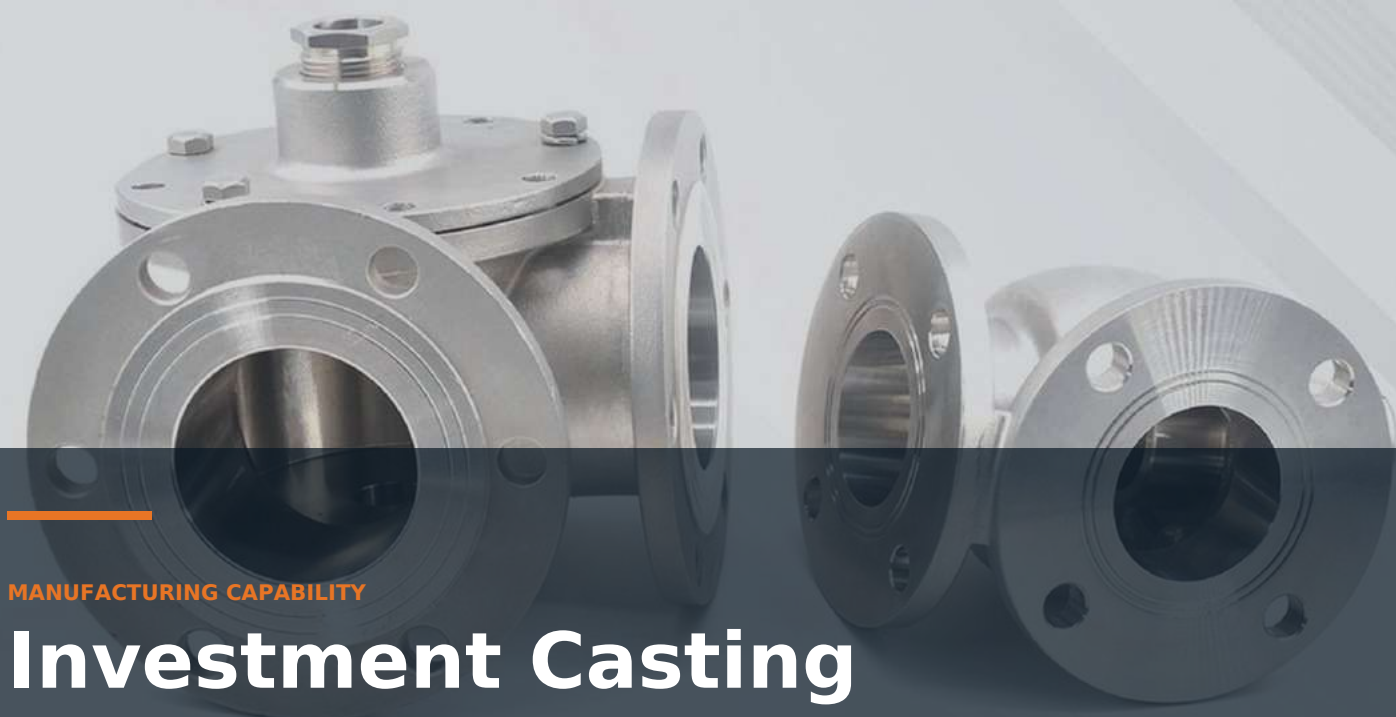


pump head



MANUFACTURING CAPABILITY

Investment Casting

Complex metal components with near-net-shape geometry, engineered alloys, CNC finishing and inspection support

WHAT THIS PDF COVERS

Wax tooling & shell building

Stainless / alloy steel components

Casting + CNC machining

Inspection and project documentation

01 / PROCESS FIT

Where investment casting adds value

The process is often selected when geometry, surface condition and material requirements make machining from solid or rougher casting routes less efficient.

PROCESS FIT

Best suited to complex geometry and engineered alloys where near-net shape...

- Complex external and internal geometry
- Fine features and integrated shapes
- Stainless and engineered alloy components

- Casting plus precision machining programs

01**Complex Shapes**

Supports intricate geometry that can be difficult or expensive to machine from solid.

02**Fine Features**

Useful for detailed contours, thinner sections and integrated features.

03**Near-Net Shape**

Can reduce machining stock when the part is designed appropriately for the process.

