

Case Study: Custom Motor Solution

Meeting Unique Application Requirements

Hankscraft accomplished a unique custom motor for a leading company in home furnishings. This motor met specific expectations - low power, practically silent, high torque relative to low speed, and a unique mechanical design.

Background

Our customer was developing a product that required a specialized motor solution. Standard motors were too large or underpowered. Other motor manufacturers were not interested in developing a custom motor for this customer, as the project required a significant redesign of standard components for larger motors, or complex designs for smaller motors, that were also underpowered.

Development

Hankscraft developed a motor with a unique mechanical shape that utilized all



Demonstrating Success

This motor's unique shape resulted in a practically silent motor, adding value to our customer's product.



the volume within the assembly to produce the necessary torque. This eliminated the requirement for any gears in the assembly. In theory, this would make a practically silent motor. The following were identified as points of interest in the research and development stage:

- Motor type
- Detent torque
- Holding torque
- Current at holding torque
- Resistance
- Inductance
- Load torque at application speed
- Noise at application speed
- Motor life expectancy
- Mechanical requirements

Execution

Once approved, Hankscraft manufactured samples for testing. Because the holding torque specification was not achieved, a second round of samples were created with updates to the motor windings. (Continued on next page)



The specifications were met in the second round of tests. Hankscraft then worked to improve motor efficiency per customer requests.

After the third sample set and testing were completed and refinements were made to increase the motor length, Hankscraft supported a 100-piece sample order to our customer to validate the prototype design. Our customer approved the prototypes, and Hankscraft began the manufacturing development phase.

The manufacturing development phase included process flow diagrams, Design Failure Mode Effect and Analysis (DFEMA), Process Failure Mode and Effects Analysis (PFEMA), control plan, component drawings, production work instructions, functional inspection test plan, special features list, and all other supporting documentation to support manufacturing. These documents were all reviewed with our customer for feedback throughout the process.

Upon customer approval, a small production "run at rate" was conducted to test the production line's efficiency and capacity. Forty-five samples were pulled from the production run and had a Level 3 Production Part Approval Process (PPAP) conducted. In working through the PPAP, 1 mechanical dimension was slightly out of specification. This specification was negotiated and found to be non-critical. Customer drawings were updated to pass the production run, and the motors received PPAP approval.



Results

The custom motor met the requirements of the application and filled a unique need for our customer. Hankscraft followed a methodical process to gather requirements, create actionable items, create prototypes, and check operation of those prototypes to the agreed standards. Hankscraft entered the next step of manufacturing tooling with high confidence for success without costly changes.



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