Equipment Overview of an Investment Casting Foundry

By

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GENERAL OBSERVATIONS

- No two foundries are exactly same
- Depends:
  - Casting design
  - Investment casting sector
    - Commercial
    - Medical
    - Aerospace
    - Industrial Gas Turbines (IGT)
  - Alloys
    - Air melt
    - Vacuum
  - Part specifications
  - Automation and Process Control
  - Others
Key assumptions for equipment considerations

- Aerospace low volume casting foundry
- Limited production
- Both airmelt and vacuum melt (Equiax only)
- Standard equipment with necessary automation w/ installation
- Land/building costs not included
- Utility (electric, air, water, environmental control, water tower, steam etc.) costs not included
- Uses standard services from outside vendors:
  - Heat treatment
  - HIP
  - Ceramic core
  - AM patterns
  - Solidification modeling
  - Any special NDT e.g. CT scanning
Wax Area

- Tooling
- Wax soluble core and ceramic core (Out source)
- Wax Melting
- Wax Injection
- Wax Pattern Cleaning/Dressing
- Wax Assembly
- Wax assembly etching
Wax Melter
Wax Injection
Shell Area

- High shear mixer
- Mixing tanks
- Slurry pump
- Weighing scale
- Low volume Shell system including robot dipping, dip tanks, sanders, drying conveyors etc.
Mixing Tanks with High Shear Mixers
Slurry Pump
Dewax and burnout

- High pressure steam autoclave
- Burn out (uses one of the batch furnace in casting area)
High Pressure Steam Autoclave
Wax Burnout Furnace
Casting

- Preheat furnaces
- Airmelt
  - Induction Furnace- 200 lbs
  - Standard hand ladle etc.
  - Rollover Furnace (OPTIONAL)
- Eqiax vacuum melt (50 lbs)
Casting – Vacuum melt

- Equiax melting furnace (50 lbs) with additional 25# coils
- Limits part casting weight - Approx. 20 lbs
- Preheat furnace
Preheat Furnaces
Vacuum Induction Melting Furnace
Casting - Airmelt

- Induction furnace system 200 lbs melting
- Limits part casting weight – Approx. 80 lbs
- Transfer ladle etc.
- Temperature measurement
- Preheat/Burnout furnace
Airmelt Induction Melt Tilt-Pour Furnace
Post casting

- Knock out
- Waterblast
- Sand blast
- Cut off
- Gate Grinding
- Casting finishing stations
Waterblast Cabinet
Manual Cut Off Saw
Plunge Grinder
Non Destructive testing (NDT)
Destructive testing (outside source)
Limited metallurgical laboratory
Non Destructive Testing (NDT)

- 3D Digitizer
- Ultrasonic test
- X-Ray
- FPI- Fluorescent Penetrant Inspection
- CT Scan (OPTIONAL)
Ultrasonic Test
X-Ray
Fluorescent Penetrant Inspection
CT Scan
Questions and comments?
Thank you!

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