04**Material Options**

Supports stainless steels, carbon/alloy steels and project-specific engineering alloys.

BUYER DECISION POINTS

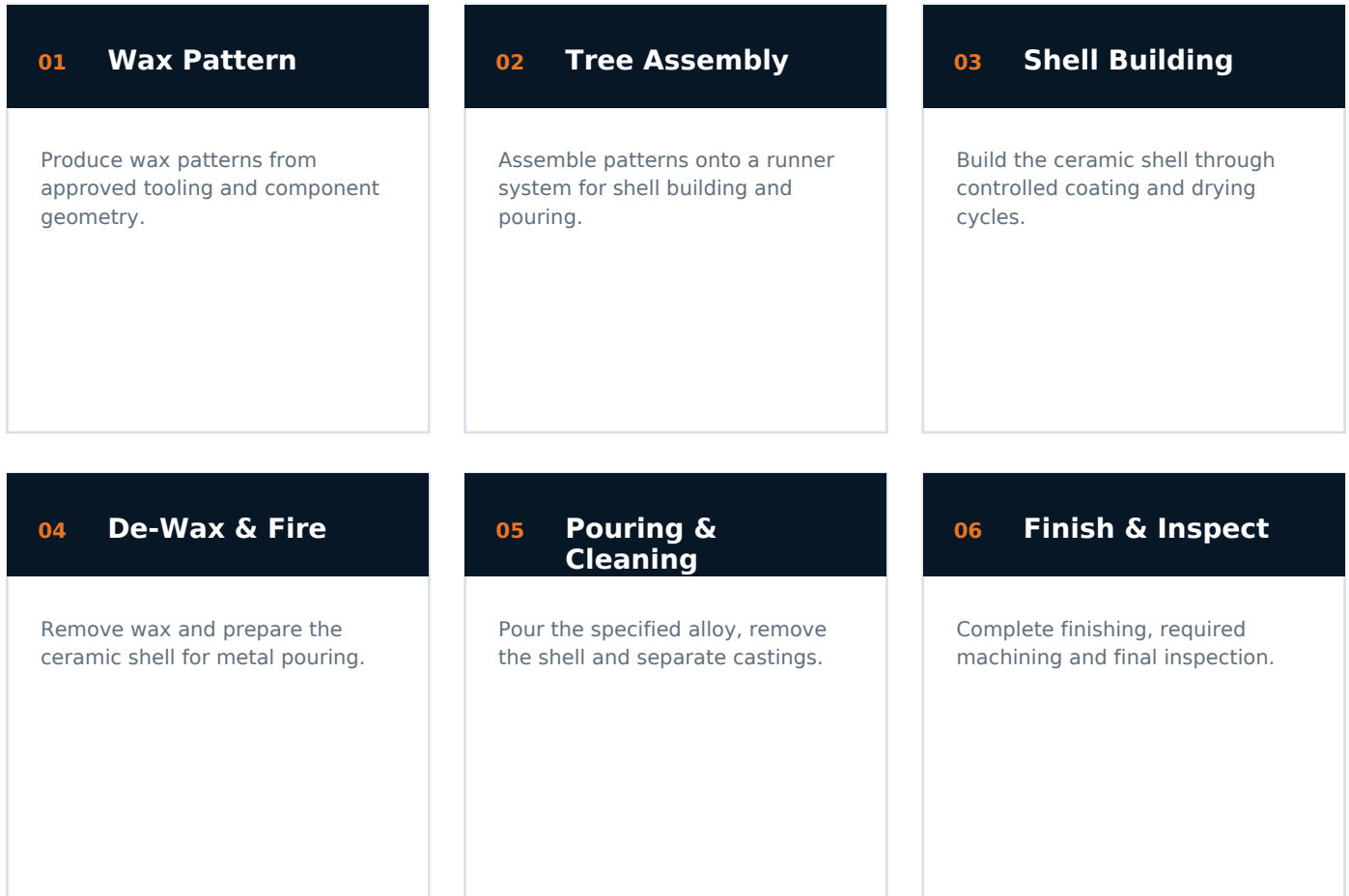
What should be clear before process selection

- Material grade and service environment
- Wall sections, cores and internal geometry
- Critical datums, machining allowances and interfaces
- Surface condition and post-casting finishing
- Development samples, low-volume or repeat production

02 / PROCESS FLOW

From wax pattern to finished metal component

Each stage is controlled around approved geometry, alloy, shell system, finishing and final component requirements.

