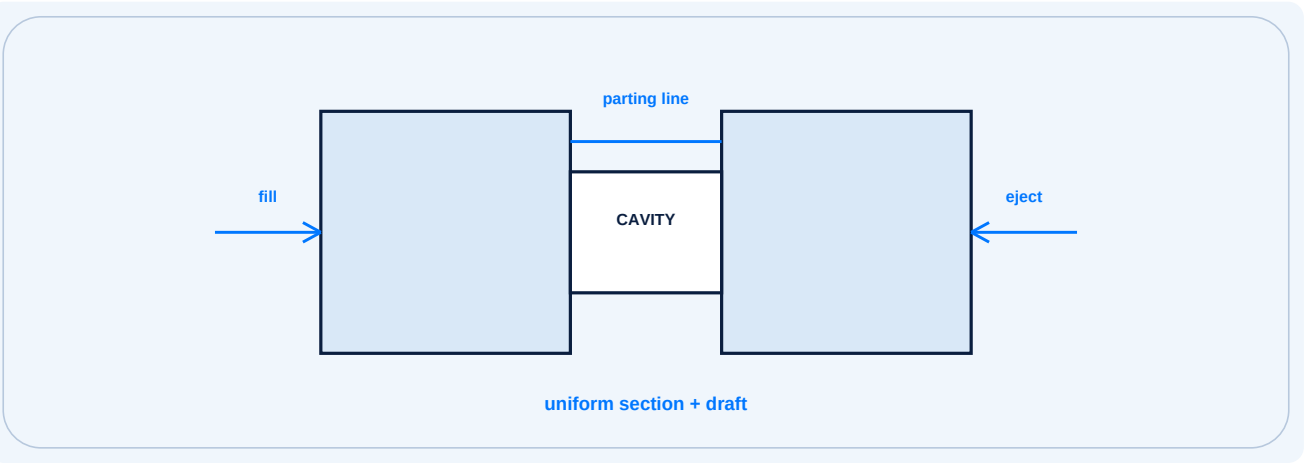
PROCESS CONTROL

Confirm texture, draft and cosmetic standards with an approved sample.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Ejection, trim and venting must be serviceable in production.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Ejector mark	Keep marks off seals and appearance zones.	Witness marks can block assembly.
Trim path	Leave room to remove flash safely.	Hidden flash becomes a recurring defect.
Vent	Protect end-of-fill and vent areas.	Blocked vents can create cold shut or gas marks.

USE WHEN

Keep marks off seals and appearance zones.

AVOID

Witness marks can block assembly.

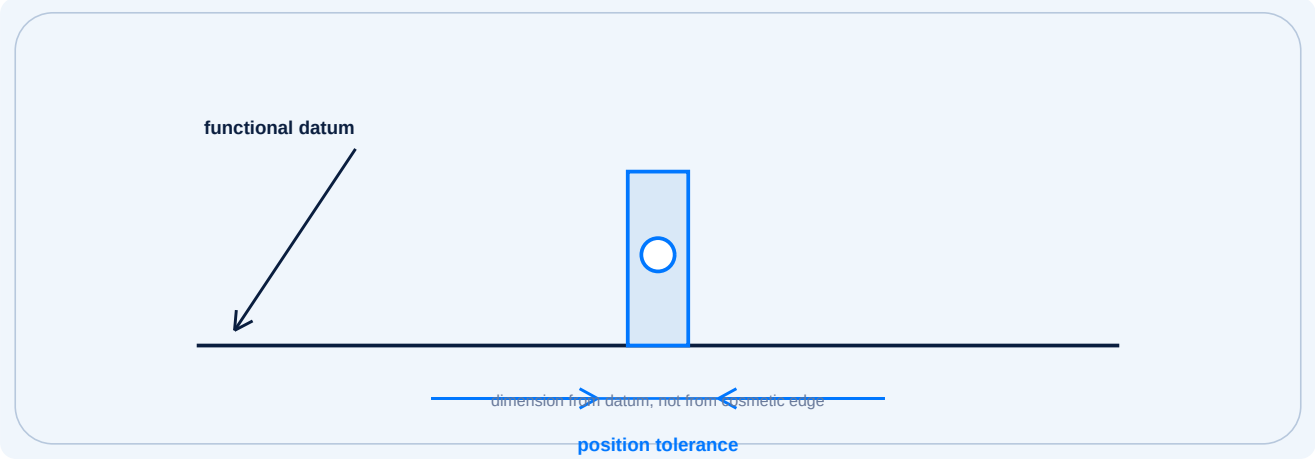
PROCESS CONTROL

Review ejection, trim and vent locations together with the parting line.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Tolerance is only meaningful with a condition and inspection method.

DESIGN PRINCIPLE



PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
As-cast	Use practical limits by feature and span.	Tight as-cast limits can increase tool corrections.
Machined	Tie fit features to functional datums.	A witness line or cast edge can move the reference.
Inspection	State free-state or restrained condition.	Unclear restraint makes results non-repeatable.

USE WHEN

Use practical limits by feature and span.

AVOID

Tight as-cast limits can increase tool corrections.

PROCESS CONTROL

Separate general, critical, cosmetic and finished-condition requirements in the drawing.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

When function forces low draft, thin wall or visible line, document the trade-off.

DESIGN PRINCIPLE

PRACTICAL DESIGN CHECKS

Feature / condition	Useful action	Risk / decision
Exception	State the reason and affected zone.	Unrecorded exceptions become supplier disputes.
Evidence	Reference sample, section view or test record.	A note without evidence is hard to enforce.
Approval	Assign owner and closure date.	Open tooling decisions can delay release.

USE WHEN

State the reason and affected zone.

AVOID

Unrecorded exceptions become supplier disputes.

PROCESS CONTROL

Use the review checklist and supplier feedback to close the last tooling assumptions.

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

Drawing review checklist before RFQ or production release

RELEASE CHECKLIST

- [ ] Pull direction is shown in the review model.
- [ ] Minimum wall and transition rules are defined.
- [ ] Draft is specified by surface group.
- [ ] Texture and grain direction are included where needed.
- [ ] Proposed parting line is marked.
- [ ] Seals, fits and cosmetic faces are clear of flash.
- [ ] Ejector and trim zones are accepted.
- [ ] Machining stock and porosity risk are reviewed.
- [ ] Inspection can reach critical features.
- [ ] Exceptions are documented with supplier feedback.

RELEASE PATH

DRAWING
geometry + datums

→

RFQ
quantity + finish

→

TRIAL
first article

→

RELEASE
evidence + approval

DECISION RECORD

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

WALL THICKNESS, DRAFT ANGLE & PARTING LINE

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/