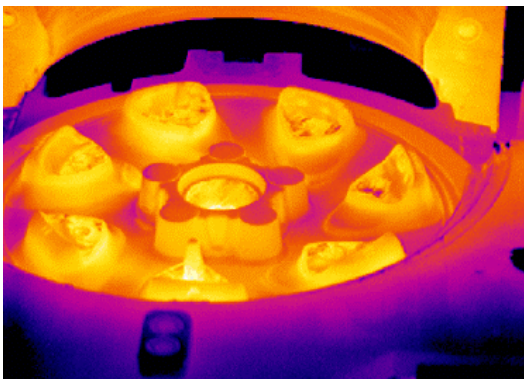
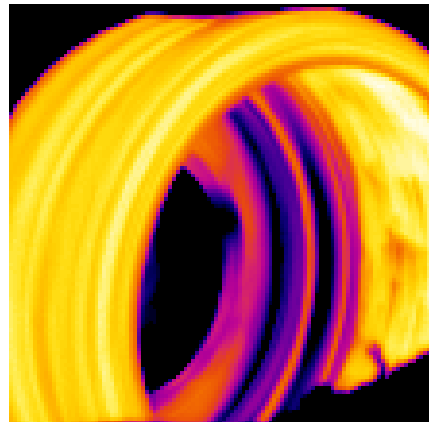


Case Study – FLIR - Thermal Imaging Vision

This process uses a FLIR infrared thermal imaging vision system to inspect heavy equipment brake drums during the preheating and subsequent centrifugal casting processes of manufacturing.

The challenges with automating this inspection process included:

- The part range and variety were huge – there were approximately 125 models of drums ranging in diameter, width, thickness, and physical geometry
- The environment was very hot and dirty and access was limited - molten cast iron from the casting process was over 2500° F – frequent spatters posed a severe threat to all hardware and cables
- The existing controls system was several generations old and incapable of expansion
- The area operators and floor supervisory personnel needed education as to the proper use of this more sophisticated equipment and process
- The requirement and volume of data storage for traceability was extremely high
- The end user had no experience with vision or infrared (IR) thermal imaging – the system had to be simple to own and operate and easy for operators to add new parts numbers and inspection parameters to the system





System Requirements

- Use non-contact measurement on incoming parts to confirm that temperatures are within specification prior to performing sequential processes
- Measure multiple inspection area windows on each part and set adjustable alarm parameters for each via HMI
- Measure temperature of brake hub after casting and monitor molten temperatures
- Run around the clock and with a variety of operators
- Data storage and tracking of a large volume of data in CSV format and export via Ethernet
- New Allen-Bradley ControlLogix PLC and controls system for future expansion of scope
- Import data from existing controls system and other temperature monitoring devices
- Generate serial number and reference all data back to that number for each brake hub
- Supply a rugged and industrial system
- Meet the financial requirements set forth by the customer

Description of the Solution

The system uses a FLIR A320G thermal imaging camera mounted within a cooled enclosure to observe the 2000° F incoming parts and casting process. Data from this camera streams via Ethernet to a remote multi-processor PC. This high-speed data stream is processed using dedicated FLIR software in the PC and the results are then exported to the PLC.

The PLC serves as the data management center for this system. It receives temperature data from multiple other system inputs and then creates a data file containing all of this data for each part. High and Low set-points for each monitored parameter are viewable and adjustable via the system HMI. Each data/part file is then assigned a serial number that is applied to the finished part before it leaves the cell. All of this part and serial number data is stored within the PC and is exported to the customer's intranet system for redundancy. If needed, all part data can be retrieved at a later date using either the serial number for that particular part or the date on which it was manufactured.

Customer Benefits

- Now have thorough traceability for all parts produced in this process
- Now have a controls system and operator interface (HMI) that provides valuable data to floor operators and supervisors and alerts management to undesirable production trends
- Reduced production of and cost of scrapped parts by identifying all non-conforming hubs prior to adding labor and raw materials at casting process
- The flexible and reprogrammable camera & controls system will have a long and useful life and will be suitable for upgrading to include other foundry processes at a later date
- Removal of the human evaluation element from a Critical-To-Quality process

TEC Automation, Inc.

**30 Hickory Springs Industrial Drive
Canton, GA 30115**

**Phone 770-720-3333
www.tec-automation.com**