**BEFORE WE START**

Drawing review connects the process to the finished part.

Confirm drawing revision, material specification, critical surfaces, machining allowance and inspection requirements before tooling or sampling.

03 / MATERIALS & ENGINEERING

Material selection starts with the application

Confirm the exact grade and material standard with the RFQ so alloy, casting and downstream machining can be reviewed together.

Stainless Steels

Corrosion-resistant components for pumps, valves and industrial systems.

Carbon & Alloy Steels

Strength, toughness and wear-focused engineered components.

Tool & Specialty Steels

Selected hardness, wear or special-property requirements.

Aluminum Alloys

Lower-weight parts where appropriate for the project.

Copper Alloys

Selected conductivity, corrosion or alloy-specific applications.

Nickel-Based Alloys

Demanding temperature or corrosion environments when specified.

ENGINEERING REVIEW

What we review before tooling and casting

Requirement	What We Review	Manufacturing Impact
Material	Specified alloy, properties and service conditions	Defines melting, pouring, heat-treatment and performance requirements.
Geometry	Wall sections, cores, internal features and complexity	Influences wax tooling, assembly and shell design.
Dimensions	Critical dimensions, datums and machining allowance	Defines casting control and secondary machining scope.
Surface	As-cast condition, cleaning, finishing and machined areas	Determines post-casting operations and inspection.
Volume	Samples, low-volume or repeat production	Influences tooling and production planning.

04 / REPRESENTATIVE COMPONENTS

Representative precision-cast component geometry

Examples below show component forms that may benefit from precision casting. Final process is confirmed from the drawing and alloy.



01

Polished pump impeller

Representative geometry. Final manufacturing route is confirmed from drawing, alloy and quantity.



02

Brass valve body

Representative geometry. Final manufacturing route is confirmed from drawing, alloy and quantity.



03

Precision cast caps and housings

Representative geometry. Final manufacturing route is confirmed from drawing, alloy and quantity.



04

Stainless elbow / tube fitting

Representative geometry. Final manufacturing route is confirmed from drawing, alloy and quantity.



05

Beverage valve body

Representative geometry. Final manufacturing route is confirmed from drawing, alloy and quantity.



06

Pump impeller and cover

Representative geometry. Final manufacturing route is confirmed from drawing, alloy and quantity.

INTEGRATED MANUFACTURING

Investment casting can be followed by CNC machining of critical bores, threads, sealing faces and datums when the finished drawing requires tighter interfaces.

05 / QUALITY CONTROL

Inspection is integrated into the manufacturing route

Inspection priorities are defined from the drawing, material, casting process and finished component requirements.



QUALITY CHECKPOINTS

01 Drawing Review

Identify critical dimensions, material, machining and special requirements before production.

02 Process Control

Control wax, shell, pouring, cleaning and finishing checkpoints.

03 Dimensional Verification

Check casting geometry and final machined interfaces against the drawing.

INSPECTION & DOCUMENTATION

Quality tools should match the actual risk in the part

- Dimensional inspection for critical features and datums
- Material verification when specified
- Surface, visual and casting-condition checks
- Air-tightness / functional testing when required by the project
- Inspection reports and traceability aligned to customer requirements

06 / PROJECT PROOF

316L Hydraulic Metering Diaphragm Pump Head

Silica-sol investment casting in 316L stainless steel followed by precision machining, deep-hole machining, sealing-surface control and air-tightness testing.



NEXT STEP

Send your drawing for manufacturing review

Send the drawing, CAD model, sample or technical requirements so material, casting, machining and inspection can be reviewed together.

01 2D drawing or 3D model

02 Material grade / alloy

03 Estimated quantity / annual demand

04 Critical dimensions and tolerances

05 Surface, heat treatment or coating requirements

06 Inspection / documentation requirements

DOWNLOAD + REVIEW + RFQ

Use this capability PDF together with your drawing when discussing a new project.

www.thcastings.com